## 4.16 WETLANDS

### 4.16.1 Introduction

This chapter explains the jurisdictional authority and wetland regulatory procedures, and describes the methods and procedures used to delineate wetland resource areas along the South Coast Rail alternatives. This chapter also presents the methods used to quantify the direct impacts (both permanent and temporary) to all categories of wetland resource areas, and the methods used to assess secondary and/or indirect impacts to wetland functions and values. Finally, this chapter identifies the goals and opportunities for wetland mitigation, based on regulatory requirements and wetland impacts presented.

The results of an initial analysis of wetland impacts along the South Coast Rail project corridor were presented in the Draft EIS/EIR. The Secretary's Certificate on the DEIR/DEIS required further analysis or discussion on several aspects of wetland impacts in the FEIR. The Certificate stated that:

- "The FEIR should document any revisions to wetland boundaries and project-related impacts based on more detailed field delineations for the proposed Stoughton route, and boundaries as approved by local Conservation Commissions."

- "The FEIR should quantify temporary as well as permanent wetland impacts, for individual project components and cumulatively for the entire project (including stations and layover facilities)."

- "Direct and indirect wetlands impacts related to canopy clearance should be further evaluated in the FEIR."

- "Where there are differences in categorization under state and federal regulations, the FEIR should clarify and differentiate as appropriate. The FEIR should include a summary table with a breakdown of all wetland resource impacts (including BVW, Bank, Riverfront Area, and BLSF) for the entire project (rail, stations/layovers, roadway improvements, and other components) so that the individual resource impacts and the cumulative totals are summarized in one place."

- "The FEIR should include information on the location and volume of BLSF that will be impacted by the project."

- "The FEIR should quantify the total area of Riverfront Area impacted by the project, provide a breakdown of impacts at specific locations, describe how work proposed in riverfront will meet applicable performance standards."

- The FEIR should expand upon the analysis of wetlands functions and values in the DEIR/S to include a more detailed analysis for the proposed Stoughton rail. The FEIR should include narrative descriptions of wetlands functions and values of each wetland impacted directly and indirectly by the proposed project."

### 4.16.2 Resource Definition

The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.[1] These areas are characterized by hydric soils, hydrophytic vegetation, and standing water or saturated soils. Wetlands provide benefits including flood storage, storm protection, ground water recharge, water filtration, and wildlife habitat. A full description of wetland resources, including their function and values, can be found in Section 4.16.2.1. Under MGL, Chapter 131, Section 40, "freshwater wetlands", are wet meadows, marshes, swamps, bogs, areas where groundwater, flowing or standing surface water or ice provide a significant part of the supporting substrate for a plant community for at least 5 months of the year; emergent and submergent plant communities in inland waters; that portion of any bank that touches any inland waters. There are several types of state regulated wetlands including: Bank, Bordering Vegetated Wetlands (BVW), Land under Waterbodies and Waterways (LUW), Land Subject to Flooding (LSF), and Riverfront Area (RA).

Wetland Resource Areas as defined in the Massachusetts WPA and its implementing regulations[2] that occur within the South Coast Rail project corridor include these inland and coastal resource areas:

- Bank;
- Bordering Vegetated Wetlands (BVW);
- Land Under Waterbodies and Waterways (LUW);
- Bordering Land Subject to Flooding (BLSF);
- Isolated Land Subject to Flooding (ILSF);
- Riverfront Area (RA);
- Land Subject to Coastal Storm Flowage (LSCSF); and
- Coastal Bank.

This section provides a brief description of the regulatory criteria defining each of these resources.

**Bank**—As defined in 310 CMR 10.54 (2)(a)&(c), a Bank is "*... the portion of the land surface that normally abuts and confines a waterbody.*" This land surface "*... may be partially or totally vegetated, or it may be comprised of exposed soil, gravel, or stone.*" "*The upper boundary of a Bank is delineated as the first observable break in the slope or the mean annual flood level, whichever is lower.*" Bank is present between a perennial river, lake or pond and the adjacent BVW or upland and within intermittent streams.

[1] Code of Federal Regulations (CFR) Title 33, Part 328.3(b), Definition of Waters of the United States.
[2] 310 CMR 10.00 et seq. http://www.lawlib.state.ma.us/source/mass/cmr/cmrtext/310CMR10.pdf, accessed June 1, 2012.

The regulations define a stream as "*a body of running water which moves within, into or out of an Area subject to protection of the Act… Such a body of running water that does not flow throughout the year (i.e. intermittent) is a stream except for that portion upgradient of all bogs, swamps, wet meadows and marshes.*" Accordingly, only those intermittent channels that convey water in response to a hydraulic gradient and those that are within or downgradient of BVW contain the resource area Bank.

**Bordering Vegetated Wetlands (BVW)**—As defined in 310 CMR 10.55(2)(a), "*Bordering Vegetated Wetlands are freshwater wetlands which border on creeks, rivers, streams, ponds and lakes.*" Bordering Vegetated Wetland (BVW) boundaries are defined in 310 CMR 10.55(2)(c) as "*... the line within which 50 percent or more of the vegetational community consists of wetland plants and saturated or inundated conditions exist.*"

**Land Under Waterbodies and Waterways (LUW)**—Land under Waterbodies and Waterways "*is the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of Land Under Waterbodies and Waterways is the mean annual low water level*" [310 CMR 10.56 (2)(a)&(c)].

**Vernal Pools**—Vernal pools are not regulated under the WPA as a wetland resource area. Vernal pool habitats, as defined in 310 CMR 10.04, are "confined basin depressions, at least in most years, holding water for a minimum of two continuous months during the spring and/or summer," and must be within a regulated wetland resource area to be protected under the WPA. Vernal pool habitat includes the certified pool itself and all land within 100 feet of the pool that is also within a resource area. The presence of vernal pool habitat indicates that the wetland resource area provides important wildlife habitat. Vernal pools are described in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*. Vernal pools discussed in this document are certified, potential, and field verified vernal pools located in wetlands within 750 feet of the right-of-way.

**Bordering Land Subject to Flooding (BLSF)**—"*Bordering Land Subject to Flooding 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 waterbodies; where a bordering vegetated wetland occurs, it extends from said wetland*" [310 CMR 10.57(2)(a)]. "*The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm… determined by reference to the most recently available flood profile data prepared for the community within which the work is proposed… under the Federal Emergency Mapping Agency*…" [310 CMR 10.57(2)(c)].

**Isolated Land Subject to Flooding (ILSF)**—"*Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or outlet. It is an area which at least once a year confines standing water to a volume of one quarter acre-foot and an average depth of six inches*" [310 CMR 10.57(1)(b)].

**Riverfront Area (RA)**—Riverfront Area is "*the area of land between a [perennial] river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away.*" [310 CMR 10.58 (2)(a)3]. Riverfront Area occurs at all locations where the right-of-way crosses a perennial watercourse, or is within 200 feet of a perennial watercourse. The regulatory presumptions regarding the intermittent or perennial nature state that "*if a river or stream is shown as intermittent or not shown on the current USGS map, or more recent map provided by the Department, an assertion that it is perennial must be supported by evidence…*" [310 CMR 10.58(2)(1)(a)].

**Land Subject to Coastal Storm Flowage (LCSCF)**—"*Land Subject to Coastal Storm Flowage means land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater.*" [310 CMR 10.04].

**Coastal Bank**—"*Coastal Bank means the seaward face or side of any elevated landform, other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland.*" [310 CMR 10.30].

Wetland resources in Massachusetts are regulated under local, state, and federal programs. The following section describes the regulatory context of the federal Clean Water Act (CWA), Massachusetts Wetlands Protection Act (the Act) and the local Bylaws.

### 4.16.3 Regulatory Context

The South Coast Rail project requires regulatory review under federal and state wetlands regulatory programs, as described below.

#### 4.16.3.1 Section 404 of the Federal Clean Water Act

Section 404 of the Clean Water Act requires a Department of the Army (DA) permit for the discharge of dredged or fill material into waters of the United States,[3] including adjacent wetlands. The South Coast Rail project would require the issuance of an Individual Section 404 Permit (i.e., would not be eligible for the Massachusetts General Permit) as it would result in the loss of more than one acre of waters of the U.S. (including adjacent wetlands).

#### 4.16.3.2 Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 requires a DA permit for all work or structures (except bridges) in, under or over navigable waters of the United States.[4] In New England, for purposes of Section 10, navigable waters of the United States are those subject to the ebb and flow of the tide and a few of the major waterways used (presently or historically) to transport goods or services sold in interstate or foreign commerce. The Taunton River is a navigable waterway to the South Street East Bridge, in Taunton. It would be crossed by the Stoughton Alternative. In addition, the Mill River is navigable from its confluence with the Taunton River upstream to the Spring Street bridge in Taunton. It also would be crossed by the Stoughton Alternative.

Pursuant to a the General Bridge Act of 1946, 33 U.S.C. 525 et seq., the United States Coast Guard regulates bridges over waters regulated under Section 10. MassDOT would be required to obtain a bridge permit from the Coast Guard for reconstruction of bridges over the Taunton or Mill Rivers. The discharge of fill material associated with supporting structures such as bridge abutments would also be regulated by the Corps under the Corps' Section 404 authority noted above.

#### 4.16.3.3 Section 401 of the Clean Water Act (Water Quality Certification)

Section 401 of the Clean Water Act (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to

[3] Code of Federal Regulations (CFR) Title 33, Part 328.3(a), Definition of Waters of the United States.
[4] Code of Federal Regulations (CFR) Title 33, Part 329.4, Definition of Navigable Waters of the United States.

obtain a certification from the State in which the discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards.[5] In addition, the Massachusetts Department of Environmental Protection (DEP) is required to issue Water Quality Certifications for projects that result in discharge of fill to a wetland or waterbody, pursuant to the Massachusetts Clean Waters Act (M.G.L. c. 21 §§ 26 – 53). The South Coast Rail project would require issuance of an individual Section 401 Water Quality Certification because it would result in the loss of more than 5,000 square feet of wetlands subject to federal jurisdiction.

#### 4.16.3.4 Coastal Zone Management

Section 307(c) of the Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1456(c)), requires any non-federal applicant for a federal license or permit to conduct an activity affecting land or water uses in the state's coastal zone to furnish a certification that the proposed activity will comply with the state's coastal zone management program. Generally, no permit will be issued until the state has concurred with the non-federal applicant's certification. This provision becomes effective upon approval by the Secretary of Commerce of the state's coastal zone management program[6]. Accordingly, coastal zone consistency certification must be conferred by the Massachusetts Office of Coastal Zone Management before MassDOT can proceed with activities authorized by any DA permit.

The Coastal Zone Management (CZM) program has a series of policies that apply to activities within the Massachusetts Coastal Zone. Projects subject to federal consistency review (particularly activities subject to permitting under the Clean Water Act, Section 404) must be consistent with the CZM program policies. Under the Massachusetts CZM program all MEPA projects are reviewed for consistency with the management principles of CZM, which are intended as guidance for any activities proposed in the Coastal Zone. The overall goal of coastal zone management is to protect coastal resources from contamination or degradation, prevent the creation of coastal hazards, and maximize the public use and benefit of coastal areas.

Additional information regarding compliance with the Coastal Zone Management program can be found in Chapter 4.18, *Coastal Zone Consistency and Chapter 91*.

Table 4.16-1 identifies the municipalities in the study area that are at least partially within the Massachusetts Coastal Zone.

**Table 4.16-1 Study Area Communities Within the Coastal Zone**

| Municipalities Within Coastal Zone | | |
|---|---|---|
| Acushnet | Fall River | Rehoboth |
| Berkley | Freetown | Somerset |
| Dartmouth | Mattapoisett | Swansea |
| Dighton | New Bedford | Westport |
| Fairhaven | | |

[5] Code of Federal Regulations (CFR) Title 33, Part 320.3(a), General Regulatory Policies.
[6] Code of Federal Regulations (CFR) Title 33, Part 320.3(b), General Regulatory Policies.

#### 4.16.3.5 Massachusetts Wetlands Protection Act

The Massachusetts Wetlands Protection Act (WPA) regulations establish performance standards for work proposed within each of the resource areas, and require review of any work proposed within 100 feet of a wetland resource to determine if that work will result in the alteration of wetland resources. "Alteration" is defined to "include a change in vegetation, hydrology, or water quality of the wetland."

##### Outstanding Resource Waters

Massachusetts regulations designate certain areas as Outstanding Resource Waters (ORWs), "as determined by their outstanding socioeconomic, recreational, ecological and/or aesthetic values." ORWs in Massachusetts include public drinking water supplies, as well as tributaries to these supplies. Vernal pools are also designated as ORWs.

#### 4.16.3.6 Local Wetland Bylaws and Ordinances

Several communities along the right-of-way corridors enforce local wetlands protection bylaws that may further regulate many of these resource areas. The United States Army Corps of Engineers (Corps) as a federal agency is not subject to local laws and regulations. As a state agency, MassDOT is exempt from local bylaws and local bylaws are not addressed in this document.

### 4.16.4 Regulatory Procedures and Definitions

#### 4.16.4.1 Wetland Identification During the DEIS/DEIR

This section describes the initial efforts to document existing wetlands adjacent to the South Coast Rail alternatives presented in the DEIS/DEIR.

##### Methodology

Each alternative corridor was assessed for the presence of wetland resources within and adjacent to the right-of-way. In addition to the right-of-way, each of the proposed station sites and layover facilities was evaluated for the presence of wetlands on-site and on abutting properties. Three sources of information were used to determine the approximate limits of existing wetlands, their cover type and their connectivity to larger wetland systems. The sources of information included (1) existing information available from previous Orders of Resource Area Delineation (ORADs) that were issued in 2000-2002, (2) GIS mapping using data available from MassGIS[7], and (3) field verification in selected locations.

The Information from existing reports had not been field reviewed by the Corps, was more than three years old, and was not available for the Attleboro or Rapid Bus alternatives. Therefore, the approximate size and cover type of each wetland used in the DEIS/DEIR impacts analysis for all alternatives was created from Geographic Information Systems (GIS) mapping that was further modified through review of features visible on aerial photographs and topographic maps. In addition, aerial photographs in conjunction with field verification were used for the proposed station sites, the Attleboro Bypass, and the Whittenton Secondary.

[7] MassGIS Data - DEP Wetlands (1:12,000).

During scoping, the U.S. Army Corps of Engineers' New England District used the Highway Methodology Workbook Supplement[8] to evaluate existing wetlands and their functions and values. This approach was specifically recommended by USEPA, and was adopted by the Corps as an initial screening tool for purposes of evaluating impacts to wetlands likely to result from the alternatives under consideration by MassDOT. During early stages of the Highway Methodology[9] a large number of alternatives may be under consideration and only limited field observations are made in order to screen out those that are obviously either not practicable or are clearly not the Least Environmentally Practicable Alternative (LEDPA). At this stage existing information is typically very general and wetland boundaries are defined as a composite of National Wetland Inventory as devised by Cowardin et al.,[10] and Natural Resource Conservation Service maps. Cover types according to the Cowardin system and key wetland functions and values can be derived from the literature, limited field investigations, or public input. Additional field work sufficient to satisfy the determination of the LEDPA is usually required. Wetland evaluation forms are generally completed and the data is presented graphically. After the LEDPA is determined, it is subjected to a three parameter delineation of the affected wetlands using the required Corps method and data sheets.

***Existing Information***

Extensive existing information for wetland resources along the right-of-way for the Stoughton Alternative and the Southern Triangle was available from information filed in the 1999 Draft EIR, the 2002 Final EIR, and Abbreviated Notices of Resource Area Delineation (ANRADs) filed with the local conservation commissions in the study area.

In the 2002 Final EIR, all Bordering Vegetated Wetlands (BVW) and Bank within or adjacent to the right-of-way were delineated for The Stoughton Alternative. The Conservation Commissions of Canton, Stoughton, Easton, Raynham, and Taunton reviewed ANRADs submitted for the wetland resource areas that occur within their communities. Canton, Stoughton, Raynham, and Taunton approved the limit of resource areas defined in the ANRADs submitted to the Commissions, while the Easton ANRAD was reviewed and approved by the Department of Environmental Protection (DEP) Southeast Regional office. ANRADs were also submitted to the remaining towns and cities for The Stoughton Alternative; however the review was not completed. The information available through these past filings includes wetland cover type, approximate size, and field-delineated wetland boundaries. Wetland boundaries were flagged between 1997 and 2001 and represent the limit of wetland resources that were present at that time. This information combined with the modified GIS layer (described below) provided the starting point for the wetland information presented in the figures included in the DEIS/DEIR.

***GIS Mapping***

The MassGIS DEP Wetlands layer, last updated in April 2007, provided an underlying data set for defining wetland resources for each of the analytical approaches. This layer provided approximate location, general vegetation cover type, and size of wetland resources, including hydrologic connections

[8] USACE. 1999. *The Highway Methodology Workbook Supplement, Wetland Functions and Values - a Descriptive Approach*. New England District, U.S. Army Corps of Engineers, NAEEP-360-1-30a. Concord, MA.

[9] USACE. 1993. *The Highway Methodology Workbook. Integrating Corps Section 404 Permit Requirements with the NEPA EIS Process.* New England District, U.S. Army Corps of Engineers, NEDEP-360-1-30. Concord, MA.

[10] Cowardin, L.M., V. Carter V., F.C. Golet, E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Report No. FWS/OBS/-79/31.Washington, D.C.

and stream characteristics. Information contained in this layer was interpreted from 1:12,000 scale, stereo color-infrared (CIR) photography by staff at the University of Massachusetts (UMASS), Amherst.

Wetland resources along the right-of-way were initially identified using this data layer. Upon closer examination of the individual wetland polygons, it became apparent through visible features shown on aerial photographs that portions of the individual wetland polygons were not accurate and required modification. Once the wetlands layer was brought into the ESRI ArcMap 9.2 and 9.3 GIS program, aerial photographs obtained through Microsoft Livesearch® were used in conjunction with USGS topographic maps to identify existing polygons that required modification. Further correction and assessment of wetland boundaries was made using the Microsoft Livesearch® bird's-eye view tool, which provides oblique aerial images at varying degrees of resolution. Clear continuation of cover types observed through aerial photographs, instances of open water, visible depressions, and elevation lines were used as a basis to modify polygons to create a more accurate wetlands layer. To the extent possible, cover types were also verified during this process.

Each right-of-way was evaluated for the presence of BLSF through GIS mapping. Federal Emergency Management Agency (FEMA) floodplain maps were used in conjunction with the modified DEP Wetland layers to determine where the 100-year floodplain extended past the boundary of Bank and BVW. BLSF was assumed to occur in such instances.

Riverfront Area was evaluated where the USGS 7.5 Minute map showed a perennial stream crossing the right-of-way. Bank could not be accurately delineated at this scale of resolution.

Due to the limitations of this methodology, no ILSF or non-state federal wetlands were identified using this approach. Wetlands within or adjacent to the right-of-way for the Stoughton and Whittenton Alternatives (Electric and Diesel) were delineated in accordance with the Corps of Engineers Wetlands Delineation Manual, as updated. However, wetland inspections were not able to be performed along the Attleboro Secondary Line, an active rail line, extends from Whittenton Junction to Weir Junction. The majority of this section of track (approximately 1.7 miles) is a densely developed area between Danforth Street and Weir Junction. The remaining stretch of tracks between Whittenton Junction and Danforth Street (approximately 0.7 mile) was assessed using available information.

Mapped vernal pools consist of certified vernal pools and potential vernal pools as identified in the 2010 Natural Heritage and Endangered Species Program (NHESP) Natural Heritage Atlas as well as vernal pools that were field verified for the South Coast Rail project. Additional information on vernal pools can be found in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*.

A review of the 2010 Edition of the Massachusetts NHESP Natural Heritage Atlas was performed to identify areas where the South Coast Rail alternatives cross Estimated Habitats of Rare Wildlife. The Estimated Habitats of Rare Wildlife polygons are based on occurrences of rare wetland wildlife observed within the last 25 years and documented in the NHESP database. They do not include those areas delineated for rare plants or for rare wildlife with strictly upland habitat requirements. Wetland resources within these Estimated Habitat polygons were identified using NHESP GIS data available through MassGIS. Additional information on Estimated Habitat of Rare Wildlife can be found in Chapter 4.15, *Threatened and Endangered Species*.

***Field Verification***

Field verification was used in areas where aerial photographs and topographic maps provided inconclusive results. This approach was also used at station sites where wetland boundaries were required for site and station building design. Field verification was also required along the Whittenton Secondary segment of the Stoughton Line (Whittenton Alternative) because examination of aerial photographs in this area did not provide sufficient information for wetland polygon modification.

Field verification of these areas was performed using a Tablet PC GPS system that displayed aerial photographs and the MassGIS DEP Wetlands layer. Approximate wetland boundaries were walked at each of the sites and either sketched onto a plan or marked using GPS. The DEP Wetland polygons were then modified using the information collected in the field. Cover types were also verified in the field and modified as needed. Preliminary assessment of cover type was made using the classification systems presented in the MassGIS data. Cowardin classifications of wetland areas were made based on these cover types. This process was performed at station sites where prior field delineated information was not available.

Ditches along the right-of-way required a different approach in interpreting their presence and how to properly regulate them. Ditches can be regulated as an isolated wetland, ILSF, BVW, or Bank depending on their characteristics and whether or not they connect two or more waters of the United States. It should be noted that ditches excavated on dry land (i.e., in uplands) solely for the purpose of draining such infrastructure as highways and railroad lines are generally not considered waters of the United States. Ditches along alternatives for which detailed information existed were described as such. Ditches were difficult to accurately represent for the alternatives which only used GIS interpretation, as the aerial photography did not possess sufficient detail. Ditches along the Stoughton Alternative and the Southern Triangle rail rights-of-way were field verified and brought into the DEP Wetlands layer as they were observed in the field.

### 4.16.4.2 Federal Delineation Procedures

A more refined identification of wetland resource areas was conducting following publication of the DEIS/DEIR. This section describes both federal and state procedures for delineating wetland resource areas, and defines those resource areas.

Wetland resource areas in the project right-of-way are federally regulated under Section 404 of the Clean Water Act.[11]

The methods in the 1987 Corps of Engineers Wetland Delineation Manual (1987 Corps Manual) require that three criteria (“diagnostic environmental characteristics”) be met for an area to be classified as a jurisdictional wetland: dominance of hydrophytic vegetation, presence of hydric soils, and evidence of wetland hydrology.

In 2009, the USACE issued Regional Supplements to the 1987 Corps Manual; final versions of the supplements were issued in 2012. Massachusetts falls into the Northcentral and Northeast Region.[12] The

[11] 33 USC §1344 – Permits for Dredged or Fill Material. http://www.law.cornell.edu/uscode/text/33/1344, accessed May 30, 2012.

[12] U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (ERDC/EL TR-12-1)*. Vicksburg Mississippi, U.S. Army Engineer Research and Development Center.

purpose of the Regional Supplement is to "address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures." The Regional Supplement provides a number of revised and refined defining characteristics and methods to be used to identify wetlands in the field, in order to increase the regional sensitivity of wetland delineation in the Northcentral and Northeast Region.

Although the Regional Supplement states that the determination of jurisdiction for a given wetland is still subject to Section 404 of the Clean Water Act, it also provides information to replace sections of the 1987 Corps Manual, and states: "*Where differences in the two documents occur, this Regional Supplement takes precedence over the Corps Manual for applications in the Northcentral and Northeast Region*."

### Hydrophytic Vegetation

According to the 1987 Corps Manual, the prevalent vegetation in jurisdictional wetlands consists of macrophytes that are typically adapted to areas having the hydrologic and soil conditions that are described in the Manual's definition of wetlands. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptations, have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Plant species have been compiled in a list[13] and are given a wetland indicator status to denote the hydrologic regime in which they are most often found. The indicator status can be Obligate (OBL), Facultative Wet (FACW), Facultative (FAC), Facultative Upland (FACU), or Upland (UPL). The use of (+) and (–) modifiers further refine those categories, with (+) designating a preference for a wetter regime and (-) a drier regime. According to the 1987 Corps Manual, a plant with a status of FAC or wetter is considered to be a wetland plant, while a plant with a status of FAC-or drier is considered to be a non-wetland plant. The 1987 Corps Manual makes note of the fact that some plant species have broad ecological tolerances and occur in both wetlands and non-wetlands.

The 2012 Northcentral/Northeast Regional Supplement provides guidance on vegetation sampling and analysis to supplement the 1987 Corps Manual, including more precise definitions of plant strata and field techniques than are found in the 1987 Corps Manual. Of particular note, the Regional Supplement alters the usage of indicator status for a given plant species by removing the usage of (+) and (–) modifiers. Therefore, any plant with an indicator status of FAC-, which would have previously been considered a non-wetland plant, is now grouped with all other plants with an indicator status of FAC, making these wetland plants. As of June 1, 2012, the National Wetland Plant list has been updated to reflect these changes.[14]

### Hydric Soils

The 1987 Corps Manual defines a hydric soil as "*a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.*" The 1987 Corps Manual describes several characteristics and features that are

[13] Reed, P. B., Jr. 1988. *National list of plant species that occur in wetlands: 1988 national summary.* Biological Report 88(24). Washington, DC: U.S. Fish and Wildlife Service.

[14] Lichvar, R.W. and J.T. Kartesz. 2009. North American Digital Flora: National Wetland Plant List, version 2.4.0. U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC. https://wetland_plants.usace.army.mil, accessed June 29, 2012.

used to identify soils as hydric, such as the presence of layers of organic material, reducing (low oxygen) soil conditions, and soil colors that result from prolonged saturation and/or inundation.

The Regional Supplement presents indicators that are designed to help identify hydric soils in the Northcentral and Northeast Region, along with accompanying photographs and identifying criteria. The Regional Supplement does not change the core definition of a hydric soil in the 1987 Corps Manual, and notes that: "Indicators are not intended to replace or relieve the requirements contained in the definition of a hydric soil. Therefore, a soil that meets the definition of a hydric soil is hydric whether or not it exhibits indicators."

**Hydrology**

The 1987 Corps Manual establishes criteria to identify wetland hydrology: "*Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and reducing conditions, respectively. Such characteristics are usually present in areas that are inundated or have soils that are saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions.*" The 1987 Corps Manual provides a number of identifying factors that are used in the field to determine the hydrology of an area, including direct observation of inundation, soil saturation, and evident drainage patterns.

The Regional Supplement presents indicators that are designed to help identify wetland hydrology in the Northcentral and Northeast, along with accompanying photographs and identifying criteria. According to the Regional Supplement, wetland hydrology indicators "provide evidence that the site has a *continuing* wetland hydrologic regime and that hydric soils and hydrophytic vegetation are not relicts of a past hydrologic regime."

**Guidance Memorandum**

In 2007, the USACE and the USEPA issued a joint guidance memorandum on Clean Water Act Jurisdiction following the U.S. Supreme Court's decision in *Rapanos v. United States* & *Carabell v. United States.*[15] The memorandum was revised after public comment and the final document was issued on December 2, 2008. The memorandum provided guidance to USEPA regions and Corps districts, particularly in regards to situations in which the agencies should apply the "significant nexus" determination to determine whether or not to take jurisdiction over an area.

In accordance with the guidance document, all of the wetlands and waterways identified and delineated for the South Coast Rail project are considered jurisdictional because they are either:

- Traditional navigable waters;
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months); or

[15] U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States &Carabell v. United States, June 6, 2007, revised December 2, 2008.

- Wetlands that directly abut such tributaries.

Additional guidance concerning Corps jurisdiction is found in the Corps' Regulatory Guidance Letter 08-02 (Jurisdictional Determinations).[16] RGL 08-02 stipulates that an applicant may elect to use a preliminary jurisdictional determination to voluntarily waive or set aside questions of jurisdiction over a particular site or resource area. A landowner, permit applicant, or other "affected party" may elect to use a preliminary JD even where initial indications are that the water bodies or wetlands on a site may not be jurisdictional. Although some small wetlands within or along the right-of-way are "isolated" – i.e., they do not directly touch or abut any traditional navigable waters (or tributaries thereto) – at this time MassDOT is not asserting that these wetlands do not have a significant nexus to a traditional navigable water. Therefore MassDOT has voluntarily elected to assume that these wetlands are jurisdictional waters of the United States. However, any areas characterized as "swales or erosional features," which do not flow through or out of another jurisdictional resource area, or which are "excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water," are not jurisdictional according to the joint guidance memorandum, and have not been delineated as wetland resource areas. These include former or current railroad drainage ditches excavated in uplands.

The Corps prepared a Preliminary Jurisdictional Determination for the proposed Stoughton and Whittenton railroad rights-of-way on February 4, 2013. A total of 73.0 acres of waters, including 70.2 acres of wetlands and 2.8 acres of other waters, were determined to be present within the existing railroad rights-of-way, plus at proposed railroad station locations. For purposes of this preliminary jurisdictional determination, any waterway that was found to contain wetlands in part is considered to be wetlands (and therefore a "special aquatic site" as defined by USEPA regulations at 40 CFR 230, Subpart E), in entirety. The preliminary jurisdictional determination was accepted and signed by MassDOT on February 19, 2013 and is attached to this FEIS as Appendix 4.16-A.

#### 4.16.4.3 State Delineation Procedures

Wetland resource areas in the South Coast Rail project right-of-way are state regulated under the WPA.[17] Delineation of BVW resource areas under Massachusetts wetland regulations are addressed in a 1995 state handbook *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook* (1995 State Handbook).[18] The 1995 State Handbook identifies wetlands as: "areas where groundwater is at or near the surface, or where surface water frequently collects for a significant part of the growing season, and where a significant part of the vegetative community is made up of plants adapted to life in saturated soil." The 1995 State Handbook also identifies the two characteristics that determine state jurisdictional wetlands: "Hydrology (water) and vegetation (plants) are the two characteristics that define freshwater wetlands protected by the Act." These characteristics are discussed below.

[16] U.S. Army Corps of Engineers Regulatory Guidance Letter 08-02: Jurisdictional Determinations. 26 June 2008, http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08-02.pdf (April 18, 2013).

[17] Massachusetts General Laws, Chapter 131, Section 40. Available online at: http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131/Section40, accessed May 30, 2012.

[18] Jackson, S. 1995. *Delineating Bordering Vegetated Wetlands under the Massachusetts Wetlands Protection Act: A Handbook*. Massachusetts Department of Environmental Protection, Division of Wetlands and Waterways.

#### Vegetation

The 1995 State Handbook refers to the same list of plants and their wetland indicator status as the 1987 Corps Manual, noting that plants with a rating of FAC or wetter are considered wetland indicator plants. The 1995 State Handbook also references plant species listed in the WPA and plants that exhibit morphological or physiological adaptations to life in saturated or inundated conditions as wetland indicator plants.

#### Hydrology

The 1995 State Handbook includes hydric soil characteristics as an indicator of wetland hydrology. Therefore, if an area has a dominance of wetland vegetation and exhibits hydric soil characteristics, it is considered to be a wetland. Areas that do not exhibit hydric soil characteristics, but that have a dominance of wetland vegetation as well as other indicators of hydrology, may also be considered wetlands. These other indicators of hydrology include evidence of surface water, evidence of soil saturation, and morphological plant adaptations.

#### Comparison of Federal and State Delineation Methods

The 1987 Corps Manual names three distinct criteria of hydrophytic vegetation, hydric soils, and hydrology that must all be satisfied for an area to be considered a wetland resource area. The 1995 State Manual names only the two criteria of vegetation and hydrology, and includes hydric soils as a sign of hydrology. In addition, small isolated wetlands are not considered jurisdictional under state delineation methods, while these areas may be jurisdictional under federal delineation methods if they have a "significant nexus" to a bordering vegetated wetland.[19] MassDOT has assumed that all isolated wetlands along the South Coast Rail project corridor are federally jurisdictional.

Vegetated wetland resource areas along the Stoughton alternative and Whittenton Branch were delineated with respect to both methodologies. Any areas that exhibited hydrophytic vegetation, hydric soils, and hydrology were flagged as wetland resource areas under both state and federal jurisdiction. Small isolated areas were also flagged and were noted as being under federal jurisdiction only.

### 4.16.5 Delineation Methods and Procedures

In order to identify and delineate the jurisdictional wetland resource areas within the South Coast Rail project corridor, field surveys were conducted along the entire length of the right-of-way. This effort involved field work in all ten municipalities along the length of the project corridor.

The initial wetland review work done for the 2009 DEIS/DEIR provided a body of knowledge and a series of figures on which to base the field work. Wetland resource areas along the Stoughton Alternative were field delineated in 2002 for the original FEIR, and this information was also referenced for the 2010 field delineations. Wetland resource areas were also delineated along the Whittenton Branch, and impacts to these wetland resource areas were calculated for both state and federal resource area types as well as by cover type. Wetlands along the Attleboro Secondary associated with the Whittenton alternative could not be field inspected due to lack of access, but the majority of the Attleboro Secondary runs through developed areas of Taunton.

[19] U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States, June 6, 2007, revised December 2, 2008.

#### 4.16.5.1 Delineation Criteria for Vegetated Wetlands

Vegetated wetlands and waterways were identified and delineated using the methods and criteria established in the 1987 Corps Manual and the 2012 Northcentral-Northeast Regional Supplement, as well as the 1995 State Manual. Potential wetland resource areas were examined by field investigators using these criteria all along the South Coast Rail project corridor. To document conditions in each identified wetland resource area, a representative observation point was selected, and field data sheets were completed describing the upland and wetland characteristics of the observation point.

Wetland areas were delineated in the field between March 2010 and August 2010. Wherever wetland resource areas occurred, points to designate the boundaries were marked with colored flagging. Points were also located with a Trimble® Model [No] hand-held GPS device.

**Hydrophytic Vegetation**

Visual estimates of species abundance were made for the upland and wetland plant communities at each observation point, and the dominant species were determined and recorded by genus and species on field data sheets. Dominant species were determined separately for each vegetative stratum as trees, saplings/shrubs, herbs, and vines.

The wetland indicator status of each species was determined according to the 1988 *National List of Plant Species That Occur in Wetlands: Region 1, Northeast*, which is based on the national list[20] According to the Regional Supplement, three separate procedures exist to determine whether an area has hydrophytic vegetation: the rapid test for hydrophytic vegetation, the dominance test, and the prevalence index. These procedures are discussed in detail in the Regional Supplement. All three methods were considered when evaluating site conditions.

**Soils**

Baseline soils information was determined from review of existing data, including the USDA NRCS Soils Surveys of Bristol, Plymouth, and Norfolk/Suffolk counties of Massachusetts,[21] county and state lists of hydric soils, and data collected from the previous wetland delineations.

During wetland investigation, soils were examined with a hand auger to determine if hydric soil characteristics were present. Auger holes were excavated to a depth that confirmed the presence of hydric soils in wetland areas, or that eliminated the possibility of hydric soils in uplands. Instances of auger refusal often occurred at a depth of only a few inches due to the subsurface conditions of the large disturbance area associated with existing railroad beds. The colors of the soil matrix and any redoximorphic features were described using Munsell® Soil Color Charts. Information describing the upland and wetland soil profiles was recorded on the field data sheets for each identified wetland.

**Hydrology**

Site hydrology was determined in the field based on properties such as soil saturation, inundation, oxidized root zones, manganese concretions, drainage patterns, and proximity to a perennial waterway.

[20] Reed, P. B., Jr. 1988. *National list of plant species that occur in wetlands: 1988 national summary.* Biological Report 88(24). Washington, DC: U.S. Fish and Wildlife Service.

[21] US Department of Agriculture, Natural Resource Conservation Service. Web Soil Survey. Available online at: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm, accessed June 1, 2012.

Hydrologic indicators were based on the 1987 Corps Manual, the 2012 Northcentral-Northeast Regional Supplement, and the 1995 State Manual.

#### 4.16.5.2 Delineation Criteria for Other Resource Areas

The following sections describe the criteria used to determine the boundaries of other resource areas.

**Bank**

Bank was delineated according to Massachusetts regulations (310 CMR 10.54) (Waterbodies were identified, including perennial and intermittent streams as well any ponds, and Bank flags were hung at the first observable break in the slope.

**Land under Waterbodies and Waterways (LUW)**

Land under Waterbodies and Waterways (LUW) was based on the delineation of Bank. In areas that contain a perennial stream or pond, LUW extends downgradient from Bank flags.

**Bordering Land Subject to Flooding (BLSF)**

Bordering Land Subject to Flooding (BLSF, (310 CMR 10.56) was not delineated in the field. The extent of this resource area is based off of published Federal Emergency Management Agency (FEMA) flood elevations, which estimate the elevations to which water would flood during a 100-year storm event[22]; any area below this elevation to the Bank of a corresponding WW or a Bordering Vegetated Wetland is BLSF. A measurement of BLSF is therefore a volume and not an area, and requires detailed topography of a given area in order to accurately measure. However, for BLSF, ILSF, and LSCSF, only the area of impact has been estimated, rather than the total volume of impact to these resource areas. Since detailed topography along the South Coast Rail project corridor does not exist, the volume of impact to these resource areas cannot be calculated with accuracy.

**Isolated Land Subject to Flooding (ILSF)**

As with BLSF, Isolated Land Subject to Flooding (ILSF, (310 CMR 10.57)) cannot be calculated for a given area with accuracy without more detailed topographic information than is currently available. ILSF areas were identified along the project corridor only when they were already known to be ILSF from previous plans, or when they were positively identified as ILSF by visual observation and estimation of their ability to hold one quarter-acre foot of water at an average depth of 6 inches.

**Riverfront Area (RA)**

Riverfront Area (RA, (310 CMR 10.58)) was not delineated in the field. Measurement of these resource areas is based on the delineation of Bank. In areas that contain a perennial stream or pond, RA extends upgradient from Bank flags.

**Land Subject to Coastal Storm Flowage (LSCSF)**

Land Subject to Coastal Storm Flowage (LSCSF) was not delineated in the field. See the discussion of BLSF for a description of how the area of LSCSF was estimated.

[22] A "100-year storm event" has a 1 percent probability of occurring in any given year.

**Coastal Bank**

Coastal Bank was delineated according to Massachusetts regulations ((310 CMR 10.30). Coastal Waterbodies were identified, and Coastal Bank flags were hung on the seaward face at the landward edge of any elevated landform.

Once wetland resource areas had been delineated in the field, the coordinates of all BVW, IVW, Bank, and Coastal Bank flags were incorporated into CAD plot plans showing the track design for the project. These plans were generated for each municipality and showed the track, the limit of the right-of-way, any wetland resource areas that were delineated, and topography using 5-foot contours. Finally, areas of BLSF, RA, and LSCSF were generated on the plans.

### 4.16.5.3 Federal and Municipal Review

The USACE has reviewed and verified the delineated boundaries. In addition to federal review by the USACE, the Secretary's Certificate called for plans to be presented to each municipality as part of an ANRAD submission, to allow the Conservation Commission in each municipality to review the delineations. The materials in the ANRAD for each municipality included the plot plans as well as field data forms documenting the delineation for each wetland resource area.

In 2011, ANRADs were submitted to all ten municipalities through which the South Coast Rail project passes. In each municipality, the filing was reviewed by the Conservation Commission through a public hearing process. Several municipalities retained outside consultants to review the delineation. All ANRAD submissions were also submitted to the Massachusetts Department of Environmental Protection (MassDEP) for state review.

> Three municipalities (Stoughton, Easton, and Raynham) elected not to review BLSF or ILSF because the 5-foot topographic contours on the plot plans were not sufficiently accurate enough to allow for a precise delineation of these resource areas. Since a full topographic survey at 1-foot contour intervals is outside the current scope of the South Coast Rail project, these areas were withdrawn from the ANRAD submissions in these municipalities.

Table 4.16-2 contains a summary of the municipalities in which ANRADs were filed, the file number issued by MassDEP for each ANRAD, the date any Order of Resource Area Delineation (ORAD) was issued, and whether any resource areas were excluded from the ORAD.

**Table 4.16-2 Summary of ANRAD Reviews**

| Municipality | MassDEP File Number | Date ANRAD Submitted | Date ORAD Issued | Resource Areas Excluded from ORAD |
|---|---|---|---|---|
| Canton | SE 124-1083 | October 2011 | April 2012 | none |
| Stoughton | SE 298-0709 | October 2011 | June 2012 | BLSF, ILSF |
| Easton | SE 152-1349 | October 2011 | August 2012[1] | BLSF, ILSF |
| Raynham | SE 269-0880 | November 2011 | August 2012 | BLSF, ILSF |
| Taunton | SE 073-2472 | May 2011 | August 2011 | Wetlands along CSX-controlled track (lack of access) |
| Berkley | SE 004-0512 | April 2011 | June 2011 | none |
| Lakeville | SE 192-0642 | April 2011 | February 2012 | none |
| Freetown | SE 026-0510 | June 2011 | January 2012 | Freetown Station |
| New Bedford | SE 049-0664 | April 2011 | July 2011 | none |
| Fall River | SE 024-0614 | May 2011 | July 2011 | none |

1 Easton issued an ORAD rejecting the delineation on April 11, 2012; this filing was appealed with MassDEP and a Superseding ORAD was issued on August 29, 2012.

### 4.16.6 Wetland Functions, Values, and Significant Interests

Wetlands, watercourses, and water bodies may provide a variety of functions and values, such as wildlife habitat, fish habitat, visual/aesthetic quality, water-based recreation, flood storage and storm damage prevention, groundwater and surface water quality and quantity, pollutant attenuation through nutrient retention and sediment trapping, shoreline stabilization, and dissipation of erosive forces. Ecological functions and societal values vary with each wetland. Factors affecting wetland function include size, location in the watershed, number and interspersion of plant cover types, and the degree of disturbance.

The WPA regulations list eight functions and values, defined as significant interests, provided by wetland resource areas. These are:

- Protection of public and private water supply;
- Protection of ground water supply;
- Flood control;
- Storm damage prevention;
- Prevention of pollution;
- Protection of land containing shellfish;
- Protection of fisheries; and
- Protection of wildlife habitat.

The regulations presume that each wetland resource area is significant to some or all of these interests. These presumptions are rebuttable under the regulations in cases where the resource area has been altered by development or other human activities.

Table 4.16-3 summarizes the regulatory presumptions for each state-regulated inland wetland resource area.

**Table 4.16-3 State Wetland Resource Area Presumptions of Significance**

| | LUW | Bank | BVW | BLSF[1] | ILSF[2] | Riverfront Area[3] | Coastal Bank |
|---|---|---|---|---|---|---|---|
| Public and Private Water Supply | x | x | x | - | x[2] | x | - |
| Ground Water Supply | x | x | x | - | x[2] | x | - |
| Flood Control | x | x | x | x | x | x | - |
| Storm Damage Prevention | x | x | x | x | x | x | x |
| Prevention of Pollution | x | x | x | - | x | x | x |
| Fisheries | x | x | x | - | - | x | - |
| Land Containing Shellfish | - | - | - | - | - | x | - |
| Wildlife Habitat | x | x | x | x | x | x | - |

1 Only those areas within the 10-year floodplain, or within 100 feet of bank or BVW (provided those areas are within the 100-year floodplain) and all vernal pool habitat within the 100-year floodplain, except for those portions which have been so extensively altered that their important wildlife habitat functions have been eliminated.

2 ILSF is presumed significant to Public and Private Water Supply and Ground Water Supply when underlain by pervious material. When it is underlain by organic material it is presumed significant to Prevention of Pollution. Vernal Pool habitat within ILSF is significant to Wildlife Habitat.

3 Riverfront Area is presumed significant to the protection of Land Containing Shellfish only when associated with coastal waterbodies.

BVWs are federally regulated under Section 404. There are also several wetlands adjacent to or within the project alternatives corridors that meet the regulatory criteria for wetlands under Section 404 of the Federal Clean Water Act because they are dominated by wetland plants and have hydric soils.

The Army Corps of Engineers New England District method for assessing wetland functions and values [23] was employed for the South Coast Rail project. The methodology considers eight wetland functions and five wetland values in a Section 404 permit application:

Wetland Functions:

- Floodflow Alteration;
- Fish and Shellfish Habitat (Aquatic Diversity/Abundance);
- Sediment/Toxicant Retention (Pollutant Attenuation);

[23] USACE. 1999. *The Highway Methodology Workbook Supplement, Wetland Functions and Values - a Descriptive Approach*. New England District, U.S. Army Corps of Engineers, NAEEP-360-1-30a. Concord, MA.

- Nutrient Removal/ Retention/Transformation (Pollutant Attenuation);
- Production Export (Nutrient);
- Wildlife Habitat;
- Uniqueness/Heritage; and
- Recreation (Consumptive/Non-Consumptive).

Wetland Values:

- Groundwater Recharge/Discharge
- Sediment/Shoreline Stabilization
- Educational/Scientific Value
- Visual Quality/Aesthetics
- Threatened or Endangered Species Habitat

**Floodflow Alteration (Storage/Desynchronization)**

Wetlands can be important in the storage and desynchronization of floodwaters, protecting downstream resources from flood damage. Wetlands high in the watershed with constricted outlets or closed basins are generally important in capturing and detaining floodwaters. Other wetland characteristics that contribute to flood storage and desynchronization include broad floodplains and plant communities consisting of low, dense vegetation.

Study area wetlands designated as having floodflow desynchronization functions are identified by considering the local topography (broad, relatively flat areas), size, presence of ponded water, contiguous/branched channels, well vegetated floodplains along rivers and larger streams, and position in the landscape. The location of culverted streams within the right-of-way provides a means for retaining floodwaters higher in the watershed.

**Fish and Shellfish Habitat (Aquatic Diversity/Abundance)**

Large wetlands contiguous to a large, perennial stream or waterbody capable of supporting large fish and/or shellfish populations are important in providing Aquatic Diversity/Abundance. Other wetland characteristics that contribute to Aquatic Diversity/Abundance include good water quality, an abundance of shoreline vegetation, objects or vegetation that provide cover, spawning areas such as beds of submerged aquatic vegetation or gravel beds, and the lack of barriers such as dams and waterfalls, which prevent fish movement.

**Sediment/Toxicant Retention (Pollutant Attenuation)**

Wetland basins with permeable soils that detain storm and flood waters and promote percolation reduce runoff rates sufficiently to allow sediments and the adsorbed toxicants to settle from the water column. Diffuse channels, deep pools, and dense low vegetation are wetland characteristics that may also contribute to this process by slowing water velocities.

### Nutrient Removal/Retention/Transformation (Pollutant Attenuation)

Wetlands can serve as a filter for the removal or detention of nutrients carried in surface water flows. Many wetland plants respond to high nutrient concentrations with accelerated rates. Some nutrients are assimilated in plant material while others are trapped in organic sediments in wetlands by chemical, physical, and biotic actions.

Study area wetlands designated as having nutrient removal functions are identified by the presence of large areas of open or ponded water with dense emergent vegetation, meandering streams with slow water velocities (supporting aggradations), and contiguous/branched channels.

### Production Export (Nutrient)

Production export is the production of organic material and its subsequent transport out of a wetland to downstream areas or to deeper waters within the basin. This organic material is then added to the food chain where it is eaten by fish and other aquatic organisms. Wetlands with dense vegetation dominated by non-persistent emergent vegetation are important in supplying downstream wetlands with organic material. Wetlands dominated by shallow marshes with a perennial stream flowing from them are most important in providing production export.

Wetlands designated as having production export functions are classified by the presence of high densities and diversity of hydrophytic vegetation, presence of abundant fish and wildlife and downstream/downgradient evidence of export.

### Wildlife Habitat

Large, undisturbed wetlands greater than 1 acre are generally considered to provide important wildlife habitat functions. Other factors that contribute to the provision of important wildlife habitat include the presence of shallow, permanent open water of good quality; proximity to undisturbed upland wildlife habitat; a high degree of interspersion of vegetation classes; a high degree of species and structural diversity within the vegetational community; high vegetation density; and the presence of wildlife food plants. Wetlands that are contiguous to other wetland areas may serve as travel or migratory corridors for wetland wildlife. Presence of vernal pools (ephemeral bodies of water that lack fish populations) connote a high wildlife value because several wildlife species, in addition to the obligate vernal pool species such as wood frog (*Rana sylvatica*) and ambystomid salamanders (*Ambystoma* spp.), use vernal pools and the areas immediately adjacent for feeding, cover, courtship, and overwintering habitat.

Size, adjacent land use, water quality, and presence of vernal pools are used to classify wetlands as important wildlife habitat for waterfowl, reptiles and amphibians, terrestrial bird species, and mammals.

### Uniqueness/Heritage

The Uniqueness/Heritage function includes considerations of science, the endangerment of the wetland, and the importance of the wetland in the context of its local and regional environment. The wetland may contain areas of archaeological, historical, or social significance, or it may represent the last fragment of its wetland type in an urbanized or agricultural environment. The presence of relatively scarce wetland habitats or wetland species contributes to the Uniqueness/Heritage function provided by the wetland. Areas containing Estimated Habitats of Rare Wildlife (Estimated Habitat) or Priority Habitats of Rare Species (Priority Habitat) mapped by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) confer a higher value in this category.

#### Recreation (Consumptive/Non-Consumptive)

Wetlands designated as having Recreational value are classified based on the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other recreational activities. Consumptive opportunities, such as fishing and hunting, consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not diminish these resources of the wetland.

### 4.16.7 Impact Assessment Methodology

#### 4.16.7.1 Quantification of Direct Impacts

As required by the National Environmental Policy Act (NEPA) Council on Environmental Quality (CEQ) regulations,[24] the analysis of the environmental consequences requires discussion of the direct and indirect effects of a proposed action, and their significance. Direct effects are defined as those "which are caused by the action and occur at the same time and place."[25] Indirect effects are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[26] These types of indirect effects are further discussed in Chapter 5, *Indirect Effects and Cumulative Impacts*.

The Massachusetts Environmental Policy Act (MEPA) requires "a detailed description and assessment of the negative and positive potential environmental impacts of the alternatives. The EIR [Environmental Impact Report] shall assess (in quantitative terms, to the maximum extent practicable) the direct and indirect potential environmental impacts from the Project that are within the Scope. The assessment shall include both short-term and long-term impacts for all phases of the Project (e.g., acquisition, development, and operation) and cumulative impacts of the Project, any other Projects, and other work or activity in the immediate surroundings and region."[27] Cumulative impacts are discussed in Chapter 5, *Indirect Effects and Cumulative Impacts*.

Direct wetland impacts, both temporary and permanent, are anticipated along each of the proposed alternatives. Each alternative corridor was assessed for the presence of wetland resources within and adjacent to the right-of-way, and the impacts associated with them. Permanent impacts are the loss of a wetland resource area following construction. Permanent impacts may result from, but are not limited to, wetland fill, dredging, and watercourse relocation or alteration.

Temporary impacts that may occur along the right-of-way include work areas adjacent to the alignment, placing erosion control devices including hay bales and silt fences, vegetation removal, and any indirect impact that could result from the migration of exposed soils. Examples of temporary impacts include short-term disturbances to wetlands and waterways during construction that would cease once construction activities are complete. These may include, but are not limited to, installing erosion

[24] Code of Federal Regulations (CFR), Title 40: Protection of the Environment, Part 1502- Environmental Impact Statement, Section 1502.16 Environmental Consequences (40 CFR 1502.16).

[25] 40 CFR 1508.8(a).

[26] 40 CFR 1508.8(b).

[27] 301 Code of Massachusetts Regulations, Title 11.00: MEPA Regulations. Section 11.07- EIR Preparation and Filing, (6) Form and Content of EIR, (h) Assessment of Impacts. (11 CMR 11.07(6)(h)).

controls, establishing work areas, or installing temporary structures at stream crossings. Section 4.16.9.4, *Temporary Construction-Period Impacts*, discusses these in greater detail and describes how these impacts would be mitigated.

As described in the Existing Conditions section, each impacted wetland along the proposed alternatives was also evaluated for its functions and values as well as the ability of each wetland to protect the interests of the Act. The evaluation was based on eight functions and five values as described and outlined by the United States Army Corps of Engineers, New England District.[28] The wetlands were evaluated using GIS data layers, orthophotos, and visual inspections of critical areas. Functions and values of impacted wetlands are shown on the figures illustrating each rail and roadway segment. These graphics show the functions and values, cover type, and total area of permanent loss for each impacted wetland. This information is presented in the large (1.75 x 1.75-inch) boxes. Where a large wetland would be impacted in several locations, smaller (1 x 1.25-inch) boxes are shown for each localized area of impact. These boxes show the cover type and amount of wetland loss in a specific sub-area of a larger wetland. Detailed information is provided about the total area of each wetland, the amount of impacted area, and the impacted cover types.

Once the wetland resource areas had been delineated and the preliminary track layout was determined, direct impacts to wetland resource areas were quantified. The quantification of direct impacts was performed using CAD analysis of the layout of the track, all wetland resource areas, and the limit of disturbance of the project. The limit of disturbance represents the limit of permanent alteration associated with the South Coast Rail project.

Direct impacts were calculated as being either permanent or temporary. Permanent impacts are any direct impact (fill) to wetland resource areas that are within the limit of disturbance. These impacts include fill, retaining walls, and other disturbance and structures that will remain in place and permanently impact the wetland resource area. Permanent impacts were determined by calculating the areas of any portion of a wetland resource area inside the limit of disturbance.

Permanent impacts were calculated for all wetland resource areas: BVW, LUW, IVW, Bank, RA, BLSF, ILSF, and LSCSF. For BLSF, ILSF, and LSCSF, only the area of impact has been estimated, rather than the total volume of impact to these resource areas. Impacts to RA were calculated as those impacts to the area within 200 feet of a perennial waterway that would constitute new development of previously undeveloped land. Previously developed (impervious surface) areas were estimated by overlaying a MassGIS data layer of mapped developed areas over the project corridor. Areas of impact to RA outside these previously developed areas were calculated as new impact. Temporary and permanent impacts to Outstanding Resource Waters (ORWs) were determined by identifying BVWs that contained a vernal pool within 100 feet of the right-of-way. These determinations are conservative and included certified vernal pools (CVPs), potential vernal pools (PVPs), and vernal pools that have been field verified in support of the South Coast Rail project (SCR-VPs). Because vernal pool boundaries have not been field delineated, the limit of the BVW associated with the vernal pool was assumed to be the boundary of the vernal pool. Prior to final design, actual vernal pool boundaries would be field delineated to enable a more refined assessment of impact to ORWs. Additional information on potential impacts to vernal pools can be found in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*. Fall Brook in Freetown and

[28] U.S. Army Corps of Engineers, New England District. 1999. *The Highway Methodology Workbook Supplement,* US Army Corps of Engineers, New England District Tech. Rept. NAEEP-360-1-30a, 32pp.

Black Brook in Easton are also listed as ORWs and impacts to these resources are included in the analysis.

Temporary impacts represent unavoidable disturbances to the wetland associated with constructing the project which will not impact the wetland longer than the period of construction. These impacts mainly arise from the necessity of crew and machinery to work beyond the limit of disturbance in order to construct slopes, retaining walls, and other portions of the project. The limit of temporary impacts was estimated by establishing an area 4 feet wide outside the limit of disturbance. Temporary impacts were calculated for BVW, LUW, and IVW because these areas are ecologically wetlands. Temporary impacts within state-jurisdictional wetland resource areas that are ecologically upland (BLSF, RA) were not calculated at this level of design.

#### 4.16.7.2 Secondary and/or Indirect Impact Analysis Methodology

Secondary (indirect) effects are defined in USEPA Regulations at 40 CFR Part 230.11.[29] The USEPA regulations state that "Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material." Additionally, although not specifically addressing impacts to aquatic resources, the CEQ NEPA regulations at 40 CFR Part 1508.8[30] define indirect effects as "effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects many include related effects on air and water and other natural systems, including ecosystems".

Secondary and/or indirect impacts are therefore the consequences of an action's direct impacts. For example, while the direct impact of filling a wetland would be the loss of the filled wetland area and the functions and values provided by that specific area, the secondary and/or indirect impacts of that wetland fill would result from the associated changes to the overall size of the wetland, hydrology, cover type, species assemblage, or degree of habitat fragmentation. These types of impacts could adversely affect the ability of the wetland to provide functions and values, or could diminish the functions and values to a degree greater than would be attributed simply due to the loss of area. Isolated fragments of wetlands or waterways may have reduced habitat value, no longer provide viable fish or wildlife habitat or be so isolated that the wetland or waterway fragments are rendered inaccessible to many fish or other aquatic species.

##### Methodology and Criteria for Evaluation

MassDOT met with the South Coast Rail Interagency Coordinating Group (ICG) in 2012 to develop a methodology for evaluating secondary and/or indirect impacts to wetlands from the South Coast Rail project. The methodology was presented in a memorandum prepared by MassDOT that incorporated ICG comments (Appendix 4.16-B).

The assessment of secondary and/or indirect impacts focuses on wetlands within 100 feet of the right-of-way along the South Coast Rail project corridor. At the request of the ICG, MassDOT was asked to consider assessing additional secondary and/or indirect impacts more than 100 feet from the right-of-way. Based on a literature review and a solid understanding of the construction and operations

[29] 40 CFR §230.11, Factual Determinations. Available on line at: http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr230_main_02.tpl, accessed June 1, 2012.

[30] 40 CFR §1508.8, Effects. http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr1508_main_02.tpl, accessed June 1, 2012.

of the South Coast Rail corridor, in comparison to the road-effects of new road construction or an operating highway, MassDOT concluded that there is no scientific basis for considering the South Coast Rail project's "road effect zone" for impacts to aquatic resources to extend further than 100 feet from the right-of-way.

The methodology developed by MassDOT to assess secondary and/or indirect impacts is a stepwise process that first evaluates any direct impacts to a given wetland, and then assesses the result of those impacts on the functions and values that the wetland provides, using a checklist of potential effects developed by MassDOT. The checklist is based on "considerations and qualifiers" for each wetland function and value, based on those outlined in a document prepared by the USACE New England Division.[31] These considerations and qualifiers are identified as the principal characteristics that contribute to the ability of each wetland to provide the indicated function or value. If the direct wetland impact of the proposed action alters these characteristics, it is presumed to alter the ability of the wetland to continue to provide the associated function or value.

For this analysis, secondary and/or indirect impacts to wetlands and other Waters of the United States include the following effects that could be caused by the placement of fill within jurisdictional wetlands, but occur at a different location or time:

- Changes in wetland functions; or
- Changes in wetland physical/biological characteristics as a result of the direct impacts (loss of wetland).

The types of direct impacts and the secondary and/or indirect impacts that may result include:

- Filling a portion of a wetland (loss of)–reduction in wetland size, introducing human activity (noise, disturbance);
- Dredging a wetland/pond–change in hydrology, vegetation, habitat;
- Constructing a berm across a wetland–change in hydrology, fragmentation, introduction of disturbed non-wetland conditions, creation of new "edge", interrupt migratory routes;
- Installing a new culvert or changing existing culvert–alter water levels or flow patterns;
- Removing canopy or other vegetation–change light regimes, water temperature, plan community structure;
- Relocating a stream– change flow characteristics; or
- A new discharge of stormwater–alter water levels or flow patterns, or introduce sediments or nutrients.

[31] The Highway Methodology Workbook Supplement, Wetland Functions and Values - a Descriptive Approach. USACE NED, 1999.

**Assessment of Secondary and/or Indirect Impacts**

Secondary and/or indirect impacts to wetlands were assessed for each within 100 feet of the Stoughton and Whittenton Lines between Brock Street in Stoughton and the terminal stations of the New Bedford Main Line in New Bedford and the Fall River Secondary Fall River, based on the functions and values that the wetland provides and the type and extent of the direct wetland impact and/or work adjacent to the wetland that is the cause of the secondary and/or indirect impact. The steps of this process are:

- For each wetland, identify the type of direct impact:
- Loss of wetland area due to placement of fill
- New culvert
- Replacement of existing culvert

**Other**

- Direct discharge of untreated stormwater from a pollutant source
- For each wetland, identify the type of work occurring within 100 feet of the wetland:
- Improvement of existing freight or commuter rail tracks and increased train service
- Replacement of track infrastructure on out-of-service rail and addition of train service, and
- Evaluate secondary and/or indirect impacts based on function-specific considerations using the attached checklist.

The list of potential effects on functions and values is based on the "considerations and qualifiers" for each wetland function and value, as presented in the Corps' "*Highway Methodology Workbook Supplement – Wetland Functions and Values, a Descriptive Approach*" (September 1999). These characteristics are identified in the Workbook Supplement as the principal characteristics that contribute to the ability of each wetland to provide the indicated function or value. If the direct wetland impact of the proposed action altered these characteristics, it is presumed to alter the ability of the wetland to continue to provide these functions.

## 4.16.8 Existing Conditions

### 4.16.8.1 Overview

**Major Watersheds**

The South Coast Rail alternatives as presented in the DEIS/DEIR pass through several watersheds associated with southeastern Massachusetts. Watersheds have become an important measure of the overall health and the capacity of a region to handle both stormwater and pollutant loading. The alternatives proposed in the DEIS/DEIR (Figure 4.16-1) cross through the Boston Harbor Regional Watershed, the Taunton River Regional Watershed, the Charles River Regional Watershed, and the Buzzards Bay Regional Watershed and are characterized by highly populated and densely populated municipalities and sparsely developed rural areas.

#### *Boston Harbor Regional Watershed*

The Boston Harbor regional watershed receives water from approximately 293 square miles in the greater Boston area. It is made up of the Mystic River, Neponset River, Fore, Back, and Weir River watersheds and includes 45 municipalities.

#### *Buzzards Bay Regional Watershed*

The Buzzards Bay regional watershed receives water from approximately 432 square miles of land in southeastern Massachusetts. The watershed takes water from lakes, rivers, streams, wetlands and groundwater that eventually drain into Buzzards Bay. Buzzards Bay is approximately 228 square miles and offers important habitat features including salt marsh, eelgrass beds, and tidal flats. It includes at least part of 15 municipalities.

#### *Charles River Regional Watershed*

The Charles River regional watershed is comprised of approximately 308 square miles and is part of 35 municipalities. This watershed is centered on the Charles River and extends from Hopkinton east to Boston Harbor. The Charles River and, consequently, its watershed have gone through cleanup efforts over the past several years resulting in a healthier, more productive ecosystem that is able to support a greater diversity of flora and fauna.

#### *Taunton River Regional Watershed*

The Taunton River regional watershed is the second largest watershed in the state, and the largest that any proposed alternative would cross. The watershed consists of 562 square miles of land, with 94 square miles of wetlands. The Hockomock Swamp is part of this regional watershed.

### Major Wetland Systems

Typical wetland resource areas within the study area consist of extensive red maple (*Acer rubrum*) swamps, Atlantic white cedar (*Chamaecyparis thyoides*) swamps, river systems with surrounding red maple swamp and shrub swamps, and small isolated wetlands. The majority of the red maple swamps (such as Hockomock Swamp) have a closed tree canopy dominated by red maple and an understory dominated by arrow-wood (*Viburnum dentatum*), silky dogwood (*Cornus amomum*), highbush blueberry (*Vaccinium corymbosum*), and sweet pepperbush (*Clethra alnifolia*). The Atlantic white cedar swamps, including portions of the Hockomock Swamp, Pine Swamp, Assonet Cedar Swamp, and Acushnet Cedar Swamp, have a closed tree canopy dominated by Atlantic white cedar and red maple with an understory dominated by highbush blueberry, arrow-wood, and sweet pepperbush.

The following sections describe the major wetland systems that are adjacent to or found within the alternatives corridors. These major wetland systems are shown in Figure 4.14-1.

#### *Fowl Meadow and Ponkapoag Bog*

The Fowl Meadow and Ponkapoag Bog ACEC covers approximately 8,350 acres in the metropolitan Boston area, including parts of Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, and Westwood (Figure 4.14-2). The ACEC is fragmented by several transportation corridors, including I-95, I-93, Route 24, Route 138, Route 1, and other roadways. It also includes upland areas that are developed in commercial and residential land uses as well as undeveloped forested upland and farmland.

The central resource features of the Fowl Meadow and Ponkapoag Bog ACEC are the Neponset River and the Ponkapoag Pond and Bog. An 8-mile stretch of the Neponset River and its tributaries, the adjacent wetlands and floodplains, the associated aquifers and public water supplies, and the diverse habitats form the core resources of the Fowl Meadow area. Ponkapoag Bog and Pond and the associated natural communities and wildlife habitats form the core resources of the Ponkapoag Bog area. Historical and archaeological resources and the recreational and educational values of both areas support their overall importance to the people and communities of the area.

The Fowl Meadow area includes the largest wetland and floodplain areas in the Neponset River basin. There are several municipal public wells that provide water to the communities of Canton, Dedham, and Westwood. At least 13 state-listed rare species occur in the ACEC. The northern Fowl Meadow area and Ponkapoag Bog have been designated a National Environmental Study Area by the National Park Service. Approximately 2,330 acres of the ACEC are owned by DCR, and are managed as part of the Blue Hills Reservation.

The Northeast Corridor forms the eastern boundary of the ACEC between Neponset Street in Canton and I-95, and forms the western boundary of the ACEC southwest of the I-95/I-93 interchange. The Northeast Corridor passes through the ACEC north of I-95, where the rail line parallels the Neponset River.

***Hockomock Swamp ACEC***

The Hockomock Swamp ACEC and its associated wetlands and water bodies are described by the Massachusetts DCR as the largest vegetated freshwater wetland system in Massachusetts (Figure 4.14-2). The wetland system, which includes the Hockomock Swamp, the Dead Swamp, the Titicut Swamp, and the Little Cedar Swamps, serves as the headwaters of the Town River, a tributary of the Taunton River, and overlays a system of high and medium yield aquifers that supply public drinking water wells in Raynham and West Bridgewater. The Stoughton and Whittenton Alternatives pass through this area.

***Pine Swamp***

Pine Swamp is a 275-acre wetland system located in western Raynham that consists of several parcels that are owned by the Town of Raynham Conservation Commission. The Stoughton Alternative (Electric and Diesel) crosses a 1-mile segment of the swamp between King Phillip Street and East Brittania Street. This area consists of forested and marsh wetlands associated with Pine Swamp, an area that is located within mapped Estimated Habitat of several rare wetlands species and supports an Atlantic white cedar swamp community.

Although there are no trails or designated points of public entry, the former rail right-of-way is used by pedestrians, all-terrain vehicles, off-road motorbikes, and other vehicles. The Stoughton Line and the former railroad bed through the conservation area is owned by the Taunton Municipal Light Corporation (TMLC), and maintained as a utility corridor with an overhead power line. The TMLC periodically maintains the right-of-way by clearing vegetation on the right-of-way and in the adjacent wetland.

***Assonet Cedar Swamp***

The Assonet Cedar Swamp Wildlife Sanctuary is a 1,000-acre parcel of conservation land owned by Mass Audubon in Lakeville. The land is designated by the state for the preservation of habitat for several rare

species, including the Hessel's hairstreak butterfly (*Callophrys hesseli*). It is one the largest Atlantic white cedar swamps in the state. The New Bedford Main Line passes through this sanctuary.

***Forge Pond***

Forge Pond is an irregularly shaped surface waterbody located mainly on the southwestern side of the Fall River Secondary. The Forge Pond Dam (MA00800) is located on the south side of Forge Pond and is classified non-jurisdictional by the DCR. A wetland complex of trees, shrubs, and emergent vegetation exists between the pond's edge and the tracks in several areas, especially along the northern edge of the pond. In the northern area, the wetland complex borders the tracks for approximately 1,600 feet and includes BVW, Bank and BLSF.

***Acushnet Cedar Swamp***

The Acushnet Cedar Swamp State Reservation is an approximately 1,000-acre property located in New Bedford and Dartmouth, north of the New Bedford Airport. It is an outstanding example of an Atlantic white cedar swamp and provides habitat for state-listed rare wetlands wildlife and other state listed rare, endangered, or special concern species. This is one of eight cedar swamps in public ownership in Massachusetts, and has been designated by the U.S. Department of the Interior – National Park Service as a National Natural Landmark. The existing New Bedford Main Line, currently used for freight rail service, forms the eastern boundary of the State Reservation.

***Three Mile River ACEC***

The recently-designated Three Mile River Watershed ACEC covers approximately 14,275 acres in Dighton, Norton, and Taunton. The ACEC is fragmented by Route 140, a major transportation corridor, and several other major roadways. It includes substantial upland areas that are developed commercial and residential lands as well as undeveloped forested upland and farmland. The Attleboro Secondary passes through the Three Mile River Watershed ACEC from Barrowsville in Norton to Crane Avenue in Taunton. This ACEC provides habitat for at least seven species listed as rare, endangered, or of special concern by NHESP.

***Canoe River Aquifer ACEC***

The Canoe River Aquifer ACEC covers approximately 17,200 acres in Easton, Foxborough, Mansfield, Norton, Sharon, and Taunton. The associated areas within this ACEC include Snake River, Watson Pond, and Lake Sabbatia. The ACEC is fragmented by several major transportation corridors, including I-495, Route 123, Route 106, and other major roadways. It includes substantial upland areas that are developed commercial and residential lands as well as undeveloped forested upland and farmland. The Northeast Corridor forms the western boundary of the ACEC from Mohawk Street in Sharon to Oakland Street in Mansfield. This ACEC contains another good example of an Atlantic White Cedar swamp community.

### 4.16.8.2 Existing Conditions by Municipality

This section presents the results of the field delineations of wetland resource areas along the FEIS/FEIR South Coast Rail alternatives, including the station sites and layover facilities. The following sections describe the wetland resource areas present in each municipality along the project corridor. Each section includes a table listing the wetland resource areas, as confirmed by each municipality's Conservation Commission.

This report only addresses those resource areas that are either within or directly adjacent to the South Coast Rail project right-of-way, or within or directly adjacent to the area of proposed stations that could be directly affected by construction. Other wetlands exist within 100 feet of the right-of-way, and their approximate locations are shown in the figures that accompany Chapter 4, but they were not field delineated at this planning stage of the project because they would not be directly impacted.

Any wetlands that are designated as Outstanding Resource Waters (ORWs) have been highlighted in the tables below. Wetlands designated as ORWs include all vernal pool wetlands, regardless of their certification status. All vernal pools were designated as ORWs in this report because all vernal pools were assumed to be certified vernal pools when determining impacts. Vernal pools are discussed in detail in the Chapter 4.14, Biodiversity, Wildlife, and Vegetation.

Federal jurisdictional wetlands include the state-regulated Land Under a Waterbody/Waterway (LUW), Bordering Vegetated Wetlands (BVW), Isolated Land Subject to Flooding (ILSF), and well as other small Isolated Vegetated Wetlands (IVW) that are not subject to state jurisdiction.

Plans showing the locations of all delineated wetland resource areas are provided in Appendix 4.16-C.

**Canton**

The Canton segment of the Stoughton alternative is approximately 2.3 miles long and is an active commuter and freight service on the Stoughton Line. Ten wetlands are located along the right-of-way in Canton.

An ANRAD was submitted to the Canton Conservation Commission in September 2011. Wetlands in Canton are part of the Neponset River watershed, and are comprised of four individual wetland systems and four isolated federal wetlands. Forge Pond (Wetland CA 1) and Mill Brook (Wetland CA 2.1) are the two large wetland systems along this segment of right-of-way. Mill Brook, a perennial stream, is part of a larger wetland system that flows into Beaver Meadow Brook. Wetland CA 1 is a large wetland system just south of Canton Center that includes Forge Pond and its adjacent wetland.

Table 4.16-4 lists the wetlands delineated along the right-of-way in Canton and the resources associated with each wetland.

There are four isolated wetlands along this section of existing track (Wetlands CA B1, CA B, CA C, and CA D). These wetlands are small depressions that appear to contain water for limited periods and are vegetated by plant species known to occur in wetlands.

**Table 4.16-4 Wetland Resource Areas–Canton**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| CA-A | PSS<br>Large common reed (*Phragmites australis*) marsh. Connected to a larger wetland across Sherman Street | - | - | ✓ | - | - | - | - |
| CA-A9 | PFO/PEM<br>Large depression containing standing water. Connected to large forested wetland adjacent to the railroad spur (offsite) | - | - | ✓ | - | - | - | - |
| CA-B1 | PEM<br>Emergent wetland with pockets of standing water | - | - | - | ✓ | - | - | - |
| CA-B | PSS<br>Small scrub-shrub wetland | - | - | - | ✓ | - | - | - |
| CA-C | PEM<br>Small emergent marsh | - | - | - | ✓ | - | - | - |
| CA-D | PEM<br>Wetland formed due to drainage received from a 12 inch RCP from parking lot | - | - | - | ✓ | - | - | - |
| CA-1 (100 series) | PFO/OW<br>Open Water with a bordering forested wetland associated with Forge Pond | ✓ | ✓ | ✓ | - | - | ✓ | - |
| CA-1 (200 series) | PFO/OW<br>Open Water with a bordering forested wetland associated with Forge Pond | ✓ | ✓ | ✓ | - | - | ✓ | - |
| CA-2.1 (100 series) | PFO/OW<br>Forested wetland system associated with Beaver Meadow Brook | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| CA-2.1 (200 series) | PFO/PSS/OW<br>Red maple wetland with scrub shrub components associated with Beaver Meadow Brook pond system | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| CA-BLSF-1 | Additional BLSF area not associated with any flagged wetland area | - | - | - | - | - | ✓ | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

### Stoughton

The Stoughton segment of the Stoughton alternative is approximately 4.2 miles long and contains active and inactive sections of the Stoughton Line. Twenty three wetlands are located along the right-of-way in Stoughton. The wetlands in Stoughton include forested areas dominated by red maple swamps and an unnamed perennial stream. An ANRAD was submitted to the Stoughton Conservation Commission in October 2011. The Commission issued an ORAD on June 19, 2012. Per the Commission's request, the resource areas of BLSF and ILSF were withdrawn from consideration. Table 4.16-5 lists the wetlands delineated along the right-of-way in Stoughton and the resources associated with each wetland.

**Table 4.16-5 Wetland Resource Areas–Stoughton**

| Wetland # | Cowardin Type and Description1 | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| STA-A1.2 | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| STA-A1 | PFO<br>Isolated depression | - | - | - | ✓ | - | - | - |
| ST-A | PFO<br>Connected to Wetland ST-B outside the limit of delineation | - | - | ✓ | - | - | ✓ | - |
| ST-B | Intermittent stream channel | ✓ | - | - | - | - | ✓ | - |
| ST-2.1 | PFO/PEM<br>Connected to Wetland ST-2 outside the limit of delineation | - | - | ✓ | - | - | - | - |
| ST-2.3 | PFO/OW<br>Forested wetland associated with perennial stream | ✓ | ✓ | ✓ | - | ✓ | - | - |
| ST-2 | PFO/OW<br>Perennial stream originating from unnamed pond east of Rte. 138 and flowing into Woods Pond | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| ST-3[3]<br>(100 series) | PEM/OW<br>Intermittent stream channel associated with a pond and its emergent wetland system | - | ✓ | ✓ | - | - | - | - |
| ST-3<br>(200 series) | PEM<br>Intermittent stream channel connected to Wetland ST-3 (100 series) | ✓ | - | ✓ | - | - | - | - |
| ST-4 | OW<br>Isolated depression with standing water and minimal emergent wetland vegetation | - | - | - | ✓ | - | - | - |
| ST-4A<br>(100 series) | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| ST-4A<br>(200 series) | Intermittent stream channel connected to Wetland ST-4A (100-series) | ✓ | - | - | - | - | - | - |

| Wetland # | Cowardin Type and Description1 | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| ST-6A (200 series) | PFO Forested wetland within the ROW, connected to Wetland ST-6A (100 series) via a culvert under rail bed | - | - | ✓ | - | - | - | - |
| ST-6A (100 series) | PFO Forested wetland within ROW | - | - | ✓ | - | - | - | - |
| ST-7 | PFO/PEM Large forested wetland with an intermittent stream channel | ✓ | - | ✓ | - | - | ✓ | - |
| ST-7.1 | Intermittent stream channel connected to Wetland ST-7 | ✓ | - | - | - | - | - | - |
| ST-7A | Intermittent stream channel connected to Wetland ST-6A upgradient via culvert under path | ✓ | - | ✓ | - | - | - | - |
| ST-9[3] | PEM/OW Large open marsh associated with Whitman Brook | - | ✓ | ✓ | - | - | - | - |
| ST-9A | Associated with Whitman Brook | - | - | ✓ | - | - | - | - |
| ST-10 (100 series) | PFO Forested wetland associated with intermittent stream | - | - | ✓ | - | - | - | - |
| ST-10 (200 series) | PFO Forested wetland along intermittent stream connected to Wetland ST-10 (100 series) | - | - | ✓ | - | - | - | - |
| ST-11 (100 series) | PEM Wet meadow | - | - | ✓ | - | - | - | - |
| ST-11[3] (200 series) | PEM Wet meadow | - | - | ✓ | - | - | - | - |
| ST-149.3 | PFO Small isolated depression | - | - | - | ✓ | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 BLSF and ILSF were withdrawn from the ANRAD application for Stoughton, and therefore neither resource area was confirmed by the Conservation Commission.

3 Shading denotes ORW.

Streams and wetlands along the right-of-way in Stoughton are part of two separate regional watersheds. Wetland systems in the northern portion of the town flow west and north into the Neponset River regional watershed, while wetlands flowing east and south are part of the Taunton River regional watershed. The Neponset River receives flow from Wetland ST 2, while the remaining wetlands south of Wetland ST 2 are tributaries to Whitman Brook, within the Taunton River watershed.

Blocked culverts and drainage ditches along the right-of-way have formed wetlands within the rail bed (Wetlands ST 6A (200 series), ST 6A (100 series), and ST 7). Wetland ST 2 (an unnamed perennial stream) flows under the tracks approximately 920 feet south of Brock Street. Wetland ST 9A is an intermittent

tributary to Whitman Brook that flows under the tracks approximately 1,170 feet south of the Stoughton Fish and Game Club access road.

### Easton

The Easton segment of the Stoughton alternative is approximately 7.1 miles long and is an inactive portion of the Stoughton Line. Sixty-nine wetlands are located along the right-of-way in Easton. The wetlands in Easton include extensive forested areas dominated by red maple swamps, a large Atlantic white cedar swamp within the Hockomock Swamp, several emergent marshes, and four perennial streams. An ANRAD was submitted to the Easton Conservation Commission in October 2011. The Commission issued an ORAD rejecting the delineation of wetland resource areas on April 11, 2012; MassDEP issued a Superseding ORAD filed by MassDOT on August 29, 2012. Per the Commission's request, the resource areas of BLSF and ILSF were withdrawn from consideration. Table 4.16-6 lists the wetlands delineated along the right-of-way in Easton and the resources associated with each wetland.

**Table 4.16-6 Wetland Resource Areas–Easton**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| EA-1 (100 series) | PFO Large forested wetland associated with an intermittent stream. Connected to Wetland EA-1 (200 series) | - | - | ✓ | - | - | - | - |
| EA-1 (200 series) | OW Intermittent stream | ✓ | - | - | - | - | - | - |
| EA-2[3] | PEM Certified vernal pool, connected to Wetland EA- 4 outside limit of delineation | - | - | ✓ | - | - | - | - |
| EA-4[3] | PEM Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-5 | PFO/OW Large forested wetland associated with an intermittent stream (BF 98 to 101) and Whitman Brook (200 and 300 series) | ✓ | ✓ | ✓ | - | ✓ | - | - |
| EA-5 (1) | PSS/OW Shrub scrub wetland associated with intermittent stream to Whitman Brook | ✓ | - | ✓ | - | - | - | - |
| EA-5.3 | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| EA-6 | PFO/PSS Forested wetland with shrub scrub components | ✓ | - | ✓ | - | - | ✓ | - |
| EA-6.1[3] | PFO/OW Intermittent stream connected to Wetland EA-5.3. Separated from Wetland EA-6 by unpaved walkway | ✓ | - | ✓ | - | - | - | - |
| EA-5.2 | PSS Small isolated wetland within ROW | - | - | - | ✓ | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| EA-6.2[3] | PSS<br>Connected to Wetland EA-6.1 outside limit of delineation | - | - | ✓ | - | - | - | - |
| EA-5 .1[3] | PSS<br>Certified vernal pool | - | - | - | ✓ | - | - | ✓ |
| EA-5 (2)[3] | PFO<br>Forested wetland associated with intermittent stream channel. Connected to Wetland EA-7 | ✓ | - | ✓ | - | - | - | - |
| EA-7[3] | PFO<br>Red maple swamp connected to a larger wetland outside limit of delineation | ✓ | - | ✓ | - | - | - | - |
| EA-8 | PFO<br>Red maple swamp connected to Wetland EA-9 under ROW by an intermittent channel | ✓ | - | ✓ | - | - | - | - |
| EA-9 | PSS<br>Intermittent stream channel connected to Wetlands EA-8 and EA-10 | ✓ | - | ✓ | - | - | - | - |
| EA-10 | PSS<br>Scrub-shrub wetland connected to Wetland EA-9 | - | - | ✓ | - | - | - | - |
| EA-11 | OW<br>Intermittent stream that flows beneath the ROW | ✓ | - | - | - | - | - | - |
| EA-12.1 | PFO/PSS<br>Connected to Wetland EA-12.2 by a culvert under Main Street | ✓ | - | ✓ | - | - | - | - |
| Wetland 1 | PSS<br>Small wetland associated with Queset Brook | - | - | ✓ | - | ✓ | ✓ | - |
| Wetland 2 | OW<br>Queset Brook (upstream) | ✓ | ✓ | - | - | ✓ | ✓ | - |
| Wetland 101 | OW<br>Queset Brook (downstream) | ✓ | ✓ | - | - | ✓ | - | - |
| EA-12.2 | PEM<br>Emergent marsh connected to Wetland EA-12.1 via culvert under Main Street | - | - | ✓ | - | - | - | - |
| EA-12.3 | PSS | ✓ | - | ✓ | - | - | - | - |
| EA-16.1 | PFO<br>Red maple dominated forested wetland | - | - | - | ✓ | - | - | - |
| EA-15 | OW<br>Large depression connected to Wetland EA-16 under ROW | - | - | ✓ | - | - | - | - |
| EA-16 | PEM<br>Connected to Wetland EA-15 under ROW | - | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| EA-19[3] | PEM<br>Emergent marsh containing a potential vernal pool | - | - | ✓ | - | - | - | - |
| EA-20.1[3] | PFO<br>Red maple swamp, certified vernal pool | - | - | - | ✓ | - | - | - |
| EA-20 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| EA-21 | PFO<br>Forested wetland connected to Wetland EA-22 under ROW | - | - | ✓ | - | - | - | - |
| EA-22[3] | PSS/PEM<br>Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-23 | PFO<br>Red maple swamp connected to Wetland EA-24 under ROW | - | - | ✓ | - | - | - | - |
| EA-24[3] | PFO<br>Forested wetland includes a certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-26.1 | PFO<br>Red maple dominated wetland | - | - | - | ✓ | - | - | - |
| EA-25 | PFO<br>Connected to Wetland EA-26 under ROW | - | - | ✓ | - | - | - | - |
| EA-26 | PSS<br>Connected to Wetland EA-25 under ROW | - | - | ✓ | - | - | - | - |
| EA-27 | PFO<br>Red maple dominated wetland | - | - | ✓ | - | - | - | - |
| EA-104[3] | PFO/PSS<br>Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-104A[3] | PFO<br>Certified vernal pool | - | - | ✓ | - | - | - | - |
| Upgradient of EA-96 | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| EA-99.1 | PFO/PSS<br>Forested wetland associated with the Black Brook wetland system | - | - | ✓ | - | - | - | - |
| EA-96 | PFO<br>Part of the Black Brook wetland system | - | - | ✓ | - | - | - | - |
| EA-94 | PFO<br>Forested wetland associated with Black Brook wetland system | - | - | ✓ | - | - | ✓ | - |
| EA-92.1 Crossing 1 | Black Brook and its associated wetland system, stream crossing under ROW connects to Wetland EA-92 (100 series) | ✓ | ✓ | - | - | ✓ | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| EA-92 (100 series) Crossing 1 | PFO/OW Black Brook and its associated wetland system stream crossing under ROW connects to Wetland EA-92.1 | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| EA-91 Crossing 2 | Black Brook and its associated wetland system, stream crossing under ROW connects to Wetland EA-92 (200 series) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| EA-92 (200 series) Crossing 2 | Black Brook and its associated wetland system, stream crossing under ROW connects to Wetland EA-91 | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| EA-84 | OW Intermittent stream connected to Wetland EA-86 | ✓ | - | - | - | - | ✓ | - |
| EA-86 | PSS Scrub-shrub wetland | - | - | ✓ | - | - | - | - |
| EA-81 | PFO/PEM Bordering an intermittent stream | ✓ | - | ✓ | - | - | ✓ | - |
| EA-82 | PFO Forested wetland connected to Wetland EA-81 under ROW | ✓ | - | ✓ | - | - | - | - |
| EA-82.1 | PSS | - | - | - | ✓ | - | - | - |
| EA-77[3] | PFO Certified vernal pool connected to Wetland EA-78 under ROW | ✓ | - | ✓ | - | - | - | - |
| EA-78[3] | PFO/OW Certified vernal pool | ✓ | - | ✓ | - | - | - | - |
| EA-76 | PFO Red maple dominated wetland | - | - | ✓ | - | - | - | - |
| EA-74 | PEM/OW Intermittent stream connected to Wetland EA-67 under ROW | ✓ | - | - | - | - | - | - |
| EA-67 | OW | ✓ | - | - | - | - | - | - |
| EA-73[3] | PFO Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-65 | PFO/PEM/OW | - | - | ✓ | - | - | - | - |
| EA-72[3] | PFO Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-66[3] | PSS/OW Certified vernal pool | - | - | - | ✓ | - | - | - |
| EA-72.1[3] | PFO Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-65.1[3] | PFO/OW Certified vernal pool | - | - | ✓ | - | - | - | - |
| EA-63 (100 series) | PFO/PSS/PEM/OW Hockomock Swamp ACEC, associated with intermittent stream | - | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] |
|---|---|---|---|---|---|---|---|---|
| EA-63[3] (200 series) Crossing 3 | PFO/PSS Hockomock Swamp ACEC BF series is associated with Black Brook | ✓ | ✓ | ✓ | - | ✓ | - | - |
| EA-64[3] (100 series) | PFO/PSS Hockomock Swamp ACEC, associated with intermittent stream | - | - | ✓ | - | - | - | - |
| EA-64 (200 series) Crossing 3 | PFO Hockomock Swamp ACEC BF series is associated with Black Brook, Crossing 3 | ✓ | ✓ | ✓ | - | ✓ | - | - |
| EA-64 (300 series) | PFO/PSS Hockomock Swamp ACEC | - | - | ✓ | - | - | - | - |
| EA-64 (400 series) | PSS Hockomock Swamp ACEC | - | - | ✓ | - | - | - | - |
| EA-64[3] (500 series) | PFO Hockomock Swamp ACEC | - | - | ✓ | - | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 BLSF and ILSF were withdrawn from the ANRAD application for Easton, and therefore neither resource area was confirmed by the Conservation Commission.

3 Shading denotes ORW.

Streams and wetlands along the right-of-way in Easton are part of the Taunton River regional watershed. Perennial streams and wetland systems along the right-of-way that discharge into this regional watershed include Whitman Brook, Queset Brook, Black Brook, and the Hockomock Swamp. Six of the fourteen stream crossings in Easton are perennial. These perennial stream crossings include Whitman Brook, Queset Brook, Black Brook, and a perennial tributary to Black Brook. Black Brook crosses the right-of-way in three separate locations. An intermittent stream has formed between Prospect Street and Purchase Street that flows in the right-of-way due to blocked culverts. This intermittent stream flows south and joins Wetland EA 96 that flows under Purchase Street. The right-of-way extends approximately 3.3 miles through the Hockomock Swamp ACEC. Wetlands EA 62 to EA 78, EA 99, and EA 102 are located within the ACEC.

### Raynham

The Raynham segment of the Stoughton alternative is approximately 4.9 miles long and is an inactive portion of the Stoughton Line. Twenty-nine wetlands are located along the right-of-way in Raynham. The wetlands in Raynham include extensive forested areas dominated by red maple swamps, two wetlands that contain Atlantic white cedar swamps (Hockomock Swamp and Pine Swamp), and three perennial streams. An ANRAD was submitted to the Raynham Conservation Commission in November 2011. The Raynham ORAD was issued August 30, 2012. Table 4.16-7 lists the wetlands delineated along the right-of-way in Raynham and the resources associated with each wetland.

Streams and wetlands along the right-of-way in Raynham are part of the Taunton River regional watershed. Perennial streams and bordering wetlands along the right-of-way that discharge into this regional watershed include streams within the Hockomock Swamp, Pine Swamp, and Pine Swamp Brook. Changes in drainage patterns and inadequate drainage along the right-of-way, south of the former Greyhound Park access road, have formed a perennial stream in the right-of-way. Three of the

six streams that cross the right-of-way in Raynham are perennial. These unnamed streams are associated with Wetlands R 12.1 and R-12.2 (Pine Swamp Brook), R 62.1 (unnamed stream), and R 116 and R 113 (unnamed stream). The right-of-way in Raynham extends through Hockomock Swamp for approximately 2.0 miles. The right-of-way also extends through Pine Swamp (Wetland RA 12) for approximately 1.0 mile.

**Table 4.16-7 Wetland Resource Areas–Raynham (Stoughton Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| EA-64[2] (500 series) | PFO Hockomock Swamp ACEC, connects to Wetland EA-63 (200 series) | - | - | ✓ | - | - | ✓ | - |
| EA-63[2] (200 series) | PFO Hockomock Swamp ACEC, connects to Wetland EA-64 (500 series) under ROW | - | - | ✓ | - | - | ✓ | - |
| R-62.1 | PSS/PEM/OW Perennial stream channel with associated bordering vegetated wetlands, connects to Wetlands R-60.1 and R-60 | ✓ | ✓ | ✓ | - | ✓ | - | - |
| R-60.1 | PEM Emergent marsh with PFO fringe, connects to Wetland R-62.1 | - | - | ✓ | - | - | - | - |
| R-61.1 | Intermittent stream channel connects to Wetland R-62.1 outside the limit of delineation | ✓ | - | - | - | - | - | - |
| R-61 | PSS Dominated by sweet pepperbush 104 connects to Wetland R-62.1 | - | - | ✓ | - | - | - | - |
| R-59 | PEM/PSS Sphagnum moss dominated marsh that transitions into a scrub shrub wetland | ✓ | - | ✓ | - | - | - | - |
| R-56 | PFO Hockomock Swamp ACEC, white pine and red maple dominated wetland | - | - | ✓ | - | - | - | - |
| R-49 | PFO Red maple dominated wetland, connects to Wetland R-50 under ROW | ✓ | - | ✓ | - | - | - | - |
| R-50 (100 & 200 series) | PFO Red maple dominated wetland, connects to Wetland R-49 under ROW | ✓ | - | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| R-44 | PFO<br>Red maple dominated wetland, connects to Wetland R-49 under Carver Street and Wetland R-2 under ROW | ✓ | - | ✓ | - | - | ✓ | - |
| RWB-2 (100 series) | PFO<br>Red maple dominated wetland, connects to Wetland R-44 under ROW | ✓ | - | ✓ | - | - | ✓ | - |
| RWB-2 (300 series) | PFO<br>Red maple dominated wetland, connects to Wetland RWB-2 (100 series) outside of delineation | - | - | ✓ | - | - | ✓ | - |
| R-117 | PFO<br>Red maple dominated wetland | - | - | ✓ | - | - | - | - |
| R-118 | OW<br>Intermittent stream channel with associated BVW outside the limit of delineation | ✓ | - | - | - | - | - | - |
| R-113 | PFO<br>Red maple dominated wetland with associated perennial stream, connects to Wetland R-116 under ROW | ✓ | ✓ | ✓ | - | ✓ | - | - |
| R-116[2] | PFO<br>Red maple dominated wetland with associated perennial stream, connects to Wetland R-113 under ROW | ✓ | ✓ | ✓ | - | ✓ | - | - |
| R-116A[2] | PFO<br>Red maple dominated | - | - | ✓ | - | - | - | - |
| R-12.2[2] | PFO<br>Red maple dominated wetland associated with Pine Swamp Brook (BF R 12.2 128 to 131) and an intermittent stream (BF R 12.2 161 to 164) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| R-12.1 (100 series) | PFO<br>White pine and red maple dominated wetland, connects to Wetland R-12.1 (300 series) outside limit of delineation | - | - | ✓ | - | - | ✓ | - |
| R-12.1 (200 series) | PFO<br>Red maple swamp | - | - | - | ✓ | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| R-12.1 (300 series) | PFO/PSS Red maple swamp associated with Pine Swamp Brook (R 12.1 BF 100 to 103) and an intermittent stream (R 12.1 BF 200 to 203). Connects to Wetland R-12.1 (100 series) outside limit of delineation | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| T-5[2] | PFO Red maple swamp, connects to Wetland T 4 under ROW | - | - | ✓ | - | - | - | - |
| T-4[2] | PEM/PFO Connects to Wetland T 5 under ROW | - | - | ✓ | - | - | - | - |
| T-3 | PFO Red maple swamp, connects to Wetland T 5 outside limit of delineation | - | - | ✓ | - | - | - | - |
| T-4.1 | PFO Red maple swamp, connects to Wetland T 4 outside limit of delineation | - | - | ✓ | - | - | - | - |
| T-2[2] | PFO Red maple swamp, connects to Wetland T 3 outside limit of delineation | - | - | ✓ | - | - | - | - |
| R-4 | Connects to Wetland R-5 outside limit of delineation | ✓ | - | - | - | - | - | - |
| R-5 | PFO Red maple dominated wetland, connects to Wetland R-4 outside limit of delineation | - | - | ✓ | - | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

The Raynham segment of the Whittenton Branch extends from Raynham Junction at Route 138 to the municipal border between Raynham and Taunton, approximately 1.2 miles. The entire length of this section is inactive. Four wetlands are located along the right-of-way of the Whittenton Branch in Raynham. These wetlands include forested areas dominated by red maple swamps, emergent marshes, and narrow wetlands along residential areas. One intermittent stream flows under the right-of-way. Streams and wetlands in Raynham are part of the Taunton River regional watershed. Table 4.16-8 lists the wetlands delineated along the right-of-way of the Whittenton Alternative in Raynham and the resources associated with each wetland.

**Table 4.16-8 Wetland Resource Areas–Raynham (Whittenton Alternative)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| EA-64[2] (500 series) | PFO Hockomock Swamp ACEC, connects to Wetland EA-63 (200 series) | - | - | ✓ | - | - | ✓ | - |
| EA-63[2] (200 series) | PFO Hockomock Swamp ACEC, connects to Wetland EA-64 (500 series) under ROW | - | - | ✓ | - | - | ✓ | - |
| R-62.1 | PSS/PEM/OW Perennial stream channel with associated bordering vegetated wetlands, connects to Wetlands R-60.1 and R-60 | ✓ | ✓ | ✓ | - | ✓ | - | - |
| R-60.1 | PEM Emergent marsh with PFO fringe, connects to Wetland R-62.1 | - | - | ✓ | - | - | - | - |
| R-61.1 | Intermittent stream channel connects to Wetland R-62.1 outside the limit of delineation | ✓ | - | - | - | - | - | - |
| R-61 | PSS Dominated by sweet pepperbush 104 connects to Wetland R-62.1 | - | - | ✓ | - | - | - | - |
| R-59 | PEM/PSS Sphagnum moss dominated marsh that transitions into a scrub shrub wetland | ✓ | - | ✓ | - | - | - | - |
| R-56 | PFO Hockomock Swamp ACEC, white pine and red maple dominated wetland | - | - | ✓ | - | - | - | - |
| R-49 | PFO Red maple dominated wetland, connects to Wetland R-50 under ROW | ✓ | - | ✓ | - | - | - | - |
| R-50 (100 & 200 series) | PFO Red maple dominated wetland, connects to Wetland R-49 under ROW | ✓ | - | ✓ | - | - | ✓ | - |
| R-44 | PFO Red maple dominated wetland, connects to Wetland R-49 under Carver Street and Wetland R-2 under ROW | ✓ | - | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| RWB-2 (100 series) | PFO Red maple dominated wetland, connects to Wetland R-44 under ROW | ✓ | - | ✓ | - | - | ✓ | - |
| RWB-2 (300 series) | PFO Red maple dominated wetland, connects to Wetland RWB-2 (100 series) outside of delineation | - | - | ✓ | - | - | ✓ | - |
| RWB-03[2] | PFO/PEM/OW Isolated forested depression with marsh outside of ROW. Potential vernal pool. | - | - | - | ✓ | - | - | - |
| RWB-02.1 | PFO/PEM Forested wetland with wet meadow outside of ROW. Connects to RWB-02 downgradient via culvert under ROW. | ✓ | - | ✓ | - | - | - | - |
| RWB-02 | PFO/PEM Forested wetland with large cattail marsh outside of ROW of 200 series. Connects to RWB-02.1 upgradient via culvert under ROW. | ✓ | - | ✓ | - | - | - | - |
| RWB-01[2] | PFO/PEM Isolated forested depression with marsh outside of ROW. Potential vernal pool. | - | - | - | ✓ | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

### Taunton

In Taunton, the Stoughton alternative includes segments of both the Stoughton Line and the New Bedford Main Line. The New Bedford Main Line segment is controlled by CSX; this segment extends from Weir Junction to Cotley Junction The two segments form one continuous track through Taunton approximately 4.7 miles long. Forty-four wetlands are located along the right-of-way in Taunton; these wetlands include four wetlands delineated in the locations of two proposed stations. The wetlands in Taunton include extensive forested areas dominated by red maple swamps, several ponds, and three perennial streams including the Taunton River. An ANRAD was submitted to the Taunton Conservation Commission in May 2011. The Commission issued an ORAD on August 10, 2011. This ORAD did not include the wetlands along the CSX-controlled portion of the right-of-way in Taunton because of lack of access. This segment encompasses wetlands from TCM-1.3 to TCM-7 West. Table 4.16-9 lists the wetlands delineated along the Stoughton Line segment of the right-of-way in Taunton and the resources

associated with each wetland. Table 4.16-10 lists the wetlands delineated along the New Bedford line segment of the right-of-way in Taunton and the resources associated with each wetland.

**Table 4.16-9 Wetland Resource Areas–Taunton (Stoughton Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| T-2[2] | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| T-42<br>(200 series) | PSS/PEM<br>Emergent wetland within the ROW | - | - | - | ✓ | - | - | - |
| T-42[2]<br>(100 series) | PEM<br>Emergent marsh | - | - | ✓ | - | - | - | - |
| T-43 | PEM<br>Emergent wetland | - | - | ✓ | - | - | - | - |
| T-41.2[2] | PEM<br>Small emergent wetland | - | - | ✓ | - | - | - | - |
| T-43.1 | PFO<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| T-43.2 | PFO<br>Forested wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| T-41.1[2] | PFO<br>Isolated wetland | - | - | - | ✓ | - | - | - |
| T-41.1.1 | PFO<br>Forested wetland bordering an intermittent stream. Connected to Wetland T-43.2 | ✓ | - | ✓ | - | - | - | - |
| T-41<br>(100 series) | PFO<br>Forested wetland | - | - | ✓ | - | - | - | - |
| T-41<br>(200 series) | PFO<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| T-41<br>(300 series) | PFO<br>Forested wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| T-40 | PFO<br>Forested wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| T-39[2] | PFO<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| TR<br>(Crossing 1) | OW<br>Taunton River | ✓ | ✓ | - | - | ✓ | - | - |
| T-34 | PFO<br>Forested wetland associated with Taunton River | - | - | ✓ | - | - | ✓ | - |
| T-37[2] | PFO<br>Forested wetland associated with Taunton River | - | - | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TR (Crossing 2) | OW/PFO<br>Taunton River (199 series and 300 series)<br>WF 304 to 307 (forested wetland)<br>TR 300 to 304 (backwaters of Taunton River) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| T-33[2] | PFO<br>Forested wetland associated with Mill River | - | - | ✓ | - | - | - | - |
| MR | OW<br>Mill River | ✓ | ✓ | - | - | ✓ | ✓ | - |
| TCM-1.3 | PFO<br>Forested wetland | - | - | ✓ | - | - | - | - |
| TCM-1 | PFO<br>Forested wetland | - | - | ✓ | - | - | ✓ | - |
| TCM-1.2[2] | OW/PFO<br>Forested wetland bordering Taunton River<br>BF 1 (north bank of Taunton River)<br>TCM 1.2 and TCM 1.1 (south bank of Taunton River)<br>TCM 1.3 WF series (PFO) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| TCM-1.1 | PFO<br>Forested wetland bordering Taunton River and Oakland Mills Pond | - | - | ✓ | - | - | ✓ | - |
| TCM-2 West[2] | PFO<br>Forested wetland, connected to with Wetland TCM-1 West | - | - | ✓ | - | - | ✓ | - |
| TCM-3 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| TCM-4 | PFO<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| TCM-5 | PFO<br>Small depression with a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-6[2] | PEM/PFO<br>Emergent wetland bordered by a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-7 East (200 series) | PFO<br>Red maple swamp. Separated from Wetland TCM-7 (100) by a stone wall | - | - | ✓ | - | - | - | - |
| Wetland 1 | PFO/PEM<br>Forested wetland with emergent marsh complex | - | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| Wetland 2[2] | OW/PEM<br>Open water with emergent marsh components. Connected to a larger wetland beyond limit of delineation | - | - | ✓ | - | - | - | - |
| Wetland 3[2] | PFO/PEM | - | - | ✓ | - | - | - | - |
| TCM-7 East (100 series) | PFO/PEM<br>Forested wetland with emergent wetland components | - | ✓ | ✓ | - | - | - | - |
| TCM-7 West | PEM<br>Connects to Wetland TCM-7 East via culvert under ROW | - | ✓ | ✓ | - | - | - | - |
| TCM-10 West (200 series) | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-10 West (100 series) | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-9 | PFO<br>Intermittent stream flowing along ROW. Changes to a forested wetland | ✓ | - | ✓ | - | - | - | - |
| TCM-11 | PFO/PEM<br>Red maple swamp with emergent wetland components | - | - | - | ✓ | - | - | - |
| TCM-12 | PFO/PEM<br>Red maple swamp with emergent wetland components | - | - | ✓ | - | - | - | - |
| TCM-13 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-11B | PFO<br>Forested wetland connected to Wetland TCM-14 under West Stevens Street | - | - | ✓ | - | - | - | - |
| TCM-14 (200 series) | PFO<br>Red maple swamp bordering an unnamed perennial stream in Berkley | - | ✓ | ✓ | - | - | - | - |
| BKCM-5 | PFO/OW<br>Red maple swamp bordering an unnamed perennial stream. Connected to Wetland TCM-14 (200 series) | ✓ | ✓ | ✓ | - | ✓ | - | - |

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2 Shading denotes ORW.

**Table 4.16-10 Wetland Resource Areas–Taunton (New Bedford Main Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TCM-1 | PFO<br>Forested wetland | - | - | ✓ | - | - | ✓ | - |
| TCM-1.2[2] | OW/PFO<br>Forested wetland bordering Taunton River<br>BF 1 (north bank of Taunton River)<br>TCM 1.2 and TCM 1.1 (south bank of Taunton River)<br>TCM 1.3 WF series (PFO) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| TCM-1.1 | PFO<br>Forested wetland bordering Taunton River and Oakland Mills Pond | - | - | ✓ | - | - | ✓ | - |
| TCM-2 West[2] | PFO<br>Forested wetland, connected to with Wetland TCM-1 West | - | - | ✓ | - | - | ✓ | - |
| TCM-3 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| TCM-4 | PFO<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| TCM-5 | PFO<br>Small depression with a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-6[2] | PEM/PFO<br>Emergent wetland bordered by a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-7 East (200 series) | PFO<br>Red maple swamp. Separated from Wetland TCM-7 (100) by a stone wall | - | - | ✓ | - | - | - | - |
| Wetland 1 | PFO/PEM<br>Forested wetland with emergent marsh complex | - | - | ✓ | - | - | - | - |
| Wetland 2[2] | OW/PEM<br>Open water with emergent marsh components. Connected to a larger wetland beyond limit of delineation | - | - | ✓ | - | - | - | - |
| Wetland 3[2] | PFO/PEM | - | - | ✓ | - | - | - | - |
| TCM-7 East (100 series) | PFO/PEM<br>Forested wetland with emergent wetland components | - | ✓ | ✓ | - | - | - | - |
| TCM-7 West | PEM<br>Connects to Wetland TCM-7 East via culvert under ROW | - | ✓ | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TCM-10 West (200 series) | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-10 West (100 series) | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-9 | PFO Intermittent stream flowing along ROW. Changes to a forested wetland | ✓ | - | ✓ | - | - | - | - |
| TCM-11 | PFO/PEM Red maple swamp with emergent wetland components | - | - | - | ✓ | - | - | - |
| TCM-12 | PFO/PEM Red maple swamp with emergent wetland components | - | - | ✓ | - | - | - | - |
| TCM-13 | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-11B | PFO Forested wetland connected to Wetland TCM-14 under West Stevens Street | - | - | ✓ | - | - | - | - |
| TCM-14 (200 series) | PFO Red maple swamp bordering an unnamed perennial stream in Berkley | - | ✓ | ✓ | - | - | - | - |
| BKCM-5 | PFO/OW Red maple swamp bordering an unnamed perennial stream. Connected to Wetland TCM-14 (200 series) | ✓ | ✓ | ✓ | - | ✓ | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

Streams and wetlands along the right-of-way in Taunton are part of the Taunton River regional watershed. Wetlands and streams along the right-of-way that discharge into the Taunton River watershed include the Taunton River and Mill River systems. All six stream crossings along the right-of-way in Taunton are perennial. The tracks bridge the Taunton River in four separate locations, including three locations between Route 44 and High Street. The Taunton River (Wetlands TCM 1.1 and TCM 1.2) flows under the tracks for a fourth time between Ingell and Hart Streets. The Mill River (Wetland T 33) is bridged by the tracks just north of High Street. Three wetlands (Wetlands 1, 2, and 3) are not in the right-of-way but are adjacent to the proposed Taunton Station site.

The Taunton segment of the Whittenton Branch extends from Raynham Junction, at the municipal border between Raynham and Taunton to Whittenton Junction, approximately 2.2 miles. The entire

length of this section is inactive. The Attleboro Secondary Line, an active rail line, extends from Whittenton Junction to Weir Junction, approximately 2.4 miles. Wetland inspections were not able to be performed along this active section of track due to lack of access. The majority of this section of track (approximately 1.7 miles) is a densely developed area between Danforth Street and Weir Junction. The remaining stretch of tracks between Whittenton Junction and Danforth Street (approximately 0.7 mile) was assessed using available information.

Thirteen wetlands are located along the right-of-way of the Whittenton Branch in Taunton, plus one additional isolated wetland along the Attleboro Secondary that was identified using available information. These 18 wetlands include forested areas dominated by red maple swamps, one Atlantic white cedar swamp, emergent marshes, and one perennial stream, the Mill River. Five additional intermittent streams flow under the right-of-way. Streams and wetlands are part of the Taunton River regional watershed. Table 4.16-11 lists the wetlands delineated along the right-of-way of the Whittenton Branch and New Bedford Main Line in Taunton and the resources associated with each wetland.

**Table 4.16-11 Wetland Resource Areas–Taunton (Whittenton Alternative)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TWB-10 | PFO/PEM<br>Forested wetland with marsh outside of ROW. Connects to TWB-11 upgradient via channel; connects to TWB-09 downgradient via culvert under ROW. | ✓ | - | ✓ | - | - | - | - |
| TWB-09 | PFO<br>Atlantic white cedar swamp; flooded. Connects to TWB-10 upgradient via culvert under ROW (western end of culvert blocked). | ✓ | - | ✓ | - | - | - | - |
| TWB-08.1 | PFO<br>Saturated portion of ROW at bottom of slope from Bay Street; extends for approx. 600 ft. | - | - | - | ✓ | - | - | - |
| TWB-08 | PFO<br>Forested wetland. Connects to TWB-07 downgradient via culvert under Whittenton Street outside of ROW. | ✓ | - | ✓ | - | - | - | - |
| TWB-07 | OW/PFO<br>Mill River with forested wetland along part of bank. Connects to TWB-06 upgradient under ROW. Connects to TWB-08 upgradient via channel/culvert under Whittenton Street outside of ROW. | ✓ | ✓ | ✓ | - | ✓ | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TWB-06 | OW/PFO<br>Mill River with forested wetland along part of bank. Connects to TWB-07 downgradient under ROW. Connects to TWB-05.1 upgradient via culvert under Warren Street outside of ROW. | ✓ | ✓ | ✓ | - | ✓ | - | - |
| TWB-05.1 | PFO/PSS<br>Two intermittent stream crossings under ROW, associated with forested and scrub-shrub area under power easement outside ROW. Connects to TWB-06 downgradient via culvert under Warren Street, and to TWB-05 upgradient via culvert under ROW. | ✓ | - | - | - | - | - | - |
| TWB-05 | PFO<br>Forested wetland. Connects to TWB-05.1 downgradient via culvert under ROW; connects to TWB-04 upgradient via culvert under ROW. | ✓ | - | ✓ | - | - | - | - |
| TWB-04 | PFO<br>Forested wetland. Connects to TWB-05 downgradient via culvert under ROW. | ✓ | - | ✓ | - | - | - | - |
| TWB-03.1 | PFO<br>Isolated forested wetland. | - | - | - | ✓ | - | - | - |
| TWB-03 | PFO<br>Forested wetland. | - | - | ✓ | - | - | - | - |
| TWB-02 | PFO<br>Forested wetland. Connects to TWB-01 upgradient via culvert under ROW. | - | - | ✓ | - | - | - | - |
| TWB-01 | PFO<br>Forested wetland. Connects to TWB-02 downgradient via culvert under ROW. | - | - | ✓ | - | - | - | - |
| TAA-19 | PFO<br>Wetland along Attleboro Secondary identified using available information | - | - | - | ✓ | - | - | - |
| TCM-1.3 | PFO<br>Forested wetland | - | - | ✓ | - | - | - | - |
| TCM-1 | PFO<br>Forested wetland | - | - | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TCM-1.2[2] | OW/PFO<br>Forested wetland bordering Taunton River<br>BF 1 (north bank of Taunton River)<br>TCM 1.2 and TCM 1.1 (south bank of Taunton River)<br>TCM 1.3 WF series (PFO) | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| TCM-1.1 | PFO<br>Forested wetland bordering Taunton River and Oakland Mills Pond | - | - | ✓ | - | - | ✓ | - |
| TCM-2 West[2] | PFO<br>Forested wetland, connected to with Wetland TCM-1 West | - | - | ✓ | - | - | ✓ | - |
| TCM-3 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| TCM-4 | PFO<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| TCM-5 | PFO<br>Small depression with a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-6[2] | PEM/PFO<br>Emergent wetland bordered by a forested overstory | - | - | ✓ | - | - | - | - |
| TCM-7 East (200 series) | PFO<br>Red maple swamp. Separated from Wetland TCM-7 (100) by a stone wall | - | - | ✓ | - | - | - | - |
| Wetland 1 | PFO/PEM<br>Forested wetland with emergent marsh complex | - | - | ✓ | - | - | - | - |
| Wetland 2[2] | OW/PEM<br>Open water with emergent marsh components. Connected to a larger wetland beyond limit of delineation | - | - | ✓ | - | - | - | - |
| Wetland 3[2] | PFO/PEM | - | - | ✓ | - | - | - | - |
| TCM-7 East (100 series) | PFO/PEM<br>Forested wetland with emergent wetland components | - | ✓ | ✓ | - | - | - | - |
| TCM-7 West | PEM<br>Connects to Wetland TCM-7 East via culvert under ROW | - | ✓ | ✓ | - | - | - | - |
| TCM-10 West (200 series) | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| TCM-10 West (100 series) | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-9 | PFO<br>Intermittent stream flowing along ROW. Changes to a forested wetland | ✓ | - | ✓ | - | - | - | - |
| TCM-11 | PFO/PEM<br>Red maple swamp with emergent wetland components | - | - | - | ✓ | - | - | - |
| TCM-12 | PFO/PEM<br>Red maple swamp with emergent wetland components | - | - | ✓ | - | - | - | - |
| TCM-13 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| TCM-11B | PFO<br>Forested wetland connected to Wetland TCM-14 under West Stevens Street | - | - | ✓ | - | - | - | - |
| TCM-14 (200 series) | PFO<br>Red maple swamp bordering an unnamed perennial stream in Berkley | - | ✓ | ✓ | - | - | - | - |
| BKCM-5 | PFO/OW<br>Red maple swamp bordering an unnamed perennial stream. Connected to Wetland TCM-14 (200 series) | ✓ | ✓ | ✓ | - | ✓ | - | - |
| BKCM-5 | PFO/OW<br>Red maple swamp bordering an unnamed perennial stream. Connected to Wetland TCM-14 (200 series) | ✓ | ✓ | ✓ | - | ✓ | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

### Berkley

In Berkley, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 2.9 miles of right-of-way, while the Fall River Secondary Line has approximately 0.8 mile of right-of-way, for a total of approximately 3.7 miles of right-of-way in Berkley.

Twenty-eight wetlands are located along the right-of-way in Berkley. Twenty wetlands occur along the New Bedford Main Line, while eight wetlands occur along the Fall River Secondary. The wetlands in Berkley include extensive forested areas dominated by red maple swamps and six perennial streams. An

ANRAD was submitted to the Berkley Conservation Commission in April 2011. The Commission issued an ORAD on June 1, 2011.

Table 4.16-12 lists the wetlands delineated along the New Bedford Main Line segment of the right-of-way in Berkley and the resources associated with each wetland. Table 4.16-13 lists the wetlands delineated along the Fall River Secondary segment of the right-of-way in Berkley and the resources associated with each wetland.

**Table 4.16-12 Wetland Resource Areas–Berkley (New Bedford Main Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| BKCM-5 | PFO<br>Red maple swamp borders an unnamed perennial stream | ✓ | ✓ | ✓ | - | ✓ | - | - |
| TCM-14 (200 series) | PFO/OW<br>Unnamed perennial stream. Connects to BKCM 5 under ROW | ✓ | ✓ | ✓ | - | ✓ | - | - |
| TCM-14 (100 series) | PFO<br>Red maple swamp | - | ✓ | ✓ | - | - | - | - |
| BKCM-6 | PFO<br>Red maple swamp connected to Wetland TCM-14 (100 series) under ROW | - | ✓ | ✓ | - | - | - | - |
| BKCM-1 | PSS<br>Scrub-shrub wetland connected to Wetland BKCM-8 under ROW | - | - | ✓ | - | - | - | - |
| BKCM-2[2] | PFO<br>Forested wetland | - | - | - | - | - | - | ✓ |
| BKCM-4[2] (100/200 series) | PFO/OW<br>Red maple swamp bordering Cotley River | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| BKCM-8 | PFO<br>Red maple swamp connected to Wetland BKCM-1 under ROW | - | - | ✓ | - | - | - | - |
| BKCM-9 | PFO<br>Red maple swamp. Part of Taunton River wetland system | - | - | ✓ | - | - | - | - |
| BKCM-10 (200 series) | PFO/OW<br>Red maple swamp associated with Cotley River | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| BKCM-10 (100 series) | PFO<br>Red maple swamp, separated from Wetland BKCM-10 (200 series) by upland berm | - | - | ✓ | - | - | - | - |
| BKCM-4 (300 series) | PFO<br>Red maple swamp that borders Cotley River | - | ✓ | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| BKCM-4 (400 series) | PFO/OW Cotley River with adjacent Red maple swamp | ✓ | ✓ | ✓ | - | ✓ | - | - |
| BKCM-13 | PFO Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| BKCM-18 .1 | PFO Red maple swamp within Cotley River wetland system | - | - | ✓ | - | - | - | - |
| BKCM-18 | PFO/OW Red maple swamp bordering Cotley River | ✓ | ✓ | ✓ | - | ✓ | - | - |
| BKCM-20 | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| BK-1.1 | PFO Small red maple swamp | - | - | - | ✓ | - | - | - |
| BK-1 | PSS Scrub-shrub wetland bordering an unnamed perennial stream | ✓ | ✓ | ✓ | - | ✓ | - | - |
| BKN-1 | PFO Red maple swamp bordering a perennial stream. | ✓ | ✓ | ✓ | - | ✓ | - | - |

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2 Shading denotes ORW.

Streams and bordering wetlands along the right-of-way in Berkley are part of the Taunton River regional watershed. The Cotley River and its bordering wetlands (Wetlands BKCM 4, 10, and 18) form the major wetland system along the right-of-way that discharges into the Taunton River. Six of the nine streams that cross the right-of-way in Berkley are perennial. Two of the perennial stream crossings are tributaries to the Cotley River, and are located between Cotley Street and Padelford Street. The Cotley River is bridged by the tracks approximately 3,500 feet south of Cotley Street, and approximately 2,800 feet south of the first crossing.

**Table 4.16-13 Wetland Resource Areas–Berkley (Fall River Secondary)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| BK-3.1 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| BK-3 | PSS<br>Isolated swamp. Separated from Wetland BK-3.1 by an upland berm | - | - | - | ✓ | - | - | - |
| BK-1B | Intermittent channel crosses ROW and connected to Wetland BK-2B | - | - | ✓ | - | - | - | - |
| BK-2B | Intermittent channel | - | - | ✓ | - | - | - | - |
| BK-4 | PFO<br>Red maple swamp bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| BK-7 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LKF-1 | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| LKF-2 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |

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### Lakeville

In Lakeville, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 3.5 miles of right-of-way, while the Fall River Secondary has approximately 0.3 mile of right-of-way, for a total of approximately 3.8 miles of right-of-way in Lakeville.

Twenty-five wetlands are located along the right-of-way in Lakeville. Nineteen wetlands occur along the New Bedford Main Line, while six wetlands occur along the Fall River Secondary. The wetlands in Lakeville include an extensive forested area dominated by red maple swamps and three perennial streams. An ANRAD was submitted to the Lakeville Conservation Commission in April 2011. The Commission issued an ORAD in March 2012.

Table 4.16-14 lists the wetlands delineated along the New Bedford Main Line segment of the right-of-way in Lakeville and the resources associated with each wetland. Table 4.16-15 lists the wetlands delineated along the Fall River Secondary segment of the right-of-way in Lakeville and the resources associated with each wetland.

**Table 4.16-14 Wetland Resource Areas–Lakeville (New Bedford Main Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| LK-2 | PFO<br>Red maple swamp | - | - | - | - | - | - | ✓ |
| LK-3 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-4 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-6 | PFO/OW<br>Pierce Brook & Cedar Swamp River (upstream) and Atlantic White Cedar Swamp | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| LK-7 | PFO/OW<br>Pierce Brook & Cedar Swamp River (downstream) and Atlantic White Cedar Swamp | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| LK-7 .1 | PFO<br>Small red maple swamp | - | - | - | ✓ | - | - | - |
| LK-9 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-10.1 | PSS<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| LK-10 | PFO/PSS<br>Red maple/scrub-shrub swamp | - | - | - | ✓ | - | - | - |
| LK-12.1 | PSS<br>Scrub-shrub swamp | - | - | ✓ | - | - | - | - |
| LK-12 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-13 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-14 | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| LK-16 | PFO<br>Red maple swamp bordering an intermittent stream, connected to Wetland LK-14 | ✓ | - | ✓ | - | - | - | - |
| LK-17 | PFO<br>Small red maple swamp | - | - | ✓ | - | - | - | - |
| LK-18 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-17.1 | OW<br>Intermittent stream in ROW | ✓ | - | ✓ | - | - | - | - |
| LK-19.1 | Intermittent stream in ROW; non-jurisdictional | - | - | - | - | - | - | - |
| LK-19.2 | Intermittent stream along edge of ROW; non-jurisdictional | - | - | - | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| LK-19[2] | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| LK-20 | PFO<br>Red maple swamp. Connected to Wetland LK-19 | - | - | ✓ | - | - | - | - |
| LK-21 West | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |

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2 Shading denotes ORW.

**Table 4.16-15 Wetland Resource Areas–Lakeville (Fall River Secondary)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| LKF-1 | PFO<br>Red maple swamp, borders an intermittent tributary to Cedar Swamp River | ✓ | - | ✓ | - | - | - | - |
| LKF-2 | PFO<br>Red maple swamp, borders the Cedar Swamp River | - | ✓ | ✓ | - | - | - | - |
| LKF-3.1 | PFO<br>Red maple swamp | - | - | ✓ | - | - | ✓ | - |
| LKF-3 | PFO/OW<br>Red maple swamp and Cedar Swamp River | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| LKF-1.1 | PFO<br>Red maple swamp, bordering the Cedar Swamp River | - | ✓ | ✓ | - | - | ✓ | - |
| LKF-4 | PSS<br>Part of the Cedar Swamp River system | - | ✓ | ✓ | - | - | ✓ | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

Streams and bordering wetlands along the right-of-way in Lakeville are part of the Taunton River and Buzzards Bay regional watersheds. The New Bedford Main Line segment of the right-of-way crosses a 1.5 mile segment of the Assonet Cedar Swamp. Pierce Brook and Cedar Swamp River flow through the Assonet Cedar Swamp; both join and ultimately flow to the Taunton River. An intermittent stream within Wetland LK-19 that crosses under the southern end of the New Bedford Main Line segment of the right-of-way and flows into Fall Brook is designated as an Outstanding Resource Water (ORW) because it discharges into Long Pond, a drinking water supply.

Three of the five stream crossings under the right-of-way in Lakeville are perennial. The Assonet River and Cedar Swamp River both flow under the New Bedford Main Line in Cedar Swamp (Wetlands LK 6 and LK 7). The Assonet River also flows under the Fall River Secondary segment (Wetlands LKF 1 and LKF 3) approximately 600 feet north of the Lakeville/Freetown town line. An intermittent stream has formed within the right-of-way south of Wetland LK 12.1 and Howland Road due to blocked drainage. This intermittent stream flows north into Wetland LK 12.1. A second intermittent stream has formed south of Wetland LK 17, again due to blocked drainage, and flows north into Wetland LK 17.

### Freetown

In Freetown, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 3.6 miles of right-of-way, while the Fall River Secondary Line has approximately 5.5 miles of right-of-way, for a total of approximately 9.1 miles of right-of-way in Freetown.

Eighty wetlands are located along the right-of-way in Freetown. Thirty eight wetlands occur along the New Bedford Main Line, while 42 wetlands occur along the Fall River Secondary. The wetlands in Freetown include extensive forested areas dominated by red maple swamps and four perennial streams. An ANRAD was submitted to the Freetown Conservation Commission in June 2011. The Commission issued an ORAD on January 23, 2012. The Freetown Station was excluded from the ORAD.

Table 4.16-16 lists the wetlands delineated along the New Bedford Main Line segment of the right-of-way in Freetown and the resources associated with each wetland. Table 4.16-17 lists the wetlands delineated along the Fall River Secondary segment of the right-of-way in Freetown and the resources associated with each wetland.

**Table 4.16-16 Wetland Resource Areas–Freetown (New Bedford Main Line)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| LK-20 | Red maple swamp | ✓ | - | ✓ | - | - | ✓ | - |
| LK-21 West (100 series) | PFO<br>Red maple swamp<br>Connected to Wetland LK-20 | ✓ | - | ✓ | - | - | ✓ | - |
| LK-21 West (200 series) | PFO<br>Red maple swamp<br>Connected to Wetland LK-21 West (100 series) | - | - | ✓ | - | - | - | - |
| LK-24 | PFO<br>Small Isolated red maple swamp | - | - | - | ✓ | - | - | - |
| LK-25 | PFO<br>Small Isolated red maple swamp | - | - | - | ✓ | - | - | - |
| LK-25.1 | PFO<br>Small Isolated red maple swamp | - | - | - | ✓ | - | - | - |
| FRN-2 | PFO/OW<br>Red maple swamp<br>Connected to Wetland LK-20 | ✓ | - | ✓ | - | - | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| FRN-3 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| LK-21 East | PFO<br>Red maple swamp | ✓ | - | ✓ | - | ✓ | ✓ | - |
| FRN-4 | PFO/PSS/OW<br>Bordering an unnamed perennial stream Connected to Wetland LK-21 East | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| FRN-4.1 | PSS<br>Scrub-shrub wetland | - | - | ✓ | - | - | - | - |
| FRN-6 | PSS | - | - | ✓ | - | - | ✓ | - |
| FRN-7 | PFO<br>Red maple swamp. Connected to Wetland FRN-13 | ✓ | - | ✓ | - | - | ✓ | - |
| FRN-8 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| FRN-9 | PFO/PEM<br>Red maple swamp with emergent marsh connected to Wetland FRN-13 | - | - | ✓ | - | - | - | - |
| FRN-13[2] | PFO/PSS<br>Intermittent tributary to Fall Brook | ✓ | - | ✓ | - | - | ✓ | - |
| FRN-11[2] | PFO/OW<br>Fall Brook | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| FRN-13.1[2] | PFO/OW<br>Fall Brook | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| FRN-14.1 | PFO<br>Isolated red maple swamp | - | - | - | ✓ | - | - | - |
| FRN-14 | PSS<br>Borders a stormwater swale outside the limits of delineation | - | - | ✓ | - | - | - | - |
| FRN-6B (100 series) | PEM | - | - | ✓ | - | - | - | - |
| FRN-6B (200 series) | PEM<br>Connected to Wetland FRN-6B (100 series) | - | - | ✓ | - | - | - | - |
| FRN-15 | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | ✓ | - |
| FRN-18 | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| FRN-19 | PFO<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| FRN-20 | PSS | - | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| FRN-20.1 | PFO<br>Forested wetland connected to Wetland FRN-20 | - | - | ✓ | - | - | - | - |
| FRN-20 West | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| FRN-AA | PFO<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| FRN-21C | Intermittent stream channel; non-jurisdictional | - | - | - | - | - | - | - |
| FRN-21 | PSS/PFO<br>Scrub-shrub wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| FRN-22 | PFO<br>Red maple swamp bordering an intermittent stream. Connected to Wetland FRN-23 | ✓ | - | ✓ | - | - | - | - |
| FRN-23 | PFO/PEM<br>Red maple swamp with wet meadow | ✓ | - | ✓ | - | - | - | - |
| FRN-24 | PFO<br>Red maple swamp | - | - | - | ✓ | - | - | - |
| FRN-25 | PFO/PEM<br>Borders an intermittent channel and connects to Wetland FRN-26 | ✓ | - | ✓ | - | - | - | - |
| FRN-26 | PFO/PEM | - | - | ✓ | - | - | - | - |
| FRN-25A | PEM | - | - | ✓ | - | - | - | - |
| FRN-27 | PFO/PEM<br>Forested wetland with intermittent stream connected to Wetland NB-1 | ✓ | - | ✓ | - | - | - | - |
| NB-1 | OW<br>Open channel | ✓ | ✓ | - | - | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

**Table 4.16-17 Wetland Resource Areas–Freetown (Fall River Secondary)**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| LKF-1A | PSS | - | - | ✓ | - | - | ✓ | - |
| LKF-1.1 | PSS/PEM | - | - | ✓ | - | - | ✓ | - |
| LKF-1 | PFO<br>Red maple swamp connected to Wetland FRF-1. Separated from Wetland LKF-1.1 by an upland mound. | - | - | ✓ | - | - | ✓ | - |
| FRF-1 | PSS<br>Connected to Wetland LKF-1 under ROW | - | - | ✓ | - | - | ✓ | - |
| FRF-1A | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| FRF-1B | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| FRF-2[2] | PFO/PEM<br>Red maple swamp associated with Cedar Swamp River | ✓ | ✓ | ✓ | - | ✓ | - | - |
| FRF-3 (100 series) | PFO/OW<br>Red maple swamp associated with Cedar Swamp River | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| FRF-3 (200 series) | PFO<br>Forested wetland connected to Wetland FRF-3 (100 series) | - | - | ✓ | - | - | - | - |
| FRF-4 | PFO | - | - | ✓ | - | - | - | - |
| FRF-6 | PFO/PSS<br>Connected to Wetland FRF-8 under ROW | ✓ | ✓ | ✓ | - | - | - | - |
| FRF-8[2] | PFO | - | ✓ | ✓ | - | - | - | - |
| FRF-9 | PFO<br>Forested wetland associated with Forge Pond. Connected to Wetland FRF-10 | - | ✓ | ✓ | - | - | - | - |
| FRF-10 | PFO<br>Red maple swamp associated with Forge Pond | - | - | ✓ | - | - | - | - |
| FRF-10.1.3 | PSS<br>Connected to a wetland across Richmond Road | - | - | ✓ | - | - | - | - |
| FRF-10.1.2 | PSS | - | - | - | ✓ | - | - | - |
| FRF-10.1.1 (100 series) | PFO<br>Forested wetland. Connected to a larger wetland east of ROW, outside limits of delineation. | ✓ | - | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| FRF-10.1.1 (200 series) | PFO Forested wetland bordering an intermittent stream channel connected to Wetland FRF-10.1.1 (100 series) under ROW | ✓ | - | ✓ | - | - | - | - |
| FRF-10.1 (100 series) | PFO Forested wetland. Connected to a larger wetland east of ROW, outside limit of delineation. | - | - | - | ✓ | - | - | - |
| FRF-10.1 (200 series) | PFO Small red maple swamp separated from Wetland FRF-10.1 by a stone wall. | - | - | - | ✓ | - | - | - |
| FRF-10.2 (100 series) | PSS Shrub-scrub wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| FRF-10.2 (200 series) | Intermittent stream channel | ✓ | - | - | - | - | - | - |
| FRF-10.2.1 | PFO Small isolated wetland | - | - | - | ✓ | - | - | - |
| FRF-10.3[2] | PFO Small isolated wetland | - | - | - | ✓ | - | - | - |
| FRF-12.5 | PFO/PSS Small isolated wetland | - | - | - | ✓ | - | - | - |
| FRF-11 | PFP/OW Red maple swamp bordering an unnamed pond | ✓ | ✓ | ✓ | - | - | ✓ | - |
| FRF-12 | PFP/OW Red maple swamp bordering an unnamed pond | ✓ | ✓ | ✓ | - | - | ✓ | - |
| FRF-A | OW Perennial stream (Rattlesnake Brook) | ✓ | ✓ | - | - | ✓ | ✓ | - |
| FRF-19.1[2] | PEM Small emergent wetland | - | - | - | ✓ | - | - | - |
| FRF-19[2] | PFO Red maple swamp | - | - | ✓ | - | - | - | - |
| Wetland 1 | PFO | - | | ✓ | - | - | - | - |
| Wetland 1A | PFO | - | | - | ✓ | - | - | - |
| Wetland 2 | PFO/PSS | - | | ✓ | - | - | - | - |
| Wetland 3 | PEM | - | | - | ✓ | - | - | - |
| Wetland 4 | PSS/PEM | - | | - | ✓ | - | - | - |
| Wetland 5 | PEM | - | | - | ✓ | - | - | - |
| Wetland 6 | PFO/OW | ✓ | | ✓ | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| FRF-21 | PFO<br>Large red maple swamp.<br>Connected to Wetland 6 | - | - | ✓ | - | - | - | - |
| FRF-23.1.1 | Unknown | - | - | ✓ | - | - | - | - |
| FRF-23.2.1 | Unknown | - | - | ✓ | - | - | - | - |
| FRF-26.2(A) | PSS<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| FRF-26.2 | PSS<br>Shrub-scrub wetland | - | - | ✓ | - | - | - | - |
| FRF-26.3 (A) | PFO/PEM<br>Forested wetland<br>Connected to Wetland FRF-26.2 | - | - | ✓ | - | - | - | - |
| FRF-26.3 | PFO<br>Forested wetland bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| FRF-26.1 | PFO<br>Forested wetland | - | - | ✓ | - | - | - | - |
| FRF-26.1.1 | PFO<br>Separated from FRF 26 by stone wall | - | - | ✓ | - | - | - | - |
| FRF-26 | PFO<br>Red maple swamp with an intermittent stream connected to Wetland FRF-26.1.1 | ✓ | - | ✓ | - | - | - | - |
| FRF-27 | PSS/OW<br>Scrub-shrub wetland bordering an intermittent stream that connects to Wetland FRF-29 (200 series) | ✓ | - | ✓ | - | - | - | - |
| FRF-29 (100 series) | PFO | - | - | ✓ | - | - | - | - |
| FRF-29 (200 series) | PFO<br>Forested wetland with an intermittent stream | ✓ | - | ✓ | - | - | ✓ | - |
| FRF-29.2 | OW<br>Intermittent stream channel | ✓ | - | - | - | - | ✓ | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

Streams and bordering wetlands along the New Bedford Main Line in Freetown are part of the Buzzards Bay regional watershed, while streams and bordering wetlands along the Fall River Secondary are part of the Taunton River regional watershed. Perennial streams in the Taunton River watershed include Terry Brook and Rattlesnake Brook. Wetlands FRF 11 and FRF 12 comprise Terry Brook Pond, which lies on both sides of the right-of-way, north of Copicut Road on the Fall River Secondary. Bordering wetlands along this segment also flow into the Assonet River before discharging into the Taunton River. Three of

the 14 streams bridged by the Fall River Secondary in Freetown [Fall Brook (Wetlands FRN 11 and FRN 13), Rattlesnake Brook (Wetland FRN 15), and an unnamed stream (Wetland FRF 26A)] are perennial. The Freetown Conservation Commission did not confirm BVW at the wetlands associated with the proposed station (Wetlands 1 through 6), but these wetlands are included in the table for informational purposes.

### New Bedford

The New Bedford segment of the Stoughton alternative is approximately 7.0 miles long and has active freight service along the New Bedford Main Line. Thirty-three wetlands are located along the right-of-way in New Bedford, three of which are isolated. The wetlands in New Bedford include extensive forested areas dominated by red maple and Atlantic white cedar swamps, and highly disturbed systems dominated by common reed (*Phragmites australis*) and other invasive plant species. An ANRAD was submitted to the New Bedford Conservation Commission in April 2011. The Commission issued an ORAD on July 12, 2011. Table 4.16-18 lists the wetlands delineated along the right-of-way in New Bedford and the resources associated with each wetland.

Streams and wetlands along the right-of-way in New Bedford are part of the Buzzards Bay regional watershed. The right-of-way in New Bedford crosses three stream channels, all of which are intermittent. Wetlands NB-21 and NB-22 are part of the Acushnet Cedar Swamp State Reservation, a Massachusetts State Park as well as a National Natural Landmark designated by the National Park Service.

**Table 4.16-18 Wetland Resource Areas–New Bedford**

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| FRN-27 | PFO/PEM<br>Forested wetland with intermittent stream connected to NB 1(100 series) | ✓ | - | ✓ | - | - | - | - |
| FRN-28 | PFO<br>Red maple swamp bordering an intermittent stream. Connect to NB 2 beyond limit of delineation | - | - | ✓ | - | - | - | - |
| NB-1 (100 series) | PSS/OW<br>Shrub scrub wetland associated with cranberry bog. Connected to NB 1. Pond eventually becomes an intermittent stream | ✓ | ✓ | ✓ | - | - | - | - |
| NB-2 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| NB-6 | PFO/PSS<br>Forested wetland with shrub-scrub components | - | - | ✓ | - | - | - | - |
| NB-1 (200 series) | PEM<br>Cranberry bog | ✓ | - | - | - | - | - | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| NB-8 | PFO/PSS<br>Red maple swamp with small areas of shrub scrub wetland. Separated from NB 6 by an upland berm | - | - | - | ✓ | - | - | - |
| NB-10 | PFO<br>Red maple swamp | - | - | ✓ | - | - | - | - |
| NB-12 | PSS<br>Shrub-scrub wetland | - | - | ✓ | - | - | - | - |
| NB-13 (100 series) | OW<br>Perennial stream with shrub-scrub components | ✓ | - | ✓ | - | ✓ | - | - |
| NB-13 (200 series) | OW<br>Perennial stream separated from NB 13 (100) by a footpath | ✓ | ✓ | ✓ | - | ✓ | - | - |
| NB-14[2] | PFO/PSS<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| NB-11 | PFO/PSS<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| NB-15 | OW<br>Perennial stream channel running parallel to ROW | ✓ | ✓ | ✓ | - | ✓ | - | - |
| NB-16 | PFO<br>Forested wetland, part of Acushnet Cedar Swamp | - | - | ✓ | - | - | - | - |
| NB-18 | PFO<br>Forested wetland, part of Acushnet Cedar Swamp | - | - | ✓ | - | - | - | - |
| NB-17 | PFO/PSS<br>Forested wetland bordering an intermittent stream | - | - | ✓ | - | - | - | - |
| NB-21 | PFO<br>Forested wetland, part of Acushnet Cedar Swamp | - | - | ✓ | - | - | - | - |
| NB-19 | PEM<br>Small isolated wetland | - | - | - | ✓ | - | - | - |
| NB-20 | OW<br>Perennial stream parallel to the ROW | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |
| NB-22[2] | PFO/OW<br>Perennial stream channel with bordering forested wetland, part of the Acushnet Cedar Swamp | ✓ | ✓ | ✓ | - | ✓ | ✓ | - |

| Wetland # | Cowardin Type and Description[1] | Bank | LUW | BVW | IVW | RA | BLSF | ILSF |
|---|---|---|---|---|---|---|---|---|
| NB-20.1 | PFO<br>Small forested wetland connected to Wetland NB20 | - | - | ✓ | - | - | - | - |
| NB-23 (200 series) | PFO<br>Red maple swamp | ✓ | - | ✓ | - | - | - | - |
| NB-23 (100 series) | PFO<br>Red maple swamp bordering an intermittent stream connected to NB 23 (200 series) | ✓ | - | ✓ | - | - | - | - |
| NB-24 | PFO/PEM<br>Forested wetland with emergent marsh | - | - | ✓ | - | - | - | - |
| NB-25 | PFO<br>Isolated depression | - | - | - | ✓ | - | - | - |
| NB-25.1 | PSS<br>Shrub scrub wetland associated with intermittent stream | - | - | ✓ | - | - | - | - |
| NBS (1) | PFO<br>Forested wetland | - | - | ✓ | - | - | - | - |
| NBS (2) | PFO/PEM<br>Forested wetland with emergent wetland along fringe | - | - | ✓ | - | - | - | - |
| NBS | PEM<br>Emergent wetland | - | - | ✓ | - | - | - | - |
| NB-28 | PFO/OW<br>Red maple swamp bordering an intermittent stream | ✓ | - | ✓ | - | - | - | - |
| WLF | PFO/PEM<br>Emergent marsh dominated -by common reed (*Phragmites australis*) | - | - | ✓ | - | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding.

2 Shading denotes ORW.

### Fall River

The Fall River segment of the Stoughton alternative is approximately 5.3 miles long and has active freight service along the Fall River Secondary. This segment of the right-of-way passes through high density residential, commercial, and industrial areas. Seventeen wetlands are located along the right-of-way in Fall River, one of which is an isolated federal wetland. The wetlands in Fall River include disturbed systems dominated by common reed and other invasive species, and one perennial stream. An ANRAD was submitted to the Fall River Conservation Commission in May 2011. The Commission issued an ORAD on July 12, 2011. Table 4.16-19 lists the wetlands delineated along the right-of-way in Fall River and the resources associated with each wetland.

**Table 4.16-19 Wetland Resource Areas–Fall River**

| Wetland # | Cowardin Type and Description[1] | Bank | Coastal Bank | LUW | BVW | IVW | RA | LSCSF | ILSF |
|---|---|---|---|---|---|---|---|---|---|
| FRF-29.1 | Intermittent stream channel under ROW | ✓ | - | - | - | - | - | - | - |
| FA-1B(1) | Intermittent stream channel | ✓ | - | - | - | - | - | - | - |
| FA-1B(2) | Intermittent stream channel | ✓ | - | - | - | - | - | - | - |
| FA-1A | Intermittent stream channel | ✓ | - | - | - | - | - | - | - |
| FA-1A(2) | PFO Small forested wetland connected to Wetland FA-1A | - | - | - | ✓ | - | - | - | - |
| FA-1 | PFO Disturbed forested wetland connected to FA-2 | - | - | - | ✓ | - | - | - | - |
| FA-2 | PFO/PSS Forested wetland connected to Taunton River | - | - | - | ✓ | - | - | ✓ | - |
| FA-3 | PFO Large forested wetland bordering an intermittent stream that is connected to Taunton River. | - | - | - | ✓ | - | - | ✓ | - |
| FA-3B | OW Taunton River | - | ✓ | ✓ | - | - | ✓ | ✓ | - |
| FA-3A | PEM Isolated depression | - | - | - | - | ✓ | - | - | - |
| SB[2] | OW Perennial Stream | - | ✓ | ✓ | - | - | ✓ | - | - |
| FA-5B | OW Taunton River | - | ✓ | ✓ | - | - | ✓ | ✓ | - |
| FA-6B | OW Taunton River | - | ✓ | ✓ | - | - | ✓ | ✓ | - |
| QR[2] | OW Quequechan River | ✓ | - | ✓ | - | - | ✓ | - | - |
| Wetland 1 | OW Open water associated with Crab Pond | ✓ | - | ✓ | - | - | - | - | - |
| Wetland 3 | PEM Disturbed emergent wetland within ROW dominated by common reed (*Phragmites australis*) | - | - | - | ✓ | - | - | - | - |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub. Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, LSCSF = Land Subject to Coastal Storm Flowage, ILSF = Isolated Land Subject to Flooding.

2 Not field delineated. Approximate limit of Bank retrieved from the MassGIS wetlands data layer.

Fall River is the only municipality along the South Coast Rail project corridor that has coastal wetland resource areas (five areas of Land Subject to Coastal Storm Flowage and four areas of Coastal Bank). Streams and bordering wetlands along the right-of-way in Fall River are part of the Narragansett Bay

regional watershed. All wetlands along the right-of-way in Fall River discharge into the Taunton River. Areas of the Taunton River along the right-of-way were delineated using ordinary high water lines.

### Summary

#### *Stoughton Alternative*

The South Coast Rail project corridor for the Stoughton Alternative contains 276 Bordering Vegetated Wetlands, 52 additional Isolated Vegetated Wetlands, and two areas of Isolated Land Subject to Flooding within or directly adjacent to the right-of-way. These 329 vegetated wetlands are subject to jurisdiction under Sections 404 and 401 of the Federal Clean Water Act. In addition, the Stoughton Alternative crosses (or is within Riverfront Area of) 52 perennial streams or rivers, and is within the 100 year floodplain in 69 locations. There are 70 waterbodies (perennial streams and ponds) along the South Coast Rail project corridor. A total of 136 areas of Bank (which include banks of perennial as well as intermittent streams, ponds, and any other waterbody) are present along the project corridor. Table 4.16-20 provides a summary of the number of different wetland resource types along the right-of-way, by municipality and in total.

**Table 4.16-20 Summary of Existing Conditions (Stoughton Alternative)**

| Municipality | Total Delineated Areas[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] | Coastal Bank | LSCSF |
|---|---|---|---|---|---|---|---|---|---|---|
| Canton | 10 | 4 | 4 | 6 | 4 | 2 | 5 | 0 | 0 | 0 |
| Stoughton | 23 | 9 | 4 | 15 | 3 | 2 | 4 | 0 | 0 | 0 |
| Easton | 72 | 29 | 9 | 55 | 8 | 10 | 10 | 1 | 0 | 0 |
| Raynham | 29 | 13 | 5 | 25 | 1 | 5 | 10 | 0 | 0 | 0 |
| Taunton | 44 | 10 | 8 | 35 | 7 | 5 | 8 | 0 | 0 | 0 |
| Berkley | 28 | 10 | 11 | 24 | 3 | 8 | 3 | 0 | 0 | 0 |
| Lakeville | 28 | 8 | 6 | 22 | 3 | 3 | 6 | 1 | 0 | 0 |
| Freetown | 87 | 36 | 12 | 61 | 19 | 7 | 21 | 0 | 0 | 0 |
| New Bedford | 32 | 11 | 5 | 28 | 3 | 5 | 2 | 0 | 0 | 0 |
| Fall River | 16 | 6 | 6 | 5 | 1 | 5 | 0 | 0 | 4 | 5 |
| **TOTAL** | **369** | **136** | **70** | **276** | **52** | **52** | **69** | **2** | **4** | **5** |

1 Delineated areas may qualify as more than one type of wetland resource area.
Wetland Classifications: LUW=Land Under Water, BVW = Bordering Vegetated Wetland, IVW = Isolated Vegetated Wetland, RA = Riverfront Area, BLSF = Bordering Land Subject to Flooding, LSCSF = Land Subject to Coastal Storm Flowage, ILSF = Isolated Land Subject to Flooding.

2 BLSF and ILSF were withdrawn from the ANRAD applications for the municipalities of Stoughton and Easton, and therefore neither resource area was confirmed by the Conservation Commissions from either municipality.

#### *Whittenton Alternative*

There are four wetland areas along the right-of-way of the Whittenton Branch in Raynham, and 13 wetland areas along the right-of-way of the Whittenton Branch in Taunton, plus one additional isolated wetland along the Attleboro Secondary that was identified using available information. All of these 18 wetlands are considered Waters of the United States, while 13 wetlands are considered state jurisdictional. The Whittenton Branch includes one perennial stream crossing and six intermittent stream crossings. All the streams and wetlands along the Whittenton Branch are in the Taunton River regional watershed. The South Coast Rail project corridor for the Whittenton Alternative as a whole

contains 351 total delineated wetland areas. Table 4.16-21 provides a summary of the number of different wetland resource types along the right-of-way of the Whittenton Alternative, by municipality and in total.

**Table 4.16-21 Summary of Existing Conditions (Whittenton Alternative)**

| Municipality | Total Delineated Areas[1] | Bank | LUW | BVW | IVW | RA | BLSF[2] | ILSF[2] | Coastal Bank | LSCSF |
|---|---|---|---|---|---|---|---|---|---|---|
| Canton | 10 | 4 | 4 | 6 | 4 | 2 | 5 | 0 | 0 | 0 |
| Stoughton | 23 | 9 | 4 | 15 | 3 | 2 | 4 | 0 | 0 | 0 |
| Easton | 72 | 29 | 9 | 55 | 8 | 10 | 10 | 1 | 0 | 0 |
| Raynham | 17 | 9 | 1 | 14 | 2 | 1 | 6 | 0 | 0 | 0 |
| Taunton | 38 | 12 | 7 | 32 | 5 | 4 | 4 | 0 | 0 | 0 |
| Berkley | 28 | 10 | 11 | 24 | 3 | 8 | 3 | 0 | 0 | 0 |
| Lakeville | 28 | 8 | 6 | 22 | 3 | 3 | 6 | 1 | 0 | 0 |
| Freetown | 87 | 36 | 12 | 61 | 19 | 7 | 21 | 0 | 0 | 0 |
| New Bedford | 32 | 11 | 5 | 28 | 3 | 5 | 2 | 0 | 0 | 0 |
| Fall River | 16 | 6 | 6 | 5 | 1 | 5 | 0 | 0 | 4 | 5 |
| **TOTAL** | **351** | **134** | **65** | **262** | **51** | **47** | **61** | **2** | **4** | **5** |

1 Delineated areas may qualify as more than one type of wetland resource area.

## 4.16.9 Analysis of Impacts

### 4.16.9.1 Introduction

Section 4.16.8 - Existing Conditions above identified the wetlands near each of the proposed station sites, layover facilities sites and railroad corridors associated with the South Coast Rail project alternatives. Section 4.16.9 (this section) identifies the impacts to wetland resources that may result from implementing each of the proposed South Coast Rail alternatives (inclusive of railroad alignments, train stations, and layover facilities).

Wetland resources are protected under several state and federal regulatory programs, including Section 404 of the (federal) Clean Water Act, the Massachusetts Clean Waters Act (MGL Chapter 21, §26-53) and the Massachusetts Wetlands Protection Act (310 CMR 10.00). Issues specific to Stormwater Management are addressed in Chapter 4.17, *Water Resources*; however, certain wetlands are protected and subject to higher standards of treatment prior to discharge. The alternatives discussed in this chapter are exempt from Local Wetland Bylaws as the project is a state transportation project.[32]

This section discusses environmental consequences as they relate to the proposed alternatives for the South Coast Rail project as well as historical impacts and reasonably foreseeable future impacts that help in the design and selection of mitigation for direct wetland impacts.

[32] MassDOT Interoffice Memorandum from M. Conyngham General Council to K. Walsh Director of Environmental Services dated May 2, 2011.

Some waterways are also regulated under MGL Chapter 91, which protects the public interest in tidelands, Great Ponds, and non-tidal rivers. More detail on compliance with regulations protecting coastal resources is provided in Chapter 4.18, *Coastal Zone Consistency and Chapter 91 – Compliance*. Potential impacts to ground and surface drinking water supplies, water supply protection districts, and stormwater management are discussed in Chapter 4.17, *Water Resources*. Important wetland wildlife habitat, such as vernal pools and Atlantic white cedar swamps would also be impacted by the South Coast Rail project. More detail on these resources is provided in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*. Cumulative impacts to wetlands are discussed in Chapter 5, *Indirect Effects and Cumulative Impacts*.

Wetland impacts are described quantitatively by specific wetland resources as well as qualitatively by functions and values. These direct and indirect impacts are discussed along with potential mitigation efforts and how they relate to the state and federal regulatory process. The direct and indirect assessment methodologies are discussed in Section 4.16.7. Section 4.16.9.2 identifies direct impacts, Section 14.16.9.3 identifies indirect impacts, Section 4.16.9.4 identifies general temporary construction period impact, and Section 4.16.9.5 summarizes the impacts by alternative. Section 4.16.10 presents mitigation approaches, and Section 4.16.11 discusses compliance with wetland regulations and the need for the Commissioner of MA DEP to issue a Variance for impacts associated with Bordering Vegetated Wetlands (BVW) and other resource areas.

### 4.16.9.2 Direct Impacts

This section evaluates the potential impacts to wetlands associated with the project alternatives that are being advanced for consideration. These alternatives include the No-Build Alternative (Enhanced Bus), the Stoughton Alternatives (Electric and Diesel), and the Whittenton Alternatives (Electric and Diesel). The alternatives considered would include the construction or rehabilitation of new railroads, stations, and layover facilities. Figure 1.4-1 shows the route for each alternative. The results of the analysis of direct wetland impacts along the South Coast Rail project alternatives are presented below. The direct impacts to wetland resource areas along the right-of-way are discussed. Direct impacts were calculated separately for federal vs. state jurisdictional resources, and area was tabulated by municipality, cover type, and watershed. The impacts presented include portions of the rail lines within the southern part of the South Coast Rail study area that are common to both rail alternatives, as well as any impacts associated with station improvements.

Using the methods of analysis previously described, permanent and temporary direct impacts were calculated to state wetland/aquatic resource areas in each municipality along the right-of-way:

- Bank;
- Bordering Vegetated Wetlands (BVW);
- Land Under Water (LUW);
- Bordering Land Subject to Flooding (BLSF);
- Isolated Land Subject to Flooding (ILSF);
- Riverfront Area (RA);

- Land Subject to Coastal Storm Flowage (LSCSF); and
- Coastal Bank.

The direct (permanent and temporary) impacts to the wetlands in each municipality are presented below.

Figures 4.16-2a-q, 4.16-3a-q, 4.16-4a-j, and 4.16-5a-e show the locations of all direct wetland impacts, as well as the functions and values provided by each wetland. For a more detailed view of existing wetlands within or adjacent to proposed station locations and layover facilities see Chapter 4.17, *Water Resources*.

**No-Build (Enhanced Bus) Alternative**

The No-Build Alternative would consist of enhancing current bus service along existing roads and highways. Three existing park-and-ride facilities would be modified as part of the No-Build Alternative:

- The West Bridgewater Park-and-Ride lot is located near the southwest corner of the intersection of Routes 106 and 24;
- The Mount Pleasant Street Park-and-Ride lot is located on the northwest corner of the intersection of King's Highway and Route 140 in New Bedford;
- The Silver City Galleria Park-and-Ride lot is located adjacent to the Silver City Galleria shopping mall in Taunton.

None of the park-and-ride facilities contains wetland resources nor would the proposed modifications be expected to impact wetland resources.

**Stoughton Electric Alternative**

The Stoughton Electric Alternative alignment would be comprised of a portion of the Northeast Corridor and the Stoughton Line (north of Weir Junction where it joins the New Bedford Main Line). This alternative would use the Northeast Corridor from South Station to Canton Junction, and the existing Stoughton Line from Canton Junction to the relocated Stoughton Station (Figures 4.16-2a-b). From that point, commuter rail service would be extended, using an out-of-service rail bed, south through Raynham Junction to Weir Junction in Taunton, where it would join the northern end of the Southern Triangle (Figures 4.16-b-q). The Southern Triangle portion of the project is common to the Stoughton and Whittenton alternatives and requires the rail bed, track, and signals along the existing Fall River Secondary and New Bedford Main Lines to be upgraded for passenger rail traffic. This portion of the project extends from Weir Junction in Taunton along the New Bedford Main Line through Berkley, Lakeville, Freetown, and New Bedford and along the Fall River Secondary from Myricks Junction in Lakeville through Freetown and Fall River (Figures 4.16-3a-q and 4.16-4a-j).

This alternative would include Battleship Cove Station, Canton Center Station, Canton Junction Station, Easton Village Station, Fall River Depot Station, Freetown Station, King's Highway Station, North Easton Station, Raynham Park Station, Stoughton Station, Taunton Station, Taunton Depot Station, and Whale's Tooth Station. Three existing train stations along the Stoughton Line would be reconstructed (Canton Center Station, Canton Junction Station, and Stoughton Station). Stoughton Station would be relocated to eliminate conflicts with traffic in Stoughton Center and to support downtown revitalization efforts.

Four new train stations would be constructed along this alignment (North Easton Station, Easton Village Station, Raynham Park Station, and Taunton Station). The alternative includes two layover facilities (Weaver's Cove East on the Fall River Secondary and Wamsutta on the New Bedford Main Line). Potential impacts to wetland resources resulting from developing the new stations and layover facilities are inclusive and not discussed separately.

No construction would be required along the Northeast Corridor. The existing Stoughton Line commuter rail track from Canton Junction to Stoughton would be upgraded for the Stoughton Electric Alternative. New track would be installed on the existing embankment from Stoughton south to Weir Junction. A section from Foundry Street in Easton to Raynham Station through the Hockomock Swamp would be constructed on an elevated trestle (Figures 4.16-2k-l). Canopy clearing would be required along the right-of-way where the elevated trestle would be located within the Hockomock Swamp, so as to accommodate additional height requirements associated with the trestle. Canopy clearing generally occurs within upland forest along the existing railroad grade, although portions would occur in wetland resources. Canopy clearing would not result in additional discharge of fill material into wetland resources as this work would occur from uplands (i.e., the existing railroad grade), without the necessity of temporary construction areas in wetlands. All canopy clearing in wetlands is accounted for in the 4-foot zone of temporary impact beyond the toe of slope. No work, or vegetation removal, would take place outside of the proposed limit of work. The amount of upland forest habitat impact was also calculated based on the limit of work line, which includes the zone of temporary impacts.

The alignment of the proposed Stoughton Alternative follows a previously developed railroad corridor. Although the rail corridor has been established, necessary track improvements would result in the loss of wetland resources along the right-of-way. The following sections describe both direct and indirect impacts as they relate to this alternative.

***Direct Impact to State and Federal Resource Areas by Municipality***

In addition to state resource areas, this section quantifies and discusses the federal waters of the United States. These wetlands are assumed jurisdictional under Section 404 of the Clean Water Act. These wetlands are also regulated at the state level by 314 CMR 9.00, which implements the federal Section 401 Water Quality Certification program for a discharge of dredged or fill material.

For the purposes of this assessment, waters of the United States are described as either waterbodies/waterways (WW) or vegetated wetlands (VW). The Section 404(b)(1) guidelines consider wetlands to be special aquatic sites. Using the analysis methods described previously, direct impacts (both permanent and temporary) were calculated to federal waters of the United States (including wetlands) in each municipality. Impacts were totaled for each municipality as a whole. The direct impacts to federal wetlands in each municipality are presented below. Although some small wetlands within the project corridor are isolated–i.e., they are not adjacent to any traditional navigable waters or tributaries thereto–the applicant is not asserting that these wetlands do not have a significant nexus to traditional navigable water. Therefore these wetlands are assumed to be jurisdictional waters of the United States under Section 404. The numbers of impacted waters/wetlands and the total size of the impact for each type of resource area are given for each municipality.

**Canton**—The Canton segment of the Stoughton alternative is approximately 2.3 miles long and is an active commuter and freight service on the Stoughton Line. Reconstructing the existing active rail line in Canton would result in permanent and temporary impact to BVW in two wetlands, with 1,200 square

feet (sf) (<0.1 acre) of permanent impact and 1,436 sf (<0.1 acre) of temporary impact, for a total of 2,636 sf (0.1 acre) of alteration to BVW. Bank would be permanently impacted in two locations, with a total of 90 linear feet (lf) impact. LUW would be temporarily impacted in one wetland, with a total of 229 sf (<0.1 acre) of impact. BLSF would be permanently impacted in five locations, with a total of 40,079 sf (0.9 acre) of impact. RA would be permanently impacted in one location, with a total of 17,257 sf (0.4 acre) of new development. Direct wetland impacts to BLSF and RA in Canton are primarily associated with Beaver Meadow Brook (Wetland CA 2.1). A small amount (less than 0.1 acre) of BVW fill would also occur in this wetland.

Reconstructing the existing active rail line in Canton for the South Coast Rail project would result in permanent impact to two VWs, with a total of 1,200 square feet (sf) (<0.1 acre) of permanent impact, and temporary impact to four VWs, with a total of 2,049 sf (<0.1 acre) of temporary impact. One WW would be temporarily impacted, with a total of 229 sf (0.1 acre) of temporary impact. Direct impacts in Canton would be mainly limited to VW impacts associated with Wetland CA 2.1, Beaver Meadow Brook. Table 4.16-22 lists the impacted wetlands in Canton and the size of each impacted area.

Stoughton—The Stoughton segment of the Stoughton alternative is approximately 4.2 miles long and contains active and inactive sections of the Stoughton Line. Reconstructing the existing active and inactive rail line in Stoughton would result in permanent impact to BVW in six wetlands, with 86,974 sf (2.0 acres) of impact, and temporary impact to BVW in five wetlands, with 6,198 sf (0.1 acre) of impact, for a total of 93,172 sf (2.1 acres) of alteration to BVW. Bank would be permanently impacted in three locations, with a total of 539 lf of impact. LUW would not be impacted. BLSF would be permanently impacted in one location, with a total of 32,008 sf (0.7 acre) of impact. RA would not be impacted.

The 2.0 acres of BVW fill in Stoughton is the largest amount in any municipality. Most of this fill (1.9 acres) is associated with Wetlands ST 6A and ST 7. The fill to Wetland ST 7 is the single largest area of BVW fill associated with the project and would result from constructing the new frontage road south of Morton Street. Additional direct wetland impacts in Stoughton would include approximately 470 lf of Bank associated with Wetland ST 7A, a small intermittent stream channel that flows within the right-of-way south from Wetland ST 6A (100 series). No state jurisdictional wetland impacts would occur in Stoughton from constructing the North Easton Station. The new frontage road would affect approximately 0.7 acre of BLSF.

**Table 4.16-22 Direct Impacts to State and Federal Resource Areas–Canton**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| CA-1 (200) | - | - | - | - | 229 | 5,387 | - | - | - | - | 229 | - | - |
| CA-2.1 (100) | 33 | 160 | 624 | - | - | 32,779 | - | 17,257 | 21,620 | - | - | 160 | 624 |
| CA-2.1 (200) | 57 | 1,040 | 812 | - | - | 375 | - | - | - | - | - | 1,040 | 812 |
| CA-1 (100) | - | - | - | - | - | 576 | - | - | - | - | - | - | - |
| CA-BLSF-1 | - | - | - | - | - | 962 | - | - | - | - | - | - | - |
| CA-B | - | - | - | - | - | - | - | - | - | - | - | - | 303 |
| CA-B1 | - | - | - | - | - | - | - | - | - | - | - | - | 310 |
| TOTAL | 90 | 1,200 | 1,436 | 0 | 229 | 40,079 | 0 | 17,257 | 21,620 | 0 | 229 | 1,200 | 2,049 |
| TOTAL (ac) | | <0.1 | <0.1 | 0.0 | <0.1 | 0.9 | 0.0 | 0.4 | 0.5 | 0.0 | <0.1 | <0.1 | <0.1 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

Reconstructing the existing active and inactive rail line in Stoughton would result in permanent impact to eight VWs, with a total of 90,729 sf (2.1 acres) of impact, and temporary impact to six VWs, with a total of 6,504 sf (0.1 acre) of impact. No WW impacts would occur. The 2.1 acres of fill to VWs in Stoughton is the largest amount that would occur in any municipality. Most of this fill (1.9 acres) is associated with Wetlands ST 6A and ST 7 and would result from constructing the new frontage road south of Morton Street. One VW, Wetland ST 149.3, would be filled to construct the North Easton Station. Table 4.16-23 lists the impacted wetlands in Stoughton and the size of each impacted area.

**Easton**—The Easton segment of the Stoughton alternative is approximately 7.1 miles long and is an inactive portion of the Stoughton Line. Reconstructing the existing inactive rail line in Easton would result in permanent impact to BVW in nine wetlands, with 14,828 sf (0.3 acre) of impact, and temporary impact to BVW in 13 wetlands, with 8,719 sf (0.2 acre) of impact, for a total of 23,547 sf (0.5 acre) of alteration to BVW. Bank would be permanently impacted in four locations, with a total of 5,423 lf of impact. LUW would not be impacted. BLSF would be permanently impacted in two locations, with a total of 36,526 sf (0.8 acre) of impact. RA would be permanently impacted in four locations, with a total of 35,715 sf (0.8 acre) of new development.

Unavoidable direct impacts to BLSF and RA would be primarily associated with Whitman Brook (Wetland EA 5), Black Brook (Wetlands EA 92.1 and 91), and Queset Brook (Wetland 2), all of which cross the right-of-way. Wetland EA 92.1 also has 0.8 acre of BLSF associated with it. An intermittent stream has formed within the right-of-way upgradient of Wetland EA 96 due to blocked drainage ditches; relocating this channel would result in 5,350 lf of bank impact. Additional direct wetland impacts in Easton would include 0.3 acre of BVW fill. The majority (0.2 acre) of this fill occurs in Wetland EA 12.1, a narrow wetland area that has formed within the right-of-way. No direct impacts would occur in the Hockomock Swamp because the tracks would be on an elevated trestle.

Constructing the North Easton Station would permanently impact 319 sf (<0.1 acre) of BVW in Wetland EA 1 (100). Constructing the Easton Village Station would permanently impact 1,552 sf (<0.1 acre) of BLSF in Wetland 101 and 5,749 sf (0.1 acre) of RA in Wetland 2. Both wetlands are associated with Queset Brook.

Reconstructing the existing inactive rail line in Easton would result in permanent impact to 11 VWs, with a total of 18,134 sf (0.4 acre) of impact, and temporary impact to 15 VWs, with a total of 9,265 sf (0.2 acre) of impact. No WW impacts would occur. Direct impacts in Easton would include 0.4 acre of fill to VWs. The majority (0.2 acre) of this fill occurs in Wetland EA 12.1, a narrow wetland area that has formed within the right-of-way. Other direct impacts are to six areas that have been designated as certified vernal pools along the right-of-way. No direct impacts would occur in the Hockomock Swamp because the tracks would be on an elevated trestle. Constructing the North Easton Station would permanently impact 319 sf (<0.1 acre) of VW in Wetland EA 1 (100). No federal resource areas would be impacted from constructing the Easton Village Station. Table 4.16-24 lists the impacted wetlands in Easton and the size of each impacted area.

**Table 4.16-23 Direct Impacts to State and Federal Resource Areas–Stoughton**

| | Bank | BVW | | LUW | | BLSF[1] | ILSF[1] | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| STA-A1.2 | 45 | - | - | - | - | - | - | - | - | | | | |
| ST-A | - | 161 | 216 | - | - | - | - | - | - | - | - | 161 | 216 |
| ST-3 (100) | - | 399 | 781 | - | - | - | - | - | - | - | - | 399 | 781 |
| ST-4 | - | - | - | - | - | - | - | - | - | - | - | 1,146 | 306 |
| ST-4A (200) | 25 | - | - | - | - | - | - | - | - | | | | |
| ST-6A (200) | - | 21,102 | 761 | - | - | - | - | - | - | - | - | 21,102 | 761 |
| ST-6A (100) | - | 12,010 | - | - | - | - | - | - | - | - | - | 12,010 | - |
| ST-7 | - | 51,538 | 4,422 | - | - | 32,008 | - | - | - | - | - | 51,538 | 4,422 |
| ST-7A | 469 | 1,764 | 18 | - | - | - | - | - | - | - | - | 1,764 | 18 |
| ST-149.3 | - | - | - | - | - | - | - | - | - | - | - | 2,609 | - |
| TOTAL | 539 | 86,974 | 6,198 | 0 | 0 | 32,008 | 0 | 0 | 0 | 0 | 0 | 90,729 | 6,504 |
| TOTAL (ac) | | 2.0 | 0.1 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | 0.1 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD application for the municipality of Stoughton, and therefore neither resource area was confirmed by the Conservation Commission. Information for these resource areas is approximate.

**Table 4.16-24 Direct Impacts to State and Federal Resource Areas–Easton**

| | Bank | BVW | | LUW | | BLSF[1] | ILSF[1] | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | | (sf) |
| EA-1 (200) | 30 | - | - | - | - | - | - | - | - | - | - | - | - |
| EA-1 (100) | - | 319 | 303 | - | - | - | - | - | - | - | - | 319 | 303 |
| EA-2 | - | 796 | 596 | - | - | - | - | - | - | - | - | 796 | 596 |
| EA-5 | - | - | - | - | - | - | - | 11,134 | 8,309 | - | - | - | - |
| EA-6.1 | - | - | 116 | - | - | - | - | - | - | - | - | - | 116 |
| EA-7 | 38 | 111 | 87 | - | - | - | - | - | - | - | - | 111 | 87 |
| EA-12.2 | - | 1,151 | 137 | - | - | - | - | - | - | - | - | 1,151 | 137 |
| EA-12.1 | - | 10,920 | 1,723 | - | - | - | - | - | - | - | - | 10,920 | 1,723 |

| | Bank | BVW | | LUW | | BLSF[1] | ILSF[1] | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | | (sf) |
| EA-12.3 | - | - | - | - | - | - | - | - | - | - | - | 2,127 | 221 |
| EA-16 | - | 355 | 1,084 | - | - | - | - | - | - | - | - | 355 | 1,084 |
| EA-22 | - | - | 116 | - | - | - | - | - | - | - | - | - | 116 |
| EA-24 | - | 828 | 2,553 | - | - | - | - | - | - | - | - | 828 | 2,553 |
| EA-25 | - | 199 | 832 | - | - | - | - | - | - | - | - | 199 | 832 |
| EA-26.1 | - | - | - | - | - | - | - | - | - | - | - | 1,179 | 325 |
| EA-27 | - | - | 819 | - | - | - | - | - | - | - | - | - | 819 |
| EA-104A | - | 149 | 136 | - | - | - | - | - | - | - | - | 149 | 136 |
| Upgradient of EA-96 | 5,350 | - | - | - | - | - | - | - | - | - | - | - | - |
| EA-77 | - | - | 217 | - | - | - | - | - | - | - | - | - | 217 |
| EA-78 | 5 | - | - | - | - | - | - | - | - | - | - | - | - |
| Wetland 101 | - | - | - | - | - | 1,552 | - | - | - | - | - | - | - |
| Wetland 2 | - | - | - | - | - | - | - | 5,749 | 8,411 | - | - | - | - |
| EA-92.1 | - | - | - | - | - | 34,974 | - | 5,249 | 9,249 | - | - | - | - |
| EA-91 | - | - | - | - | - | - | - | 13,583 | 25,351 | - | - | - | - |
| TOTAL | 5,423 | 14,828 | 8,719 | 0 | 0 | 36,526 | 0 | 35,715 | 51,319 | 0 | 0 | 18,134 | 9,265 |
| TOTAL (ac) | | 0.3 | 0.2 | 0.0 | 0.0 | 0.8 | 0.0 | 0.8 | 1.2 | 0 | 0 | 0.4 | 0.2 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD application for the municipality of Easton, and therefore neither resource area was confirmed by the Conservation Commission. Information for these resource areas is approximate.

**Raynham**—The Raynham segment of the Stoughton alternative is approximately 4.9 miles long and is an inactive portion of the Stoughton Line. Reconstructing the existing inactive rail line in Raynham would result in permanent impact to BVW in 17 wetlands, with 58,628 sf (1.3 acres) of impact, and temporary impact to BVW in 21 wetlands, with 41,403 sf (0.9 acre) of impact for a total of 100,031 sf (2.3 acres) of alteration to BVW. Bank would be permanently impacted in eight locations, with a total of 6,994 lf of impact. LUW would be permanently impacted in two wetlands, with a total of 66,528 sf (1.5 acres) of impact, and temporarily impacted in four wetlands, with a total of 3,639 sf (0.1 acre) of impact. BLSF would be permanently impacted in three locations, with a total of 126,940 sf (2.9 acres) of impact. RA would be permanently impacted in three locations, with a total of 110,368 sf (2.5 acres) of new development.

Raynham has some of the largest direct wetland impacts along the project corridor. Blocked drainage ditches have forced water to travel down the right-of-way, which has formed a perennial stream (Wetland R 62.1). Relocating this stream to one side of the right-of-way would create impacts to over 6,500 lf of Bank, 204 sf of BVW, 1.5 acres of LUW, and 2.3 acres of RA to reconstruct the railroad and to construct Raynham Park Station. Additional direct wetland impacts in Raynham would include 77 lf of Bank impact, 18,578 sf (0.4 acre) of BVW impact, and 76,126 sf (1.7 acres) of BLSF to Wetlands R 12.2 and R 12.1 (300), at Pine Swamp Brook, in the Pine Swamp area.

Reconstructing the existing inactive rail line in Raynham would result in permanent impact to 17 VWs, with a total of 58,628 sf (1.3 acres) of impact, and temporary impact to 21 VWs, with a total of 41,403 sf (1.0 acre) of impact. Two WW areas would be permanently impacted, with a total of 66,528 sf (1.5 acres) of impact, and four WW areas would be temporarily impacted, with a total of 3,639 sf (0.1 acre) of impact.

Raynham would have some of the largest direct wetland impacts along the project corridor. Blocked drainage ditches have forced water to travel down the right-of-way and formed a perennial stream (Wetland R 62.1). Relocating this stream to one side of the right-of-way would create impacts to 204 sf of VW and over 1.5 acres of WW to reconstruct the railroad and to construct Raynham Park Station. Additional direct impacts in Raynham would include fill to VWs in Wetlands R 12.2 and R 12.1 (0.4 acre) in Pine Swamp. Table 4.16-25 lists the impacted wetlands in Raynham and the size of each impacted area.

In response to comments on the DEIS/DEIR the feasibility of constructing a trestle through Pine Swamp was evaluated. The current design for the Stoughton Alternative includes an at-grade track structure through the Pine Swamp, utilizing the existing embankment to carry the proposed track. A trestle option similar to the structure proposed for the Hockomock Swamp was evaluated but was found to be not practicable based on cost and logistics.

**Table 4.16-25 Direct Impacts to State and Federal Resource Areas–Raynham**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| EA-63 (200) | - | 4,813 | 3,163 | - | - | 32,900 | - | - | - | - | - | 4,813 | 3,163 |
| EA-64 (500) | - | 381 | 447 | - | - | - | - | - | - | - | - | 381 | 447 |
| R-62.1 | 6,579 | 204 | 67 | 66,334 | 401 | - | - | 100,449 | 158,950 | 66,334 | 401 | 204 | 67 |
| R-59 | - | 641 | 2,004 | - | - | - | - | - | - | - | - | 641 | 2,004 |
| R-61 | - | 522 | 389 | - | - | - | - | - | - | - | - | 522 | 389 |
| R-50 | - | 367 | 647 | - | - | - | - | - | - | - | - | 367 | 647 |
| R-49 | 66 | 13,209 | 5,950 | - | - | - | - | - | - | - | - | 13,209 | 5,950 |
| R-50 (100) | - | 3,293 | 3,115 | - | - | - | - | - | - | - | - | 3,293 | 3,115 |
| R-44 | 7 | 742 | 1,554 | - | - | 17,914 | - | - | - | - | - | 742 | 1,554 |
| RWB-02 (100) | 9 | - | 187 | - | - | - | - | - | - | - | - | - | 187 |
| RWB-02 (300) | - | - | 389 | - | - | - | - | - | - | - | - | - | 389 |
| R-118 | 175 | - | - | - | - | - | - | - | - | - | - | - | - |
| R-113 | 83 | 412 | 642 | - | 2,361 | - | - | - | - | - | 2,361 | 412 | 642 |
| R-116 | - | - | - | - | 601 | - | - | 6,788 | 13,557 | - | 601 | 161 | 496 |
| R-116 | - | 161 | 496 | - | - | - | - | - | - | | | | |
| R-116A | - | - | 124 | - | - | - | - | - | - | - | - | - | 124 |
| R-12.2 | 57 | 18,578 | 14,537 | 194 | 276 | 76,126 | - | 2,927 | 8,919 | 194 | 276 | 18,578 | 14,537 |
| R-12.1 (300) | 19 | - | 2,130 | - | - | - | - | - | - | - | - | - | 2,130 |
| T-5 | - | 3,341 | 1,388 | - | - | - | - | - | - | - | - | 3,341 | 1,388 |
| T-4 | - | 577 | 725 | - | - | - | - | - | - | - | - | 577 | 725 |
| T-3 | - | 1,693 | 863 | - | - | - | - | - | - | - | - | 1,693 | 863 |
| T-4.1 | - | 438 | 858 | - | - | - | - | - | - | - | - | 438 | 858 |
| T-2 | - | 9,256 | 1,729 | - | - | - | - | - | - | - | - | 9,256 | 1,729 |
| TOTAL | 6,994 | 58,628 | 41,403 | 66,528 | 3,639 | 126,940 | 0 | 110,164 | 181,426 | 66,528 | 3,639 | 58,628 | 41,403 |
| TOTAL (ac) | | 1.3 | 1.0 | 1.5 | 0.1 | 2.9 | 0.0 | 2.5 | 4.2 | 1.5 | 0.1 | 1.3 | 1.0 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

Pine Swamp is a 275-acre wetland system located in western Raynham and consisting of several properties that are owned by the Town of Raynham Conservation Commission. The Stoughton Line crosses the swamp in a one-mile segment from King Phillip Street to East Britannia Street (Figures 4.16-1o and p). This area consists of forested and marsh wetlands known as Pine Swamp, an area that is located within estimated habitat of rare wetlands species, and which supports an Atlantic white cedar swamp community. Pine Swamp is currently fragmented by the former railroad bed, which acts as a barrier to aquatic organisms except at the two culverts. The swamp is also fragmented by the Taunton Municipal Light Corporation's overhead power line that is maintained as a cleared utility corridor parallel to the existing railroad embankment. The Taunton Municipal Light Corporation (TMLC) currently uses the embankment as access for maintenance of their overhead wires. With the proposed new rail in place, they would be required to use a high-rail vehicle to perform this function. A separate access road is not required and will not be constructed.

Pine Swamp is a small (relative to the Hockomock) wetland ecosystem that is not recognized as an ACEC or Important Bird Area. It does not have extensive vernal pool complexes adjacent to the existing elevated embankment or track bed, and does not support state-listed salamanders or turtles. The only state-listed species present is a butterfly (Hessel's hairstreak). The area immediately adjacent to the existing embankment is a power line where invasive species including common reed have become established.

The currently proposed At-Grade design would cost approximately $5 Million, and would result in permanent BVW impacts of approximately 18,600 square feet of wetland. Wildlife passage would be provided by reconstructing the two existing stream crossings with extended culverts (which provide a shelf or bank on either side of the waterway to allow a passage for non-aquatic wildlife), and by adding at least four wildlife underpasses. These wildlife underpasses will maintain travel passages for species that may be unable to cross the tracks (salamanders, frogs, turtles, small mammals) as well as enhance travel passages for small mammals that may be deterred from crossing an active rail line. Drift fences will be installed that will facilitate wildlife passage by directing movement to these underpasses.

A trestle structure, similar to the structure proposed for the Hockomock Swamp, would consist of two distinct cross sections – a 1,000-foot transition at each end and a central trestle structure, approximately 3,300 feet long. The transition would include a cast-in-place (CIP) retained fill section that would vertically transition from the standard at-grade track cross section to the trestle at a grade of one percent. The retained fill section has would have an overall width of 28 to 30 feet. The cast-in-place retaining walls would maintain a vertical barrier along each side of the track to minimize wetland impacts as the track profile rose up to the level of the trestle. The trestle would consist of a prestressed concrete superstructure. The overall width of the superstructure would be 21 feet, supported on pile caps spaced every 30 feet. The bottom of the superstructure would be approximately three feet above the existing track bed to allow for inspection and maintenance, which translates to the top of rail profile rising up above the existing embankment as much as 9.5 feet. This solution reduces wetland impacts to only those locations where the pier caps and transition retaining walls extend into the bordering vegetated wetlands.

The Trestle Option would cost approximately $50 Million, which includes engineering and construction costs. Other alternatives may be considered beyond the common bridge types, however it is not anticipated that any savings would be significant enough to make the trestle a viable option. This option would result in filling approximately 3,800 square feet of wetland.

Because Pine Swamp does not provide extraordinary biodiversity values, a trestle would not provide significant biodiversity or rare species benefits. The cost increase (ten times the cost of the At-Grade Alternative) is not warranted and the trestle is not practicable based on cost. Proposed wildlife crossing structures would mitigate for the effects of reconstructing the At-Grade Option, and the proposed Mechanically Stabilized Earth MSE retaining walls would minimize wetland impacts.

**Taunton**—In Taunton, the Stoughton alternative includes segments of both the Stoughton Line and the New Bedford Main Line. The New Bedford Main Line segment extends from Weir Junction to Cotley Junction. The two segments form one continuous track through Taunton approximately 4.7 miles long. Reconstructing the existing active and inactive rail lines in Taunton would result in permanent impact to BVW in 20 wetlands, with 63,313 sf (1.5 acres) of impact, and temporary impact to BVW in 24 wetlands, with 55,795 sf (1.3 acres) of impact, for a total of 119,108 sf (2.7 acres) of alteration to BVW. Bank would be permanently impacted in four locations, with a total of 468 lf of impact. LUW would be temporarily impacted in one wetland, with a total of 1,067 sf (<0.1 acre) of impact. BLSF would be permanently impacted in six locations, with a total of 33,290 sf (0.8 acre) of impact. RA would be permanently impacted in four locations, with a total of 55,523 sf (1.3 acres) of new development.

Taunton has some of the largest direct wetland impacts along the project corridor. Several wetlands have formed partially or mostly within the inactive right-of-way and would be impacted. Additional direct wetland impacts in Taunton would include 0.7 acre of RA and 0.5 acre of BLSF associated with the Taunton River (Wetlands TCM 1.2 and TR (Crossing 2)).

Reconstructing the existing active and inactive rail line in Taunton would result in permanent impact to 24 VWs, with a total of 83,685 sf (1.9 acres) of impact, and temporary impact to 27 VWs, with a total of 58,790 sf (1.3 acres) of impact. One WW would be temporarily impacted, with a total 1,067 sf (<0.1 acre) of impact. Taunton would have some of the largest direct wetland impacts along the project corridor. Several wetlands have formed partially or mostly within the inactive right-of-way and would be impacted. Table 4.16-26 lists the impacted wetlands in Taunton and the size of each impacted area.

**Table 4.16-26 Direct Impacts to State and Federal Resource Areas–Taunton**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| T-42 (100) | - | 2,730 | 2,519 | - | - | - | - | - | - | - | - | 2,730 | 2,519 |
| T-42 (200) | - | - | - | - | - | - | - | - | - | - | - | 15,220 | - |
| T-43 | - | 1,042 | 762 | - | - | - | - | - | - | - | - | 1,042 | 762 |
| T-41.2 | - | - | 329 | - | - | - | - | - | - | - | - | - | 329 |
| T-41.1 | - | - | - | - | - | - | - | - | - | - | - | 334 | 540 |
| T-41.1.1 | - | - | 171 | - | - | - | - | - | - | - | - | - | 171- |
| T-43.2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| T-41 (100) | - | 3,173 | 2,167 | - | - | - | - | - | - | - | - | 3,173 | 2,167 |
| T-40 | - | - | - | - | 1,067 | - | - | - | - | - | 1,067 | - | - |
| T-39 | - | - | - | - | - | - | - | - | - | - | - | 416 | 467 |
| T-37 | - | 476 | 1,474 | - | - | 1,738 | - | - | - | - | - | 476 | 1,474 |
| T-34 | - | 3,008 | 2,489 | - | - | 4,498 | - | - | - | - | - | 3,008 | 2,489 |
| T-33 | - | 198 | 662 | - | - | - | - | - | - | - | - | 198 | 662 |
| MR | 9 | - | - | - | - | 3,348 | - | - | - | - | - | - | - |
| TCM-1 | - | 7,421 | 1,079 | - | - | - | - | - | - | - | - | 7,421 | 1,079 |
| TCM-1.2 | - | 617 | 4,806 | - | - | 4,938 | - | 10,467 | 18,169 | - | - | 617 | 4,806 |
| TCM-2WEST | - | 865 | 2,202 | - | - | - | - | - | - | - | - | 865 | 2,202 |
| TCM-1.1 | - | - | 563 | - | - | 1,554 | - | - | - | - | - | - | 563 |
| TCM-3 | - | - | - | - | - | - | - | - | - | - | - | 4,403 | 1,987 |
| TCM-5 | - | 6,299 | 1,204 | - | - | - | - | - | - | - | - | 6,299 | 1,204 |
| TCM-7EAST (200) | - | 7,038 | 2,652 | - | - | - | - | - | - | - | - | 7,038 | 2,652 |
| TCM-6 | - | 8,299 | 12,030 | - | - | - | - | - | - | - | - | 8,299 | 12,030 |
| TCM-7EAST (100) | - | 3,173 | 4,955 | - | - | - | - | - | - | - | - | 3,173 | 4,955 |
| TCM-7WEST | - | 6,367 | 3,736 | - | - | - | - | - | - | - | - | 6,367 | 3,736 |
| TCM-10WEST (200) | - | 1,189 | 990 | - | - | - | - | - | - | - | - | 1,189 | 990 |
| TCM-10WEST (100) | - | 1,246 | 1,198 | - | - | - | - | - | - | - | - | 1,246 | 1,198 |
| TCM-9 | 283 | 5,763 | 1,659 | - | - | - | - | - | - | - | - | 5,763 | 1,659 |

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| TCM-12 | - | 665 | 1,155 | - | - | - | - | - | - | - | - | 665 | 1,155 |
| TCM-11B | - | - | 1,801 | - | - | - | - | - | - | - | - | - | 1,801 |
| TCM-14 (200) | - | 3,100 | 2,838 | - | - | - | - | - | - | - | - | 3,100 | 2,838 |
| TR (Crossing 1) | - | - | | - | - | - | - | 15,866 | 8,983 | - | - | - | - |
| TR (Crossing 2) | 174 | 643 | 2,355 | - | - | 17,214 | - | 21,893 | 28,059 | - | - | 643 | 2,355 |
| BKCM-5 | - | - | - | - | - | - | - | 7,297 | 13,512 | - | - | - | - |
| TOTAL | 468 | 63,313 | 55,795 | 0 | 1,067 | 33,290 | 0 | 55,523 | 68,722 | 0 | 0 | 83,685 | 58,790 |
| TOTAL (ac) | | 1.5 | 1.3 | 0.0 | <0.1 | 0.8 | 0.0 | 1.3 | 1.6 | 0.0 | 0.0 | 1.9 | 1.3 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**Berkley**—In Berkley, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 2.9 miles of right-of-way, while the Fall River Secondary Line has approximately 0.8 mile of right-of-way, for a total of approximately 3.7 miles of right-of-way in Berkley.

Reconstructing the existing active rail lines in Berkley would result in permanent impact to BVW in 14 wetlands, with 61,247 sf (1.4 acres) of impact, and temporary impact to BVW in 19 wetlands, with 42,056 sf (1.0 acre) of impact, for a total of 103,303 sf (2.4 acres) of alteration to BVW. Bank would be permanently impacted in two locations, with a total of 233 lf of impact. LUW would not be impacted. BLSF would be permanently impacted in two locations, with a total of 7,325 sf (0.2 acre) of impact. RA would be permanently impacted in four locations, with a total of 48,648 sf (1.1 acres) of new development.

The largest direct wetland impacts in Berkley are those associated with the Cotley River, which is bridged twice along the project corridor and also flows directly adjacent to the right-of-way for several hundred feet. Reconstructing the rail line would require widening the existing berm, impacting wetlands associated with the river. Direct wetland impacts associated with the Cotley River would include 1.0 acre of RA and 0.7 acre of BVW fill to four wetland areas (Wetlands BCKM 4 (100), BKCM 10 (200), BKCM 4 (400), and BKCM 18).

Reconstructing the existing active rail lines in Berkley would result in permanent impact to 14 VWs, with a total of 65,402 sf (1.5 acres) of impact, and temporary impact to 18 VWs, with a total of 42,057 sf (1.0 acre) of impact. No WW impacts would occur. The largest direct impacts in Berkley are in vegetated wetlands associated with the Cotley River, which is bridged by the tracks twice along the project corridor and also flows directly adjacent to the right-of-way for several hundred feet. Reconstructing the rail line would require widening the existing berm, causing impacts to wetlands associated with the river. Direct impacts associated with the Cotley River include 0.7 acre of fill to four VWs (Wetlands BCKM 4 (100), BKCM 10 (200), BKCM 4 (400), and BKCM 18). Table 4.16-27 lists the impacted wetlands in Berkley and the size of each impacted area.

**Table 4.16-27 Direct Impacts to State and Federal Resource Areas–Berkley**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| BKCM-5 | - | - | - | - | - | - | - | 6,951 | 13,613 | - | - | - | - |
| TCM-14 (100) | - | 4,210 | 2,049 | - | - | - | - | - | - | - | - | 4,210 | 2,049 |
| BKCM-6 | - | - | 141 | - | - | - | - | - | - | - | - | - | 141 |
| BKCM-1 | - | 712 | 793 | - | - | - | - | - | - | - | - | 712 | 793 |
| BKCM-8 | - | - | 119 | - | - | - | - | - | - | - | - | - | 119 |
| BKCM-4 (100) | 202 | 10,926 | 7,614 | - | - | 1,881 | - | 25,208 | 36,723 | - | - | 10,926 | 7,614 |
| BKCM-10 (200) | - | - | 350 | - | - | 5,444 | - | - | - | - | - | - | 350 |
| BKCM-4 (200) | - | - | 120 | - | - | - | - | - | - | - | - | - | 120 |
| BKCM-18.1 | - | 5,847 | 1,856 | - | - | - | - | - | - | - | - | 5,847 | 1,856 |
| BKCM-4 (300) | - | 1,335 | 1,430 | - | - | - | - | - | - | - | - | 1,335 | 1,430 |
| BKCM-4 (400) | - | 18,734 | 9,367 | - | - | - | - | 8,238 | 12,828 | - | - | 18,734 | 9,367 |
| BKCM-18 | - | 295 | 4,294 | - | - | - | - | 8,251 | 15,201 | - | - | 295 | 4,294 |
| BKCM-13 | - | 164 | 835 | - | - | - | - | - | - | - | - | 164 | 835 |
| BKCM-20 | - | 700 | 3,246 | - | - | - | - | - | - | - | - | 700 | 3,246 |
| BK-1.1 | - | - | - | - | - | - | - | - | - | - | - | 4,156 | - |
| BK-1 | 31 | 9,903 | 4,178 | - | - | - | - | - | - | - | - | 9,903 | 4,178 |
| BKN-1 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| BK-2B | - | 5,963 | 1,721 | - | - | - | - | - | - | - | - | 5,963 | 1,721 |
| BK-4 | - | - | 108 | - | - | - | - | - | - | - | - | - | 108 |
| BK-7 | - | 414 | 1,336 | - | - | - | - | - | - | - | - | 414 | 1,336 |
| LKF-2 | - | 2,043 | 2,500 | - | - | - | - | - | - | - | - | 2,043 | 2,500 |
| TOTAL | 233 | 61,247 | 42,056 | 0 | 0 | 7,325 | 0 | 48,648 | 78,365 | 0 | 0 | 65,402 | 42,057 |
| TOTAL (ac) | | 1.4 | 1.0 | 0.0 | 0.0 | 0.2 | 0.0 | 1.1 | 1.8 | 0.0 | 0.0 | 1.5 | 1.0 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**Lakeville**—In Lakeville, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 3.5 miles of right-of-way, while the Fall River Secondary has approximately 0.3 mile of right-of-way, for a total of approximately 3.8 miles of right-of-way in Lakeville.

Reconstructing the existing active rail lines in Lakeville would result in permanent impact to BVW in 10 wetlands, with 34,442 sf (0.8 acre) of impact, and temporary impact to BVW in nine wetlands, with 23,382 sf (0.5 acre) of impact, for a total of 57,824 sf (1.3 acres) of alteration to BVW. Bank would be permanently impacted in three locations, with a total of 606 lf of impact. LUW would be temporarily impacted in one wetland, with a total of 829 sf (<0.1 acre) of impact. BLSF would be permanently impacted in one location, with a total of 2,623 sf (0.1 acre) of impact. RA would be permanently impacted in two locations, with a total of 33,439 sf (0.8 acre) of new development.

The largest direct wetland impacts in Lakeville are those associated with the Assonet Cedar Swamp area and the Cedar Swamp River. Wetland LK 7 would receive 0.5 acre of BVW fill and 0.6 acre of RA impact. Additional direct wetland impacts in Lakeville would include 0.2 acre of BVW fill to nine other wetland areas on the New Bedford Main Line and Fall River Secondary.

Reconstructing the existing active rail lines in Lakeville would result in permanent impact to 11 VWs, with a total of 34,563 sf (0.8 acre) of impact, and temporary impact to 10 VWs, with a total of 23,622 sf (0.5 acre) of impact. One WW would be temporarily impacted, with a total of 829 sf (<0.1 acre) of impact. The largest direct impacts in Lakeville would be in wetlands associated with the Assonet Cedar Swamp and the Cedar Swamp River. Wetland LK 7 would receive 0.5 acre of fill. Additional direct impacts in Lakeville would include 0.2 acre of fill to nine other VWs along the New Bedford Main Line and Fall River Secondary. Table 4.16-28 lists the impacted wetlands in Lakeville and the size of each impacted area.

**Table 4.16-28 Direct Impacts to State and Federal Resource Areas–Lakeville**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| LK-4 | - | 2,499 | 1,503 | - | - | - | - | - | - | - | - | 2,499 | 1,503 |
| LK-7 | - | 23,608 | 17,267 | - | - | - | - | 26,313 | 31,601 | - | - | 23,608 | 17,267 |
| LK-7.1 | | | | | | | | | | - | - | 121 | 238 |
| LK-12.1 | - | 2,664 | - | - | - | - | - | - | - | - | - | 2,664 | - |
| LK-13 | - | 178 | 416 | - | - | - | - | - | - | - | - | 178 | 416 |
| LK-17.1 | 469 | 4,135 | 1,854 | - | - | - | - | - | - | - | - | 4,135 | 1,854 |
| LK-19 | - | 126 | 76 | - | - | - | - | - | - | - | - | 126 | 76 |
| LK-20 | 21 | - | - | - | - | - | - | - | - | - | - | - | - |
| LKF-1 | 116 | - | - | - | - | - | - | - | - | - | - | - | - |
| LKF-3.1 | - | 644 | 1,032 | - | - | - | - | 7,127 | 12,879 | - | - | 644 | 1,032 |
| LKF-1 - LKF1.1 | - | - | - | - | 829 | - | - | - | - | - | 829 | - | - |
| LKF-3 | - | 109 | 193 | - | - | - | - | - | - | - | - | 109 | 193 |
| LKF-1.1 | - | 172 | 529 | - | - | 2,623 | - | - | - | | - | 172 | 529 |
| LKF-4 | - | 307 | 514 | - | - | - | - | - | - | - | - | 307 | 514 |
| TOTAL | 606 | 34,442 | 23,382 | 0 | 829 | 2,623 | 0 | 33,439 | 44,479 | 0 | 829 | 34,563 | 23,622 |
| TOTAL (ac) | | 0.8 | 0.5 | 0.0 | <0.1 | 0.1 | 0.0 | 0.8 | 1.0 | 0.0 | <0.1 | 0.8 | 0.5 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**Freetown**—In Freetown, the Stoughton alternative includes segments of both the New Bedford Main Line and the Fall River Secondary, both of which currently have active freight service. The New Bedford Main Line has approximately 3.6 miles of right-of-way, while the Fall River Secondary Line has approximately 5.5 miles of right-of-way, for a total of approximately 9.1 miles of right-of-way in Freetown.

Reconstructing the existing active rail lines in Freetown would result in permanent impact to BVW in 17 wetlands, with 43,869 sf (1.0 acres) of impact, and temporary impact to BVW in 27 wetlands, with 24,465 sf (0.6 acre) of impact, for a total of 68,334 sf (1.6 acres) of alteration to BVW. Bank would be permanently impacted in 20 locations, with a total of 2,460 lf of impact. LUW would be permanently and temporarily impacted in two wetlands, with a total of 14,072 sf (0.3 acre) of permanent impact and 6,379 sf (0.1 acre) of temporary impact. BLSF would be permanently impacted in 11 locations, with a total of 12,435 sf (0.3 acre) of impact. RA would be permanently impacted in four locations, with a total of 42,223 sf (1.0 acre) of new development.

Direct wetland impacts in Freetown include four areas of BVW fill greater than 0.1 acre along the Fall River Secondary, including 0.3 acre of BVW fill to Wetland FRF 21, a wetland that has formed within the right-of-way. Impact to 0.5 acre of RA and 0.2 acre of BVW fill would occur to two wetland areas associated with the Cedar Swamp River (Wetlands FRF 2 and FRF 3 (100 series)). Reconstructing the rail bed would affect 1,592 lf of Bank impact as well as 0.3 acre of LUW fill to Wetlands FRF 11 and FRF 12, associated with Terry Brook Pond on both sides of the right-of-way (Fall River Secondary). One BVW (Wetland RFR-23.1.1) would be directly impacted from constructing the Freetown Station.

Reconstructing the existing active rail lines in Freetown would result in permanent impact to 19 VWs, with a total of 47,935 sf (1.1 acres) of impact, and temporary impact to 30 VWs, with a total of 25,913 sf (0.6 acre) of impact. Two WW areas would be permanently and temporarily impacted, with a total of 14,072 sf (0.3 acre) of permanent impact and 6,379 sf (0.1 acre) of temporary impact.

Direct impacts in Freetown would include fill in four VWs in amounts greater than 0.1 acre along the Fall River Secondary, including 0.3 acre of fill in Wetland FRF 21, a wetland that has formed within the right-of-way, and 0.2 acre of fill in two VWs associated with the Cedar Swamp River (Wetlands FRF 2 and FRF 3 (100 series)). Constructing the Freetown Station would impact one VW (Wetland RFR-23.1.1), for a total of 2,590 sf of permanent impact, and 565 sf of temporary impact. Additional impacts in Freetown include 0.3 acre of WW fill in Wetlands FRF 11 and FRF 12, associated with Terry Brook Pond on both sides of the Fall River Secondary right-of-way. Table 4.16-29 lists the impacted wetlands in Freetown and the size of each impacted area.

**Table 4.16-29 Direct Impacts to State and Federal Resource Areas–Freetown**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| LK-21WEST (100) | 26 | - | 139 | - | - | 151 | - | - | - | - | - | - | 139 |
| LK-24 | | | | | | | | | | - | - | - | 106 |
| FRN-2 | 10 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRN-4 | 28 | - | 360 | - | - | 389 | - | 7,778 | 8,278 | - | - | - | 360 |
| FRN-4.1 | - | 410 | 453 | - | - | - | - | - | - | - | - | 410 | 453 |
| FRN-13 | 30 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRN-13.1 | - | - | 164 | - | - | - | - | 7,197 | 8,607 | - | - | - | 164 |
| FRN-15 | 26 | 399 | 441 | - | - | 480 | - | - | - | - | - | 399 | 441 |
| FRN-19 | 5 | - | 181 | - | - | - | - | - | - | - | - | - | 181 |
| FRN-18 | 24 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRN-20 | - | - | 272 | - | - | - | - | - | - | - | - | - | 272 |
| FRN-21 | 508 | 1,881 | 35 | - | - | - | - | - | - | - | - | 1,881 | 35 |
| FRN-23 | 2 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRN-24 | | | | | | | | | | - | - | - | 169 |
| FRN-25 | 9 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRN-27 | 13 | 570 | 483 | - | - | - | - | - | - | - | - | 570 | 483 |
| LKF-1 | - | - | 107 | - | - | 1,412 | - | - | - | - | - | - | 107 |
| LKF-1A | - | 638 | 335 | - | - | - | - | - | - | - | - | 638 | 335 |
| FRF-1 | - | - | 461 | - | - | - | - | - | - | - | - | - | 461 |
| FRF-1B | 12 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRF-1A | 21 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRF-2 | 23 | 7,711 | 4,295 | - | - | - | - | - | - | - | - | - | - |
| FRF-3 (100) | 24 | 2,296 | 1,675 | - | - | 1,436 | - | 22,444 | 37,307 | - | - | 2,296 | 1,675 |
| FRF-4 | - | 4,238 | 2,909 | - | - | - | - | - | - | - | - | 4,238 | 2,909 |
| FRF-8 | - | 1,421 | 1,106 | - | - | - | - | - | - | - | - | 1,421 | 1,106 |
| FRF-6/FRN6 | 21 | - | 156 | - | - | - | - | - | - | - | - | - | 156 |
| FRF-10 | - | 505 | 1,024 | - | - | - | - | - | - | - | - | 505 | 1,024 |
| FRF-9 | - | - | 229 | - | - | - | - | - | - | - | - | - | 229 |
| FRF-10.1.1 | - | - | 256 | - | - | - | - | - | - | - | - | - | 256 |

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| FRF-10.2 (100) | 35 | - | - | - | - | - | - | - | - | - | - | - | - |
| FRF-11 | 862 | - | - | 9,490 | 3,400 | 1,025 | - | - | - | 9,490 | 3,400 | - | - |
| FRF-12 | 730 | - | - | 4,582 | 2,979 | 3,449 | - | - | - | 4,582 | 2,979 | - | - |
| FRF-19.1 | - | - | - | - | - | - | - | - | - | - | - | 232 | 330 |
| FRF-19 | - | 2,867 | 1,038 | - | - | - | - | - | - | - | - | 2,867 | 1,038 |
| FRF-23.2.1 | - | 305 | 276 | - | - | - | - | - | - | - | - | 305 | 276 |
| FRF-23.1.1 | - | 2,590 | 565 | - | - | - | - | - | - | - | - | 2,590 | 565 |
| FRF-21 | - | 13,500 | 2,854 | - | - | - | - | - | - | - | - | 13,500 | 2,854 |
| FRF-26.3(A) | - | 1,436 | 4,518 | - | - | - | - | - | - | - | - | 1,436 | 4,518 |
| FRF-26.2(A) | | | | | | | | | | - | - | 939 | - |
| FRF-26.2 | - | 4,527 | - | - | - | - | - | - | - | - | - | 4,527 | - |
| FRF-26.1 | - | - | 222 | - | - | - | - | - | - | - | - | - | 222 |
| FRF-26.1.1 | - | 1,470 | 754 | - | - | - | - | - | - | - | - | 1,470 | 754 |
| FRF-29.2 | 52 | - | - | - | - | 996 | - | - | - | - | - | - | - |
| LKF-1.1 | - | - | - | - | - | 788 | - | - | - | - | - | - | - |
| FRF-A | - | - | - | - | - | 872 | - | 4,804 | 10,121 | - | - | - | - |
| FRF-29 (200) | - | - | - | - | - | 1,436 | - | - | - | - | - | - | - |
| TOTAL | 2460 | 43,869 | 24,465 | 14,072 | 6,379 | 12,435 | 0 | 42,223 | 64,313 | 14,072 | 6,379 | 47,935 | 25,913 |
| TOTAL (ac) | | 1.0 | 0.6 | 0.3 | 0.1 | 0.3 | 0.0 | 1.0 | 1.5 | 0.3 | 0.1 | 1.1 | 0.6 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**New Bedford**—The New Bedford segment of the Stoughton alternative is approximately 7.0 miles long and has active freight service along the New Bedford Main Line. Reconstructing the existing active rail line in New Bedford would result in permanent impact to BVW in 13 wetlands, with 53,137 sf (1.2 acres) of impact, and temporary impact to BVW in 14 wetlands, with 33,168 sf (0.8 acre) of impact, for a total of 86,305 sf (2.0 acre) of alteration to BVW. Bank would be permanently impacted in four locations, with a total of 269 lf of impact. LUW would not be impacted. BLSF would be permanently impacted in one location, with a total of 1,494 sf (<0.1 acre) of impact. RA would not be impacted.

Direct wetland impacts in New Bedford would include four areas of BVW fill greater than 0.1 acre, including 0.4 acre of BVW fill to Wetland NBS, a narrow wetland along the side of the railroad berm, which would be filled to construct the King's Highway Station. Other areas of BVW fill would occur in more natural wetland areas, including 0.3 acre of BVW fill to Wetland NB 28.

Reconstructing the existing active rail line in New Bedford would result in permanent impact to 15 VWs, with a total of 52,601 sf (1.2 acres) of impact, and temporary impact to 16 VWs, with a total of 33,370 sf (0.8 acre) of impact. No WW impacts would occur. Direct impacts in New Bedford would include four areas of fill in VWs in amounts greater than 0.1 acre, including 0.4 acre of fill in Wetland NBS, a narrow wetland (a former drainage ditch) within the right-of-way that would be filled to construct the King's Highway Station. Other areas of fill in VWs occur in more natural areas, including 0.3 acre of fill in Wetland NB 28. Table 4.16-30 lists the impacted wetlands in New Bedford and the size of each impacted area.

**Fall River**—The Fall River segment of the Stoughton alternative is approximately 5.3 miles long and has active freight service along the Fall River Secondary. Reconstructing the existing active rail line in Fall River would not result in any permanent impact to BVW, and temporary impact to BVW in one wetland, with 154 sf (<0.1 acre) of impact. Coastal Bank would be permanently impacted in four locations, with a total of 274 lf of impact. LUW would not be impacted. LSCSF would be permanently impacted in three locations, with a total of 25,221 sf (0.6 acre) of impact. RA would not be impacted.

Fall River is the only municipality along the project corridor that would have Coastal Bank and LSCSF impacts in three areas, including 0.4 acre of FA 6B). These impacts are associated with the Taunton River.

Reconstructing the existing active rail line in Fall River would result in permanent impact to two VWs, with a total of 1,647 sf (<0.1 acre) of impact, and temporary impact to three VWs, with a total of 2,192 sf (0.1 acre) of impact. No WW impacts would occur. Table 4.16-31 lists the impacted wetlands in Fall River and the size of each impacted area.

**Table 4.16-30 Direct Impacts to State and Federal Resource Areas–New Bedford**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA[1] | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| NB-2 | - | 1,045 | 928 | - | - | - | - | - | - | - | - | 1,045 | 928 |
| NB-6 | - | 2,012 | 1,010 | - | - | - | - | - | - | - | - | 2,012 | 1,010 |
| NB-8 | - | - | - | - | - | - | - | - | - | - | - | 1,567 | 1,139 |
| NB-10 | - | 7,067 | 3,822 | - | - | - | - | - | - | - | - | 7,067 | 3,822 |
| NB-14 | - | - | 302 | - | - | - | - | - | - | - | - | | 302 |
| NB-15 | - | 4,695 | 242 | - | - | - | - | - | - | - | - | 4,695 | 242 |
| NB-20 | - | 171 | 1,695 | - | - | 1,494 | - | - | - | - | - | 171 | 1,695 |
| NB-22 | - | 1,043 | 2,859 | - | - | - | - | - | - | - | - | 1,043 | 2,859 |
| NB-24 | - | 294 | 1,124 | - | - | - | - | - | - | - | - | 294 | 1,124 |
| NB-23 (200) | - | 1,925 | 6,032 | - | - | - | - | - | - | - | - | 1,925 | 6,032 |
| NB-25 | - | - | - | - | - | - | - | - | - | - | - | 2,764 | 998 |
| NB-23 (100) | - | 5,299 | 6,526 | - | - | - | - | - | - | - | - | 5,299 | 6,526 |
| NB-25.1 | - | 879 | 2,766 | - | - | - | - | - | - | - | - | 879 | 2,766 |
| NBS (1) | - | 724 | 386 | - | - | - | - | - | - | - | - | 724 | 386 |
| NBS | - | 16,176 | 1,140 | - | - | - | - | - | - | - | - | 16,176 | 1,140 |
| NB-28 | - | 11,806 | 4,338 | - | - | - | - | - | - | - | - | 11,806 | 4,338 |
| TOTAL | 0 | 53,137 | 33,168 | 0 | 0 | 1,494 | 0 | 0 | 0 | 0 | 0 | 52,601 | 33,370 |
| TOTAL (ac) | | 1.2 | 0.8 | 0.0 | 0.0 | <0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 0.8 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 Riverfront Area is measured 25 feet from the edge of a resource area.

**Table 4.16-31 Direct Impacts to State and Federal Resource Areas–Fall River**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA[1] | | Coastal Bank | LSCSF | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Perm. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| FRF-29.1 | - | - | - | - | - | - | - | - | - | 32 | - | - | - | - | - |
| FA-1A | - | - | - | - | - | - | - | - | - | 79 | - | - | - | - | - |
| FA-3 | - | - | 154 | - | - | - | - | - | - | 60 | 524 | - | - | - | 154 |
| FA-3A | - | - | - | - | - | - | - | - | - | 103 | - | - | - | 1,021 | 417 |
| B | - | - | - | - | - | - | - | - | - | - | - | - | - | 626 | 1,034 |
| Wetland 3 | - | 10,181 | 587 | - | - | - | - | - | - | - | - | - | - | 10,181 | 587 |
| FA-5B | - | - | - | - | - | - | - | - | - | - | 5,327 | - | - | - | - |
| FA-6B | - | - | - | - | - | - | - | - | - | - | 19,370 | - | - | - | - |
| TOTAL | 0 | - | 154 | 0 | 0 | 0 | 0 | 0 | 0 | 274 | 25,221 | 0 | 0 | 1,647 | 2,192 |
| TOTAL (ac) | | 0.0 | <0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.6 | 0.0 | 0.0 | <0.1 | 0.1 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 Riverfront Area is measured 25 feet from the edge of a resource area.

**Summary of Direct Impacts to State and Federal Resource Areas**—Reconstructing the existing active and inactive rail lines along the Stoughton alternative would result in permanent impact to BVW in 105 wetlands, with 9.6 acres of impact, and temporary impact to BVW in 131 wetlands, with 5.4 acres of impact, for a total of 15.0 acres of alteration to BVW. BVW impacts would result from reconstructing and widening existing berms associated with the rail lines, and filling wetlands that have formed within the right-of-way.

Bank would be permanently impacted in 46 locations, with a total of 16,813 lf of impact. The largest Bank impacts would occur in:

- Raynham (6,994 lf of impact), in order to relocate a perennial stream that has formed in the right-of-way due to blocked drainage ditches;
- Easton (5,423 lf of impact), due to an intermittent stream channel that flows down the right-of-way due to blocked drainage ditches; and
- Freetown (2,460 lf of impact), due to filling of Terry Brook Pond on both sides of the right-of-way.

LUW would be permanently impacted in four wetlands, with a total of 1.9 acres of impact, and temporarily impacted in nine wetlands, with a total of 0.3 acre of impact. LUW impacts would largely result mainly from relocating the perennial stream in Raynham and filling Terry Brook Pond in Freetown.

BLSF would be permanently impacted in 32 locations, with a total of 6.7 aces of impact. The largest BLSF impacts would occur in Raynham as a result of relocating the perennial stream.

RA would be permanently impacted in 22 locations, with a total of 7.9 acres of new development of naturally vegetated land outside of the existing ballast and other active rail elements. The largest RA impacts would occur in Raynham as a result of relocating the perennial stream.

Coastal Bank would be permanently impacted in four locations in Fall River, with a total of 274 lf of impact.

LSCSF would be permanently impacted in three locations in Fall River, with a total of 0.6 acre of impact, associated with the Taunton River.

Reconstructing the existing active and inactive rail lines along the project corridor would result in permanent impact to 121 VWs, with 10.4 acres of impact, and temporary impact to 148 VWs, with 5.6 acres of impact, for a total of 16.0 acres of alteration to VWs. Impacts to VWs would result from reconstructing and widening existing berms associated with the rail lines, and would impact wetlands that have formed within the right-of-way.

Four WW areas would be permanently impacted, with a total of 1.9 acres of impact, and nine WW areas would be temporarily impacted, with a total of 0.3 acre of impact. WW impacts would result mainly from relocating a perennial stream that has formed within the right-of-way in Raynham due to blocked drainage culverts, and filling portions of Terry Brook Pond in Freetown on both sides of the right-of-way in order to widen the existing berm.

Table 4.16-32 summarizes the direct impacts to state and federal wetland resource areas along the Stoughton Alternative corridor. The number of impacted wetlands and the total size of the impact for each type of resource area are given for each municipality.

**Direct Impacts to Wetlands in an ACEC**

Several resource areas along the Stoughton alternative occur in an Area of Critical Environmental Concern (ACEC). ACECs receive special recognition because of the quality, uniqueness, and significance of natural and cultural resources. ACECs are designated by the office of the Secretary of Energy and Environmental Affairs. Massachusetts wetland regulations at 310 CMR 10.55(4)(c) state that "Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern." MassDOT does not anticipate that the South Coast Rail project can be constructed in full compliance with this performance standard. A Variance will be sought for the project because there are several performance standards for BVW and other resource areas that cannot be met.

The Stoughton alternative crosses the Hockomock Swamp ACEC in Easton and Raynham. Within the Hockomock Swamp ACEC, six wetlands would be directly impacted by the project. This includes the perennial stream that has formed within the right-of-way in Raynham.

Reconstructing the existing inactive rail line in Easton and Raynham would result in permanent impact to BVW in five wetlands, with 6,561 sf (0.2 acre) of impact, and temporary impact to BVW in six wetlands, with 6,287 sf (0.1 acre) of impact, for a total of 12,848 sf (0.3 acre) of alteration to BVW. Bank would be permanently impacted in one location, for a total of 6,579 lf of impact. LUW would be permanently and temporarily impacted in one wetland, with a total of 66,334 sf (1.5 acres) of permanent impact and 401 sf (<0.1 acre) of temporary impact. BLSF would be permanently impacted in one location, for a total of 32,900 sf of impact. RA would be permanently impacted in one location, for a total of 100,449 sf (2.3 acres) of impact. The majority of the BVW impacts would occur as a result of widening the existing berm to reconstruct the inactive rail line along Wetland EA 63 (200). The entirety of the Bank, LUW, and RA impacts would result from relocating the perennial stream that has formed within the right-of-way in Raynham.

Table 4.16-33 lists the wetlands that are directly impacted in the Hockomock Swamp ACEC, along with the type and amount of each impact.

**Table 4.16-32 Summary of Direct Impacts to State and Federal Resource Areas**

| | Bank | BVW | | LUW | | BLSF[1] | ILSF[1] | RA | | Coastal Bank | LSCSF | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Perm. | Perm. | Temp. | Perm. | Temp. |
| Municipality | (#/lf) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/lf) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) |
| Canton | 2/90 | 2/<0.1 | 2/<0.1 | - | 1/<0.1 | 5/0.9 | - | 1/0.4 | 1/0.5 | - | - | - | 1/<0.1 | 2/<0.1 | 4/<0.1 |
| Stoughton | 3/539 | 6/2.0 | 5/0.1 | - | - | 1/0.7 | - | - | - | - | - | - | - | 8/2.1 | 6/0.1 |
| Easton | 4/5,423 | 9/0.3 | 13/0.2 | - | - | 2 /0.8 | - | 4/0.8 | 4/1.2 | - | - | - | - | 11/0.4 | 15/0.2 |
| Raynham | 8/6,994 | 17/1.3 | 21/1.0 | 2/1.5 | 4/0.1 | 3/2.9 | - | 3/2.5 | 3/4.2 | - | - | 2/1.5 | 4/0.1 | 17/1.3 | 21/1.0 |
| Taunton | 4/468 | 20/1.5 | 24/1.3 | - | 1/<0.1 | 6/0.8 | - | 4/1.3 | 4/1.6 | - | - | - | 1/<0.1 | 24/1.9 | 27/1.3 |
| Berkley | 2/233 | 13/1.4 | 18/1.0 | - | - | 2/0.2 | - | 4/1.1 | 4/1.8 | - | - | - | - | 14/1.5 | 18/1.0 |
| Lakeville | 3/606 | 10/0.8 | 9/0.5 | - | 1/<0.1 | 1/0.1 | - | 2/0.8 | 2/1.0 | - | - | - | 1/<0.1 | 11/0.8 | 10/0.5 |
| Freetown | 20/ 2,460 | 15/1.0 | 25/0.6 | 2/0.3 | 2/0.1 | 11/0.3 | - | 4/1.0 | 4/1.5 | - | - | 2/0.3 | 2/0.1 | 19/1.1 | 30/0.6 |
| New Bedford | - | 13/1.2 | 14/0.8 | - | - | 1/<0.1 | - | - | - | - | - | - | - | 13/1.2 | 14/0.8 |
| Fall River | - | - | 1/<0.1 | - | - | - | - | - | - | 4/274 | 3/0.6 | - | - | 2/<0.1 | 3/0.1 |
| TOTAL | 46/ 16,813 | 105 /9.6 | 132/5.4 | 4/1.9 | 9/0.3 | 32/6.7 | 0/0.0 | 22/7.9 | 22/11.7 | 4/274 | 3/0.6 | 4/1.9 | 9/0.3 | 121/10.4 | 148/5.6 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD applications for the municipalities of Stoughton and Easton, and therefore neither resource area was confirmed by the Conservation Commissions from either municipality. Information for these resource areas is presented here for informational purposes and is approximate.

**Table 4.16-33 Direct Impacts to Wetlands in the Hockomock Swamp ACEC**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA[1] | |
|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| EA-77 | - | - | 217 | - | - | - | - | - | - |
| EA-63 (200) | - | 4,813 | 3,163 | - | - | 32,900 | - | - | - |
| EA-64 (500) | - | 381 | 447 | - | - | - | - | - | - |
| R-62.1 | 6,579 | 204 | 67 | 66,334 | 401 | - | - | 100,449 | 158,950 |
| R-59 | - | 641 | 2,004 | - | - | - | - | - | - |
| R-61 | - | 522 | 389 | - | - | - | - | - | - |
| TOTAL | 6,579 | 6,561 | 6,287 | 66,334 | 401 | 32,900 | 0 | 100,449 | 158,950 |
| TOTAL (ac) | | 0.2 | 0.1 | 1.5 | <0.1 | 0.8 | 0.0 | 2.3 | 3.6 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

***Direct Impacts by Cover Type***

This section quantifies and discusses the direct impacts to vegetation cover types along the Stoughton Alternative. Totals of each cover type will be used when determining mitigation goals. Using the analysis methods previously described, direct impacts were calculated to Cowardin cover types in each municipality along the right-of-way:

- Palustrine Forested (PFO);
- Palustrine Scrub-Shrub (PSS);
- Palustrine Emergent Marsh (PEM); and
- Open Water (OW).

These cover types encompass the state resource areas of BVW, LUW, and ILSF, as well as the federal resource areas of AFW, IFW, and WW. Impacts were further calculated for PFO subtypes of Wooded Swamp Deciduous (WSD) and Wooded Swamp Mixed (WSM), and PEM subtypes of Shallow Marsh (SM) and Deep Marsh (DM). The subtypes were obtained from MassGIS data layers showing cover type; however, where direct observation showed different conditions than the data layer, the direct observation data were used. Impacts were then totaled for each municipality as a whole.

Table 4.16-34 gives a summary of the direct impacts to cover types along the Stoughton Alternative corridor. The number of impacted wetlands and the total size of the impact for each cover type are given for each municipality. Totals for the entire length of the project are also given. The direct impacts to the cover types in each municipality are presented below.

**Table 4.16-34 Direct Impacts by Cover Type–Stoughton Alternative**

| | | | OW | | PEM | | | | PSS | | PFO | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total of All Types | | Open Water | | Shallow Marsh | | Deep Marsh | | Scrub-Shrub | | WSD | | WSM | |
| Municipality | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) |
| Canton | 2/<0.1 | 5/0.1 | - | 1/<0.1 | - | 1/<0.1 | - | - | - | 1/<0.1 | 2/<0.1 | 2/<0.1 | - | - |
| Stoughton | 8/2.1 | 6/0.1 | - | - | 2/<0.1 | 2/<0.1 | - | - | - | - | 6/2.0 | 4/0.1 | - | - |
| Easton | 11/0.4 | 15/0.2 | - | - | - | - | 2/<0.1 | 3/<0.1 | 3/0.3 | 3/<0.1 | 6/0.1 | 9/0.1 | - | - |
| Raynham | 19/ 2.9 | 25/1.0 | 2/1.5 | 4/0.1 | - | - | 1/<0.1 | 1/<0.1 | 3/<0.1 | 4/0.1 | 12/1.3 | 14/0.8 | 1/<0.1 | 2/<0.1 |
| Taunton | 24/1.9 | 28/1.4 | - | 1/<0.1 | 4/0.6 | 4/0.2 | - | - | - | - | 20/1.3 | 23/1.2 | - | - |
| Berkley | 14/1.5 | 18/1.0 | - | - | - | - | - | - | 2/0.2 | 2/0.1 | 11/1.1 | 15/0.8 | 1/0.1 | 1/<0.1 |
| Lakeville | 11/0.8 | 11/0.6 | - | 1/<0.1 | - | - | - | - | 2/0.1 | 1/<0.1 | 9/0.7 | 9/0.5 | - | - |
| Freetown | 21/1.4 | 32/0.7 | 2/0.3 | 2/0.1 | 2/<0.1 | 2/0.1 | - | - | 5/0.2 | 7<0.1 | 12/0.9 | 21/0.4 | - | - |
| New Bedford | 13/1.2 | 14/0.8 | - | - | 1/0.4 | 1 <0.1 | - | - | 1<0.1 | 1/0.1 | 10/0.8 | 10/0.6 | 1 <0.1 | 2/0.1 |
| Fall River | 2/<0.1 | 3/0.1 | - | - | - | - | - | - | - | - | 2/<0.1 | 3/0.1 | - | - |
| TOTAL | 125/12.3 | 157/5.9 | 4/1.9 | 9/0.3 | 9/1.0 | 10/0.3 | 3/<0.1 | 4/0.1 | 16/0.9 | 19/0.4 | 90/8.3 | 110/4.7 | 3/0.2 | 5/0.1 |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.

Reconstructing the existing active rail line in Canton would result in permanent and temporary impact to PFO in two wetlands, with a total of 1,200 square feet (sf) (<0.1 acre) of permanent impact and 1,436 sf (<0.1 acre) of temporary impact. All PFO impacts are of the subtype WSD. PSS would be temporarily impacted in one wetland, with a total of 303 sf (<0.1 acre) of impact. PEM would be temporarily impacted in one wetland, with a total of 310 sf (<0.1 acre) of impact. All PEM impacts are of the subtype SM. OW would be temporarily impacted in one wetland, with a total of 229 sf (<0.1 acre) of impact.

Reconstructing the existing active and inactive rail line in Stoughton would result in permanent impact to PFO in six wetlands, with a total of 86,184 sf (2.0 acres) of impact, and temporary impact to PFO in four wetlands, with a total of 5,417 sf (0.1 acre) of impact. All PFO impacts are of the subtype WSD. PSS would not be impacted. PEM would be permanently and temporarily impacted in two wetlands, with a total of 1,545 sf (<0.1 acre) of permanent impact and 1,087 sf (<0.1 acre) of temporary impact. All PEM impacts are of the subtype SM. OW would not be impacted.

Reconstructing the existing inactive rail line in Easton would result in permanent impact to PFO in six wetlands, with a total of 2,784 sf (0.1 acre) of impact, and temporary impact to PFO in nine wetlands, with a total of 5,388 sf (0.1 acre) of impact. All PFO impacts are of the subtype WSD. PSS would be permanently and temporarily impacted in three wetlands, with a total of 14,198 sf (0.3 acre) of permanent impact and 2,081 (<0.1 acre) of temporary impact. PEM would be permanently impacted in two wetlands, with a total of 1,151 sf (<0.1 acre) of impact, and temporarily impacted in three wetlands, with a total of 1,796 sf (<0.1 acre) of impact. All PEM impacts are of the subtype DM. OW would not be impacted. No direct impacts would occur to any Atlantic white cedar areas in the Hockomock Swamp because the tracks would be on an elevated trestle through the swamp.

Reconstructing the existing inactive rail line in Raynham would result in permanent impact to PFO in 12 wetlands, with a total of 56,685 sf (1.3 acres) of impact, and temporary impact to BVW in 14 wetlands, with a total of 35,322 sf (0.8 acre) of impact. PFO impacts are nearly all of the subtype WSD, except for 412 sf (<0.1 acre) of permanent and 766 sf (<0.1 acre) of temporary WSM impact. PSS would be permanently impacted in three wetlands, with a total of 1,367 sf (<0.1 acre), and temporarily impacted in four wetlands, with a total of 4,590 sf (0.1 acre) of impact. PEM would not be impacted. OW would be permanently impacted in two wetlands, with a total of 66,528 sf (1.5 acres) of impact, and temporarily impacted in four wetlands, with a total of 3,639 sf (0.1 acre) of impact. No areas of Atlantic white cedar present in the Hockomock Swamp or the Pine Swamp would be impacted.

Reconstructing the existing active and inactive rail line in Taunton would result in permanent impact to PFO in 20 wetlands, with a total of 58,326 sf (1.3 acres) of impact, and temporary impact to BVW in 23 wetlands, with a total of 51,443 sf (1.2 acres) of impact. All PFO impacts are of the subtype WSD. PSS would not be impacted. PEM would be permanently and temporarily impacted in four wetlands, with a total of 25,359 sf (0.6 acre) of permanent impact and 7,346 sf (0.2 acre) of temporary impact. All PEM impacts are of the subtype SM. OW would be temporarily impacted in one wetland, with a total of 1,067 sf (<0.1 acre) of impact.

Reconstructing the existing active rail lines in Berkley would result in permanent impact to PFO in 11 wetlands, with a total of 48,825 sf (1.1 acres) of impact, and temporary impact to PFO in 15 wetlands, with a total of 35,366 sf (0.8 acre) of impact. PFO impacts are nearly all of the subtype WSD, except for 5,963 sf (0.1 acre) of permanent and 1,721 sf (<0.1 acre) of temporary WSM impact. PSS would be permanently and temporarily impacted in two wetlands, with a total of 10,214 sf (0.2 acre) of permanent impact and 4,608 sf (0.1 acre) of temporary impact. PEM and OW would not be impacted.

Reconstructing the existing active rail lines in Lakeville would result in permanent impact to PFO in nine wetlands, with a total of 31,592 sf (0.7 acre) of impact, and temporary impact to PFO in nine wetlands, with a total of 23,106 sf (0.5 acre) of impact. All PFO impacts are of the subtype WSD. PSS would be permanently impacted in two wetlands, with a total of 2,971 sf (0.1 acre) of impact, and temporarily impacted in one wetland, with a total of 514 sf (<0.1 acre) of impact. PEM would not be impacted. OW would be temporarily impacted in one wetland, with a total of 829 sf (<0.1 acre) of impact. No areas of Atlantic white cedar, present in the Assonet Cedar Swamp, would be impacted.

Reconstructing the existing active rail lines in Freetown would result in permanent impact to PFO in 12 wetlands, with a total of 35,248 sf (0.9 acre) of impact, and temporary impact to PFO in 21 wetlands, with a total of 17,683 sf (0.4 acre) of impact. All PFO impacts are of the subtype WSD. PSS would be permanently impacted in five wetlands, with a total of 8,395 sf (0.2 acre) of impact, and temporarily impacted in seven wetlands, with a total of 2,071 sf (<0.1 acre) of impact. PEM would be permanently and temporarily impacted in two wetlands, with a total of 1,667 sf (<0.1 acre) of permanent impact and 4,848 sf (0.1 acre) of temporary impact. All PEM impacts are of the subtype SM. OW would be permanently and temporarily impacted in two wetlands, with a total of 14,072 sf (0.3 acre) of permanent impact and 6,379 sf (0.1 acre) of temporary impact.

Reconstructing the existing active rail line in New Bedford would result in permanent impact to PFO in 10 wetlands, with a total of 34,504 sf (0.8 acre) of impact, and temporary impact to PFO in 10 wetlands, with a total of 26,303 sf (0.6 acre) of impact. PFO impacts are nearly all of the subtype WSD, except for 1,043 sf (<0.1 acre) of permanent and 3,160 sf (0.1 acre) of temporary WSM impact. PSS would be permanently and temporarily impacted in one wetland, with a total of 879 sf (<0.1 acre) of permanent impact and 2,766 sf (0.1 acre) of temporary impact. PEM would be permanently and temporarily impacted in one wetland, with a total of 16,176 sf (0.4 acre) of permanent impact and 1,140 sf (<0.1 acre) of temporary impact. PEM impacts are all of the subtype SM. No areas of Atlantic white cedar, present in the Acushnet Cedar Swamp, would be impacted.

Reconstructing the existing active rail line in Fall River would result in permanent impact to PFO in two wetlands, with a total of 1,647 sf (<0.1 acre) of impact, and temporary impact to PFO in three wetlands, with a total of 2,192 sf (0.1 acre) of impact. PFO impacts are all of the subtype WSD. PSS and PEM would not be impacted.

In summary, reconstructing the existing active and inactive rail lines along the Stoughton alternative would result in permanent impact to PFO in 93 wetlands, with 8.5 acres of impact, and temporary impact to PFO in 115 wetlands, with 4.8 acres of impact, for a total of 13.3 acres of alteration to PFO (Table 4.16-34).

PSS would be permanently impacted in 16 wetlands, with a total of 0.9 acres of impact, and temporarily impacted in 19 wetlands, with a total of 0.4 acres of impact. The largest PSS impacts are associated with Wetland EA 12.1 in Easton, a narrow wetland area that has formed within the right-of-way.

PEM would be permanently impacted in 12 wetlands, with a total of 1.0 acre of impact, and temporarily impacted in 14 wetlands, with a total of 0.4 acres of impact. The largest PEM impacts are associated with Wetland T 42 (200) in Taunton, an emergent wetland that has formed within the right-of-way.

OW would be permanently impacted in four wetlands, with a total of 1.9 acres of impact, and temporarily impacted in nine wetlands, with a total 0.3 acres of impact. The largest OW impacts would occur in Wetland R 62.1 in Raynham, in order to relocate a perennial stream that has formed in the

right-of-way due to blocked drainage ditches, and in Wetlands FRF 11 and FRF 12 in Freetown, where Terry Brook Pond occurs on both sides of the right-of-way.

***Direct Impacts to Jurisdictional Wetlands/Waters by Watershed***

The Stoughton Alternative crosses the Neponset, Taunton, Buzzards Bay, and Narragansett Bay regional watersheds. Direct impacts to jurisdictional wetlands/waters that fall within each watershed were calculated to help guide the development of mitigation measures. The majority of the project corridor falls within the Taunton regional watershed. Of the approximately 52.1 miles of the total rail length of the project, approximately 39.9 miles lie in the Taunton watershed, 4.7 miles in the Neponset watershed, 6.8 miles in the Buzzards Bay watershed, and 0.7 mile in the Narragansett Bay watershed. The majority of direct impacts also occur in the Taunton watershed. A total of 102 of the 123 wetlands that would be permanently impacted are in the Taunton watershed, with 9.1 of the 10.7 acres of total permanent impact. A total of 128 of the 151 wetlands that would be temporarily impacted are also in the Taunton watershed, with 4.7 of the 5.6 acres of total temporary impact. In the Neponset watershed, three wetlands would be permanently and temporarily impacted, with a total of less than 0.1 acre of permanent impact and less than 0.1 acre of temporary impact. In the Buzzards Bay watershed, 15 wetlands would be permanently impacted, with a total of 1.3 acres of impact, and 16 wetlands would be temporarily impacted, with a total of 0.8 acre of impact. In the Narragansett Bay watershed, three wetlands would be permanently and temporarily impacted, with 0.2 acre of permanent impact and less than 0.1 acre of temporary impact. Impacts to Outstanding Resource Waters (ORWs) include those wetlands associated with vernal pools. A detailed discussion of vernal pool impacts is provided in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*. Table 4.16-35 lists the watersheds in the South Coast Rail project corridor, the number of wetlands impacted in each, and the amount of each impact.

**Table 4.16-35 Direct Impacts to Vegetated Wetlands by Watershed**

| | Waterbody/Waterway | | Adjacent Federal Wetlands | | Isolated Federal Wetlands | | ORW Impacts | |
|---|---|---|---|---|---|---|---|---|
| Watershed | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) |
| Neponset | - | 1/<0.1 | 2/<0.1 | 4/<0.1 | - | - | - | - |
| Taunton | 4/1.9 | 8/0.3 | 91/8.3 | 113/4.6 | 13/0.8 | 14/0.1 | 26/1.5 | 32/1.5 |
| Buzzards Bay | - | - | 13/1.2 | 14/0.8 | - | - | - | - |
| Narragansett Bay | - | - | - | 1/<0.1 | 2/<0.1 | 2/<0.1 | - | - |
| **TOTAL** | **4/1.9** | **9/0.3** | **106/9.6** | **132/5.4** | **15/0.8** | **16/0.1** | **26/1.5** | **32/1.5** |

**Stoughton Diesel**

Impacts to wetlands for the Stoughton Diesel Alternative are similar to the impacts identified above for the Stoughton Electric Alternative. The diesel alternative does not require traction power substations and would result in approximately 0.01 acre of permanent wetland impacts less than the Stoughton Electric Alternative along the New Bedford Main Line. All other impacts are the same as those estimated for the remainder of Stoughton Electric Alternative.

### Whittenton Electric Alterative

The Whittenton Electric Alternative is a variant of the Stoughton Electric Alternative alignment described in the section on the Stoughton Electric Alternative. Specifically, at Raynham Junction near the southern end of the historic Stoughton Line, the alignment would divert to the southwest, following the old Whittenton Branch (Figures 4.16-4a-j). This alignment would connect with the Attleboro Secondary at Whittenton Junction in Taunton, and then continue southeast to connect with the New Bedford Main Line at Weir Junction, at the northern end of the Southern Triangle. Service along the southernmost portion of the Stoughton Line, from Raynham Junction to Weir Junction, would not be reestablished if this variant were selected. The Southern Triangle portion of the project is common to all alternatives and requires the rail bed, track, and signals along the existing Fall River Secondary and New Bedford Main Lines to be upgraded for passenger rail traffic. This portion of the project extends from Cotley Junction in Taunton along the New Bedford Main Line through Berkley, Lakeville, Freetown, and New Bedford and along the Fall River Secondary from Myricks Junction in Lakeville through Freetown and Fall River (Figures 4.16-2a-q and 4.16-3a-j).

This alternative would include Battleship Cove Station, Canton Center Station, Canton Junction Station, Dana Street Station, Easton Village Station, Fall River Depot Station, Freetown Station, King's Highway Station, North Easton Station, Raynham Park Station, South Station, Stoughton Station, Taunton Depot Station, and Whale's Tooth Station. The alternative includes two layover facilities (Weaver's Cove East on the Fall River Secondary and Wamsutta on the New Bedford Main Line. Potential impacts to wetland resources resulting from developing the new stations and layover facilities are inclusive and not discussed separately.

No construction would be required along the Northeast Corridor and the existing Stoughton Line commuter rail track from Canton Junction to Stoughton would be upgraded for the Whittenton Electric Alternative. New track would be installed on the existing embankment from Stoughton south to Raynham Junction. Similar to the Stoughton alternative a section from Foundry Street in Easton to Raynham Station through the Hockomock Swamp would be constructed on an elevated trestle (Figures 4.16-2k and l). Canopy clearing would be required along the right-of-way where the elevated trestle would be located within the Hockomock Swamp to accommodate additional height requirements associated with the trestle. Canopy clearing generally occurs within upland forest, though portions would occur in wetland resources. Canopy clearing would not result in additional impacts to wetland resources as this work would occur in uplands.

The alignment of the proposed Whittenton Alternative follows a previously developed railroad corridor. Although the rail corridor has been established, necessary track improvements would result in the loss of wetland resources along the right-of-way. The following sections describe both direct and indirect impacts as they relate to this alternative.

#### *Direct Impact to State and Federal Resource Areas by Municipality*

With the exception of those impacts within Raynham and Taunton, the direct impacts to state resources for the Whittenton Alternative are the same as those reported previously for the Stoughton alternative.

For the towns of Canton, Stoughton, Easton, Berkley, Lakeville, and Freetown, and the cities of New Bedford and Fall River, the impacts to State and Federal Resources are as reported for the Stoughton Electric Alternative, in Tables 4.16-32, above.

This section also quantifies and discusses the federal waters of the United States (including wetlands) affected by the Whittenton Alternative. These waters are assumed jurisdictional under Section 404 of the Clean Water Act. They are also regulated at the state level by 314 CMR 9.00, which implements the Federal Clean Water Act Section 401 Water Quality Certification program for a discharge of dredged or fill material.

Using the analysis methods described previously, direct impacts (both permanent and temporary) were calculated to federal wetlands in each municipality. Impacts were totaled for each municipality as a whole. The direct impacts to federal wetlands in each municipality are presented below. As previously described, some small isolated wetlands within the project corridor are assumed to be jurisdictional under Section 404.

**Raynham**—The Raynham segment of the Whittenton alternative includes approximately 2.8 miles along an inactive portion of the Stoughton Line and approximately 1.2 miles along an inactive portion of the Whittenton Branch. Reconstructing the existing inactive rail line in Raynham would result in permanent impact to BVW in 9 wetlands, with 24,172 sf (0.5 acre) of impact, and temporary impact to BVW in 12 wetlands, with 18,081 sf (0.4 acre) of impact for a total of 42,253 sf (1.0 acre) of alteration to BVW. Bank would be permanently impacted in five locations, with a total of 6,773 lf of impact. LUW would be permanently impacted in one wetland with a total of 66,334 sf (1.5 acres) of impact, and temporarily impacted in the same wetland, with a total of 401 sf (<0.1 acre) of impact. BLSF would be permanently impacted in two locations, with a total of 50,814 sf (1.2 acres) of impact. RA would be permanently impacted in one location, with a total of 100,449 sf (2.3 acres) of new development. The Whittenton Alternative avoids impacts in the Pine Swamp area.

The Whittenton Alternative would result in permanent impact to nine VWs, with a total of 24,172 sf (0.6 acre) of impact, and temporary impact to 12 VWs, with a total of 18,081 sf (0.4 acre) of impact. One WW area would be impacted, with a permanent impact of 66,334 sf (1.5 acres) and a temporary impact of 401 sf (<0.1 acre). Table 4.16-36 lists the impacted wetlands in Raynham and the size of each impacted area.

**Table 4.16-36 Direct Impacts to State and Federal Resource Areas–Raynham**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Perm. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| EA-63 (200) | - | 4,813 | 3,163 | - | - | 32,900 | - | - | - | - | - | 4,813 | 3,163 |
| EA-64 (500) | - | 381 | 447 | - | - | - | - | - | - | - | - | 381 | 447 |
| R-62.1 | 6,579 | 204 | 67 | 66,334 | 401 | - | - | 100,449 | 158,950 | 66,334 | 401 | 204 | 67 |
| R-59 | - | 641 | 2,004 | - | - | - | - | - | - | - | - | 641 | 2,004 |
| R-61 | - | 522 | 389 | - | - | - | - | - | - | - | - | 522 | 389 |
| R-50 | - | 367 | 647 | - | - | - | - | - | - | - | - | 367 | 647 |
| R-49 | 66 | 13,209 | 5,950 | - | - | - | - | - | - | - | - | 13,209 | 5,950 |
| R-50 (100) | - | 3,293 | 3,115 | - | - | - | - | - | - | - | - | 3,293 | 3,115 |
| R-44 | 7 | 742 | 1,554 | - | - | 17,914 | - | - | - | - | - | 742 | 1,554 |
| RWB-02 (100) | 9 | - | 187 | - | - | - | - | - | - | - | - | - | 187 |
| RWB-02 (300) | - | - | 389 | - | - | - | - | - | - | - | - | - | 389 |
| RWB-02.1 | 112 | - | 169 | - | - | - | - | - | - | - | - | - | 169 |
| TOTAL | 6,773 | 24,172 | 18,081 | 66,334 | 401 | 50,814 | - | 100,449 | 158,950 | 66,334 | 401 | 24,172 | 18,081 |
| TOTAL (ac) | | 0.5 | 0.4 | 1.5 | <0.1 | 1.2 | - | 2.3 | 3.6 | 1.5 | <0.1 | 0.6 | 0.4 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**Taunton**—In Taunton, the Whittenton alternative includes approximately 2.2 miles along an inactive portion of the of the Whittenton Branch, a 2.4 mile segment of the active Attleboro Secondary, as well as, a portion of the New Bedford Main Line from Weir Junction to Cotley Junction. Reconstructing the existing active and inactive rail lines in Taunton would result in permanent impact to BVW in 15 wetlands, with 53,145 sf (1.2 acres) of impact, and temporary impact to BVW in 17 wetlands, with 46,040 sf (1.1 acres) of impact, for a total of 99,185 sf (2.3 acres) of alteration to BVW. Bank would be permanently impacted in two locations, with a total of 457 lf of impact. LUW would not be impacted. BLSF would be permanently impacted in three locations, with a total of 32,706 sf (0.8 acre) of impact. RA would be permanently impacted in five locations, with a total of 61,390 sf (1.4 acres) of new development.

Taunton has some of the largest direct wetland impacts along the project corridor. Several wetlands have formed partially or mostly within the inactive right-of-way and would be impacted. Additional direct wetland impacts in Taunton would include 0.7 acre of RA and 0.5 acre of BLSF associated with the Taunton River (Wetlands TCM 1.2 and TR (Crossing 2)).

Reconstructing the existing active and inactive rail line in Taunton would result in permanent impact to 17 VWs, with a total of 71,326 sf (1.6 acres) of impact, and temporary impact to 19 VWs, with a total of 50,015 sf (1.1 acres) of impact. Taunton would have some of the largest direct wetland impacts along the project corridor. Several wetlands have formed partially or mostly within the inactive right-of-way and would be impacted. Table 4.16-37 lists the impacted wetlands in Taunton and the size of each impacted area.

**Table 4.16-37 Direct Impacts to State and Federal Resource Areas–Taunton**

| | Bank | BVW | | LUW | | BLSF | ILSF | RA | | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Temp. | Perm. | Temp. |
| Wetland ID | (lf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) | (sf) |
| TWB-04 | - | 460 | 817 | - | - | - | - | - | - | - | - | 460 | 817 |
| TWB-06/07 | - | - | - | - | - | - | - | 5,867 | 24,490 | - | - | - | - |
| TWB-08.1 | - | - | - | - | - | - | - | - | - | - | - | 13,778 | 1,988 |
| TCM-1 | - | 7,421 | 1,079 | - | - | - | - | - | - | - | - | 7,421 | 1,079 |
| TCM-1.2 | - | 617 | 4,806 | - | - | 4,938 | - | 10,467 | 18,169 | - | - | 617 | 4,806 |
| TCM-2WEST | - | 865 | 2,202 | - | - | - | - | - | - | - | - | 865 | 2,202 |
| TCM-1.1 | - | - | 563 | - | - | 1,554 | - | - | - | - | - | - | 563 |
| TCM-3 | - | - | - | - | - | - | - | - | - | - | - | 4,403 | 1,987 |
| TCM-5 | - | 6,299 | 1,204 | - | - | - | - | - | - | - | - | 6,299 | 1,204 |
| TCM-7EAST (200) | - | 7,038 | 2,652 | - | - | - | - | - | - | - | - | 7,038 | 2,652 |
| TCM-6 | - | 8,299 | 12,030 | - | - | - | - | - | - | - | - | 8,299 | 12,030 |
| TCM-7EAST (100) | - | 3,173 | 4,955 | - | - | - | - | - | - | - | - | 3,173 | 4,955 |
| TCM-7WEST | - | 6,367 | 3,736 | - | - | - | - | - | - | - | - | 6,367 | 3,736 |
| TCM-10WEST (200) | - | 1,189 | 990 | - | - | - | - | - | - | - | - | 1,189 | 990 |
| TCM-10WEST (100) | - | 1,246 | 1,198 | - | - | - | - | - | - | - | - | 1,246 | 1,198 |
| TCM-9 | 283 | 5,763 | 1,659 | - | - | - | - | - | - | - | - | 5,763 | 1,659 |
| TCM-12 | - | 665 | 1,155 | - | - | - | - | - | - | - | - | 665 | 1,155 |
| TCM-11B | - | - | 1,801 | - | - | - | - | - | - | - | - | - | 1,801 |
| TCM-14 (200) | - | 3,100 | 2,838 | - | - | - | - | - | - | - | - | 3,100 | 2,838 |
| TR (Crossing 1) | - | - | | - | - | - | - | 15,866 | 8,983 | - | - | - | - |
| TR (Crossing 2) | 174 | 643 | 2,355 | - | - | 17,214 | - | 21,893 | 28,059 | - | - | 643 | 2,355 |
| BKCM-5 | - | - | - | - | - | - | - | 7,297 | 13,512 | - | - | - | - |
| TOTAL | 457 | 53,145 | 46,040 | 0 | 0 | 32,706 | 0 | 61,390 | 93,212 | 0 | 0 | 71,326 | 50,015 |
| TOTAL (ac) | | 1.2 | 1.1 | 0.0 | 0.0 | 0.8 | 0.0 | 1.4 | 2.1 | 0.0 | 0.0 | 1.6 | 1.1 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

**Summary of Direct Impacts to State and Federal Resource Areas**—Reconstructing the existing active and inactive rail lines along the Whittenton alternative would result in permanent impact to BVW in 92 wetlands, with 8.4 acres of impact, and temporary impact to BVW in 117 wetlands, with 4.7 acres of impact, for a total of 13.1 acres of alteration to BVW. BVW impacts would result from reconstructing and widening existing berms associated with the rail lines, and filling wetlands that have formed within the right-of-way. The majority of impacts are to one wetland, Wetland TWB 08.1, just south of Bay Street in the Taunton section of the Whittenton Branch. While a large portion of this wetland would be filled in order to construct the railroad, this is a disturbed, mainly unvegetated wetland that has developed within the right-of-way due to compression of soils from ATV and other use of the path. The area is isolated and does not provide wetland functions and values other than a minor amount of groundwater recharge through infiltration into sections of former drainage ditches along either side of the right-of-way.

Bank would be permanently impacted in 41 locations, with a total of 16,581 lf of impact. The largest Bank impacts would occur in:

- Raynham (6,773 lf of impact);
- Easton (5,423 lf of impact); and
- Freetown (2,460 lf of impact).

LUW would be permanently impacted in three wetlands, with a total of 1.8 acres of impact, and temporarily impacted in five wetlands, with a total of 0.2 acre of impact. LUW impacts would largely result mainly from relocating the perennial stream in Raynham and filling Terry Brook Pond in Freetown.

BLSF would be permanently impacted in 28 locations, with a total of 5.0 acres of impact. The largest BLSF impacts would occur in Raynham as a result of relocating the perennial stream.

RA would be permanently impacted in 21 locations, with a total of 7.8 acres of new development of naturally vegetated land outside of the existing ballast and other active rail elements. The largest RA impacts would occur in Raynham as a result of relocating the perennial stream.

Coastal Bank would be permanently impacted in four locations in Fall River, with a total of 274 lf of impact.

LSCSF would be permanently impacted in three locations in Fall River, with a total of 0.6 acres of impact, associated with the Taunton River.

Reconstructing the existing active and inactive rail lines along the project corridor would result in permanent impact to 106 VWs, with 9.4 acres of impact, and temporary impact to 131 VWs, with 4.9 acres of impact, for a total of 14.3 acres of alteration to VWs. Impacts to VWs would result from reconstructing and widening existing berms associated with the rail lines, and would impact wetlands that have formed within the right-of-way.

Three WW areas would be permanently impacted, with a total of 1.8 acres of impact, and five WW areas would be temporarily impacted, with a total of 0.2 acre of impact. WW impacts would result mainly from relocating a perennial stream that has formed within the right-of-way in Raynham due to blocked

drainage culverts, and filling portions of Terry Brook Pond in Freetown on both sides of the right-of-way in order to widen the existing berm.

Table 4.16-38 summarizes the direct impacts to state and federal wetland resource areas along the Whittenton Alternative corridor. The number of impacted wetlands and the total size of the impact for each type of resource area are given for each municipality.

***Direct Impacts to Wetlands in an ACEC***

Similar to the Stoughton alternative, the Whittenton alternative crosses the Hockomock Swamp ACEC in Easton and Raynham. Within the Hockomock Swamp ACEC, six wetlands would be directly impacted by the project. This includes the perennial stream that has formed within the right-of-way in Raynham. Table 4.16-33 lists the wetlands that are directly impacted in the Hockomock Swamp ACEC, along with the type and amount of each impact.

***Direct Impacts by Cover Type***

This section quantifies and discusses the direct impacts to vegetation cover types along the Whittenton Alternative. Totals of each cover type will be used when determining mitigation goals. Direct impacts were calculated to Cowardin cover types in each municipality along the right-of-way. Using the analysis methods previously described.

Table 4.16-39 gives a summary of the direct impacts to cover types along the Whittenton corridor. The number of impacted wetlands and the total size of the impact for each cover type are given for each municipality. Totals for the entire length of the project are also given. The direct impacts to the cover types in each municipality are presented below.

**Table 4.16-38 Direct Impacts to State and Federal Resource Areas along the Whittenton Alternative**

| | Bank | BVW | | LUW | | BLSF1 | ILSF1 | RA | | Coastal Bank | LSCSF | Waterbody/Waterway | | Vegetated Wetlands | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Perm. | Perm. | Temp. | Perm. | Temp. | Perm. | Temp. | New | Redev. | Perm. | Perm. | Perm. | Temp. | Perm. | Temp. |
| Municipality | (#/lf) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/lf) | (#/ac) | (#/ac) | (#/ac) | (#/ac) | (#/ac) |
| Canton | 2/90 | 2/<0.1 | 2/<0.1 | - | 1/<0.1 | 5/0.9 | - | 1/0.4 | 1/0.5 | - | - | - | 1/<0.1 | 2/<0.1 | 4/<0.1 |
| Stoughton | 3/539 | 6/2.0 | 5/0.1 | - | - | 1/0.7 | - | - | - | - | - | - | - | 8/2.1 | 6/0.1 |
| Easton | 4/5,423 | 9/0.3 | 13/0.2 | - | - | 2/0.8 | - | 4/0.8 | 4/1.2 | - | - | - | - | 11/ 0.4 | 15/0.2 |
| Raynham | 5/6,773 | 9/0.5 | 12/0.4 | 1/1.5 | 1/<0.1 | 2/1.2 | - | 1/2.3 | 1/3.6 | - | - | 1/1.5 | 1/<0.1 | 9/0.6 | 12/0.4 |
| Taunton | 2/457 | 15/1.2 | 18/1.1 | - | - | 3/0.8 | - | 5/1.4 | 5/2.1 | - | - | - | - | 17/1.6 | 19/1.1 |
| Berkley | 2/233 | 13/1.4 | 18/1.0 | - | - | 2/0.2 | - | 4/1.1 | 4/1.8 | - | - | - | - | 14/1.5 | 18/1.0 |
| Lakeville | 3/606 | 10/0.8 | 9/0.5 | - | 1/<0.1 | 1/0.1 | - | 2/0.8 | 2/1.0 | - | - | - | 1/<0.1 | 11/0.8 | 10/0.5 |
| Freetown | 20/2,460 | 15/1.0 | 25/0.6 | 2/0.3 | 2/0.1 | 11/0.3 | - | 4/1.0 | 4/1.5 | - | - | 2/0.3 | 2/0.1 | 19/1.1 | 30/0.6 |
| New Bedford | - | 13/1.2 | 14/0.8 | - | - | 1/<0.1 | - | - | - | - | - | - | - | 13/1.2 | 14/0.8 |
| Fall River | - | - | 1/<0.1 | - | - | - | - | - | - | 4/274 | 3/0.6 | - | - | 2/<0.1 | 3/<0.1 |
| TOTAL | 41/16,581 | 92/8.4 | 117/4.7 | 3/1.8 | 5/0.2 | 28 /5.0 | 0/0.0 | 21/7.8 | 21/11.7 | 4/274 | 3/0.6 | 3/1.8 | 5/0.2 | 106/9.4 | 131/4.9 |

Notes: Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD applications for the municipalities of Stoughton and Easton, and therefore neither resource area was confirmed by the Conservation Commissions from either municipality. Information for these resource areas is presented here for informational purposes and is approximate.

**Table 4.16-39 Direct Impacts by Cover Type–Whittenton Alternative**

| | | | OW | | PEM | | | | PSS | | PFO | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total of All Types | | Open Water | | Shallow Marsh | | Deep Marsh | | Scrub-Shrub | | WSD | | WSM | |
| Municipality | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) |
| Canton | 2/<0.1 | 5/0.1 | - | 1/<0.1 | - | 1/<0.1 | - | - | - | 1/<0.1 | 2/<0.1 | 2/<0.1 | - | - |
| Stoughton | 8/2.1 | 6/0.1 | - | - | 2/<0.1 | 2/<0.1 | - | - | - | - | 6/2.0 | 4/0.1 | - | - |
| Easton | 11/0.4 | 15/0.2 | - | - | - | - | 2/<0.1 | 3/<0.1 | 3/0.3 | 3/<0.1 | 6/0.1 | 9/0.1 | - | - |
| Raynham | 10/2.1 | 13/0.4 | 1/1.5 | 1/<0.1 | - | - | - | 1/<0.1 | 3/<0.1 | 3/0.1 | 6/0.5 | 8/0.4 | - | - |
| Taunton | 17/1.6 | 19/1.1 | - | - | 1/0.1 | 1/0.1 | | | | | 16/1.5 | 18/1.1 | | |
| Berkley | 14/1.5 | 18/1.0 | - | - | - | - | - | - | 2/0.2 | 2/0.1 | 11/1.1 | 15/0.8 | 1/0.1 | 1/<0.1 |
| Lakeville | 11/0.8 | 11/0.6 | - | 1/<0.1 | - | - | - | - | 2/0.1 | 1/<0.1 | 9/0.7 | 9/0.5 | - | - |
| Freetown | 21/1.4 | 32/0.7 | 2/0.3 | 2/0.1 | 2/ <0.1 | 2/0.1 | - | - | 5/0.2 | 7 <0.1 | 12/0.9 | 21/0.4 | - | - |
| New Bedford | 13/1.2 | 14/0.8 | - | - | 1/0.4 | 1 <0.1 | - | - | 1 <0.1 | 1/0.1 | 10/0.8 | 10/0.6 | 1 <0.1 | 2/0.1 |
| Fall River | 2/<0.1 | 3/0.1 | - | - | - | - | - | - | - | - | 2/<0.1 | 3/0.1 | - | - |
| TOTAL | 109/11.2 | 136/5.1 | 3/1.8 | 5/0.2 | 6/0.6 | 7/0.3 | 2/<0.1 | 4/<0.1 | 16/0.9 | 18/0.3 | 80/7.7 | 99/4.1 | 2/0.2 | 3/0.1 |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.

In comparison to the impacts previously discussed for the Stoughton Alternative, all impacts are the same with the exceptive of two municipalities, Raynham and Taunton. Reconstructing the existing inactive rail lines in Raynham would result in permanent impact to PFO in six wetlands, with a total of 0.5 acre of impact, and temporary impact to BVW in eight wetlands, with a total of 0.4 acre of impact. PFO impacts are all of the subtype WSD. PSS would be permanently impacted in three wetlands, with a total of <0.1 acre, and temporarily impacted in three wetlands, with a total of 0.1 acre of impact. PEM would not be permanently impacted. OW would be permanently impacted in one wetland, with 1.5 acres of impact, and temporarily impacted in one wetland, with <0.1 acre of impact. No areas of Atlantic white cedar present in the Hockomock Swamp would be impacted.

Reconstructing the existing active and inactive rail lines in Taunton would result in permanent impact to PFO in 16 wetlands, with a total of 1.5 acres of impact, and temporary impact to BVW in eight wetlands, with a total of 0.4 acre of impact. All PFO impacts are of the subtype WSD. The majority of impacts are to one wetland, Wetland TWB 08.1, just south of Bay Street in the Taunton section of the Whittenton Branch. This wetland has developed within the right-of-way and a large portion would be filled in order to construct the railroad. Although this wetland has been classified as palustrine forested area, this is a disturbed, mainly unvegetated wetland that has developed within the right-of-way due to compression of soils from ATV and other use of the path. The area is isolated and does not provide wetland functions and values other than a minor amount of groundwater recharge through infiltration into sections of former drainage ditches along either side of the right-of-way. PSS would not be impacted. PEM would be permanently impacted in one wetland with a total of 0.1 acre of impact and temporarily impacted in one wetland with 0.1 acre of temporary impact. All PEM impacts are of the subtype SM. OW would not be impacted.

In summary, reconstructing the existing active and inactive rail lines along the Whittenton alternative would result in permanent impact to PFO in 82 wetlands, with 7.9 acres of impact, and temporary impact to PFO in 102 wetlands, with 4.2 acres of impact, for a total of 12.1 acres of alteration to PFO (Table 4.16-39).

PSS would be permanently impacted in 16 wetlands, with a total of 0.9 acre of impact, and temporarily impacted in 18 wetlands, with a total of 0.3 acre of impact. The largest PSS impacts are associated with Wetland EA 12.1 in Easton, a narrow wetland area that has formed within the right-of-way.

PEM would be permanently impacted in 8 wetlands, with a total of 0.6 acre of impact, and temporarily impacted in 11 wetlands, with a total of 0.3 acre of impact. The largest PEM impacts are associated with Wetland T 42 (200) in Taunton, an emergent wetland that has formed within the right-of-way

OW would be permanently impacted in three wetlands, with a total of 1.8 acres of impact, and temporarily impacted in five wetlands, with a total 0.2 acres of impact. The largest OW impacts would occur in Wetland R 62.1 in Raynham, in order to relocate a perennial stream that has formed in the right-of-way due to blocked drainage ditches, and in Wetlands FRF 11 and FRF 12 in Freetown, where Terry Brook Pond occurs on both sides of the right-of-way.

***Direct Impacts to Wetlands/Waters by Watershed***

The Whittenton Alternative crosses the Neponset, Taunton, Buzzards Bay, and Narragansett Bay regional watersheds. Direct impacts to vegetated wetlands that fall within each watershed were calculated to help guide the development of mitigation measures. The majority of the project corridor falls within the Taunton regional watershed. Of the approximately 52.1 miles of the total rail length of

the project, approximately 39.9 miles lie in the Taunton watershed, 4.7 miles in the Neponset watershed, 6.8 miles in the Buzzards Bay watershed, and 0.7 mile in the Narragansett Bay watershed. The majority of direct impacts also occur in the Taunton watershed. A total of 87 of the 106 wetlands that would be permanently impacted are in the Taunton watershed, with 8.1 of the 9.4 acres of total permanent impact. A total of 108 of the 133 wetlands that would be temporarily impacted are also in the Taunton watershed, with 4.0 of the 4.8 acres of total temporary impact. In the Neponset watershed, three wetlands would be permanently and temporarily impacted, with a total of less than 0.1 acre of permanent impact and less than 0.1 acre of temporary impact. In the Buzzards Bay watershed, 15 wetlands would be permanently impacted, with a total of 1.3 acres of impact, and 16 wetlands would be temporarily impacted, with a total of 0.8 acre of impact. In the Narragansett Bay watershed, two wetlands would be permanently impacted with less than 0.1 acre of impact and three wetlands would be temporarily impacted, with 0.1 acre of impact. Impacts to Outstanding Resource Waters (ORWs) include those wetlands associated with vernal pools. A detailed discussion of vernal pool impacts is provided in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*. Table 4.16-40 lists the watersheds in the South Coast Rail project corridor, the number of wetlands impacted in each, and the amount of each impact.

**Table 4.16-40 Direct Impacts to Wetlands/Waters by Watershed**

| | Waterbody/Waterway | | Vegetated Wetlands | | ORW Impacts | |
|---|---|---|---|---|---|---|
| Watershed | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) | Perm. (#/ac) | Temp. (#/ac) |
| Neponset | - | 1/<0.1 | 2/<0.1 | 4/<0.1 | - | - |
| Taunton | 3/1.8 | 4/0.2 | 87/8.1 | 108/4.0 | 17 /1.1 | 21/1.3 |
| Buzzards Bay | - | - | 15/1.3 | 16/0.8 | - | - |
| Narragansett Bay | - | - | 2/<0.1 | 3/0.1 | - | - |
| TOTAL | 3/1.8 | 5/0.2 | 106/9.4 | 131/4.9 | 17/1.1 | 21/1.3 |

#### Whittenton Diesel Alternative

Impacts to wetlands for the Whittenton Diesel Alternative are similar to the impacts identified above for the Whittenton Electric Alternative. The diesel alternative does not require traction power substations and would result in approximately 0.01 acre of permanent wetland impacts less than the Whittenton Electric Alternative along the New Bedford Main Line. All other impacts are the same as those estimated for the remainder of Whittenton Electric Alternative.

### 4.16.9.3 Secondary and/or Indirect Impact Analysis

As described in Section 4.16.6.2 the Secondary and/or Indirect Impact Analysis evaluated the effects of the alternatives on wetland functions and values for all wetlands within 100 feet of the project limits for the Stoughton and Whittenton alternatives. These impacts cannot be quantified, but are presented in a qualitative approach that identifies, for each wetland, the principal functions and values provided by that wetland, the magnitude of impact to those functions based on the physical extent of the impacts in comparison to the overall size of the wetland.

Secondary and/or indirect effects are changes in the ability of a wetland to provide each function, and do not affect a wetland uniformly (except for some small wetlands). These functional effects occur as gradients with the highest intensity occurring closest to the disturbance and decreasing with distance.

Each resource affected may also experience the effects differently – for example, the effects of a canopy gap do not affect all wildlife species in the same way, or at the same distance. While some researchers have considered a secondary effect ("road effect") to alter the entire wetland, others have documented that the effects of highways are not uniformly distributed across a wetland. Effects on the ability of a wetland to support production export are different in type and location than on the ability of a wetland to provide sediment/toxicant retention or nutrient transformation. Eigenbrod et al.[33] have shown that the ability of a wetland to provide wildlife habitat functions is multivariate, and includes size, edge: interior ratio, cover type, connectivity, microhabitat diversity, soil moisture, and other factors. Their work has shown that the most important variable is wetland size, and that changes in wetland size in small wetlands has a much greater effect on wildlife species richness than changes in size in larger wetlands.

For these reasons, the analysis of secondary and/or indirect effects has estimated the severity of the effect of the South Coast Rail project (reconstructing out-of-service rail infrastructure, reconstructing active rail infrastructure, adding infrastructure necessary for electric service, and constructing stations) on each adjacent or nearby wetland by ranking the impact based on the relative extent of impact in comparison to the overall size of the wetland, for each key function or value provided by that wetland.

Wetlands within 100 feet of the South Coast Rail project could experience secondary and/or temporary impacts to wetland functions as a result of the permanent loss of a portion of the wetland, temporary impacts resulting from construction, and/or proximity to the project. These impacts would differ, for some resources, depending on whether the adjacent project area is an active rail corridor or out-of-service.

**Active Rail Segments**

Active rail segments are characterized by a developed (ballasted) rail bed and tracks, which create a canopy gap and barrier to wildlife movement. Work proposed along these segments would improve wildlife passage by reconstructing bridges and culverts, and installing between-the-tie crossings to accommodate smaller fauna such as amphibians, but would not change the characteristics of the upland. The only effects of the proposed project would be to increase train passage and a minor increase in noise levels due to the increased number of trains.

The physical characteristics of those wetlands within 100 feet of the project limit-of-work not directly affected by construction would not change. The increased train passage is not anticipated to adversely affect the wildlife habitat function of adjacent or nearby wetlands (see Chapter 4.14, *Biodiversity, Wildlife, and Vegetation*).

The introduction of the overhead catenary system required for the Electric Alternatives could affect the visual quality of wetlands, where there are views of the wetland from a public way or across a navigable waterway. There could be a negligible effect on the ability of waterways to provide fish habitat as a result of tree clearing within 25 feet of the bank.

Secondary and/or indirect effects to physical and biochemical functions (groundwater recharge, sediment/toxicant retention, flood storage, nutrient retention/transformation, production export) are

[33] Eigenbrod, F., S.J. Hecnor, and L. Fahrig. 2009. Quantifying the road-effect zone: threshold effects of a motorway on anuran populations in Ontario, Canada. Ecology and Society 14:24. Available online at: http://www.ecologyandsociety.org/vol14/iss1/art24.

related to the loss of the wetland that provides these functions, and impacts would be proportionate to the size of the lost area relative to the total wetland size. Areas of temporary construction impact would be restored to the same elevation and re-vegetated, with no loss of wetland function for these physical and biochemical functions. In general, reductions in sediment/toxicant/pathogen removal and nutrient removal/transformation would result from a reduced opportunity for sediment trapping, reduced vegetation/water interspersion, and changes in the type and density of vegetation. The ability of a wetland to provide production export would be affected by reduction in wildlife food sources, reduced wildlife usage, and a potentially reduced diversity of wetland plants.

Secondary effects to wildlife habitat functions would result from a loss of wetland that provides wildlife habitat function, or from canopy removal in forested wetlands as the canopy edge effects would extend further into the wetland. The loss of a portion of a wetland would reduce the effective habitat size for all species, and more so for forest interior species. These effects would be exacerbated by the barrier and noise effects. Barrier effects (and creation of a canopy gap that reduces the size of forest interior habitat) would result in the reduction of effective contiguous habitat size for populations of some species (especially reptiles, amphibians, some small mammals, some forest interior birds) as documented in Chapter 4.14, *Biodiversity, Wildlife, and Vegetation*.

Areas of temporary impact would be restored, but create the potential for establishment of invasive species such as common reed or reed canary-grass (*Phalaris arundinacea*) that reduce wetland habitat quality in the impacted area and can spread throughout the wetland. Where the wetland is a vernal pool, or contains vernal pool habitat, the same effects occur and further reduce the wildlife habitat functions through the reduction of effective habitat size. The loss of vegetation on the rail berm within vernal pool supporting upland habitat could affect the population size of vernal pool amphibians. Reconstructing the rail infrastructure in some upland areas could affect the habitat of state-listed rare species (turtles, blue-spotted salamanders) in some wetlands.

Impacts to fisheries habitat would occur only where fill would be placed in pond or other waterway/waterbody with fisheries value, or where removing vegetation from or near a riverbank could affect shading. Impacts to recreational functions would occur where fill would be placed in pond or other waterway/waterbody accessible to/used for fishing.

**Out-of-Service Rail Segments**

Out-of-service rail segments are characterized by a developed (ballasted) rail bed, but also have a closed canopy in some areas and no tracks or ties remaining in place between Short Street in Easton and Longmeadow Road in Taunton. Work proposed along these segments would improve wildlife passage by reconstructing bridges and culverts, but would result in a barrier to the movement of some terrestrial wildlife species, and would increase the canopy gap in forested areas.

The physical characteristics of those wetlands within 100 feet of the project limit-of-work not directly affected by construction would not change. As a result no secondary or indirect effects to wetland functions or values would be anticipated (groundwater recharge, sediment/toxicant retention, flood storage, nutrient removal/transformation, production export, uniqueness/heritage).

The increased train passage is not anticipated to adversely affect the wildlife habitat function of adjacent or nearby wetlands (see Chapter 4.14, *Biodiversity, Wildlife, and Vegetation*). The introduction of the overhead catenary system could affect the visual quality of wetlands, where there are views of the wetland from a public way or across a navigable waterway.

Secondary effects to wetland wildlife habitat, where this is a principal function, would occur as a result of the barrier and noise effects. Barrier effects (and creation of a canopy gap that reduces the size of forest interior habitat) would result in the reduction of effective contiguous habitat size for populations of some species (especially reptiles, amphibians, some small mammals, some forest interior birds) as documented in Chapter 4.14, *Biodiversity, Wildlife, and Vegetation*. In Hockomock Swamp, the proposed trestle structure would largely eliminate the barrier effect. The loss of vegetation on the rail berm within vernal pool supporting upland habitat could affect the population size of vernal pool amphibians. However, it should be noted that re-establishment of commuter rail service would eliminate use of the right-of-way by ATV users that currently and regularly leave the right-of-way to enter, cross through, and/or ride in circuitous or serpentine pathways through the vernal pools, adversely affecting amphibians in those pools, particularly at breeding, egg and larval life stages. Preventing these occurrences would presumably enhance vernal pool habitat, thereby increasing populations of vernal pool amphibians–including some that are state-listed. Thus re-establishment of commuter rail service could actually have a secondary *benefit* to vernal pool wetlands, particularly in Hockomock Swamp. However, reconstructing the rail infrastructure in some upland areas could affect the habitat of state-listed rare species (turtles, blue-spotted salamanders) in some wetlands that provide the rare species habitat function.

Other secondary effects to wetlands that are in proximity to the project alternatives include the educational use of wetlands. Reconstructing the rail bed south of Foundry Street in Easton may affect the visual quality and access to wetlands that are used by faculty and students from the Southeast Regional Vocational and Technical School to supplement in-class learning. In locations where the out-of-service right-of-way is used as a trail and/or crossed by trails, reconstructing the track infrastructure would prevent hikers or ATV users from using the right-of-way or crossing the right-of-way to access recreational areas. The proximity to the overhead catenary could also affect the visual quality of some recreational areas adjacent to the right-of-way. All of these wetlands are adjacent to the Vocational and Technical school or residences and are not open for hunting. It should be noted, however that there are no mapped designated or sanctioned trails in Stoughton, Easton, or Raynham on or across the right-of-way that would be affected, notwithstanding *de facto* usage of the right-of-way for these purposes.

Many wetlands adjacent to the right-of-way provide habitat for state-listed reptile or amphibian species. Although the actual wetland habitat would not be directly affected, construction could have a secondary effect on the endangered species functions of these wetlands by creating a barrier to the movement of small vertebrates, although in Hockomock Swamp, the proposed trestle structure would largely eliminate the barrier effect. Similar to active sections of the rail, secondary and/or indirect effects to physical and biochemical functions (groundwater recharge, sediment/toxicant retention, flood storage, nutrient retention/transformation, production export) are related to the loss of the wetland that provides these functions, and impacts would be proportionate to the size of the lost area relative to the total wetland size. Areas of temporary construction impact would be restored to the same elevation and re-vegetated, with no loss of wetland function for these physical and biochemical functions.

Secondary effects to wildlife habitat functions would result from a loss of wetland that provides wildlife habitat function, or from canopy removal in forested wetlands as the canopy edge effects would extend further into the wetland. The loss of a portion of a wetland would reduce the effective habitat size for all species, and more so for forest interior species. These effects would be exacerbated by the barrier and noise effects. Barrier effects (and creation of a canopy gap that reduces the size of forest interior habitat) would result in the reduction of effective contiguous habitat size for populations of some

species (especially reptiles, amphibians, some small mammals, and some forest interior birds) as documented in Chapter 4.14, *Biodiversity, Wildlife and Vegetation*.

Areas of temporary impact would be restored but create the potential for establishment of invasive species such as common reed or reed-canary grass that reduce wetland habitat quality in the impacted area and can spread throughout the wetland. Where the wetland is a vernal pool, or contains vernal pool habitat, the same effects occur and further reduce the wildlife habitat functions through the reduction of effective habitat size. The loss of vegetation on the rail berm within vernal pool supporting upland habitat could affect the population size of vernal pool amphibians. Reconstructing the rail infrastructure in some upland areas could affect the habitat of state-listed rare species (Blanding's turtle (*Emydoidea blandingii*) and blue spotted salamander (*Ambystoma laterale*) eastern box turtle (*Terrapene carolina carolina*)) in some wetlands that provide the rare species habitat function. Impacts to fisheries habitat would occur only where fill would be placed in pond or other waterway/waterbody with fisheries value.

Temporary wetland impacts would have similar secondary and/or indirect effects on wetlands adjacent to out-of-service rail segments as for active rail segments. Secondary effects to wildlife habitat functions would result from the temporary loss of wetland that provides wildlife habitat function, or from canopy removal in forested wetlands as the canopy edge effects would extend further into the wetland. The change in wetland vegetation would reduce the effective habitat size for all species, more so for forest interior species. Areas of temporary impact would be restored but create the potential for establishment of invasive species such as common reed or reed-canary grass that reduce wetland habitat quality in the impacted area and can spread throughout the wetland. Where the wetland is a vernal pool, or contains vernal pool habitat, the same effects occur and further reduce the wildlife habitat functions.

#### Other Secondary and/or Indirect Effects

Other categories of secondary and/or indirect effects include effects caused by extending or relocating culverts that convey streams, and the potential effects of changes in stormwater discharge from the proposed commuter rail stations. Where culverts would be required to be extended or relocated, the changes to the wetland outlet have the potential to result in secondary effects to the physical as well as biological characteristics of wetlands. Changes to the outlet of a wetland could alter the duration or depth of flood storage, change discharge rates (that would affect downstream wetlands), or result in channel modifications upstream or downstream of the culvert.

Culverts are proposed to be retained without modification in the majority of areas, or reconstructed to meet to meet engineering requirements for operation of the South Coast Rail (per industry standards for railroad use) and, where appropriate (based on hydrology and ecological value), the Massachusetts Stream Crossing Standards.[34] Where culverts are proposed to be reconstructed to meet these standards, culvert extension is not proposed and the appropriate hydrological studies would be undertaken prior to final design to ensure that the upstream and downstream hydrology was not altered.

[34] River and Stream Crossing Partnership. 2011. Massachusetts River and Stream Crossing Standards. The University of Massachusetts- Amherst (College of Natural Sciences), The Nature Conservancy, Massachusetts Division of Ecological Restoration-Riverways Program, American Rivers, and others. August 2004; revised March 1, 2006; revised March 1, 2011; corrected January 31, 2012.

Effects of stormwater discharges on wetlands have been minimized since all stations have been designed to comply with the Massachusetts Stormwater Standards. Stormwater collection and treatment systems would reduce the discharge of total suspended solids (TSS) and other contaminants, and would reduce discharge rates through the use of infiltration basins and bioretention swales. However, increased flows into or through the wetland, and potential increased discharge of TSS and other contaminants, could affect stream channels through erosion and/or deposition, alter vegetation or facilitate the introduction of invasive species. Functions affected could include bank stabilization, sediment/toxicant retention, production export, and wildlife habitat. Stormwater discharge would be likely to affect up to ten wetlands.

### Stoughton Alternative

As shown in Table 4.16-41, the majority of wetlands along either the active or inactive segments of the Stoughton alternative would experience negligible to minor impacts to functions and values. In most cases, the wetlands are relatively large in comparison to the area in which functions would be lost or altered, and there would be little overall effect on the ability of the wetland to provide these functions. As shown in the table, the functions most affected would be wildlife habitat, with 116 of the 144 wetlands providing this function affected. Most of these (77 percent) would experience negligible or minor impacts. Although wetlands along both the active and inactive segments would experience a decrease in their ability to support wildlife habitat functions, including rare species habitat, these changes would be greater in the inactive segments due to the barrier effect of the reconstructed tracks. The segment through the Hockomock Swamp would result in a minor effect on wildlife habitat through creation of a canopy gap although there would be no barrier to wildlife movement. The overhead catenary system required to provide electric rail service would affect 58 wetlands that provide visual or aesthetic value, a majority of the wetlands that provide this function.

**Table 4.16-41 Secondary and/or Indirect Effects on Wetlands within 100 feet of the Rail Segments along the Stoughton Alternative[1]**

| | | Negligible/Minor | | Moderate/High | | |
|---|---|---|---|---|---|---|
| Function | Total Wetlands[2] | Active | Out-of-Service | Active | Out-of-Service | Total[3] |
| Groundwater recharge/discharge | 339 | 0 | 0 | 0 | 0 | 10 |
| Floodflow alteration | 112 | 33 | 18 | 9 | 8 | 68 |
| Fish and shellfish habitat | 84 | 16 | 15 | 0 | 0 | 32 |
| Sediment/toxicant/pathogen retention | 145 | 45 | 11 | 20 | 5 | 88 |
| Nutrient removal/retention/transformation | 145 | 45 | 11 | 20 | 5 | 87 |
| Production export | 206 | 38 | 23 | 11 | 10 | 86 |
| Sediment/shoreline stabilization | 203 | 8 | 2 | 0 | 5 | 19 |
| Wildlife habitat | 144 | 39 | 52 | 13 | 12 | 118 |
| Recreation | 52 | 4 | 10 | 0 | 0 | 14 |
| Educational/scientific value | 10 | 0 | 5 | 0 | 0 | 5 |
| Uniqueness/heritage | 9 | 0 | 0 | 0 | 0 | 0 |
| Visual quality/aesthetics | 77 | 33 | 25 | 6 | 0 | 64 |
| Endangered species habitat | 96 | 27 | 15 | 4 | 22 | 68 |

1 Includes all wetlands within 100 feet of the right-of-way
2 Wetlands that perform each function as a principal function
3 Includes wetlands that would receive stormwater discharge that are more than 100 feet from the right-of-way

### Whittenton Alternative

As shown in Table 4.16-42, the majority of wetlands along either the active or inactive segments of the Whittenton alternative proposed commuter rail line would experience negligible to minor impacts to functions and values. In most cases, the wetlands are relatively large in comparison to the area in which functions would be lost or altered, and there would be little overall effect on the ability of the wetland to provide these functions. As shown in the table, the functions most affected would be wildlife habitat, with 113 of the 145 wetlands providing this function affected. Most of these (80 percent) would experience negligible or minor impacts. Although wetlands along both the active and inactive segments would experience a decrease in their ability to support wildlife habitat functions, including rare species habitat, these changes would be greater in the inactive segments due to the barrier effect of the reconstructed tracks. The segment through the Hockomock Swamp would result in a minor effect on wildlife habitat through creation of a canopy gap although there would be no barrier to wildlife movement.

**Table 4.16-42 Secondary and/or Indirect Effects on Wetlands within 100 feet of the Rail Segments along the Whittenton Alternative[1]**

| | | Negligible/Minor Impacts | | Moderate/High Impacts | | |
|---|---|---|---|---|---|---|
| Function | Total Wetlands[2] | Active | Out of Service | Active | Out of Service | Total Impacts |
| Groundwater recharge/discharge | 333 | - | 3 | - | 1 | 14 |
| Floodflow alteration | 122 | 33 | 17 | 9 | 8 | 72 |
| Fish and shellfish habitat | 78 | 16 | 11 | - | - | 35 |
| Sediment/toxicant/pathogen retention | 151 | 45 | 8 | 20 | 2 | 88 |
| Nutrient removal/retention/transformation | 152 | 45 | 8 | 20 | 2 | 87 |
| Production export | 203 | 38 | 14 | 11 | 7 | 86 |
| Sediment/shoreline stabilization | 204 | 8 | - | - | 5 | 19 |
| Wildlife habitat | 145 | 40 | 50 | 13 | 10 | 127 |
| Recreation | 49 | 4 | 7 | - | - | 14 |
| Educational/scientific value | 10 | - | 5 | - | - | 5 |
| Uniqueness/heritage | 8 | - | - | - | - | - |
| Visual quality/aesthetics | 73 | 33 | 22 | 6 | - | 67 |
| Endangered species habitat | 102 | 27 | 12 | 4 | 22 | 69 |

1 Includes all wetlands within 100 feet of the right-of-way.
2 Wetlands that perform each function as a principal function.

As a result of the overhead catenary structures required to provide electric rail service, the overhead catenary system would affect 52 wetlands that provide visual or aesthetic value, a majority of which provide this function.

Along the Whittenton Branch, overall indirect or secondary impacts are generally small, due to the proportionately small direct impacts along the route. A large portion of one wetland, Wetland TWB-08.1, would be eliminated to construct the railroad. As described above, this is a disturbed, mainly unvegetated wetland that has developed within the right-of-way due to compression of soils from ATV and other use of the path, and provides little function or value. The remaining impacts to wetlands along

the Whittenton Branch are negligible or minor. The most affected wetland function is wildlife habitat, as barrier and noise effects along the currently inactive right-of-way could impact existing habitat or reduce the effective contiguous habitat size of wetlands. This effect is most likely to be seen in the approximately 0.3 mile section of the Whittenton Branch where the right-of-way branches off from the stone quarry access road. In this section, in the vicinity of Wetlands TWB 03.1 through TWB 01, both the western and eastern sides of the tracks have large areas of undeveloped land with only a narrow, mostly-vegetated path between them, whose size may be effectively reduced by constructing the railroad.

#### 4.16.9.4 Temporary Construction-Period Impacts

Construction impacts associated with a transportation project are those impacts that are temporary or short term, and occur only during construction. This section provides an overview of construction impacts, and outlines mitigation measures that would be employed to reduce short term impacts related to construction.

**Temporary Impacts**

Temporary impacts that may occur along the right-of-way include work areas adjacent to the alignment, the placement of erosion control devices including hay bales and silt fence, and any indirect impact that could result from the migration of exposed soils. Erosion and sedimentation control plans would be required from the contractor prior to commencement of work that would include ground disturbance. The Stormwater Pollution Prevention Plan (SWPPP) required under the General Permit for Discharges From Construction Activities[35,] effective February 16, 2012 and promulgated by the US Environmental Protection Agency must identify potential source areas and describe what measures would be employed as erosion control, sedimentation control, temporary stormwater management, dust control, and winter stabilization measures. Multiple Best Management Practices (BMPs) would be used in sensitive areas. Erosion control plans would also address any in-water work at stream crossing locations.

Because railroad equipment operates optimally on relatively level track segments, existing and proposed rail corridors are located in areas of flat topography commonly associated with wetland resource areas. Wetlands frequently occur at the toe of the embankment along the existing rail corridors within the project area. Any work that disturbs the toe of slope along the right-of-way typically involves some amount of temporary wetland impacts for slope stabilization, the placement of erosion controls and to provide a work zone for laborers and equipment. To calculate these impacts, an 8-foot temporary work zone strip was assumed to occur on either side of the existing or proposed right-of-way. This area would be returned to preconstruction conditions following the completion of work. Temporary impacts to wetlands would be mitigated for by returning the area to original grade following work and by seeding it with an appropriate seed mix for the area.

An erosion and sedimentation control program would be implemented to limit temporary impacts associated with migrating sediment during the construction phase of the project. These programs typically minimize exposed soil through sequencing and temporary stabilization, placing structures to minimize stormwater runoff and erosion, and establishing a vegetated cover or other forms of stabilization as soon as practicable.

[35] US Environmental Protection Agency. 2012. National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities. US EPA, April 16, 2013, <http://www.epa.gov/npdes/pubs/cgp2012_finalpermit.pdf> (April 25, 2013)

**Bridges and Culverts**

For bridges over waterways, the contractor would ensure that all construction is performed within the temporary and permanent impact limits set forth by the environmental permits. Any dewatering, if required, would also be performed in accordance with the environmental conditions and would be discharged to an adjacent upland area using appropriate BMPs such as filter bags, settling pools and sediment traps. No debris shall be allowed to enter the watercourse. For longer spans over watercourses, such as the Taunton River, it may be necessary for the work to be done using barges.

Culverts along the right-of-way were evaluated for their stability and effectiveness at conveying water across the existing rail bed. Where possible, culverts would be replaced to meet the new stream crossing standards. Other culvert crossings would be improved to the maximum extent practicable to more closely adhere to stream crossings standards. Where expansions and improvements are not possible, culverts would be replaced in-kind, or would be left in place. The design of each culvert would be evaluated during the final design process to assess and prevent potential adverse effects on hydrology, streamflow, and fisheries.

Where culvert and bridge work is proposed, coffer dams or other silt barriers would be used to prevent debris and sediment from entering the work area and migrating downstream. Where necessary, water would be pumped around the culvert or the bridge structure during work to limit downstream disturbance. Following completion of work, areas adjacent to bridge abutments and culvert headwalls would be restored to its original condition through planting and grading.

Temporary impacts at bridges and culverts would occur on either end of the structure as a result of the temporary work zone that would be required in order for equipment and personnel to install the structure. Additional temporary impacts would occur through the installation of coffer dams, erosion control barriers, equipment movement and other construction period activities.

### 4.16.9.5 Summary of Direct Impacts by Alternative

This section and Table 4.16-43 summarizes the total potential impact to wetlands that would occur under each of the alternatives inclusive of stations and layover facilities.

**No-Build (Enhanced Bus) Alternative**

The No-Build Alternative would not impact wetlands.

**Stoughton Electric Alternative**

In terms of Commonwealth of Massachusetts resources, the Stoughton Electric Alternative would permanently impact 16,813 linear feet of Bank, 9.6 acres of BVW, 6.7 acres of BLSF, and 7.9 acres of new development Riverfront Area (Table 4.16-43). The largest impacts would occur in Raynham (1.3 acres of BVW) and Stoughton (2.0 acres of BVW), particularly south of the former Greyhound Park where the corridor forms the border of the Hockomock Swamp and then crosses through Pine Swamp. These impacts would occur in and along the edge of the abandoned railroad embankment. Minor impacts would occur along the components of the Southern Triangle, along the remainder of the Stoughton Line north of the Hockomock Swamp, at the Canton, East Taunton, Easton Village, and Raynham Park stations, and at traction power stations Stoughton TPSS-2 in New Bedford, Stoughton PS-1 in Easton, and Stoughton SWS-1 in Canton. Impacts would be closely evaluated during final design and would be minimized or avoided to the maximum extent practicable. Potential permanent wetland impacts along the Stoughton Line include 0.2 acre within the Hockomock Swamp ACEC. Indirect impacts within the

Hockomock swamp would be minimal due to the existing rail bed and the proposed elevated trestle that would span 1.8 miles of the Hockomock swamp. The elevated trestle would facilitate free wildlife passage across the proposed route, as well as maintain the current hydrology of the area. Additionally, approximately 1.5 acres of ORWs would be impacted along the Stoughton Electric Alternative.

Federally regulated waters of the United State include tributaries to navigable waters of the United States and their adjacent wetlands. For purposes of this FEIS, waters of the United States are divided into waterbodies/waterways and vegetated wetlands. The Stoughton Electric Alternative would result in the permanent loss of 12.3 acres of waters of the United States, including 1.9 acres of waterbodies/waterways and 10.4 acres of federally regulated wetlands.

**Table 4.16-43 Permanent Wetland Resource Impacts by Alternative[1]**

| Alternative | Total |
|---|---|
| **Stoughton Electric Alternative** | |
| a. Massachusetts WPA Resources: | |
| Bank (lf) | 16,813 |
| Land Under Water (ac) | 1.9 |
| Bordering Vegetated Wetland (ac) | 9.6 |
| Wetlands (BVW) within ACECs (ac) | 0.2 |
| Outstanding Resource Waters (ac) | 1.5 |
| Bordering Land Subject to Flooding (ac) | 6.7 |
| Riverfront Area (ac)[2] | 7.9 |
| b. Waters of the United States: | |
| Waterbodies/Waterways (ac) | 1.9 |
| Vegetated Wetlands (ac) | 10.4 |
| **Whittenton Electric Alternative** | |
| a. Massachusetts WPA Resources: | |
| Bank (lf) | 16,581 |
| Land Under Water (ac) | 1.8 |
| Bordering Vegetated Wetland (ac) | 8.4 |
| Wetlands (BVW) within ACECs (ac) | 0.2 |
| Outstanding Resource Waters (ac) | 1.1 |
| Bordering Land Subject to Flooding (ac) | 5.0 |
| Riverfront Area (ac)[2] | 7.8 |
| b. Waters of the United States: | |
| Waterbodies/Waterways (ac) | 1.8 |
| Vegetated Wetlands (ac) | 9.4 |

[1] Figures are inclusive of stations and layovers.

[2] New Development of Riverfront Area – the loss of on naturally vegetated lands within RA, excluding railroad track and ballast

### Stoughton Diesel Alternative

Impacts to wetlands for the Stoughton Diesel Alternative are similar to the impacts identified above for the Stoughton Electric Alternative. The diesel alternative does not require traction power substations and would result in approximately 0.01 acre of permanent wetland impacts less than the Stoughton

Electric Alternative along the New Bedford Main Line. All other impacts are the same as those estimated for the remainder of Stoughton Electric Alternative.

**Whittenton Electric Alternative**

The Whittenton Electric Alternative would permanently impact the following resources regulated by the Commonwealth: 16,581 linear feet of Bank, 8.4 acres of BVW, 5.0 acres of BLSF, and 7.8 acres of new development Riverfront Area (Table 4.16-43). By town, the largest amount of impacts would occur in Berkley (1.4 acres of BVW) and Stoughton (2.0 acres).This alternative would leave the Stoughton Line corridor at Raynham Junction and instead would follow the Whittenton Branch to the Attleboro Secondary. This diversion would avoid wetland impacts in Pine Swamp. As with the Stoughton Alternative, the majority of impacts would occur in and along the edge of the abandoned railroad embankments. Minor impacts would occur along the components of the Southern Triangle, along the remainder of the Stoughton Line north of the Hockomock Swamp, at the Canton, East Taunton, Easton Village, and Raynham Park stations, and at traction power stations Whittenton TPSS-2 in New Bedford, Whittenton PS-1 in Easton, and Whittenton SWS-1 in Canton. Impacts would be avoided or minimized during final design to the maximum extent practicable.

Potential permanent wetland impacts along the Stoughton Line segment of this alternative include 0.2 acre within the Hockomock Swamp ACEC. Indirect impacts within the Hockomock swamp would be minimal due to the existing rail bed and the proposed elevated trestle that would span 1.8 miles of the Hockomock swamp. The elevated trestle would facilitate free wildlife passage across the proposed route, as well as maintain the current hydrology of the area. Additionally, approximately 1.1 acres of ORWs would be impacted along the Whittenton Electric Alternative.

The Whittenton Electric Alternative would result in the permanent loss of 11.2 acres of waters of the United States, including 1.8 acres of waterbodies/waterways and 9.4 acres of federally regulated wetlands.

**Whittenton Diesel Alternative**

Impacts to wetlands for the Whittenton Diesel Alternative are similar to the impacts identified above for the Whittenton Electric Alternative. The diesel alternative does not require traction power substations and would result in approximately 0.01 acre of permanent wetland impacts less than the Whittenton Electric Alternative along the New Bedford Main Line. All other impacts are the same as those estimated for the remainder of Whittenton Electric Alternative.

### 4.16.10 Mitigation

This section provides a description of wetland mitigation measures (wetland creation and restoration, and land preservation) proposed to minimize impacts and restore wetland resource areas functions and values. This section addresses both the Stoughton and Whittenton Alternatives. The two alternatives are identical except for a 5.8 mile stretch of tracks between Raynham Junction and Weir Junction in Raynham and Taunton, resulting in slightly lower wetland impacts along the Whittenton Alternative. Mitigation goals are considered based on the impacts for each alternative individually.

The Secretary's Certificate focused on wetland creation, restoration, and land acquisition as mitigation for wetland and biodiversity impacts. Specific requirements of the Certificate included:

- The FEIR should identify targeted lands for acquisition by MassDOT as mitigation for the cumulative and indirect impacts of the project.

- A variance from the Wetlands Protection Act (WPA) regulations is required for the project's impacts to rare species. One concrete way for MassDOT to translate its smart growth planning into resource protection is to fund for conservation-protected targeted acquisition of parcels in Priority Protection Areas (PPAs) that are important to meet the long-term net benefit to rare species and preserve land with a high Index of Ecological Integrity. The FEIR should identify targeted sites for acquisition and describe in detail how the proposed land acquisition will offset direct and indirect impacts of the project.

- MassDOT should consult with EEA agencies to identify and protect areas critical to preserving the integrity of existing and valuable ecosystems. MassDOT should also partner with local Conservation Commissions and Planning Boards, regional planning agencies, and non-profit land trust/conservation organizations in a coordinated effort to adopt land preservation strategies that will stem wetland habitat fragmentation. The FEIR should clearly identify MassDOT's commitments to acquire land that meets the project's mitigation requirements and longer-term smart growth plans.

- The FEIR mitigation plan should include the following:

  - A 2:1 ratio for Bordering Vegetated Wetland (BVW) mitigation (at a minimum), at least 1:1 for all other wetlands. Where the USACE requires higher ratios (e.g., for forested wetlands) the mitigation plan should reflect the federal requirements also;

  - An evaluation of potential for restoration/preservation of Atlantic white cedar (*Chamaecyparis thyoides*) wetlands;

  - Meaningful Riverfront Area improvements and/or restoration to mitigate for riverfront impacts;

  - On-site elevation-specific compensatory storage for lost flood storage, or if such compensatory storage cannot be provided, demonstrate an insignificant increase in flooding, demonstrate that any incremental increase in flooding could be contained on the Proponent's property, or acquire flood easements;

  - Wetland restoration within the Hockomock Area of Critical Environmental Concern (ACEC).

- The FEIR should document with a high level of assurance that land identified for preservation, restriction or relocation/restoration to be taken by eminent domain can actually be acquired and will satisfy mitigation goals. As part of the assurances, additional mitigation areas should be identified as fall-back options in the event the primary mitigation goals are not achieved.

- MassDOT should consult with the Interagency Coordinating Group (ICG) for input on a draft mitigation plan including the methodology to identify appropriate mitigation for fragmentation impacts and the analysis of mitigation opportunities in the context of fulfilling

mitigation objectives. MassDOT should expand its outreach efforts during FEIR preparation to obtain public input on draft mitigation plans.

- The draft mitigation plan presented in the FEIR should clearly identify the impacts to be mitigated, for example specific resources, functions and values, amounts and types of impacts, etc. The plan should describe specific mitigation objectives and include an evaluation of mitigation options to determine which sites and mitigation measures perform best overall in terms of fulfilling mitigation objectives.

### 4.16.10.1 Avoidance and Minimization

#### State and Federal Guidelines

MassDEP has published a guidance document for wetland mitigation that discusses avoidance and minimization. The MassDEP guidance document avoids relying solely on replication for loss of wetlands, in light of evidence to suggest that poorly designed or constructed replication projects can fail to become new wetland areas as they were designed to do. The guidance document establishes avoidance as the first consideration for a project, using "evaluation of reasonable project designs that attempt to locate projects away from wetlands in order to avoid impacts." After considering all reasonable avoidance, minimization measures can be taken such as "steepening slopes, and, depending on the scale/nature of the project, construction of retaining walls or bridge spans to reduce wetland impacts." Only after avoidance and minimization have been applied to the fullest extent practicable should replication be considered for mitigation purposes. The use of avoidance and demonstrating no reasonable alternatives that would allow the project to proceed in compliance with the regulations one of the criteria required to obtain a Variance from the regulations.

Federal guidelines about avoidance and minimization are presented in the Section 404(b)(1) "Guidelines for Specification of Disposal Sites for Dredged or Fill Material." A Memorandum of Agreement (MOA) between the USACE and USEPA sets forth a sequence approach for evaluating wetland impacts that calls first for avoidance, then minimization, and finally compensatory mitigation for impacts. The goal of the guidelines and MOA is to establish no net loss of wetland functions and values.

#### *Avoidance*

Avoidance of wetland impacts was considered when designing the track layout for the alternatives described below. When possible, the track was kept within the existing footprint, elevated by trestle, and/or re-routed away from large areas of wetland impact. Retaining walls were also included, to the maximum extent practicable in this design stage, in track and layout design to avoid additional impacts associated with large grading footprints. Complete avoidance of all wetland impacts would only be possible through the No Build Alternative, which does not meet the project purpose. The sections below describe specific steps taken towards avoidance.

The Stoughton Electric Alternative would provide commuter rail service to South Station using the Northeast Corridor, the Stoughton Line, the New Bedford Main Line, and the Fall River Secondary. This alternative requires reconstructing track on the Southern Triangle segments and reconstructing freight rail and existing inactive rail along the Stoughton Line in Stoughton, Easton, Raynham, and Taunton, as well as the Southern Triangle. The routes were selected to avoid wetland impacts associated with the design and construction of a new right-of-way. Impacts are unavoidable along this alternative because wetlands are directly adjacent to existing track and, in some locations, on the rail bed itself.

Several portions of the Stoughton Alternative would use retaining walls to avoid wetland impacts. Impacts to 28 wetlands would be minimized by retaining walls along the Stoughton Alternative, particularly at wetlands ST 7A in Stoughton. In addition to the proposed retaining walls, a proposed trestle through the Hockomock Swamp would reduce direct wetland impacts. The proposed track design includes approximately 8,500 feet of elevated trestle along the track segment that crosses the Hockomock Swamp through Raynham and Easton. Along this portion of the right-of-way, the track would be supported by pilings. The elevated track design would avoid indirect impacts such as hydrologic movement, animal crossings, and wetland connectivity. The reconstruction of the existing right-of-way would occur within the existing footprint to the maximum extent practicable to further avoid wetland impacts.

Both portions of the Southern Triangle would use retaining walls to avoid wetland impacts. The Fall River Secondary and New Bedford Main Line would use retaining walls in ten locations to avoid additional impacts in eleven wetlands.

Station and layover facilities were chosen from a large pool of potential sites and were selected to avoid wetland impacts to the extent practicable. Neither of the proposed layover sites would affect vegetated wetlands. Proposed stations at North Easton, Easton Village, Raynham Park, Taunton, Fall River Depot, Battleship Cove, and Whale's Tooth would avoid wetlands.

The Whittenton Alternative is different from the Stoughton Alternative only along a portion of right-of-way between Raynham Junction and Weir Junction, a length of approximately 5.8 miles. The Whittenton and Stoughton Alternatives run the same course on the Stoughton Line from Canton to Raynham Junction. The New Bedford Main Line and the Fall River Secondary are also identical for both alternatives. The Whittenton Alternative, using the Whittenton Branch and a portion of the Attleboro Secondary, avoids some wetland areas associated with Pine Swamp that would be impacted by the Stoughton Alternative. Structural avoidance measures such as retaining walls would be used in the same manner as on the Stoughton Alternative, and the trestle through the Hockomock Swamp would also remain part of the design.

***Minimization***

The conceptual alternatives evaluated in this report include design features that were selected to minimize wetland impacts, such as the use of single track segments where possible to minimize widening of the right-of-way and locating railroad passing sidings in adjacent uplands rather than in wetlands. Wetland impacts would be further evaluated during final design. As part of that process, additional steps would be taken to minimize specific impacts along the preferred alternative, such as tightening side slopes and using retaining walls to reduce the overall footprint associated with the proposed work.

Proposed track design and layout in conjunction with construction practices would minimize impacts to wetlands to the extent practicable. In the final design process, impacts would be further minimized by design modifications including the use of steep slopes and retaining walls when the right-of-way is elevated above wetland resource areas. For example, use of a vertical retaining wall could reduce wetland impacts by 50 percent or more over a sloped embankment. Minimization of impacts to wetland resource areas has occurred since the DEIS/DEIR, which estimated a total of 11.9 acres of wetland impact BVW and LUW along the right-of-way for the Stoughton Alternative. The current estimate of the impacts to these resource areas from the Stoughton Alternative is 11.7 acres and 10.6 acres from the

Whittenton Alternative. Additional measures to minimize wetland impacts will be considered as the project design advances.

Wetland impacts at station locations were minimized by designing station layouts around wetland resources and by selecting station locations where the smallest number of impacts would occur. Within the footprint of the selected sites, the configuration of station amenities and storage tracks were modified to minimize impacts that could not otherwise be avoided.

### 4.16.10.2 Mitigation Goals and Objectives

#### Introduction

This section identifies the goals of wetland mitigation, based on regulatory requirements and wetland impacts previously presented. The objective of the mitigation design is to replace the functions and values provided by wetlands that would be altered during reconstruction or construction of the preferred alternative. The design of wetland replacement areas will incorporate, to the extent possible, functions and values that have been lost through wetland impacts. Wetlands would be designed to conform to the guidelines developed by the USACE and would meet the performance standards contained in the WPA regulations to the extent practicable. This would include providing minimums of 2:1 replacement for BVW, and 3:1 replacement for lost federally regulated forested wetlands. Bank and BLSF would be replaced at a 1:1 ratio and would be replaced in kind to the extent practicable. Compensatory mitigation areas would also be designed to provide vernal pool habitat.

Replacement of impacted wetlands, along with their functions and values would be achieved through several approaches including: restoring former wetland areas that were filled or otherwise altered and are currently upland; restoring functions to an existing, degraded wetland; enhancing wetland functions; and contributions to a mitigation bank or in lieu fee program, if one were available in the same watershed.

A watershed approach to wetland mitigation has been taken to compensate for direct impacts associated with the proposed work. Permanent impacts associated with each alternative were identified by watershed and by cover type. Proposed mitigation would seek to mitigate for impacted wetland cover types within the each watershed where impact would occur. USACE guidelines for mitigation ratios were followed in conjunction with guidelines established by MassDEP. Establishment of wetlands under USACE guidelines also mitigate for secondary impacts of the project. The tables in the remainder of this section show mitigation goals required under both state and federal guidelines.

The following sections present the wetland mitigation goals under both state and federal guidelines for both the Stoughton and Whittenton Alternatives. The following information is based on the current level of design for the project. At later design stages, detailed wildlife habitat assessments would be conducted of both impact areas and proposed mitigation areas. Mitigation goals, plans, and design may be adjusted based on the results of these assessments.

#### Massachusetts Wetlands Protection Act

On similar projects, MassDEP has required a 2:1 replacement ratio for BVW as part of a WPA variance. MassDEP typically seeks strict replication by requiring mitigation sites to be on site or adjacent to the impacted site, in the same watershed, with the same elevation, habitat type, hydrological connection, ecological functions, and other key characteristics. BLSF requires mitigation at a 1:1 ratio to provide compensatory flood storage. This would be designed during the final design phase and would follow the

performance standards for BLSF replacement to the extent practicable. Impacts to LUW (shown as having a cover type of OW) do not have an associated replacement ratio under the WPA. MassDEP has indicated that 1:1 replacement of LUW areas would constitute sufficient mitigation for this resource area.

***Stoughton Electric Alternative***

The Stoughton Alternative would result in the alteration of approximately 16,813 linear feet of Bank, of which the majority are intermittent or perennial streams that flow on the railroad bed due to blocked drainage ditches. Most of these streams lack vegetation, and do not provide important wildlife habitat. Impacts will be mitigated at a 1:1 ratio, on-site, by restoration of drainage ditches. One drainage diversion in Raynham has been determined to be a perennial stream with vegetated banks.

The project would result in the loss of 9.6 acres of BVW, which would require a 2:1 mitigation ratio, for a total replacement of 19.2 acres. Areas of temporary alteration (5.4 acres) would be restored in place. The project would also result in the loss of 1.9 acres of LUW, of which the majority is associated with the Raynham perennial stream. An additional 0.3 acre of LUW is within Terry Brook Pond in Freetown.

A total of 6.7 acres of BLSF would be impacted by the Stoughton Electric Alternative. Mitigation would be provided for the loss of compensatory flood storage (to be determined during subsequent final design phases of the project) and for the loss of wildlife habitat, at a 1:1 ratio. The project would result in the loss of 7.9 acres of vegetation within Riverfront Area. Further analysis is required to determine if any of the 22 affected areas provide important wildlife habitat and would require compensatory mitigation. Table 4.16-44 presents the wetland mitigation goals for impacts to state resource areas for the Stoughton Electric Alternative.

**Table 4.16-44 Wetland Mitigation Goals–State Resource Areas (Stoughton Electric Alternative)**

| Municipality | Bank (lf) | BVW (ac) | LUW (ac) | BLSF1 (ac) | RA2 (ac) |
|---|---|---|---|---|---|
| Canton | 90 | <0.1 | - | 0.9 | 0.4 |
| Stoughton | 539 | 2.0 | - | 0.7 | - |
| Easton | 5,423 | 0.3 | - | 0.8 | 0.8 |
| Raynham | 6,994 | 1.3 | 1.5 | 2.9 | 2.5 |
| Taunton | 468 | 1.5 | - | 0.8 | 1.3 |
| Berkley | 233 | 1.4 | - | 0.2 | 1.1 |
| Lakeville | 606 | 0.8 | - | 0.1 | 0.8 |
| Freetown | 2,460 | 1.0 | 0.3 | 0.3 | 1.0 |
| New Bedford | - | 1.2 | | <0.1 | - |
| Fall River | - | - | | - | - |
| Total 1:1 Mitigation[3] | 16,813 | 9. 6 | 1.9 | 6.7 | 7.9[4] |
| Total 2:1 Mitigation | | 19.2 | | | |

Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD applications for the municipalities of Stoughton and Easton, and therefore neither resource area was confirmed by the Conservation Commissions from either municipality. Information for these resource areas is presented here for informational purposes and is approximate.

2 New Development of Riverfront Area – the loss of naturally vegetated lands within RA, excluding railroad track and ballast.

3 Total 1:1 Mitigation figures also equal the total impact to wetland resource areas.

4 Requires replacement of important wildlife habitat, rather than acreage of equivalent land.

***Whittenton Electric Alternative***

The Whittenton Alternative would result in the alteration of approximately 16,581 linear feet of Bank, of which the majority are intermittent or perennial streams that flow on the railroad bed due to blocked drainage ditches. Most of these streams lack vegetation, and do not provide important wildlife habitat. Impacts will be mitigated at a 1:1 ratio, on-site, by restoration of drainage ditches. One drainage diversion in Raynham has been determined to be a perennial stream with vegetated banks.

The project would result in the loss of 8.4 acres of BVW, which would require a 2:1 mitigation ratio, for a total replacement of 16.8 acres. Areas of temporary alteration (4.7 acres) would be restored in place. The project would also result in the loss of 1.8 acres of LUW, of which the majority is associated with the Raynham perennial stream. An additional 0.3 acre of LUW is within Terry Brook Pond in Freetown.

A total of 5.0 acres of BLSF would be impacted by the Whittenton Alternative. Mitigation would be provided for the loss of compensatory flood storage (to be determined during subsequent final design phases of the project) and for the loss of wildlife habitat, at a 1:1 ratio. The project would result in the loss of 8.3 acres of vegetation within Riverfront Area. Further analysis is required to determine if any of the 22 affected areas provide important wildlife habitat and would require compensatory mitigation. Table 4.16-45 presents the wetland mitigation goals for impacts to state resource areas for the Whittenton Alternative.

**Table 4.16-45 Wetland Mitigation Goals–State Resource Areas (Whittenton Alternative)**

| Municipality | Bank (lf) | BVW (ac) | LUW (ac) | BLSF1 (ac) | RA2 (ac) |
|---|---|---|---|---|---|
| Canton | 90 | <0.1 | - | 0.9 | 0.4 |
| Stoughton | 539 | 2.0 | - | 0.7 | - |
| Easton | 5,423 | 0.3 | - | 0.8 | 0.8 |
| Raynham | 6,773 | 0.5 | 1.5 | 1.2 | 2.3 |
| Taunton | 457 | 1.2 | - | 0.8 | 1.4 |
| Berkley | 233 | 1.4 | - | 0.2 | 1.1 |
| Lakeville | 606 | 0.8 | - | 0.1 | 0.8 |
| Freetown | 2,460 | 1.0 | 0.3 | 0.3 | 1.0 |
| New Bedford | - | 1.2 | | <0.1 | - |
| Fall River | - | - | | - | - |
| Total 1:1 Mitigation | 16,581 | 8.4 | 1.8 | 5.0 | 7.8[4] |
| Total 2:1 Mitigation | | 16.8 | | | |

Wetland Classifications: BVW = Bordering Vegetated Wetland, LUW=Land Under Water, BLSF = Bordering Land Subject to Flooding, ILSF = Isolated Land Subject to Flooding, RA = Riverfront Area.

1 BLSF and ILSF were withdrawn from the ANRAD applications for the municipalities of Stoughton and Easton, and therefore neither resource area was confirmed by the Conservation Commissions from either municipality. Information for these resource areas is presented here for informational purposes and is approximate.

2 New Development of Riverfront Area – the loss of naturally vegetated lands within RA, excluding railroad track and ballast.

3 Total 1:1 Mitigation figures also equal the total impact to wetland resource areas.

4 Requires replacement of important wildlife habitat, rather than acreage of equivalent land.

### Federal Wetlands

The following sections present the wetland mitigation goals under federal guidelines for both permanent and temporary impacts for both the Stoughton and Whittenton Alternatives.

#### *Stoughton Electric Alternative*

The following sections present the wetland mitigation goals under federal guidelines for both permanent and temporary impacts, and presents mitigation goals by watershed, for the Stoughton Electric Alternative.

**Permanent Impacts**—The Stoughton Alternative would result in the loss of 10.4 acres of vegetated jurisdictional wetlands in three primary cover types (palustrine emergent wetland, palustrine scrub-shrub swamp, and palustrine wooded swamp). The first two cover types require mitigation at a 2:1 ratio (assuming restoration), while wooded swamp requires a higher mitigation ratio of 3:1 (assuming restoration). The total minimum area required for mitigation (as restoration) of these vegetated wetlands would be 31.3 acres. The project would also result in the loss of 1.9 acres of Open Water, which would be mitigated at a 1:1 ratio. The majority (1.5 acres) of Open Water is associated with the Raynham perennial stream. An additional 0.3 acre is within Terry Brook Pond in Freetown. Table 4.16-46 establishes goals for mitigation of impacts to federal jurisdictional wetlands for the Stoughton Electric Alternative, based on the ratios contained in the USACE New England District mitigation guidance.

**Table 4.16-46 Summary of Federal Mitigation Goals by Cover Type–Permanent Impacts (acres) (Stoughton Electric Alternative)**

| Municipality | Total Impact | OW | PEM–Shallow Marsh | PEM–Deep Marsh | PSS–Scrub-Shrub | PFO–WSD | PFO–WSM |
|---|---|---|---|---|---|---|---|
| Canton | <0.1 | - | - | - | - | <0.1 | - |
| Stoughton | 2.1 | - | <0.1 | - | - | 2.0 | - |
| Easton | 0.4 | - | - | <0.1 | 0.3 | 0.1 | - |
| Raynham | 2.9 | 1.5 | - | <0.1 | <0.1 | 1.3 | <0.1 |
| Taunton | 1.9 | - | 0.6 | - | - | 1.3 | - |
| Berkley | 1.5 | - | - | - | 0.2 | 1.1 | 0.1 |
| Lakeville | 0.8 | - | - | - | 0.1 | 0.7 | - |
| Freetown | 1.4 | 0.3 | <0.1 | - | 0.2 | 0.9 | - |
| New Bedford | 1.2 | | 0.4 | - | <0.1 | 0.8 | <0.1 |
| Fall River | <0.1 | | - | - | - | <0.1 | - |
| Total Impact | 12.3 | 1.9 | 1.0 | <0.1 | 0.9 | 8.3 | 0.2 |
| Minimum Mitigation Ratio[1] | | 1:1 | 2:1 | 2:1 | 2:1 | 3:1 | 3:1 |
| Total Mitigation | 31.3 | 1.9 | Total PEM: 2.1 | | 1.8 | Total PFO: 25.5 | |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.
1 Assumes Restoration as the mitigation method.

**Temporary Impacts**—As shown in Table 4.16-47, the Stoughton Alternative would result in the temporary alteration of 5.6 acres of vegetated jurisdictional wetlands in three primary cover types (palustrine emergent wetland, palustrine scrub-shrub swamp, and palustrine wooded swamp). The first two cover types require mitigation at a 1:1 ratio (restoration in situ), while wooded swamp requires a higher mitigation ratio of 1.5:1 (restoration in situ plus additional mitigation to compensate for longer-term changes in vegetative cover type and wildlife habitat functions). Temporary impacts would also occur to 0.3 acre of Open Water. Since the majority of the Open Water area is composed of unvegetated banks of intermittent streams along the right-of-way and areas where culverts are being replaced or upgraded, mitigation is not proposed for these areas. The total area required for mitigation (as restoration) would be 8.1 acres. About 5.7 acres of this mitigation can be accomplished by restoration in situ; the remaining 2.4 acres of mitigation will be added to the mitigation goals for permanent impacts.

**Table 4.16-47 Summary of Federal Mitigation by Cover Type–Temporary Impacts (acres) (Stoughton Electric Alternative)**

| Municipality | Total Impact | OW | PEM–Shallow Marsh | PEM–Deep Marsh | PSS–Scrub-Shrub | PFO–WSD | PFO–WSM |
|---|---|---|---|---|---|---|---|
| Canton | 0.1 | <0.1 | <0.1 | - | <0.1 | <0.1 | - |
| Stoughton | 0.1 | - | <0.1 | - | - | 0.1 | - |
| Easton | 0.2 | - | - | <0.1 | <0.1 | 0.1 | - |
| Raynham | 1.0 | 0.1 | - | <0.1 | 0.1 | 0.8 | <0.1 |
| Taunton | 1.4 | <0.1 | 0.2 | - | - | 1.2 | - |
| Berkley | 1.0 | - | - | - | 0.1 | 0.8 | <0.1 |
| Lakeville | 0.6 | <0.1 | - | - | <0.1 | 0.5 | - |
| Freetown | 0.7 | 0.1 | 0.1 | - | <0.1 | 0.4 | - |
| New Bedford | 0.8 | | <0.1 | - | 0.1 | 0.6 | 0.1 |
| Fall River | 0.1 | | - | - | - | 0.1 | - |
| Total Impact | 5.9 | 0.3 | 0.3 | 0.1 | 0.4 | 4.7 | 0.1 |
| Minimum Mitigation Ratio[1] | | | 1:1 | 1:1 | 1:1 | 1.5 | 1.5 |
| Total Mitigation | 8.1[2] | 0.0 | Total PEM: 0.4 | | 0.4 | Total PFO: 7.3 | |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.

1 Assumes all temporary impacts restored in place. Forested wetland (PFO) requires a higher ratio due to temporal change in wildlife habitat function.

2 Includes 5.6 acres of restoration in situ and 2.4 acres to be added to the mitigation goals for permanent impacts.

**Mitigation Goals by Watershed**—Compensatory mitigation for the loss of vegetated wetlands would be conceived with the overall goal to distribute mitigation among the four watersheds comprising the project area, as shown in Table 4.16-48. Under this general scenario, small areas of mitigation would be in the Neponset River Watershed and the Narragansett Bay watershed. The majority of the mitigation (88 percent) would be in the Taunton River Watershed, while approximately 12 percent would be allocated to the Buzzards Bay watershed. The mitigation goals shown in Table 4.16-48 include the mitigation goals for permanent impacts to vegetated wetlands and waterways (31.3 acres based on a permanent impact of 12.3 acres) as well as those temporary impacts not restored in situ (2.4 acres total). About 2.1 acres of restoration for temporary impacts would be in the Taunton River watershed and 0.3 acre would be in the Buzzards Bay watershed.

**Table 4.16-48 Mitigation Goals by Watershed (Federal Wetlands/Waterways) for Stoughton Electric Alternative**

| Watershed | Impact Amount | Percentage |
|---|---|---|
| Neponset River | <0.1 ac | <1% |
| Taunton River | 11.0 ac | 88% |
| Buzzards Bay | 1.2 ac | 11% |
| Narragansett/Mt. Hope Bay | <0.1 ac | <1% |
| Totals | 12.3 ac | 33.7 ac |

***Whittenton Electric Alternative***

The following sections present the wetland mitigation goals under federal guidelines for both permanent and temporary impacts, and presents mitigation goals by watershed, for the Whittenton Alternative.

**Permanent Impacts**—The Whittenton Alternative would result in the loss of 9.4 acres of vegetated jurisdictional wetlands in three primary cover types (palustrine emergent wetland, palustrine scrub-shrub swamp, and palustrine wooded swamp). The first two cover types require mitigation at a 2:1 ratio (assuming restoration), while wooded swamp requires a higher mitigation ratio of 3:1 (assuming restoration). The total minimum area required for mitigation (as restoration) of these vegetated wetlands would be 26.6 acres. The project would also result in the loss of 1.8 acres of Open Water, which would be mitigated at a 1:1 ratio. The majority (1.5 acres) of Open Water is associated with the Raynham perennial stream. An additional 0.3 acre is within Terry Brook Pond in Freetown. Table 4.16-49 establishes goals for mitigation of impacts to federal jurisdictional wetlands for the Whittenton Alternative, based on the ratios contained in the USACE's New England District mitigation guidance.

**Table 4.16-49 Summary of Federal Mitigation Goals by Cover Type–Permanent Impacts (acres) (Whittenton Alternative)**

| Municipality | Total Impact | OW | PEM–Shallow Marsh | PEM–Deep Marsh | PSS–Scrub-Shrub | PFO–WSD | PFO–WSM |
|---|---|---|---|---|---|---|---|
| Canton | <0.1 | - | - | - | - | <0.1 | - |
| Stoughton | 2.1 | - | <0.1 | - | - | 2.0 | - |
| Easton | 0.4 | - | - | <0.1 | 0.3 | 0.1 | - |
| Raynham | 2.1 | 1.5 | - | - | <0.1 | 0.5 | - |
| Taunton | 1.6 | - | 0.1 | - | - | 1.5 | - |
| Berkley | 1.5 | - | - | - | 0.2 | 1.1 | 0.1 |
| Lakeville | 0.8 | - | - | - | 0.1 | 0.7 | - |
| Freetown | 1.4 | 0.3 | <0.1 | - | 0.2 | 0.9 | - |
| New Bedford | 1.2 | | 0.4 | - | <0.1 | 0.8 | <0.1 |
| Fall River | <0.1 | | - | - | - | <0.1 | - |
| Total Impact | 11.2 | 1.8 | 0.6 | <0.1 | 0.9 | 7.7 | 0.2 |
| Minimum Mitigation Ratio[1] | | 1:1 | 2:1 | 2:1 | 2:1 | 3:1 | 3:1 |
| Total Mitigation | 28.4 | 1.8 | Total PEM: 1.2 | | 1.8 | Total PFO: 23.6 | |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.
1 Assumes Restoration as the mitigation method.

**Temporary Impacts**—As shown in Table 4.16-50, the Whittenton Alternative would result in the temporary alteration of 4.9 acres of vegetated jurisdictional wetlands in three primary cover types (palustrine emergent wetland, palustrine scrub-shrub swamp, and palustrine wooded swamp). The first two cover types require mitigation at a 1:1 ratio (restoration in situ), while wooded swamp requires a higher mitigation ratio of 1.5:1 (restoration in situ plus additional mitigation to compensate for longer-term changes in vegetative cover type and wildlife habitat functions). Temporary impacts would also occur to 0.2 acre of Open Water. Since the majority of the Open Water area is comprised of unvegetated banks of intermittent streams along the right-of-way and areas where culverts are being replaced or upgraded, mitigation is not proposed for these areas. The total area required for mitigation

(as restoration) would be 7.0 acres. About 4.8 acres of this mitigation can be accomplished by restoration in situ; the remaining 2.2 acres of mitigation will be added to the mitigation goals for permanent impacts.

**Table 4.16-50 Summary of Federal Mitigation by Cover Type–Temporary Impacts (acres) (Whittenton Alternative)**

| Municipality | Total Impact | OW | PEM–Shallow Marsh | PEM–Deep Marsh | PSS–Scrub-Shrub | PFO–WSD | PFO–WSM |
|---|---|---|---|---|---|---|---|
| Canton | 0.1 | <0.1 | <0.1 | - | <0.1 | <0.1 | - |
| Stoughton | 0.1 | - | <0.1 | - | - | 0.1 | - |
| Easton | 0.2 | - | - | <0.1 | <0.1 | 0.1 | - |
| Raynham | 0.4 | <0.1 | - | <0.1 | 0.1 | 0.4 | - |
| Taunton | 1.1 | - | 0.1 | - | - | 1.1 | - |
| Berkley | 1.0 | - | - | - | 0.1 | 0.8 | <0.1 |
| Lakeville | 0.6 | <0.1 | - | - | <0.1 | 0.5 | - |
| Freetown | 0.7 | 0.1 | 0.1 | - | <0.1 | 0.4 | - |
| New Bedford | 0.8 | | <0.1 | - | 0.1 | 0.6 | 0.1 |
| Fall River | 0.1 | | - | - | - | 0.1 | - |
| Total | 5.1 | 0.2 | 0.3 | <0.1 | 0.3 | 4.1 | 0.1 |
| Minimum Mitigation Ratio[1] | | | 1:1 | 1:1 | 1:1 | 1.5 | 1.5 |
| Total Mitigation | 7.0 | 0.0 | Total PEM: 0.3 | | 0.3 | Total PFO: 6.4 | |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub
PFO = Palustrine Forested.
PFO Subgroups: WSD = Wooded Swamp Deciduous, WSM = Wooded Swamp Mixed trees.

1 Assumes all temporary impacts restored in place. Forested wetland (PFO) requires a higher ratio due to temporal change in wildlife habitat function.

2 Includes 5.0 acres of restoration in situ and 2.2 acres to be added to the mitigation goals for permanent impacts.

**Mitigation Goals by Watershed**—Compensatory mitigation for the loss of vegetated wetlands would be distributed among the four watersheds comprising the project area, as shown in Table 4.16-51. A small amount of mitigation (<0.1 acre) would be in the Neponset River Watershed and (0.2 acre) in the Narragansett Bay watershed. The majority of the mitigation (86 percent) would be in the Taunton River Watershed, while approximately 12 percent would be allocated to the Buzzards Bay watershed. The mitigation goals shown in Table 4.16-51 include the mitigation goals for permanent impacts (11.2 acres total) as well as those temporary impacts not restored in situ (2.2 acres total), allocated by watershed. About 2.0 acres of restoration for temporary impact would be in the Taunton River watershed and 0.2 acre would be in the Buzzards Bay watershed.

**Table 4.16-51 Mitigation Goals by Watershed (Federal Wetlands/Waterways) (Whittenton Alternative)**

| Watershed | Permanent Impacts | Mitigation |
|---|---|---|
| Neponset River | <0.1 ac | <1% |
| Taunton River | 9.9 ac | 86% |
| Buzzards Bay | 1.7 ac | 12% |
| Narragansett/Mt. Hope Bay | 0.2 ac | 1% |
| Totals | 11.2 ac | 31.0 ac |

### Functions and Values

Wetland mitigation goals seek not only to replace an area equal to or greater than the lost or directly impacted area of wetlands, but also to replace the lost functions and values of the wetland areas. These functions and values are described in a guidance document[36] published by the USACE's New England District describing functions and values of wetlands and their evaluation. Impacts to wetland functions and values along the Stoughton and Whittenton Alternatives were previously analyzed (see Tables 4.16-41 and 42). The review of functions and values of impacted areas was based on an analysis of individual wetlands along the right-of-way. During the subsequent design and permitting phase, detailed wildlife habitat assessments as required by DEP regulations, would be performed, and the functions and values assessments done using the Corps methodology would be refined based on more detailed site-specific methodologies in order to refine the information on functions and values provided by wetlands along the project corridor. The USACE's guidance document on mitigation states that for effective replacement of functions, "Applicants should expect that more than 1:1 acreage replacement will usually be deemed appropriate." Replacement ratios agreed upon by MassDOT and reviewing agencies are all 1:1 or greater. Future evaluation of areas used for wetland mitigation would include an assessment of the functions and values that would be provided by these areas.

### Summary

Table 4.16-52 and Table 4.16-53 provide a summary of federal wetland mitigation goals for the project for the Stoughton and Whittenton Alternatives.

[36] USACE. 1999. The Highway Methodology Workbook Supplement, Wetland Functions and Values - a Descriptive Approach. New England District, U.S. Army Corps of Engineers, NAEEP-360-1-30a. Concord, MA.

**Table 4.16-52 Vegetated Wetland/Waterway Mitigation Goals (Stoughton Electric Alternative)**

| Watershed | Cover Type | Permanent Impact (ac) | Temporary Impact (ac) | Federal Mitigation Goal (ac)1 |
|---|---|---|---|---|
| Buzzards Bay Watershed | OW | 0.1 | <0.1 | 0.1 |
| | PEM | 0.4 | <0.1 | 0.7 |
| | PSS | <0.1 | 0.1 | <0.1 |
| | PFO | 0.8 | 0.7 | 2.8 |
| Subtotal | | 1.2 | 0.8 | 3.6 |
| Narragansett/Mt. Hope Bay Watershed | PFO | <0.1 | 0.1 | 0.1 |
| Subtotal | | <0.1 | 0.1 | 0.1 |
| Neponset River Watershed | OW | - | <0.1 | - |
| | PEM | - | <0.1 | - |
| | PSS | - | <0.1 | - |
| | PFO | <0.1 | <0.1 | 0.1 |
| Subtotal | | <0.1 | <0.1 | 0.1 |
| Taunton River Watershed | OW | 1.9 | 0.3 | 1.9 |
| | PEM | 0.7 | 0.4 | 1.4 |
| | PSS | 0.9 | 0.3 | 1.8 |
| | PFO | 7.6 | 4.1 | 24.8 |
| Subtotal | | 11.0 | 4.7 | 29.8 |
| Total | | 12.3 | 5.9 | 33.6 |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
Shading denotes temporary impact amounts that will be replaced in situ.
Assumes a 2:1 mitigation ratio for marsh and scrub-scrub cover types, a 3:1 mitigation ratio for forested cover types, and a 1:1 mitigation ratio for Open Water. Also assumes an additional 0.5:1 amount of temporary impact for PFO.

**Table 4.16-53 Vegetated Wetland Mitigation Goals (Whittenton Electric Alternative)**

| Watershed | Cover Type | Permanent Impact (ac) | Temporary Impact (ac) | Federal Mitigation Goal (ac)[1] |
|---|---|---|---|---|
| Buzzards Bay Watershed | OW | 0.1 | <0.1 | 0.1 |
| | PEM | 0.4 | <0.1 | 0.7 |
| | PSS | <0.1 | 0.1 | <0.1 |
| | PFO | 0.8 | 0.7 | 2.8 |
| Subtotal | | 1.2 | 0.8 | 3.6 |
| Mt. Hope Bay Watershed | PFO | <0.1 | 0.1 | 0.1 |
| Subtotal | | <0.1 | 0.1 | 0.1 |
| Neponset River Watershed | OW | - | <0.1 | - |
| | PEM | - | <0.1 | - |
| | PSS | - | <0.1 | - |
| | PFO | <0.1 | <0.1 | 0.1 |
| Subtotal | | <0.1 | <0.1 | 0.1 |
| Taunton River Watershed | OW | 1.8 | 0.2 | 1.8 |
| | PEM | 0.2 | 0.3 | 0.5 |
| | PSS | 0.9 | 0.3 | 1.7 |
| | PFO | 7.0 | 3.5 | 22.7 |
| Subtotal | | 9.9 | 4.2 | 26.7 |
| Total | | 11.2 | 5.1 | 30.6 |

Notes: Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
Shading denotes temporary impact amounts that will be replaced in situ.
Assumes a 2:1 mitigation ratio for marsh and scrub-scrub cover types, a 3:1 mitigation ratio for forested cover types, and a 1:1 mitigation ratio for Open Water. Also assumes an additional 0.5:1 amount of temporary impact for PFO.

### 4.16.10.3 Compensatory Mitigation Site Selection

This section describes the process undertaken by MassDOT to identify appropriate compensatory mitigation sites through a multi-level screening process. The process involved GIS analysis as well as coordination between MassDOT and regulatory agencies to review potential sites suitable for wetland establishment and preservation.

#### Agency Coordination and GIS Analysis

Preliminary lists were generated of potential sites to be used for wetland establishment and restoration, and potential sites to be used for land preservation. These lists were generated using sites first identified in the DEIS/DEIR, either as candidates for wetland establishment or as Priority Preservation Areas (PPAs). Most of these sites are currently undeveloped, privately owned land, although some PPAs are several hundred or more acres in size and encompass some public and private roads, buildings, and utility rights of way. A total of 25 potential wetland establishment sites and 38 PPAs were identified.

Each site was mapped using aerial photography, and GIS software was used to determine the size of each site. MassDEP wetland data layers were used to determine the cover types of adjacent or nearby wetlands. Elevation data was added to the images, as well as the extent of protected open space, priority habitat of rare species, and vernal pools within and/or adjacent to each site. This analysis was performed for each site in the list of potential wetland establishment sites as well as each site in the list of PPAs. The lists and the resulting sets of images were reviewed in meetings between MassDOT and regulatory agencies.

MassDOT met with resource agency representatives from the USACE, MassDEP, USEPA, and the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to allow the reviewing agencies to have input on which sites have the highest potential value for wetland establishment and/or preservation. MassDOT reviewed each site with the agencies and noted comments. Factors deemed important by MassDOT and the reviewing agencies were:

- Proximity to the project corridor;
- Size of wetland areas adjacent to the site;
- Ability to provide compensatory flood storage; and
- Other known or potential environmental resources nearby, such as rare species habitat or protected open space.

***Wetland Establishment and Restoration Sites***

MassDOT and the reviewing agencies reviewed the preliminary list of potential wetland establishment sites to determine the sites with the highest potential for wetland establishment and/or restoration. Based on agency input, the preliminary list was divided into three groups:

- Tier 1 sites, which were advanced to a preliminary design stage, including preliminary grading and planting;
- Tier 2 sites, to be used in the event that not enough wetland establishment can be achieved from Tier 1 sites; and
- Sites dismissed from further consideration.

The review of the preliminary list of potential wetland establishment sites yielded 5 sites designated as Tier 1, 9 sites to be retained as Tier 2, and 11 sites that were dismissed from further consideration. Table 4.16-54 presents the preliminary list of sites reviewed by MassDOT and the reviewing agencies.

During review meetings, an additional site was added, an auto junkyard directly adjacent to Pine Swamp in Raynham, north of East Brittania Street. This site could provide a valuable wetland establishment and restoration opportunity, since at least a portion of the junkyard has been constructed on filled wetlands. In addition, the project proposes to fill approximately 0.3 acre of open water in Terry Brook Pond in Freetown. While Terry Brook Pond was not on the preliminary list of potential wetland establishment sites, MassDOT analyzed the immediate area surrounding Terry Brook Pond to identify any areas that could be used for establishment of open water areas.

**Table 4.16-54 Potential Wetland Establishment Sites**

| Site ID | Location | Size (ac) | Adjacent Cover Type | Category | Rationale |
|---|---|---|---|---|---|
| East-01 | Adjacent to cranberry bog and Little Cedar Swamp (north of Morse Rd.), Easton | 1.3 | Cranberry bogs | Dismiss | May have current utility as turtle nesting habitat |
| East-01a | Adjacent to cranberry bog and Little Cedar Swamp (north of Morse Rd.), Easton | 1.0 | Cranberry bogs | Dismiss | Already a wetland area, may not need restoration |
| East-02 | Pit east of Prospect St. south of power line easement, Easton | 3.1 | PFO | Tier 2 | |
| East-04 | North of power line easement on Route 138, Easton | 5.5 | PFO | Tier 1 | Upland area directly adjacent to wetland |
| East-05 | Power line ROW between Route 138 and tracks | 8.5 | PFO | Dismiss | High likelihood of colonization by invasive species |
| Rayn-01 | End of Old King Road, Raynham | 3.2 | PFO | Tier 2 | Residential yard |
| Rayn-02 | Access road west of Juniper Hill Drive, Raynham | 8.3 | PFO | Tier 2 | Difficulty preventing use of area by off-road vehicles |
| Rayn-03 | Route 138 across from dog track, Raynham | 6.0 | PFO, PSS | Tier 2 | |
| Rayn-04 (Carney Yard) | Carney Yard, across ROW from dog track, Raynham | 12.4 | PFO | Tier 1 | Both wetland and upland restoration opportunities |
| Rayn-05 | East of ROW, between E. Brittania and Thrasher St., Raynham | 2.8 | PFO | Tier 2 | |
| Taun-01 | End of West Water Street, Taunton | 3.2 | OW | Tier 2 | |
| Taun-02 | Taunton River, Weir Junction, Taunton | 7.8 | OW | Dismiss | Difficulty creating emergent wetland shelves |
| Taun-02a | Taunton River, Weir Junction, Taunton | 6.0 | OW | Dismiss | Difficulty creating emergent wetland shelves |
| Other-01 (Middleborough Brickyard) | Corner of Middleborough, Halifax, Bridgewater | 78.7 | OW | Tier 2 | |
| Other-02 (Burrage Pond WMA) | Burrage Pond between Elm Street and Route 27, Hanson and Halifax | 74.4 | PEM, PSS, PFO, Cranberry bogs | Tier 1 | Extensive wetland restoration opportunities in cranberry bogs |
| BLSF-01 | Beaver Brook/Bolivar Pond system, Canton | 1.2 | PFO | Dismiss | Existing upland appears natural and undisturbed |
| BLSF-02 | Area of proposed frontage road, Stoughton | 1.6 | PFO | Dismiss | Existing upland appears natural and undisturbed |
| BLSF-03 | Area of proposed frontage road, Stoughton | 1.4 | OW | Dismiss | Difficulty grading areas to match existing wetlands |
| BLSF-04 | Black Brook/Easton golf course, Easton | 1.5 | PFO | Dismiss | Existing upland appears natural and undisturbed |
| BLSF-05 | Black Brook/Easton golf course, Easton | 1.5 | PFO | Tier 2 | |
| BLSF-06 | Hockomock Swamp, Raynham | 3.3 | PFO | Dismiss | Existing upland appears natural and undisturbed |

| Site ID | Location | Size (ac) | Adjacent Cover Type | Category | Rationale |
|---|---|---|---|---|---|
| BLSF-07 | East of Carver Street/Route 495, Raynham | 1.5 | PFO, PSS | Tier 1 | Upland directly adjacent to wetland |
| BLSF-08 | East of Carver Street/Route 495, Raynham | 1.3 | PSS | Tier 2 | |
| BLSF-09 | Pine Swamp, Raynham | 3.2 | PFO, PSS | Tier 1 | Replaces impacted Pine Swamp flood storage |
| BLSF-10 | Taunton River, Taunton | 2.9 | PFO | Dismiss | Active farmland |

Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.
Shading denotes Tier 1 areas selected to be advanced to a conceptual design phase.

As previously discussed, the South Coast Rail project cannot fully comply with the performance standards of the WPA. While the regulations of the Act call for impacts to be mitigated onsite, not every impact along the right-of-way can practicably be mitigated for in a way that meets this criterion. Some areas of impacted BLSF cannot be replicated adjacent to the impact area due to surrounding development. Furthermore, detailed topographical information for all areas along the project corridor is not available at this level of design, and estimates of BLSF may change. Further analysis will be conducted in final design to more accurately estimate both the extent of BLSF and the effect of any impacted BLSF on the ability of the area to provide flood storage capacity.

***Tier 1 Wetland Establishment Sites***

Based on GIS analysis and agency review, the lists of sites were narrowed down to those sites with the highest potential value for wetland establishment or restoration. Based on input from the reviewing agencies, five sites were chosen from the preliminary list as having the highest potential for wetland establishment or restoration. Sites were renamed from their original designations (East 04, Rayn 04) to a simpler naming scheme (Site A, Site B) that will be used for the remainder of this report. The auto junkyard adjacent to Pine Swamp at East Brittania Street was also added to the list, as was Terry Brook Pond, for a total of seven sites that were advanced to a conceptual mitigation design stage. Wetland establishment and restoration opportunities are presented in Table 4.16-55 and existing conditions at each site and proposed mitigation are discussed individually.

**Site A**—Site A is in the Taunton River Watershed in Easton, east of Route 138 and north of the power line easement that cuts across a portion of the Hockomock Swamp. While not directly adjacent to the project right-of-way, this approximately 5.4 acre site is adjacent to a large area of forested wetland associated with the swamp. The site contains scrub-shrub areas and sparse trees, along with some unvegetated areas that appear to be the site of ATV use, based on aerial photography. The site has an elevation change of approximately 10 feet from the wetland edge to the upper limit of the site. The entire site is within rare species habitat and the Hockomock Swamp ACEC. Approximately one-third of the site is shown as existing protected open space based on a MassGIS data layer. A portion of the site also contains BLSF. This site was selected because it is an undeveloped area located adjacent to the wetland systems of the Hockomock Swamp. This site can provide over 5 acres of mitigation through wetland establishment. Although a change of grade of approximately 10 feet exists across the site, the upgradient area is also undeveloped and regrading of the topography to match the adjacent wetland landscape seems feasible.

**Table 4.16-55 Tier 1 Wetland Establishment Sites**

| Site ID | Location | Size (ac) | Adjacent Cover Type | Watershed |
|---|---|---|---|---|
| A (formerly East-04) | Easton–north of power line easement on Route 138 | 5.4 | PFO | Taunton |
| B (formerly Rayn-04) | Raynham–across ROW from dog track, Raynham | 12.4 | PFO | Taunton |
| C (formerly BLSF-07) | Raynham–east of Carver Street/Route 495 | 1.7 | PFO | Taunton |
| D (formerly BLSF-09) | Raynham–Pine Swamp | 3.5 | PSS, PFO | Taunton |
| E | Raynham–Pine Swamp Junkyard | 4.3 | PSS, PFO | Taunton |
| F | Freetown–Terry Brook Pond | 0.4 | OW | Taunton |
| G (formerly Other-02) | Hanson–Burrage Pond WMA, between Elm Street and Route 27 | 61.3 | PEM, PSS, PFO, Cranberry bogs | Taunton |

Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested

**Site B**—Site B is in the Taunton River Watershed in Raynham, directly west of the right-of-way, opposite the Raynham dog track. The site is approximately 12.4 acres in size and consists mainly of pavement over a large oval area once used as a dog training track, along with additional paved areas to either side of the track and one building. The site is currently used for trucking and other commercial purposes, along with an access road across the right-of-way. This site is also adjacent to Wetland R62.1, a perennial stream that has formed within the right-of-way. The northern end of the site includes a steep slope of over 10 feet down to the existing wetland areas, where the old dog track was built on a large area of fill. The difference in grade between the site and the surrounding landscape decreases from the northern end of the site to the southern end, which roughly matches the surrounding landscape. The site is surrounded on three sides by rare species habitat, and to the north by forested wetlands that are part of Hockomock Swamp. The entire site is located within the Hockomock Swamp ACEC. Along much of the northern portion of the site, the existing wetlands are close to or at the edge of pavement or the toe of the fill slope. It is likely that at least a portion of this site was originally constructed on top of wetlands. This site was chosen because it represents an opportunity to restore several acres of wetland areas that are currently covered by pavement and fill. Areas at the southern end of the site would be replanted as forested upland to provide additional rare species habitat. Based on agency input and feedback, this site was viewed as being one of the best opportunities along the project corridor for wetland establishment and restoration.

**Site C**—Site C is in the Taunton River Watershed in Raynham, west of the project right-of-way, just south of Carver Street and Interstate 495. This 1.7 acre site is approximately 200 feet from existing residential houses and yards, and is adjacent to wetlands that would be impacted from constructing the railroad. These wetlands include both forested wetlands and scrub-shrub areas near the site. The site also contains areas of BLSF. The existing vegetation is typical forested upland, interspersed with some patches of scrub-shrub vegetation. The elevation changes approximately 10 feet from the lowest to the highest point of the site, although along the margins the elevation change is only a few feet above the mapped wetland area. The parcel is not within any rare species habitat or protected open space. This site was selected because of its proximity to both impacted wetlands and impacted BLSF along the right-of-way of the South Coast Rail project. The site has the potential to provide approximately 1.5 acres of compensatory flood storage if used for wetland establishment.

**Site D**—This site is similar in nature to Site C. The site is in the Taunton River Watershed in Raynham, west of the right-of-way, near the municipal border between Raynham and Taunton. The area is approximately 3.5 acres and is adjacent to wetlands of the northern part of Pine Swamp. The wetlands adjacent to Site D consist of both forested and scrub-shrub wetlands, and BLSF is also supported within this site. Four potential vernal pools lie to the north and east of the site. The existing vegetation of Site D is a mix of forested upland, interspersed with some areas of scrub-shrub upland, and is approximately 200 feet from existing residential houses and yards. The elevation of the site is fairly uniform and is approximately 3 to 6 feet above the elevation of the existing wetlands. The entire site is located within rare species habitat. No part of the site is protected open space. This site was selected because of its proximity to Pine Swamp and wetland associated with Pine Swamp. Being adjacent to existing BLSF, this site also has the potential to provide over 3.0 acres of compensatory flood storage. Wetlands established at this site would also enhance wildlife habitat for species that use the four nearby potential vernal pools.

**Site E**—Site E is in the Taunton River Watershed in Raynham, directly east of the right-of-way, and is adjacent to wetlands of the southern part of Pine Swamp. This site is approximately 4.3 acres. The site is currently used as an auto junkyard, and aerial photography suggests that at least part of the junkyard is built on filled wetlands. The wetlands bordering Site E consist of large contiguous areas of both forested and scrub-shrub wetlands, and the site also supports BLSF. A portion of the site falls into an area of both rare species habitat and protected open space, which is also part of the existing degraded areas. The elevation of the site is fairly uniform and the site is approximately 3 to 6 feet above the elevation of the existing wetlands in most areas, although portions of the filled area appear from aerial photography to be very close to the elevation of the existing wetlands. This site was chosen because it represents an opportunity for both wetland establishment and restoration. While a detailed study of conditions at the junkyard would have to be undertaken in a further design stage, an establishment of wetlands in this area combined with restoration of degraded areas would benefit the adjacent wetlands of Pine Swamp. The site also has the potential to provide over 3.0 acres of compensatory flood storage.

**Site F**—Site F is adjacent to Terry Brook Pond in Freetown, in the Taunton River Watershed. Terry Brook Pond is a large area of open water approximately 13 acres on both sides of the right-of-way. Approximately 0.3 acre of the pond would be impacted by the project. Site E is approximately 0.4 acre on the northern side of the pond and is currently comprised of forested upland bordering the pond, with a walking trail or small boat launch ramp that leads down to the pond. Site E also supports BLSF, as does much of the immediate area surrounding the pond. The elevation of the site is a few feet above the existing water elevation. No part of the site is within rare species habitat, nor is any part of the site designated as protected open space. This site was chosen because it represents an opportunity to mitigate for open water impacts that occur in the same resource area (Terry Brook Pond). The small change in elevation and amount of adjacent upland available for grading would make the design of an open water area straightforward.

**Site G**—Site G, the Burrage Pond Wildlife Management Area, is a large complex of former cranberry bogs in Hanson, in the Taunton River Watershed. The portion under consideration for wetland establishment encompasses several bogs totaling approximately 61.2 acres. While MassDOT has reviewed the entire area with the reviewing agencies, and has prepared a mitigation design concept for the entire 61.2 acre area, the entire area may not be necessary to achieve the mitigation goals for the project. MassDOT would commit to constructing the amount of wetland establishment or restoration necessary to achieve the goals for the project, which may encompass a smaller area than shown in the proposed mitigation design concept. MassDOT would undertake wetland establishment and restoration

at this site in conjunction with the Massachusetts Division of Wildlife (MassWildlife), which owns and administers the WMA.

The Burrage Pond Wildlife Management Area is not located along the South Coast Rail project corridor. However, its large size and proximity to other wetland resources presents opportunities for wetland establishment and restoration of the old cranberry bogs. Despite Burrage Pond not being located along the project corridor, it is a large contiguous tract of land within the Taunton River watershed and reviewing agencies indicated that this area would be a good candidate for wetland establishment and restoration, as well as long-term stewardship through management by MassWildlife. The site is adjacent to a large marsh to the northwest and west, as well as forested and scrub-shrub wetlands to the east and southeast. The topography within the bogs is very uniform, with berms several feet high separating the bogs from one another and from the large swamp to the west and the forested wetlands to the east. A small portion of the forested wetland to the east consists of Atlantic white cedar swamp. The entire site is within rare species habitat and is also protected open space. This site was chosen for its extensive opportunities for wetland establishment and restoration of the old cranberry bogs. The site has previously been studied for the purpose of establishing a wetland bank area, and as such there is good historical information on the existing topography and hydrology.

**Raynham Stream Relocation**—Wetland R62.1 is the perennial stream that has formed within the former railroad right-of-way in Raynham. The site was investigated for the possibility of relocating the stream to the west of the right-of-way using Natural Channel Design techniques and to assess the functions and values of the stream.

The stream is not a natural formation that was channelized to construct the original railroad. Rather, drainage ditches were constructed on either side of the original railroad berm to channel water away from the berm. The ditches have become blocked and have diverted flow onto the right-of-way of the original railroad. A culvert under the Site B access road on the east side of the right-of-way is mostly blocked, resulting in water becoming impounded on the south side of the access road. During and after rain events, water overtops the bank and flows across the access road, discharging to the west side of the right-of-way.

A preliminary concept design of a relocated stream channel was prepared and presented to the consulting agencies. Constructing this stream channel would be difficult due to excavation through several feet of bedrock that would likely be required for much of the distance, and associated increase of the cost of the project. Additionally, relocating the stream into the adjacent forested upland would create impacts to existing box turtle habitat. For these reasons, the consensus of the agencies was that resources would be better spent elsewhere on other mitigation efforts.

**Preservation Areas**—Based on GIS analysis and agency review of the list of PPAs, sites that provide land preservation opportunities are presented in Table 4.16-56 below. The PPAs listed in Table 4.16-56 were first identified as part of a comprehensive Corridor Plan for the South Coast Rail project to address issues of smart growth. The Corridor Plan addresses economic development and land use related to the South Coast Rail project as a whole, and "provides a framework for regional growth that is clustered, more sustainable, and better connected within the region and to metro Boston." The Corridor Plan was developed in light of expected future increases in development along the project corridor due to the economic boost the project would provide to the area. The Corridor Plan identified PPAs along the project corridor and elsewhere in the region to identify areas of land or environmental resources not currently protected, but worthy of increased levels of protection. The USACE has indicated a willingness

to allow land preservation as one of a suite of mitigation options, to accompany the wetland establishment and restoration discussed in the previous section.

**Table 4.16-56 Potential Land Preservation Opportunities**

| PPA # | Site Name | Municipality | Size (ac) | Has Priority Habitat | Has Vernal Pools | Category | Comments |
|---|---|---|---|---|---|---|---|
| P09 | Gobi Property | Foxborough, Sharon | 191 | N | Y | Tier 2 | |
| P14 | Municipal Water Source and Future Well Site | Foxborough | 77 | PH 488/EH 392 | Y | Tier 2 | |
| P17 | Canoe River ACEC (MAPC Region) | Foxborough | 11 | N | N | Dismiss | No wetlands – developable uplands adjacent to Willow St. |
| P20 | Massapoag Sportmen's Club | Sharon | 125 | N | Y | Tier 2 | |
| P22 | Sreda Property | Sharon | 88 | PH 298/EH 198 | Y | Tier 2 | Includes land to north and west of original delineated parcel1 |
| P24 | Morse Farm | Sharon | 40 | PH 367/EH 233 | N | Tier 2 | Adjacent to existing protected open space |
| P25 | Rattlesnake Hill | Sharon | 339 | PH 367/EH 233 | Y | Tier 1 | Adjacent to existing protected open space |
| P26 | Echo Pond | Stoughton | 60 | N | Y | Tier 1 | |
| P28 | Benson Pond | Stoughton | 102 | N | Y | Tier 1 | |
| P33 | Clover Valley Farm | Easton | 94 | N | N | Tier 1 | Includes additional land outside of original delineated parcel[1] |
| P34 A | Hockomock ACEC (OCPC Region) | Easton | 315 | PH 1392/EH 59 | Y | Tier 2 | Large cranberry bogs – review agencies determined to be lower priority |
| P34 B | Hockomock ACEC (OCPC Region) | Easton | 131 | PH 245/EH 132 | Y | Tier 1 | |

| PPA # | Site Name | Municipality | Size (ac) | Has Priority Habitat | Has Vernal Pools | Category | Comments |
|---|---|---|---|---|---|---|---|
| P34 C | Hockomock ACEC (OCPC Region) | Bridgewater | 224 | PH 1392/EH 59 | Y | Tier 2 | Large cluster of vernal pools – review agencies determined to be lower priority |
| P36 | Taunton River/South Bridgewater/Cumberl and Farm Land | Bridgewater | 746 | PH 1423/EH 34 | Y | Tier 2 | Restoration of ditched farm fields |
| P37 | Taunton River | Bridgewater | 151 | PH 1423/EH 34 | Y | Tier 2 | Includes additional land to east of original delineated parcel[1] |
| P38 | Bird Street Sanctuary | Stoughton | 45 | N | Y | Tier 1 | Small portions of developable upland accessible |
| P40 | Southworth Pond and Lipsky Fields | Stoughton | 59 | N | N | Tier 1 | |
| P46 A | Upper Taunton River | Middleborough | 228 | PH 1421/EH 36 | Y | Tier 2 | |
| P46 B | Upper Taunton River | Raynham | 393 | PH 282/EH 179 | Y | Tier 1 | |
| P47 | Great & Little Cedar Swamps | Halifax, Middleborough | 2,579 | PH 1332/EH 966 | Y | Tier 2 | Includes extensive farm areas |
| P49 | Nemasket River - Farm Protection | Middleborough | 186 | PH 13/EH 77 | Y | Tier 2 | Protection of wetlands in northern portion |
| P50 A | Green Heart Corridor | Middleborough | 997 | N | Y | Tier 2 | Cranberry bogs |
| P50 B | Green Heart Corridor | Middleborough | 523 | PH 226/EH 107 | Y | Tier 2 | |
| P51 | Thatcher Pond | Taunton | 180 | PH 1421/EH 36 | Y | Tier 1 | Adjacent to existing protected open space |
| P52 | Runnins River Headwaters | Seekonk | 292 | PH 724/EH 661 | Y | Tier 2 | |
| P53 | Palmer River Aquifer/Zone II Protection Area | Rehoboth | 198 | N | Y | Tier 2 | |
| P54 | Muddy Cove Brook | Dighton | 207 | N | Y | Tier 2 | |
| P55 | Lower Taunton River Protection Area | Berkley | 50 | N | Y | Tier 1 | Area adjacent to existing protected open space |

| PPA # | Site Name | Municipality | Size (ac) | Has Priority Habitat | Has Vernal Pools | Category | Comments |
|---|---|---|---|---|---|---|---|
| P56 | Acidic Fen | Freetown | 255 | PH 1379 | Y | Tier 1 | |
| P58 | Greenway Connection | Freetown | 1,583 | PH 303/EH 204, PH 1239/EH 177 | Y | Tier 2 | Surrounds small box of existing protected open space |
| P59 | Mattapoisett River Aquifer Protection Area | Rochester | 1,138 | PH 1330/EH 58 | Y | Tier 2 | |
| P60 | Aucoot Cove | Marion | 49 | PH 15/EH 79 | N | Tier 2 | Frontage to existing road |
| P61 | Pine Barrens/Aquifer Protection Area | Wareham | 1,341 | PH 1396/EH 862/EH 969, PH 858, PH 859 | Y | Tier 2 | Developable uplands in central section of parcel |
| P62 | Bioreserve (Infill) | Westport | 275 | N | Y | Tier 2 | Evidence of previous subdivision road layout |
| P63 A | Acushnet Swamp | Dartmouth | 176 | PH 1349/EH 1 | Y | Tier 1 | |
| P63 B | Acushnet Swamp | Dartmouth | 196 | PH 1349/EH 1 | N | Tier 1 | |
| P66 | Aponagansett Cove | Dartmouth | 189 | PH 922/EH 751 | Y | Tier 2 | Out-of-kind mitigation |
| P69 | Nasketucket Bay State Reservation Area | Mattapoisett, Fairhaven | 185 | PH 15/EH 79 | N | Tier 2 | |

Shading denotes Tier 1 areas.

1 "Original delineated parcel" refers to parcels as shown on the Corridor Plan map.

The number of sites and total area in Table 4.16-56 is much larger than any potential area needed for preservation. At the current level of design for the project, the amount of land potentially needed for preservation is not known. Preservation would be used if the area of federal wetland mitigation needed would not be fully achieved by wetland establishment and restoration. The sites listed in Table 4.16-56 provide a broad range of possible sites to ensure that opportunities for preservation can be developed once exact amounts of preservation acreage needed are known.

The preliminary list was reviewed by MassDOT and the reviewing agencies to determine the sites most likely to provide preservation opportunities for both wetlands and developable uplands. Factors deemed important for a site to provide good preservation opportunities were:

- Proximity of the site to the project corridor, particularly in municipalities or communities that would experience wetland or other environmental impacts;
- Proximity to the Hockomock Swamp, which was given priority by the reviewing agencies;

- Diversity of wetland and upland cover types at the site;
- Amount of undeveloped upland at the site, particularly if the undeveloped upland could feasibly be developed in the future; and
- Other known or potential environmental resources at the site, such as rare species habitat or clusters of certified or potential vernal pools.

Based on agency input, the PPAs were divided into two groups, Tier 1 and Tier 2. Tier 1 sites have a higher potential to provide preservation opportunities. Tier 2 sites would be considered only if not enough wetland preservation can be achieved from Tier 1 sites.

Appendix 4.16-D includes graphics showing each of these areas, along with their size and any adjacent wetlands, rare species habitat, and other environmental factors.

***Summary***

Sites have been chosen that based on review of available information, along with input from review agencies. The sites described in this chapter represent Tier 1 sites that have a high likelihood of being able to replace wetlands impacted by the South Coast Rail project. However, should one or more of these sites prove to be not practicable for wetland establishment or preservation and additional area is needed, Tier 2 sites can be examined. Based on the review of available information and agency input, the sites presented in this report for wetland establishment, restoration, enhancement and preservation are all located in the Taunton River Watershed. While other watersheds through which the project passes are affected, The Taunton River Watershed comprises 88 percent of the wetland impact along the right-of-way for the Stoughton Electric Alternative and 86 percent for the Whittenton Alternative. Although Tier 1 sites for wetland establishment were not identified in other watersheds at this design stage, potential areas for preservation have been identified in all project watersheds.

The MassDEP wetland mitigation guidance document calls for wildlife habitat evaluations of wetland areas impacted by a project, in order to facilitate the replication of the wildlife functions provided by the area. Detailed wildlife habitat evaluations of impacted areas of the South Coast Rail project would be undertaken during the final design phase of the project. This may require adjustments to the amount or type of wetlands to be replicated in order to provide adequate mitigation for impacted wildlife habitat and other functions and values.

There are watershed action plans outlining overall goals within Buzzards Bay, Mount Hope Bay, Neponset River, and Taunton River Watersheds. Mitigation efforts would be coordinated with the different associations and follow their action plans to the extent possible. The Buzzards Bay Comprehensive Conservation and Management Plan[37] (originally created in 1991 and currently being revised), Mount Hope and Narragansett Bay Five-Year Action Plan[38], Neponset River Watershed Action Plan (part of the Boston Harbor Watersheds 2004 2009 Action Plan[39]) and the Five-Year Watershed

[37] Buzzards Bay Project. Buzzards Bay Comprehensive Conservation and Management Plan, August 1991

[38] Massachusetts Executive Office of Environmental Affairs. Mount Hope and Narragansett Bay Five-Year Action Plan. November 2004.

[39] Massachusetts Executive Office of Environmental Affairs. Boston Harbor Watersheds 2004 - 2009 Action Plan, November 2004.

Action Plan for the Taunton River[40] would be consulted when creating final mitigation goals and selecting mitigation locations. Several of the plans are being revised or updated to accurately reflect current conditions within the watershed. The most recent plan available for each impacted watershed would be used to guide mitigation efforts once the preferred alternative is selected.

#### 4.16.10.4 Proposed Compensatory Mitigation

Based on input from reviewing agencies and GIS analyses, the initial list of 25 potential wetland establishment sites was narrowed down to five sites. An additional two sites raised in discussions with the reviewing agencies (the auto junkyard adjacent to Pine Swamp and Terry Brook Pond) were also added to the final list, for a total of seven final sites to be advanced to a conceptual mitigation design. This chapter describes the proposed wetland compensatory mitigation package. Figures are provided showing the existing conditions at each parcel, along with a proposed design concept.

##### Methodology

The following sections describe the methodology used for the conceptual mitigation designs in each proposed wetland establishment site.

###### *Overall Design and Elevation*

Conceptual mitigation design began with a detailed analysis of the Tier 1 establishment and restoration sites using GIS software. Based on input from the reviewing agencies, Light Detection and Ranging (LiDAR) elevation data was added to the analysis of the sites. The LiDAR dataset is a fairly recent (released in July 2012) dataset produced by Massachusetts Office of Geographic Information (MassGIS). LiDAR data, while not as accurate as a ground survey of topography, produces finer-scale topographical information than the existing state elevation data layers, which show elevation only in 3 meter (10 foot) increments. After processing the LiDAR data, elevation contours at the wetland establishment sites were generated at 1 meter (3.3 foot) intervals.

The use of LiDAR data enabled more detailed analysis of elevation at these sites, and allowed for more detailed mitigation design concepts that incorporated proposed grades into the design. Proposed grades were included in the concept design for each wetland establishment area, to determine if grading was practicable at the site and if the elevation of the existing wetland areas could be matched in the adjacent wetland establishment area, with enough surrounding space to regrade the upland buffer to match existing grades.

###### *Vegetation Types and Mitigation Goals*

The general vegetation types used in the design concept for each wetland establishment site were based on the Cowardin classification of the natural vegetation of the wetlands adjacent to each site. Generally, the design concepts propose equivalent vegetation types adjacent to existing vegetation types, such as palustrine forested wetland adjacent to existing palustrine forested wetlands and scrub shrub wetlands adjacent to existing scrub-shrub wetlands. Using this design framework is more likely to result in the successful establishment of the target plant communities. The minimum mitigation ratios

[40] Massachusetts Executive Office of Environmental Affairs. Five-Year Watershed Action Plan for the Taunton River Watershed, September 2006

given in the USACE's Compensatory Mitigation Guidance were the basis for the total mitigation acreage goals for each vegetation type. These minimum mitigation ratios and total acreage goals were considered when creating the mitigation concept designs for each site. The sum of the proposed acreage of each vegetation type at all sites seeks to meet or exceed the previously stated mitigation goals. This allows for adjustments to the total mitigation goals that may be necessary in final design. The sum of each vegetation type also meets or exceeds the mitigation goals laid out in the MassDEP's Inland Wetland Replication Guidelines. The guidelines include a requirement that at least 75 percent of the surface of the replacement area be established with indigenous wetland plant species within two growing seasons.

***Planting Plans***

Planting plans were developed based on each vegetation type proposed for establishment at each site. Recommended plant lists are included for palustrine forested, palustrine scrub-shrub, and palustrine emergent wetland areas. These plant lists are general recommendations, and species may change in final design. Plant lists were generated using species native to Massachusetts and New England, and do not use invasive species, such as those listed on the Massachusetts Prohibited Plant List[41]. Plant lists for palustrine forested wetlands (Table 4.16-57) palustrine scrub-shrub wetlands (Table 4.16-58) and palustrine emergent wetlands (Table 4.16-59) are designed to create a representative plant community based on the surrounding or adjacent vegetation. In addition, certain areas such as the Burrage Pond site may lend themselves to restoration of Atlantic white cedar habitat; although the regulated activities noted above are not expected to measurably affect existing Atlantic white cedar swamps, USACE intends to encourage this and other opportunities to restore this increasingly rare habitat type.

**Table 4.16-57 CONCEPTUAL Planting Specifications, Palustrine Forested Wetlands**

| Common Name | Latin Name | Wetland Indicator Status | Spacing |
|---|---|---|---|
| Red maple | *Acer rubrum* | FAC | 20 ft. oc[1] |
| Tupelo | *Nyssa sylvatica* | FAC | 20 ft. oc |
| Eastern hemlock | *Tsuga canadensis* | FACU[2] | 20 ft. oc |
| Yellow birch | *Betula alleghaniensis* | FAC | 20 ft. oc |
| Atlantic white cedar | *Chamaecyparis thyoides* | OBL | 10 ft. oc |
| Inkberry | *Ilex glabra* | FACW | 12 ft. oc |
| Winterberry | *Ilex verticillata* | FACW | 12 ft. oc |
| Highbush blueberry | *Vaccinium corymbosum* | FACW | 12 ft. oc |
| Sweet pepperbush | *Clethra alnifolia* | FAC | 100 /ac |
| Cinnamon fern | *Osmunda cinnamomea* | FACW | 100 /ac |
| Sensitive fern | *Onoclea sensibilis* | FACW | 100/ ac |

oc = on center

Listed as a wetland indicator in the Massachusetts Wetland Protection Act.

[41] Massachusetts Department of Agriculture Resources, Massachusetts Prohibited Plant List. Effective January 1, 2009. http://www.mass.gov/agr/farmproducts/prohibitedplantlist.htm, accessed November 4, 2012.

**Table 4.16-58 CONCEPTUAL Planting Specifications, Palustrine Scrub-Shrub Wetlands**

| Common Name | Latin Name | Wetland Indicator Status | Spacing |
|---|---|---|---|
| Speckled alder | *Alnus incana* | FACW | 12 ft. oc |
| Winterberry | *Ilex verticillata* | FACW | 12 ft. oc |
| Pussy willow | *Salix discolor* | FACW | 12 ft. oc |
| Buttonbush | *Cephalanthus occidentalis* | OBL | 12 ft. oc |
| Inkberry | *Ilex glabra* | FACW | 12 ft. oc |
| Highbush blueberry | *Vaccinium corymbosum* | FACW | 12 ft. oc |
| Arrowwood | *Viburnum dentatum* | FAC | 8 ft. oc |
| Silky dogwood | *Cornus amomum* | FACW | 8 ft. oc |
| Red-osier dogwood | *Cornus alba* | FACW | 8 ft. oc |
| Swamp azalea | *Rhododendron viscosum* | FACW | 8 ft. oc |
| Tussock sedge | *Carex stricta* | OBL | 100 /ac |

oc = on center

**Table 4.16-59 CONCEPTUAL Planting Specifications, Palustrine Emergent Wetlands**

| Common Name | Latin Name | Wetland Indicator Status | Spacing |
|---|---|---|---|
| Meadowsweet | *Spiraea alba* | FACW | 100/ac |
| Steeplebush | *Spiraea tomentosa* | FACW | 100/ac |
| Marsh marigold | *Caltha palustris* | OBL | 100/ac |
| Bearded sedge | *Carex comosa* | OBL | 100/ac |
| Tussock sedge | *Carex stricta* | OBL | 100/ac |
| Fox sedge | *Carex vulpinoidea* | OBL | 100/ac |
| Boneset | *Eupatorium perfoliatum* | FACW | 100/ac |
| Soft rush | *Juncus effusus* | FACW | 100/ac |
| Cardinal flower | *Lobelia cardinalis* | FACW | 100/ac |
| Hard-stem bulrush | *Scirpus acutus* | OBL | 100/ac |
| Green bulrush | *Scirpus atrovirens* | OBL | 100/ac |
| Woolgrass | *Scirpus cyperinus* | FACW | 100/ac |
| Soft Stem bulrush | *Scirpus tabernaemontani* | OBL | 100/ac |

oc = on center

***Soils***

Soils used for wetland establishment sites would either be translocated (i.e., existing wetland soils from impacted wetland areas would be reused) or created with soil amendments. While translocation is the preferred method stated in the MassDEP mitigation guidance, created wetland soils may also be used. Generally, wetland soils are created from a 1:1 mixture (or equal volumes) of organic and mineral materials, with the final product containing at least 12 percent organic carbon by weight. According to USACE's guidance, soils to be used for emergent wetlands in permanently or semi permanently flooded areas should have a target organic carbon level of 4 to 6 percent. Soil specifications would be generated for each wetland establishment site to include a description of the composition of the existing soil, added material, and the techniques used in its preparation. A detailed schedule would be developed for

the collection and stockpiling of soils. No soil used for creation of wetland soils would be taken from any area supporting invasive species.

***Wildlife Habitat Features***

In addition to wetland plantings and establishment of appropriate wetland hydrology within each wetland establishment site, wildlife habitat features would be used wherever feasible. The creation of hummock and hollow microtopography where appropriate creates burrowing opportunities. Any large rocks or boulders uncovered during excavation would be left in place or set aside to be reused. These can provide nesting, burrowing, and hiding places. Fallen logs and woody debris provide important cover and foraging habitat to a variety of wildlife species. Logs and woody debris in varying stages of decay can be used to provide habitat features. Upland tree species close to the wetland boundary may not be affected by excavation, but are likely to suffer mortality in the increased hydrologic regime of the newly established wetland. These trees can be left to stand in place, and when they die they will provide snags for perching, foraging, and nesting opportunities for a variety of bird species including woodpeckers. Alternatively, whole trees can be pushed over into the newly established wetland to provide wildlife habitat features.

***Construction Guidelines***

Construction of the wetland establishment sites would seek to minimize erosion and sedimentation into existing wetlands, and to maximize the establishment and survival of plantings. Final mitigation plans would be developed for each wetland establishment site based on a detailed updated topographic survey, groundwater monitoring, test borings, and soil sampling. The replacement wetlands would be designed to conform to the guidelines developed by the USACE and MassDEP guidance and to meet the performance standards in the WPA regulations.

The construction of the wetland establishment sites would involve excavation of the non-wetland areas adjacent to the existing wetlands. The excavation would bring the elevation of the non-wetland areas down to the grade of the existing wetlands or lower, depending on the type of vegetational community desired. The excavation would bring the replacement areas into contact with groundwater, which establishes a hydrologic connection to a water source of sufficient volume and duration to maintain wetland hydrology. This in turn supports wetland vegetation and the development of hydric soils. Each site would be graded with microtopography to mimic the surface of the wetlands that will be impacted.

Each wetland establishment site would be vegetated (planted) with native wetland species in accordance with USACE and MassDEP guidance, and in accordance with the previous plant lists. In final design, dominant native wetland plant species observed in the existing wetlands adjacent to a wetland establishment site may be substituted for plants in the previous plant lists.

***Construction Oversight***

The construction of successful replacement wetland sites would require oversight by a supervising wetland scientist who is an experienced field professional. The supervising wetland scientist may need to make field adjustments in grading and/or planting in response to field conditions at each wetland establishment site. These modifications can ensure that hydrologic conditions necessary to support wetland vegetation and functions are created. During construction, the supervising wetland scientist may relocate up to 50 percent of the plantings if conditions require.

***Construction Sequence***

A general sequence of construction events follows.

- Before construction begins, an erosion control barrier would be erected around the entire proposed wetland replacement site, except the upgradient edge to allow machinery access to the site. The erosion control barrier prevents erosion of disturbed soils and sedimentation into the adjacent existing wetland areas.

- The wetland establishment site would be cleared and grubbed, and would be excavated to a depth of 12 inches below the final design elevation. In response to subsurface hydrologic conditions, the supervising wetland scientist may make minor modifications to the rough grading plan in the field. The supervising wetland scientist would inspect the sub-grade of the wetland establishment site to ensure that wetland hydrology has been established.

- The wetland establishment site would then be backfilled with wetland soils that have either been translocated or created. Hydric soils that are created would follow the guidelines discussed above. Once the final topsoil is in place, it would be graded to achieve a topography to match the existing adjacent wetland, or to achieve topography of the target wetland cover type. Often, a slight hummock/hollow microtopography simulates a natural substrate. Additionally, low spots would be created within the wetland establishment site to provide temporary ponding of surface waters.

- Rocks and boulders uncovered during the excavation may be left in place, provided they do not result in a large decrease in the plantable area of the wetland establishment site. If possible, rocks and boulders would be repositioned to provide crevices and cavities suitable for wildlife use.

- Fallen logs and other woody debris would be distributed in the wetland establishment site to provide beneficial habitat features for wildlife. Woody material would be distributed to cover approximately 2 percent of the site's surface area. Logs and woody debris would be of various sizes and in various degrees of decomposition.

- After work with heavy machinery is completed, an erosion control barrier would be erected along the upgradient edge of the wetland establishment site.

- Plantings would take place according to the planting schedule of the final design of each wetland establishment site, which would specify species, size, and quantity of plantings. Prior to delivery to the site, the supervising wetland scientist would visit the nursery or nurseries providing the planting stock to ensure that the specimens are healthy, free from pests and any invasive plant material, and suitable for use within the wetland establishment site. Unsuitable specimens would be rejected and replaced with suitable specimens. The supervising wetland scientist must approve any planting substitutions. All woody plant stock would be either bare root stock or container grown. Planting within the wetland establishment site and adjacent uplands would conform to the plans or would be completed in accordance with directions provided in the field. Only plant materials native and indigenous to the region would be used. Use of cultivars would be prohibited. Species not specified in the final planting plan would not be used without written approval from the permitting agency.

- All plantings would be spaced in similar species clusters in a random distribution, at the direction of the supervising wetland scientist, to simulate natural growth patterns.

- Upon completion of planting, the areas around each plant or cluster or plants would be mulched with a 2 inch thick layer of leaf litter or other natural organic material (not fresh wood chips)

- The erosion control barriers would be disassembled and properly disposed of before November 1 of the third full growing season after planting of the wetland establishment site. Sediment collected by the barriers would be removed and disposed of in a manner that prevents erosion and transport to a wetland or waterway. If minor grading is required in the immediate zone around the erosion control barrier to provide surface hydrologic connection between the wetland establishment site and the existing wetland area, it would be done by hand and stabilized by mulch.

- The wetland establishment site would be inspected twice a year, during the spring and fall, each year of the post construction monitoring period for invasive or unwanted plants. If invasive species are found, they would be uprooted and removed from the area, and/or treated with a glyphosate herbicide approved for wetland use and applied by hand. Invasive plants are discussed in more detail below.

- Long-term monitoring of the wetland establishment site would be conducted as recommended below.

***Invasive Species Control Plan***

Exotic or invasive species commonly observed in the surrounding landscape may colonize wetland establishment sites as the vegetation community develops. These species potentially include:

- *Alliaria petiolata*, garlic mustard

- *Berberis thunbergii*, Japanese barberry

- *Lonicera* spp., shrub honeysuckle

- *Lysimachia nummularia*, moneywort

- *Lythrum salicaria*, purple loosestrife

- *Phalaris arundinacea*, reed canary grass

- *Phragmites australis*, common reed

- *Frangula alnus*, glossy buckthorn

- *Rosa multiflora*, multiflora rose

- *Solanum dulcamara*, bittersweet nightshade

To protect the functions and integrity of wetland replacement sites, each site would be inspected twice a year as part of the long term monitoring plan for the site. If feasible, any exotic or invasive plants would be pulled by hand and removed from the wetland replacement site. In the event that herbaceous species become established and hand removal is not feasible, a qualified pesticide applicator would be contacted to spray plants with an appropriate herbicide. Spraying would be done using a backpack unit and dye mixed with the liquid herbicide to minimize overspray and damage to native wetland species.

***Post Construction Monitoring***

This section provides a monitoring and assessment plan for the wetland establishment sites. A 10 year monitoring period is proposed.

***Field Monitoring and Report Schedules***

Monitoring reports would be prepared, based on field observations, in the format required by the USACE New England District Mitigation Guidance[42]. Monitoring of field conditions would be performed for each of the first three full growing seasons following construction of the wetland establishment sites. Observations would occur at least two times during the growing season (in late spring/early summer and again in late summer/early fall). Each annual monitoring report would be submitted to the USACE and MassDEP no later than December 15 of the year being monitored. Failure to perform the monitoring and submit a monitoring report would constitute permit non-compliance. A self-certification form would be completed, and signed as the transmittal coversheet for each annual monitoring report and would indicate the permit number and the report number. The reports would address success standards in the summary data section and would address any additional items noted in the monitoring report requirements. The reports would also include the monitoring report appendices listed below. The first year of monitoring would be the first year that the wetland establishment sites have been through a full growing season after completion of construction and planting. For the purpose of this monitoring effort, a growing season starts no later than May 31. If there are problems that need to be addressed and if the measures to correct them require prior approval from the agencies, MassDOT would contact the agencies as soon as the need for corrective action is discovered.

Remedial measures would be implemented at least one year prior to the completion of the 10-year field monitoring period, to attain the success standards within three growing seasons after completion of construction of the wetland establishment sites. Should measures be required within one year of the end of the 10-year field monitoring period, the monitoring period would be extended as necessary to demonstrate success of the mitigation site after the remedial work is completed. Measures requiring earth movement for changes in hydrology would not be implemented without written approval from the USACE and MassDEP.

At least one reference site adjacent to or near each wetland establishment site would be described and shown on a locus map.

[42] U.S. Army Corps Of Engineers New England District Regulatory Division. 2010. New England District Compensatory Mitigation Guidance. Concord MA.

***Field Monitoring Methods***

Vegetation, soils, and hydrology development would be monitored within the wetland establishment site and at a reference site established in the adjacent wetland. The following data would be collected in the wetland establishment site and the reference site during each site visit:

- Two monitoring wells would be installed in the wetland establishment site and the reference site, and shown on a plan;
- Two sediment horizon markers would be established in the wetland establishment site and the reference site to characterize sediment accumulation;
- Water table height would be measured two times per year, during site visits;
- Sediment accumulation;
- Percent vegetative cover;
- Species composition, with reference to wetland indicator status;
- Height and stem density for dominant target species and invasive species; and
- Evidence of wildlife use of the area (tracks, scat, dens, nests, or evidence of browsing.

***Success Standards***

Each monitoring report would answer the following questions (success standards):

- Does the wetland establishment site have the hydrology, as demonstrated by observations of monitoring well levels, to support the designed wetland type?
- Is the proposed hydrology met at the site?
- What percentage of the site is meeting project hydrology levels? Areas that are too wet or too dry should be identified along with suggested corrective measures.
- Does the wetland establishment site have at least 80 percent aerial cover of non-invasive hydrophytes, excluding planned open water areas or planned bare soil areas?
- Are invasive species being controlled so that the aerial cover of invasives is less than 5 percent?
- Does data from the substrate cores and horizon markers show increasing organic carbon content and sediment accumulation over time?
- Are all slopes, soils, substrates and constructed features within and adjacent to the wetland establishment area stabilized?

***Monitoring Report Requirements***

Each monitoring report would address the following items:

- Dates that work began and ended.
- Description of monitoring inspections since the last report.
- Soils and hydrology data.
- Remedial actions undertaken to meet success standards.
- Status of erosion control measures.
- Visual estimates of total percent cover, and visual estimate of percent cover of invasive species.
- General health and vigor of each of the plant species in the wetland establishment sites, with diagnosis of cause(s) of morbidity or mortality.
- Evidence of wildlife use.
- Remedial measures recommended to achieve or maintain success, and improve the extent to which the wetland establishment site replaces the lost functions and values.
- Each monitoring report would include four appendices:
- A copy of the permit, with mitigation special conditions and mitigation goals.
- An as-built planting plan showing the location and extent of the designed plant community type. (This is required only in the first monitoring report.)
- A species list of volunteer plant species in each community type.
- Representative photos of each mitigation site, taken from the same location for each monitoring event.

***Final Assessment***

A final post-construction assessment of the condition of the wetland establishment site would be performed at the end of the 10 year monitoring period. The assessment report would be submitted to the USACE and MassDEP by December 15 of the year the assessment is conducted. This assessment would:

- Summarize the original or modified mitigation goals and discuss the level of attainment of these goals.
- Describe significant problems and solutions during construction and post-construction.

- Identify agency procedures or policies that encumbered implementation of the mitigation plan. The assessment will specifically note procedures or policies that contributed to lower success or effectiveness than anticipated.

- Recommend measures to improve efficiency, reduce cost, or improve effectiveness of similar projects.

- The assessment will include the following appendices:

- Summary of the functions and values assessment of the wetland establishment areas.

- Calculation of the area of wetlands in each site, accompanied by a scaled drawing showing the wetland boundary and representative transects, with data sheets supporting the delineation.

- Comparison of the area and extent of delineated constructed wetlands with the area and extent of created wetlands proposed in the mitigation plan.

- Photos of the wetland establishment site taken from the same locations as the monitoring photos.

**Tier 1 Wetland Establishment Sites**

Five sites were selected as Tier 1 wetland establishment sites. The auto junkyard adjacent to Pine Swamp at East Brittania Street and Terry Brook Pond were also added to the list, for a total of seven sites that were advanced to a conceptual mitigation design stage. Six of the sites are located along the project corridor, or in the case of Site A, adjacent to the same wetland complex (the Hockomock Swamp) as the project corridor. The seventh site is Burrage Pond in Hanson, which is not located along the project corridor but that provides extensive wetland establishment and restoration opportunities. The following sections describe the proposed wetland concept design for each wetland establishment site.

**Site A**—Site A is approximately 5.4 acres, and the entire site is adjacent to existing forested wetland, at an elevation of approximately 71 feet. Figure 4.16-6 shows the existing conditions at Site A. Forested wetland is proposed for this site, since it is the vegetation type that would have the highest likelihood of long term success at this site and would expand the existing forested wetland. Wetland establishment at this site would create approximately 5.4 acres of new forested wetland, by excavating down to the existing wetland elevation of 71 feet to establish wetland hydrology. Wetlands created here would also provide approximately 4.9 acres of compensatory flood storage by expanding the existing floodplain over the created wetland.

Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, and threatened or endangered species habitat. The area outside the wetland replacement site would be graded to match the existing topography Approximately 2.4 acres of additional upland would be required for grading, resulting in 7.8 acres of land acquisition needed to construct this wetland establishment site. Figure 4.16-7 shows the proposed wetland establishment design concept plan for this Site A.

**Site B**—Site B is approximately 12.4 acres. This site is partially built on fill material, particularly at the northern end of the old dog track (now paved) that makes up the central portion of this site. While the elevation of the northern portion of the site is currently 15 feet or more above the elevation of the existing wetlands, the hydrology of the surrounding area suggests that wetland restoration is possible at approximately half of the site through removal of fill material that was likely placed on top of wetlands. Figure 4.16-8 shows the existing conditions at Site B.

The existing pavement and enough fill material would be removed to match the elevation of Site B with the elevation of the existing wetlands to the north and west (approximately elevation 91 feet). Additionally, a channel would be rebuilt along the west side of the right-of-way to contain the perennial stream in Wetland R 62.1. The stream would flow into the wetlands adjacent to Site B, partially restoring the hydrology to this area and increasing the likelihood of long term successful hydrology at Site B. Wetland reestablishment at this site would result in approximately 6.5 acres of restored wetland area. As with Site A, the surrounding wetlands are entirely forested, so the proposed wetland reestablishment would produce additional forested wetlands here, and would restore the functions of the wetlands originally filled to construct the dog track. Although Hockomock Swamp to the north contains Atlantic white cedar, the wetlands surrounding Site B do not, and the hydrology of the area does not support this species.

Functions and values provided by the newly reestablished wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, and threatened or endangered species habitat. The southern half of the site would be cleared of existing pavement and would be planted as upland forest, resulting in approximately 5.9 acres of restored upland. This area would provide additional wildlife habitat as well as rare species habitat. Figure 4.16-9 shows the proposed wetland establishment design concept for Site B.

**Site C**—Site C is approximately 1.7 acres and is surrounded on three sides by forested and scrub-shrub wetlands that begin at an elevation of approximately 81 feet. This site also provides flood storage as BLSF, at an elevation of approximately 81 feet. Figure 4.16-10 shows the existing conditions at Site C.

Wetland establishment would result in approximately 1.2 acres of forested wetland and 0.5 acre of scrub-shrub wetland, by excavating down to the wetland elevation of 81 feet to establish wetland hydrology. Wetlands created here would also provide approximately 1.5 acres of compensatory flood storage by expanding the existing floodplain over the created wetland.

Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, and wildlife habitat. The area outside the wetland replacement site would be graded to match the existing topography. Approximately 0.4 acre of additional upland would be required for grading, resulting in 2.1 acres of land acquisition required to construct this wetland establishment site. Figure 4.16-11 shows the proposed wetland establishment design concept for Site C.

**Site D**—Site D is approximately 3.5 acres and is adjacent to forested and scrub-shrub wetlands that begin at an elevation of approximately 62 feet. This site also provides flood storage as BLSF at an elevation of approximately 60 feet. Figure 4.16-12 shows the existing conditions at Site D.

Wetland establishment at Site D would seek to create three different wetland cover types. The presence of potential vernal pools near the eastern edge of the site provides evidence of hydrology that could support an area of palustrine emergent wetlands by excavating down to an elevation of approximately 59 feet. This would provide approximately 1.1 acres of emergent wetland. Grading to an elevation of approximately 61 feet would create approximately 1.2 acres of scrub-shrub wetland in the middle third of the site. Finally, grading to an elevation of approximately 62 feet would create approximately 1.2 acres of forested wetland. Wetlands created at Site D would also create approximately 3.1 acres of compensatory flood storage by expanding the existing floodplain over the created wetland.

Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, and threatened or endangered species habitat. Minimal grading would be needed to match the created wetland with the existing upland. Figure 4.16-13 shows the proposed wetland establishment design concept for Site D.

**Site E**—Site E is the automotive junkyard and is approximately 4.3 acres, adjacent to forested and scrub-shrub wetlands that begin at approximately elevation 59 feet. This site also provides flood storage as BLSF at approximately elevation 60 feet. Figure 4.16-14 shows the existing conditions at Site E.

Wetland establishment would result in approximately 2.2 acres of forested wetland and 2.1 acres of scrub-shrub wetland at Site E, by excavating to elevation 59 feet to establish wetland hydrology. Wetlands created here would also provide approximately 3.2 acres of compensatory flood storage by expanding the existing floodplain over the created wetland. Wetland restoration would also be constructed in current BLSF and within upland areas on the site degraded by the auto junkyard. From aerial photography, portions of the site appear to be filled wetlands.

Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, and threatened or endangered species habitat. Minimal grading would be needed to match the created wetland with the existing upland. Figure 4.16-15 shows the proposed wetland establishment design concept for Site E.

**Site F**—Site F is approximately 0.4 acre and is adjacent to Terry Brook Pond, which has a shoreline elevation of approximately 55 feet. This site provides flood storage as BLSF at an elevation of approximately 56 feet. Figure 4.16-16 shows the existing conditions at Site F.

Wetland establishment would result in approximately 0.4 acre of open water at Site F by excavating below the wetland elevation of 55 feet to establish wetland hydrology. Establishment of open water at this site would compensate directly for the South Coast Rail project impacts to Terry Brook Pond. Wetlands created here would also create approximately 0.4 acre of compensatory flood storage area, by expanding the existing BLSF.

Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization, wildlife habitat, recreation, and visual quality/aesthetics. The area outside the wetland replacement site would be graded to match the existing topography. Minimal grading would be needed to match the created wetland with the existing upland. Figure 4.16-17 shows the proposed wetland establishment design concept for Site F.

**Site G**—Site G (the Burrage Pond WMA) represents the largest wetland establishment site at 61.3 acres. As discussed previously, Site G is not along the project corridor, but would provide opportunity for extensive wetland establishment and restoration where there are now abandoned cranberry bogs. While MassDOT has evaluated the entire area with the reviewing agencies and has prepared a mitigation design concept for the entire 61.2 acre site, the entire site may not be necessary to achieve the mitigation goals for the project. MassDOT would commit to constructing the amount of wetland establishment necessary to achieve the goals for the project, which may encompass a smaller area than shown in the proposed mitigation design concept. MassDOT would undertake wetland establishment and restoration at this site in conjunction with MassWildlife, who owns and manages the WMA.

The site was previously the focus of study for a potential wetland banking pilot program, and as such there is historical information on the size and extent of the site as well as a previous wetland mitigation design concept. The previous design concept focused on three areas of the site (Areas A, B, and C). Two of these, Areas A and C are part of Site G; Area B is not part of Site G and will not be discussed further. In addition to Areas A and C, three additional locations of the site (referred to as Areas D, E, and F) have been studied by MassDOT for this potential wetland establishment site. Table 4.16-60 lists the different areas of Site G and their size in acres. All five areas are abandoned cranberry bogs enclosed by earthen berms. Figure 4.16-18 shows the existing conditions at Site G.

**Table 4.16-60 Site G Areas**

| Area | Description | Size (acre) | Current Elevation (feet) |
|---|---|---|---|
| A | Single large bog | 15.0 | 65 |
| C | Single large bog | 27.3 | 59 |
| D | Two small bogs separated by berm | 10.7 | 62 |
| E | Two small bogs separated by berm | 6.6 | 62 |
| F | Single small bog | 1.7 | 59/62 |

Mitigation at Site G would consist of wetland establishment and restoration. The entire area is already classified as wetland cranberry bogs, with the exception of the berms surrounding the bogs. Wetland establishment and creation at this site would create a diversity of wetland cover types. The following sections detail the wetland establishment proposed for each area. Figure 4.16-19 shows the proposed wetland establishment design concept for Site G.

Area A is a single large bog of approximately 15.0 acres and has the highest elevation of any portion of Site G at approximately 65 feet. Forested wetland is proposed for this location. Wetland establishment would create approximately 15.0 acres of forested wetland at Area A. Existing berms around the perimeter of Area A would be retained. Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, educational/scientific value, and threatened and endangered species habitat.

Area C is a single large bog that is approximately 27.3 acres and has the lowest elevation at Site G of approximately 59 feet. Forested wetland is proposed for this area, with a focus on providing habitat for Atlantic white cedar. Atlantic white cedar swamps are considered imperiled in Massachusetts by the NHESP. Standing water in these habitats generally occurs for half the year or longer. Wetland

establishment would create approximately 27.3 acres of forested wetland within Area C. Further study would be required to determine the acreage that could feasibly be devoted to Atlantic white cedar. The existing berms on the east and south sides of Area C would be removed to connect this area to the adjacent wetland community. The existing berms on the north and west sides of Area C would be left in place. Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, uniqueness/heritage, educational/scientific value, and threatened and endangered species habitat.

Area D consists of two smaller bogs separated by a berm, totaling 10.7 acres, at an elevation of approximately 62 feet. Wetland establishment would create approximately 10.7 acres of scrub-shrub wetland at Area D. The existing berm separating the two bogs would be removed. Other existing berms around the perimeter of Area D would be left in place. Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, educational/scientific value, and threatened and endangered species habitat.

Area E consists of two smaller bogs separated by a berm, totaling 6.6 acres, at an elevation of approximately 62 feet. Excavation of the area would allow creation of approximately 6.6 acres of open water wetland. The existing berm separating the two bogs would be removed as part of the site excavation. Other existing berms around the perimeter would be left in place. Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, recreation, educational/scientific value, visual quality/aesthetics, and threatened and endangered species habitat.

Area F consists of a single small bog, 1.7 acres, at an elevation of between 59 and 62 feet. Emergent marsh wetland is proposed for this area. Wetland establishment would result in approximately 1.7 acres of emergent marsh wetland at Area F. Existing perimeter berms would be left in place. Functions and values provided by the newly established wetland would include groundwater recharge/discharge, floodflow alteration, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, wildlife habitat, educational/scientific value, visual quality/aesthetics, and threatened and endangered species habitat.

**Summary of Proposed Mitigation**

Wetland mitigation for the South Coast Rail project is proposed to use wetland establishment, reestablishment, enhancement and preservation. Mitigation goals were established following both MassDEP regulations and guidance and USACE mitigation rules (33 CFR 332) and guidance. The mitigation goals established for state resource areas were:

- A 1:1 replacement ratio for BLSF and LUW; and
- A 2:1 replacement ratio for BVW.

The mitigation goals established for federal resource areas were:

- A 1:1 replacement ratio for permanent impacts to Open Water wetlands;

- A 2:1 replacement ratio for permanent impacts palustrine emergent and scrub-shrub wetlands;
- A 3:1 replacement ratio for permanent impacts to palustrine forested wetlands;
- A 1:1 replacement ratio for temporary impacts to palustrine emergent and scrub-shrub wetlands, to be replaced in situ; and
- A 1.5:1 replacement ratio for temporary impacts to palustrine forested wetlands, to be replaced in situ plus additional mitigation added to the mitigation goals for the loss of forested wetland cover associated with the delay in the growth of tree species.

MassDOT met with reviewing agencies of the ICG to review lists of potential sites for both wetland compensation and land preservation. Based on agency input and GIS analysis, the list of potential sites for wetland establishment was narrowed down to five sites, plus an additional two sites raised by agency members, for a total of seven sites that were advanced to a wetland compensation design concept. Wetland establishment at these sites is proposed to meet federal and state mitigation goals by providing:

- Up to 76.1 potential acres of BVW mitigation (mitigation required is 19.2 acres for the Stoughton Alternative or 16.8 acres for the Whittenton Alternative);
- Up to 7.0 potential acres of LUW mitigation (required area is 1.9 acres for permanent impacts on the Stoughton Alternative or 1.8 acres for the Whittenton Alternative); and
- Up to 13.1 potential acres of BLSF mitigation (mitigation required is 6.7 acres for the Stoughton Alternative or 4.7 acres for the Whittenton Alternative). Final design of BLSF mitigation will also assess the volume of compensatory storage provided on a foot by foot basis in comparison to the impacted BLSF.
- Wetland establishment at these sites is proposed to meet federal mitigation goals by providing:
- Up to 58.8 potential acres of palustrine forested wetlands mitigation (required area is 25.5 acres for permanent impacts on the Stoughton Alternative or 23.6 acres for the Whittenton Alternative);
- Up to 14.5 potential acres of palustrine scrub-shrub wetlands (required area is 1.8 acres for both alternatives);
- Up to 2.8 potential acres of palustrine emergent wetlands mitigation (required area is 1.8 acres for permanent impacts on either the Stoughton or Whittenton Alternatives); and
- Up to 7.0 potential acres of Open Water mitigation (required area is 1.9 acres for permanent impacts on the Stoughton Alternative or 1.8 acres for the Whittenton Alternative);

Chapter 4.14, *Biodiversity, Wildlife and Vegetation* addresses potential mitigation measures for direct and indirect impacts to vernal pools. The proposed wetland mitigation (establishment and restoration) areas could be designed to include new vernal pools to provide at least a 3:1 replacement of lost vernal

pool area (assuming the same mitigation ratio as for forested wetlands). Replacement vernal pools would be designed in accordance with the Corps' Guidelines for Vernal Pool Establishment.

Mitigation for vernal pool impacts would also be provided through preservation of vernal pool-upland complexes. Although MassDOT has not selected the final sites for wetland preservation, several of the potential preservation sites identified in the Wetland Mitigation Technical Report contain important vernal pool complexes:

- P9, Gobi Site
- P25, Rattlesnake Hill
- P26, Echo Pond
- T34B, Hockomock ACEC
- P36, Taunton River
- P52, Runnies River
- P53, Palmer River
- P56, Acidic Fen
- P58, Greenway Connection
- P59, Mattapoiset River Aquifer
- P62, BioReserve Infill

While the areas of potential mitigation are larger than the required mitigation, MassDOT would commit to constructing the amount of mitigation necessary to satisfy the required mitigation goals. At the current level of design for the project, proposed mitigation plans are not sufficiently accurate to determine the amount of wetland establishment that is practicable in a given area and will likely change when detailed field conditions are evaluated. The proposed mitigation plans cover larger areas than are required and allows for changes or reductions in the area of wetland mitigation from unknown site constraints.

Wetlands would generally be constructed by excavating wetland establishment sites to the appropriate elevation to establish a connection to groundwater hydrology. Wetland soils would be placed in the excavated areas to match the surrounding topography. Plantings would be installed at the sites to provide the appropriate vegetation cover types in the establishment sites. Sites would be monitored for a 10 year period after the completion of wetland construction to assess their development, hydrology, and functions and values.

Table 4.16-61 and Table 4.16-62 provide summaries of mitigation goals and potential mitigation totals by state and federal resource areas, respectively.

**Table 4.16-61 Summary of Mitigation by State Resource Area**

| Site ID | Total Size | BVW (acre) | LUW (acre) | BLSF (acre) |
|---|---|---|---|---|
| A | 5.4 | 5.4 | - | 4.9 |
| B | 6.5 | 6.5 [1] | - | - |
| C | 1.7 | 1.7 | - | 1.5 |
| D | 3.5 | 3.5 | - | 3.1 |
| E | 4.3 | 4.3 | - | 3.2 |
| F | 0.4 | - | 0.4 | 0.4 |
| G | 61.3 | 54.7 | 6.6 | - |
| Total Potential Mitigation (ac) | 89.0 | 76.1 | 7.0 | 13.1 |
| Required Mitigation (Stoughton) | | 19.2 | 1.9 | 6.7 |
| Required Mitigation (Whittenton) | | 16.8 | 1.8 | 4.7 |

1 An additional 5.9 ac of forested upland would be created from this site.

**Table 4.16-62 Summary of Mitigation by Cover Type[1] (acres)**

| Site ID | Total Size | OW | PEM | PSS | PFO |
|---|---|---|---|---|---|
| A | 5.4 | - | - | - | 5.4 |
| B | 12.4 | - | - | - | 6.52 |
| C | 1.7 | - | - | 0.5 | 1.2 |
| D | 3.5 | - | 1.1 | 1.2 | 1.2 |
| E | 4.3 | - | - | 2.1 | 2.2 |
| F | 0.4 | 0.4 | - | - | - |
| G | 61.3 | 6.6 | 1.7 | 10.7 | 42.3 |
| Total Potential Mitigation (ac) | 89.0 | 7.0 | 2.8 | 14.5 | 58.8 |
| Required Mitigation (Stoughton) | | 1.9 | 2.1 | 1.8 | 27.9 |
| Required Mitigation (Whittenton) | | 1.8 | 1.2 | 1.8 | 25.7 |

1 Cowardin Types: OW = Open Water, PEM = Palustrine Emergent, PSS = Palustrine Scrub/Shrub PFO = Palustrine Forested.

2 An additional 5.9 ac of forested upland would be created from this site.

Both the Stoughton and Whittenton Alternatives of the South Coast Rail project would require a variance from the regulations of the WPA, an Individual Water Quality Certificate under Section 401 of the CWA, and an Individual Permit under Section 404 of the CWA. No alternative of the project that would satisfy the purpose and need of the project would avoid wetland impacts. As documented in this report, the South Coast Rail project addresses state and federal wetland regulations and meets the criteria for the required variances and permits needed to allow the proposed wetland impacts. Mitigation for those wetland impacts can be provided in compliance with the state and federal mitigation guidelines to offset the adverse impacts to wetland habitat, and functions and values of wetlands from the project.

Once a LEDPA is determined, the project would advance to a final design stage. This would require MassDOT to prepare a final set of engineering plans. This information would be used for the preparation of Notices of Intent (NOI) for each municipality along the right-of-way. Either alternative exceeds the area of alteration to BVW and would require the Commissioner of MassDEP to issue a variance from the performance standards of the WPA regulations. The procedure for requesting a variance includes first submitting the NOIs to the Conservation Commission for each municipality along the right-of-way. The

Commission in each municipality would be required to deny the proposed project in their Order of Conditions (OOC). MassDOT would then request that the MassDEP Southeast Regional Office issue a Superseding OOC (SOC) for the project. The Regional Office would be required to deny the proposed project in its SOC. MassDOT would then request that the Commissioner issue a variance.

#### Mitigation of Temporary Impacts

A range of measures would be implemented both during and immediately after the construction period to avoid and minimize temporary impacts to wetlands resulting from construction of the LEDPA. Potential measures that would be undertaken are described below. They include preventative measures as well as the in-kind restoration of regulated areas along the right-of-way and at bridges and culverts.

#### Minimization

An erosion and sedimentation control program would be implemented to minimize temporary impacts to wetland resource areas during the construction phase of the project. The program would incorporate Best Management Practices (BMPs) specified in guidelines developed by MA DEP and the USEPA through the development of a stormwater pollution prevention plan (SWPPP).

Proper implementation of the erosion and sedimentation control program would:

- Minimize exposed soil areas through sequencing and temporary stabilization
- Place structures to manage stormwater runoff and erosion; and
- Establish a permanent vegetative cover or other forms of stabilization as soon as practicable.

There are several structural and non-structural devices that would be implemented during the construction phase of the project to limit sediment movement, and to protect adjacent wetland resources from temporary impacts. An erosion control barrier would be installed upgradient of wetland resource areas and may consist of a barrier of hay bales and silt fence. Additional practices may include stabilized construction exits, catch basin inlet protection such as silt sacks, and dewatering filters if dewatering is required.

Mitigation of temporary construction-related impacts by erosion and sedimentation control may also include: temporary seeding, hay bale checkdams, and rock outlet protection. These BMPs aid in the reduction of erosion by stabilizing exposed soil surfaces and reducing flow velocities.

#### Restoration

Mitigation for construction period impacts would include in-kind and *in situ* replacement of resource areas. This restoration consists of several components, including regrading disturbed areas, replanting appropriate wetland vegetation, removing construction materials from the project area, and implementing an invasive species control plan.

Following the conclusion of construction, all temporarily impacted areas would be regraded and restored to match the adjacent wetland elevation. In locations where the placement of fill or other earthwork had occurred, stockpiled hydric topsoil or equivalent manufactured topsoil would be placed in the upper 12 inches of the soil profile. Planting plans for restoration areas would specify plant

materials appropriate to the type of wetland impacted in that location. As part of these planting plans, locations may also be seeded with an appropriate wetland seed mixture in order to provide rapid vegetative coverage to stabilize disturbed soils.

All debris would be removed from the work area. Hay bales used for sedimentation and erosion control would be broken up and spread as mulch in adjacent upland areas where possible, or would be removed from work area and disposed of properly outside of the project area.

An invasive species control plan would be implemented to prevent disturbed areas from becoming colonized by invasive species such as common reed. The invasive species control plan should include frequent eradication of invasive species during the initial period following construction to prevent the establishment of large populations that could spread to adjacent undisturbed areas.

Upon completion of work, temporarily impacted upland areas adjacent to wetland restoration areas would be regraded. Areas of exposed soils would be seeded with a wildlife/conservation grass mixture to provide permanent stabilization and erosion control. The seeded slopes would be temporarily mulched with loose hay to prevent erosion before the seeds germinate and take root.

### 4.16.11 Regulatory Compliance of the Alternatives

Proposed work and its associated impacts would be subject to regulatory review with respect to state and federal wetlands regulatory programs, as described below.

#### 4.16.11.1 Massachusetts Wetlands Protection Act (WPA)

The Massachusetts Wetlands Protection Act (WPA) regulations (310 CMR 10.00) establish specific mitigation requirements for the majority of wetland resource areas. Performance standards are outlined for work performed in each of the wetland resources regulated under the Massachusetts State Wetlands Regulations. The following sections list these performance standards by resource type except for Land Subject to Coastal Storm Flowage (LSCSF) for which there are no performance standards.

The South Coast Rail project cannot fully comply with the performance standards of the WPA, and will require a variance under 310 CMR 10.05(10) (a). This regulation allows performance standards to be waived in the event that: “mitigating measures are proposed that will allow the project to be conditioned so as to contribute to the protection of the interests identified in M.G.L. c. 131 §40.” The regulation also requires that “there are no reasonable conditions or alternatives that would allow the project to proceed in compliance” with the regulations of the Act, and that “the variance is necessary to accommodate an overriding community, regional, state or national public interest.” MassDOT has prepared data in the Technical Reports for the FEIS/FEIR intended to demonstrate that the conditions for granting a waiver have been met. However, MADEP is the final arbiter as to whether MassDOT has met the necessary regulatory requirements for a variance. MassDOT will attempt to design mitigation for the project that complies with the resource area standards to the maximum extent practicable.

This section discusses the project’s compliance with the performance standards established for each resource area and the need for a variance to proceed with the project.

### Performance Standards

Performance standards are outlined for work performed in each of the wetland resources regulated under the Massachusetts State Wetlands Regulations.[43] The following sections list these performance standards by resource type except for Land Subject to Coastal Storm Flowage for which there are no performance standards.

#### *Bank*

The regulations for Bank (310 CMR 10.54(4)) do not specify mitigation requirements, but do list general performance standards that require that work on a Bank not impair any of the following:

(a) The physical stability of the Bank;

(b) The water carrying capacity of the existing channel within the Bank;

(c) Ground water and surface water quality;

(d) The capacity of the Bank to provide breeding habitat, escape and food cover for fisheries; and

(e) The capacity of the Bank to provide important wildlife habitat functions.

Where Bank is significant to important wildlife habitat functions, the regulations at 310 CMR 10.60(3) apply. These regulations require that alterations of wildlife habitat characteristics beyond permissible thresholds (for Bank, 50 linear feet) be restored onsite or replicated offsite in accordance with the following general conditions:

(a) The surface of the replacement area to be created shall be equal to that of the area that will be lost;

(b) The elevation of groundwater relative to the surface of the replacement area shall be approximately equal to that of the lost area;

(c) The replacement area shall be located within the same general area as the lost area. In the case of banks and land under water, the replacement area shall be located on the same water body or waterway if the latter has not been rechanneled or otherwise relocated. In the case of bordering land subject to flooding, the replacement area shall be located approximately the same distance from the water body or waterway as the lost area. In the case of vernal pool habitat, the replacement area shall be located in close proximity to the lost area;

(d) Interspersion and diversity of vegetation, water and other wildlife habitat characteristics of the replacement area, as well as its location relative to neighboring wildlife habitats, shall be similar to that of the lost areas, insofar as necessary to maintain the wildlife habitat functions of the lost area;

[43] 310 Code of Massachusetts Regulations (CMR) 10.00. Revised June 2009

(e) The project shall not alter ten or more acres of Land Subject to Flooding (LSF) or Land Under Water (LUW) found to be significant to the protection of wildlife habitat, or 2,000 feet or more of Bank found to be significant to the protection of wildlife habitat (in the case of a bank of a stream or river, this shall be measured as each side of said stream or river);

(f) If the replacement area is located in an area subject to M.G.L. c. 131 §40, there shall be no adverse effect on the existing important wildlife habitat functions of said area as measured by the standards of 310 CMR 10.60;

(g) The "thresholds" established in 310 CMR 10.54(4)(a)(5)m, 10.56(4)(a)4, 10.57(4)(a)3, and 10.58(4)(d)1.c (below which alterations of resource areas are not deemed to impair capacity to provide important wildlife habitat functions) shall not apply to any replacement area; and

(h) The replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in 310 CMR 10.51 through 10.60.

***Bordering Vegetated Wetlands (BVW)***

For work proposed within BVW, the following performance standards apply:

- Any proposed work in a BVW shall not destroy or impair any portion of the said area;
- The issuing authority may issue an Order of Conditions permitting work, which results in the loss of up to 5,000 square feet of BVW when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area would function in a manner similar to the area that would be lost;
- No project may be permitted that would have any adverse effect on the specified habitat sites of rare vertebrate or invertebrate species; and
- Any proposed work shall not destroy or otherwise impair any portion of a BVW that is within an ACEC designated by the Secretary of Environmental Affairs.

The regulations at 310 CMR 10.55(4)(b) establish seven general performance standards for replacement of lost BVW. Although the South Coast Rail project does not comply with the performance standard limiting BVW loss to 5,000 square feet and will therefore require a variance, the subsequent performance standards are applicable.

- The issuing authority may issue an Order of Conditions permitting work, which results in the loss of up to 5,000 square feet of BVW when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area would function in a manner similar to the area that would be lost;
- The surface of the replacement area to be created shall be equal to that of the area that will be lost (the MassDEP has determined that projects requiring a variance should provide replacement wetland area at a 2:1 ratio);

- The elevation of groundwater relative to the surface of the replacement area shall be approximately equal to that of the lost area;
- The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;
- The replacement area shall have an unrestricted hydraulic connection to the same water body or waterway associated with the lost area;
- The replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;
- At least 75 percent of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods; and
- The replacement area shall be provided in a manner that is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00.

***Land Under Waterbodies and Waterways (LUWW)***

The regulations for Land Under Water Bodies and Waterways (LUWW) (310 CMR 10.56(4)) do not specify mitigation requirements, but do list general performance standards, which require that work within LUWW not impair any of the following:

(a) The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;

(b) Ground and surface water quality;

(c) The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and

(d) The capacity of said land to provide important wildlife habitat functions.

Where LUWW is significant to important wildlife habitat functions, the regulatory standards at 310 CMR 10.60(3) apply. These regulations require that alterations of wildlife habitat characteristics beyond permissible thresholds (for LUWW, 5,000 square feet) be restored onsite or replicated offsite in accordance with the general conditions listed above for Bank.

***Bordering Land Subject to Flooding (BLSF)***

For work proposed in BLSF, the following performance standards apply:

- Compensatory flood storage shall be provided for all flood storage volume that would be lost as the result of a proposed project within BLSF. Such compensatory volume shall have an unrestricted hydraulic connection to the same waterway or waterbody. Further, with respect to waterways, such compensatory volume shall be provided within the same reach of the river, stream or creek;

- Work within BLSF, including that work required to provide the compensatory flood storage specified above, shall not restrict flows so as to cause an increase in flood stage or velocity; and

Work in those portions of bordering land subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions. Where this resource is significant to important wildlife habitat functions, the regulatory standards at 310 CMR 10.60(3) apply. These regulations require that alterations of wildlife habitat characteristics beyond permissible thresholds (for BLSF, 5,000 square feet) be restored onsite or replicated offsite in accordance with the general conditions listed above for Bank.

***Riverfront Area***

The performance standards for Riverfront Area (310 CMR 10.58(4)) do not specify mitigation requirements. However, where this resource is significant to important wildlife habitat functions, the regulatory standards at 310 CMR 10.60(3) apply. These regulations require that alterations of wildlife habitat characteristics beyond permissible thresholds (for Riverfront Area, 5,000 square feet) be restored onsite or replicated offsite in accordance with the six general conditions listed above for Bank.

***Coastal Bank***

There are no specific mitigation requirements for work on Coastal Bank. The regulations at 310 CMR 10.30(6) require that any project on a coastal bank shall have no adverse effects on the stability of the coastal bank. Compliance with this performance standard would require that alterations of Coastal Bank be mitigated on-site through measures to ensure stability.

**Build Alternatives**

None of the Build Alternatives would meet all of the performance standards outlined for each resource protected under the Act. Construction of any of the Build Alternatives would therefore require the Commissioner of MA DEP to issue a variance from the WPA regulations.

***Bank***

Each of the proposed alternatives would alter Bank for reconstruction and rehabilitation of the rail bed and bridges. Generally, the altered bank is directly adjacent to the rail bed at a bridge or culvert associated with a stream crossing. The replacement or extension of culverts and bridge abutments would be designed and constructed in such a way as to maintain physical stability of the bank, and water carrying capacity. Construction would be done using appropriate erosion and sedimentation control measures to protect water quality.

Alterations of bank at existing bridges or culverts would be temporary in nature, except in locations where additional tracks are added. In most cases, existing bridge abutments or culverts provide minimal important wildlife habitat. All areas of temporarily altered bank would be restored in-kind.

At locations where culvert extensions or enlarged bridge abutments would be required, wildlife habitat evaluations would be performed to determine the capacity of the bank to provide wildlife habitat functions. Bridges and culverts would be designed to maintain the physical stability and water carrying capacity of the channel. The wetland habitat evaluations would be used to guide mitigation efforts to restore lost habitat functions within the project area. Where necessary, permanently altered bank could

be relocated and reconstructed as mitigation to meet the performance standards (unless impacts occur within rare species habitat). Detailed designs for bank replacement would be developed in a later design phase, once the LEDPA is determined. This would be done in consultation with MA DEP and the local Conservation Commissions.

***Bordering Vegetated Wetlands***

Each of the proposed alternatives would result in the loss of over 5,000 square feet of BVW and would result in the loss of BVW within endangered and protected species habitat. There would be loss of BVW in an ACEC along the Stoughton and Whittenton Alternatives. These losses do not conform to the WPA performance standards and would require a Variance from the Commissioner of DEP.

***Land Under Waterbodies and Waterways (LUWW)***

Specific impacts to LUWW would be calculated in the final design phase for the LEDPA. It is expected that impacts would be minor and associated with the replacement of bridges and culverts. All impacts would be mitigated for and proposed work would not alter the carrying capacity of the channel, the water quality, or wildlife habitat. Each of the Alternatives can be constructed in conformance with the performance standards and would not require a Variance from the Commissioner of MA DEP for work occurring in LUWW (unless the impacts occur within rare species habitat).

***Bordering Land Subject to Flooding (BLSF)***

Each of the proposed Alternatives would result in losses to BLSF and losses within areas of protected habitat for Rare or Protected species. This does not conform to the performance standards outlined in the Act and work along any of the proposed Alternatives would require a Variance from the Commissioner of MA DEP for work proposed within BLSF.

***Riverfront Area***

Work within Riverfront Area is unavoidable along each of the proposed alternatives due to the location of the rights-of-way and the number of perennial streams that each crosses. Although primarily redevelopment, portions of work proposed within Riverfront Area would occur within habitat of protected or rare species and would not conform to the performance standards. A Variance from the Commissioner of MA DEP would be required for work along any of the proposed alternatives if the performance standards could not be met. During a subsequent design phase, the project's ability to comply with the compensatory storage performance standard and wildlife habitat performance standard would be evaluated to determine if a variance is required.

***Coastal Bank***

The Fall River Secondary is the only proposed alternative that would impact Coastal Bank. Work in these areas consists of reconstruction and would meet all the performance standards outlined in the Act. A variance would not be required for work within Coastal Bank.

#### 4.16.11.2 Water Quality Certification – Section 401

Section 401 of the Federal Clean Water Act requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates or would originate that the

discharge will comply with the applicable (i.e., Commonwealth of Massachusetts) water quality standards. MA DEP executes its responsibilities pursuant to Section 401 under the Massachusetts Clean Water Act (M.G.L. c 21 §§ 26-53) and is the final arbiter as to whether a water quality certification will be issued, denied, or waived. The Order of Conditions issued by local conservation commissions automatically assumes the issuance of a water quality certificate for projects impacting less than 5,000 square feet of wetlands. This project would require MassDOT to obtain an Individual Water Quality Certificate from MA DEP as impacts would exceed 5,000 square feet.

There are seven criteria for the evaluation of applications for discharge of dredge or fill material (314 CMR 9.06):

- No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem;
- No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that would minimize potential adverse impacts to the bordering or isolated vegetated wetlands or land under water, including a minimum of 1:1 restoration or replication of isolated or bordering wetlands;
- No discharge of dredged or fill material shall be permitted to ORWs, except for the activities specified in 314 CMR 9.06(3)(a) through (l), which remain subject to an alternatives analysis and other requirements of 314 CMR 9.06;
- Discharge of dredged or fill material to an ORW specifically identified in 314 CMR 4.06(1)(d) (e.g., vernal pool, within 400 feet of a water supply reservoir and any other area so designated) is prohibited as provided therein unless a variance is obtained under 314 CMR 9.08;
- No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater for the purposes of controlling sedimentation or other pollutant attenuation;
- Stormwater discharges shall be provided with BMPs to attenuate pollutants and provide a set back from receiving water or wetland; and
- No discharge of dredged or fill material shall be permitted in the rare circumstances where the activity meets the criteria for evaluation but would result in substantial adverse impacts to the physical, chemical, or biological integrity of surface waters of the Commonwealth.

One of the seven criteria for the evaluation of applications for discharge of dredge or fill material (314 CMR 9.06(2)) is relevant to mitigation:

- No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that would minimize potential adverse impacts to the bordering or isolated vegetated wetlands or land under water, including a minimum of 1:1 restoration or replication of isolated or bordering wetlands.

**No-Build Alternative**

The No-Build Alternative requires no construction and would not result in any impacts to wetland resources areas. A water quality certificate would not be required for this alternative.

**Stoughton Alternatives**

The Stoughton Alternatives comply with the criteria outlined for the discharge of dredged or fill material within waterways. Compliance with the criteria outlined in 310 CMR 9.06 is explained below. Based on the methodology used for delineating the boundaries of vernal pools, the Stoughton Alternatives would require fill in ORWs (based on the presence of one or more vernal pools) and would not meet performance standards for the discharge of dredged or fill material in ORWs.

No dredging or fill is planned in conjunction with the construction of stormwater management systems proposed as part of this project, and the proposed stormwater systems proposed at station sites and layover facilities include BMPs and setbacks as outlined in the Stormwater Management Regulations.

**Whittenton Alternatives**

The Whittenton Alternatives comply with the criteria outlined for the discharge of dredged or fill material within waterways. Compliance with the criteria outlined in 310 CMR 9.06 is explained below.

Based upon the methodology used for delineating the boundaries of vernal pools, the Whittenton Alternatives would require fill in ORWs (based on the presence of one or more vernal pools) and would not meet performance standards for the discharge of dredged or fill material in ORWs.

No dredging or fill is planned in conjunction with the construction of stormwater management systems proposed as part of this project, and the proposed stormwater systems proposed at station sites and layover facilities include BMPs and setbacks as outlined in the Stormwater Management Regulations.

### 4.16.11.3 Section 404 of the Clean Water Act

Section 404 of the Clean Water Act requires a Department of the Army permit for the discharge of dredged or fill material into waters of the United States, including adjacent wetlands. The Build Alternatives would require the issuance of an Individual Section 404 Permit (i.e., would not be eligible for the Massachusetts Programmatic General Permit) because they would result in the loss of more than one acre of vegetated wetland, as described in the preceding analyses.

The Build Alternatives would require a Section 404 permit for the placement of fill in freshwater wetlands. The wetland filling is evaluated, in part, using the US EPA Guidelines for Specification of Disposal Sites for Dredged or Fill Material promulgated pursuant to Section 404(b) (1) of the Clean Water Act (Section 404(b)(1) Guidelines) and its implementing regulations at 40 CFR 230 *et seq*. The Guidelines are intended to avoid unnecessary filling of waters and wetlands. Two of the guidelines are relevant to mitigation:

- No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences; and

- No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that will minimize adverse effects of the discharge on the aquatic ecosystem.

In setting mitigation requirements for Section 404 permits, the USACE considers watershed needs, mix of habitat types, and compatibility with adjacent land use.

The USACE issued rules for compensatory wetland mitigation (33 CFR Parts 325 and 332) in April 2008. This guidance emphasizes a watershed approach to selecting compensatory mitigation measures and locations. Five types of compensatory mitigation are recognized:

- Establishment (creation), defined as: "the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions."

- Re-establishment: "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions." In the past, this was generally referred to as "restoration."

- Rehabilitation: "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area."

- Enhancement: "the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area."

- Preservation: "the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions."

The New England District has published a guidance[44] document for compensatory mitigation that establishes certain mitigation ratios for permanent impacts. For purposes of calculating federal mitigation goals, it is assumed that the wetland restoration standard would be applied. Using this formula assuming that wetland restoration would be required for permanent impacts, a 1:1 minimum ratio is required for impacts to areas of open water, a 2:1 minimum ratio is required for permanent to

[44] USACE. 2010. New England District Compensatory Mitigation Guidance. New England District, U.S. Army Corps of Engineers, July 20, 2010. Available online at: <http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/CompensatoryMitigationGuidance.pdf> (April 26, 2013).

emergent wetlands, a 2:1 minimum ratio is required for impacts to scrub shrub wetlands, and a 3:1 minimum ratio is required for impacts to forested wetlands. Temporary impacts are also addressed in the guidance document, with most impacts requiring the replacement of a given percentage of the impacted area. Meetings between MassDOT and reviewing agencies, described in more detail in Chapter 5, agreed upon replacement ratios of 1:1 for temporary impacts to either emergent wetlands or scrub-shrub wetlands, to be replaced in-situ, and 1.5:1 for temporary impacts to forested wetlands, to be replaced in-situ as well as offsite.

The regulations recognize that mitigation may be located on site (at or adjacent to the impact site) or off site (at another location in the same watershed). Wetland mitigation banks, where available, and in lieu fee programs, where available, may also be used to mitigate for unavoidable impacts. Neither of these programs currently exists in Massachusetts. However, the USACE recently (October 2, 2012) issued a public notice seeking comments on a "Prospectus for a State-Wide In-Lieu Fee Program Administered by the Massachusetts Department of Fish and Game." The In-Lieu Fee (ILF) program would allow all applicants for Section 404 permits to pay into a trust fund administered by the Department of Fish and Game (DFG), who would then propose compensatory mitigation projects. The USACE would determine which projects were eligible to be used in the ILF program. Permittees would purchase mitigation credits, based on a ratio to be determined. If this program is implemented, it may impact the mitigation strategy for the project. MassDOT would consult with the USACE and review agencies to examine this option should it arise.

These regulations also recognize that compensatory mitigation must be commensurate with the amount and type of impact, and requires that the Corps determine what is practicable and capable of compensating for the aquatic resource function that would be lost, and what is environmentally preferable. Considerations include:

- The likelihood for ecological success;
- The location relative to the impact site;
- The significance within the watershed; and
- The costs of the compensatory mitigation project.

These regulations require a watershed-based approach, ideally based on an existing watershed plan that provides information on the land uses, natural habitats, water quality, and aquatic resources within a watershed. The goal of using a watershed approach is to maintain and improve the quality and quantity of aquatic resources within a watershed, by strategically siting compensatory mitigation sites.

**Practicable Alternatives**

Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.[45] In considering whether an alternative is practicable, due consideration must be given to cost, constructability, existing technology and also to logistical considerations such as traffic flow and safety in and around each particular alignment and station location. The practicability of the alternatives is considered in the Corps' determination of the

[45] 40 CFR 230.3(q)

LEDPA. Once a LEDPA is determined, the project would advance to a final design stage. This would require MassDOT to prepare a final set of engineering plans.

#### Water Quality/Threatened and Endangered Species

The Build Alternatives include proposed stormwater management systems intended to mitigate potential impacts to water quality by controlling runoff velocities and removing pollutants from the stormwater runoff discharging from station locations to downstream surface water resources. The proposed project has been designed to comply with Massachusetts Stormwater Standards.[46] Due to the proposed impacts to ORWs, the Build Alternatives would require a variance from the state water quality standards (Section 401).

The Build Alternatives would seemingly not affect any federally-listed endangered species, because there are none within the immediate project area. Habitat for several state listed species occurs within or immediately adjacent to the right-of-way. This is described in detail in Chapter 4.14, *Biodiversity. Wildlife and Vegetation* and Chapter 4.15, *Threatened and Endangered Species*.

#### No Significant Degradation

The 404(b)(1) Guidelines stipulate that no discharge of dredged or fill material shall be permitted that will cause or contribute to significant degradation of the waters of the United States.[47] Measures to protect and avoid impacts to wetlands and water resources were incorporated into the design process of the Build Alternatives and will be further refined for the LEDPA. Construction practices will be implemented in accordance with state and federal guidelines to prevent unnecessary impacts to wetland and water resources. Water resources are further described in Chapter 4.17, *Water Resources*.

#### Reasonable Steps to Minimize Adverse Effects

The 404(b)(1) Guidelines further stipulate that no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem, To the extent practicable, adverse effects to wetland resources will be minimized through avoidance, minimization, and compensatory mitigation.

##### *Avoidance*

Avoidance of all direct wetland impacts would only be possible by implementing the No-Build Alternative. Section 4.16.10.1 of this chapter describes specific measures incorporated into the design process to incorporate avoidance of impacts into each of the Build Alternatives.

##### *Minimization*

Special construction techniques, such as retaining walls, have been incorporated into the design of the Build Alternatives to further minimize adverse impacts to wetlands. A full description of the measures taken to minimize wetland impacts is provided above in Section 4.16.10.1.

[46] 310 Code of Massachusetts Regulations (CMR) 10.05(6) (k).
[47] 40 CFR 230.10(c)

***Mitigation***

Mitigation would be provided to offset all losses of wetland and other aquatic resource functions and values. Section 4.16.10 identifies the methodology that would be used to identify locations and presents the mitigation goals that would provide replacement of lost areas as well as functions and values. Mitigation areas would be designated within the same watershed as the lost area whenever possible. Once the LEDPA is determined, specific mitigation sites would be identified and conceptual mitigation designs prepared.