NORTHERN NEW ENGLAND PASSENGER RAIL AUTHORITY

Service Level (Tier I) Environmental Assessment for the Downeaster Service Development Plan

Boston, Massachusetts to Brunswick, Maine

Prepared Pursuant to the National Environmental Policy Act (42 U.S.C. 4332) and 64 FR Section 28545 by the U.S. Department of Transportation, Federal Railroad Administration, and Northern New England Passenger Rail Authority

July 2017

This Page Intentionally Left Blank

Downeaster Service Development Plan
Service Level (Tier 1) Environmental Assessment (EA)

Prepared by:
Federal Railroad Administration (FRA)

Pursuant to:

National Environmental Policy Act (42 U.S.C. § 4321 et seq.), and implementing regulations (40 CFR Parts 1500-1508), 23 CFR §771, Section 4(f) of the U.S. Department of Transportation Act (49 USC §303) and implementing regulations (23 CFR Part 774); FRA Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545, May 26, 1999); National Historic Preservation Act (54 USC §306101 et seq.) and implementing regulations (36 CFR Part 800); Clean Air Act as amended (42 USC §7401 et seq.) and implementing regulations (40 CFR Parts 51 and 93); the Endangered Species Act of 1973 (16 USC §1531-1544) and implementing regulations (50 CFR Part 402); the Clean Water Act (33 USC §1251-1387) and implementing regulations (33CFR Parts 320 to 324 and 40 CFR Part 230); and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 USC §4601).

Approved:

7/10/17

Date

Marlys Osterhues
Chief, Environment and Corridor Planning
Federal Railroad Administration

The following person may be contacted for information on the Environmental Assessment:

Michael Johnsen
Supervisory Environmental Protection Specialist
Office of Railroad Policy and Development
USDOT Federal Railroad Administration
1200 New Jersey Avenue, SE
Washington, DC 20590

Table of Contents

Exhibits

Glossary

A-Weighting (dBA) – A standardized filter used to alter the sensitivity of a sound level meter with respect to frequency so that the instrument is less sensitive at low and high frequencies where the human ear is less sensitive.

Alignment – Horizontal and vertical geometry defining the path of a transportation component or system.

Amtrak – Formally the National Railroad Passenger Corporation. A federally owned passenger railroad created in 1971 and authorized to operate a nationwide system of passenger rail transportation. Amtrak services focus on national rail passenger transportation service between major intercity travel markets of the United States. Amtrak passengers enjoy service in more than 500 communities in 46 states throughout a 22,000-mile rail system.

At-Grade Crossing – An intersection of two or more flows of traffic (possibly involving different modes) at the same location and elevation.

Ballast (Railroad) – Coarse gravel or crushed rock laid to form a bed for a railroad.

Commuter Rail – Passenger rail system serving travel within an urban region mainly for commuter purposes. Also known as regional rail or corridor rail service. Typically designed to operate on the general railroad system, sharing tracks with freight trains and intercity passenger trains.

Controlled Siding – A siding, the use of which is governed by signals under the control of a train dispatcher or operator.

Corridor Rail Service – Passenger rail system serving travel within an urban region mainly for commuter purposes. Also known as regional rail or commuter rail. Typically designed to operate on the general railroad system, sharing tracks with freight trains and intercity passenger trains.

Cumulative Impacts – Impacts on the environment that result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes other such actions.

Decibel (dB) – The standard unit of measurement for sound pressure level and vibration level. Technically, a decibel is the unit of level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm of this ratio.

Double Track – Two main tracks, one of which the trains run in one direction and the other in the opposite direction.

Endangered Species – According to the Federal Endangered Species Act (ESA) of 1973, endangered species are any species in danger of extinction throughout all or a significant portion of its natural range.

Environmental Assessment (EA) – A document prepared pursuant to the National Environmental Policy Act (NEPA) for federal actions that are not categorical exclusions and that do not clearly require an Environmental Impact Statement (EIS). An EA provides the analysis and documentation to determine if an EIS or a Finding of No Significant Impact (FONSI) should be prepared.

Environmental Impact Statement (EIS) – A NEPA document that must be filed when the Federal Government takes a "major federal action significantly affecting the quality of the human environment." An EIS is to serve as an action forcing device to insure that the policies and goals defined in NEPA are infused into the ongoing programs and actions of the Federal Government. Agencies shall focus on important environmental issues and alternatives and shall reduce paperwork and the accumulation of extraneous background data, per 40 CFR Section1502.1.

Environmental Justice (EJ) – The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA, 2012d).

Federal Rail Administration (FRA) – One of ten intermodal administrations within the U.S. Department of Transportation. FRA is involved in promulgating and enforcing rail safety regulations; administering railroad assistance programs; conducting research and development in support of improved railroad safety and national rail transportation policy; providing for the rehabilitation of Northeast Corridor rail passenger service; and consolidating government support of rail transportation activities.

Finding of No Significant Impact (FONSI) – A document prepared pursuant to NEPA by a federal agency that briefly presents the reasons why an action, not otherwise excluded (§ 1508.4), would not have a significant effect on the human environment and, therefore, for which an environmental impact statement would not be prepared. It would include the environmental assessment or a summary of it and would note any other environmental documents related to it (§ 1501.7(a)(5)). If the assessment is included, the finding need not repeat any of the discussion in the assessment but may incorporate it by reference.

Floodplain – The level area adjoining a river channel that is inundated during periods of high flow.

Hertz (Hz) – The unit of acoustic or vibration frequency representing cycles per second.

Intercity Rail – Passenger rail system used for serving long distance travel between cities.

Interlocking – An arrangement of signal apparatus that prevents conflicting movements through an arrangement of tracks such as junctions or crossings.

Main Track – A designated track upon which trains are operated by timetable, train order, or both, or the use of which is governed by block signals.

Metropolitan Planning Organization – The area agency charged with the conduct of the urban transportation planning process. The Federal Government mandates that federal transportation funds be used in an urban area. A Metropolitan Planning Organization is also the largest, single, region-wide recipient of federal funds for transportation planning purposes. Together with the state, it carries out the planning and programming activities necessary for federal capital funding assistance.

Mitigation – Engineering, design, monetary, or construction measures to lessen or offset adverse impacts caused by a proposed action.

Mode – A system for transporting people and goods described by a specific right-of-way (ROW), technology and operational features (e.g., aviation, rail, marine transport, highway).

National Environmental Policy Act (NEPA) – Federal legislation that requires federal agencies to consider the potential environmental consequences in their decision-making regarding major federal actions (including land port of entry studies). The law requires that the agency make the analysis and information considered available to the public for comment prior to a final decision regarding the proposed action.

National Historic Preservation Act (NHPA) – The National Historic Preservation Act (NHPA) (16 U.S.C. 470 et seq.) is legislation intended to preserve historical and archaeological sites in the United States of America. The act created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices.

National Register of Historic Places (NRHP) – A list of structures, sites, and districts of national historical significance as determined by the Advisory Council on Historic Preservation under the National Historic Preservation Act of 1966, as amended.

No-build Alternative – The No-build Alternative (also known as the No-Build Alternative, is the baseline to which the benefits and impacts of other alternatives are compared.

Park-and-ride – A parking area provided for commuters who park their automobile either to form carpools or to connect to public transit (train or bus) to continue their commute.

Passenger station – The buildings, structures, and shelters, including all attached fixtures, used as transit passenger station facilities for access to a regional rail system. Passenger stations may include other amenities or services such as auto parking, ticket/token/pass sales, or consumer services.

Peak period – The period during which the maximum amount of travel (e.g., highest demand for passenger service) occurs. It may be specified as a morning (a.m.) or evening (p.m.) peak period. The peak period generally corresponds with the morning and evening commuter traveling periods as employees travel to and from their places of employment.

Public transit – Transportation provided via bus, rail, or other conveyance, either publicly or privately owned, providing to the public general or special service (but not including school buses or charter or sightseeing service) on a regular basis.

Quiet Zone – A railroad grade crossing at which trains are prohibited from sounding their horns in order to decrease the noise level for nearby residential communities. The train horns can be silenced only when other safety measures compensate for the absence of the horns.

Receiver/Receptor – A stationary far-field position at which noise or vibration levels are specified.

Regional Rail – Passenger rail system serving travel within an urban region mainly for commuter purposes. Also known as commuter rail or corridor rail service. Typically designed to operate on the general railroad system, sharing tracks with freight trains and intercity passenger trains.

Ridership – A general measure of the number of people utilizing a transit service.

Right-of-Way (ROW) – The corridor (horizontal and vertical space) occupied by a transportation way such as a highway, street, road, rail, or runway.

Section 106 of the National Historic Preservation Act (1966) – Requires federal agencies to consider the effect of their undertakings on properties included in, or eligible for, inclusion on the NRHP, and allows the Advisory Council on Historic Preservation the opportunity to comment on such undertakings.

Section 404 of the Clean Water Act – The Federal Water Pollution Control Act Amendments of 1972 (33 USC 401 et seq.) is the enabling legislation for protection of waters of the United States by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency.

Section 4(f) of the U.S. Department of Transportation Act of 1966– Legislation protecting publicly owned parks, public recreation areas, historic properties, or wildlife and waterfowl refuges. The statute states that no Department of Transportation project may use land from these areas unless it has been demonstrated that there is to be no prudent and feasible alternative to using the land and that the project includes all possible planning to minimize harm resulting from the use.

Section 6(f) of the Land and Water Conservation Act of 1965 – Legislation that provides funds for and authorizes federal assistance to the states in planning, acquisition, and development of needed land and water areas and facilities, and for the federal acquisition and development of certain lands and other areas.

Single-track – A main track upon which trains are operated in both directions.

Sound Exposure Level – The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference time of one second.

State Historic Preservation Office (SHPO) – Administers the national historic preservation program at the state level, reviews National Register of Historic Places nominations, maintains data on historic properties that have been identified but not yet nominated, and consult with federal agencies during Section 106 review. The governor of their respective state or territory designates SHPOs.

Stations – Locations where trains stop to take on and discharge passengers.

Super-elevation – In rounding a curve, a train is subject to a centrifugal outward force. To counteract the effects of the outward force, the outside rail of the curve is raised or super-elevated a small distance, in inches (higher than the height of the top of the inside rail).

Track – The pair of steel rails, and supporting ties and stone ballast or concrete slab, upon which trains operate.

Trackbed – The prepared, graded surface upon which tracks are constructed.

Transit-Oriented Development – Concentrated, higher density development typically constructed within one-half mile of a public transit station that features mixed land uses, a pedestrian-friendly environment, a strong sense of "place" and public areas and open spaces. Transit-Oriented Development seeks to take advantage of the benefits provided by efficient access to public transportation.

Vibration – An oscillation wherein the quantity is a parameter that defines the motion of a mechanical system.

Waters of the U.S. – Waters used in interstate or foreign commerce, subject to ebb and flow of the tide, and all interstate waters including interstate wetlands which are considered jurisdictional under Section 328.3[2] of the Clean Water Act (CWA). Jurisdictional waters of the U.S. are further defined as all other waters such as navigable waterways, intrastate lakes, rivers, streams, intermittent streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, or impoundments of water, tributaries of waters, and territorial seas.

Wetlands – Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and similar areas.

Wye – A track arrangement of two tracks in the form of the letter Y, for reversing the direction of a train.

Acronyms

Advisory Council on Historic Preservation	**ACHP**
Americans with Disabilities Act	**ADA**
Area of Potential Effects	**APE**
A-weighted decibel	**dBA**
Boston & Maine	**B&M**
British Thermal Unit	**BTU**
carbon dioxide	**CO_2**
carbon monoxide	**CO**
chloroflourocarbon	**CFC**
Clean Air Act	**CAA**
Clean Water Act	**CWA**
Coastal Zone Management	**CZM**
Coastal Zone Management Act	**CZMA**
Code of Federal Regulations	**CFR**
Code of Massachusetts Regulations	**CMR**
Comprehensive Environmental Response, Compensation and Liability Act	**CERCLA**
Comprehensive Environmental Response, Compensation and Liability Information System	**CERCLIS**
Corridor Improvement Plan	**CIP**
Council on Environmental Quality	**CEQ**
Day-Night Sound Level	**L_{dn}**
Decibel	**dB**
Department of Transportation	**DOT**
Endangered Species Act	**ESA**
Environmental Assessment	**EA**
Environmental Impact Statement	**EIS**
Environmental Justice	**EJ**
Environmental Notification Form	**ENF**
equivalent sound level	**L_{eq}**
Executive Order	**EO**
Farmland Protection Policy Act	**FPPA**
Federal Emergency Management Agency	**FEMA**
Federal Railroad Administration	**FRA**
Federal Register	**FR**
Federal Transit Administration	**FTA**
Finding of No Significant Impact	**FONSI**
Fixing America's Surface Transportation Act	**FAST**
Flood Insurance Rate Map	**FIRM**
geographic information systems	**GIS**
greenhouse gases	**GHG**
Information for Planning and Conservation	**IPaC**
Land and Water Conservation Fund	**LWCF**
lead	**Pb**
Maine Coastal Program	**MCP**
Maine Department of Environmental Protection	**MDEP**
Maine Department of Inland Fisheries and Wildlife	**MDIFW**
Maine Department of Transportation	**MaineDOT**
Maine Revised Statutes Annotated	**MRSA**
Massachusetts Bay Transportation Authority	**MBTA**
Massachusetts Department of Environmental Protection	**MassDEP**
Massachusetts Department of Fish and Game	**MassDFG**
Massachusetts Division of Fisheries and Wildlife	**MassDFW**
Massachusetts Environmental Policy Act	**MEPA**
maximum authorized speed	**MAS**

Acronyms Continued

methane	**CH_4**
micrograms per cubic meter of air	**µg/m³**
milepost	**MP**
National Ambient Air Quality Standards	**NAAQS**
National Environmental Policy Act	**NEPA**
National Historic Preservation Act	**NHPA**
National Oceanic and Atmospheric Administration	**NOAA**
National Register of Historic Places	**NRHP**
National Resource Protection Act	**NRPA**
National Standards for Hazardous Air Pollutants	**NESHAPS**
National Wetlands Inventory	**NWI**
Natural Resources Conservation Service	**NRCS**
Natural Resources Protection Act	**NRPA**
New Hampshire Coastal Program	**NHCP**
New Hampshire Department of Environmental Services	**NHDES**
New Hampshire Department of Fish and Game	**NHDFG**
New Hampshire Revised Statutes Annotated	**NH RSA**
nitrogen dioxide	**NO_2**
nitrous oxide	**N_2O**
No Further Remedial Action Planned	**NFRAP**
Northern New England Passenger Rail Authority	**NNEPRA**
on-time performance	**OTP**
oxides of nitrogen	**NO_X**
ozone	**O_3**
particulate matter	**PM**
parts per billion	**ppb**
parts per million	**ppm**
peak particle velocity	**PPV**
Portland Transportation Center	**PTC**
Resource Conservation Recovery Act	**RCRA**
right-of-way	**ROW**
Service Development Plan	**SDP**
State Historic Preservation Office	**SHPO**
State Planning Office	**SPO**
sulfur dioxide	**SO_2**
Superfund National Priority List	**NPL**
Toxic Substances Control Act	**TCSA**
U. S. Environmental Protection Agency	**USEPA**
U.S. Army Corps of Engineers	**USACE**
U.S. Fish and Wildlife Service	**USFWS**
United States Code	**USC**
University of New Hampshire	**UNH**
US Department of Transportation	**USDOT**
vibration decibels	**Vdb**
volatile organic compound	**VOC**
Wetlands Protection Act	**WPA**

Preface

This document is a Service-level (Tier 1) Environmental Assessment (EA) prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for implementing NEPA, and the Federal Railroad Administration's (FRA) Environmental Procedures. Service-level analyses typically address broad questions related to the type of rail service(s) being proposed, including cities and stations served, route alternatives, service levels, types of operations, ridership projections, and major infrastructure components. For a corridor improvement program, FRA requires that this level of environmental analysis be completed before substantial investments in the corridor can be made.

Once broad questions at the Service-level are answered, subsequent planning, design, coordination, environmental analysis, and documentation at the Project-level (Tier 2) takes place. Project-level NEPA identifies project-specific alternatives and assesses the potential environmental impacts resulting from construction, operation, and maintenance of a proposed action(s) Project-level NEPA analysis may be completed with the development of an environmental impact statement, environmental analysis, or categorical exclusion.

1.0 Purpose and Need

1.1 Introduction

The Northern New England Passenger Rail Authority (NNEPRA), in conjunction with the Federal Railroad Administration (FRA), is evaluating rail service enhancements through the preparation of a "Service Development Plan" (SDP) for improving existing and future intercity passenger rail service along the Amtrak Downeaster railroad corridor from Boston, Massachusetts to Brunswick, Maine (Exhibit 1.1).

The Downeaster links twelve cities and towns with ten daily trips (five round trips) between Boston, Massachusetts, and Portland, Maine, and six[1] daily trips (three round trips) between Portland and Brunswick, Maine. The Downeaster connects to Amtrak's Northeast Corridor,[2] ferries, airports, subways, and intercity and regional bus services along the corridor. Under a 20-year agreement with NNEPRA, Amtrak operates trains along the 116-mile portion of the corridor between Boston and Portland. Each trip between Boston and Portland takes approximately two hours and 30 minutes. Although each train usually consists of a locomotive, three passenger coaches, a café car and a non-powered control unit, additional coaches are sometimes added to increase passenger capacity during peak travel periods. The overall passenger train seating capacity is 232. The Downeaster has a layover each night at Portland's Sewall Street facility for servicing, cleaning, and fueling.

[1] Two of these trips are equipment positioning movements and, although available for public use, do not meet transportation needs in the corridor. They operate due to a lack of adequate facilities at Brunswick, Maine.
[2] Via transfer to/from South Station in Boston, for which multiple public and private transit options exist.

Exhibit 1.1 – *Study Location*

Under an agreement with NNEPRA, which began November 1, 2012, Amtrak operates trains along the 30-mile corridor between Portland and Brunswick. Each trip between Portland and Brunswick takes approximately 45 minutes.

The SDP presents a near-term vision for intercity passenger rail service enhancements to the Downeaster corridor by 2030. The goals of the SDP are to:

- Reduce travel time between Boston and Brunswick;
- Increase service (number of trains) between Boston and Brunswick;
- Improve service reliability and efficiency; and
- Support -feeder services which may be developed in the future.

To achieve the goals of the SDP, a Corridor Improvement Plan (CIP) was developed (NNEPRA, 2013b). The focus of the CIP was to identify projects that can be funded and constructed before 2030. Broadly, each project can be classified in one of three categories:

1. Incremental, in-kind improvements to track and signaling;
2. Additional second main track and controlled passing sidings; and
3. Facility improvements at stations.

Each project contributes incrementally to reducing trip time, increasing capacity, or both. Increased capacity creates the opportunity to operate more passenger rail traffic and a more reliable service with fewer delays and improved delay recovery capability.

The CIP identified the following actions to achieve the goals of the SDP:

- Increase passenger train speed on up to 80 curves;
- Construct or modify interlockings in the main track;
- Improve/modify grade crossings;
- Reconstruct approximately 30.3 miles of second main track or passing sidings in New Hampshire and Maine;
- Construct new station platforms with overhead pedestrian walkways at existing stations in Wells and Portland, Maine;

- Double the station capacity at Portland for boarding and disembarking trains; and
- Construct a new connecting track (i.e., "wye") at Portland, Maine.

After the proposed corridor improvements are implemented to reduce travel time from Boston to Portland and Portland to Brunswick, additional daily trains (also known as frequencies) would be added to help improve the reliability of service and accommodate growing demand. Initially, the service from Boston to Portland would be increased to six daily round trips and subsequently to seven daily round trips. In addition, the service between Portland and Brunswick would be increased to five daily round trips.

Enhanced passenger rail service has the potential to play an important role in keeping the economies of Massachusetts, New Hampshire, and Maine competitive by enhancing quality of life for employers, employees, residents, and visitors. Investment in the passenger rail system helps fulfill state and federal transportation policy goals such as reducing the nation's dependency on foreign sources of energy, reducing greenhouse gas emissions that contribute to climate change, increasing public safety, and strengthening transportation system redundancies in the wake of natural and man-made disasters. Improvements to the track infrastructure would benefit freight rail services, which use the same corridor.

As proponents of an action supported by federal funds, NNEPRA and the FRA must comply with the National Environmental Policy Act (NEPA). NEPA requires federal agencies to consider the impacts of their actions on the natural, social, economic, and cultural environment and to disclose those considerations in a public document. The NEPA process is intended to help public officials make decisions based on an understanding of the environmental consequences and take actions that protect, restore, and enhance the environment (40 CFR 1500.1).

This Service-level (also known as Tier 1) Environmental Assessment (EA) has been prepared to evaluate the broad program-wide potential environmental impacts from the proposed service improvements. Following completion of the Service-level EA, Project-level (also known as Tier 2) NEPA analysis and documents would be developed to quantitatively evaluate the environmental impacts of one or more specific infrastructure improvements of the SDP.

1.2 Purpose and Need

1.2.1 Purpose

The purpose of the proposed action is to improve intercity passenger rail service by reducing travel times, increasing frequency, and improving reliability of passenger service along the Downeaster rail corridor to accommodate current and future ridership. Improvements in intercity passenger rail service for the Downeaster need to consider the other commuter and freight rail services operating along the corridor.

1.2.2 Need

The need for improved intercity passenger rail service is a result of:

1. Existing infrastructure conflicts and deficiencies;
2. Weak and inconsistent on-time performance; and
3. Growing future demand for improved and increased service.

1.2.2.1 Existing Infrastructure Conflicts and Deficiencies

The existing infrastructure is marginally adequate for the five daily round trips between Boston and Portland and three daily round trips between Portland and Brunswick. The Downeaster has struggled periodically to provide reliable on-time service primarily due to interference with passenger and freight trains, capacity constraints, speed restrictions, and specific infrastructure deficiencies. The existing infrastructure does not provide enough capacity to add more service to address gaps in the existing schedule, nor does it support speeding up existing or new schedules without eliminating established station stops (NNEPRA, 2013).

Shared Use of Corridor

Shared use of the existing track with the freight operator – Pan Am Railways – and MBTA commuter trains is problematic for reliability of Downeaster service. Six to eight freight movements in each direction daily exists between Andover, Massachusetts and Yarmouth, Maine and there are approximately 80 weekday MBTA commuter trains operated on all or a portion of the Downeaster's route between North Station, Boston and Haverhill, Massachusetts (NNEPRA, 2013).

Insufficient Rail Line Capacity

Prior to the 1960s, most of the Downeaster corridor from Boston to Brunswick was double-tracked; the second track was removed to reduce maintenance costs. Today, the Downeaster corridor is predominantly single-tracked. In Massachusetts, almost 90 percent of the 39 miles are either double-tracked or are in the process of being restored to double-track. However, almost 87 percent of the 77 miles between the Massachusetts state line and Portland are single-track. The 30-mile Brunswick extension is almost entirely single-track.

Trains operating on the single-track must wait on a passing track or along a double-tracked section for the trains operating in the opposite direction to pass before proceeding. Freight trains operating on the Downeaster corridor are not scheduled and, therefore, may be operating anyplace along the corridor, at any time of day or night, in either direction. Each time a train must wait for a train operating in the opposite direction to pass, total travel time increases by approximately five minutes. Additionally, single-tracking does not allow for scheduling flexibility and restricts capacity. It is more difficult and potentially more expensive to perform maintenance because there is no routing alternative when a single main track is taken out of service. When operations are delayed or disrupted, the existing network struggles to absorb the delays and it is challenging to recover lost time. Additional capacity is needed to support increases in service frequency while maintaining freight operations and performing required maintenance (NNEPRA, 2013).

Speed Restrictions

Track, grade crossing, and equipment conditions can restrict travel speeds along portions of the Downeaster corridor. The speed restrictions increase travel times along the corridor and, in some cases they impair capacity (NNEPRA, 2013).

Infrastructure Deficiency

The lack of a 'wye' connecting track requires trains approaching Portland to execute reversing movements to enter and exit the Portland Transportation Center (PTC), which is effectively a stub terminal (i.e., dead-end track). This results in an additional travel time of approximately ten minutes each way (NNEPRA, 2013).

Capacity constraints exist at the PTC and Wells, Maine stations. At the PTC, only one track with platform access exists resulting in the ability to berth only a single "live" train at a time. This limits scheduling flexibility and impairs delay recovery (NNEPRA, 2013).

At the Wells Station, the passenger platform can only access one of two tracks shared with freight trains. Currently, the Downeaster must access the track adjacent to the one existing passenger platform. This forces other trains to the second track, which results in delays to the freight operator, the Downeaster, or both, especially when operations are disrupted (NNEPRA, 2013).

1.2.2.2 Weak and Inconsistent On-Time Performance

Despite a track record of strong ridership growth, the Downeaster has struggled to achieve and maintain consistent on-time performance (OTP) since 2004. Since 2003, the Downeaster has had only two years with 90 percent or better average OTP. Since 2007 when a fifth round trip was added, monthly OTP has been as low as 44 percent[3] and has never exceeded the highest OTP in 2003-2004 (Exhibit 1.2). Monthly OTP results below 80 percent have been recorded 40 times in the 72 months from January 2007 through December 2012 (NNEPRA, 2013).

Exhibit 1.2 - *Downeaster OTP – 2003 through 2015 (%)*

Year	Average %	Best Monthly %	Worst Monthly %	1Q %	2Q %	3Q %	4Q %
2015	29.6	72.6	0.0	52.6	33.4	22.2	10.1
2014	58.0	81.3	8.1	60.7	74.3	75.3	20.8
2013	82.2	81.3	57.5	83.7	81.0	84.9	79.2
2012	86.4	94.7	78.1	91.0	89.8	83.7	81.0
2011	74.3	91.0	43.3	76.4	81.7	58.5	80.7
2010	70.8	85.1	43.6	77.2	53.8	67.3	84.8
2009	82.5	93.0	64.5	81.0	80.6	82.5	86.0
2008	68.2	89.3	48.0	76.2	79.2	62.5	54.9
2007	72.1	93.6	49.3	92.8	66.0	64.7	64.9
2006	80.0	98.3	54.4	89.4	66.8	73.7	90.0
2005	84.6	93.7	68.3	90.3	84.6	84.1	79.3
2004	91.6	96.4	83.3	95.3	88.9	87.7	94.5
2003	90.0	96.3	79.6	90.1	89.5	88.6	92.8

Source: Amtrak, 2016a

Note: OTP in 2014 and 2015 declined due to severe weather conditions and a tie replacement project which resulted in the cancellation of nearly 500 trains.

The weak and uneven OTP is primarily due to "interference" with other passenger and freight trains caused by capacity constraints, temporary speed restrictions, and some state-of-good-repair issues. Once delays occur, it is often difficult to recover lost time. The portions of the Downeaster corridor that experience the weakest OTP are near Andover, Massachusetts, Plaistow, New Hampshire, and Wells and Arundel, Maine.

[3] June 2010: 43.6%; August 2011: 43.3%. A Downeaster is recorded as "on time" if it arrives at its destination terminal within ten minutes of the published arrival time.

The OTP issues are chronic; only 1 to 2 percent of delays are due to equipment issues (e.g., locomotive or railcar mechanical problems) (NNEPRA, 2013).

A desired quality goal for OTP is 90 percent or better. To put the Downeaster's historical OTP record into perspective, Amtrak's OTP for its regional services operating between the northern terminals of Boston (South Station) and Springfield, Massachusetts, and Washington, DC, Richmond, and Newport News, Virginia, to the south was 86.7 percent for 2012 (NNEPRA, 2013).

The Boston Region Metropolitan Planning Organization identifies an OTP goal for MBTA commuter rail services of 95 percent; the MBTA is achieving an OTP of 90 percent[4] (MBTA, 2016b).

1.2.2.3 Growing Future Demand for Improved and Increased Service

The demand for intercity passenger rail service between Boston and Portland has grown steadily, with the exception of 2015 (Amtrak, 2015) (Exhibit 1.3).

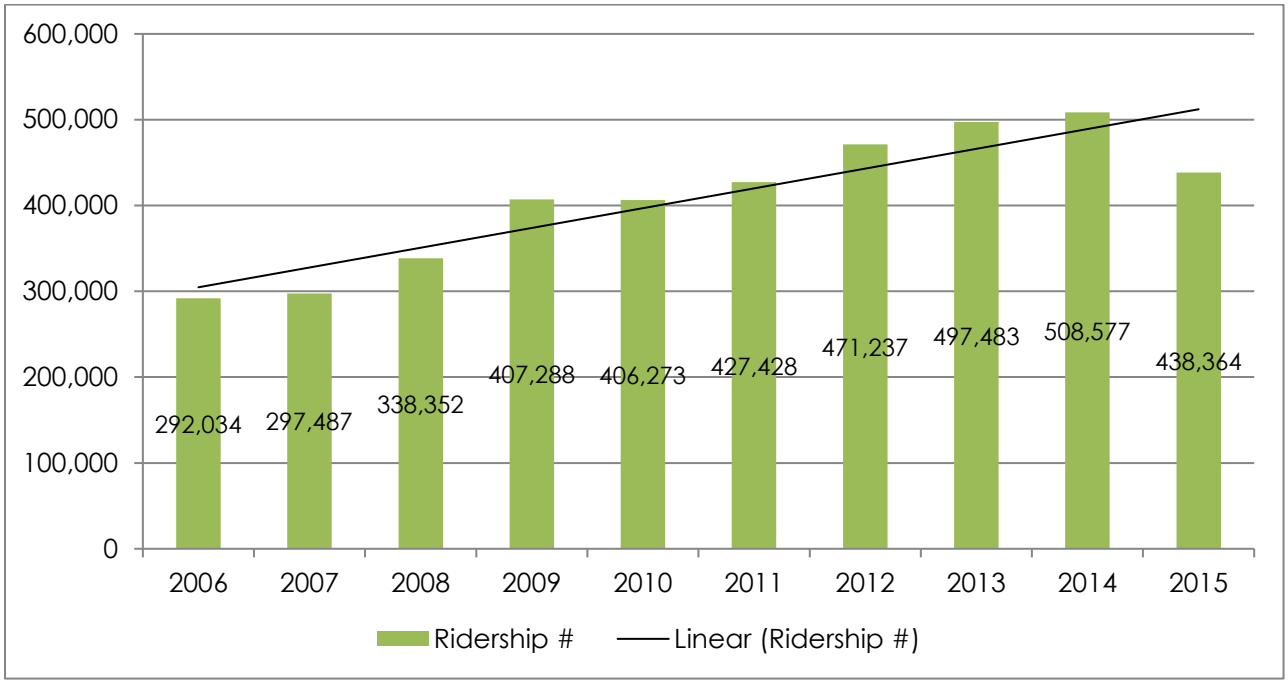
Over the Downeaster's first decade in operation, through December 2012, the average annual compounded ridership growth rate has been 6.64 percent. For that ten-year period ridership increased by more than 90 percent (Amtrak, 2012b).

Ridership forecasts indicate that demand is anticipated to continue to increase to approximately 900,000 by 2030 (Exhibit 1.4). By 2030, additional coaches would be needed to support the forecasted ridership (NNEPRA, 2013).

A potential future rail shuttle service linking the Lewiston/Auburn, Maine area with the Downeaster in Portland has been studied by MaineDOT and the Androscoggin Valley Council of Governments.

[4] Defined as arriving at final stop no more than 4:59 minutes later than scheduled.

Exhibit 1.3 - *Downeaster Ridership History by Fiscal Year*



Source: Amtrak, 2015

Note: Ridership in 2015 declined due to severe weather conditions and a tie replacement project which resulting in the cancellation of nearly 500 trains.

Exhibit 1.4 – *2030 Station-level Ridership with 7 Trains, Boston – Brunswick*

Year 2030	5 Trains Boston to Brunswick	6 Trains Boston to Brunswick	7 Trains Boston to Brunswick
Boston - North	341,207	366,668	393,741
Woburn, MA	13,428	14,430	15,496
Haverhill, MA	28,922	31,080	33,375
Exeter, NH	87,195	93,701	100,619
Durham-UNH, NH	42,718	45,906	49,295
Dover, NH	46,818	50,311	54,026
Wells, ME	36,648	39,383	42,291
Saco-Biddeford, ME	38,158	41,005	44,033
Old Orchard Beach, ME	7,565	8,129	8,729
Portland, ME	61,808	66,420	71,324
Freeport, ME	31,640	34,001	36,511
Brunswick, ME	50,545	54,317	58,327
Total Ridership	**786,652**	**845,352**	**907,767**

1.3 Other Actions Being Considered

There are other actions in the discussion phase that address some of the needs discussed above, including improving intercity passenger rail service for the Downeaster and the other commuter and freight rail service operating along the corridor. Because these actions are only being discussed by others at this time and are not funded or planned for construction, they were not included in the alternatives analysis for the proposed action and their impacts are not included in this Service-level EA. Thus, the "No-Build" alternative will serve as a baseline and include only potential changes than are in development.

1.3.1 Portland Transportation Center (PTC) Improvements

NNEPRA is a tenant at the PTC facility, which is owned and operated by Concord Coach Lines. The facility requires capacity improvements to support anticipated incremental increases in service and to support cross-platform connections with potential proposed rail-based feeder services (by others). NNEPRA is evaluating options related to future improvements at the PTC.

1.3.2 Lewiston/Auburn Feeder Service

A potential future rail shuttle service linking the Lewiston/Auburn, Maine area with the Downeaster in Portland has been studied by MaineDOT and the Androscoggin Valley Council of Governments. Funding has been provided by the MaineDOT and the communities of Lewiston

and Auburn to study the market needs and develop a service plan for service to those communities.

1.4 Other Approvals and Permits

1.4.1 MEPA Review

Proposed projects in Massachusetts requiring a state environmental license, permit, or funding, are subject to review in accordance with the Massachusetts Environmental Policy Act (MEPA) review if they equal or exceed the MEPA thresholds (301 CMR 11.03: Review Thresholds). The intent of the MEPA review is to inform project proponents and state agencies of potential adverse environmental impacts while a proposal is still in the planning stage. The review thresholds identify categories of projects or aspects thereof of a nature, size or location that are likely, directly (locally) or indirectly (physically removed or later in time), to cause damage to the environment. A review threshold that is met or exceeded specifies whether MEPA review shall consist of the preparation of an Environmental Notification Form (ENF) and a mandatory Environmental Impact Report or of an ENF and other MEPA review if the Secretary so requires.

MEPA thresholds applicable to the proposed improvements in service were reviewed; the applicable ENF thresholds triggering the preparation of an ENF and other MEPA review are:

- **Land:** direct alteration of 25 or more acres; creation of five or more acres of impervious surface;
- **State-listed Species:** alteration of designated significant habitat;
- **Wetlands, Waterways, and Tidelands:** alteration of 500 or more linear feet of bank along a fish run or inland bank, alteration of 1,000 or more square feet of salt marsh or outstanding resource waters, alteration of 5,000 or more square feet of bordering or isolated vegetated wetlands, new fill or structure or expansion of existing fill or structure, construction of a new roadway or bridge providing access to a barrier beach, dredging or disposal of 10,000 or more cubic yards; and
- Transportation: construction of a new rail or rapid transit line for transportation of passengers, discontinuation of passenger service along a rail or rapid transit line, abandonment of a substantially intact rail or rapid transit line.

At the Service-level, the proposed improvements do not meet nor exceed these thresholds and the preparation of an ENF and other MEPA review for this Service-level EA is not required. At the Project-level, the proposed corridor improvements may meet or exceed a threshold requiring the preparation of an ENF and other MEPA review; this would be considered at the time they are designed and in coordination with Project-level (Tier 2) NEPA studies.

1.4.2 Permits and Approvals

The following statutes and orders apply to the proposed action and were considered during the preparation of the Service-level (Tier 1) EA:

- Endangered Species Act, as regulated at 50 Code of Federal Regulations (CFR) 17;
- Magnuson-Stevens Fishery Conservation and Management Act, 50 CFR part 600;
- Public Law 91-190, National Environmental Policy Act of 1969, 42 U.S. Code (USC) § 4321 et seq., signed January 1, 1970;
- Public Law 95-217, Clean Water Act of 1977, 33 USC § 1251-1376;
- Sections 9 and 10 of the Rivers and Harbors Act of 1899, 33 USC 401;
- Section 106 of the National Historic Preservation Act of 1966, as amended, 16 USC 470;
- Section 4(f) of the U.S. Department of Transportation Act of 1966, 49 USC 303 and 23 USC 138;
- Section 404 of the Federal Water Pollution Control Act;
- Section 6(f) of the Land and Water Conservation Act of 1965, 16 USC 460;
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 USC 61;
- Executive Order 11988, Floodplain Management, 42 Federal Register (FR) 26951, signed May 24, 1977;
- Executive Order 11990, Protection of Wetlands, 42 FR 26961, signed May 24, 1977;
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629, signed February 11, 1994;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, 65 FR 50121, signed August 11, 2000;

- Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, 80 FR 6425, signed Friday, January 30, 2015;
- Federal Register, Environmental Impact and Related Procedures; Final Rule, 23 CFR parts 635, 640, 650, 712, 771, and 790; and 40 CFR part 622, August 28, 1987;
- Federal Register, Federal Railroad Administration Procedures for Considering Environmental Impacts, 49 CFR Part 260.35, May 26, 1999;
- Federal Register, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40 CFR parts 1500-1508, November 29, 1978;
- Federal Register, Use of Locomotive Horns at Highway-Rail Grade Crossings; Final Rule, 49 CFR parts 222 and 229, April 27, 2005;
- Massachusetts Environmental Policy Act (MEPA), 301 Code of Massachusetts Regulations (CMR) 11;
- Massachusetts Endangered Species Act, 321 CMR 8;
- Massachusetts Wetland Protection Act, 310 CMR 10;
- New Hampshire Endangered Species Conservation Act, New Hampshire Revised Statutes Annotated (NH RSA) 212-A;
- New Hampshire Air Toxic Control Act, NH RSA 125-I;
- New Hampshire Comprehensive Shoreline Protection Act, NH RSA 483-B;
- New Hampshire Groundwater Protection Act, NH RSA 485-C;
- Maine Department of Environmental Protection, Natural Resources Protection Act, 38 MRSA, Chapter 3 § 480 et seq.;
- Maine Department of Environmental Protection/Maine Department of Transportation, Stormwater Memorandum of Understanding;
- Maine Endangered Species Act, 12 Maine Revised Statutes Annotated (MRSA) § 7751;
- Maine Hazardous Waste, Septage and Solid Waste Management Act, 38 MRSA § 1301, 1979; and
- Maine Revised Statutes, Sensible Transportation Policy Act of 1991, 23 MRSA § 73.

The MaineDOT will develop the design and construction as well as coordinate permitting, of the new connecting or wye track. Installation of the wye track would impact less than 0.25 acre. The MaineDOT would be required to obtain:

- Natural Resources Protection Act (NRPA) Permit: A NRPA Permit is required from the Maine Department of Environmental Protection (MDEP) for projects in, on, over, or adjacent to protected natural resources. Protected resources are coastal wetlands, great ponds, rivers, streams, significant wildlife habitat, and freshwater wetlands.
- Section 404 of the Clean Water Act Permit: Nationwide Permit 14 for Linear Transportation Projects would be required from the USACE for the discharge of dredged or fill material into the waters of the United States, which include wetlands.
- Section 401 Water Quality Certification: Section 401 of the CWA regulates the discharge of dredged or fill materials into waters. A Section 401 Water Quality Certification is required from the MDEP to ensure that the project would comply with state water-quality standards. Typically, the Section 401 Water Quality Certification would be issued concurrently by the MDEP with the NRPA Permit.

Additional permits and approvals may be required at the Project-level (Tier 2) when the details of specific actions are designed; Project-level NEPA documents would identify individual permits and approvals required based upon specific actions to be completed.

2.0 Alternatives

This chapter identifies and describes the range of reasonable alternatives considered for satisfying the purpose and satisfying the needs of the proposed action. Alternatives discussed in this chapter, in detail, are the No-Build Alternative and the Build Alternative, comprised primarily of: 1) improvements to the existing track and signaling; 2) restoration of second main track and controlled passing sidings; and 3) facility improvements at existing stations. Other potential alternatives including electrification, additional second and/or third main track, increasing maximum authorized speed (MAS), different capacity improvement plans, and modifications to existing interlockings or stations, were considered but eliminated from further consideration; they are identified and briefly described below, including the reasons for their dismissal from further consideration.

This Service-level analysis, considering the entire corridor program, is intended to define the broad differences between the No Build Alternative and the Build Alternative. The level of detail for the Build Alternative is conceptual or general rather than project-specific. Project-specific information on individual components, which will provide more detail on physical infrastructure improvements, would be assessed in detail in future Project-level analysis.

2.1 Major Assumptions and Screening Criteria for Alternatives

The key assumptions NNEPRA used to develop the build alternatives were:

- Future rolling stock for the Downeaster service would continue to be self-propelled locomotives carrying their own fuel supply, consistent with conventional single-level or possibly bi-level coaches and a café or dinette car, operating in push-pull mode;
- MBTA, freight, and Downeaster trains would continue to use shared infrastructure except at certain terminals, such as the PTC, that are specialized and intended solely to support passenger train operations;
- MAS would remain at 79 mph for passenger trains on the corridor until at least 2030 unless there is a change in federal regulations;
- Electrification is not likely until after 2030;

- Improvements that require acquisition of property impart potentially significant increases in cost, except at specific sites;
- The Downeaster may operate for several years at a level of six round trips between Boston and Portland before adding a seventh round trip, due primarily to Positive Train Control implications including cost and inter-operability;
- Migration to a conventional Automatic Train Control/Cab Signal on any part of the corridor is unlikely before 2030;
- There are no plans to suspend or consolidate existing station stops; and
- Capacity limitations at North Station would not be solved before 2030 and the Downeaster would continue to have access to only one platform/track at a time (NNEPRA, 2013).

The build alternatives that were identified and considered focused on incremental improvements to the Downeaster corridor for meeting the SDP goals, and furthering the purpose and satisfying the needs of the proposed action. To be retained for further consideration and detailed analysis, the build alternatives had to meet the following screening criteria (NNEPRA, 2013):

Criteria #1: Meet the Purpose and Need of the proposed action;

Criteria #2: Provide benefit when compared to cost;

Criteria #3: Achieve OTP in a mixed traffic corridor under normal operating conditions;

Criteria #4: Achieve increased service round trips and improve reliably;

Criteria #5: Achieve a shorter trip time without skipping station stops;

Criteria #6: Allow freight service to operate as required (except for possible constraints during peak periods in MBTA commuter territory);

Criteria #7: Allow at least a modest increase in freight rail traffic;

Criteria #8: Do not impair existing or planned MBTA commuter rail operations;

Criteria #9: Incorporate existing and potential future MBTA service expansion projects;

Criteria #10: Are compatible with existing capacity constraints at Boston's North Station (or identify a solution to relieve existing capacity constraints);

Criteria #11: Avoid or minimize the amount of property that would need to be acquired; and

Criteria #12: Avoid and minimize adverse environmental impacts.

2.2 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives were considered, but were dismissed from further consideration due to the inability to meet the screening criteria (Exhibit 2.1):

Alternative #1: Electrification;

Alternative #2: Third Main Track in MBTA Territory;

Alternative #3: Increase Train Speed;

Alternative #4: Modify Corridor at Old Orchard Beach;

Alternative #5: More Second Track in Maine;

Alternative #6: Less Ambitious Capacity Improvement Program;

Alternative #7: Moving Interlockings; and

Alternative #8: Extend Second Main Track through Exeter, NH.

Exhibit 2.1 – *Alternatives Screening Matrix*

	Alt. #1	Alt. #2	Alt. #3	Alt. #4	Alt. #5	Alt. #6	Alt. #7	Alt. #8
Criteria #1	✓	✓	✓	✓	×	×	×	✓
Criteria #2	×	✓	×	×	✓	✓	✓	×
Criteria #3	✓	✓	✓	✓	✓	×	×	✓
Criteria #4	✓	✓	✓	✓	✓	×	×	✓
Criteria #5	✓	✓	✓	✓	✓	×	×	✓
Criteria #6	×	✓	✓	✓	✓	✓	✓	✓
Criteria #7	✓	✓	✓	✓	✓	✓	✓	✓
Criteria #8	×	✓	✓	✓	✓	✓	✓	✓
Criteria #9	×	✓	✓	✓	✓	✓	✓	✓
Criteria #10	✓	✓	✓	✓	✓	✓	✓	✓
Criteria #11	✓	×	✓	×	✓	✓	✓	✓
Criteria #12	✓	×	✓	✓	✓	✓	✓	✓

× = Does not meet the Screening Criteria

✓ = Does meet the Screening Criteria

2.2.1 Alternative #1: Electrification

Electrification was dismissed from further consideration because of the substantial cost associated with raising existing clearances beneath older overhead structures and incompatibility with existing and near-term future MBTA commuter rail operations. The MBTA has no plans to electrify its Haverhill or Lowell Line service routes within the planning horizon of the SDP. Therefore, electrification costs would be solely allocable to the Downeaster. There would be adverse impacts to the freight operator during construction because of the unavoidable need to replace the entire signal system to be compatible with AC electrification. Moreover, the freight operator (Pan Am Railways) is one of the owners and there is no assurance that it would approve such a project. At approximately $3 million dollars per mile to design and install electrification using conventional overhead catenary, electrifying the corridor could cost approximately $430 million dollars (excluding costs for replacing the existing signal system, property acquisition, and the initial cost of acquisition for electric locomotives) (NNEPRA, 2015).

2.2.2 Alternative #2: Third Main Track in MBTA Territory

Adding a partial or continuous third main track in MBTA territory was considered because of the operational benefits. However, adding a partial or continuous third main track would require acquisition of more than 90 acres of property to expand the width of the ROW by approximately 25 feet over approximately 30 miles (even if the Wildcat Branch was not included). Much of the land that would need to be acquired is developed with residences, offices, and light industry. If a third main track were to be installed through the existing stations, they would need to be reconfigured and reconstructed to current Americans with Disabilities Act (ADA) design requirements. Adding a partial or continuous third main track would adversely impact MBTA commuter rail operations.

2.2.3 Alternative #3: Increase Maximum Authorized Train Speed

While increasing the maximum speed would reduce trip time from Boston to Portland and Portland to Brunswick, it would trigger additional specifications for Positive Train Control and/or Automatic Train Control with Cab Signals under existing federal law at approximately $1 million per mile, not including the cost of a cab signal system. This cost is unlikely to be

recovered by increased ridership and revenue because the trip time savings between Portland and Boston would be three to six minutes in each direction.[5]

2.2.4 Alternative #4: Modify Corridor Alignment at Old Orchard Beach

Realignment of the railroad corridor and grade crossing closures through Old Orchard Beach could also result in an increase in speed through that area, however other more practical and less costly alternatives to improve safety and increase speeds at this location exist. Furthermore, work at this location would have an extremely high cost and potentially significant environmental impacts. A portion of the former Eastern Railroad ROW is roughly parallel to the existing route and would be the most logical bypass route; however there are several single-family homes along it even though much of that roadbed is a bike trail. A project to channel pedestrians toward existing grade crossings with ROW fencing and improved pedestrian crossing warning systems plus optional traffic signal pre-emption is proposed instead, and there are clear ridership advantages to serving downtown Old Orchard Beach where the Downeaster already makes a scheduled stop.

2.2.5 Alternative #5: More Second Track in Maine

Network simulations indicated adding more second main track in Maine (between milepost (MP) 226 and MP 220 and MP 215 and MP 211) would not help meet the purpose and need and was not justified given existing freight traffic levels including modest escalation for future growth. Moreover, they are not needed to support a sixth or seventh daily round-trip and would not contribute to reducing trip time except in cases of severe delays elsewhere along the route.

2.2.6 Alternative #6: Less Ambitious Capacity Improvement Program

A less ambitious capacity improvement program that would add less capacity than what has been identified as needed would not help meet the purpose and need. This would have precluded the operation of a "daytime" operating plan with a sixth and seventh service frequency because of the need to meet and pass trains, including opposing-direction Downeaster services, or would not have been able to support reliable train operations. Reducing the extent of improvements would result in less reduction of train delays, thereby adversely impacting OTP.

[5] A previous reduction of 15 minutes increased revenue and ridership by 36%. Based on $10 million in revenue, (which is more than has ever been achieved) there would be an increase of $360,000 per year. At that rate it would take about 400 years to pay off $146 million.

2.2.7 Alternative #7: Move Interlockings

Moving existing interlockings would not help meet the purpose and need. Capacity improvement projects must consider suitable locations for the establishment of interlockings. This process must take into account: accessibility of the site, proximity of commercial power, sightlines, track alignment and profile, braking distances, grade crossings, and whether or not the site makes sense from the perspective of its operational utility. Many potential sites for interlocking facilities fall short in one or more of these important requirements and therefore it does not very often make sense to move an interlocking a few miles to a poor site merely to gain a small additional increment of multiple-track territory.

2.2.8 Alternative #8: Extend Second Main Track through Exeter, NH

Extension of second main track east of MP 264.5 through Exeter was considered and dismissed due primarily to cost. To complete the extension, three public grade crossings in downtown Exeter would have mandated extending the second main track seamlessly to Rockingham; increasing the extension, disturbing those additional crossings (which is not justified by the anticipated traffic), and reconstructing the existing Exeter station facility would add significant expenses that would not be repaid in sufficient trip time reductions. Currently the recommended improvement program outlines leeway for the Downeaster operator and the freight owner/operator to establish a new interlocking at the north limit of the proposed new second main track either near MP 264 or near MP 262. The additional track adds cost but makes the new double-tracked section even more useful for meeting and passing freight trains. Thus the extension is not essential but may be more desirable to the freight operator.

2.3 No-Build Alternative

Evaluation of the No-Build Alternative is required under NEPA as the baseline against which to evaluate the environmental impacts of the build alternatives. The No-Build Alternative assumes that the existing rail corridor would be maintained, in a state of good repair, to allow for the continuation of existing Downeaster service. The existing five daily scheduled round trips between Boston and Portland would continue and the existing scheduled trip time of 2½ hours would be sustained. The existing three daily round trips between Portland and Brunswick would continue to operate.

Other projects that would impact the intercity passenger rail service for the Downeaster and the other commuter and freight rail service operating along the corridor are in various stages of

development. Because these projects are in development, they were considered to be part of the No-Build Alternative and the changes from the proposed action alternatives in this document reflect the delta between the No-Build Alternative, which includes these projects, and the action alternative proposed. These projects are described below. Additional information on these projects and the impacts that would result from them are discussed in the environmental documentation prepared for them.

2.3.1 Improving the Curve between MP 0 and MP 4 in Massachusetts

The MBTA's Green Line Extension project would be adjacent to the Downeaster corridor from Washington Avenue in Somerville to College Avenue in Medford. The Green Line Extension project would relocate the existing railroad tracks along the Downeaster corridor between MP 0 and MP 4. The Green Line Extension project would reconstruct the track to support a maximum passenger train operating speed of at least 70 mph. The EA/FONSI was issued in July 2012 and the Final Environmental Impact Report was completed in 2010. As of May, 2016, construction has not begun (MBTA, 2016a).

2.3.2 Second Main Track Construction/Reconstruction Project Wilmington Junction to Lawrence, MA

From Wilmington Junction, to Lawrence, a second main track is being constructed on roughly the alignment of the original that was removed decades ago with single track remaining in front of Ballardvale Station. NNEPRA secured a grant to fund the project south of Ballardvale station which consists of track and signal interlocking reconfiguration and improvements at Wilmington Junction and Lowell Junction on the Haverhill Line along with the addition of 2.7 miles of second track between Wilmington Junction and the Tewksbury Street crossing north of Lowell Junction. Other work consists of modifications to the existing grade crossing at Lowell Junction Road for the new second track. The MBTA secured a grant to construct the second track north of Ballardvale station. Both projects are underway and should be completed in 2017.

2.3.3 Merrimack River Bridge Rehabilitation

The MBTA is repairing and rehabilitating the Merrimack River Bridge in Haverhill, MA. This bridge has a speed restriction of 15 mph for passenger trains and 5 mph for freight trains. The repairs would allow for restoration of 40 mph passenger train operations over the bridge. This would improve overall travel time between Portland, Haverhill, and Boston. The speed restrictions on the Merrimack River Bridge are severe and adversely affect all three carriers

operating across it. Construction of the project started in the spring of 2014 and is expected to be completed in April 2017 (MBTA, 2016b).

2.3.4 Brunswick Layover Facility

Construction of the Brunswick layover facility began in October 2015 and is scheduled to be completed in September 2016. The facility will house multiple trains required to operate the Downeaster. An EA was completed for the project in 2013, and a FONSI was signed by the FRA in June 2014 (NNEPRA, 2016).

2.4 Build Alternative

Using the results of the network simulations, the CIP identified various improvements that would address the existing conflicts and deficiencies, reduce trip time, and increase OTP of the Downeaster service to better serve its existing passengers and accommodate projected increases ridership. These improvements were compiled into a single Build Alternative. The Build Alternative would be implemented incrementally, based on the availability of funding and other resources between now and the year 2030.

The Build Alternative would allow for an increase in the round trip service between Boston and Portland and between Portland and Brunswick. Between Boston and Portland, one daily round trip would be added after improvements to existing infrastructure deficiencies and initial trip time and reliability improvements are completed. A seventh daily round trip could potentially be introduced at a later date. Between Portland and Brunswick, up to two daily round trips would be added, bringing the daily service round trip between Portland and Brunswick to five. A sixth or seventh Portland-Brunswick round trip would be added with the introduction of a seventh Boston-Portland round trip. Travel time would be reduced by 15 minutes between Boston and Portland and by 10 minutes between Portland and Brunswick (NNEPRA, 2013). The improved travel time and increased service frequencies would, based on NNEPRA corridor modeling forecasts, increase patronage of the Downeaster.

The Build Alternative consists of a series of rail infrastructure and related improvements that can be implemented incrementally[6] (Exhibit 2.2). Some of these actions represent individual

[6] At the Service-level, trip time reductions have been quantified where possible (NNEPRA, 2013b and 2013c). Individual unimpeded trip time reductions were estimated using a rail network operations simulation model. Curve modifications would result in at least 10-1/2 minutes of trip time reduction with all station stops. The Portland wye track would result in approximately

capacity improvements such as a new controlled passing siding or facility improvements at a specific location. Some actions consist of groupings of individual actions, such as curve geometry modifications, which achieve higher passenger train operating speeds, leading to reductions in trip time (Appendix A).

Specific individual and groups of actions comprising the Build Alternative and a part of the CIP are discussed below.

10 minutes of trip time reduction. Overall it is anticipated that the curve modifications and the addition of the Portland wye track will account for a total of 20-1/2 minutes of trip-time reduction between Boston and Brunswick. Trip time reductions from second main track and controlled passing sidings occur only when meeting or overtaking another train. Wherever the Downeaster is able to meet opposing traffic without either train stopping, trip time improvement would be substantial.

Exhibit 2.2 – *Proposed Track and Station Improvements*

Note: Map was summarized from detailed track charts (NNEPRA, 2013d)

2.4.1 Curve Modifications

Curve modifications would consist of increasing the super-elevation (the amount by which the outer edge of a curve on a road or railroad is banked above the inner edge) of the curve and lengthening the curves. The increased super-elevation would allow the trains to operate at higher speeds through the same curvature. The locations for curve modifications were selected where there are opportunities 1) to remove a speed restriction, 2) to improve the alignment without causing a large shift, and 3) to reduce trip time if the curve was modified, as shown in rail operations simulations.

Curve modifications would occur within the limits of the existing right-of-way and trackbed; the maximum shifts would be within a few inches of the existing track location. Additional ballast and ties may be required. Where a curve modification passes through a grade crossing, the crossing would be removed and replaced and the roadway approach to the crossing would be adjusted to make a smooth transition between the track(s) and the roadway.

Approximately 80 curve modifications have been identified and analyzed as part of the CIP (NNEPRA, 2013b).

2.4.2 Restoration of Second Main Track and/or Passing Sidings

Prior to the 1960s most of the Downeaster corridor was double-tracked. During the 1960s, the railroad owner removed much of the second main track between Plaistow, New Hampshire and South Portland, Maine to reduce maintenance costs. The Build Alternative consists of restoration of approximately 30.3 miles of second main track and/or passing sidings at six locations (see Exhibit 2.2). These six segments, described further below, were chosen based on the portions of the Downeaster corridor that experience the weakest OTP (near Andover, Massachusetts, Plaistow, New Hampshire, and Wells and Arundel, Maine), the network simulation model analysis (NNEPRA, 2013c), consideration of other work within the Downeaster corridor (e.g., the MBTA Green Line project) (see Section 2.3), and in coordination with the MBTA and Pan Am Railways. All planned work on these six segments is within the existing ROW.

2.4.2.1 Segment 1: Second Main Track Andover, Massachusetts

The Build Alternative would reconstruct approximately 0.8 mile of second main track near the Ballardvale Station in Andover, Massachusetts within the existing ROW (Exhibit 2.3). The MBTA is restoring second main track to the sections immediately to the north and south of this

segment (see Section 2.3.2). The Build Alternative would serve to close the remaining "gap" in the overall restoration of the second main track not addressed as a part of the MBTA's improvements. This gap would be closed by constructing a second main track between the north limit of the Wilmington Junction-Lowell Junction project and the southern limit of the MBTA double track north of the Ballardvale Station.

By closing this gap with the restoration of a second track, the Downeaster corridor within Massachusetts would consist of two main tracks, except for approximately three miles in Wilmington known as the Wildcat Branch. The Wildcat Branch would remain single-tracked, as the existing and projected rail traffic does not justify the construction of a second main track in this location. The existing track and three grade crossings on the Wildcat Branch would be improved to support increasing the passenger train MAS from 40 mph to 60 mph.

2.4.2.2 Segment 2: Second Main Track, Plaistow, NH to Kingston, NH

The Build Alternative would reconstruct approximately 5.1 miles of second main track between Main Street, Plaistow, New Hampshire (MP 272.9), and a new proposed universal interlocking in Kingston, New Hampshire (MP 267.8) within the existing ROW (Exhibit 2.4). Four existing at-grade crossings (Main Street, Plaistow, NH and Cranes Crossing, Main Street and Russ Crossing, Newton, NH) would be affected due to the restoration of the second track, which would disturb the asphalt pavement, and would require modification and adjustment of the warning systems and repositioning or replacement of the masts for gates and flashers.

An existing bridge carrying Partridge Hill Road over the tracks (MP 268.9) would be replaced or strengthened. If replaced, it would be designed to not preclude potential future "double-stacked" container-on-flatcar rail traffic consistent with the New Hampshire State Rail Plan.

Exhibit 2.3 – *Segment 1*

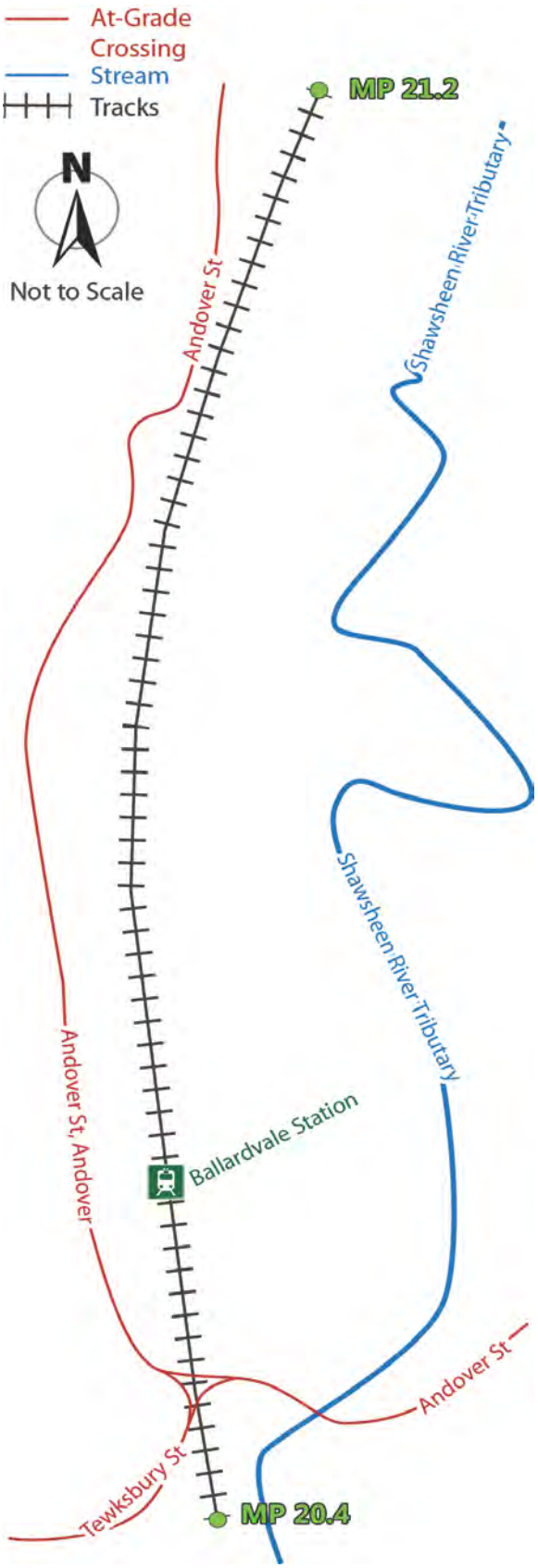
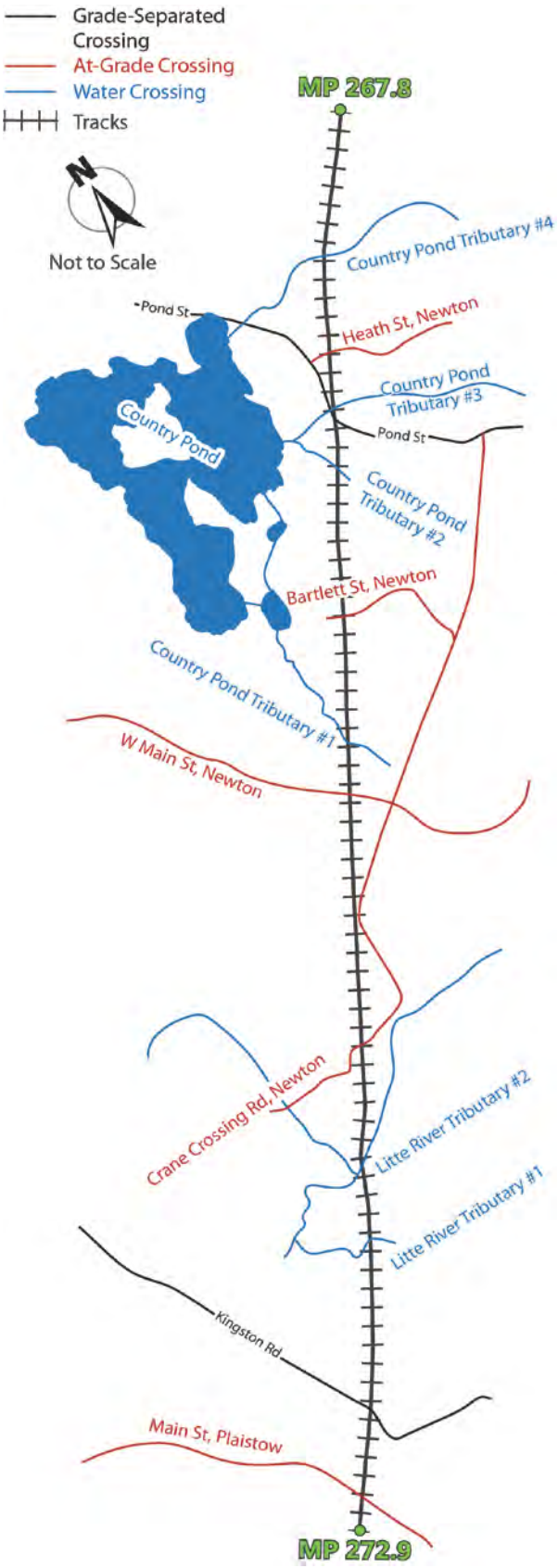


Exhibit 2.4 – *Segment 2*



2.4.2.3 Segment 3: Second Main Track or Passing Siding Rollinsford, NH

The Build Alternative would reconstruct approximately 6.8 miles of second main track or a passing siding between Rollinsford, New Hampshire (MP 241) and North Berwick, Maine (MP 234) within the existing ROW (Exhibit 2.5). The new track or passing siding would be constructed approximately on the alignment of the former second main track to the east of the existing main track. Two existing at-grade crossings (Church Street and Route 236/Berwick Road) would be affected due to restoration of the second track or installation of new interlockings, which would disturb the asphalt pavement, and require modification and adjustment of the warning systems and repositioning or replacement of the masts for gates and flashers.

2.4.2.4 Segment 4: Second Main Tack or Passing Siding North Berwick, ME to Wells, ME

The Build Alternative would extend the Wells Passing Siding (MP 228), approximately 6.2 miles southward to an existing block signal and defect detector adjacent to Route 4 (Elm Street) in North Berwick, Maine (MP 234.2) within the existing ROW (Exhibit 2.6). This second main track or passing siding would be constructed within the existing ROW east of the existing single main track. Four existing at-grade crossings (Route 4 and Main Street, North Berwick and Bragdon Crossing and Willie Hill Road, Wells) would be affected due to the extension of the second track or installation of new interlockings, which would disturb the asphalt pavement and require modification and adjustment of the warning systems and repositioning or replacement of the masts for gates and flashers.

Exhibit 2.5 – *Segment 3*

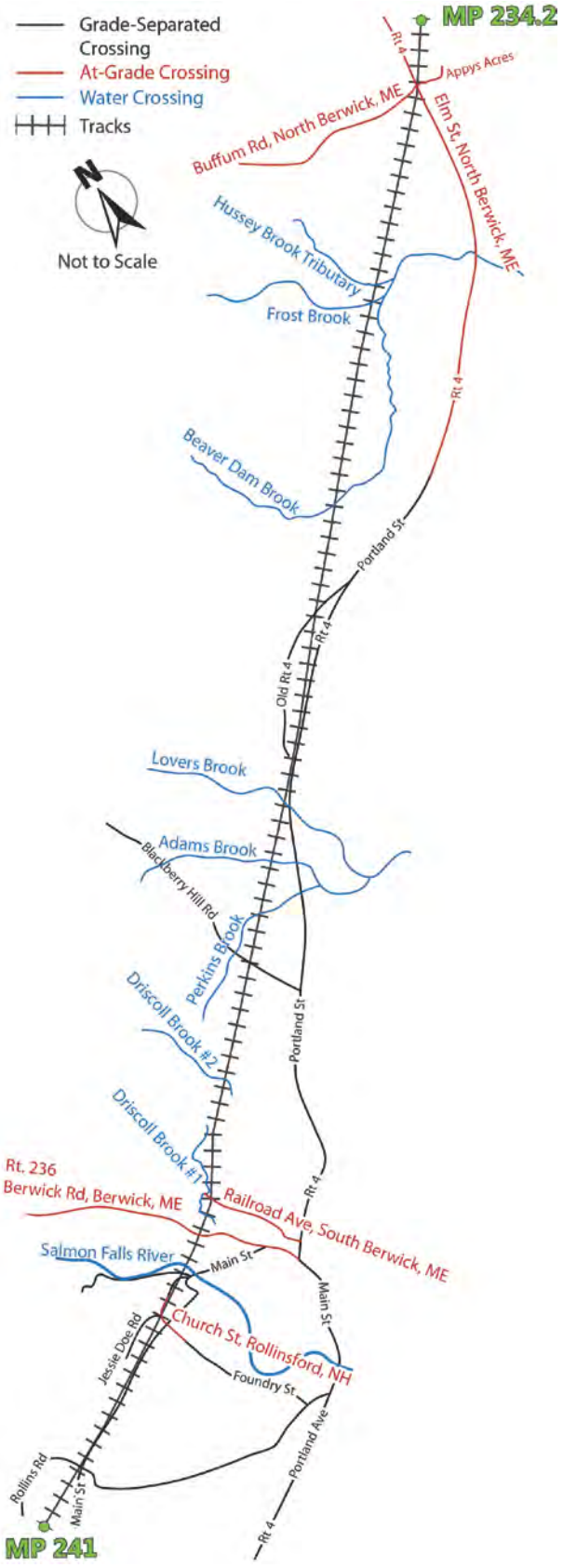
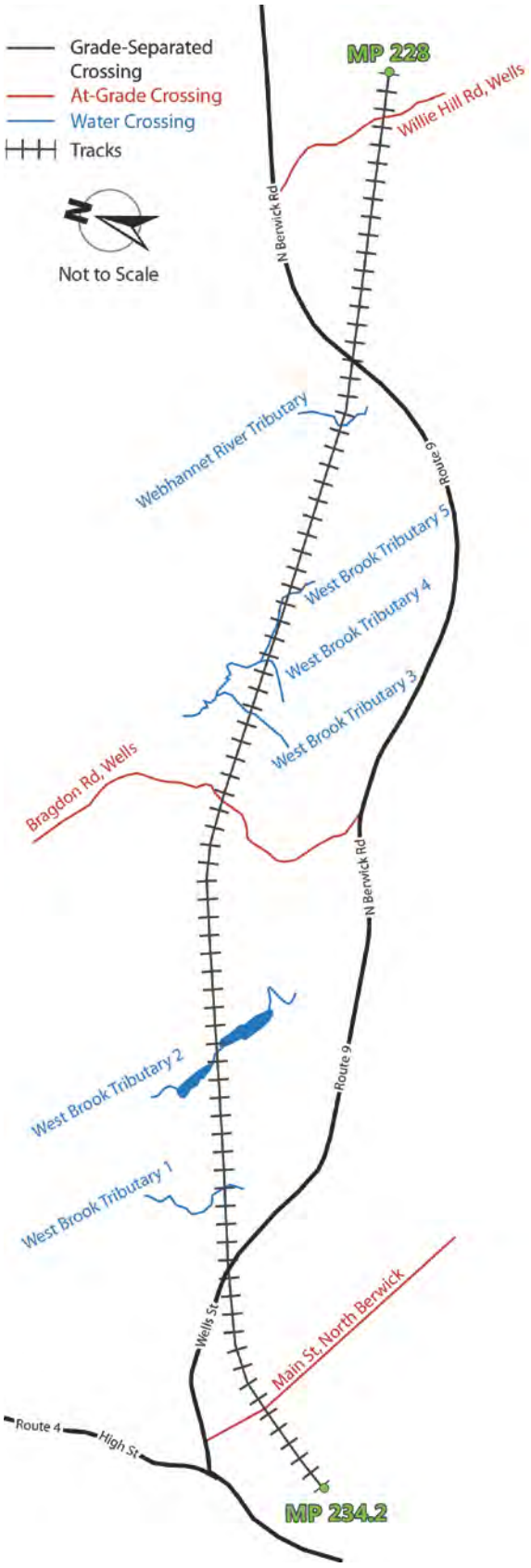


Exhibit 2.6 – *Segment 4*



2.4.2.5 Segment 5: Passing Siding, Arundel ME

The Build Alternative would reconstruct approximately 7.4 miles of former second main track as a passing siding from the town of Arundel (MP 216.2) to Old Orchard Beach (MP 208.8) within the existing ROW (Exhibit 2.7). The passing siding would be constructed within the existing ROW east of the existing single main track. Four existing at-grade crossings (Main Street, Saco; Main Street, Biddeford; Temple Avenue and Union Avenue in Old Orchard Beach) would be affected due to reconstruction of the second main track or installation of associated new interlockings, which would disturb the asphalt pavement and require modification and adjustment of the warning systems and repositioning or replacement of the masts for gates and flashers.

One bridge carrying the tracks over the Saco River may require improvement or modification under the Build Alternative; the horizontal and vertical width would need to be surveyed to determine if it has sufficient clearance for the second track. The need to improve or modify this bridge would be determined at the Project-level.

2.4.2.6 Segment 6: Royal Junction Siding Falmouth, ME to Yarmouth, ME

The Build Alternative would reconstruct approximately 4.6 miles of former second main track as a passing siding between Field Road in Falmouth (MP 9) and Royal Junction in Yarmouth, Maine (MP 13.2) within the existing ROW (Exhibit 2.8). The passing siding would be constructed within the existing ROW east of the existing single main track. Five existing at-grade crossings would be affected at Woodville Road in Falmouth; Muirfield Road, Route 9 (Main Street) and Tuttle Road in Cumberland; and Greely Road on the Cumberland-Yarmouth line. All would have a second track within the crossing added to the existing single-track. Modifications to the automatic highway crossing warning systems would be required.

Exhibit 2.7 – *Segment 5*

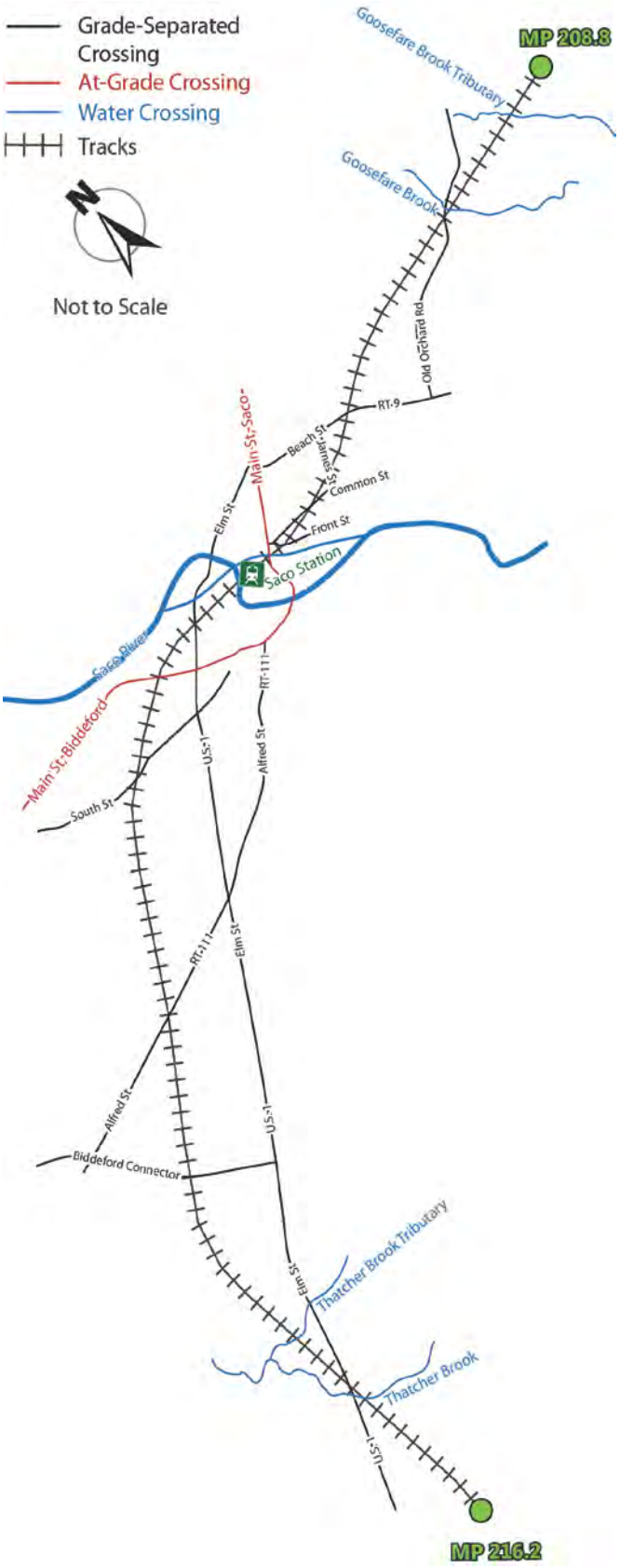
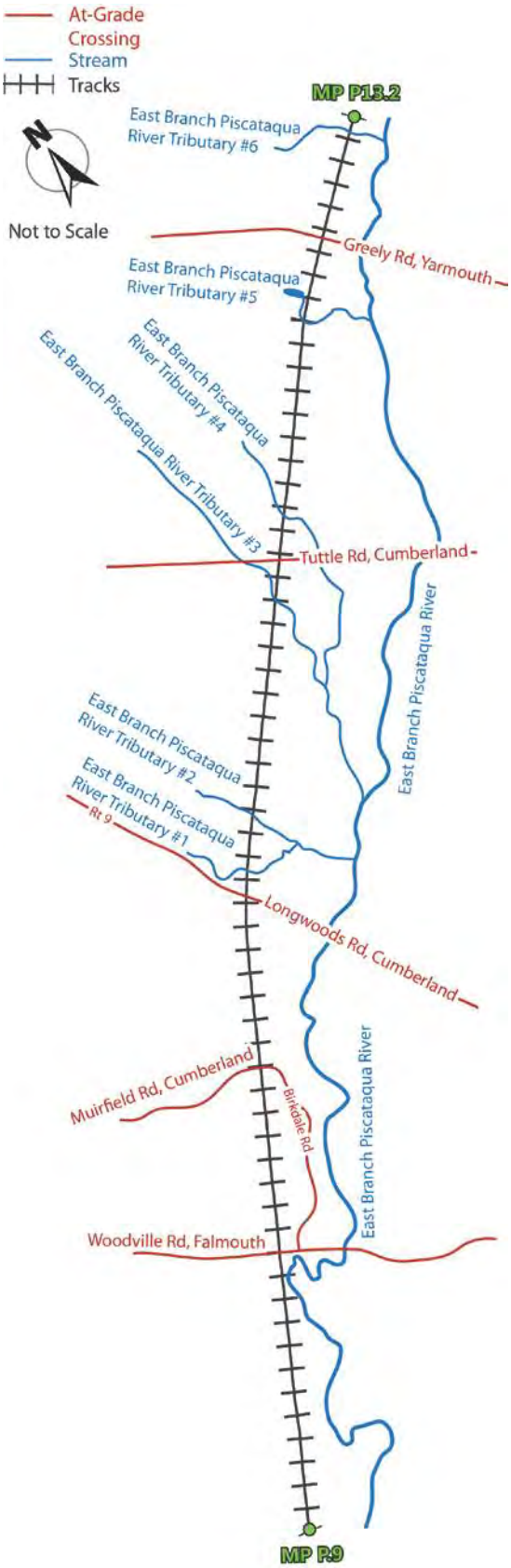


Exhibit 2.8 – *Segment 6*



2.4.3 Installation of New Track – "Wye" Track, Portland, ME

The Build Alternative would construct an approximately 0.5 mile new connecting or "wye" track, outside of the existing ROW, east of the PTC extending to Congress Street in Portland, Maine (Exhibit 2.9). The proposed new track would roughly follow the path of a former connecting track that was removed.

Currently, trains travelling from the PTC to Brunswick must travel to the main line and operate clear of the Mountain Branch track before advancing toward Freeport and Brunswick; a similar maneuver in the opposite direction is required by each train arriving in Portland from Brunswick and Freeport. Elimination of this reversing movement would reduce the total trip time for the Portland-Brunswick segment of the Downeaster service by approximately 10 minutes and would improve operating efficiency.

Other actions with the new connecting track would consist of:

1. Modifications to the Congress Street at-grade crossing;
2. Signal systems at each end of the connecting track;
3. Modifications to County Way and adjacent sidewalks;
4. Installation of grade crossing warning devices consisting of signage and flashers with gate arms to warn motorists and pedestrians making turns to or from County Way; and
5. Drainage improvements.

Additionally, a new turnout would be added to an interlocking to accommodate the "wye" track and a third track would be added at the grade crossing at Congress Street and the warning system would be modified.

Exhibit 2.9 – Proposed Wye Track

2.4.4 Installation of New Interlockings and Modifications to Existing Interlockings

The Build Alternative would install new interlockings or modifications to existing interlockings at several locations within the ROW. An interlocking is an arrangement of signal apparatus that prevents conflicting train or engine movements through an arrangement of intersecting tracks such as at junctions or crossings, but is also used to safely control train movements over a single turnout (track switch) or at a moveable bridge. The interlocking improvements are associated with the proposed restoration of double-track or passing siding improvements, the realignment of existing track at Yarmouth Junction, and the proposed "wye" track in Portland.

2.4.5 Upgrade Highway-Rail At-Grade Crossings

Highway-rail at-grade crossings would be upgraded under the Build Alternative on an as needed basis, either as part of the identified work elements or as part of regular maintenance. All upgrades would be constructed within the existing ROW.

2.4.6 Facility Improvements

2.4.6.1 Wells Station Improvements, Wells, ME

The Build Alternative would construct a second side platform to complement the existing platform and an ADA-compliant overhead pedestrian bridge with adequate vertical clearance to not preclude future operation of "double-stack" container-on-flatcar equipment on freight trains at Wells Station. The improvements would allow a passenger train to stop on either of the two existing tracks to discharge and receive passengers (Exhibit 2.10). On the easterly side of the existing two tracks, the proposed overhead pedestrian bridge may touch down partially or fully outside of the existing ROW. Although the structure would not directly impact two nearby overhead bridge structures carrying the Maine Turnpike over the tracks, verification that no potential shadow effect would result to the eastbound lanes would need to be considered before the location of the structure is finalized at the Project-level. If there is a shadow effect on the interstate highway, a solution would be to build the pedestrian overpass adjacent to the southern end of the platform instead of the northern end.

Exhibit 2.10 – *Wells Station Improvements*

2.4.6.2 PTC Improvements, Portland, ME

The Build Alternative would dismantle and remove the existing side platform, canopy, and pedestrian access ramp and replace them with a new high-level island platform that could

berth two trains simultaneously at the PTC. An enclosed ADA-compliant overhead pedestrian bridge would be constructed (Exhibit 2.11). These actions are critical for operating a six- or seven-round trip service reliably and eliminate a key capacity constraint so that only one train at a time can board and discharge passengers. If a second train should arrive during this process, two awkward and time-consuming reverse moves would be needed to maneuver it to the platform after the previous train had left. The Thompson's Point Road grade crossing would be improved to accommodate the proposed station improvements. Modifications to the open-air layover facilities would be implemented to contain facilities within the existing ROW.

Exhibit 2.11 – *Conceptual Rendering of Proposed Platform, Canopy, and Pedestrian Overpass at the PTC*

2.4.6.3 PTC Layover Facility Improvements, Portland, ME

The Build Alternative would reconfigure the open-air layover facility at the PTC to accommodate one train laying over during the mid-day or overnight. The rest of the trains required to operate the Downeaster would be housed at Brunswick Layover Facility. This would eliminate deadheading (trains that transport no passengers or freight during a trip) of trains between Brunswick and Portland.

2.4.7 Phasing and Priority of Specific Actions for the Build Alternative

NNEPRA has considered the priority and phasing of the specific actions under the Build Alternative. NNEPRA's highest priority is to address existing deficiencies followed by reducing trip time; addressing the existing deficiencies and reducing trip time immediately benefits the

existing service without adding rolling stock. Moreover, most of the incremental travel time improvements can be implemented within the existing ROW.

During Phase One, there would be no increase in the round trips of Downeaster train operations between Portland and Boston, but there would be an increase in round trips between Portland and Brunswick and improvements would be made to incrementally increase operating speeds. Phase Two focuses on adding capacity to support additional Downeaster round trip service and enhance delay recovery capability. Phase Three focuses on the second main track "gap" at the Ballardvale station and the construction of remaining sidings.

Phase One – specific actions:

- Segment 6: Royal Junction siding track;
- Horizontal curve modifications and drainage projects;
- Wells, Maine track and platform improvements; and
- Portland wye track.

The Portland wye track would save approximately ten minutes of trip time (20 minutes per round trip) for every train that operates north of Portland. The Portland wye track was estimated to cost approximately $9.9 million (2012 dollars) (NNEPRA, 2013e).

The Royal Junction siding was proposed as an improvement to support the extension of service to Brunswick, but has not been constructed. Both Downeaster and freight trains would use it daily.

Phase Two – specific actions:

- Segment 4: The Wells siding extension;
- Construction of a second ADA-compliant platform at the Wells Station with an enclosed, overhead pedestrian walkway.
- PTC island platform and improvements; and
- Segment 5: Arundel controlled siding.

Phase Three – specific actions:

- Segment 2: Kingston second main track and controlled siding.
- Segment 3: Rollinsford controlled siding; and
- Segment 1: Second main track "gap" project and grade crossing at Ballardvale, Massachusetts;

The identified improvements were chosen to be part of the Build Alternative for the ability to implement them incrementally, based on availability of fund and other resources available between now and the year 2030.

3.0 Affected Environment and Environmental Consequences

This chapter describes the affected environment and potential environmental consequences that would result from the Build Alternative in comparison with the No-Build Alternative, The Build Alternative consists of an increase in service frequency between Boston and Portland from five to seven trips daily (each way), and between Portland and Brunswick from three to five trips daily (each way) (Exhibit 3.1), and the specific individual and groups of actions that are a part of the CIP (Appendix A). If the improvements identified herein advance to the Project-level, additional environmental analysis would be performed at the Project-level and tiered off this Service-level EA.

Exhibit 3.1 - *Downeaster Station Locations*

Source: Amtrak, 2012

This chapter describes the existing social, economic, and environmental conditions in the study area, which serve as a proxy for comparing the potential impacts of the Build Alternative to the No-Build Alternative. Because some of the projects included in the No Build are still in the planning or implementation stages, the environmental conditions under the No Build are not readily measurable. The chapter identifies the Build Alternative's potential impacts — both beneficial and adverse — at a Service-level through a review of literature and studies of the natural, social, and economic environments. Potential impacts consist of the direct impacts, secondary or indirect impacts, and cumulative impacts of the Build Alternative.

To describe the existing conditions and environmental consequences, resources potentially affected by the Build Alternative, at a Service-level, have been identified and analyzed. For purposes of the environmental analysis, the study area for the Downeaster service improvements was defined as follows:

- **Socioeconomic and Cultural Resources:** The 1,000-foot corridor on either side of the existing rail line between Boston, Massachusetts and Brunswick, Maine.
- **Natural Resources:** The 100-foot corridor on either side of the existing rail line between Boston and Brunswick.

These distances were selected because they provide a reasonable context for the direct, indirect, and cumulative effects of the Build Alternative considered at a Service-level, and are anticipated to encompass the proposed improvements advanced to the Project-level.

Federal, state, and county geographic information systems (GIS) datasets for the study area were collected and combined into one database. This GIS database was used for the identification of the majority of the natural and social environment features in the study area. This GIS database was supplemented with other readily available information online (see Section 6.0 References). Throughout this section, the specific sources of information used are referenced.

At a Service-level environmental analysis, the identification of potential impacts resulting from the Build Alternative consists of both quantitative and qualitative analysis that results in a "desktop" level analysis by comparing the individual actions comprising the Build Alternative to known resources or features in the area. In most cases, the individual actions comprising the Build Alternative are proposed on existing ballast and within the existing ROW.

Additional planning, design, coordination, environmental analysis, and documentation would be performed at the Project-level and references to additional analysis required are noted.

With the exception of the areas of noise, vibration, and air quality, the methods for identifying the potential impacts consisted of identifying the natural and social features in the study area and overlaying similar or typical improvements for each individual and group of actions comprising the Build Alternative.

The group of actions comprising the Build Alternative would potentially result in the following generalized impacts; each of these potential impacts are detailed in this chapter and would be

further developed at the Project-level. The individual actions comprising the Build Alternative would occur within the existing rail ROW and the acquisition of property would not be necessary, with the potential exception of the construction of the new pedestrian walkway at the Wells station which may touch down outside the ROW.

- **Restoration of second main track and/or passing sidings** – the reconstruction of tracks in locations that previously had tracks may require widening the berm to accommodate the reconstructed tracks. This could result in impacts to natural features at the toe of the slope of the berm such as the need to clear vegetation or extend a culvert. Clearing vegetation occurs regularly with other maintenance and may not be needed. Culverts may have sufficient length and may not require extension. Restoration of tracks would result in a temporary increase in noise and fugitive dust during construction. The temporary impacts would be limited to the duration of construction.
- **Station improvements** – the station improvements could result in the need to clear vegetation and disturb soils. Station improvements would result in a temporary increase in noise and fugitive dust during construction. The temporary impacts would be limited to the duration of construction. Improvements at the PTC would occur within the existing ROW. The pedestrian walkway at the Wells station may touch down outside of the existing ROW. Clearing vegetation occurs regularly with other maintenance and may not be needed.
- **Curve modifications** – curve modifications would consist of increasing the super-elevation of the curve and lengthening the curves. Curve modifications would occur within the limits of the existing trackbed, and maximum shifts would be within a few inches of the existing track locations. Curve modifications could result in a temporary increase in noise and fugitive dust during construction. The temporary impacts would be limited to the duration of construction.
- **Installations of new interlockings or modifications to existing interlockings -** improvements to interlockings may require modification or replacement of underdrains (a concealed drain with openings through which the water enters when the water table reaches the level of the drain) and/or outlet piping, temporarily impacting soils underneath the existing paved areas. Improvements to interlockings could result in a temporary increase in noise and fugitive dust during construction. The temporary impacts would be limited to the duration of construction.

- **Upgrading highway-rail at-grade crossings** – depending on location, upgrading highway-rail at-grade crossings would range from installing traffic signals preempted by the railroad control systems to upgrading signs, signals and safety equipment; to replacement of the warning system with four-quadrant gates and interconnected traffic signals. Upgrading highway-rail at-grade crossings may require clearing vegetation if it has not occurred recently as part of maintenance activities. Modification or replacement of underdrains may be required, temporarily impacting soils underneath the existing paved areas. Upgrading highway-rail at-grade crossings could result in a temporary increase in noise and fugitive dust during construction. The temporary impacts would be limited to the duration of construction.
- **Service** – changes in service would result in changes in traffic volumes as passengers approach a station, parking at stations, and impacts to air quality, noise, vibration, and potentially other resources.

3.1 Transportation

This section describes the existing conditions and potential impacts to transportation that may result from the Build Alternative.

3.1.1 Methodology

The potential impacts to mobility, traffic, transit, and freight operations are discussed by station served by the Downeaster.

3.1.2 Affected Environment

The study area is connected with an extensive transportation network that consists of air, intercity passenger and commuter rail, intercity and commuter bus, and roadways; the predominant mode of travel in the region is the automobile. The following describes the transportation systems around the existing twelve stations served by the Downeaster.

Boston

North Station is on the first floor of the TD Garden, which is the home of the Boston Celtics and Boston Bruins. This station is in an urban area with a dense road network and in proximity to busses, the MBTA, and on-site taxis (Amtrak, 2012a). The station has approximately 1,275 parking spaces with 38 ADA accessible spaces. Hourly rates start at $5, special event parking is $25, and overnight parking is available (Amtrak, 2016b).

Woburn

The Woburn station, Anderson Regional Transportation Center, is 12 miles north of Boston and connects to the Lahey Clinic and the Logan Express. This station has access to busses, trains, and taxis. The Logan Express provides connections to Logan Airport and the MBTA provides connections via the MBTA Commuter Rail Line (Amtrak, 2012a). Approximately 1,513 long-term and 1,113 short-term parking spaces are available. Dedicated ADA parking is marked and available. The daily rate is $7 per 24 hours (Amtrak, 2016a).

Haverhill

The Haverhill station is close to retail shops, restaurants, and the Merrimac River. The MBTA Commuter Rail Line provides connections from Haverhill and taxis are available on request (Amtrak, 2012a). There are 150 short-term parking spaces available, with dedicated ADA spaces (specific number unknown) available for $4 per day (Amtrak, 2016b).

Exeter

The Exeter station is in a small community. COAST Bus provides connections to Stratham, Portsmouth, and Newington, New Hampshire. Flightline provides airport connections to Logan Airport and Manchester-Boston Regional Airport (Amtrak, 2012a). Parking is free; 10 short-term spaces and 72 long-term spaces (4 of which are ADA accessible) are available (Amtrak, 2016b).

Durham-UNH

The Durham-University of New Hampshire (UNH) train station and the Dairy Bar Restaurant are part of the UNH Transit Center on the UNH campus adjacent to the Whittemore Center, and a short walk from downtown Durham. Wildcat Transit provides connections from to Dover, Newington, Newmarket, and Portsmouth, New Hampshire, and C&J buses provide service to the Durham Station (Amtrak, 2012a). A limited number of short-term metered spaces are available for $12 per weekday (free on the weekends) at the UNH Visitor Center, and an adjacent long-term parking lot is available with the purchase of an annual town permit for $400 (Amtrak, 2016a).

Dover

Dover station is in downtown Dover within walking distance of the business district, shops, restaurants, and the Children's Museum. COAST Bus provides connections to Portsmouth, Newington, Somersworth, and Rochester, New Hampshire (Amtrak, 2012a). Parking is

metered at a rate of $0.25 per hour; 75 short-term spaces (5 of which are ADA accessible) and 400 long-term spaces are available (Amtrak, 2016b).

Wells

The Wells Regional Transportation Center station is adjacent to I-95, approximately two miles from Wells Beach. The Shoreline Explorer Trolley operates seasonally and connects to Sanford, Kennebunkport, Ogunquit, and York, Maine. The Sanford Ocean Shuttle provides year-round connections to Wells Beach and Sanford, Maine (Amtrak, 2012a). Parking is free; 200 spaces are available, 96 are long-term (Amtrak, 2016b).

Saco

The Saco Transportation Center is in downtown Saco, Maine within walking distance to retail shops and restaurants. ShuttleBus provides connections to the University of New England and the Tri-City area of Saco, Biddeford, and Old Orchard Beach (Amtrak, 2012a). Approximately 120 free parking spots are available in an adjacent municipal lot; overnight spaces are available (Amtrak, 2016a).

Old Orchard Beach

The Old Orchard Beach train platform is near the beach, pier, and other attractions. Old Orchard Beach is a seasonal stop that is open from mid-April through October. The Old Orchard Beach Seasonal Trolley provides connections throughout Old Orchard Beach (Amtrak, 2012a). Public metered parking is available with 10 short-term and 10 long-term spaces available (Amtrak, 2016b).

Portland

The PTC is adjacent to I-95 and approximately two miles west of downtown Portland. METRO Bus connects most Downeaster trains to destinations throughout the city and Old Port Taxis are available on site. Concord Coach provides connections between Bangor, Augusta, Portland, and Boston. The Portland International Jetport is approximately two miles to the west. Parking is available for $4 per day; overflow parking during peak travel times is available for $5 per day. There are approximately 374 parking spaces in the (MaineDOT) lot, 295 spaces in the Concord lot, and 26 short-term spaces in front of the station; 700 total long-term spaces are available (Amtrak, 2016b).

Freeport

The train platform is adjacent to retailers and outlets. Freeport is a small community. Many local accommodations offer free pick-up at the train stations (Amtrak, 2012a). There are 25 short-term spaces and 100 long-term parking spaces available. Additional street parking is available (Amtrak, 2016b).

Brunswick

The Brunswick Station and Visitor Center are in downtown Brunswick within walking distance of shops, restaurants, hotels, and Bowdoin College. The Brunswick Explorer provides public transit service (Amtrak, 2012a). There are 25 short-term and 25 long-term parking spaces available (Amtrak, 2016b).

3.1.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would have a negligible impact on roadway traffic and congestion on the local roads and at intersections near the existing stations because of the small increase in number of patrons at each station, each day, in comparison to the available capacity of the existing roadway network and volumes of existing and future traffic.

The No-Build Alternative would not impact parking at stations. Over time, the demand for parking at stations would increase.

Build Alternative

The Build Alternative would improve the existing passenger rail service, providing an additional incentive for more commuters and other travelers to reduce use of their personal vehicles. The Build Alternative would also have a positive impact on freight rail traffic through the construction of a series of rail infrastructure and related improvements.

The Build Alternative would not result in significant impacts on roadway traffic and congestion on the local roads and at intersections near the existing stations because of the small increase in number of patrons at each station, each day, in comparison to the available capacity of the existing roadway network and volumes of existing and future traffic. Due to the low volume of anticipated vehicle traffic around the stations, roadway capacity improvements and signal optimization at intersections would not be necessary (NNEPRA, 2013f).

The Build Alternative would impact parking at stations (Exhibit 3.2). Currently, there is a lack of available parking spaces at the Dover and Exeter stations. An analysis of ridership and parking demand suggests an increased demand for parking stemming from the implementation of the Build Alternative. According to that analysis, by 2030, patrons would have difficulties parking at 11 stations, with Woburn station (which has more than 1,500 available parking spaces, enough to serve the expected increase in patronage) the exception, due to a lack of available parking spaces (NNEPRA, 2013f).

Exhibit 3.2 – *Projected Parking Demand*

Station	2012 Patronage[1]	2010 Average Patronage		Existing Parking Capacity (autos)	Ratio parking spaces to patronage[3,4]		2030 Patronage[5]	Average 2030 Patronage		Ratio parking spaces to patronage[3,4]	
		Daily	Weekday[2]		Max	Min		Daily	Weekday	Max	Min
Boston	241,833	662	967	1,275	1.2	0.8	393,741	1079	1575	0.7	0.5
Woburn	9,873	27	39	1,541	35.9	24.9	15,496	42	62	23	16
Haverhill	21,552	59	86	160	1.7	1.2	33,375	91	133	1.1	0.8
Exeter	47,312	129	189	86	0.4	0.3	100,619	276	402	0.2	0.1
Durham[6]	29,105	79	116				49,295	135	197		
Dover	31,404	86	125	75	0.5	0.4	54,026	148	216	0.3	0.2
Wells	27,636	75	110	200	1.7	1.1	42,291	116	169	1.1	0.7
Saco	25,109	68	100	120	1.1	0.8	44,033	121	176	0.6	0.4
Old Orchard Beach[7]	8,692	23	34				8,729	24	35		
Portland	107,670	294	430	669	1.4	1.0	71,324	195	285	2.2	1.5
Freeport	22,140	60	88	120	1.3	0.9	36,511	100	146	0.3	0.2
Brunswick	38,004	104	152	40	.6	0.2	58,327	160	233	0.5	0.3

Source: NNEPRA, 2013f

Notes:

[1] "Actual patronage" estimated as boardings + alightings divided by two; most recent information available. Assumes majority of passengers make a round trip. Boardings/alightings for Brunswick and Freeport are actual Nov & Dec 2012 prorated by dividing by 2 and multiplying times 12. Full year ridership not available.

[2] 2012 patronage divided by 250. There are nominally 5x52 = 260 weekdays per year. Deducting 10 holidays per year yields 250. This represents a worst-case.

[3] Average 7-day patronage and average 5-day patronage (as if there was no service on weekends). Divided by number of parking spaces divided by federal average vehicle occupancy of 1.59 occupants/car including the driver.

[4] Less than 1.0 suggests a parking shortfall assuming 1.59 passengers per auto (national average).

[5] Assuming seven daily round trips between Boston and Portland and six daily round trips between Portland and Brunswick.

[6] Short-term metered parking. "Limited" weekday ($6 fee) and weekend (free) parking at UNH Visitor's center 0.5 mile away.

[7] Metered street parking only. No capacity estimate. This is predominantly a walk-up station.

NNEPRA does not own or operate the stations it serves; NNEPRA has a standing Station Operations Committee consisting of one or two representatives from each station served by the Downeaster. This does not include the Anderson Transportation Center (Woburn) and Boston's North Station. The Committee meets monthly to review and coordinate station facilities issues, including parking. The Station Operations Committee is a method for identifying, discussing, and coordinating operational and physical improvements and current issues, including parking.

Construction of track segments 1-6 would not result in adverse impacts to transportation systems as improvements would be in in the existing ROW. Access to businesses and residences would not be changed from existing conditions. Impacts to Downeaster service during construction would be minimal. Impacts would occur when signal and track systems are installed.

Improvements at the PTC would be in the existing ROW and therefore would not impact other transportation facilities as the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not impact other transportation facilities as none are present in the area and the area is currently dedicated to transportation. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to transportation as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. Access to businesses would be maintained and coordination with business owners by MaineDOT as part of the planning, design, and permitting of the wye track.

Curve modifications would not result in adverse impacts to transportation as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not result in adverse impacts to transportation as improvements would be in the existing ROW and on the existing ballast.

At-grade crossing upgrades would not result in permanent adverse impacts to transportation facilities as improvements would be in the existing ROW and in areas currently dedicated to transportation. No new at-grade crossings are proposed. Impacts to transportation facilities from upgrading at-grade crossings would be temporary, and limited to the duration of construction. At-grade crossing upgrades would improve safety for drivers and pedestrians at the upgraded intersections (NNEPRA, 2013). Access to businesses and residences would not be changed from existing conditions. Impacts from construction will be analyzed in the Tier 2 NEPA documents prepared for those projects.

The increase in service with the Build Alternative would not result in adverse impacts to freight or commuter rail services in the study area as capacity in the corridor would be increased and conflicts reduced. The increase in service with the Build Alternative would adversely impact parking at stations in the future as ridership increases due to the increase in Downeaster service (NNEPRA, 2013f).

3.2 Social and Economic Environment

This socioeconomics assessment is aimed at identifying social and economic components of the communities and the surrounding Downeaster region, and identifies potential sensitivities to the types of effects associated with rail service and improvement projects. Potential direct impacts may occur at a relatively discrete local level (e.g., the area that may be altered physically). Potential indirect effects may be experienced locally near communities where existing service would be changed.

3.2.1 Methodology

The most current socioeconomic data sets available at levels comparable among counties, cities, places, and states are summarized in the U.S. Census. These data are summarized below and were used to characterize the socioeconomic conditions of the region and stations served by the Downeaster.

3.2.2 Affected Environment

Select demographic and socioeconomic conditions of the communities with Downeaster Stations were analyzed (Exhibit 3.3).

Exhibit 3.3 - *Demographics and Socioeconomics of Communities with Downeaster Stations*

City	Population in 2014	Population Change Since 2000	Median Resident Age	Median Household Income, 2014	Per Capita Income, 2014	Median Value, Owner-occupied housing units, 2014	Mean Price of All Housing Units (2013)	Median Gross Rent, 2014
Boston	639,594	9%	31.3	$54,485	$34,770	$379,500	$478,733	$1,298
Woburn	38,826	4%	40.3	$77,833	$35,767	$365,500	$482,112	$1,292
Haverhill	61,769	5%	38.4	$61,208	$30,348	$256,600	$276,204	$1,042
Exeter	14,434	3%	44.3	$74,071	$40,310	$257,000	$242,633	$1,156
Durham	15,180	20%	20.7	$67,578	$21,890	$338,900	$228,961	$1,074
Dover	30,332	13%	36.6	$60,038	$32,315	$238,700	$255,514	$997
Wells	9,783	4%	51.1	$60,455	$33,039	$281,200	$262,003	$851
Saco	18,757	12%	42.3	$52,611	$28,831	$235,200	$230,735	$865
Old Orchard Beach	8,679	-2%	50.2	$41,831	$32,029	$191,500	$211,172	$820
Portland	66,317	3%	36.1	$45,865	$29,445	$236,000	$257,683	$932
Freeport	8,049	3%	44.6	$72,526	$36,138	$272,400	$278,620	$975
Brunswick	20,329	-4%	45.1	$55,833	$30,490	$214,600	$278,620	$816

Source: U.S. Census Bureau, American Community Survey, 2010-2014 and Advameg, Inc., 2016.

Population has grown in the majority of study area communities from 2000-2015. Median household income ranges from $41,831 in Old Orchard Beach to $77,833 in Woburn, similar to the median household income range in Massachusetts ($67,846), New Hampshire ($65,986) and Maine ($48,804). Median home values in Massachusetts communities are higher than the state median ($329,900), with the exception of Haverhill. In New Hampshire communities, median home values are similar to or higher than the state median ($237,400). Median home values in Maine communities are higher than the state median ($173,600).

Employment in Massachusetts has increased moderately from 2000-2015, but the unemployment rate has also risen from 2.7 to 5.0 percent (BLS, 2016). Within Essex County, employment has increased at a slightly faster rate than the state. Middlesex County employment has increased at a slower rate than the state, and Suffolk County employment has increased at a much faster rate than the state. Unemployment in the three Massachusetts counties has increased at a similar rate as the state overall (Exhibit 3.4).

Employment in New Hampshire has increased by nearly 7 percent from 2000-2015, and the unemployment rate has risen slightly to 3.4 percent (BLS, 2016). Employment in the two New Hampshire counties has increased at a faster rate than the state overall. Unemployment in the two counties has increased at a similar rate to the state overall.

Employment in Maine has remained stable from 2000-2015. Employment in the two counties has increased, in contrast to the state overall. The state unemployment rate has grown slightly to 4.4 percent, while unemployment in the two study area counties has remained lower (BLS, 2016).

Exhibit 3.4 – *Regional Employment Trends, 2000-2015*

County and State	Unemployment Rate		Total Employment		% Change
	2000	2015	2000	2015	
Massachusetts	2.7%	5.0%	3,240,245	3,392,107	4.7%
Suffolk County, MA	3.0%	4.6%	336,913	397,615	18.0%
Middlesex County, MA	2.2%	4.0%	795,506	822,940	3.4%
Essex County, MA	2.7%	5.2%	358,867	384,778	7.2%
New Hampshire	2.7%	3.4%	669,621	715,727	6.9%
Rockingham County, NH	3.0%	3.6%	155,772	171,426	10.0%
Strafford County, NH	2.7%	3.1%	60,154	68,494	13.9%
Maine	3.4%	4.4%	655,349	649,855	-0.8%
York County, ME	2.7%	3.9%	100,722	103,942	3.2%
Cumberland County, ME	2.5%	3.4%	146,206	151,229	3.4%

Source: U.S. Bureau of Labor Statistics, 2016

3.2.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not create new impacts on the social and economic resources in the study area.[7]

Build Alternative

Construction of track segments 1-6 would not result in adverse impacts to communities, neighborhoods, or businesses as improvements would be in the existing ROW. Access to businesses and residences would not be changed from existing conditions.

Improvements at the PTC would be in the existing ROW and therefore would not impact communities, neighborhoods, or businesses as none are present in the area and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not impact communities, neighborhoods, or businesses as none are present in the area and the area is currently dedicated to transportation. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to communities, neighborhoods, or businesses as improvements would be in the former ROW and in an area

[7]Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

which is primarily dedicated to transportation and commercial uses. Access to businesses would be maintained and coordination with business owners is being performed by MaineDOT as part of the planning, design, and permitting of the wye track.

Curve modifications would not result in adverse impacts to communities, neighborhoods, or businesses as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not result in adverse impacts to communities, neighborhoods, or businesses as improvements would be in the existing ROW and on the existing ballast. Access to businesses and residences would not be changed from existing conditions.

At-grade crossing upgrades would not result in adverse impacts to communities, neighborhoods, or businesses as improvements would be in the existing ROW and in areas currently dedicated to transportation. Access to businesses and residences would not be changed from existing conditions.

The increase in service under the Build Alternative would have beneficial impacts by providing additional daily trips between communities. It is unlikely that the Build Alternative would result in an increase in employment.

3.3 Environmental Justice

The Environmental Justice (EJ) assessment identifies the locations of potential EJ communities along the rail corridor, in compliance with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994; 59 FR 32) and U.S. Department of Transportation policy (U.S. DOT Order 5610.2) to ensure nondiscrimination under Title VI of the Civil Rights Act of 1964. Title VI states that "no person in the United States shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

EJ communities are those areas where minority or low-income populations exist in concentrations that are substantially greater than the associated planning region. EJ

communities may be affected directly (locally) or indirectly (physically removed or later in time) by rail service and improvement projects.

A minority population is defined as a readily identifiable group of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity. Minority persons include an individual who identifies as Black or African American, Hispanic or Latino, Asian or Asian-American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, or who identifies as a multi-racial (two or more races) individual.

Low-income population means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.

The Council on Environmental Quality (CEQ) guidance calls for identifying EJ populations where either: 1) the minority population of the affected area exceeds 50 percent, or 2) the minority population of the affected area is "meaningfully greater" than the minority population in a larger reference population (CEQ, 1997).

Potential direct impacts to EJ communities are comprised of significant adverse impacts determined by other analyses, which for rail projects are typically related to noise, land acquisition, and community cohesion. These analyses, if appropriate, would be conducted at the individual project level. These analyses may reveal potential significant adverse impacts, and would evaluate whether such impacts constitute a disproportionate and adverse impact to EJ communities. The extent to which EJ communities would be expected to share in project benefits, such as improved access to service, would also be analyzed at the individual project level.

3.3.1 Methodology

Potential EJ communities are identified at the census tract level, using the most currently available U.S. Census data (American Community Survey 2010-2014 averages) in conjunction with GIS analysis. Census tracts are the smallest level at which both poverty and minority data are typically available for comparison among multiple scales of geographic regions. These

data are collected for census tracts intersecting or adjacent to the ROW extending to within 1,000 feet of the existing stations.

3.3.2 Affected Environment

Census tracts were identified as potential EJ communities when the minority population of the tract was approximately twice as high as the respective county and/or state minority population. According to GIS analysis, the study area includes portions of 60 census tracts in Massachusetts with a total population of 281,336. The portion of the study area within Massachusetts has a 22 percent minority population, similar to the 20 percent minority population in the state overall. Minority population in the three Massachusetts study area counties ranged from 20 percent in Essex and Middlesex Counties to 44 percent in Suffolk County. Of the 60 Massachusetts census tracts, 10 were identified as potential EJ communities based on minority population (U.S. Census Bureau, 2013).

According to GIS analysis, the study area includes portions of 23 census tracts in New Hampshire with a total population of 112,760. The portion of the study area within New Hampshire has a 6 percent minority population, equivalent to the minority population found in the study area counties and state overall. Of the 23 census tracts, three were identified as potential EJ communities based on minority population (U.S. Census Bureau, 2013).

According to GIS analysis, the study area includes portions of 39 census tracts in Maine with a total population of 192,758. The portion of the study area within Maine has a 7 percent minority population, similar to the 5 percent minority population found in the state overall (Exhibits 3.5 – 3.7). Minority population was 7 percent in Cumberland County and 4 percent in York County. Of the 39 census tracts, 9 were identified as potential EJ communities based on minority population (U.S. Census Bureau, 2013).

Census tracts were identified as potential EJ communities based on income when the poverty level within the tract was approximately twice as high as the respective county and/or state poverty level. The portion of the study area within Massachusetts has 12 percent of residents living below the poverty level, equivalent to the state poverty rate. Essex and Middlesex County poverty rates are below the state average and Suffolk County (21 percent) is substantially above the state poverty level. Of the 60 Massachusetts study area census tracts, nine were identified as potential EJ communities based only on income, three were identified

based only on minority population, and seven were identified for both (U.S. Census Bureau, 2013).

The portion of the study area within New Hampshire has 8 percent of residents living below the poverty level, equivalent to the state poverty rate. Rockingham and Strafford County poverty rates are 6 and 11 percent, respectively. Of the 23 New Hampshire census tracts, three were identified as potential EJ communities based only on income, two were identified based only on minority population, and one was identified for both (U.S. Census Bureau, 2013).

The portion of the study area within Maine has 11 percent of residents living below the poverty level, equivalent to the study area counties and state poverty rates. Of the 39 Maine census tracts, three were identified as potential EJ communities based only on income, eight were identified based only on minority population, and one was identified for both. (U.S. Census Bureau, 2013).

Exhibit 3.5 – *Minority Population and Poverty Rate by Study Area County and State*

County and State	% Minority Population	% Poverty	# of Tracts Identified as Potential EJ Communities
Massachusetts	**20%**	**12%**	
Suffolk County, MA	44%	21%	1
Middlesex County, MA	20%	8%	9
Essex County, MA	20%	11%	9
New Hampshire	**6%**	**8%**	
Rockingham County, NH	5%	6%	1
Strafford County, NH	7%	11%	5
Maine	**5%**	**11%**	
York County, ME	4%	11%	3
Cumberland County, ME	7%	12%	9

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Exhibit 3.6 – *Potential EJ Communities within the Study Area*

Census Tract	Identified Based on Minority Population	Identified Based on Income
Tract 203.03, Suffolk County, MA	X	
Tract 3393, Middlesex County, MA	X	
Tract 3394, Middlesex County, MA		X
Tract 3396, Middlesex County, MA		X
Tract 3506, Middlesex County, MA		X
Tract 3507, Middlesex County, MA		X
Tract 3510, Middlesex County, MA		X
Tract 3513, Middlesex County, MA		X
Tract 3514.03, Middlesex County, MA		X
Tract 3521.01, Middlesex County, MA	X	X
Tract 2501, Essex County, MA	X	X
Tract 2508, Essex County, MA	X	X
Tract 2515, Essex County, MA	X	X
Tract 2516, Essex County, MA	X	X
Tract 2517, Essex County, MA	X	X
Tract 2518, Essex County, MA	X	
Tract 2601, Essex County, MA	X	X
Tract 2606, Essex County, MA		X
Tract 2608, Essex County, MA		X
Tract 1062, Rockingham County, NH		X
Tract 802.02, Strafford County, NH		X
Tract 802.03, Strafford County, NH	X	X
Tract 802.04, Strafford County, NH		X
Tract 814, Strafford County, NH	X	
Tract 815, Strafford County, NH	X	
Tract 52, York County, ME	X	
Tract 61.02, York County, ME		X
252.02, York County, ME		X
Tract 3, Cumberland County, ME		X
Tract 13, Cumberland County, ME	X	X
Tract 20.02, Cumberland County, ME	X	
Tract 21.01, Cumberland County, ME	X	
Tract 21.02, Cumberland County, ME	X	
Tract 22, Cumberland County, ME	X	
Tract 30, Cumberland County, ME	X	
Tract 33, Cumberland County, ME	X	
Tract 112.02, Cumberland County, ME	X	

Source: U.S. Census Bureau, American Community Survey, 2010-2014

Exhibit 3.7 – *Minority Populations by Census Tract*

3.3.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have disproportionate adverse impacts on minority or low-income populations.[8] However, the No-Build Alternative would not encourage or provide additional public transportation options that may be desirable to low-income residents who may not be able to afford reliable personal transportation.

Build Alternative

Construction of track segments 1-4 and 6 would not result in disproportionate adverse impacts to minority or low-income populations as improvements would be in the existing ROW, and the segments are not located within census tracts identified as containing EJ populations. Access to businesses and residences would not be changed from existing conditions.

Track segment 5 does overlap with three identified census tracts in Maine. Construction of track segment 5 would not result in disproportionate adverse impacts to minority or low-income populations as improvements would be in the existing ROW. Access to businesses and residences would not be changed from existing conditions.

Improvements at the PTC would be in the existing ROW and therefore would not result in disproportionate adverse impacts to minority or low-income populations as none are present in the area and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in disproportionate adverse impacts to minority or low-income populations as none are present in the area and the area is currently dedicated to transportation. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to minority or low-income populations as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. Access to businesses would be maintained and coordination with business owners is being performed by MaineDOT as part of the planning, design, and permitting of the wye track.

[8] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility, Merrimack River Bridge Rehabilitation)

Curve modifications would not result in disproportionate adverse impacts to minority or low-income populations as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not result in disproportionate adverse impacts to minority or low-income populations as improvements would be in the existing ROW and on the existing ballast.

At-grade crossing upgrades would not result in permanent disproportionate adverse impacts to minority or low-income populations as improvements would be in the existing ROW and in areas currently dedicated to transportation. There would be adverse temporary impacts to traffic during construction of the upgrades, but those impacts would be limited to the duration of construction. Mitigation to offset these impacts would be developed in the Tier 2 NEPA documents when exact impacts would be determined. The upgrades would not change access to businesses or residences from existing conditions. At-grade crossing upgrades would improve safety for drivers and pedestrians at the upgraded intersections.

The increase in service under the Build Alternative should benefit all demographics, including low-income, elderly, and disabled residents who may not be able to afford personal transportation and rely on public transportation for access to employment and other services.

3.4 Land Use and Parks and Recreation

3.4.1 Land Use

Land uses and levels of development were considered with regard to proximity to project rail infrastructure and potential sensitivity to related construction and operations activities. Land use conditions may be affected directly (locally) or indirectly (physically removed or later in time) by the proposed action. Typically, the potential for direct impacts on land uses within and near a study area comprised of existing rail is limited to instances where planned capital improvements (e.g., rail yards and service facilities, new rail stations or expansions) may extend beyond the limits of the existing rail ROW and result in a change in land use.

A general review of local and regional land use and development conditions is provided in this section. Regional conditions are described as a means of providing context to the proposed action and to inform the assessment of potential indirect and cumulative effects.

3.4.1.1 Methodology

Land use types are defined broadly throughout the study area, according to available land use data, to ensure relative consistency. Federal, state, and county GIS datasets were used for the identification of land uses in the study area; data was summarized into the broad land use categories: developed, forested, wetlands/wetland forest, and transportation. The data were used to determine the location and amount of each land use type within the study area and the proximity to the No-Build and Build Alternatives.

3.4.1.2 Affected Environment

The Downeaster corridor was constructed in the 1910s and 1920s and much of the existing land uses have been constructed adjacent to and in recognition of the corridor.

The study area consists of a wide mix of urban, suburban, and rural areas and uses. Approximately 38 percent of the study area in Massachusetts is developed (consisting primarily of industrial, commercial, residential, and agricultural uses), 40 percent is forested, 15 percent is being used for transportation purposes, and 7 percent is considered wetlands/wetland forest.

Approximately 59 percent of the study area in New Hampshire is forested, 29 percent is developed (consisting primarily of industrial, commercial, residential, and agricultural uses), 13 percent is considered wetlands/wetland forest, and 12 percent is being used for transportation purposes.

Approximately 48 percent of the study area in Maine is developed (consisting primarily of industrial, commercial, residential, and agricultural uses), 35 percent is forested, 15 percent is being used for transportation purposes, and 13 percent is considered wetlands/wetland forest.

Land use in the area of the wye track in the city of Portland consists of I-295 and an interchange with the Fore River Parkway, a wetland mitigation area, a bike path, the Cumberland County jail and sheriffs' offices, and several small buildings used for automobile repair. Further to the Northwest, the area consists of residential areas and scattered commercial facilities. Further to the east and northeast, the area consists of shopping and other commercial and office facilities.

As the Downeaster corridor was constructed in the 1910s and 1920s, the disposition of the underlying mineral rights (while not fully investigated at the Service-level) are believed to remain with the current owners of the corridor.

Other sections of this Service-level EA that provide more specific descriptions of land uses include: 3.1 Transportation, 3.4.2 Parks and Recreation, 3.9 Cultural and Historic Resources, and 3.14 Soils.

3.4.1.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have an impact on land use, be inconsistent with zoning, or require the acquisition of property. The No-Build Alternative would not generate or require the disposal of large amounts of solid waste. The No-Build Alternative would impact the underlying mineral rights.[9]

Build Alternative

The Build Alternative would not impact the underlying mineral rights in the study area as the individual components of the Build Alternative are proposed on existing ballast and within the existing ROW, with the possible exception of the pedestrian overpass at the Wells station which may extend beyond the existing ROW but within an area dedicated to transportation and the wye track, which is proposed within former rail ROW and primarily in a commercial area.

Construction of track segments 1-6 would not result in adverse impacts to land use or be inconsistent with zoning as improvements would be in the existing ROW and would not require acquisition of new property. Access to businesses and residences would not be changed from existing conditions.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to land use or be inconsistent with zoning as the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to land use or be

[9] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

inconsistent with zoning as the area is currently dedicated to transportation. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to land use or be inconsistent with zoning as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. Access to businesses would be maintained and coordination with business owners is being performed by MaineDOT as part of the planning, design, and permitting of the wye track.

Curve modifications would not result in adverse impacts to land use or be inconsistent with zoning as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails. Curve modifications would not require the acquisition of property, and public access to parks and recreational areas in the study area would not be changed from existing conditions.

Modifications to existing interlockings, and installation of new interlockings, would not result in adverse impacts to land use or be inconsistent with zoning as improvements would be in the existing ROW and on the existing ballast. Modifications to existing interlockings, and installation of new interlockings would not require the acquisition of property, and public access to parks and recreational areas in the study area would not be changed from existing conditions.

At-grade crossing upgrades would not result in permanent adverse impacts to land use or be inconsistent with zoning as improvements would be in the existing ROW and in areas currently dedicated to transportation.

The increase in service under the Build Alternative would not result in adverse impacts to land use or be inconsistent with zoning as trains would operate in the existing ROW and would not require acquisition of new property. Access to businesses and residences would not be changed from existing conditions. Solid waste generated during operation of the passenger service would be disposed consistent with NNEPRA's existing practices and contracts for maintenance.

3.4.2 Parks and Recreation

This section inventories existing parks and recreational areas within the study area.

A proposed action may be subject to Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 (23 USC. 138 and 49 USC. 303), which requires that the proposed use of land from a publicly-owned public park, recreation area, wildlife and/or waterfowl refuge, or any significant historic or archaeological site, as part of a federally funded or approved transportation project, is permissible only if: 1) there is no feasible and prudent alternative to the use and (2) the project consist of all planning to minimize harm; or (3) if the use is a *de minimis* impact. A Section 4(f) evaluation is provided in Chapter 9, "Section 4(f) Evaluation." A use of a Section 4(f) property occurs:

- When land is permanently incorporated into a transportation facility;
- When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or
- When there is a constructive use of a Section 4(f) property. A constructive use occurs when project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired.

Section 6(f) of the Land and Water Conservation Fund Act (16 USC 460) requires that the Secretary of the U.S. Department of the Interior approve any conversion of lands purchased or developed with assistance under this Act to a use other than public, outdoor recreation use. Any park or recreational resource that received grants from the Land and Water Conservation Fund (LWCF) is considered a Section 6(f) resource.

3.4.2.1 Methodology

Federal, state, and county GIS datasets were used for the identification of parks and recreational areas in the study area and to determine their proximity to the No-Build and Build Alternatives.

3.4.2.2 Affected Environment

There are approximately 100 parks and recreation areas in the study area: approximately 81 in Massachusetts, 15 in New Hampshire, and four in Maine (Exhibit 3.8).

One park, the Mystic River Reservation, is bisected by the rail ROW twice between Somerville and Woburn, Massachusetts. The reservation is a publicly-owned nature preserve, established in 1893, along the Mystic River and comprised of four state parks. The Mystic Lakes State Park

is located next to the rail ROW north of Somerville, Massachusetts. The Downeaster corridor follows along the eastern edge of Mystic Lakes State Park and crosses the reservation to the north and south of the park. In 2010, a plan was proposed to restore and preserve the Mystic River Reservation.

Exhibit 3.8 – *Parks and Recreational Areas in the Study Area*

Facility	Owner	County	City/Town	State
New Charles River Dam	Division of State Parks and Recreation	Suffolk	Boston	MA
Paul Revere Park	Division of State Parks and Recreation	Middlesex	Boston	MA
Charles River Reservation	Division of State Parks and Recreation	Middlesex	Cambridge	MA
Central Hill Memorial Park	City of Somerville	Middlesex	Somerville	MA
Central Hill Playground	City of Somerville	Middlesex	Somerville	MA
Glen Street Park	City of Somerville	Middlesex	Somerville	MA
Hoyt-Sullivan Playground	City of Somerville	Middlesex	Somerville	MA
Kemp Nut Park and Community Garden	City of Somerville	Middlesex	Somerville	MA
Marshall Street Playground	City of Somerville	Middlesex	Somerville	MA
Nathan Tufts/Powder House Park	City of Somerville	Middlesex	Somerville	MA
Somerville Junction Park	City of Somerville	Middlesex	Somerville	MA
Trum Field Park	City of Somerville	Middlesex	Somerville	MA
Trum Playground	City of Somerville	Middlesex	Somerville	MA
Winter Hill Playground	City of Somerville	Middlesex	Somerville	MA
Brooks Playstead	City of Medford	Middlesex	Medford	MA
Cummings Park	City of Medford	Middlesex	Medford	MA
Grant Park	City of Medford	Middlesex	Medford	MA
Hillside Memorial Park	City of Medford	Middlesex	Medford	MA
Mystic Lakes	Division of State Parks and Recreation	Middlesex	Medford	MA
Mystic River Reservation	Division of State Parks and Recreation	Middlesex	Medford	MA
Thomas Brooks Park	City of Medford	Middlesex	Medford	MA
Tufts Alumni Fields	Tufts University	Middlesex	Medford	MA
Tufts Park	City of Medford	Middlesex	Medford	MA
Tufts University Fields	Tufts University	Middlesex	Medford	MA
Chefalo Wadleigh Park	Town of Winchester	Middlesex	Winchester	MA
Davidson Park	Town of Winchester	Middlesex	Winchester	MA
Eliot Park	Town of Winchester	Middlesex	Winchester	MA
Ginn Field	Town of Winchester	Middlesex	Winchester	MA
Judkins Pond	Town of Winchester	Middlesex	Winchester	MA
Leonard Field and Beach	Town of Winchester	Middlesex	Winchester	MA
Lincoln School Playground	Town of Winchester	Middlesex	Winchester	MA
McCall Middle School Recreational Fields	Town of Winchester	Middlesex	Winchester	MA
Mill Pond	Town of Winchester	Middlesex	Winchester	MA
Muraco School Playground	Town of Winchester	Middlesex	Winchester	MA
Mystic Valley Parkway	Division of State Parks and Recreation	Middlesex	Winchester	MA
Town Common	Town of Winchester	Middlesex	Winchester	MA
Wedge Pond Park	Town of Winchester	Middlesex	Winchester	MA
Winchester High School	Town of Winchester	Middlesex	Winchester	MA

Facility	Owner	County	City/Town	State
Athletic Fields				
Leland Park	City of Woburn	Middlesex	Woburn	MA
Avco Recreation Area	Avco Corporation	Middlesex	Wilmington	MA
Butters Row	Middlesex Canal Association	Middlesex	Wilmington	MA
Corum Meadows	Town of Wilmington	Middlesex	Wilmington	MA
Elmwood Village	Town of Wilmington	Middlesex	Wilmington	MA
Glen Acres	Town of Wilmington	Middlesex	Wilmington	MA
Lawrence Street Acres/Wetlands	Town of Wilmington	Middlesex	Wilmington	MA
Legacy Park	Legacy Park Wilmington Two LLC	Middlesex	Wilmington	MA
Lubbers Brook	Town of Wilmington	Middlesex	Wilmington	MA
Rotary Park	Town of Wilmington	Middlesex	Wilmington	MA
Town Forest	Town of Wilmington	Middlesex	Wilmington	MA
Andover High School Athletic Fields	Town of Andover	Essex	Andover	MA
Carmel Woods	Town of Andover	Essex	Andover	MA
Catalano Park	Town of Andover	Essex	Andover	MA
Conservation Area	Town of Andover	Essex	Andover	MA
Indian Ridge Reservation	Andover Village Improvement Society	Essex	Andover	MA
Joyce Terrace	Town of Andover	Essex	Andover	MA
Pole Hill Conservation Area	Town of Andover	Essex	Andover	MA
Pomps Pond Conservation Area	Town of Andover	Essex	Andover	MA
Rogers Dell	Town of Andover	Essex	Andover	MA
Sacred Heart Park	Town of Andover	Essex	Andover	MA
Shawsheen River Natural Area	Town of Andover	Essex	Andover	MA
Shawsheen/Vale Reservation	Andover Village Improvement Society	Essex	Andover	MA
Den Rock Park	Stirling Woods LLC	Essex	Lawrence	MA
McDermott Park	City of Lawrence	Essex	Lawrence	MA
O'Connell South Common	City of Lawrence	Essex	Lawrence	MA
Greene Reservation	Andover Village Improvement Society	Essex	North Andover	MA
Grogans Field	Town of North Andover	Essex	North Andover	MA
Riverview Street Conservation Area	Town of North Andover	Essex	North Andover	MA
Schruender Park	City of Methuen	Essex	Methuen	MA
American Legion Athletic Fields	City of Haverhill	Essex	Haverhill	MA
Bradford Rail Trail	City of Haverhill	Essex	Haverhill	MA
Cashmans Field	City of Haverhill	Essex	Haverhill	MA
Ferry Road Triangle Park	City of Haverhill	Essex	Haverhill	MA
Laurier Street Conservation Area	Essex County Greenbelt Association	Essex	Haverhill	MA
Margin Street Park	City of Haverhill	Essex	Haverhill	MA
Moody Elementary School Playground	City of Haverhill	Essex	Haverhill	MA
Riverfront Promenade	City of Haverhill	Essex	Haverhill	MA
Tremont Street Park	City of Haverhill	Essex	Haverhill	MA
Washington Square Park	City of Haverhill	Essex	Haverhill	MA
West Myrtle Street Conservation Area	Essex County Greenbelt Association	Essex	Haverhill	MA
Wood Elementary School Playground	City of Haverhill	Essex	Haverhill	MA
Wood School Park	City of Haverhill	Essex	Haverhill	MA
Richard Sargent Management	NH Dept of Fish & Game	Rockingham	Newton	NH

Facility	Owner	County	City/Town	State
Area 3				
Town Beach	Town of Newton	Rockingham	Newton	NH
Railroad Lot Natural Area	Town of East Kingston	Rockingham	East Kingston	NH
Town Boat Launch	Town of East Kingston	Rockingham	East Kingston	NH
Brickyard Park	Town of Exeter	Rockingham	Exeter	NH
Henderson-Swasey Town Forest	Town of Exeter	Rockingham	Exeter	NH
George F. Smith Woodlot	Society for the Prot. of NH Forests	Rockingham	Newfields	NH
College Woods And Reservoir	University of New Hampshire	Strafford	Durham	NH
Doe Farm and Moat Island	Town of Durham	Strafford	Durham	NH
East Foss Farm	University of New Hampshire	Strafford	Durham	NH
Old Reservoir	University of New Hampshire	Strafford	Durham	NH
West Foss Farm	University of New Hampshire	Strafford	Durham	NH
Pudding Hill Town Forest	Town of Madbury	Strafford	Madbury	NH
Sandy Bank Play Field	Town of Rollinsford	Strafford	Rollinsford	NH
Town Forest	Town of Rollinsford	Strafford	Rollinsford	NH
Lover's Brook Farm	Maine Department of Agriculture	York	Berwick	ME
Rachel Carson National Wildlife Refuge Upper Wells Division	U.S. Fish and Wildlife Service	York	Wells	ME
Scarborough Marsh Wildlife Management Area	Maine Department of Inland Fisheries and Wildlife	York, Cumberland	Scarborough	ME
Central Falmouth Conservation Corridor	Maine Bureau of Parks and Lands	Cumberland	Falmouth	ME

3.4.2.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not use parks and recreational areas.[10]

Build Alternative

Construction of track segments 1-6 would not result in use of parks and recreational areas as improvements would be in the existing ROW and would not require acquisition of new property or temporary staging for construction activities. Public access to parks and recreational areas in the study area would not be changed from existing conditions.

Improvements at the PTC would be in the existing ROW and therefore would not result in the use of parks and recreational areas as the improvements would not require acquisition of new property or temporary staging for construction activities and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in the use of parks and recreational areas as the improvements would not require the acquisition of new property and the area is currently

[10] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

dedicated to transportation. Public access to parks and recreational areas in the study area would not be changed from existing conditions.

Installation of the wye track would not result in the use of parks and recreational areas as improvements would be in the former ROW, in an area which is primarily dedicated to transportation and commercial uses, and would not require acquisition of new property or temporary staging for construction activities. Public access to parks and recreational areas in the study area would not be changed from existing conditions.

Though the corridor does bisect the Mystic River Reservation, curve modifications would not result in use of parks and recreational areas as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails. Curve modifications would not require the acquisition of property or temporary staging for construction activities, and public access to parks and recreational areas in the study area would not be changed from existing conditions.

Modifications to existing interlockings, and installation of new interlockings, would not result in the use of parks and recreational areas as improvements would be in the existing ROW and on the existing ballast. Modifications to existing interlockings, and installation of new interlockings, would not require the acquisition of property or temporary staging for construction activities and, and public access to parks and recreational areas in the study area would not be changed from existing conditions.

At-grade crossing upgrades would not result in to the use of parks and recreational areas as improvements would be in the existing ROW, in areas currently dedicated to transportation, and would not require acquisition of new property or temporary staging for construction activities. Public access to parks and recreational areas in the study area would not be changed from existing conditions.

The increase in service under the Build Alternative would not result in the use of parks and recreational areas as trains would operate in the existing ROW and would not require acquisition of new property. Public access to parks and recreational areas in the study area would not be changed from existing conditions.

No Section 6(f) resources would be impacted by the Build Alternative.

3.5 Noise and Vibration

3.5.1 Noise

Introducing new or additional passenger rail service and/or infrastructure improvements has the potential to increase noise along the corridor. This section describes the existing noise environment and the potential impact from adding passenger rail service to the corridor.

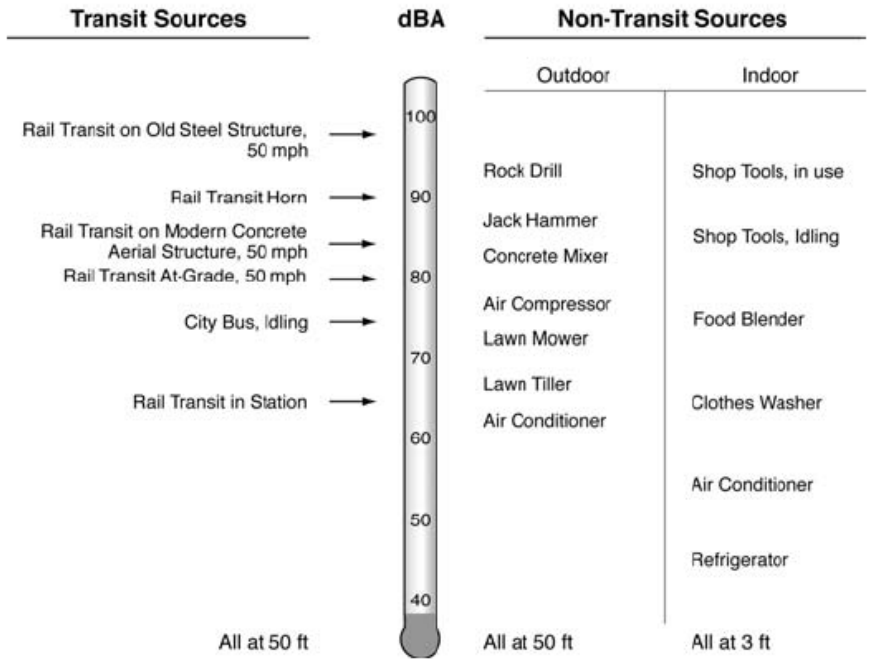
3.5.1.1 Methodology

The noise analysis was conducted in accordance with methodologies contained in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* manual, dated May 2006 (FTA, 2006). The analysis established a screening distance for the Build Alternative to determine whether noise sensitive areas and/or receivers of interest were present, the number of receivers, and the severity of the impacts to the identified receivers.

Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above or below the atmospheric pressure. The basic parameters of noise that affect human response are: 1) intensity or level; 2) frequency content; and 3) variation with time. Intensity or level of noise is determined by how great the sound pressure fluctuates above or below the atmospheric pressure. The universal descriptor used for environmental noise is the A-weighted Sound Level. It describes the level of noise measured at a receiver at a moment in time.

Exhibit 3.9 shows some typical A-weighted Sound Levels for both transit and non-transit sources. Typical A-weighted sound levels range from the 30s to the 90s, where 30 is very quiet and 90 is very loud. The scale is labeled "dBA" to denote the way A-weighted sound levels are typically written (e.g., 80 dBA). The letter "A" indicates that the sound has been filtered to reduce the strength of very low and very high-frequency sounds. Without this A-weighting, noise-monitoring equipment would respond to events people cannot hear, such as high-frequency dog whistles and low-frequency seismic disturbances. On average, each A-weighted sound level increase of 10 decibels (dB) corresponds to an approximate doubling of subjective loudness (FTA, 2006).

Exhibit 3.9 – *Typical A-Weighted Sound Levels for Transit and Non-Transit Sources*



Source: FTA, 2006

Because noise fluctuates over time, it is common practice to condense this information into a single number called the "equivalent" sound level (Leq). Leq expresses the average sound level over a specified period (typically 1 hour or 24 hours). Often the Leq values over a 24-hour period are used to calculate cumulative noise exposure in terms of the Day-Night Sound Level (Ldn). Ldn is the A-weighed Leq for a 24-hour period with an added 10-decibel penalty imposed on noise that occurs during the nighttime hours (between 10 PM and 7 AM). The extremes of Ldn range from 50 dBA in a small residential environment to 80 dBA in noisy urban environments. Ldn is generally found to range between 55 dBA and 75 dBA in most communities.

The FRA and FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on a comparison of existing and future noise levels. According the FRA and FTA, noise-sensitivity land uses are categorized as follows:

- **Category 1:** Tracks of land where quiet is an essential element of their intended purpose.

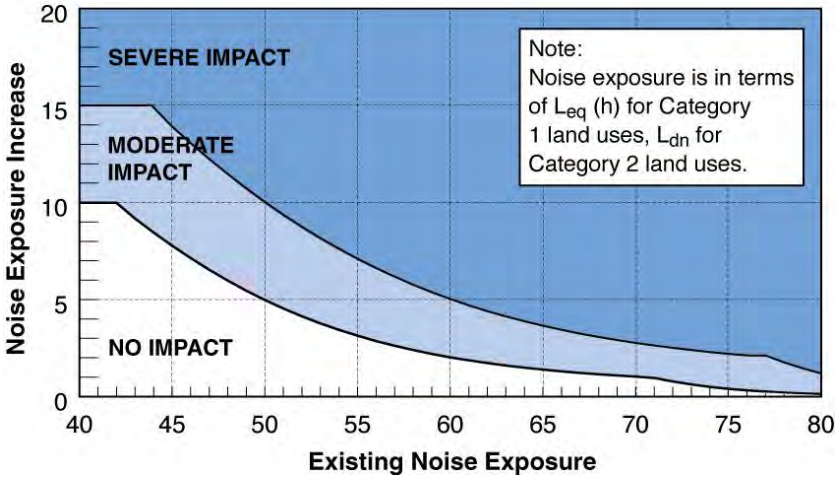
- **Category 2:** Places where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- **Category 3:** Institutional lane uses with primarily daytime and evening use. This category includes schools, libraries, churches, and parks with passive use.

Noise impact is assessed at receptors with nighttime sensitivity (Category 2) according to the Ldn. For other noise sensitivity land uses, such as outdoor amphitheaters and institutional buildings (Categories 1 and 3), the hourly equivalent sound level (Leq) during the peak transit service while the facility is in operation is used to assess impact. There are two levels of noise impact included in the criteria:

- **Severe Impact:** project-generated noise in the severe impact range can be expected to cause a significant percentage of people to be highly annoyed by the new noise. Severe impacts represent the most compelling need for mitigation. Noise mitigation would normally be specified for severe impact areas unless there are truly extenuating circumstances that prevent it.
- **Moderate Impact:** In this range of noise impact, the change in the cumulative noise level is noticeable to most people but may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These factors include the existing noise level, the predicted level of increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, the noise sensitivity of the properties, the effectiveness of the mitigation measures, community views and the cost of mitigating noise to more acceptable levels.

Exhibit 3.10 expresses the criteria in terms of the increase in total or cumulative noise that can occur in the overall noise environment before impact occurs. With higher existing noise levels, smaller increases in total future noise exposure are allowed.

Exhibit 3.10 – *FRA Noise Impact Criteria*



Source: FRA, 2012b

3.5.1.2 Affected Environment

The FTA recommends using a screening procedure to determine the likelihood of a noise impact from a proposed action. The noise screening procedure is designed to identify locations where a proposed action may cause noise impact. If no noise-sensitive land uses are present within a defined area of proposed action noise influence, then no further noise assessment is necessary. This approach allows the focusing of further noise analysis on locations where impacts are likely. The screening procedure accounts for the noise impact criteria, the type of proposed action, and noise-sensitive land uses. For screening purposes, noise-sensitive land uses are considered to be in a single category. The areas defined by the screening distances are meant to be sufficiently large to encompass potentially impacted locations. The FTA screening distance is 750 feet for an area with unobstructed line of sight to the rail proposed action and the screening distance is 1,600 feet for grade crossings where the train would be required to blow the horn (FTA, 2006).

Within the study area, there are approximately 13,358 residential receivers in Massachusetts, 3,187 in New Hampshire and 13,648 in Maine. Within the study area, other potential noise sensitive receivers (such as schools, churches, cemeteries and recreation areas) exist including approximately 430 receivers in Massachusetts, 100 in New Hampshire and 340 in Maine.

3.5.1.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not create additional noise impacts. Construction of actions that are part of the No-Build Alternative would result in a temporary increase in noise in the immediate area.

Build Alternative

For the Build Alternative, noise sensitive areas and receivers of interest within the study area were identified based on the FTA screening procedure for determining potential impacts, a review of available information, and aerial maps. The FTA screening distance is 750 feet for unobstructed line of sight. However, this screening distance is based on assumption of higher train frequency than the number of trains proposed for this proposed action (seven round trips between Boston and Portland; six or seven round trips between Portland and Brunswick). The lower frequency of trains requires less screening distance. Using the FTA spreadsheet model, the new screening distance ranges between 213 and 267 feet between Boston and Portland (Exhibit 3.11), and between 204 and 219 feet between Portland and Brunswick (Exhibit 3.12).

Exhibit 3.11 - *Modified Noise Buffer Distances from Boston, MA to Portland, ME*

Speed (mph)	Buffer Distance (feet)	Assumptions
40	213	New Buffer distances calculated based on: 1 Locomotive, 7 cars, 12 trains during daytime, and 2 trains during nighttime
50	213	
60	225	
65	234	
70	244	
79	267	

Exhibit 3.12 – *Modified Noise Buffer Distances from Portland, ME to Brunswick, ME*

Speed (mph)	Buffer Distance (feet)	Assumptions
30	219	New Buffer distances calculated based on: 1 Locomotive, 6 cars, 10 trains during daytime, and 2 trains during nighttime
40	199	
50	196	
60	204	
70	219	

Based on the noise screening analysis for the Build Alternative, there are 1,702 noise-sensitive uses in Massachusetts, 1,085 in New Hampshire and 2,092 in Maine defined as noise-sensitive uses that fall within the screening criteria distances.

General Noise Assessment

Existing Noise Levels

Residences are within the screening distances for the commuter rail on the mainline or the commuter rail with horn at highway grade crossings. Due to the presence of these receivers, additional noise analysis was required, and a General Noise Assessment was conducted.

Noise impact is assessed based on a combination of the existing ambient noise exposure and the additional noise exposure that would be caused by the proposed action. To estimate existing noise in the study area, data on freight schedules was used in combination with information on noise exposures with and without train horn (from the FTA manual). Furthermore, the general noise assessment was conducted at several distances from the tracks to determine the limit of potential impacts due to increases in train frequency. Exhibit 3.13 shows the ambient sound levels at distances from the tracks.

Exhibit 3.13 – *Summary of Ambient Sound Levels*

Distance	Ambient Sound Level without Train Horn dB(A)	Ambient Sound Level with Train Horn dB(A)
50 feet	65	75
100 feet	60	75
200 feet	55	75
300 feet	55	75
400 feet	55	75

Using the ambient sound level, noise exposure levels were calculated based on existing passenger trains and operations.[11]

Predicted Noise Levels

Predicted noise levels were based on the proposed increase in train frequency between Boston, Massachusetts and Brunswick, Maine. The train types for the additional frequencies will remain the same. Under the Build Alternative the total number of frequencies between Boston, Massachusetts and Portland, Maine would be increased to 12 during the day, and two at night, while the total number of daytime frequencies between Portland and Brunswick, Maine would be 10, with two at night. Passenger train speed would vary between 30 and 79 mph throughout the corridor.

The noise analysis was conducted for the proposed increases in train frequency with and without train horn at highway grade crossings. Exhibits 3.14 and 3.15 indicate the total noise exposure without the train horn at several distances from the tracks for each train speed between Boston, Massachusetts and Portland, Maine. Exhibit 3.16 indicates the total noise exposure without the train horn between Portland and Brunswick, Maine. According to the noise analysis, the sound level increase is 1 dB(A), which is barely perceptible to humans, therefore it can be concluded that the additional train frequencies would have no noise impact.

Table 3.14 – *Future Train Operation between Boston, MA and Portland, ME*

Speed (mph)	Distance (feet)	Ambient Sound Levels dB(A)	Existing Sound Levels dB(A)	Future Total Noise Exposure dB(A)	Increase over Existing dB(A)	Potential Impacts (Y/N)
40	50	65	66	67	1	N
50	100	60	61	62	1	N
60	200	55	56	57	1	N
65	300	55	56	57	1	N
70	400	55	56	57	1	N

Table 3.15 – *Future Train Operation between Boston, MA and Portland, ME (Speed 79 mph)*

Distance (feet)	Ambient Sound Levels dB(A)	Existing Sound Levels dB(A)	Future Total Noise Exposure dB(A)	Increase over Existing dB(A)	Potential Impacts (Y/N)
50	65	66	67	1	N

[11] The existing passenger trains consist of one locomotive and seven passenger cars between Boston, Massachusetts and Portland, Maine and the trains consist of one locomotive and six passenger cars between Brunswick and Portland, Maine. There are eight trains operating between Boston, Massachusetts and Portland, Maine during the daytime, and two operating at night. Five trains operate during the day between Portland and Brunswick, Maine and one operates at night. Daytime operation is between 7:00 a.m. and 10:00 p.m., and nighttime operation between 10:00p.m. and 7:00 a.m.

100	60	62	63	1	N
200	55	57	58	1	N
300	55	56	57	1	N
400	55	56	57	1	N

Table 3.16 – *Future Train Operation between Portland and Brunswick, ME*

Speed (mph)	Distance (feet)	Ambient Sound Levels dB(A)	Existing Sound Levels dB(A)	Future Total Noise Exposure dB(A)	Increase over Existing dB(A)	Potential Impacts (Y/N)
40	50	65	66	67	1	N
50	100	60	61	62	1	N
60	200	55	56	57	1	N
65	300	55	55	56	1	N
70	400	55	55	56	1	N

Exhibits 3.17 and 3.18 indicate the total noise exposure at highway grade crossings (with train horn) at several distances from the tracks for each train speed between Boston, Massachusetts and Brunswick, Maine. According to the noise analysis, the additional train frequencies would have noise impacts at highway grade crossings that will vary between severe (50 feet from crossing) and moderate (200 feet from crossing).

Table 3.17 – *Future Train Operation between Boston, MA and Portland, ME (at grade crossings)*

Distance (feet)	Ambient Sound Levels dB(A)	Existing Sound Levels dB(A)	Future Total Noise Exposure dB(A)	Increase over Existing dB(A)	Potential Impacts (Y/N)
50	75	78	80	2	Y (Severe)
100	75	76	77	1	Y (Moderate)
200	75	76	77	1	Y (Moderate)
300	75	75	75	0	N
400	75	75	75	0	N

Table 3.18 – *Future Train Operation between Portland and Brunswick, ME (at grade crossings)*

Distance (feet)	Ambient Sound Levels dB(A)	Existing Sound Levels dB(A)	Future Total Noise Exposure dB(A)	Increase over Existing dB(A)	Potential Impacts (Y/N)
50	75	77	79	2	Y (Severe)
100	75	76	77	1	Y (Moderate)
200	75	75	76	1	Y (Moderate)
300	75	75	75	0	N
400	75	75	75	0	N

Based on the general noise assessment for the Build Alternative, there are 82 noise-sensitive land uses in Massachusetts, 56 in New Hampshire and 47 in Maine defined as noise-sensitive land uses that fall within the potential impact distances at highway grade crossings (Exhibit 3.19). The results of the noise analysis predict the Build Alternative would result in 0 severe noise impacts and 185 potential moderate noise impacts.

Table 3.19 – *Summary of Potential Noise Impacts*

Crossing	City	County	State	Potential Impacts	
				Severe	Moderate
Canal Street	Medford	Middlesex	MA	0	12
High Street	Medford	Middlesex	MA	0	7
Main Street	Wilmington	Middlesex	MA	0	3
Clark Street	Wilmington	Middlesex	MA	0	3
Glen Road	Wilmington	Middlesex	MA	0	2
Salem Street	Wilmington	Middlesex	MA	0	3
Lowell Junction Road	Andover	Essex	MA	0	0
Andover Street	Andover	Essex	MA	0	6
Tewksbury Street	Andover	Essex	MA	0	5
Austin Avenue	Andover	Essex	MA	0	1
Essex Street	Andover	Essex	MA	0	10
Pearson Street	Andover	Essex	MA	0	10
Andover Street	Lawrence	Essex	MA	0	5
Marblehead Street	North Andover	Essex	MA	0	1
Sutton Street	North Andover	Essex	MA	0	6
Main Street	North Andover	Essex	MA	0	5
Cross Road	Haverhill	Essex	MA	0	1
Rosemont Street	Haverhill	Essex	MA	0	2
Main Street	Plaistow	Rockingham	NH	0	2
Crane Crossing Road	Newton	Rockingham	NH	0	2
West Main Street	Newton	Rockingham	NH	0	4
Bartlett Street	Newton	Rockingham	NH	0	0
Heath Street	Newton	Rockingham	NH	0	1
New Boston Road	Kingston	Rockingham	NH	0	0
Depot Road	East Kingston	Rockingham	NH	0	4
Powder Mil Road	Exeter	Rockingham	NH	0	0
Front Street	Exeter	Rockingham	NH	0	5
Main Street	Exeter	Rockingham	NH	0	5
Salem Street	Exeter	Rockingham	NH	0	7
Swamscott Street	Newfields	Rockingham	NH	0	2
Exeter Road	Newmarket	Rockingham	NH	0	7
Elm Street	Newmarket	Rockingham	NH	0	6
Perkins Road	Madbury	Strafford	NH	0	0
Chestnut and 3rd Streets	Dover	Strafford	NH	0	3
Central Avenue	Dover	Strafford	NH	0	4
Church Street	Rollinsford	Strafford	NH	0	4
Berwick Road	Berwick	Maine	ME	0	4
Driveway	Berwick	York	ME	0	2
Driveway	Berwick	York	ME	0	1
Elm Street	North Berwick	York	ME	0	1

Crossing	City	County	State	Potential Impacts	
				Severe	Moderate
Lower Main Street	North Berwick	York	ME	0	3
Springfield Terminal	Wells	York	ME	0	1
Willie Hill Road	Wells	York	ME	0	0
Burnt Mill Road	Wells	York	ME	0	1
Coles Hill Road	Wells	York	ME	0	1
River Road	Arundel	York	ME	0	0
Log Cabin Road	Arundel	York	ME	0	2
Main Street	Biddeford	York	ME	0	8
Main Street	Saco	York	ME	0	2
Temple Avenue	Old Orchard Beach	York	ME	0	0
Union Avenue	Old Orchard Beach	York	ME	0	3
Atlantic Avenue	Old Orchard Beach	York	ME	0	7
Old Orchard Street	Old Orchard Beach	York	ME	0	6
Walnut Street	Old Orchard Beach	York	ME	0	5
Winnocks Neck	Scarborough	Cumberland	ME	0	0

3.5.2 Vibration

Introducing new or additional passenger rail services and/or infrastructure improvements has the potential to increase vibration along the route. This section describes the existing vibration environment and the potential impacts from the project along each segment.

3.5.2.1 Methodology

The vibration screening analysis was conducted in accordance with methodologies contained in the FTA's *Transit Noise and Vibration Impact Assessment* manual, dated May 2006 (FTA, 2006). The screening analysis established a screening distance for the Build Alternative to determine whether vibration sensitive areas and/or receivers of interest were present.

Ground-borne vibration is the oscillatory motion of the ground surrounding some equilibrium point. Sensitivity to vibration typically corresponds to the amplitude of vibration velocity within the range of most concern for environmental vibration (approximately 5-100 Hertz); therefore, velocity is the preferred measure for evaluating ground-borne vibration for rail proposed actions.

Vibration consists of rapidly fluctuating motions with an average motion of zero. Several descriptors can be used to quantify vibration amplitude. The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV), defined as the maximum instantaneous peak of the vibratory motion. PPV is typically used in monitoring blasting and

other types of construction-generated vibration, since it is related to the stresses experienced by buildings.

Although PPV is appropriate for evaluating building damage, it is less suitable for evaluating human response, which is better related to the average vibration amplitude. Because the net average of a vibration signal is zero, the root mean square vibration velocity level, in decibels, is used to describe the "smoothed" vibration amplitude; ground-borne vibration levels are stated in units of vibration decibels (Vdb). This unit is equivalent to a velocity of one micro-inch per second (10-6 in/sec). This is not a universally accepted notation; it is used to reduce the confusion with sound decibels.

Typical ground-borne vibration levels for common sources, as well as criteria for human and structural response to ground-borne vibration, range from approximately 50 to 100 Vdb. Although the approximate threshold of human perception to vibration is 65 Vdb, annoyance is usually not significant unless the vibration exceeds 70 Vdb. The FTA ground-borne vibration impact criteria are based on land use and train frequency. Vibration sensitive receptors are classified in three categories:

- **Category 1:** Buildings where vibration would interfere with interior operations. Category 1 receptors are those buildings where low ambient vibrations are essential for the operations conducted within the building. An example of Category 1 receptor is a building in which research using electron microscopes is conducted.
- **Category 2:** Residences and buildings where people normally sleep. Category 2 receptors consist of single family residences, apartments, and townhouses.
- **Category 3:** Institutional land uses with primarily daytime use. Category 3 receptors consist of churches, schools and other commercial buildings that do not house vibration sensitive equipment.
- **Special-use Buildings:** Concert halls, theaters, and other special-use buildings have separate ground-borne vibration and ground-borne noise criteria. Due to the sensitivity of these buildings, they usually warrant special attention during the environmental assessment.

The FTA vibration and ground-borne noise impact criteria are based on land use and train frequency. Exhibits 3.20 and 3.21 present the ground-borne noise and vibration impact criteria for the three land use categories and special buildings, respectively.

Exhibit 3.20 – *FTA Ground-borne Noise and Vibration Impact Criteria for Category 1-3*

Land Use Category	Ground-borne Vibration Impact Levels (Vdb re 1 mirco-inch/second)			Ground-borne Noise Impact Levels (dBA re 20 micro-pascals)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1	65 Vdb[4]	65 Vdb[4]	65 Vdb[4]	n/a[5]	n/a[5]	n/a[5]
Category 2	72 Vdb	75 Vdb	80 Vdb	35 dBA	38 dBA	43 dBA
Category 3	75 Vdb	78 Vdb	83 Vdb	40 dBA	43 dBA	48 dBA

Source: FTA, 2006

Notes:

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same kind per day. Most commuter rail trunk lines have this many operations.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category consist of most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC system and stiffened floors.

[5] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

Exhibit 3.21 – *FTA Ground-borne Noise and Vibration Impact Criteria for Special Buildings*

Type of Building or Room[3]	Ground-borne Vibration Impact Levels (Vdb re 1 mirco-inch/second)		Ground-borne Noise Impact Levels (dBA re 20 micro-pascals)	
	Frequent Events[1]	Occasional or Infrequent Events[2]	Frequent Events[1]	Occasional or Infrequent Events[2]
Concerts Halls	65 Vdb	65 Vdb	25 dBA	25 dBA
TV Studios	65 Vdb	65 Vdb	25 dBA	25 dBA
Recording Studios	65 Vdb	65 Vdb	25 dBA	25 dBA
Auditoriums	72 Vdb	80 Vdb	30 dBA	38 dBA
Theaters	72 Vdb	80 Vdb	35 dBA	43 dBA

Source: FTA, 2006

Notes:

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

[2] "Occasional or Infrequent Events" is defined as fewer than 70 vibration events per day. This category consist of most commuter rail lines.

[3] If the building would rarely be occupied when the trains are operating there is no need to consider impact. As an example consider locating a commuter rail line next to a concert hall. If no commuter trains would operate after 7pm, it should be rare that the trains would interfere with the use of the hall.

For projects in existing railroad ROWs, where receptors may already be exposed to vibration, the applicable vibration criteria also depend on the existing number of trains per day:

- For infrequently used rail corridors (less than five trains per day), potential impact is assessed by comparing vibration levels from the project to the FTA criteria regardless of existing vibration levels.
- For moderately used rail corridors (five to 12 trains per day), there would be no impact if the project vibration levels are lower than the existing levels by 5 Vdb or more. Otherwise, potential impact is assessed by comparing vibration levels from the project to the FTA criteria.
- For heavily used rail corridors (more than 12 trains per day), the project would cause additional impact if the project significantly increases the number of vibration events (e.g., doubles the number of trains). If there is not a significant increase in vibration events, there would be additional impact only if the project vibration would be 3 Vdb or higher than existing vibration.

3.5.2.2 Affected Environment

Within the study area, there are approximately 13,358 residences in Massachusetts, 3,187 in New Hampshire, and 13,648 in Maine.

3.5.2.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not create additional vibration impacts.[12]

Build Alternative

For the Build Alternative, the vibration screening distance for a commuter rail-highway crossing is 200 feet in accordance with the FTA vibration guidelines. Based on the vibration screening analysis for the Build Alternative, in the study area, there are 1,028 residential receivers in Massachusetts, 343 in New Hampshire and 877 in Maine defined as Category 2 receivers that fall within the screening criteria distances. Therefore, it is required to perform a general vibration assessment analysis.

General Vibration Analysis

The FTA criteria vibration level for infrequent operations and residential receivers is specified as 80 Vdb. Based on the FTA manual, it is anticipated that passenger trains would produce

[12] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

vibration levels of 80 Vdb within approximately 80 feet of the track when operating at 50 mph; beyond this distance, the vibration levels decrease. Vibration levels are imperceptible at distances greater than 200 feet from the track and do not cause a residential impact according to the FTA (FTA, 2006).

Three primary variables are involved in the determination of vibration impact distances: distance from rail, type of rail source, and speed of the rail source. Type of source or mass of the source influences energy imparted through the rail into the ballast and through the ground. Speed has a similar effect since increased speed results in greater kinetic energy imparted through this rail-ballast-ground pathway. Based on the information available, the train speed will vary between 30 and 79 mph, therefore the vibration levels should be adjusted for each speed. The FTA *Transit Noise and Vibration Impact Assessment* manual recommends a vibration-speed relationship of $20*\log_{10}(\text{speed}/\text{speed}_{ref})$ and this approach was used to adjust the Amtrak vibration-distance curve at 50 mph to speeds ranging from 30 mph to 79 mph as shown in Exhibit 3.22 (FTA, 2006).

Exhibit 3.22 – *Summary of Vibration Levels Adjusted for Speed*

Speed (mph)	Vibration Levels (Vdb)
30	76
40	78
50	80
60	82
65	82
70	83
79	84

For heavily used rail corridors, there would be an impact if the vibration levels are higher than the existing levels by 3 Vdb or more. The existing trains operate at a speed of 60 mph, which correlates to 82 Vdb. Vibration levels associated with the variable speed throughout the corridor would not exceed 84 Vdb, which is less than 3 Vdb above existing vibration levels (Exhibit 3.22). Therefore there would be no vibration impacts under the Build Alternative.

3.6 Air Quality

This section provides a qualitative overview of the existing conditions and potential impacts to air quality that may result from the Build Alternative.

3.6.1 Methodology

The Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulate matter (PM), and sulfur dioxide (SO_2). Primary standards set emission limits to protect public health, and secondary standards to protect public welfare. Transportation sources, particularly motor vehicles, are the primary source of CO, oxides of nitrogen (NO_x), and volatile organic compounds (VOCs). In the presence of heat and sunlight, NO_x and VOC chemically react to form O_3. Particulate matter and SO_2 are primarily emitted from stationary sources that burn fossil fuels (i.e., power plants). USEPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants (Exhibit 3.23). Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu g/m^3$).

The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for federal proposed actions. The Federal Conformity Rule was promulgated in 1993 by the USEPA, following the passage of Amendments to the Clean Air Act (CAA) in 1990. The rule mandates that a conformity analysis must be performed when a federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS. A conformity analysis determines whether a federal action meets the requirements of the General Conformity Rule. It requires the responsible federal agency to evaluate the nature of a proposed action and associated air pollutant emissions as a result of the proposed action.

Based on air quality monitoring data, an area that has not shown a violation of the NAAQS is designated as “in attainment.” An area that has shown a violation of the NAAQS may be designated as “non-attainment.” Areas that were designated non-attainment subsequent to the CAA of 1990, but have since been re-designated as in attainment by the USEPA, are referred to as “maintenance areas” (USEPA, 2012c).

Exhibit 3.23 - *NAAQS Standards*

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 µg/m^3[1]	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		primary and secondary	Annual	53 ppb [2]	Annual Mean
Ozone		primary and secondary	8-hour	0.075 ppm [3]	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary and secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
			24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb [4]	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA, 2012c

Notes:

[1]Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[2]The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

[3]Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

[4]Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

If the proposed action is determined to be exempt, or below thresholds then no further review is required.[13] If the proposed action is not exempt, then a General Conformity Determination is required. Further coordination with the state and local air quality agencies would then be required to determine the options in demonstrating conformity, including implementation of any mitigation measures.

3.6.2 Affected Environment

In the study area, the USEPA considers all counties in attainment with the NAAQS, except Middlesex and Suffolk Counties in Massachusetts which are moderate maintenance areas for CO (USEPA, 2012b).

In Massachusetts, the trend for O_3 exceedances has been stable for the last few years and downward since 2007. The long-term trend for SO_2 has been downward overall since 1985 and stable for the last few years; Massachusetts has been below the primary 1-hour standard of 75 ppb for SO_2. For NO_2, the trend has been downward overall since 1985 and stable the last few years, and Massachusetts has been below the annual standard. In Massachusetts, CO has been trending downward and has been well below the 1-hour and 8-hour standards. In Massachusetts, the data show an overall downward trend for $PM_{2.5}$ and PM_{10} since 2004. In 2011, lead monitoring samples in Massachusetts (including 3-month rolling averages) were below the standard of0.15 $\mu g/m^3$ (MassDEP, 2012b).

In New Hampshire, full monitoring, reporting, and forecasting for ozone occurs from April through September, and monitoring and reporting of fine particles occurs year-round (NHDES, 2012b). Air quality data indicate the air quality for the Portsmouth Seacoast portion of New Hampshire, the air monitoring sites for ground-level O_3 and $PM_{2.5}$, is good or moderate (for SO_2 and NO_2, data was not recorded). "Good" means that no health impacts are expected in this range and "moderate" means that unusually sensitive people should consider limiting prolonged outdoor exertion (NHDES, 2012b). Rockingham County New Hampshire is in non-attainment for SO_2.

Maine's air quality data indicate that the air quality in the state is good or moderate. In Maine, the air quality was good for both O_3 and PM (MDEP, 2012a).

[13] 40 CFR 93.153(b)-(c).

3.6.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not cause a decrease in air quality in the study area in the near future. However, over time, air quality could worsen as traffic congestion increases on the roads and highways across the study area.

Build Alternative

The Build Alternative would incrementally improve train operations in the study area including increased capacity, reduced trip time, and improved reliability of service. Although increased capacity and additional trips may add to air emissions from locomotive engine fuel combustion, these impacts would be offset by reductions from improved efficiencies. For instance, one-way travel time is expected to be reduced by 15 minutes between Boston and Portland and by 10 minutes between Portland and Brunswick. The reduced travel times lead to shorter locomotive run times and fewer emissions per trip.

Specific actions such as restoration of second main track and new controlled passing siding would reduce conflicts between passenger and freight trains, thus reducing future emissions from idling trains waiting for clearance to proceed. Installation of the new "wye" track would shorten the travel distance and improve operating efficiencies. This action would eliminate excess locomotive run-time on each trip. Upgrades to highway-rail at-grade crossings are expected to increase minimum operating speeds and allow locomotives to pass through at higher speeds. This would reduce the need for acceleration after a slow-down, and lead to improved fuel efficiency and reduced emissions.

The Build Alternative would improve the existing passenger rail service providing an additional incentive for more commuters and other travelers to reduce use of their personal vehicles. Passenger trains are generally more fuel efficient than automobiles, per passenger, thus providing an overall reduction of future emissions in the study area (Davis, et al., 2015).

Table 3.17 shows the estimated emissions that would occur for the Build Alternative. The counties of particular concern were Middlesex and Suffolk, MA (maintenance for CO) and Rockingham, NH (non-attainment for SO_2). As shown in Table 3.17, the emissions are well below the threshold limit and do not pose any significant impact on current air quality standards.

Table 3.17 – *Estimated Downeaster Improvement Emissions Per County*

County	Pollutant (tpy)		General Conformity Threshold (tpy)	Exceed Threshold?
	CO	SO_2		
Middlesex, MA	8.5	-	100	N
Suffolk, MA	0.5	-	100	N
Rockingham, NH	**-**	**0.01**	**100**	**N**

The Build Alternative would require construction activities that may temporarily contribute air emissions at particular locations. Construction could include activities such as earthwork, including clearing and grubbing, excavating, grading, embankment formation, and stockpiling. Based on the expected minimal acreage affected at each location, fugitive dust emissions from these types of construction activities are expected to be minimal. Dust control measures during construction would also limit the transport of dust. Emissions of other criteria pollutants such as VOCs and NO_x would occur from the combustion of fuel from construction equipment. Air emissions from construction equipment can be minimized by properly maintaining engines and reducing idling times. Given the expected small impact areas of each individual action and the actions occurring at different times, the emissions from construction activities would likely be insignificant.

Residents along designated truck haul routes may have to contend with the day-to-day hauling activities. The need to consider mitigation measures would be determined at the Project-level.

3.7 Public Health and Safety

This section describes public health and safety issues associated with the proposed change in passenger rail service. Passenger and freight rail service has the highest potential to impact public health and safety where the track crosses roads at-grade (not grade-separated crossings). Gates, lights, bells to prevent crossing the tracks or warn the public of an arriving train, provide at-grade crossing control to reduce the risk of a train striking a vehicle or pedestrian.

3.7.1 Methodology

Potential impacts to public health and safety, at the Service-level, were evaluated by identifying the locations of emergency facilities and responders in the study area and identifying the existing at-grade crossings. (NNEPRA, 2013a).

3.7.2 Affected Environment

There are 28 public safety facilities in the study area (Exhibit 3.24). These facilities consist of hospitals, fire stations, police stations, and law enforcement agencies.

The rail line crosses a variety of roadways from small roads in rural areas to major highways. There are approximately 261 crossings (95 crossings in Massachusetts, 53 crossings in NH, and 113 crossings in Maine), with 113 of those crossings (43 percent) being at-grade crossings. These at-grade crossings have various forms of safety and control, ranging from actively protected grade crossing predictor technology with gates and flashing light signals to passively-protected lights- and bells-only crossing signals.

Exhibit 3.24 - *Public Safety Facilities in the Study Area*

Facility	Address	City	State
Medford Fire Department	26 Harvard Avenue	Medford	MA
Winchester Fire Department	32 Mt. Vernon Street	Winchester	MA
Winchester Police Department	15 Pleasant St	Winchester	MA
Andover Fire Department	163 Andover Street	Andover	MA
Andover Police Department	32 North Main Street	Andover	MA
Lawrence Fire Department	71 South Broadway	Lawrence	MA
East Kingston Fire Department	5 Main Street	East Kingston	NH
Newfields Police Department	65 Main Street	Newfields	NH
Newmarket Police Department	70 Exeter Street	Newmarket	NH
Durham Fire Department	51 College Road	Durham	NH
McGregor Memorial Emergency Medical Services	47 College Road	Durham	NH
City of Dover Fire And Rescue - Central Station	9-11 Broadway	Dover	NH
Rollinsford Fire Department	17 Roberts Road	Rollinsford	NH
Rollinsford Police Department	667 Main Street	Rollinsford	NH
North Berwick Police Station	21 Main Street	North Berwick	ME
Pratt And Whitney Protective Services	113 Wells Street	North Berwick	ME
Arundel Fire - Rescue	550 Old Post Road	Arundel	ME
Saco Fire Department - Central Station	14 Thornton Avenue	Saco	ME
Saco Police Department	20 Storer Street	Saco	ME
South Portland Fire Department - Cash Corner	360 Main Street	South Portland	ME
Bureau Of Alcohol Tobacco Firearms And Explosives - Portland Field Office	68 Marginal Way	Portland	ME

Facility	Address	City	State
Cumberland County Sheriff's Department	36 County Way	Portland	ME
Maine Medical Center	22 Bramhall Street	Portland	ME
Mercy Hospital	144 State Street	Portland	ME
Portland Fire Department	380 Congress Street	Portland	ME
United States Marshals Service - Portland -District Headquarters	156 Federal Street	Portland	ME
Freeport Fire Rescue Department	4 Main Street	Freeport	ME
Freeport Police Department	16 Main Street	Freeport	ME

3.7.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have an impact on public health and safety.

Build Alternative

Construction of track segments 1-6 would not result in adverse impacts to public health and safety facilities as improvements would be in the existing ROW.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to public health and safety facilities. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to public health and safety facilities. Improvements at stations would increase station capacity for trains and pedestrians by constructing new, ADA-compliant train platforms and pedestrian walkways, potentially improving public safety at those stations. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to public health and safety facilities as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. Access to businesses would be maintained and coordination with business owners is being performed by MaineDOT as part of the planning, design, and permitting of the wye track.

Curve modifications would not result in adverse impacts to public health and safety facilities as improvements would be in the existing ROW and on existing ballast. These modifications would affect only existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not result in adverse impacts to public health and safety facilities as improvements would be in the existing ROW and on the existing ballast.

The Build Alternative would continue to use the existing grade separated and at-grade crossings; no new grade separated or at-grade crossings would result from the Build Alternative. The Build Alternative would have a beneficial impact on public health and safety facilities at some existing at-grade crossings by improving safety with upgraded signs, signals, and safety equipment. With improved safety with upgraded signs, signals, and safety equipment, the Build Alternative would reduce the risk of a train striking a vehicle or pedestrian.

The increase in service under the Build Alternative may have a negligible impact to public health in the form of a slight change in noise (see Section 3.5, Noise) and air quality (see Section 3.6, Air Quality).

3.8 Contaminated Sites and Hazardous Waste

Hazardous materials can affect the environment, construction of proposed actions, and long-term cleanup liability. There are numerous state and federal regulations applicable to the above potential contaminants. NEPA, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the National Emissions Standards for Hazardous Air Pollutants (NESHAPS), and the Toxic Substances Control Act (TSCA) are examples of federal regulations applicable to these contaminants. Many laws and regulations have been enacted throughout the United States at the state level to implement these federal regulations.

3.8.1 Methodology

Federal, state, and county GIS datasets were used for the identification of contaminated sites and areas of hazardous waste in the study area and to determine their proximity to the No-Build and Build Alternatives. Additionally, the USEPA's databases for the National Priority List (NPL) (also known as Superfund sites), Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), and the RCRA were reviewed.

3.8.2 Affected Environment

The USEPA's Superfund program was established to locate, investigate, and clean up hazardous waste sites throughout the United States (USEPA, 2012e). The study area contains three superfund sites, all located in Massachusetts; 62 hazardous waste sites in Massachusetts, 18 hazardous waste sites in New Hampshire, and 37 hazardous waste sites in Maine (Exhibit 3.25). Further analysis would have to be performed at the Project-level to identify the exact nature of the sites and if further cleanup is required (USEPA, 2012f). There are no sites in the existing ROW.

Exhibit 3.25 - *Hazardous Waste Sites near Downeaster Stations*

Name	Address	City	State
Boston Sand And Gravel Plant & Garage	500 Front Street	Boston	MA
Continental Brands	181 New Boston Street	Woburn	MA
EG&G Woburn Cathode Ray Tube	19 Wheeling Ave.	Woburn	MA
Engelhard Surface Technologies	5 Draper Street	Woburn	MA
Fraen Corp	324 New Boston Street	Woburn	MA
Industriplex NPL Site	Commerce & Atlantic	Woburn	MA
Insultab Inc.	50 Everberg Rd.	Woburn	MA
Luminus Devices Inc.	175 New Boston Street, Suite X	Woburn	MA
Morton International	185 New Boston	Woburn	MA
Murphy Waste Oil Service	252 Salem Street	Woburn	MA
Nexus Custom Electronics Corp.	317 New Boston Street	Woburn	MA
Organix Inc.	240 Salem Street	Woburn	MA
Riley Leather Company	228 Salem Street	Woburn	MA
Somerville DPW	160 New Boston Street	Woburn	MA
Tecomet	170 New Boston Street	Woburn	MA
Wells G&H	Aberjona River Valley	Woburn	MA
902 Boston Road	902 Boston Road	Haverhill	MA
Dyetex Inc.	14 Stevens Street	Haverhill	MA
Former Auto Body Shop And Truck Garage	20-22 Locke Street	Haverhill	MA
Gare Inc.	165 Rosemont Street	Haverhill	MA
Hayes Building	14-44 Granite Street	Haverhill	MA
IMI Inc.	140 Hilldale Ave	Haverhill	MA
Josephs Gourmet Pasta & Sauces	133 Hale Street	Haverhill	MA
Metal Tronics Inc.	42 Newark Street	Haverhill	MA
Printed Circuit Design	17 Locust Street	Haverhill	MA
Stevens Street Mill	14 Stevens Street	Haverhill	MA
Ted's For Tires	57 Granite Street	Haverhill	MA
Winchell Building And Adjoining Parking Lot	13-17 Locust Street and 61-79 Essex Street	Haverhill	MA
Alrose Shoe Co	1 Rockingham Street	Exeter	NH
Baggage Building	64-66 Lincoln Street	Exeter	NH
Dagostino Rose Farm	1-11 Oak Street Extension	Exeter	NH

Name	Address	City	State
Exeter Wastewater Treatment Facility	13 Newfields Rd	Exeter	NH
Craig Supply	Depot Road	Durham	NH
Depot Road	Depot Road	Durham	NH
Cogebi Inc.	14 Faraday Drive	Dover	NH
Collins & Aikman Automotive Interiors	85 Industrial Park Drive	Dover	NH
Collins & Aikman Tooling & Equipment Group	16 Industrial Park Drive.	Dover	NH
Goss International Web Offset Printing And Finishing	121 Broadway	Dover	NH
Pace Industries - Cambridge North Div	29 1/2 Littleworth Rd.	Dover	NH
Textron Automotive Company	85 Industrial Park Drive	Dover	NH
Turbocam Energy Solutions	5 Faraday Drive	Dover	NH
Universal Recycling Technologies	61 Industrial Park Ave	Dover	NH
Spencer Press Div Of RR Donnelley	90 Spencer Drive.	Wells	ME
Saco Tanning Corp	72 Main Street	Saco	ME
Saco Wastewater Treatment Facility	68 Front t	Saco	ME
American Hoist & Derrick Co	143 Fore Street	Portland	ME
Americold Logistics Plant # 80573	165 Read Street	Portland	ME
Barber Foods	54 Street John Street	Portland	ME
Barber Foods Distribution Center	56 Milliken Street	Portland	ME
Bath Iron Works	40 Commercial Street	Portland	ME
Bayside Brownfields Proposed action	2 Myrtle Street	Portland	ME
Bayside Rail Yard Chestnut Street Ext.	49-105 Somerset Street	Portland	ME
Bayside Rail Yard Surface Parking Lot Section	49-105 Somerset Street	Portland	ME
Bayside Trail And Open Space	Somerset Street	Portland	ME
Chestnut Street Lofts	29 Chestnut Street	Portland	ME
Cianbro Corporation Ricker's Wharf Facility	60 Cassidy Point Drive	Portland	ME
Deering Ice Cream Company	135 Walton Street	Portland	ME
E. Perry Company, Kennebec Street	42-44 Kennebec Street	Portland	ME
E. Perry Company, Somerset Street	9 Somerset Street	Portland	ME
Former Jordan Meats	38 India Street	Portland	ME
HP Hood LLC	349 Park Ave	Portland	ME
Maine Medical Center	22 Bramhall Street	Portland	ME
Marada Adams School	48 Moody Street	Portland	ME
Oakhurst Dairy	364 Forest Ave.	Portland	ME
Portland Dry Cleaners Inc.	28 Allen Ave	Portland	ME
Thompson's Point	1 Thompsons Point	Portland	ME
Eastland Shoe Manufacturing Corp	106 Park Street	Freeport	ME
Brooks Property	86-88 Union Street	Brunswick	ME
People Plus	210 Maine Street	Brunswick	ME

Source: USEPA, 2012e

3.8.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact contaminated sites or hazardous waste.[14]

At the Brunswick Layover Facility, coal ash and stockpiled soils with contaminants are present. The coal ash and stockpiled soils are in the process of being remediated in accordance with the MaineDEP approved action plan (USDOT, 2014).

Build Alternative

The Build Alternative would not impact known contaminated sites or areas of hazardous waste. The operation of up to two additional trains a day on the existing rail corridor would not add a substantial contribution of contamination to the existing ROW. The servicing of up to two additional trains a day at the existing facility at the PTC and the Brunswick layover facility would not add a substantial contribution of contamination to areas dedicated to servicing trains. The PTC and the Brunswick layover facility have protocols in place for handling and disposing of waste and other materials generated from servicing trains.

The Build Alternative could impact or encounter contaminated areas during construction. Potential contamination during construction could be encountered in the form of abandoned underground storage tanks, buried drums and waste, stained soils, and petroleum or chemical odors. If potentially contaminated areas were encountered, the contractor would be required to stop construction and contact the state department of environmental protection and, if within a state highway or other facility under the jurisdiction of a Department of Transportation (DOT), the state DOT to determine the appropriate course of action.

The Massachusetts Department of Environmental Protection (MassDEP) administers the Commonwealth's environmental regulatory programs. It is responsible for ensuring the timely cleanup of hazardous waste sites, providing emergency response to hazardous material spills, implementing strategies for preserving wetlands, and ensuring clean air and water. The Massachusetts Department of Transportation's Hazardous Materials Investigation and Remediation Unit has oversight of remedial activities to ensure compliance with Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan.

[14] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

The New Hampshire Department of Environmental Services' (NHDES) Hazardous Waste Management Bureau is responsible for administering the State's hazardous waste management program. The New Hampshire Department of Transportation's Bureau of Environment should be contacted to assess contaminated materials, recommending and administering remedial activities, and assuring compliance with rules and regulations relative to contamination issues and the handling of hazardous or regulated materials.

The Maine Department of Environmental Protection (MDEP) should be contacted when a discovery is made of potential unknown contamination. The MDEP relies on their Spills and Site Cleanup Section, Uncontrolled Hazardous Substance Sites Program to address hazardous issues. MaineDOT relies on their Coordination, Assessment and Permits Division to coordinate actions within the Environmental Office.

At the Project-level, due diligence investigations may be performed to identify contamination issues before construction. At the Project-level, special conditions and provisions would be incorporated into construction documents to address contamination if encountered during construction.

3.9 Cultural and Historic Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires that federal agencies take into account the effects of their undertakings on historic properties. A historic property is any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register of Historic Places (NRHP). The Section 106 review process is outlined in regulations promulgated by the Advisory Council on Historic Preservation (ACHP), "Protection of Historic Properties" (36 CFR Part 800).

To be eligible for the NRHP, a property must possess integrity and meet at least one of the following NRHP evaluation criteria (36 CFR § 60.4):

- The property is associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- The property is associated with the lives of persons significant in our past (Criterion B);

- The property embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or,
- The property has yielded, or may be likely to yield, information important to prehistory or history (Criterion D).

3.9.1 Methodology

The objective of this Service-level evaluation is to identify the locations of known historic properties within the preliminary area of potential effect (APE) from readily available federal and state GIS data, and to assess the potential for effects to these properties based on the Build Alternative. As the design of the Build Alternative is advanced and more detailed information becomes available at the Project-level (Tier 2), the APE would be formally determined by FRA, or another lead federal agency, in consultation with the appropriate State Historic Preservation Offices (SHPO)s. The lead federal agency's Tier 2 Section 106 efforts would also include, in consultation with the appropriate SHPOs and consulting parties, the identification of additional historic properties, determinations of effect, and resolution of any adverse effects.

For this Tier 1 Service-level analysis, Federal, state, and county GIS datasets were used for the identification of cultural and historic resources and to determine their proximity to Build Alternative. Additionally, the National Park Service's NRHP on-line database was reviewed.

3.9.2 Affected Environment

This Service-level analysis identifies known historic properties in the study area. Properties were identified using the National Park Service's NRHP on-line database. There are 74 properties within the study area in Massachusetts that are listed on the NRHP. In New Hampshire, there are nine NRHP-listed properties within the study area. In Maine, there are 28 NRHP-listed properties in the study area (Exhibit 3.26).

Exhibit 3.26 - NRHP-Listed Properties

Historic Site	State
Abbot, Benjamin, House	MA
Abbot, J. T., House	MA
Alewife Brook Parkway	MA
American Woolen Mill Housing District	MA
Andover Village Industrial District	MA
Austin, Francis B., House	MA
Russell, Susan, House	MA
Shawsheen Village Historic District	MA
Skillings Estate House	MA
Snow, Lemuel, Jr., House	MA
Somerville High School	MA
Third Railroad Station	MA

Historic Site	State
Ayer, Thomas, House	MA
Bacon, Robert, House	MA
Ballardvale District	MA
Barnes, Walter S. and Melissa E., House	MA
Bradlee School	MA
Building at 138--142 Portland Street	MA
Bulfinch Triangle Historic District	MA
Central Library	MA
Central Street District	MA
Chickering House	MA
Childs, Webster, House	MA
Church Street Historic District	MA
Clifford, Nathan, School	MA
Cochran, Jehiel, House	MA
Crowell, C. C., House	MA
Cummings' Guest House	MA
Cummings Shoe Factory	MA
DeRochmont House	MA
Elder, Samuel, House	MA
Engine Company Number Nine Firehouse	MA
Everett Avenue-Sheffield Road Historic District	MA
First Parish Church	MA
First Unitarian Church	MA
First Universalist Church	MA
Firth--Glengarry Historic District	MA
Frye, Nathan, House	MA
Gaut, Samuel, House	MA
Ginn Carriage House	MA
Ginn Gardener's House	MA
Hatch, Horace, House	MA
Haverhill Board of Trade Building	MA
Hayes, Charles H., Building	MA
Highland, The	MA
House at 21 Dartmouth Street	MA
House at 25 Clyde Street	MA
House at 49 Vinal Avenue	MA
House at 5 Prospect Hill	MA
Ireland, Samuel, House	MA
L.H. Hamel Leather Company Historic District	MA
Langmaid Building	MA
Loring, George, House	MA
Merrill, Capt. Reuben, House	MA
Merrimack Associates Building	MA
Mystic Gatehouse	MA
Mystic Valley Parkway, Metropolitan Park System of Greater Boston MPS	MA
North Canal	MA
Parker, Harrison, Sr., House	MA
Pearson, Abiel, House	MA
Primrose Street Schoolhouse	MA
Punchard, Benjamin House	MA
Tufts, Peter and Oliver, House	MA
US Post Office--Winchester Main	MA
Warren, H. House	MA
Washington Street Shoe District	MA
Williams, Charles, House	MA
Williams, F. G., House	MA
Wilmington Centre Village Historic District	MA
Winchester Center Historic District	MA
Winchester Savings Bank	MA
Winchester Town Hall	MA
Wood Worsted Mill	MA
Wright House	MA
Exeter Waterfront Commercial Historic District	NH
Front Street Historic District	NH
Gilman, Maj. John, House	NH
Newmarket Industrial and Commercial Historic District	NH
Plaistow Carhouse	NH
Rollinsford Town Hall	NH
Salmon Falls Mill Historic District	NH
Stone School	NH
Back Cove	ME
Biddeford--Saco Mills Historic District	ME
Early Post Office	ME
Federal Street Historic District	ME
Freeport Main Street Historic District	ME
Harraseeket Historic District	ME
Hussey Plow Company Building	ME
Jacobs Houses and Store	ME
Kennebunk Historic District	ME
Maine Central Railroad General Office	ME
Maine Publicity Bureau Building	ME
Mallett, E. B., Office Building	ME
Massachusetts Hall, Bowdoin College	ME
Ocean Park Historic Buildings	ME
Reade, Michael, House	ME
Richardson House	ME
Russell, Arthur H., House	ME
Saco Central Fire Station	ME
Saco Historic District	ME
Saunders, Daniel, School	ME
Simonds, William, House	ME
Sparrow House	ME
St. Paul's Episcopal Church	ME
Staples Inn	ME
Stowe, Harriet Beecher, House	ME
Thompson, Abijah, House	ME
Western Promenade	ME
Western Promenade Historic District	ME
Woodbury Mill	ME

Source: NRHP, 2016

Early in the scoping process, the SHPOs in Massachusetts, New Hampshire, and Maine were contacted for information and input to the study at the Service-level. All three SHPOs support deferring Section 106 consultation to the Tier 2 level. See Appendix C.

The Massachusetts Historical Commission (MHC) requested information and design drawings, at the Project-level, for all new construction and for rehabilitation of existing structures. The MHC requested the opportunity to review the proposed scope for the historic properties identification effort prior to the implementation of any cultural resource surveys at the Project-level. (MHC, 2012).

In New Hampshire, the Division of Historical Resources noted the B & M rail line was determined eligible for listing in the NRHP in 1993 for its historical and engineering significance and that the railbed and bridges, stations, and ancillary structures that pre-date 1943 appear to be eligible as contributing properties. The Division of Historical Resources recommended, as plans are developed, at the Project-level, additional detailed study. (NHDHR, 2012).

The Maine SHPO advised that additional consultation would be required at the Tier 2 Project-level.

3.9.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have an effect on known cultural resources or historic sites.[15]

Build Alternative

If the Build Alternative improvements receive federal funding and have the potential to affect historic properties, the FRA would initiate Section 106 consultation with the appropriate State Historic Preservation Officers (SHPOs) and Tribal Historic Preservation Officers. Section 106 consultation at the Project-level would involve establishing the Area(s) of Potential Effects (APE), identifying and consulting with consulting parties, providing opportunities for public involvement, identifying and evaluating historic properties within the APE, assessing effects to historic

[15] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

properties, and resolving any adverse effects to historic properties. Based on the nature of the improvements that would be necessary to improve the Downeaster service, direct and indirect effects to historic properties are likely. However, at the Tier 1 level, there is not enough information to be able to assess and determine effects to historic properties. FRA, or another lead federal agency, would be responsible for Section 106 compliance for any Tier 2 projects affecting historic properties.

The Section 106 process at the Tier 2 Project-level may involve the identification of historic railroad infrastructure located within the existing ROW (e.g., stations, bridges, culverts), as well as the identification of above-ground historic properties adjacent to the ROW that could be affected by noise, vibration, or changes in setting resulting from improvements to the rail corridor and increased train operations, the identification of archaeological resources in soils beneath the ROW that could be affected by ground-disturbing activities, and consideration of impacts to historic properties from the construction of access roads or equipment or materials staging areas. Section 11504 of the Fixing America's Surface Transportation (FAST) Act (Pub. L. 114-94) enacted on December 4, 2015 mandates the development of a Section 106 exemption for railroad rights-of-way; it is possible that certain railroad-related resources along the NNEIRI corridor will be exempt from the requirements of Section 106 in the future.

3.10 Section 4(f) Resources

Section 4(f) of the U.S. Department of Transportation Act of 1966, 49 USC 303(c) provides that the proposed use of land from any publicly-owned public park, recreation area, wildlife and/or waterfowl refuge, or any significant historic site may not be approved as part of a federally-funded or approved transportation proposed action unless:

a) FRA determines that there is no feasible and prudent avoidance alternative to the use of land from the property, and the action includes all possible planning to minimize harm to the property resulting from such use; or

b) FRA determines that the use of the Section 4(f) properties, including any measures to minimize harm (such as avoidance, minimization, mitigation, or enhancements measures) committed to by the applicant, would have a *de minimis* impact on the property.

A "use" of property afforded consideration and protection under Section 4(f) occurs:

- When land is ***permanently incorporated*** into a transportation facility;
- When there is a ***temporary occupancy*** of land that is adverse in terms of the statute's preservation purpose; that is, when one of the following criteria for temporary occupancy are not met:
  - The duration of the occupancy must be less than the time needed for the construction of the proposed action, and no change of ownership occurs.
  - Both the nature and magnitude of the changes to the Section 4(f) property are minimal.
  - No permanent adverse physical changes, or interference with activities or purposes of the resources on a temporary or permanent basis, are anticipated.
  - The land must be returned to a condition that is at least as good as existed prior to the proposed action.
  - A documented agreement of the federal, state, or local officials having jurisdiction over the land regarding the above conditions.
- When there is a ***constructive use*** of a Section 4(f) property. A constructive use occurs when the proposed action does not incorporate land from a Section 4(f) property, but the proposed action's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Examples of a constructive use are:
  - The noise level increase from the proposed action substantially interferes with the use and enjoyment of a Section 4(f) resource (e.g., hearing performances at an outdoor amphitheater or interrupting a quiet setting).
  - The proximity of the proposed action substantially impairs the aesthetic quality of a resource where these aesthetic qualities are considered important contributing elements to the value of a resource (e.g., obstructing or eliminating the primary views of an architecturally significant building).
  - A restriction on access diminishes the utility of a resource.

- A vibration impact from the operation of a proposed action impairs the use of a resource, affects the structural integrity of a historic building, or impairs its utility.
- The proposed action results in an intrusion into an ecological setting that diminishes the value of a wildlife or waterfowl refuge adjacent to the proposed action.

Pursuant to Section 11502 of the FAST Act improvements to, or the maintenance, rehabilitation, or operation of, railroad lines or elements thereof that are in use or were historically used for the transportation of goods or passengers are not considered a use of a historic site, regardless of whether the railroad or element thereof is listed on or eligible for listing on the NRHP. An exception to this is historic stations and certain bridges and tunnels, which are still subject to Section 4(f). A full Section 4(f) analysis and determination would occur during Tier 2 Project-Level analysis.

Agencies may apply the Section 11502 exemption to proposed uses of Section 4(f) property by projects for which the environmental review process was initiated after December 3, 2015. However, this exemption will not apply to any project, regardless of when it was initiated, for which the Secretary of Transportation approved the funding arrangement under title 49, United States Code, before December 4, 2015.

3.10.1 Methodology

Federal, state, and county GIS datasets were used for the identification of Section 4(f) lands and to determine their proximity to the Build Alternative. Additionally, the National Park Service's NRHP on-line database was reviewed.

3.10.2 Affected Environment

Many resources afforded consideration and protection under Section 4(f) are located in the study area (see Section 3.4, Parks and Recreation Areas and Section 3.9, Cultural Resources). There are no known wildlife and waterfowl refuges in the study area.

3.10.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact a resource afforded consideration and protection under Section 4(f) because a use of property would not occur.[16]

Build Alternative

Improvements under the Build Alternative would be located within the existing ROW of an active rail line. The Build Alternative would not permanently incorporate land from public parks, recreation areas, or wildlife or waterfowl refuges protected under Section 4(f). At the Service-level, a temporary use or occupancy of a Section 4(f) property for construction staging or access is not anticipated. Impacts to historic resources will be addressed at the Tier 2 Project-Level.

Analysis in accordance with Section 4(f) at the Project-level may be necessary to determine if there would be a constructive use of 4(f) properties (e.g., proximity impacts such as increased noise levels that would substantially impair the property's activities, features, or attributes that qualify the property for protection under Section 4(f)). However, it is not anticipated that the addition of two Downeaster trips per day would substantively change existing conditions, and therefore recreational activities or wildlife functions at nearby Section 4(f) properties are not anticipated to be affected, and changes in noise levels are not anticipated to conflict with active recreational use.

3.11 Waters

This section describes the surface water and groundwater resources near the railroad. Once the design of the Build Alternative is advanced at the Project-level, surface water resources would be delineated prior to or concurrently with the design phases, to avoid and/or minimize impacts to regulated surface water bodies. If it is determined that impacts to waters are unavoidable, authorization for unavoidable impacts would be sought from the appropriate federal and state agencies.

The U.S. Army Corps of Engineers (USACE) provides oversight and regulates activities in the nation's navigable waters. The Clean Water Act (CWA) provides protections for Waters of the

[16] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

United States and wetlands, including special aquatic sites. Authorization under Section 404 is required from the USACE for the discharge of dredged or fill material into the waters of the United States, which include wetlands. Section 404(b)(1) of the CWA provides guidance to the USACE for the issuance of permits; compliance with Section 404(b)(1) is required. Work in or affecting navigable waters is regulated under Section 10 of the U.S. Rivers and Harbors Act.

3.11.1 Methodology

Federal, state, and county GIS datasets were used for the identification of water resources and to determine their proximity to the Build Alternative. Additionally, the USEPA WATERS program and the MassDEP, NHDES, and MDEP standards for water quality were used.

In Massachusetts, existing water quality uses and the level of water quality necessary to protect the existing uses shall be maintained and protected. Surface inland waters are classified into Class A, B, or C:

- Class A waters include waters designated as a source of public water supply and their tributaries. They are designated as excellent habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation, even if not allowed. These waters shall have excellent aesthetic value. These waters are protected as Outstanding Resource Waters.
- Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. Where designated in 314 CMR 4.06, they shall be suitable as a source of public water supply with appropriate treatment ("Treated Water Supply"). Class B waters shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value.
- Class C waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for secondary contact recreation. These waters shall be suitable for the irrigation of crops used for consumption after cooking and for compatible industrial cooling and process uses. These waters shall have good aesthetic value.

In Massachusetts, coastal and marine waters are classified into Class SA, SB, and SC:

- Class SA waters are designated as an excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shell fishing, these waters shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas). These waters shall have excellent aesthetic value.
- Class SB waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, habitat for fish, other aquatic life and wildlife may include, but is not limited to, seagrass. Where designated in the tables to 314 CMR 4.00 for shell fishing, these waters shall be suitable for shellfish harvesting with depuration (Restricted and Conditionally Restricted Shellfish Areas). These waters shall have consistently good aesthetic value.

Class SC waters are designated as a habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for secondary contact recreation. They shall also be suitable for certain industrial cooling and process uses. These waters shall have good aesthetic value.

In New Hampshire, surface waters are divided into Class A and class B waters:

- Class A waters are generally of the highest quality and are considered potentially usable for water supply after adequate treatment. Discharge of sewage or wastes is prohibited to waters of this classification.
- Class B waters are of the second highest quality, these waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies.

In general, the current water quality in New Hampshire is very good.

The State of Maine's objective is to restore and maintain the chemical, physical, and biological integrity of the state's waters and to preserve certain pristine state waters. The MDEP sets

water quality standards for the rivers and lakes of the state. According to the Maine Water Quality Standards (MDEP, 2012b):

- Class AA waters must be of such quality that they are suitable for the designated uses of drinking water after disinfection, fishing, agriculture, recreation in and on the water, navigation and as habitat for fish and other aquatic life. The habitat must be characterized as free-flowing and natural.
- Class A waters must be of such quality that they are suitable for the designated uses of drinking water after disinfection; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, Section 403; navigation; and as habitat for fish and other aquatic life. The habitat must be characterized as natural.
- Class B waters must be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, Section 403; navigation; and as habitat for fish and other aquatic life. The habitat must be characterized as unimpaired.
- Class C waters must be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, Section 403; navigation; and as a habitat for fish and other aquatic life.

3.11.2 Surface Waters and Water Quality

3.11.2.1 Affected Environment

Many perennial and intermittent waterways are in the study area (Exhibit 3.27). Many waters and wetlands were impacted and bisected during the construction of the corridor in the 1910s and 1920s. Many of these waters remain hydraulically connected, while others do not.

Exhibit 3.27 - *Waterways*

Name	County	State

Name	County	State
Charles River	Suffolk	MA
Aberjona River	Middlesex	MA
Mystic River	Middlesex	MA
Whittemore Pond	Middlesex	MA
Shawsheen River	Essex, Middlesex	MA
Cochichewick River	Essex	MA
Merrimack River	Essex	MA
Little River	Rockingham, Essex	NH, MA
Executer River	Rockingham	NH
Little River	Rockingham	NH
Powwow River	Rockingham	NH
Squamscott River[1]	Rockingham	NH
Bellamy River	Strafford	NH
Cocheco River	Strafford	NH
Lamprey River	Strafford	NH
Oyster River	Strafford	NH
Salmon Falls River	York, Strafford	ME, NH
Great Works River	York	ME
Kennebunk River	York	ME
Merriland River	York	ME
Mousam River	York	ME
Saco River	York	ME
East Branch Piscataqua River[1]	Cumberland	ME
Fore River	Cumberland	ME
Nonesuch River	Cumberland	ME
Piscataqua River	Cumberland	ME
Presumpscot River	Cumberland	ME
Royal River	Cumberland	ME
Scarborough River	Cumberland	ME

Source: USGS, 2011

Notes: [1]River is within 100 feet of rail corridor. All other rivers cross the rail corridor.

Surface waters in the study area in Massachusetts are Class B water and the Merrimack River is Class SB waters (MassDEP, 2007).

Waters that drain directly or indirectly into tidal waters of Cumberland County, Maine— with the exception of the Presumpscot River Basin (mostly Class A) and the Royal River Basin (Class A and B) —are considered Class B waters, unless otherwise specified. In the Town of Freeport, Frost Gully Brook is Class A; and in Portland, Scarborough, and South Portland, all minor drainages are Class C. Waters that drain directly or indirectly into tidal waters of York County, Maine with the exception of the Saco River Basin (Class AA, A, B and C), the Salmon Falls River Basin (Class A, B,

and C), and the Mousam River Basin (Class B and C) are Class B waters, unless otherwise specified. In the Town of Kennebunk, Branch Brook is Class A; and in Wells, Branch Brook, Merriland River, Depot Brook, and Blacksmith Brook are all Class A waters (MDEP, 2012a).

Overall, the majority of the study area surface waters are of good quality, but problems exist around densely populated urban areas. In rivers, nutrient enrichment, low dissolved oxygen, organic matter, siltation, and habitat alteration degrade water quality. In lakes, the leading problems result from metals and other toxics, ammonia, and nutrients. In estuaries, nutrient enrichment, habitat alteration, and siltation degrade quality.

The USEPA's database of impaired waters was reviewed (Exhibit 3.28). The database provides information on the designated use(s) of a waterbody, water quality data, assessment of water quality, the potential causes of impaired waters, and locations of discharges. At the Project-level, design and analysis would be performed if the Build Alternative would have an impact on an impaired water.

Exhibit 3.28 – *Impaired Waters in the Study Area*

Name of Water	County	City/Town	State
Charles River	Suffolk	Boston	MA
Boston Inner Harbor	Suffolk	Boston	MA
Mystic River	Middlesex	Somerville	MA
Aberjona River	Middlesex	Winchester/Woburn	MA
Mill Pond	Middlesex	Winchester	MA
Judkins Pond	Middlesex	Winchester	MA
Wedge Pond	Middlesex	Winchester	MA
Shawsheen River	Essex	Andover/Lawrence	MA
Rogers Brook	Essex	Andover	MA
Merrimack River	Essex	Lawrence/North Andover/Methuen/Haverhill	MA
Ballardvale Impoundment	Essex	Andover	MA
Little River	Essex	Haverhill	MA
Kelly Brook	Rockingham	Plaistow	NH
Great Brook	Rockingham	East Kingston	NH
Exeter River, Pws	Rockingham	Exeter	NH
Little River	Rockingham	Exeter	NH
Norris Brook	Rockingham	Exeter	NH
Unnamed Brook - To Squamscott River	Rockingham	Newfields	NH
Lamprey River - Macallen Dam	Rockingham	Newmarket/Durham	NH
Oyster River	Strafford	Durham	NH
College Brook	Strafford	Durham	NH
Reservoir Brook	Strafford	Durham	NH
Bellamy River, Cls-A	Strafford	Madbury	NH
Cocheco River - Central Ave Dam	Strafford	Dover	NH
Rollins Brook	Strafford	Rollinsford	NH
Fresh Creek	Strafford	Rollinsford	NH
Adams Brook (Berwick)	York	Berwick	ME

Name of Water	County	City/Town	State
West Brook (North Berwick)	York	Wells	ME
Thacher Brook (Biddeford)	York	Arundel/Biddeford	ME
Dole Brook (Formerly Known As 'Unnamed Stream-Portland 3')	Cumberland	Portland	ME
Unnamed Tributary (Brunswick 2) To Androscoggin River	Cumberland	Brunswick	ME

Source: USEPA, 2015

3.11.2.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact surface waters or water quality.[17]

Build Alternative

The Build Alternative is not anticipated to result in significant, permanent impacts to surface waters and water quality. The Build Alternative may have a temporary impact on surface waters due to construction; the specific waters and construction activities that could have a temporary impact would be determined at the Project-level.

Construction of track segments 1-6 may necessitate widening the ballast to accommodate the tracks. This could result in minor, permanent impacts to surface waters and water quality, through the placement of fill or sedimentation, if water is ponded at the toe of the slope of the berm or if a culvert needs to be extended. When in proximity to surface waters, the side slope of the berm could be increased to further avoid and minimize impacts at the toe of the slope of the berm. At the Project-level, survey, design, and analysis would need to be performed to determine if widening the ballast is necessary and if existing culverts have sufficient length or require extension.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to surface waters and water quality as none are present in the area and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to surface waters and water quality as none are present in the area and the area is currently dedicated to transportation.

[17] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

Installation of the wye track would not result in adverse impacts to surface waters and water quality as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. There are no waters in the area.

Curve modifications would not result in adverse impacts to surface waters and water quality as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to surface waters and water quality, if present. The temporary impacts would be limited to the duration of construction.

At-grade crossing upgrades may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to surface waters and water quality from increased sedimentation, if present. The temporary impacts would be limited to the duration of construction.

The increase in service under the Build Alternative would not result in adverse impacts to surface waters or water quality as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

At the Project-level, actions may require authorization or permits for the discharge of dredged or fill materials into surface waters. In Massachusetts, a Wetlands Protection Act (WPA) Permit may be required from the MassDEP for projects in, on, over or adjacent to:

> *"any bank, freshwater wetland coastal wetland, beach, dune, tidal flat, marsh or swamp bordering on the ocean, any estuary, creek, river, stream, pond, lake, or certified vernal pool; land under any of the water bodies listed; land subject to tidal action, coastal storm flowage, or flooding; and Riverfront areas in the Commonwealth of Massachusetts. In addition, a 100-foot buffer zone around any fresh water or coastal resource listed above is subject to jurisdiction" (MassDEP, 2007).*

In New Hampshire, a Wetlands and Non Site-Specific Permit-Standard Permit may be required from the NHDES Wetlands Bureau:

"to protect and preserve submerged lands under tidal and freshwaters and its wetlands, both salt water and fresh-water, from unregulated alteration that would adversely affect the natural ability of wetlands to absorb flood waters, treat stormwater and recharge groundwater supplies, impact fish and wildlife of significant value and depreciate or obstruct the commerce, recreation and the aesthetic enjoyment of the public" (NHDES, 2012a).

In Maine, a NRPA Permit may be required from the MDEP for projects in, on, over, or adjacent to protected natural resources. Protected resources are coastal wetlands, great ponds, rivers, streams, significant wildlife habitat, and freshwater wetlands (MDEP, 2012b).

3.11.3 Groundwater

3.11.3.1 Affected Environment

The study area lies within the Seaboard Lowlands section of the New England province of the Appalachian physiographic division. This physiographic section runs from Rhode Island through the easternmost portion of Maine, and topographic relief is less than 200 feet in most places. Approximately 70 acres of land within the study area is classified as water bodies and approximately 536 acres of wetlands are present. Throughout the Seaboard Lowlands, small streams and rivers generally flow towards the coast along the land-surface slope. Given the location of the study area, substantial proportion of surface waters, saturated soils, and flat topography of the area, groundwater is close to the surface throughout the study area.

The northeastern coastal region of the U.S. is classified as having little or no water deficiency in any season, and mean annual groundwater recharge is 10.0 to 15.0 inches per year within the Massachusetts and Maine portions of the study area, and 5.0 to 15.0 throughout the New Hampshire portion of the study (USGS, 2008).

Within the study area, residential and commercial groundwater wells exist including three in Massachusetts, none in New Hampshire, and 177 in Maine. None of these wells are in the Downeaster ROW.

3.11.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact groundwater.[18]

Build Alternative

The Build Alternative would not have a permanent impact on groundwater quantity or quality. The Build Alternative would not impact groundwater wells outside of the ROW. The Build Alternative may have a temporary impact on groundwater quality due to construction; the specific locations of construction activities that could have a temporary impact would be determined at the Project-level.

Construction of track segments 1-6 would not result in adverse impacts to groundwater quantity or quality as improvements would be in the existing ROW and would not require excavation. This element of the Build Alternative may necessitate widening the berm to accommodate the tracks.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to groundwater quantity or quality as the improvements would not require excavation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to groundwater quantity or quality as the improvements would not require excavation and the area is currently dedicated to transportation.

Installation of the wye track would not result in adverse impacts to groundwater quantity or quality as improvements would be in the former ROW and would not require excavation.

Curve modifications would not result in adverse impacts to groundwater quantity or quality as improvements would be in the existing ROW and on existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to groundwater quality. As the purpose of the underdrains is to remove groundwater

[18] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

from the area, it is unlikely the underdrains would be constructed when groundwater is near the surface. If groundwater quality were impacted, the impact would be temporary and limited to the duration of construction.

At-grade crossing upgrades may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to groundwater quality. If groundwater quality were impacted, the impact would be temporary and limited to the duration of construction.

The increase in service under the Build Alternative would not result in adverse impacts to groundwater quantity or quality as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property or excavation.

3.12 Wetlands

Wetlands are critical environmental resources that perform functions such as wildlife habitat, flood attenuation, groundwater recharge and discharge, and others. Wetlands are regulated by the United States Corps of Engineers (USACE) through the Clean Water Act Section 404 permit process. In Maine, the Department of Environmental Protection regulates wetlands. In New Hampshire, the Department of Environmental Services wetland bureau regulates wetlands. In Massachusetts, wetlands are regulated by MassDEP.

EO 11990, "Protection of Wetlands," requires federal agencies to avoid, to the extent practicable, short- and long-term impacts associated with the destruction or modification of wetlands. Specifically, it directs federal agencies to avoid new construction in wetlands unless there is no practical alternative. It further states that where wetlands cannot be avoided, the proposed action must include all practical measures to minimize harm to the wetlands.

In accordance with EO 11990, Protection of Wetlands, federal agencies shall avoid undertaking or providing assistance for new construction in wetlands unless:

- There is no practicable alternative to such construction; and/or,

  The proposed action includes all practicable measures to minimize harm to wetlands, which may result from its use.

Principal applicable state law is as follows:

Massachusetts

- The Massachusetts Wetlands Protection Act (M.L. Chapter 12 Section 40).

New Hampshire

- New Hampshire Statutes. Title 50 Chapter 482-A: Fill and Dredge in Wetlands
- New Hampshire Wetland Rules (Chapter Env-Wt 100 – 900 Wetlands Rules)

Maine

- Natural Resources Protection Act (38 MRSA 480-B)

3.12.1 Methodology

Federal, state, and county GIS datasets were used for the identification of wetlands and to determine their proximity to the Build Alternative. Wetlands in the study area were identified using National Wetlands Inventory (NWI) mapping. The NWI is a program administered by the U.S. Fish and Wildlife Service (USFWS) for mapping and classifying wetlands.

3.12.2 Affected Environment

Palustrine wetlands refers to a system of wetlands which consist of "all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 percent" (Mitsch and Gossleink, 2015). Historic or traditional names for palustrine wetlands include marsh, swamp, bog, fen, and prairie, and other water bodies such as ponds (Cowardin, 1979). According to GIS analysis, approximately 420 acres of the study area are classified as palustrine wetlands, and these wetlands are fairly evenly distributed throughout the study area.

Estuarine wetlands consist of deepwater tidal habitats and wetlands, usually semi-enclosed by land but having open, partly obstructed or sporadic access to the open ocean, where ocean is at least occasionally diluted by freshwater runoff from the land. Estuarine wetlands consist of both subtidal and intertidal subsystems. Varieties of wetlands develop in estuaries because of differences in salinity and duration and frequency of tidal inundation. Major wetland types consist of emergent wetlands, intertidal unconsolidated shores, and scrub-shrub wetlands. Other coastal wetlands consist of intertidal coral and mollusk reefs, rocky shores, streambeds, and forested wetlands (Mitsch and Gossleink, 2015). According to GIS analysis, there are approximately 84 acres of estuarine wetlands in the study area.

Riverine wetlands include "all wetlands and deep water habitats contained within a channel with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and 2) deep water habitats with water containing ocean-derived salts in excess of 0.5 parts per thousand" (Mitsch and Gossleink, 2015). Upland islands or palustrine wetlands may occur in the channel, but they are not part of the riverine system. According to GIS analysis, approximately 24 acres of riverine wetlands occur in the study area (see Section 3.12 for more information on waterways). A lacustrine system consist of wetlands and deep-water habitats with all of the following characteristics: wetlands are situated in a topographic depression or a dammed river channel; wetlands are lacking trees, shrubs, persistent emergents, or emergent mosses or lichens with more than 30 percent area coverage; and the wetland total area exceeds 20 acres (Cowardin, 1979). According to GIS analysis, approximately 9 acres of lacustrine wetlands occurs in the study area.

According to GIS analysis, approximately 536 acres of wetlands exist in the study area (Exhibit 3.29). Approximately 16 percent are in Massachusetts (approximately 83 acres), 28 percent are in New Hampshire (approximately 151 acres), and 56 percent are in Maine (approximately 302 acres). Many waters and wetlands were impacted and bisected during the construction of the corridor in the 1910s and 1920s. Many of these waters remain hydraulically connected, while others do not.

Exhibit 3.29 – Wetlands in the Study Area

County	State	Palustrine (ac.)	Estuarine (ac.)	Lacustrine (ac.)	Riverine (ac.)	Total Wetlands (ac.)	Study Area (ac.)	Percent of Wetlands in Study Area (%)
Suffolk	MA	0.0	1.4	0.0	0.0	1.4	17.8	7.9
Middlesex	MA	45.7	0.5	0.0	3.1	49.4	621	8.0
Essex	MA	16.1	0.0	4.4	11.8	32.3	608	5.3
Rockingham	NH	95.8	10.0	3.5	0.5	110	737	14.9
Strafford	NH	38.7	0.0	1.2	1.1	41.0	444	9.2
York	ME	171	15.3	0.0	4.5	191	1,162	16.4
Cumberland	ME	52.7	56.2	0.0	3.0	112	1,247	9.0
Total		**420**	**84**	**9.1**	**24**	**536**	**4,838**	**11.1%**

3.12.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact wetlands.[19]

Build-Alternative

Construction of track segments 1-6 may necessitate widening the ballast to accommodate the tracks. This could result in a permanent impact to wetlands, through placement of fill or sedimentation, if water is ponded at the toe of the slope of the berm or if a culvert needs to be extended. When in proximity to wetlands, the side slope of the berm could be increased to further avoid and minimize impacts at the toe of the slope of the berm.

At the Project-level, survey, design, and analysis would need to be performed to determine if widening the ballast is necessary and if existing culverts have sufficient length or require extension.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to wetlands as none are present in the area. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to wetlands as none are present in the area.

Installation of the wye track would have a permanent impact on wetlands to the east of the PTC to Congress Street in Portland, Maine (Exhibit 2.3). On behalf of NNEPRA, the MaineDOT will develop the design, permitting, and construction of the new connecting or wye track. It is anticipated the permanent impact to palustrine emergent wetlands would be approximately 0.25 acre (see Section 1.4.2, Permits and Approvals).

Curve modifications would not result in adverse impacts to wetlands as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary

[19] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

impact to wetlands, if present. The temporary impacts would be limited to the duration of construction.

Installations of new interlockings, or modifications to existing interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to wetlands, if present. The temporary impacts would be limited to the duration of construction.

At-grade crossing upgrades may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to wetlands, if present. The temporary impacts would be limited to the duration of construction.

The increase in service under the Build Alternative would not result in adverse impacts to wetlands as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

The Build Alternative may impact wetlands due to construction; the specific wetlands, including type and size, and construction activities that could have a temporary impact would be determined at the Project-level. To avoid wetlands, the side slope of the berm could be increased to further avoid and minimize impacts at the toe of the slope of the berm. Design and analysis at the Project-level would be necessary to determine if any of the improvements require a USACE permit or other authorization for the discharge of dredged or fill materials into wetlands.

3.13 Floodplains

Floodplain areas are zones adjacent to streams, rivers, lakes, or other surface waters that are periodically inundated, usually as a result of large precipitation events. Development within floodplains may be at risk due to possible inundation and endangers downstream areas by reducing flood storage capacity.

EO 11988, "Floodplain Management," requires consideration of impacts to floodplains. The EO directs federal agencies to undertake actions to avoid impacts on floodplain areas by structures built in flood-prone areas unless that agency finds that: 1) there is no practical alternative, and 2) the proposed action has been designed or modified to minimize harm to, or within, the floodplain. The intent of these requirements is to reduce the risk of flood loss; minimize the

impact of floods on human safety, health and welfare; and restore and preserve the natural and beneficial values served by floodplains. Compliance with the EO ensures that work within the 100-year floodplain does not increase downstream flooding. The Federal Emergency Management Agency (FEMA) regulates floodplains, and local floodplain management administers ordinances within individual localities (U.S. President, 1977).

EO 13690, "Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input," enacts the Federal Flood Risk Management Standard, a framework to increase resilience against flooding and preserve floodplains, and amends EO 11988. These regulations raise the standards set in EO 11988 for any development within a floodplain by: more clearly defining the term "floodplain"; adding new methods for determining the floodplain; increasing the base flood level to a higher vertical elevation; and encourages natural systems, ecosystem processes, and nature-based approaches for any development within a floodplain (U.S. President, 2015). The U.S. Department of Transportation has not yet published guidance for assessing floodplains impacts under the 2015 E.O.

3.13.1 Methodology

Federal, state, and county GIS datasets were used for the identification of floodplains and to determine their proximity to the No-Build and Build Alternatives. Additionally, the floodplain assessment used FEMA's digital representation of Flood Insurance Rate Maps (FIRMs).

3.13.2 Affected Environment

According to FEMA's digital representation of FIRMs, portions of the study area are within 100-year floodplain areas. A 100-year floodplain consist of land that could be inundated by a flood of a magnitude that has a 1 percent chance of being equaled or exceeded in any given year (i.e., 100-year floodplain). Locations in the study area lying within these special flood hazard areas generally correspond to drainage basins of rivers, creeks, and canals. There are approximately 116 acres of floodplains in the study area in Massachusetts, 86 acres of floodplains in New Hampshire, and 199 acres of floodplains in Maine (FEMA, 2012).

3.13.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact floodplains.[20]

Build Alternative

The Build Alternative improvements would be in the existing ROW and are not expected to have a significant permanent impact on floodplains or result in changes to hydraulic conditions. The Build Alternative may have a temporary impact on floodplains from sedimentation during construction; the specific areas floodplains and construction activities that could have a temporary impact would be determined at the Project-level.

Construction of track segments 1-6 may necessitate widening the ballast to accommodate the tracks. This could result in a minor permanent impact to floodplains through the placement of fill, or if a culvert needs to be extended. When in proximity to floodplains, the side slope of the berm could be increased to further avoid and minimize impacts at the tow of the slope of the berm.

At the Project-level, survey, design, and analysis would need to be performed to determine if widening the ballast is necessary and if existing culverts have sufficient length or require extension.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to floodplains as none are present in the area. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to floodplains as none are present in the area.

Installation of the wye track would not result in adverse impacts to floodplains as improvements would be in the former ROW and floodplains are not present in the area.

Curve modifications would not result in adverse impacts to floodplains as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

[20] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

Modifications to existing interlockings, and installation of new interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to floodplains, if present. The temporary impacts would be limited to the duration of construction.

At-grade crossing upgrades may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to floodplains, if present. The temporary impacts would be limited to the duration of construction.

The increase in service under the Build Alternative would not result in adverse impacts to floodplains as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

3.14 Soils

The Farmland Protection Policy Act (FPPA) of 1981, 7 U.S.C. 4201, was enacted to minimize the loss of prime farmland and unique farmlands from federal actions that convert these lands to nonagricultural land uses. Actions that result in the conversion of prime or unique farmland not already committed to urban development or water storage are reviewed for compliance with the FPPA. Compliance is coordinated with the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS).

Land within the study area is comprised of 16 different soil associations. Also referred to as a general map unit, a soil association represents a mapped area that has a distinctive proportional pattern of soils. A soil association is usually made up of one or more major soil series and at least one minor soil, and it is named for the major soil series, beginning with the most prominently-featured soil series and separated by hyphens. The soils in one association may occur in another, but in a different pattern.

3.14.1 Methodology

Federal, state, and county GIS datasets were used for the identification of soils and to determine their proximity to the Build Alternative. Additionally, Soil association data was obtained from the General Soil Map of the U.S. (Soil Survey Staff, 2015) and soils series information was obtained from the NRCS.

3.14.2 Affected Environment

The Massachusetts portion of the study area is largely within the Boston Basin, a subregion of the New England physiographic province. Characterized by a relatively smooth plain with round hills known as drumlins, the Boston Basin has a history of soil disturbance from early American settlement through modern urbanization (Soil Survey Staff, 2009). The parent material for approximately 43 percent (536 acres) of the soils within the Massachusetts study area is characterized as excavated and filled land. Undisturbed soils in the low-lying Massachusetts study area were primarily formed from glaciofluvial deposits. The majority of soils in this region are classified in hydrologic group A, indicating a high infiltration rate, and approximately 29 percent (361 acres) of the Massachusetts study area soils are classified as farmland, meaning they are considered to be prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland (Soil Survey Staff, 2013).

There are approximately 1,240 acres of land within the study area in Massachusetts, consisting of four soil associations and 8 soil series (Exhibit 3.30).

Exhibit 3.30 – *Massachusetts Soils*

Soil Association	Approximate Acreage	Primary Location
Windsor-Urban land-Paxton-Newport	452	Suffolk and Southern Middlesex Counties
Woodbridge-Paxton-Hollis	271	Central portions of Middlesex and Essex Counties
Windsor-Merrimac-Hinckley	354	Northern Middlesex and southern Essex Counties
Windsor-Hinckley-Canton	162	Northern Essex County

Soil Series	Characteristics	Locations
Windsor	Excessively drained, loamy sand on surface with sand below	Wide plains
Paxton	Nearly level to steep, well drained loamy soils that are very deep to bedrock and moderately deep to a densic contact.	Hills, drumlins, till plains, and ground moraines
Newport	Nearly level to moderately steep, well drained loamy soils that are very deep to bedrock, and moderately deep to a densic contact.	Till plains, low ridges, hills, and drumlins
Woodbridge	Nearly level to moderately steep, moderately well drained loamy soils formed in lodgment till. Very deep to bedrock and moderately deep to a densic contact.	Hills, drumlins, till plains, and ground moraines
Hollis	Nearly level to very steep well drained and, somewhat excessively drained, upland soils. Shallow to bedrock.	Bedrock-controlled hills and ridges
Merrimac	Nearly level to very steep. Very deep, somewhat excessively drained soils formed in outwash.	Outwash terraces and plains and other glaciofluvial landforms
Hinckley	Nearly level to very steep. Very deep, excessively drained soils.	Outwash terraces, outwash plains, outwash deltas, kames, kame terraces, and eskers
Canton	Nearly level to very steep very deep, well drained soils.	Glaciated plains, hills, and ridges

Source: Soil Survey Staff, 2014

Soils within the lowlands New Hampshire study area were formed from marine deposits. The majority of soils in this region are classified in hydrologic groups A and B, indicating high and moderate infiltration rates, respectively. Approximately 33 percent (394 acres) of soils within the New Hampshire study area have a farmland classification (Soil Survey Staff, 2013).

There are approximately 1,180 acres of land within the study area in New Hampshire, consisting of 5 soil associations and 9 soil series (Exhibit 3.31).

Exhibit 3.31 – *New Hampshire Soils*

Soil Association	Approximate Acreage	Primary Location
Windsor-Hinckley-Canton	343	Southern Rockingham and northern Strafford Counties
Squamscott-Paxton-Charlton	116	Southern Rockingham County
Pennichuck-Paxton-Hoosic	32	Southern Rockingham County
Hollis-Chatfield-Canton-Boxford	459	Throughout Rockingham and Strafford Counties
Scitico-Eldridge-Deerfield	232	Northern Rockingham County

Soil Type	Characteristics	Locations
Squamscott	Very deep, poorly drained soils. Permeability is rapid in the upper part of the soil and moderately slow in the lower part.	Marine or lacustrine plains or terraces
Charlton	Nearly level to steep, very deep, well drained loamy soils.	Till plains and hills
Pennichuck	Moderately deep, well drained soils with moderate permeability.	Loamy glacial till underlain by unweathered phyllite on rolling uplands
Hoosic	Nearly level to very steep, very deep, somewhat excessively drained soils.	Outwash plains, terraces, kames, eskers, and moraines
Chatfield	Nearly level to very steep well drained and somewhat excessively drained soils. Moderately deep to bedrock.	Glaciated plains, hills, and ridges
Boxford	Nearly level, very deep, moderately well to somewhat poorly drained soils formed in clayey marine sediments with slow to very slow permeability.	Terraces
Sitico	Nearly level to very gently sloping very deep, poorly drained soils formed in silty and clayey sediments. Permeability ranges from moderate to very slow.	Low-lying positions of glaciolacustrine and marine terraces
Eldridge	Very deep, moderately well drained soils with permeability ranging from rapid to slow.	Glacial lake plains, terraces, and glacial outwash areas
Deerfield	Nearly level to strongly sloping very deep, moderately well drained soils.	Terraces, deltas, and outwash plains

Source: Soil Survey Staff, 2014

Approximately 32 percent (764 acres) of the soils within the Maine portion of the study area have a state or local designation of prime farmland. Soils within the Maine study area are primarily hydrologic groups A and D (Soil Survey Staff, 2013). Hydrologic group D soils have a high runoff potential and typically have greater than 40 percent clay composition (Soil Survey Staff, 2007).

In Maine, there are approximately 2,360 acres of land within the study area comprised of 9 soil associations and 16 soil series (Exhibit 3.32).

Exhibit 3.32 – *Maine Soils*

Soil Association	Approximate Acreage	Primary Location
Scantic-Lamoine-Buxton	791	Throughout York and Cumberland Counties
Marlow-Lyman-Dixfield	20	Southern York County
Naumburg-Croghan-Adams	671	York and Southern Cumberland Counties
Windsor-Hinckley-Canton	26	Southern York County
Sebago-Croghan-Colton-Adams	212	Throughout York and Southern Cumberland Counties
Ipswich-Groveton-Beaches	197	Throughout York and Southern Cumberland Counties
Tunbridge-Lyman-Abram	105	Throughout Coastal Portions of York and Cumberland Counties
Tunbridge-Rock outcrop-Lyman-Buxton-Boothbay	245	Northern Cumberland County
Madawaska-Adams	92	Northern Cumberland County

Soil Type	Characteristics	Locations
Scantic	Nearly level and poorly drained with a seasonal high water table.	
Lamoine	Very deep, somewhat poorly drained soils with permeability that ranges from moderate to very slow.	Coastal lowlands and river valleys
Buxton	Very deep, moderately well drained soils with permeability that ranges from moderate to very slow.	Coastal lowlands and river valleys
Marlow	Well drained soils that formed in loamy lodgment till. Moderately deep to a dense substratum and very deep to bedrock.	Hills and mountains in glaciated uplands
Dixfield	Very deep, moderately well drained soils.	Drumlins and till ridges
Naumburg	Very deep, poorly and somewhat poorly drained.	Low sand plains and terraces
Croghan	Very deep, moderately well drained soils.	Terraces and sand plains
Adams	Very deep, excessively and somewhat excessively drained soils.	Outwash plains, deltas, lake plains, moraines, terraces, and eskers
Sebago	Very deep, very poorly drained soils formed in herbaceous and woody organic deposits more than 51 inches thick with moderately rapid permeability.	Bogs and swamps
Colton	Very deep, excessively drained soils.	Terraces, kames, eskers, and outwash plains
Ipswich	Very deep, very poorly drained soils formed in thick herbaceous organic deposits	Level tidal marshes subject to inundation by salt water twice daily
Groveton	Very deep, well drained soils with moderate to moderately rapid permeability.	Stream terraces
Tunbridge	Moderately deep, well drained soils.	Glaciated uplands
Lyman	Shallow, somewhat excessively drained soils.	Glaciated uplands
Abram	Very shallow, excessively drained soils with moderately rapid permeability.	Ridges and mountains
Madawaska	Very deep, moderately well drained and somewhat poorly drained soils.	Outwash plains and stream terraces

Source: Soil Survey Staff, 2014

3.14.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact soils.[21]

Build Alternative

The Build Alternative would not have a significant permanent impact on soils. Because improvements would occur on previously disturbed soils and areas dedicated to development, there would be no conversion of soils protected by the FPPA to a non-agricultural use. The Build Alternative may have a temporary impact on soils due to construction; the specific locations of soils and construction activities that could have a temporary impact would be determined at the Project-level.

Construction of track segments 1-6 may necessitate widening the ballast to accommodate the tracks. This could result in a minor impact to soils through the placement of fill, or if a culvert needs to be extended.

At the Project-level, survey, design, and analysis would need to be performed to determine if widening the ballast is necessary and if existing culverts have sufficient length or require extension.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to soils as the soils in the area are already disturbed and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to soils as the soils in the area are already disturbed and the area is currently dedicated to transportation.

Installation of the wye track would not result in adverse impacts to soils as improvements would be in the former ROW, in an area which is primarily dedicated to transportation and commercial uses where the soils are already disturbed.

[21] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

Curve modifications would not result in adverse impacts to soils as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to soils underneath the existing pavement. The temporary impacts would be limited to the duration of construction.

At-grade crossing upgrades may require modification or replacement of underdrains and/or outlet piping resulting in a temporary impact to soils. The temporary impacts would be limited to the duration of construction.

The increase in service under the Build Alternative would not result in adverse impacts to soils as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

3.15 Coastal Zones

The Coastal Zone Management Act (CZMA) of 1972 aims to preserve, protect, develop, and where possible, restore and enhance the resources of the nation's coastal zone. Section 307 of the CZMA stipulates that federal activities that affect any land or water use or natural resource of the coastal zone be consistent, to the maximum extent practicable, with the CZMA of 1972 and the states' federally approved coastal management program.

3.15.1 Methodology

Federal, state, and county GIS datasets were used for the identification of resources considered under the CZMA and to determine their proximity to the No-Build and Build Alternatives. GIS analysis identified portions of the study area within designated coastal zones of federally approved coastal management programs in Massachusetts, New Hampshire, and Maine. The Massachusetts Office of Coastal Zone Management State administers the CZMA federal consistency reviews in Massachusetts. The New Hampshire Department of Environmental Services administers the New Hampshire Coastal Program (NHCP). The Maine State Planning Office (SPO) administers the Maine Coastal Program (MCP).

3.15.2 Affected Environment

The official Massachusetts coastal zone includes the lands and waters within an area defined by the seaward limit of the state's territorial sea, extending from the Massachusetts-New Hampshire border south to the Massachusetts-Rhode Island border, and landward to 100 feet inland of specified major roads, rail lines, other visible rights-of-way. The CZMA requires certain federal actions affecting Massachusetts' coastal zone to be consistent with the "enforceable policies" contained in the Massachusetts Coastal Program. The study area within Massachusetts is approximately 36 miles. The Massachusetts Coast Programs' enforceable policies fall within the following categories (MCZM, 2011):

- Coastal Hazards;
- Energy;
- Growth Management;
- Habitat;
- Ocean Resources;
- Ports and Harbors;
- Protected Area;
- Public Access; and
- Water Quality.

The coastal zone of New Hampshire consists of the Town of Exeter north to the Maine border. The federal consistency review process in New Hampshire ensures that federal activities affecting land or water use, or natural resource in New Hampshire's coastal zone would be conducted in a manner consistent with the "enforceable policies" of the NHCP. The study area within New Hampshire is approximately 36 miles. The NHCP's enforceable policies fall within the following categories (NHDES, 2011):

- Protection of coastal resources;
- Recreation and public access;
- Management of coastal development;
- Coastal dependent uses;

- Preservation of historic and cultural resources; and
- Marine and estuarine research and education.

The coastal zone of Maine consists of the entire study area with the exception of the Towns of Berwick and North Berwick in southern York County. The CZMA requires certain federal actions affecting Maine's coastal zone to be consistent with the "enforceable policies" contained in the Maine Coastal Program. The study area within Maine is approximately 70 miles. The enforceable policies of the Maine Coastal Program are contained in the state laws and implementing regulations listed below (State of Maine, 2006):

- Natural Resources Protection;
- Mandatory Shoreland Zoning Law;
- Site Location of Development Law;
- Erosion Control and Sedimentation Law;
- Wind Energy;
- Storm Water Management Law;
- Subdivision;
- Maine Rivers Act;
- Maine Waterway Development and Conservation;
- Coastal Management Policies Act;
- Protection and Improvement of Air Law;
- Protection and Improvement of Waters Act;
- Land Use Regulation Law;
- Maine Hazardous Waste, Septage and Solid Waste and Management Act;
- Wellhead Protection;
- Nuclear Facility Decommissioning Laws;
- Oil Discharge Prevention and Pollution Control Law;
- Marine Resources Law;

- Coastal Barrier Resources System Act;
- Maine Endangered Species Act; and
- Fee Schedule.

3.15.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not impact the coastal zone and no further action is required to comply with the CZMA.

Build Alternative

The Build Alternative is not anticipated to impact coastal zones because the service will use the existing rail line and improvements are within the ROW. A project-level analysis of the Build Alternative improvements would include compliance with the CZMA. In Massachusetts, the MassDEP with the WPA permit would issue a Coastal Zone Management (CZM) consistency determination. In New Hampshire, the CZM consistency determination would be issued by the NHDES with the Routine Roadway and Railway Maintenance Permit. In Maine, a CZM consistency determination would be issued by the MDEP with the NRPA permit.

3.16 Threatened and Endangered Species

The Endangered Species Act (ESA) provides for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing ESA are the USFWS and the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. The law requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. A species designated as “endangered” is in danger of extinction throughout all or a significant portion of its range. A species designated as “threatened” is likely to become endangered in the foreseeable future. Species of Special Concern commonly refers to species that are declining or appear to be in need of conservation within state laws. Species may also be protected under state law, including the Maine Endangered Species Act, New Hampshire Threatened and Endangered Species Act, and the Massachusetts Endangered Species Act. .

Species protected by these state laws are managed by the Massachusetts Department of Fisheries and Wildlife (MassDFW), New Hampshire Fish and Game (NHDFG) and Maine Department of Inland Fisheries and Wildlife (MDIFW).

Recorded federal- or state- listed species and their habitat near the Build Alternative would need to be confirmed with the USFWS or NOAA and the MassDFW, NHDFG and MDIFW (as appropriate) during the final design at the Project-level to determine if listed species or designated critical habitat are actually present within the rail corridor and would be affected by the project. If present, coordination with the agencies would be required to identify potential impacts and appropriate avoidance measures.

Additionally, birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

This section describes the potential presence of protected species and their habitat; the potential impacts of the alternatives; and recommendations for minimizing potential impacts.

3.16.1 Methodology

The assessment of protected species and habitat included:

- Consulting the UFSWS, NOAA, MassDFW, NHDFG, and MDIFW, and Maine Natural Areas Program early in the study phase;
- Reviewing USFWS and NOAA online protected species information;
- Reviewing MDIFW species listed under the Maine's Endangered Species Act;
- Reviewing NHDFG species listed under the New Hampshire's Endangered Species Conservation Act;
- Reviewing MassDFW Wildlife species listed under the Massachusetts Endangered Species Act;
- Performing a search using the USFWS Information for Planning and Conservation (IPaC) tool for records of federal- and state-listed species and their habitat within the study area; and
- Evaluating potential impacts to the listed species and their habitat within the study area that would result from the Build Alternative.

3.16.2 Affected Environment

According to the USFWS, the study area passes through sites where the small whorled pogonia, a threatened species, is known to exist. In addition, and within the same general area, the Blanding's turtle, a species of special concern, has been documented. In the Boston area, the Roseate tern, an endangered species, could be affected by construction (USFWS, 2012).

The northern long-eared bat's range includes much of the eastern and north central United States. According to the USFWS, the northern long-eared bat (NLEB) was listed as threatened under the ESA on April 2, 2015. The NLEB is dependent on forests, using trees as summer and maternity roosts. The USFWS asserts that NLEB roosts occur throughout its range and, therefore, it could be present in the study area. There is no critical habitat designated for the NLEB, however tree clearing and bridge rehabilitation or reconstruction could potentially impact the NLEB (USFWS, 2015).

Although no formal consultation is required at this stage, the USFWS requested continued coordination when specific construction activities are developed during Project-level (USFWS, 2012).

According to the USFWS's IPaC tool, there is one ESA-listed plant and four ESA-listed animal species in the study area (Exhibit 3.33) (Appendix B).

Exhibit 3.33 – *USFWS IPaC Species Listing*

Species	Status	Federal (F)/State (S)
Piping Plover (Chardrius melodus)	Threatened	F/S
Red Know (Calidris canutus rufa)	Threatened	F
Atlantic Salmon (Salmo salar)	Endangered	F
Small Whorled Pogonia (Isotria medeolodes)	Threatened	F/S
Northern Long-eared Bat (Myotis septentrionalis)	Threatened	F/S

Source: USFWS, 2016

The USFWS provided information on bird species that may inhabit the study area and for information to assist with planning the proposed action (Appendix B). Any action that may result in the "take" of migratory birds must comply with the regulations and implement conservation measures.

NOAA reported, although marine waters are not present in the study area, several estuaries are present within or adjacent to it. A number of resources use habitats within or adjacent to

the study area, including Atlantic salmon and several of the rivers and estuaries have been identified as Essential Fish Habitat (EFH) for Atlantic salmon. Other managed species and EFH may be adversely affected by the proposed action but construction drawings and details are needed (NOAA, 2012).

According to NOAA, without more information it is difficult to determine if impacts to listed species are likely to occur. Impacts to listed species could occur if in-water work occurs in areas where these species are present. According to NOAA, improvements to track and signal systems are unlikely to result in effects to listed species, provided the activities occur on land. Similarly, reintroduction or installation of new track is unlikely to affect listed species as it occurs on land or existing bridges. Improvements at existing stations are unlikely to impact listed species as the stations are not located on or near water where the listed species occurs (NOAA, 2012).

In Massachusetts, the Natural Heritage and Endangered Species Program, MassDFW and the Department of Fish and Game (MassDFG) is responsible for the conservation and protection of state-listed endangered and threatened species. According to MassDFW, portions of the study area are within mapped Priority and Estimated Habitat for several state-listed species (MassDFW, 2012). There are 176 species of vertebrate and invertebrate animals and 259 species of native plants that are listed as endangered, threatened or of special concern under the Massachusetts Endangered Species Act (MassDFW, 2012).

In New Hampshire, the Nongame and Endangered Wildlife Program, part of the Department of Fish and Game, is responsible for the conservation and protection of state-listed endangered and threatened species. Endangered wildlife are those native species whose prospects for survival in New Hampshire are in danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to ensure continued existence as a viable component of the state's wildlife community. Threatened wildlife are those species, which may become endangered if conditions surrounding them begin, or continue, to decline. There are 40 species of fish and wildlife listed as endangered or threatened under New Hampshire's Endangered Species Conservation Act (NHDFG, 2012). According to the USFWS, in the area between Route 101 in New Hampshire and the Maine border, the study area has sites where the small whorled pogonia is known to occur and where the Blanding's turtle has been documented (Chapman, 2012).

In Maine, the Maine Natural Areas Program and the MDIFW are responsible for the conservation and protection of state-listed endangered and threatened species. There currently are 33 species of fish and wildlife listed as endangered or threatened under Maine's Endangered Species Act. Three of those species are also federally listed under the ESA. An additional 16 species currently or historically occurring in Maine are listed as endangered or threatened under the ESA, but not under the Maine Endangered Species Act (MDIFW, 2010a). According to the Maine Natural Areas Program, there are five rare plant features documented in the study area (MDACF, 2010).

3.16.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have an impact on federal- or state-listed species or on proposed threatened or endangered species or migratory birds.[22]

Build Alternative

The Build Alternative is unlikely to adversely affect threatened and endangered species and migratory birds. The individual actions comprising the Build Alternative would occur on land within the existing ROW and consist primarily of restoring former tracks and replacing equipment within the existing ROW on disturbed areas. No trees and other vegetation would be removed beyond those associated with regular maintenance activities. Additional study and coordination with the federal and state agencies with jurisdiction is required at the Project-level.

Construction of track segments 1-6 is unlikely to result in adverse impacts to threatened and endangered species and migratory birds as improvements would be in the existing ROW and would not require acquisition of property.

At the Project-level, design and analysis would need to be performed to determine if the existing length of culverts can accommodate the tracks or if culverts would require extension or other modification; time of year restrictions for any instream work would be determined at the Project-level.

[22] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

Improvements at the PTC would be in the existing ROW and therefore are unlikely to adversely affect threatened and endangered species and migratory birds as none are present in the area and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would be unlikely to adversely affect threatened and endangered species and migratory birds. There are no known threatened and endangered species present in the area.

Installation of the wye track would not result in adverse impacts to threatened and endangered species and migratory birds as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses. There are no known threatened and endangered species present in the area.

Curve modifications are not likely to result in adverse impacts threatened and endangered species and migratory birds as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, are not likely to result in adverse impacts to threatened and endangered species and migratory birds as improvements would be in the existing ROW and on the existing ballast.

At-grade crossing upgrades are not likely to result in adverse impacts to threatened and endangered species and migratory birds as improvements would be in the existing ROW and in areas currently dedicated to transportation.

The increase in service under the Build Alternative are not likely to result in adverse impacts to threatened and endangered species and migratory birds as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

Additional study and coordination with the federal and state agencies with jurisdiction is required at the Project-level.

3.17 Ecological Systems

Ecological systems are comprised of undeveloped upland and wetland communities. Wetlands were discussed in Section 3.12; this section focuses on upland vegetation and its use as wildlife habitat.

3.17.1 Methodology

The assessment of vegetation and its use as wildlife habitat consisted of a review of the federal, state, and county (GIS) datasets for the study area to identify undeveloped areas and provide an indication of their vegetative cover, reviewing the online data for wildlife and threatened and endangered species (see Section 3.16), use of the USFWS's IPaC tool, and other readily available information online.

3.17.2 Affected Environment

A wide range of upland vegetated communities exist throughout the study area; upland forested communities include a wide range of species of pines, oaks, maples, birches, and firs.

The USFWS was contacted for information on species that may inhabit the study area and for information to assist with planning the proposed action. An informational Planning and Conservation (IPaC) report was reviewed from the USFWS (Appendix B).

Wildlife likely to inhabit the area includes birds and mammals that normally frequent the agricultural and wooded areas in the coastal and interior portions of the states of Massachusetts, New Hampshire, and Maine. Wildlife in the study area use the vegetated areas for both cover and food. The species found closest to the existing rail ROW are those that are accustomed to living in proximity to development. The diversity of species inhabiting the area is greatly dependent on the distribution of water and vegetation that provides cover and food. Wildlife movement corridors are likely to exist throughout the study area.

3.17.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative maintains the existing conditions and would not have an impact on ecological systems.[23]

Build Alternative

The Build Alternative is unlikely to adversely impact ecological systems. The individual actions comprising the Build Alternative would occur on land within the existing ROW and consist primarily of restoring former tracks and replacing equipment within the existing ROW on disturbed areas. No trees or timber and other vegetation would be removed beyond those associated with regular maintenance activities. Additional study and coordination with the federal and state agencies with jurisdiction over wildlife and natural areas is required at the Project-level.

Construction of track segments 1-6 would not result in adverse impacts to ecological systems as improvements would be in the existing ROW and would not require acquisition of property.

Improvements at the PTC would be in the existing ROW and therefore would not impact ecological systems as none are present in the area and the area is currently dedicated to transportation. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not impact ecological systems as none are present in the area and the area is currently dedicated to transportation.

Installation of the wye track would not impact ecological systems as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses.

Curve modifications would not impact ecological systems as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not impact ecological systems as improvements would be in the existing ROW and on the existing ballast.

[23] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

At-grade crossing upgrades would not impact ecological systems as improvements would be in the existing ROW and in areas currently dedicated to transportation.

The increase in service under the Build Alternative would not impact ecological systems as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

3.18 Energy

This section evaluates the impacts to energy that may result from the No-Build and Build Alternative.

3.18.1 Methodology

Potential impacts to energy were qualitatively estimated by comparing the energy expenditure of the existing rail service to the anticipated changes that would result from the Build Alternative. Given this Service-level analysis, it is not possible to estimate impacts to energy from future construction activities with any degree of accuracy.

3.18.2 Affected Environment

Energy and its conservation in general are important factors to consider when planning for and implementing a transportation project. The existing NNEPRA Downeaster service operates diesel-powered trains for six round trips over 116 miles between Boston, Massachusetts and Portland, Maine and three round trips over 30 miles between Portland and Brunswick, Maine. A passenger train consumes about 55,000 British Thermal Units (BTUs) of energy per vehicle mile. This energy is in the form of diesel fuel and the average fuel economy is 0.7 miles per gallon (Davis, et al., 2015). The existing energy use of the NNEPRA Downeaster service is summarized in Exhibit 3.34.

Exhibit 3.34 – *Energy Use – Existing*

Current Train Travel	Existing Conditions
Boston, MA to Portland, ME	
Number of round trips per day	5
Corridor Distance (miles)	116
Total train miles per day	1,160
Fuel Use per day (gallons)	1,657
Energy Use per day (million BTUs)	64
CO_2 Emissions (metric tons of CO_2 per gallon)	17
Portland, ME to Brunswick, ME	
Number of round trips per day	3
Corridor Distance (miles)	30

Total train miles per day	180
Fuel Use per day (gallons)	257
Energy Use per day (million BTUs)	10
CO_2 Emissions (metric tons of CO_2 per gallon)	2

A typical automobile consumes about 5,517 BTUs of energy (in gasoline form) per vehicle mile and personal trucks consume about 6,788 BTUs of energy (in gasoline form) per vehicle mile. Thus, because of its high passenger capacity, a passenger train carrying 10 or more passengers (55,000 BTUs per train mile ÷ 10 passengers = 5,500 BTUs per passenger mile) is more energy-efficient than an automobile or personal truck with a single occupant (Davis, et al., 2015). The Downeaster, with a maximum passenger capacity of 232 people per train can get as low as 237 BTUs per passenger on a sold-out trip.

3.18.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative retains the existing service and would not have an impact on energy consumption.

Build Alternative

The Build Alternative proposes to add one to two daily round trips to each section of the Downeaster corridor. The Build Alternative would not have an appreciable impact on energy consumption following construction (Exhibit 3.35).

Exhibit 3.35 –*Energy Use – Build Alternative*

Travel Conditions	No Build Alternative	Build Alternative	Difference
Boston, MA to Portland, ME			
Number of round trips per day	5	7	2
Corridor Distance (miles)	116	116	0
Total train miles per day	1,160	1,624	464
Fuel Use per day (gallons)	1,657	2,320	663
Energy Use per day (million BTUs)	64	89	25
CO_2 Emissions (metric tons of CO_2 per gallon)	17	24	7
Portland, ME to Brunswick, ME			
Number of round trips per day	3	5	2
Corridor Distance (miles)	30	30	0
Total train miles per day	180	300	120
Fuel Use per day (gallons)	257	429	172
Energy Use per day (million BTUs)	10	17	7
CO_2 Emissions (metric tons of CO_2 per gallon)	2	3	1

Source: USEPA, 2014

The Build Alternative could have a beneficial impact on energy by encouraging travelers to shift use from automobiles to passenger rail. If the increase in annual Downeaster ridership due to the proposed improvements is converted to automobile miles at the accepted ratio of 1.59 people per car (including the driver), approximately 12.0 million pounds of CO_2 emissions would be "avoided" annually after netting out the CO_2 emitted by the additional train-miles operated annually (NNEPRA, 2013).

3.19 Visual Quality and Aesthetics

This section identifies and evaluates potential impacts to the visual and aesthetic resources along the project corridor.

3.19.1 Methodology

The existing visual and aesthetic conditions along the project corridor were identified by analyzing GIS mapping and photographs of the study area to determine the nature of the visual environment along the existing rail line. Potential impacts to the visual and aesthetic resources were evaluated by reviewing areas where new construction would occur and assessing how the visual environment may change.

3.19.2 Affected Environment

The landscape within the study area in Massachusetts is mostly an urban and suburban setting; in New Hampshire, exclusive of station areas, the study area is mostly forested with some urban areas; and in Maine, exclusive of the City of Portland and station areas, the study area is mostly rural with forested areas. Views tend to be more urban in the southern portion of

the study area and more rural in the northern portion. Views of the existing track are often limited from the adjacent areas by vegetation and man-made structures.

3.19.3 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not have an impact on visual quality and aesthetics.

Build Alternative

The Build Alternative would not have a significant impact on visual quality and aesthetics. The individual actions comprising the Build Alternative consist primarily of restoring former tracks and replacing equipment within the existing ROW, and upgrading other existing infrastructure. The Build Alternative would not introduce new visual elements or new lighting to areas presently without lighting.

Construction of track segments 1-6 would not result in significant adverse impacts to visual quality and aesthetics as improvements would be in the existing ROW and would not require acquisition of new property.

Improvements at the PTC would be in the existing ROW and therefore would not result in adverse impacts to visual quality and aesthetics and could be considered an improvement over existing conditions because it would consist of a modern facility in keeping with the adjoining land uses. While the pedestrian walkway at the Wells station may touch down outside the existing ROW, construction of it would not result in adverse impacts to visual quality and aesthetics and could be considered an improvement over existing conditions because it would consist of a modern facility in keeping with the adjoining land uses. Access to businesses and residences would not be changed from existing conditions.

Installation of the wye track would not result in adverse impacts to visual quality and aesthetics as improvements would be in the former ROW and in an area which is primarily dedicated to transportation and commercial uses.

Curve modifications would not result in adverse impacts to visual quality and aesthetics as improvements would be in the existing ROW and on the existing ballast. These modifications would only affect existing rails.

Modifications to existing interlockings, and installation of new interlockings, would not result in adverse impacts visual quality and aesthetics as improvements would be in the existing ROW and on the existing ballast.

At-grade crossing upgrades would not result in adverse impacts to visual quality and aesthetics as improvements would be in the existing ROW, in areas currently dedicated to transportation, and would not require acquisition of new property. Public access to businesses, residences, parks, and recreational areas would not be changed from existing conditions.

The increase in service under the Build Alternative would not result in adverse impacts to visual quality and aesthetics as trains would operate in the existing ROW, in an area currently dedicated to transportation, and would not require acquisition of new property.

3.20 Construction Impacts

Earthwork, including clearing and grubbing, excavating, grading, embankment formation, and stockpiling, would be required during the construction of the Build Alternative. Exposed soils may result in the potential for increased site erosion and sedimentation impacts to nearby water resources. Some of the best management practices that may be implemented are:

- Implementing approved soil erosion and sedimentation control plans;
- Conducting earthwork activities during a known dry season;
- Diverting stormwater that originates off-site away from the construction site;
- Minimizing the extent and duration of exposed soils by using temporary or permanent seeding or mulching;
- Constructing appropriately sized temporary sedimentation basins;
- Establishing a designated equipment cleaning/washing areas that is bermed and consist of some measures for the treatment of runoff prior to discharge; and
- Establishing an emergency response spill contingency plan.

Other localized short-term/temporary impacts that may occur during construction of the Build Alternative are air, noise, vibration, traffic, visual, and public safety impacts.

Air quality impacts from construction activities would be temporary and are primarily associated with the operation of diesel-powered equipment and the generation of fugitive dust from excavation and earth moving activities. Air emissions from construction equipment can be minimized by properly maintaining engines and reducing idling times. Fugitive dust is generated as trucks travel to and from the construction site, and from the handling of cement, aggregate and other materials. The effect of fugitive dust would vary depending on local weather conditions during periods of extensive earth moving activities. The need to consider mitigation measures would be determined at the Project-level.

Noise impacts from construction activities are a function of the noise generated by construction equipment, the location of construction, the sensitivity of adjacent land uses, and the timing and duration of the noise generating activity. The dominant source of noise from most construction equipment is the diesel engine. The need to consider mitigation measures would be determined at the Project-level.

Construction can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes vibrations that spread through the ground and diminish in strength with distance. Buildings in the immediate vicinity of construction respond to these vibrations with varying results ranging from no perceptible effects at the lowest levels, low rumbling sounds and perceptible vibrations at moderate levels.

Construction traffic and staging could be planned and scheduled to minimize impacts to traffic and transportation. Signing could be used to notify motorists of road closures and detours. Access to local residences and businesses near the construction site would be maintained to the greatest extent practicable. Temporary disruptions in access would be coordinated with residents and business owners. Residents along designated truck haul routes may have to contend with the day-to-day hauling activities.

Temporary visual impacts attributed to construction activities would be greatest for those residents immediately adjacent to the construction site. Views of heavy equipment and material stockpiles would be commonplace for the duration of the construction activities. Fugitive dust may also impede visual quality during limited periods.

Solid waste generated during construction would be the responsibility of the construction contractor for proper disposal.

Public safety during proposed construction activities would be maintained through restricting public access to active construction areas with temporary fencing and warning signs.

3.21 Indirect Impacts and Cumulative Effects

This section provides an assessment of the indirect effects and cumulative impacts of the project in combination with the past, present, and reasonably foreseeable future actions in the study area and the surrounding region.

In CEQ regulations, indirect (or secondary) impacts are defined as those that are:

> *"…caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect impacts include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density or growth rate, and related impacts on air and water and other natural systems, including ecosystems" (40 CFR 1508.8b).*

Under the CEQ regulations, cumulative effects are defined as:

> *"…the impact on the environment which results from the incremental impact of the actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).*

The cumulative-effects analysis considers the aggregate effects of direct and indirect impacts – from federal, non-federal, public, or private actions – on the quality or quantity of a resource.

3.21.1 Methodology

To identify the indirect impacts from the Build Alternative at the Service-level, the affected environment of the study area and the direct impacts were examined to help determine those that could extend to occur later in time or further removed from the proposed action, based on best professional judgement.

The consideration of cumulative effects entails an assessment of the total effect on a resource or ecosystem from the past, present, and reasonably foreseeable future actions that have altered, or have the potential to alter, the quantity, quality, or context of those resources within a broad geographic scope. Because the direct and indirect impacts from the Build Alternative are, with the exception of the 0.5 mile wye track at the PTC, within the existing ROW, at the Service-level, the consideration of cumulative effects was limited to the consideration of climate change.

3.21.2 Indirect Impacts

No-Build Alternative

The No-Build Alternative would not result in indirect impacts.[24]

Build Alternative

The Build Alternative would result in indirect impacts. The Build Alternative is unlikely to generate local or regional growth in jobs or population, however, it could affect where the growth occurs, the form of the growth, and the pace of redevelopment, indirectly affecting land use and socioeconomics. The additional train service is unlikely to generate an appreciable amount of additional transit-oriented development in proximity to the stations due to the incremental increase in ridership.

Changes in land use could affect natural resources and the human environment depending upon where they occur. Development of undeveloped land, for example, could impact water resources, wetlands, floodplains, ecological systems (wildlife habitat), or threatened or endangered species if these resources are present in the development area. Residential development can also affect traffic, air quality, noise and vibration, environmental justice neighborhoods, public safety, cultural resources, energy, or the visual environment if commuters drive cars to stations or build homes that change the visual setting. Impacts to these resources are governed by environmental regulations at the federal, state, or local levels and are therefore expected to be minimal. With the low level of land use changes expected to indirectly result from the Build Alternative, these further impacts would be *de minimis*.

[24] Other studies for ongoing projects found no impacts. (Brunswick Layover Facility. Merrimack Bridge Rehabilitation)

Indirect socioeconomic effects at the local level could be associated with the creation of new access opportunities to goods, services, employment, and labor. Given the projected ridership assumed for the proposed action, however, it is unlikely that indirect local socioeconomic effects would be significant. It is possible that new station parking may provide an opportunity for municipalities to harness commuter spending power, and thus lead to possible positive indirect socioeconomic effects. Given the size of the stations, it is reasonable to conclude that such localized effects to surrounding businesses would not be significant. The types of indirect benefits that communities may experience are better assessed at a regional level, and would consist of improved public transportation access to employment, goods, and services.

The Build Alternative would not result in a significant amount of induced development, socioeconomic change, or other induced effects.

3.21.2 Cumulative Impacts

The intent of the cumulative effects analysis is to determine the magnitude and significance of cumulative effects, both beneficial and adverse, and to determine the contribution of the proposed action to those aggregate effects. Contributions to cumulative effects from the Build Alternative on resources would be limited to those derived from direct and indirect impacts of the proposed action. Because the Build Alternative would not result in direct or indirect impacts to resources beyond those normally associated with railroad maintenance activities, the cumulative effects analysis for the proposed action was limited to climate change.

The term climate change is often used interchangeably with the term global warming, but according to the National Academy of Sciences, "the phrase 'climate change' is growing in preferred use to 'global warming' because it helps convey that there are [other] changes in addition to rising temperatures" (The National Academies, 2008). Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g. changes in ocean circulation); and

- Human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

Natural processes and human activities affect emissions of greenhouse gases (GHG). Prominent GHGs include carbon dioxide (CO_2), methane (CH_4), O_3, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs). The accumulation of GHG in the atmosphere affects the Earth's temperature. Emissions from human activities have caused the atmospheric concentrations of heat-trapping GHG to increase significantly. These gases prevent heat from escaping to space, somewhat like the glass panels of a greenhouse. This accumulation has contributed to an increase in the temperature of the Earth's atmosphere known as climate change. The United Nations Framework Convention on Climate Change as defines climate change: a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time period (The National Academies, 2008).

FRA used projected annual emissions of 25,000 metric tons of GHG as an indicator that a proposed action may warrant analysis under NEPA for greenhouse gas emissions and climate change impacts.

Climate change is likely to continue as human activity in the form of GHG emissions is warming the planet in ways that would have impacts on natural resources, energy use, ecosystems, economic activity, and potentially quality of life. The aggregated effect of the reasonably foreseeable future actions would not contribute to the cumulative effects of climate change, as these actions are small in scope.

In recognition of the scope and magnitude of the threat and opportunities posed by global climate change, the Massachusetts Governor signed the Global Warming Solutions Act in August 2008. The Act affirms Massachusetts' position by requiring reductions in GHG emissions from 1990 levels by between 10 and 25 percent by 2020, and by 80 percent by 2050. In December 2010, in compliance with the new law, the Secretary of Energy and Environmental Affairs set the 2020 reduction limit at 25 percent, and unveiled the *Massachusetts Clean Energy and Climate Change Plan for 2020*, which lays out a strategy to achieve that goal.

The majority of transportation emissions come from cars and trucks. The *Massachusetts Clean Energy and Climate Plan for 2020* takes into account state and federal measures to improve vehicle efficiency, reduce vehicle miles traveled, and increase use of lower-carbon fuels, and proposes additional measures that would contribute toward meeting the 2020 limit. The *Massachusetts Clean Energy and Climate Plan for 2020* plans on reducing GHG emission by 7.6 percent in the transportation sector (Maine Office of Energy and Environmental Affairs, 2010).

Members of the Governor's Climate Change Policy Task Force developed a Climate Action Plan for New Hampshire, which is aimed at achieving the greatest feasible reductions in GHG emissions while providing long-term economic benefits. The Task Force recommended that New Hampshire strive to achieve a long-term reduction in greenhouse gas emissions of 80 percent below 1990 levels by 2050. To move toward this long-term goal and provide the greatest economic opportunity, the Task Force recommends 67 actions to:

- Reduce greenhouse gas emissions from buildings, electric generation, and transportation;
- Protect our natural resources to maintain the amount of carbon sequestered;
- Support regional and national initiatives to reduce greenhouse gases;
- Develop an integrated education, outreach and workforce training program; and
- Adapt to existing and potential climate change impacts.

Based on the greenhouse gas emission reductions projected for the recommended actions, the Task Force has chosen a mid-term goal of reducing greenhouse gas emissions 20 percent below 1990 levels by 2025. All of the recommended actions can be implemented immediately or through a phased in approach that can expand implementation as technology evolves and economic means become available (NHDES, 2009).

For the past century, the rate of warming in Maine has been increasing. All three of Maine's climate divisions are warmer today than 30 years ago. There are measurable changes in seasonal variation and in patterns of precipitation, with particular impacts on groundwater that can reasonably be associated with climate change (MDEP, 2004).

A 2003 Maine law (PL 237) required the MDEP to develop and submit a Climate Action Plan for Maine. The goals of the Climate Action Plan are to reduce GHG emissions to 1990 levels by

ten percent below those levels by 2020, and by a sufficient amount to avert the threat of global warming over the longer term, which could be as much as 75 percent. The law directed the MDEP to undertake "Lead by Example" initiatives, including conducting emissions inventories for state facilities and programs; obtaining voluntary carbon-reduction agreements with private-sector businesses and nonprofit organizations; participating in a regional GHG registry; and establishing an annual statewide GHG emissions inventory (MDEP, 2004).

On a comparative basis, shifting travel to conventional rail from personal automobile reduces the overall emission of GHG approximately 50 percent per equivalent passenger mile (Exhibit 3.36).

Exhibit 3.36 – *Summary Emissions Factors by Mode*

Mode	Emissions per Passenger Mile (lbs CO_2)	Emissions per Vehicle Mile (lbs CO_2)	Passengers per Vehicle
Bus	0.14	4.87	35
Conventional Rail	0.21	66.96	322
High Speed Rail	0.26	25.10	97
Automobile	0.53	0.85	1.6
Airplane	0.62	48.04	77

Source: Center for Clean Air Policy and Center for Neighborhood Technology, 2006

The No-Build and Build Alternatives would not have an appreciable impact on climate change. The Build Alternative consists of adding two daily round trips and associated infrastructure improvements within the ROW of an existing active rail line. This small increase in passenger rail service is not anticipated to result in a significant diversion of vehicle miles travelled or a significant increase in emissions from train operations. Considering the operation of the rail service (both Boston to Portland and Portland to Brunswick) over a full year, the estimated emissions are approximately 7,100 MT CO_2. Given this level of emissions the Build Alternative is not anticipated to have an appreciable impact on climate change.

4.0 Public Involvement and Agency Coordination

Coordination and consultation with agencies, stakeholder groups and the public was initiated early in the study to incorporate agency and public comments and concerns into the development and analysis of the proposed action's purpose and need, alternatives, and potential resultant environmental impacts.

4.1 Scoping

Scoping - There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed "scoping" (40 CFR 1501.7).

In October 2012, scoping letters were sent to federal and state, regulatory and resource agencies in each state (Exhibit 4.1). Letters accompanied by a map of the study area, a description of the study goals, and an outline of the study were mailed to provide notification of the study, request specific information pertaining to the study area, and encourage participation by identifying areas of initial concern for consideration and inclusion in the study (Exhibit 4.1). No key resources or issues of primary concern were identified.

The USFWS was contacted for information on species that may inhabit the study area and for information to assist with planning the proposed action. An informational Planning and Conservation (IPaC) Trust Resources Report was reviewed from the USFWS (Appendix B).

Stakeholder groups were established to provide guidance to the project team on various aspects of NNEPRA's Service Development Plan throughout the process and included representatives from:

NNEPRA	MBTA
Amtrak	Thompson Point Associates
Pan Am Railways	City of Portland
Concord Coach Line	Downeaster Station Committee
MaineDOT	Maine Passenger Rail Advisory Council

Stakeholder groups met periodically throughout the planning process to address and identify improvements to meet the service plan objectives.

Exhibit 4.1 - *Summary of Early Coordination Letters and Responses Received*

Federal Agencies	Information Requested	Information Received
U.S. Fish and Wildlife Service Mark McCollough Fish and Wildlife Biologist	Federally-listed endangered and threatened species or important habitat and resources along the corridor	Noted the study area may include the small whorled pogonia (threatened), Blanding's Turtle (species of special concern), and, in the Boston area, the Roseate Tern (endangered and / or its habitat). Requested identification of specific construction activities and continued coordination at the Project-level.
National Marine Fisheries Service Habitat Conservation	Endangered and threatened species or important habitat and resources along the corridor	Noted several rivers and estuaries have been identified as Essential Fish Habitat for Atlantic Salmon. Other managed species and EFH may be adversely affected but detailed design is needed. New track and improvements to existing tracks and stations are unlikely to affect species. Further consultation needed at the Project-level.

Massachusetts State Agencies	Information Requested	Information Received
Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program	Endangered and threatened species or important habitat and resources along the corridor	Portions of the proposed project would occur within mapped Priority and Estimated Habitat for several state-listed species. Additional coordination is needed at the Project-level.
Massachusetts Historical Commission	Information on known historic resources along the corridor	Looks forward to consultation with the FRA for the project in the identification and evaluation of historic properties. Project plans and other materials should be provided for construction.
Massachusetts Office of Coastal Zone Management	Coastal zone management resources and consistency along the corridor	No Information Received

New Hampshire State Agencies	Information Requested	Information Received
NH Division of Historical Resources	Information on known historic resources along the corridor	A portion of the B&M line was determined eligible for listing in the

		NRHP. As plans develop, evaluation of resources will be needed.
NH Natural Heritage Bureau	Endangered and threatened species or important habitat and resources along the corridor	No Information Received
NH Fish and Game Department	Endangered and threatened species or important habitat and resources along the corridor	No Information Received
NH Coastal Program Department of Environmental Services	Coastal zone management resources and consistency along the corridor	No Information Received

Maine State Agencies	Information Requested	Information Received
Maine Historic Preservation Commission State Historic Preservation Officer Earle G. Shettleworth, Jr.	Information on known historic resources along the corridor	Looks forward to consultation on the project
Maine Department of Inland Fisheries and Wildlife	Endangered and threatened species or important habitat and resources along the corridor	No Information Received
Maine Natural Areas Program	Endangered and threatened species or important habitat and resources along the corridor	There are five rare plant features documented along the corridor. No concerns provided the project remains in the existing rail corridor. Further coordination at the Project-level.
Maine State Planning Office Maine Coastal Program Kathleen Leyden, Director	Coastal zone management resources and consistency along the corridor	No MDEP review is required at this time for the preparation of the environmental documents

4.2 Public Involvement

This section describes how the public was involved during the preparation of the SDP and Service-level EA.

4.2.1 Public Information Meetings

Two public meetings specific to the Downeaster Service Development Plan were conducted in 2014 to solicit input concerning the Downeaster service and to share an outline of the proposed service improvements (Exhibit 4.2). Meetings were advertised in advance in Portland, Augusta and New Hampshire newspapers, the NNEPRA website, and on the Downeaster train to encourage both riders and non-riders to participate.

Exhibit 4.2 - *Summary of Public Information Hearings*

Location	Date	Attendees
Portland City Hall State of Maine Room 389 Congress St. Portland, ME 04101	Wednesday March 19, 2014 6:00 – 8:00 p.m.	40
McConnel Center Cafeteria 61 Locust St. Dover, NH 03820	Tuesday June 10. 2014 6:30 – 8:30 p.m.	10

At both public meetings, NNEPRA received support for its existing service and great interest in furthering it; and preparation of the SDP. Specifically, attendees at both public meetings suggested to NNEPRA:

- Extend service to other cities and towns and consider seasonal connections;
- Increase service frequencies;
- Pursue infrastructure improvements that increase speeds and efficiency;
- Pursue funding track and other infrastructure improvements;
- Encourage others to continue to work to improve the PTC and multi-modal connections to Portland; and
- Continue to allow bikes on trains and work to make improvements to accommodate additional bikes.

4.2.2 Project Web Site

A webpage dedicated to the project, http://www.nnepra.com/projects/downeaster-service-development-plan, was established to provide the public with updates, notices of meetings, links to other organizations and studies, access to meeting information and project reports, and an opportunity to contact NNEPRA.

5.0 List of Preparers

Federal Railroad Administration

Laura Shick, Environmental Protection Specialist

Larry Squires, Environmental Protection Specialist

Michael Johnsen, Supervisory Environmental Protection Specialist

Booz Allen Hamilton

Matthew Mielke, Environmental Scientist

Rachel Schneider, Environmental Scientist

Northern New England Passenger Rail Authority

Patricia Quinn, Executive Director

Marina Douglass, Manager, Budget and Administration

Jim Russell, Special Projects Manager

Gannett Fleming, Inc.

William M. Plumpton, CEP, Senior Environmental Scientist

Scott W. Duncanson, AICP, Senior Environmental Planner

Ahmed El-Aassar, P.E., Ph.D., Noise and Vibration Analyst

Jasmine R. Sodemann, Air Quality Analyst

Russell A. Spangler, Graphic Designer and Publisher

Greg J. Nazarow, Senior Rail Operations Analyst

Matthew Dixon, P.E., Engineer/Rail Operations Analyst

John Legath, P.E., Senior Track Design Engineer

David Prichard, P.E., Senior Signal Engineer

Earle Spotts, Signal Engineer

Martha Averso, P.E., Structures Engineer

Susan Gibbons, AICP, RA, LEED Green Associate, Senior Planner

Resource Systems Group, Inc.

Greg Spitz, Senior Transportation Market Research Analyst

John Lobb, Senior Transportation Forecaster

Margaret Campbell, Transportation Market Researcher

James Novakowski, Analyst

6.0 References

Advameg, Inc. (2016). Stats about all U.S. cities. *City-Data.com*. Retrieved 2016, from http://www.city-data.com/

Amtrak. (2016a). Amtrak Downeaster Information. *Amtrak Downeaster*. Retrieved May, 19, 2016, from http://www.amtrakdowneaster.com/

— (2016b). Amtrak Northeast Train and Bus Stations. *Northeast Stations*. Retrieved April 22, 2016, from https://www.amtrak.com/northeast-train-bus-stations

— (2015). Amtrak Downeaster Reports and Statistics. *Amtrak Downeaster*. Retrieved September 8, 2015, from http://www.amtrakdowneaster.com/reports-and-statistics

— (2012a). Amtrak Downeaster: Roundtrip Daily From Boston, MA to Portland, ME. *Amtrak Downeaster*. Retrieved September 15, 2012, from http://www.amtrakdowneaster.com/

— (2012b). Amtrak Downeaster Breaks Annual Ridership Record. *Amtrak Downeaster*. Retrieved July 10, 2012, from http://www.amtrakdowneaster.com/press/amtrak-downeaster-breaks-annual-ridership-record

Bishaw, A. (2012, September). Poverty: 2010 and 2011. *American Community Survey Briefs*, *11-01*, 1-8. Retrieved November, 2012, from http://www.census.gov/prod/2012pubs/acsbr11-01.pdf

Boston Region Metropolitan Planning Organization. (2012). Transportation Planning. *Boston Region MPO*. Retrieved November 30, 2012, from http://www.ctps.org/Drupal/transportation_planning

Cameron, D., Ecologist, Maine Natural Areas Program. (2012, October 12). Rare and Exemplary Botanical Features in Proximity to Northern New England Passenger Rail Authority (NNEPRA) Downeaster Service, Brunswick to South Berwick, Maine [Letter to Scott Duncanson, Gannett Fleming]. Augusta, Maine.

Chapman, T. R., Supervisor. (2012, November 28). [Letter to Scott Duncanson, Gannett Fleming]. New England Field Office, U.S. Fish & Wildlife Service (USFWS), Concord, NH.

Chiarella, L. A., Assistant Regional Administrator for Habitat Conservation. (2012, October 31). Northern New England Passenger Rail Authority (NNEPRA), Downeaster Service Development Plan, Service Level (Tier 1) Environmental Assessment [Letter to Scott Duncanson, Gannett Fleming]. National Oceanic and Atmospheric Administration (NOAA), Gloucester, MA.

Council on Environmental Quality (CEQ). (2007). *A Citizen's Guide to NEPA: Having Your Voice Heard* (pp. 1-55) (United States, Council on Environmental Quality (CEQ), Executive Office of the President of the United States). Washington, DC. Retrieved November, 2012, from http://ceq.hss.doe.gov/nepa/Citizens_Guide_Dec07.pdf

Cowardin, L. M. (1979). *Classification of wetlands and deepwater habitats of the United States*. Washington, DC: U.S. Fish and Wildlife Service (USFWS), U.S. Department of the Interior.

Davis, Stacy C., Diegel, Susan W., and Boundy, Robert G. *Transportation Energy Data Book*. 34th ed. Oak Ridge, TN: Oak Ridge National Laboratory, 2015. Accessed October 5, 2015. http://cta.ornl.gov/data/download34.shtml.

Federal Emergency Management Agency (FEMA). (2012). Web Map Service (WMS) for the FEMA National Flood Hazard Layer (NFHL) and Related Items. *FEMA: Mapping Information Platform*. Retrieved 2012, from https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS

Federal Railroad Administration (FRA). (2012a). Federal Railroad Administration-Homepage. *Federal Railroad Administration Office of Safety Analysis*. Retrieved December 6, 2012, from http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx

— (2012b). *High-Speed Ground Transportation Noise and Vibration Impact Assessment*. Washington, DC: U.S. Department of Transportation. Retrieved April 25, 2016, from http://www.fra.dot.gov/eLIB/Details/L04090

Federal Transit Administration (FTA). (2006). *Transit Noise and Vibration Impact Assessment* (pp. 1-261) (United States, Federal Transit Administration, Office of Planning and Environment). Washington, DC: U.S. Department of Transportation. Retrieved September 13, 2012, from http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf

Feighter, E., Review and Compliance Coordinator, Archaeologist. (2012, October 24). Request for Comment on the Northern New England Passenger Rail Authority (NNEPRA) Proposed Downeaster Service Development Plan, Service Level (Tier 1) Environmental Assessment [Letter to Scott Duncanson, Gannett Fleming]. New Hampshire Division of Historical Resources, Concord, NH.

Gillham, C., Consedine, T., & McSweeney, D. M. (2011). *High-tech Industries in Massachusetts: Employment and Wage Trends during* (2011 ed., Vol. 11-03, Regional Reports, pp. 1-8, Rep.). Washington, DC: U.S. Department of Labor.

LessCarbon.net. (2007). Less Carbon: Climate Change/Global Warming? *Less Carbon-Reduce Global Warming*. Retrieved 2012, from http://www.lesscarbon.net/index.html

Maine Department of Agriculture, Conservation, and Forestry (MDACF). (2010). Natural Communities and Ecosystems. *Maine Natural Areas Program*. Retrieved 2012, from http://www.maine.gov/doc/nrimc/mnap/features/community.htm

— (2012, October 12). Letter to Gannett Fleming. MDACF, Augusta, ME.

Maine Department of Environmental Protection (MDEP). (2004). A Climate Action Plan for Maine 2004: A Report to the Joint Standing Committee on Natural Resources of the Maine Legislature Pursuant to PL 2003 Chapter 237 (Rep.). Retrieved April 23, 2013, from http://www.newamerica.net/files/ME%20Climate%20Action%20Plan%202004%20Vol.%201.pdf

— (2012a). Air Quality Forecast. *Maine.gov - Air Quality*. Retrieved 2012, from http://www.maine.gov/dep/air/ozone

— (2012b). Maine's Water Quality Standards. *Maine.gov - Water*. Retrieved February 17, 2012, from http://www.maine.gov/dep/water/wqs/index.html

Maine Department of Inland Fisheries and Wildlife (MDIFW). (2010a). Maine Endangered Species Program/Endangered and Threatened Species. *Maine.gov - Maine Department of Inland Fisheries and Wildlife*. Retrieved 2012, from http://www.maine.gov/ifw/wildlife/species/endangered_species/species.htm

— (2010b). Significant Wildlife Habitats. *Maine.gov - Maine Department of Inland Fisheries and Wildlife*. Retrieved February 20, 2012, from http://www.maine.gov/ifw/wildlife/habitat_data/significant_habitat_data.htm

Maine Office of GIS. (2011). Maine Office of GIS Data Catalog. *Maine.gov - Maine Office of GIS*. Retrieved 2012, from http://www.maine.gov/megis/catalog/

Massachusetts Bay Transportation Authority (MBTA). (2016a, May 11). "Green Line Extentsion Project". *Green Line Extension Project*. Retrieved May 17, 2016 from http://greenlineextension.eot.state.ma.us/

— (2016b). "MBTA Performance Dashboard". *Massachusetts Bay Transportation Authority*. Retrieved May 17, 2016 from http://www.mbtabackontrack.com/performance/index.html#/detail/reliability

Massachusetts Department of Environmental Protection (MassDEP). (2007, January). *CMR 4.00: Surface Water Quality Standards*. Retrieved February 17, 2012, from http://www.mass.gov/dep/service/regulations/314cmr04.pdf

— (2012a). About Greenhouse Gases & Climate Change. *Mass.gov - Air & Climate*. Retrieved 2012, from http://www.mass.gov/dep/air/climate/aboutcc.htm

— (2012b). Air Monitoring Reports & Studies. *Mass.Gov - Air and Climate*. Retrieved 2012, from http://www.mass.gov/dep/air/aq/aq_repts.htm

Massachusetts Division of Fisheries and Wildlife (MassDFW). (2012, February 27). Numerical Summary of the Massachusetts List of Endangered, Threatened and Special Concern Species. *Mass.gov - Department of Fish and Game*. Retrieved 2012, from http://www.mass.gov/dfwele/dfw/nhesp/species_info/mesa_list/mesa_list_summary.htm

— (2012, November 9). Letter to Gannett Fleming. MassDFW Field Headquarters, Westborough, MA.

Massachusetts Historical Commission. (2012, October 31). Letter to Gannett Fleming. Massachusetts Historical Commission, Boston, MA.

Massachusetts Office of Coastal Zone Management (MCZM). (2011). *Massachusetts Office of Coastal Zone Management Policy Guide* (pp. 1-168). Boston, MA: Massachusetts Office of Coastal Zone Management (MCZM). Retrieved December 11, 2012, from http://www.mass.gov/czm/plan/docs/czm_policy_guide_october2011.pdf

Massachusetts Office of Energy and Environmental Affairs. (2010). Massachusetts Clean Energy and Climate Plan for 2020: A report to the Great and General Court pursuant to the Global Warming Solutions Act (Chapter 298 of the Acts of 2008, and as codified at M.G.L. c. 21N) (Rep.). Retrieved April 23, 2013, from http://www.mass.gov/eea/docs/eea/energy/2020-clean-energy-plan.pdf

— (2013). 301 CMR 11.00: Regulation Filing. Retrieved August 24, 2015 from http://www.mass.gov/eea/docs/mepa/final-regulations-5-10-13.pdf

Metropolitan Area Planning Council. (2012). *Metropolitan Area Planning Council*. Retrieved 2012, from http://www.mapc.org/

Mitsch, W.J. and J.G. Gosselink. (2015). Wetlands (5th ed.), John Wiley & Sons, Inc., New York.

The National Academies. (2008). *Understanding and responding to climate change: Highlights of national academies reports*. Retrieved December 11, 2012, from http://dels.nas.edu/resources/static-assets/materials-based-on-reports/booklets/climate_change_2008_final.pdf

National Energy Education Development (NEED) Project. (2012). Energy Consumption. *Efficiency Conservation*, 44-48. Retrieved 2012, from http://www.need.org/needpdf/infobook_activities/IntInfo/ConsI.pdf

National Register of Historic Places (NRHP). (2016). *National Park Service*. Retrieved May 18, 2011, from http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome

New Hampshire Department of Environmental Services (NHDES). (2011). *New Hampshire Coastal Program: Guide to Federal Consistency Coastal Zone Management Act § 307* (2nd ed., Vol. 2011, pp. 1-35) (United States, New Hampshire Department of Environmental Sciences (NHDES), Water Division: Watershed Management Bureau). Concord, NH: New Hampshire Coastal Program. Retrieved 2012, from http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-05-21.pdf

— (2012a). *New Hampshire Code of Administrative Rules*. Concord, NH. Retrieved February 17, 2012, from http://des.nh.gov/organization/commissioner/legal/rules/documents/env-wq1700.pdf

— (2008). Coastal Program Overview. *NH.gov - Coastal Program*. Retrieved November 30, 2012, from http://des.nh.gov/organization/divisions/water/wmb/coastal/categories/overview.htm

— (2009). *The New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future* (Rep.). Retrieved April 23, 2013, from http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_frontmatter.pdf

— (2012b, November 30). Current Air Quality. *NH.gov - Air Quality*. Retrieved November 30, 2012, from http://www2.des.state.nh.us/airdata

New Hampshire Fish and Game (NHDFG). (2012). Endangered and Threatened Wildlife of NH. *Endangered and Threatened Wildlife of New Hampshire*. Retrieved December 11, 2012, from http://www.wildlife.state.nh.us/Wildlife/Nongame/endangered_list.htm

New Hampshire Division of Historical Resources (NHDHR). (2012, October 24). Letter to Gannett Fleming. Division of Cultural Resources, Concord, NH.

New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT). (2012). Layers by Data Category. *NH GRANIT*. Retrieved 2012, from http://www.granit.unh.edu/data/downloadfreedata/category/databycategory.html

Northern New England Passenger Rail Authority. (2016, May). "Brunswick Layover Facility". *NNEPRA*. Retrieved May 17, 2016 from http://www.nnepra.com/projects/brunswick-layover-facility

— (2015). Relative Order of Magnitude Cost Estimate for 25kV Electrification of the Downeaster Corridor.

— (2013). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation: Project Purpose, Needs and Goals.

— (2013a). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix A - Existing Conditions Assessment.

— (2013b). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix B - Corridor Improvement Plan Detail.

— (2013c). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix C - Network Simulation and Analysis.

— (2013d). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix D – Detailed Track Charts.

— (2013e). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix E – Portland 'Wye' Track Analysis and Conceptual Cost Estimate.

— (2013f). Summary Report. Downeaster Corridor Service Development Plan and NEPA Documentation. Appendix F – Ridership and Parking Demand Analysis.

Office of Geographic Information (MassGIS). (2012). *Mass.gov - Administration and Finance*. Retrieved February 20, 2012, from http://www.mass.gov/mgis/cvp.htm

State of Maine, Maine Coastal Program. (2006). *Maine Guide to Federal Consistency Review* (3rd ed.). Bangor, ME: Maine Coastal Program. Retrieved from https://maine.gov/doc/nrimc/mcp/permitting.htm

Soil Survey Staff. (2007). "National Engineering Handbook". Natural Resources Conservation Service (NRCS). May 2007. Accessed October 06, 2015. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mi/technical/engineering/?cid=nrcs141p2_024573.

— (2014). "Official Soil Series Descriptions (OSDs)." Natural Resource Conservation Service (NRCS). January 14, 2014. Accessed October 06, 2015. http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/home/?cid=nrcs142p2_053587.

— (2009). *Soil Survey of Middlesex County, Massachusetts*. Technical paper. Natural Resource Conservation Service (NRCS). 2009. Accessed October 06, 2015. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/massachusetts/MA017/0/middlesex.pdf.

— (2015). "U.S. General Soil Map (STATSGO2)." Data.gov. Natural Resource Conservation Service (NRCS). August 21, 2015. Accessed October 06, 2015. https://catalog.data.gov/dataset/u-s-general-soil-map-statsgo2-for-the-united-states-of-america.

— (2013). "Web Soil Survey." Web Soil Survey. Natural Resource Conservation Service (NRCS). December 06, 2013. Accessed October 02, 2015. http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

U.S. Bureau of Labor Statistics (BSL). (2016). *Current Employment Statistics*. Retrieved May, 2016, from http://www.bls.gov/data/

U.S. Census Bureau. (2016a). *2000 Decennial Census*. Retrieved May, 2016, from http://www.census.gov/popest/data/cities/totals/2011/index.html

— (2013). *American Community Survey 2010-2014*. Retrieved May, 2016, from https://www.census.gov/programs-surveys/acs

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS). (2012, October 31). Letter to Gannett Fleming. NMFS Northeast Region, Gloucester, MA.

U.S. Department of Transportation (USDOT). (2011). U.S.C. Title 49 - Transportation. *U.S.C. Title 49 - Transportation*. Retrieved 2012, from http://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/html/USCODE-2011-title49-subtitleI-chap3-subchapI-sec303.htm

— (2012). Moving Ahead for Progress in the 21st Century. *Federal Highway Administration - MAP-21*. Retrieved 2012, from http://www.fhwa.dot.gov/map21/

— (2014). Finding of No Significant Impact – Brunswick Layover Facility, Brunswick, Maine.

U.S. Environmental Protection Agency (USEPA). (2015). *WATERS (Watershed Assessment, Tracking & Environmental Results System)*. Retrieved May 18, 2016 from https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system

— (2014). *Greenhouse Gas Emissions from a Typical Passenger Vehicle*. Retrieved May 26, 2016 from https://www.epa.gov/sites/production/files/2016-02/documents/420f14040a.pdf

— (2011). *Air Pollution*. Retrieved December, 2012, from http://www.epa.gov/airtrends/2011/report/airpollution.pdf

— (2012b, December 14). The Green Book Nonattainment Areas. *EPA.gov - Green Book*. Retrieved December, 2012, from http://www.epa.gov/oaqps001/greenbk/

— (2012c, December 14). National Ambient Air Quality Standards (NAAQS). *EPA.gov - NAAQS*. Retrieved December, 2012, from http://www.epa.gov/air/criteria.html

— (2012d, December 14). Summary of Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. *Summary of Executive Order 12898*. Retrieved December, 2012, from http://www2.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice

— (2012e, July 16). Basic Information. *EPA.gov - Brownfields and Land Revitalization*. Retrieved December, 2012, from http://www.epa.gov/brownfields/basic_info.htm

— (2012f). Title 50: Water Management and Protection. Chapter 485A: Water Pollution and Waste Disposal. Section 485-A:8: Classification of Waters (United States, Environmental Protection Agency (EPA)). Washington, DC. Retrieved February 17, 2012, from http://water.epa.gov/scitech/swguidance/standards/upload/2003_11_21_standards_wqslibrary_nh_nh_1_title50.pdf

U.S. Fish & Wildlife Service (USFWS). (2016). *USFWS Downeaster SDP EA iPAC Trust Resource Report*. Retrieved February 10, 2016, from http://ecos.fws.gov/ipac/

— (2015). "Northern Long-Eared Bat (*Myotis Septentrionalis*)." *USFWS: Northern Long-Eared Bat*. Retrieved September 9, 2016, from https://www.fws.gov/Midwest/endangered/mammals/nleb/index.html.

— (2012, November 28). Letter to Gannett Fleming. USFWS New England Field Office, Concord, NH.

U.S. Geological Survey (USGS). (2011). NHD Data. *U.S. Geological Survey (USGS)*. Retrieved August 2, 2011, from http://nhd.usgs.gov/data.html

— (2008). Ground-Water Availability in the United States.

U.S. President. (2015). Executive Order 13690 – Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input. *White House*. Retrieved May 17, 2016, from https://www.whitehouse.gov/the-press-office/2015/01/30/executive-order-establishing-federal-flood-risk-management-standard-and-

— (1977). Executive Order 11988 – Floodplain Management. *National Archives*. Retrieved 2012, from http://www.archives.gov/federal-register/codification/executive-order/11988.html

Appendix A

Proposed Corridor Improvements

Appendix A – *Proposed Corridor Improvements*

Improvement		Quantity	Location
Curve Modifications	To Allow 79 mph MAS*	35	Throughout corridor
	To Allow 70 mph MAS*	27	
	To Allow 65 mph MAS*	14	
	To Allow 60 mph MAS*	3	
	To Allow 50 mph MAS*	1	
	Total	80	
Restoration of Second Main Track and/or Passing Sidings	Second Main Track	0.8 mile	MP 20.4 – MP 21.2, Andover, MA
	Second Main Track	5.1 miles	MP 272.9 – MP 267.8, Plaistow, Newton and Kingston, NH
	Second Main Track or Passing Siding	6.8 miles	MP 241 – MP 234, Rollinsford, NH and North Berwick, ME
	Second Main Track or Passing Siding	6.2 miles	MP 234.2 – MP 228, Berwick and Wells, ME
	Passing Siding	7.4 miles	MP 216.2 – MP 208.8, Arundel, ME
	Passing Siding	4.3 miles	MP P-13.2 – MP P-9, Falmouth, Cumberland and Yarmouth, ME
	Total	30.3 miles	
Installation of New Track	Connecting track	0.5 mile	Connecting (or "Wye") Track, Portland, ME
Installation of New Interlockings or Modification of Existing Interlockings	New Interlockings to be Installed	7 (+1 optional)	MP 267.8, Kingston, NH
			MP 264.4, East Kingston, NH
			MP 234.2, North Berwick, ME
			MP 219.9, Arundel, ME
			MP 215.4, Arundel, ME
			MP 1.6 (CPM 1), Mountain Branch, Portland, ME
			MP 189 (CPF 189), Falmouth, ME
			MP 1.9 (CPM 2), Mountain Branch Portland, ME (optional)
	Existing Interlockings to be modified	5	MP 272.9, Plaistow, NH
			MP 228.0, Wells, ME
			MP 196.72 (CPF 196), Portland, ME
			MP 196.29 (CPF 195), Portland, ME
			MP 184.70 (CPF 185), Yarmouth, ME
Upgrade Highway-Rail At-Grade Crossings	Highway-Rail At-Grade Crossing Improvements	Throughout corridor	
Facility Improvements	Existing Station Improvements (platforms, other pedestrian access)	2	Wells Station, Wells, ME
			PTC, Portland, ME
	Existing Layover Facility Improvements	1	PTC, Portland, ME

* MAS = Maximum Authorized Speed

Appendix B

USFWS IPaC Report

U.S. Fish & Wildlife Service

Downeaster SDP EA

IPaC Trust Resource Report

Generated February 10, 2016 11:43 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.

IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME

Downeaster SDP EA

LOCATION

Maine, Massachusetts and New Hampshire

DESCRIPTION

Tier 1 Service Level EA

IPAC LINK

https://ecos.fws.gov/ipac/project/332CJ-EDBG5-CXRE7-733QW-PLXZDA

U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

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

Maine Ecological Services Field Office
17 Godfrey Drive, Suite 2
Orono, ME 04473-3702
(207) 866-3344

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Piping Plover Charadrius melodus — Threatened

MANAGED BY
Maine Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa — Threatened

MANAGED BY
Maine Ecological Services Field Office
New England Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Fishes

Atlantic Salmon Salmo salar — Endangered

MANAGED BY
Maine Ecological Services Field Office

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E07L

Flowering Plants

Small Whorled Pogonia Isotria medeoloides — Threatened

MANAGED BY
New England Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=Q1XL

Mammals

Northern Long-eared Bat Myotis septentrionalis — Threatened

MANAGED BY
Maine Ecological Services Field Office
New England Ecological Services Field Office

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Critical Habitats

This location overlaps all or part of the critical habitat for the following species:

Atlantic Salmon Critical Habitat Final designated

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E07L#crithab

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

American Oystercatcher Haematopus palliatus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0G8

American Bittern Botaurus lentiginosus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F3

Arctic Tern Sterna paradisaea — Bird of conservation concern
Season: Breeding

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bay-breasted Warbler Dendroica castanea — Bird of conservation concern
Season: Breeding

Black-billed Cuckoo Coccyzus erythropthalmus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HI

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Canada Warbler Wilsonia canadensis — Bird of conservation concern
Season: Breeding

Great Cormorant Phalacrocorax carbo — Bird of conservation concern
Season: Wintering

Horned Grebe Podiceps auritus — Bird of conservation concern
Season: Wintering

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
Season: Migrating

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Least Tern Sterna antillarum — Bird of conservation concern
Season: Breeding

Nelson's Sparrow Ammodramus nelsoni — Bird of conservation concern
Season: Breeding

Olive-sided Flycatcher Contopus cooperi — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0AN

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Pied-billed Grebe Podilymbus podiceps — Bird of conservation concern
Season: Breeding

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Purple Sandpiper Calidris maritima — Bird of conservation concern
Season: Wintering

Saltmarsh Sparrow Ammodramus caudacutus — Bird of conservation concern
Season: Breeding

Seaside Sparrow Ammodramus maritimus — Bird of conservation concern
Season: Breeding

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Egret Egretta thula — Bird of conservation concern
Season: Breeding

Upland Sandpiper Bartramia longicauda — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HC

Willow Flycatcher Empidonax traillii — Bird of conservation concern
Season: Breeding
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F6

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

Refuge data is unavailable at this time.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Wetland data is unavailable at this time.