

6.0 Mitigation and Commitments

Mitigation measures have been developed to mitigate the adverse impacts described in Chapter 5.0. This chapter lists both the specific measures meant to mitigate unavoidable environmental impacts, and additional mitigation measures that the Massachusetts Department of Transportation – Highway Division (MassDOT) has agreed to implement in coordination with the three communities of Newburyport, Amesbury, and Salisbury.

6.1 SURFICIAL GEOLOGY AND SOILS

The Preferred Alternative would not result in adverse impacts to geology and soils in the project area; therefore, no mitigation measures would be required. MassDOT will require that the design/build contractor develop and implement specific erosion and sedimentation and fugitive-dust emission-control measures during construction to ensure that impacts are avoided.

Erosion and sediment control techniques that will be employed during construction and earth-moving phases of the work include installation and maintenance of hay bale barriers, silt fence barriers, and catch basin protection with temporary catch basin filters. The contractor will be responsible for implementing and maintaining each of these controls, all of which will be described in the Storm Water Pollution Prevention Plan (SWPPP) for the project. A copy of the draft SWPPP is included in Appendix E.

6.2 LAND USE AND VISUAL RESOURCES

6.2.1 Land Use

Since the proposed bridge and roadway improvements would be located within the existing right-of-way (ROW), the Preferred Alternative would not have a direct impact on land use.

6.2.2 Visual Resources

The visual analysis in Section 5.3 concludes that, overall, constructing the Preferred Alternative with the network tied arch bridge design would have a negligible visual impact within the project corridor. An exception to this would be at the Whittier Point condominium complex in Amesbury, located to the east of the realigned I-95 northbound roadway. As noted in Section 5.3, constructing the Preferred Alternative with a new I-95 northbound bridge to the east of existing I-95 northbound would require

removing mature vegetation currently located within the limits of the I-95 ROW adjacent to the condominium complex. The Preferred Alternative would relocate the I-95 northbound roadway further to the east, within the I-95 ROW, but closer to the condominiums. Removing the mature vegetation would be a major visual impact to the condominium residents.

To mitigate this impact to the greatest extent practicable, MassDOT will construct a visual barrier that will screen the view of the I-95 roadway north of the Merrimack River as seen from the Whittier Point condominiums. Snowplows on interstate highways can throw snow and ice a considerable distance. The proximity of the roadway to the condominium building would require constructing a fence to preclude snow and ice from winter road plowing operations hitting the condominium building. The fencing will restrict the throw of the snow and ice to the immediate vicinity of the roadway and will avoid impacts to adjacent structures or roadways.

The visual impact of the fence will be mitigated with plantings (e.g., climbing vines) on the side facing the condominium complex to soften the blank wall of the fence. An example of the potential landscaping improvements is shown on Figures 6-1 through 6-3.

The network tied arch bridge, the bridge type most closely replicating the look of the existing Whittier Bridge, will minimize the negligible visual impacts at the Merrimack River crossing.

6.3 OPEN SPACE AND RECREATION

The Preferred Alternative would not result in adverse impacts to open space and recreation areas along the project alignment. Temporary construction-period noise impacts could result at open space and recreation areas. Potential construction-noise mitigation measures are described in Section 6.15.4.

As part of mitigating the demolition of the National Register of Historic Places-eligible Whittier Bridge and as specified in the Section 106 Memorandum of Agreement (Appendix G), the Federal Highway Administration (FHWA) and MassDOT have committed to preserving certain historic elements of the existing bridge and incorporating these elements into interpretive features of the shared-use path. The intent of the preservation activities is to celebrate the life of John Greenleaf Whittier, the history of the existing Whittier Bridge, and the natural environment of the Merrimack River. Decorative elements from the bridge, including the builder's plaques and the carved granite Massachusetts state seals located on both shorelines, would be

incorporated into interpretive panels located at path trailheads or at one or more of the three scenic overlooks to be located immediately south of, mid-span, and on the northern end of the new I-95 northbound bridge.

The shared-use path along the I-95 ROW would create the first recreational path constructed on interstate highway ROW in Massachusetts and represents MassDOT's commitment to embrace the recommended actions outlined in the U.S. Department of Transportation (USDOT) *Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations* (March 15, 2010) and MassDOT's *GreenDOT Initiatives Policy*. The three communities will be responsible for maintenance activities along the shared-use path, as discussed during the Whittier Working Group meetings with representatives of the three communities.

6.4 TRAFFIC AND SAFETY

As detailed in Section 5.5, the Preferred Alternative would result in greatly improved levels of service for the study area roadways, and would alleviate existing safety problems.

The contractor will be required to submit a Traffic Maintenance Plan to MassDOT for review and approval. This plan will be coordinated with engineering, planning, police, and fire departments, and emergency medical services in Newburyport, Amesbury, and Salisbury.

Electronic variable message signs will be used to inform motorists of construction activity and suggest detours when required. The signs will be sited to provide early notification to travelers so that alternate routes could be sought.

6.4.1 Alternative Modes of Transportation - Shared-Use Path

With the construction of the Whittier Bridge shared-use path and the interconnection to the existing Salisbury Ghost Trail, a continuous connection from Route 1 in Salisbury south to the park-and-ride lot at Exit 57 in Newburyport would be created. This would also enhance connectivity to existing parks, including Moseley Woods and Maudslay State Park in Newburyport, and would provide a safe and efficient crossing of the Merrimack River for alternative modes of transportation.

FIGURE 6-2: VISUAL BARRIER AT WHITTIER PLACE CONDOMINIUMS, AMESBURY (CUT-AWAY VIEW OF TEMPORARY CONDITION DURING CONSTRUCTION)

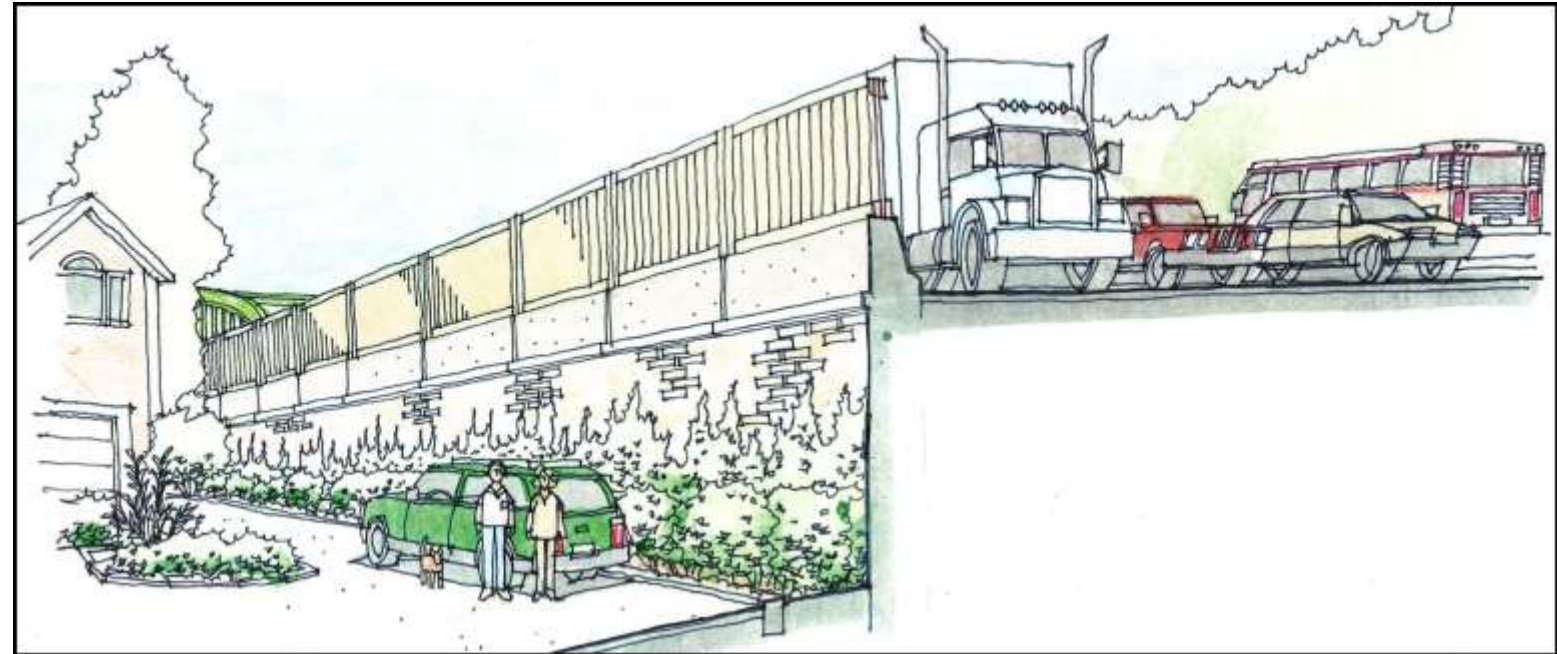
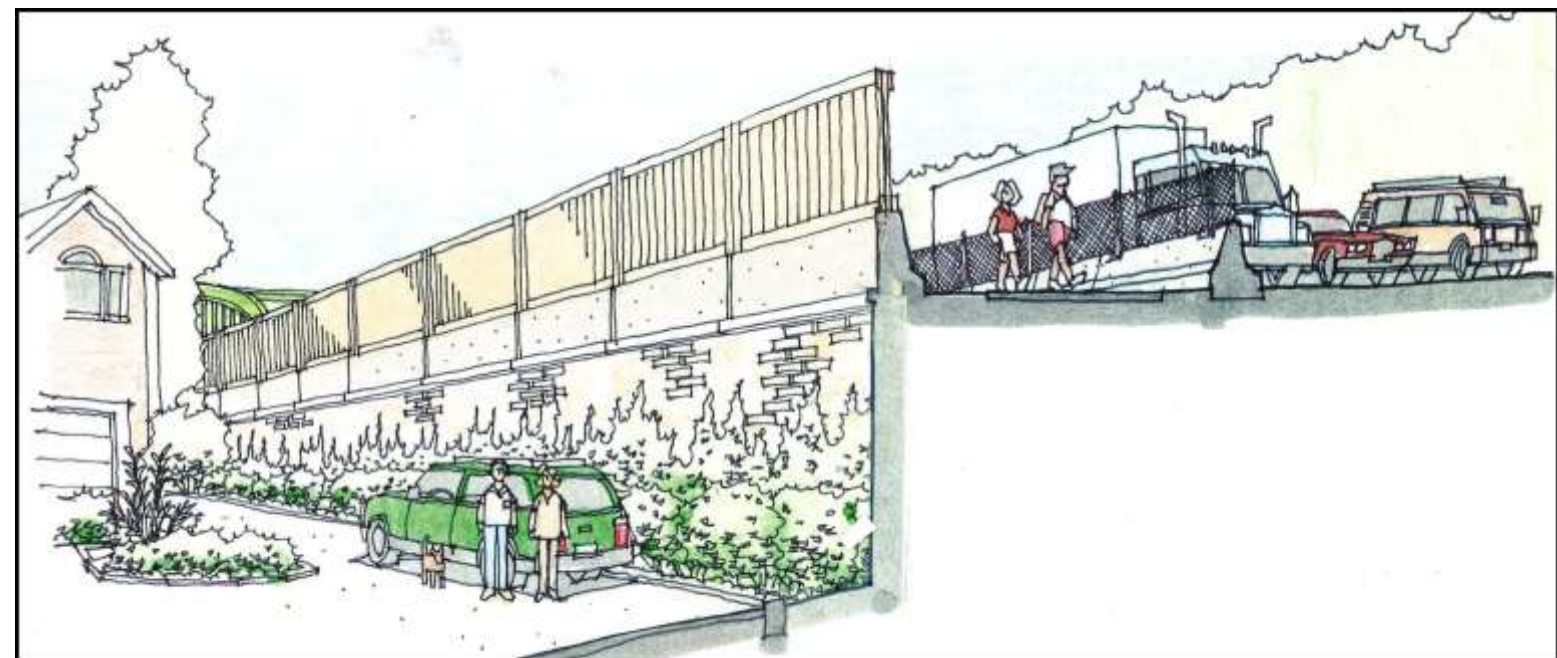


FIGURE 6-1: VISUAL BARRIER AT WHITTIER PLACE CONDOMINIUMS, AMESBURY (PERMANENT CONDITION)



FIGURE 6-3: VISUAL BARRIER AT WHITTIER PLACE CONDOMINIUMS, AMESBURY (CUT-AWAY VIEW OF PERMANENT CONDITION)



6.4.2 Public Transportation/Transportation Demand Management (TDM)/Intelligent Transportation Systems (ITS)

Introduction

The goal of the proposed public transportation, TDM, and ITS plan is to reduce total traffic volume on the roadway within the project limits, both during and after construction for peak and off-peak commuting hours. The plan uses a variety of approaches to meet the needs of the long-established tourist and commuting behavior of this corridor. The program focuses on ideas that will assist in reducing personal vehicle demand in the project area.

Public Transportation

Work with Local Transit Agencies

MassDOT will continue to work with the Merrimack Valley Regional Transit Authority (MVRTA) to maintain existing bus service in the project area that provides regional connections. Route 51 currently provides access to Newburyport, Amesbury, Merrimac, NECC, and Haverhill areas on both weekdays and weekends, and meets existing demands in the region. This route uses I-95 in the study area and will be maintained throughout the project duration. MassDOT will work with MVRTA to ensure that buses maintain existing schedules and that transfer times are not impacted by the project.

Additionally, MVRTA received a Job Access and Reverse Commute Program (JARC) Grant from the Federal Transit Administration to initiate a new flexible fixed bus route in Salisbury, Amesbury, and Newburyport. Currently, the Town of Salisbury does not receive any fixed bus service, and MVRTA has to prioritize rides for their Ring and Ride on-demand service because it is oversubscribed. This new service will provide both on-demand and fixed bus service adjacent to the study area, including Routes 110 and 113, to help build ridership in the region. The proposed route is currently under design based on the origins and destinations of the current Ring and Ride clients.

Commuter Transit

In addition to local bus access, existing commuter bus services use I-95 to travel between New Hampshire and Boston, MA, via the Newburyport Park-and-Ride facility. Commuting options from the lot include C&J Trailways, The Coach Company, and Greyhound. C&J Trailways operates both weekend and weekday service, while The Coach Company operates only during weekday peak hours. MassDOT will continue to work with the transit authorities to ensure that the services continue with the construction of the bridge and roadway widening.

Commuter rail service is also provided from the Newburyport Commuter Rail Station. The station has 814 parking spaces, including 24 accessible spaces, which have an average weekday availability of 75 percent. Additionally, there are 22 bicycle spaces and the MVRTA Bus Route 51 provides service to the station. MassDOT will work with MVRTA to ensure that buses maintain existing schedules and that transfer times are not impacted by the project.

Transportation Demand Management

Expand Park-and-Ride Capacity in the Project Area

Although it is outside the project area, an existing park-and-ride facility exists in Newburyport at Exit 57, which influences traffic in the study area. Currently, there are 510 parking spaces with an average 100 percent occupancy on both weekday and weekends. There are existing bike racks and bus shelters at the facility. MassDOT is currently expanding the park-and-ride facility with the addition of 105 parking spaces and resurfacing the existing lot. Construction began in summer 2009 and is expected to be completed in spring 2011. The existing spaces will be resurfaced and restriped at night so that the facility can remain open during construction. Expansion of the facility will help reduce personal vehicle demand on the corridor.

Promote Alternative Transportation Options with Signage

Alternative modes of transportation will be promoted as part of the project. Dynamic Message Signs used for construction will be used to promote park-and-ride lots and carpooling during and after construction in addition to existing static roadside signs that direct patrons to park-and-ride lots. In addition to signs on I-95, signage will be added along Routes 110 and 113 to promote alternative transportation options.

Carpooling and Vanpooling

MassDOT has an annual Carpool Program to encourage ride sharing and the use of high-occupancy vehicles (HOV). As an incentive, they offer a discount to commuters who travel with three or more people in their private vehicle and use the Massachusetts Turnpike or the Sumner/Ted Williams Tunnels. Carpool registrants receive a discount on the regular price of daily tolls as long as three or more passengers are in the vehicle.

In addition to toll discounts, the I-93 North of Boston Carpool Lane was developed to encourage ridesharing and to improve the flow of traffic during weekday morning and afternoon commutes. The 2-mile southbound HOV lane runs between Medford and Boston. Vehicles with two or occupants or motorcycles can use this lane.

MassRIDES, a statewide ridesharing program was developed to connect commuters to an array of bus, vanpool, and carpool support services.

MassDOT will promote this program to encourage drivers to carpool and vanpool.

Project Website

The project website will be used to provide current information to users. Website information will include current construction-related activities information, including detours, work schedules, and road closures.

Intelligent Transportation Systems

Permanent Traffic Data Collection

The project will include upgrading the existing MassDOT permanent count station. Station #5087, on I-95 in Salisbury at the Amesbury Town Line (north of Route 110 Ramps), will need to be upgraded to count traffic on the interstate due to roadway widening.

Real-time Traveler Information

As with any construction project, there may be minor delays to drivers traveling through the area, including those on buses. MassDOT, either through the project website or through the statewide 511 program, will evaluate the need to provide real-time traffic information during the construction of the project.

The contractor will be required to notify MassDOT and coordinate with Newburyport, Amesbury, and Salisbury for any exceptions to the standard work hours.

The Merrimack River navigation channels will remain open to marine traffic for most of the construction period, except for temporary closures of short duration for the bridge construction. Such times are expected to include floating the proposed bridge spans over the channels into place and dismantling the existing bridge superstructure over the navigation channels. Directives of the U.S. Coast Guard (USCG) regarding navigational traffic will be followed, and the USCG and local harbor masters will be kept informed of all construction activity potentially affecting marine traffic.

6.5 AIR QUALITY

The mesoscale air quality analysis described in Section 5.6 demonstrates that the Preferred Alternative would not adversely affect air quality—the improvement in traffic level of service projected for the Preferred Alternative would lead to improved air quality. The Preferred Alternative conforms to the Commonwealth of Massachusetts State Implementation Plan to achieve attainment of the 8-hour National Ambient Air Quality Standards for ozone. No adverse impacts to air quality were identified; therefore, no mitigation measures will be required.

Emissions would be generated during the construction phase of the proposed project. Emissions from diesel-fuel burning equipment and dust generated by earth-moving operations would be the primary sources of these emissions that could affect air quality levels at nearby sensitive land uses. To mitigate the potential impacts of these emissions, control measures will be employed during the project's construction phase. Emission reduction measures will include:

- Using low-emitting diesel-fueled equipment or retrofitting of heavy duty diesel-fueled construction equipment with diesel oxidation catalysts or diesel particulate filters;
- Using electric compressors, welders, and pumps; and locating operations of large emission sources, such as excavators and earth-moving equipment, as far from sensitive land uses as possible;
- Wetting exposed soil, covering trucks, and other dust sources;
- All diesel-powered non-road construction equipment and vehicles greater than 50 brake horsepower will have engines that meet the U.S. Environmental Protection Agency (EPA) particulate matter emission standards in effect for non-road diesel engines for the applicable engine power group; or emission control technology verified by the EPA or the California Air Resources Board (CARB) for use with "non-road engines;" or emission control technology verified by EPA or CARB for use with "on-road engines" provided that such equipment is operated with diesel fuel that has not more than 15 parts per million sulfur content; or emission control technology certified by manufacturers to meet or exceed emission reductions provided by either "on-road" or "non-road" emission control technology verified by EPA or CARB; and
- Limiting truck idling to 5 minutes maximum in compliance with Massachusetts General Law (MGL) Chapter 90, Section 16A and the Massachusetts Department of Environmental Protection (MassDEP) idling reduction regulation (310 CMR 7.11(1)(b)).

MGL Chapter 111 Part 7.01B regulates dust emissions under construction activities. In order to comply with the PM₁₀ and PM_{2.5} standards, and to reduce nuisance dust, the contractors will be required to keep dust down at all times including non-working hours, weekends, and holidays.

Dust control measures are described in the MassDOT – Highway Department *Standard Specifications for Highways and Bridges Manual*. These requirements are intended to control excessive nuisance dust and their use on this project will include one or more of the following measures:

- Using wet dust suppression, alone or with approved binding agents;
- Using calcium chloride instead of wet suppression when freezing conditions exist;
- Using wind-screen fabric or solid-wood barriers around the perimeter of construction site;
- Using wheel-wash stations or crushed stone at construction ingress/egress areas;
- Covering active stockpiles with plastic tarps, and seeding or using approved soil stabilizers on inactive stockpiles; and
- Covering dump trucks during material transport on public roadways.

A specification on air quality will be incorporated into contract documents to ensure compliance with the provisions of MGL Chapter 111 Section 142A, "Pollution or Contamination of Atmosphere: Prevention; Regulations; Violations; Enforcement," and the MassDEP Code of Massachusetts Regulations (CMR) 310 CMR 7.09, "Dust, Odor, Construction and Demolition."

Implementation of these emission-control measures will serve to reduce emissions to avoid potentially adverse public health impacts.

6.6 NOISE

The traffic noise analysis performed in accordance with FHWA and MassDOT's 2011 Policy and procedures predicted that as many as 39 residential, commercial and park area receptors within the project's study area would be exposed to future traffic noise levels in excess of applicable abatement criteria limits. Traffic noise mitigation measures would therefore be warranted for consideration and further evaluation.

Since this project is classified as a Type I highway project, FHWA's and MassDOT's noise abatement criteria and funding for mitigation would be applicable. FHWA policy recognizes five different potential means of mitigating traffic noise; however, the only option requiring quantitative evaluation is that of noise barriers. Other mitigation measures, such as highway realignments, traffic vehicle type or speed restrictions, soundproofing for buildings, or the purchase of properties to act as a buffer zone, are typically not evaluated unless required by special circumstances.

6.6.1 Noise Barrier Fundamentals

The potential noise reduction benefits and costs associated with a hypothetical noise barrier were evaluated using the FHWA's Traffic Noise

Model (TNM model). The TNM model assumes that noise does not transmit through the barrier. Rather, the limiting aspect for a noise barrier's performance is due to noise diffracting over the top of the barrier. To be effective, a noise barrier must break the line-of-sight between the noise source and the receptor. To ensure that noise does not transmit directly through the barrier, its "surface density" should be 4 pounds per square foot or greater. Many common barrier materials satisfy this surface density requirement, including wooden timbers, lightweight concrete, dense plastics, or engineered metal panels.

Noise barriers are modeled as close to the edge of the highway as possible to be most effective at reducing noise for those receptors that are at the same elevation or below the highway (i.e., roadway at grade or in a fill section). Similarly, barriers are modeled within the ROW as close to the receptors as possible for those receptors that are located above the highway (i.e., roadway in a cut section). In this manner, the potential noise reduction (i.e., insertion loss) provided by the barriers is maximized for a given barrier's height.

Since noise travels through the air in a wave pattern, the barrier length must be long enough to minimize the contribution of noise wrapping (or flanking) around the ends of the barrier. The barrier's length is determined by extending its endpoints beyond the outermost receptors by a distance several times (typically 4x) the perpendicular distance from the outermost affected receptors to the barrier. In this manner, it can be reasonably assured that noise will not wrap around the ends of the barrier, so the primary factor limiting the noise reduction performance of the barrier will be its height. In general, the taller the barrier, the greater noise reduction or insertion loss it can provide for an increased number of benefiting receptors, but at a greater cost for materials and construction. In general, State departments of transportation evaluate the noise reduction performance and cost aspects of noise barriers to determine whether a candidate barrier is both "feasible" and "reasonable" prior to committing its inclusion and construction in a highway project.

6.6.2 MassDOT Noise Barrier Policy

According to MassDOT's 2011 *Type I [Traffic] Noise Abatement Guidelines*, for a candidate barrier to be considered "acoustically feasible," it must be able to provide a minimum insertion loss (or noise reduction) of 5 decibels at the exterior of more than 50 percent of front-row receptors that are expected to be impacted by future traffic noise. The term "insertion loss" or "noise reduction" is defined as the change in noise level at a given receptor location *with* versus *without* a barrier in place. A number of safety and environmental factors must also be considered and accounted for in the design process to evaluate a barrier's "engineering feasibility" as

well, including, but not limited to, the ability to construct the barrier within the ROW, avoid crossing other roadways, drainage, maintenance, wetland issues, wind load and driver sight-line ability. In addition to these environmental and visibility concerns, MassDOT limits the height of a barrier not to exceed 25 feet tall due to potentially excessive wind load conditions.

A barrier is considered acoustically “reasonable” if it can be constructed within an acceptable cost range, meet MassDOT’s Noise Reduction Design Goal of providing at least 10 decibels reduction for at least one front row receptor, and be desired by the property owners and residents located behind the barrier. To aid in this determination, a Cost Effectiveness Index (CEI) is computed for each candidate noise barrier. The CEI accounts for three factors, namely (1) the cost to construct the barrier; (2) the average insertion loss among receptors benefiting by at least 5 decibels of reduction, and (3) the number of receptor dwelling units (Units) within the study zone expected to benefit from the barrier. For Category B residential receptors, the CEI is calculated by dividing the barrier cost by the average insertion loss by the number of benefiting receptors, and is expressed in units of dollars/decibel insertion loss/dwelling unit (\$\$/dBIL/Unit). Per MassDOT policy, a barrier is considered reasonable if it can be demonstrated that the barrier’s CEI computes to \$8,400/dBIL/Unit or less, based on an assumed barrier unit cost of \$50 per square foot. For Category C, D and E receptors, such as offices, hotels, hospitals, parks, schools and churches, a barrier’s CEI is computed based on the number of people expected to benefit from the barrier. For these non-residential receptors, the equivalent CEI can be expressed as \$138/dBIL/person/hour. Again, only those receptors within the study zone expected to benefit from at least a 5 decibel reduction in exterior noise are accounted for in computing the CEI.

If a candidate barrier’s CEI is \$8,400/dBIL/Unit or \$138/dBIL/person/hour or less, then the barrier is considered to be both cost and performance justified. However, there may be overriding factors that could eliminate a given barrier from further consideration. For example, in the event that a barrier does not physically fit within the necessary space, or if the barrier disrupts traffic sight lines, or if local roadway over- and under-passes pose significant design restrictions, then the barrier might be dismissed as infeasible. In addition, the viewpoint of property owners and residents must be taken in to account. A candidate barrier must be desired by at least a two-thirds majority (67 percent) of the “weighted” total number of residential voters behind the barrier to justify its construction. After being presented at a public meeting, MassDOT will conduct a survey by mail to query the affected public’s opinion of the barrier. In this manner the public can ‘vote’ on the desirability of the barrier in which existing front row

residential owners count for 5 votes each, second- and third-row owners count for 3 votes each, and renters count for 1 vote each. Potential issues of public concern could involve barrier aesthetics, sightline and scenic landscape interruption, or a feeling of being closed-in and confined by the barrier.

If a candidate barrier passes all of MassDOT’s feasibility and reasonableness tests, and if it is desired by the affected property owners and residents, then the barrier would be recommended for inclusion and construction in the project subject to MassDOT’s Statement of Likelihood:

Based on the studies conducted to date, the Massachusetts Department of Transportation (MassDOT) intends to install highway traffic noise abatement measures in the form of noise barrier(s) at the noise-impacted locations identified in this study provided that the following feasibility and reasonableness conditions remain:

- Safety and engineering aspects relating to the roadway user and adjacent property owners do not preclude construction of the noise barrier.
- Environmental impacts are not of a magnitude to make construction of the noise barrier infeasible.
- The noise abatement is acoustically feasible and meets MassDOT’s noise reduction design goal.
- The noise abatement is cost effective.
- There is community acceptance of the noise abatement by the property owners and residents.

If it subsequently develops during final design that these conditions have substantially changed, the noise barrier(s) might not be provided. A final decision of the construction of the noise barrier(s) will be made upon completion of the project’s final design and the public involvement processes.

6.6.3 Candidate Traffic Noise Barriers

The TNM model predictions, as shown in Table 5-19 in Section 5.7, indicate that the 2030 East-Inside Build PM Condition results in the greatest number of expected impacts (i.e., 39 impacted receptors); consequently, this condition was selected as the worst-case for further evaluation in the TNM model to determine the “feasibility” and “reasonableness” of candidate noise barriers in accordance with MassDOT procedures.

Of the 39 impacted receptors, 36 were Category B receptors, so candidate noise barriers for these receptors were evaluated in accordance with MassDOT’s *Type I and Type II [Traffic] Noise Abatement Policies and Procedures* with a cost-effectiveness index limit of \$8,400/dBIL/Unit. The other three impacted receptors were Category C receptors with outdoor use, so barriers for those three receptors were evaluated in accordance with MassDOT’s *Methodology for the Determination of Cost Effectiveness of Proposed Noise Abatement for Activity C Land Uses and Activity*

Category D Facilities with a cost-effectiveness index limit of \$138/dBIL/person/hour.

Based on the locations of the 39 receptors predicted to be impacted by future project-related traffic noise, eight candidate noise barriers were initially considered and evaluated for cost and noise reduction effectiveness. These initial eight barriers can be seen in Figure 6-4, and descriptions of the numbers and types of impacted receptors, locations and neighborhoods benefiting from each of these candidate noise barriers are summarized in Table 6-1. In a few cases, impacted receptors were dispersed so sporadically that a noise barrier would not be a cost-effective mitigation measure; consequently, no barriers were evaluated for those isolated receptors.

Within the TNM model, the eight candidate barriers were placed as close as possible to the roadway edge. Since all of the impacted receptors were located either at- or below-grade of the roadway, this placement assured the barrier would provide the most noise reduction possible. Barriers were evaluated in 2-foot-height increments from 11 to 25 feet and the lengths were determined using design guidance found in FHWA’s *Noise Barrier Design Handbook*. In this handbook, it is recommended that a barrier be extended past the outermost receptor a distance of at least four times the perpendicular distance from the receptor to the barrier to ensure that noise does not wrap around the ends of the barrier and degrade the barrier’s potential noise reduction effectiveness.

The results of the initial noise barrier evaluation can be seen in Table 6-2 and Table 6-3, which summarize each of the eight candidate barriers’ pertinent design features (i.e., height and length), potential cost of the barrier, predicted maximum and average decibel insertion losses, number of benefiting receptors within the study zone, and resulting CEI. In addition, it is noted whether a given barrier is considered cost and performance justified per MassDOT policy.

The findings indicate that none of the initial eight traffic noise barriers are expected to meet MassDOT’s criteria for justification. As shown in Table 6-2, while most, but not all, of the six Category B receptor barriers could achieve the 5 decibels of insertion loss for the majority of front row impacted receptor necessary to be considered “acoustically feasible” and show an insertion loss of at least 10 decibels for at least one front row receptor in order to meet MassDOT’s “barrier design goal,” none of the barriers were sufficiently cost-effective to be considered “reasonable” Per MassDOT’s requirement not to exceed \$8,400/dBIL/Unit. Similarly, as shown in Table 6-3, the two barriers for Category C receptors, while not subject to any feasibility tests, failed to meet MassDOT’s cost-effectiveness requirement of \$138/dBIL/person/hour or less to be considered

“reasonable.” The numbers of persons visiting the two Category C receptors were determined by discussions with the facility owners and/or conservatively estimated based on the number of available parking spaces. It was then assumed that visitors to these areas would be evenly distributed between the additional receptor locations used to spatially cover the impacted areas. For example, the Moseley Woods park area was first represented by two receptor locations, which, upon being identified as impacted by future traffic noise levels, was expanded to 12 receptor locations to cover all the trails and play areas in the park.

The primary reason for this is that the receptors closest to the highway were not grouped in dense clusters. Instead, for the most part, receptors were sparsely distributed throughout the area, as is evident in Table 6-2, where it can be seen that less than 15 receptors are located behind four of the six proposed barriers. As a result, there were not enough benefiting receptors to sufficiently distribute the cost of the barriers, leading to CEI values that exceeded MassDOT’s criteria limit of \$8,400/dBIL/Unit or \$138/dBIL/person/hour.

The initial barrier evaluations clearly indicated that none of the initial eight candidate barriers satisfied MassDOT’s cost-effectiveness criteria, so attention shifted to other (atypical) potential barrier designs in hopes that a cost-effective barrier could be identified. Numerous different scenarios were then evaluated in the TNM to achieve this goal. As alternative designs were being evaluated, it became clear that the only barrier which was at all close to meeting MassDOT’s cost-effectiveness criteria was Barrier No. 1 due to the higher concentration of receptors along Rabbit Road. Consequently, three refinements of Barrier No. 1 were evaluated in hopes of finding one that would meet MassDOT’s cost-effectiveness requirement not to exceed \$8,400/dBIL/Unit.

Throughout evaluating additional barrier design scenarios, the barrier length was the primary feature that was changed. It was hoped that a reduced barrier length could afford the necessary reduction in cost while continuing to provide significant noise reduction, thus lowering the CEI. As before, all three refined barriers were modeled at heights from 11 to 25 feet in 2-foot increments.

FIGURE 6-4: LOCATION OF CANDIDATE NOISE BARRIERS (APPROXIMATE)



TABLE 6-1: NEIGHBORHOODS BENEFITING FROM CANDIDATE NOISE BARRIERS

Barrier No.	Noise Barrier Location Description	Benefiting Neighborhood Receptors	No. of Impacted Receptors and Activity Category
1	Northbound side of I-95 between Rte 110 on-ramp and I-495 overpass	Residences along Rabbit Road	19 – Cat. B receptors
2	Southbound side of I-95 between Toll Road overpass and Rte 286 on-ramp	Residences along Locust Street	5 – Cat. B receptors
3	Adjacent to Rte 286 on-ramp to I-95 SB	Residences along Rte 286 near on-ramp to I-95 NB	2 – Cat. B receptors
4	Northbound side of I-95, north of Toll Road overpass	Residences along Lena Maes Way	1 – Cat. B receptor
5	Southbound side of I-95 between Old Ferry Road and Curzondale Court	Residences along Spring Lane, Pine Hill Road, and Hallisey Drive	7 – Cat. B receptors
6	Northbound side of I-95 between Main Street underpass and off-ramp to Rte 110	A medical facility along Merrill Street	1 – Cat. C receptor
7	Northbound side of I-95 between Evergreen Valley Golf Course and Merrimack River	Residences along Ferry Road and Laurel Road	2 – Cat. B receptors
8	Northbound side of I-95 between Pine Hill Road overpass and Merrimack River	Users of Moseley Woods park	2 – Cat. C receptors (expanded to 12 receptors to cover entire park area)

TABLE 6-2: CATEGORY B RECEPTORS – INITIAL TRAFFIC NOISE BARRIER EVALUATIONS

Barrier No. for Category B Receptors	Barrier Height (feet) ^(a)	Barrier Length (feet)	Barrier Cost (\$) ^(b)	No. of Receptors Behind Barrier (Units)	"Feasibility" Percent of Front Row Receptors with IL > 5 dB (%) ^(c)	"Design Goal" Max Insertion Loss for Front Row Receptors (dBIL) ^(d)	Ave Insertion Loss of Benefiting Receptors with IL > 5 dB (dBIL)	No. of Benefiting Receptors with IL > 5 dB (Units)	Cost-Effectiveness Index (CEI) (\$\$/dBIL/Unit) ^(e)	Meets all MassDOT Criteria ^(f) (Yes/No)
1	25	3490	\$4,362,500	30	100%	17	12	26	\$13,818	NO
	23	3490	\$4,013,500	30	100%	17	12	26	\$13,137	NO
	21	3490	\$3,664,500	30	100%	16	11	26	\$12,460	NO
	19	3490	\$3,315,500	30	100%	16	11	26	\$11,765	NO
	17	3490	\$2,966,500	30	100%	15	10	26	\$11,073	NO
	15	3490	\$2,617,500	30	100%	14	10	24	\$10,803	NO
	13	3490	\$2,268,500	30	100%	13	9	24	\$10,087	NO
11	3490	\$1,919,500	30	100%	12	9	24	\$9,409	NO	
2	25	1741	\$2,176,250	7	100%	15	13	6	\$28,560	NO
	23	1741	\$2,002,150	7	100%	15	12	6	\$27,056	NO
	21	1741	\$1,828,050	7	100%	14	12	6	\$25,675	NO
	19	1741	\$1,653,950	7	100%	13	11	6	\$24,251	NO
	17	1741	\$1,479,850	7	100%	12	11	6	\$22,943	NO
	15	1741	\$1,305,750	7	100%	12	10	6	\$21,799	NO
	13	1741	\$1,131,650	7	100%	11	9	6	\$20,879	NO
11	1741	\$957,550	7	100%	10	7	6	\$21,763	NO	
3	25	441	\$551,250	2	0%	5	0	0	N/A	NO
	23	441	\$507,150	2	0%	5	0	0	N/A	NO
	21	441	\$463,050	2	0%	5	0	0	N/A	NO
	19	441	\$418,950	2	0%	5	0	0	N/A	NO
	17	441	\$374,850	2	0%	5	0	0	N/A	NO
	15	441	\$330,750	2	0%	5	0	0	N/A	NO
	13	441	\$286,650	2	0%	5	0	0	N/A	NO
11	441	\$242,550	2	0%	5	0	0	N/A	NO	
4	25	1578	\$1,972,500	11	100%	11	8	10	\$23,651	NO
	23	1578	\$1,814,700	11	100%	10	8	10	\$22,826	NO
	21	1578	\$1,656,900	11	100%	10	8	10	\$21,888	NO
	19	1578	\$1,499,100	11	100%	9	7	10	\$21,114	NO
	17	1578	\$1,341,300	11	100%	9	7	10	\$20,323	NO
	15	1578	\$1,183,500	11	100%	8	6	9	\$21,096	NO
	13	1578	\$1,025,700	11	100%	7	6	7	\$25,201	NO
11	1578	\$867,900	11	100%	5	5	1	\$163,755	NO	
5	25	3340	\$4,175,000	22	100%	13	10	17	\$25,196	NO
	23	3340	\$3,841,000	22	100%	12	9	17	\$24,797	NO
	21	3340	\$3,507,000	22	100%	11	8	17	\$24,559	NO
	19	3340	\$3,173,000	22	100%	9	8	16	\$25,776	NO
	17	3340	\$2,839,000	22	100%	8	7	15	\$28,648	NO
	15	3340	\$2,505,000	22	83%	6	6	10	\$43,794	NO
	13	3340	\$2,171,000	22	0%	5	0	0	N/A	NO
11	3340	\$1,837,000	22	0%	3	0	0	N/A	NO	
7	25	1367	\$1,708,750	16	100%	10	7	4	\$59,126	NO
	23	1367	\$1,572,050	16	100%	10	7	4	\$56,549	NO
	21	1367	\$1,435,350	16	100%	9	7	3	\$66,145	NO
	19	1367	\$1,298,650	16	100%	9	7	3	\$63,973	NO
	17	1367	\$1,161,950	16	100%	8	6	3	\$62,470	NO
	15	1367	\$1,025,250	16	50%	7	7	1	\$155,341	NO
	13	1367	\$888,550	16	0%	5	0	0	N/A	NO
11	1367	\$751,850	16	0%	5	0	0	N/A	NO	

(a) - Barrier height relative to roadway pavement, maximum height 25 feet

(b) - Barrier unit cost of \$50/SF per MassDOT policy

(c) - Feasibility test of at least 50% front row receptors benefiting by at least 5 dBIL

(d) - Noise reduction design goal of at least one front row receptor benefiting by 10 dBIL

(e) - Category B residential receptors CEI limit of \$8,400/dBIL/Unit per MassDOT policy

(f) - Barrier meets all acoustical feasibility and reasonableness tests, yes or no

TABLE 6-3: CATEGORY C,D,E RECEPTORS – INITIAL TRAFFIC NOISE BARRIER EVALUATIONS

Barrier No. for Category C,D,E Receptors	Barrier Height (feet) ^(a)	Barrier Length (feet)	Barrier Cost (\$) ^(b)	Total No. Persons Using Facility/Hour (person/hour)	Percent of Facility Impacted by Noise (%)	Percent of Facility Benefited with IL > 5 dB (%)	Ave Insertion Loss of Benefiting Receptors with IL > 5 dB (dBIL)	No. of Benefiting Persons/Hour with IL > 5 dB (person/hour)	Cost-Effectiveness Index (CEI) (\$\$/dBIL/Person/Hour) ^(c)	Meets all MassDOT Criteria ^(d) (Yes/No)
6	25	520	\$650,000	10	100%	100%	10	10	\$6,068	NO
	23	520	\$598,000	10	100%	100%	10	10	\$5,748	NO
	21	520	\$546,000	10	100%	100%	10	10	\$5,465	NO
	19	520	\$494,000	10	100%	100%	9	10	\$5,102	NO
	17	520	\$442,000	10	100%	100%	9	10	\$4,876	NO
	15	520	\$390,000	10	100%	100%	8	10	\$4,618	NO
	13	520	\$338,000	10	100%	100%	7	10	\$4,435	NO
	11	520	\$286,000	10	100%	100%	6	10	\$4,339	NO
8	25	1806	\$2,257,500	336	17%	33%	9	112	\$2,185	NO
	23	1806	\$2,076,900	336	17%	33%	9	112	\$2,125	NO
	21	1806	\$1,896,300	336	17%	33%	8	112	\$2,071	NO
	19	1806	\$1,715,700	336	17%	33%	8	112	\$2,022	NO
	17	1806	\$1,535,100	336	17%	25%	7	84	\$2,470	NO
	15	1806	\$1,354,500	336	17%	25%	6	84	\$2,560	NO
	13	1806	\$1,173,900	336	17%	17%	6	56	\$3,710	NO
	11	1806	\$993,300	336	17%	0%	N/A	0	N/A	NO

(a) - Barrier height relative to roadway pavement, maximum height 25 feet
 (b) - Barrier unit cost of \$50/SF per MassDOT policy
 (c) - Category C, D, E receptors CEI limit of \$138/dBIL/person/hour per MassDOT policy
 (d) - Barrier meets all acoustical feasibility and reasonableness tests, yes or no

Table 6-4 summarizes these efforts. Barrier 1 OPT was a variant of Barrier 1 except that its endpoints were reduced in length to barely cover the outermost impacted receptors. Barriers 1S and 1N were much shorter-length barriers covering only the southern and northern halves of Barrier 1, respectively. It was hoped that one of these shorter-length barriers would be more cost-effective given the way the receptors were clustered at each end of Barrier 1. However, as before, all three refined barrier designs led to the same results; none met MassDOT's justification criteria. Of all the barriers modeled, Barrier 1-N at a height of 13 feet came the closest with a CEI of \$9,002/dBIL/Unit, which is still well in excess of MassDOT's limit of \$8,400/dBIL/Unit.

6.6.4 Undeveloped and Unpermitted Properties

Finally, in accordance with the requirements in MassDOT's policy regarding undeveloped and unpermitted parcels, the distances from I-95 to a potential noise impact was computed using the TNM model for each land-use activity category. Efforts were made to contact local zoning agencies and area land-use maps were reviewed to identify any undeveloped/unpermitted lands, however none could be found. However, in the event such undeveloped/unpermitted lands do exist in the project area, a TNM model run with generic terrain conditions was used to estimate the distances to noise impact between Exits 57 and 58, 58 and 59, and 59 and 60. This information, as summarized in Table 6-5, will be provided to local officials in the event the properties are developed in the future in which case noise mitigation funding from Federal or State agencies would not be available for developments within these impact distances.

6.6.5 Conclusion

A traffic-noise mitigation analysis was completed in accordance with updated FHWA and MassDOT policy. The TNM was used to evaluate the noise reduction performance and cost-effectiveness of numerous candidate noise barriers. Although a number of receptors have been identified as impacted by future noise conditions, no noise barriers can be justified as being both "feasible" and "reasonable." Not enough receptors benefit from the noise reduction to sufficiently distribute the cost of a barrier; consequently, noise barriers are not recommended for further consideration.

6.7 WATER RESOURCES

Areas of soils would be exposed during construction and could erode into, and cause sedimentation of, adjacent water bodies and wetlands if controls are not established. The control of soil erosion and sedimentation

from the site during construction would be based on the regulations, guidelines, and conditions set forth by the EPA in its Final Notice of the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Construction Sites. The MassDEP stormwater management standards will also be used as a guideline.

Stormwater Pollution Prevention Plan. Controls during construction will be incorporated in a Stormwater Pollution Prevention Plan (SWPPP) that complies with the NPDES requirements for construction. An SWPPP will be prepared for the project prior to initiating earth-disturbing activities. The SWPPP will establish the project's approach to controlling water pollution during construction and would list structural and non-structural Best Management Practices (BMPs) that will be employed to control stormwater pollution associated with construction. The SWPPP will also identify stormwater control measures remaining after the construction is complete. Control methods such as minimizing areas of disturbance, maintaining existing vegetated areas, and employing non-structural and structural stabilization methods will be included. BMPs will include but not be limited to seeding, mulching, geotextiles, bonded fiber matrices, permanent vegetative cover, turf reinforcement mats, bioengineering, armoring, outlet stabilization, vehicle sediment tracking, dewatering, dust control, management of hazardous materials and stockpiling. Velocity dissipation methods such as surface roughening, diversion swales, check dams, earth dikes and level spreaders will also be included as appropriate. Measures for sediment capture techniques such as hay bales, silt fences, sedimentation basins, deep sump catch basins and water quality inlets, filter berms, and sediment tanks will be detailed as applicable. Finally, the SWPPP will clearly outline training, inspection, and reporting responsibilities.

A draft SWPPP is included in Appendix E. The SWPPP is conceptual at this stage of design, a final SWPPP will be prepared by the design/build contractor before the start of project construction and final details may vary somewhat from the draft SWPPP included in this report.

As described in Section 5.15, an engineered stormwater management system will be constructed for the Preferred Alternative. This system will improve water quality for stormwater discharges to the Merrimack River, Meader Brook, and other project-area surface waters compared to No Build conditions. The proposed stormwater management includes:

- Eight infiltration basins;
- One wet basin;
- Two extended detention basins;

- An outlet control structure installed over existing drainage located in the Route 110 Loop Ramp;
- Eleven sediment forebays (one per basin);
- Water quality swales (in the median where space is available); and
- Deep sump catch basins.

No adverse impacts to water quality are anticipated and no post-construction mitigation measures would be required.

6.8 FISHERIES

The Preferred Alternative would result in a permanent loss of 3,050 square feet of Essential Fish Habitat (EFH) in the Merrimack River, which is minor compared to the overall amount of EFH in the river. The new river crossing would not impede fish passage or adversely affect fish, including the state- and federal-listed endangered shortnose sturgeon and state-listed Atlantic sturgeon.

Based on the listing status of the two sturgeon species, an informal Section 7 consultation regarding potential impacts and impact avoidance measures with National Marine Fisheries Service (NMFS) under the federal Endangered Species Act has been initiated. MassDOT is coordinating with NMFS and has requested a "No Effect" determination with no time of year restrictions. In a letter dated June 8, 2011, NMFS stated: "Based on the analysis that any effects to shortnose sturgeon from the proposed action will be insignificant or discountable, NMFS is able to concur with the determination that the proposed reconstruction of the Whittier Bridge in Amesbury, Massachusetts is not likely to adversely affect any listed species under NMFS jurisdiction. Therefore, no further consultation pursuant to Section 7 of the ESA is required." NMFS also concluded, with regards to the Atlantic sturgeon, that: "... all effects of the proposed action are likely to be insignificant and discountable and the proposed action is not likely to result in the injury or mortality of any Atlantic sturgeon, the action is not likely to appreciably reduce the survival and recovery of any DPS [distinct population segment] of Atlantic sturgeon and therefore it is not reasonable to anticipate that this action would be likely to jeopardize the continued existence of any DPS of Atlantic sturgeon. As such, no conference is necessary for Atlantic sturgeon. Correspondence with NMFS is included in Appendix E. The FHWA authorized MassDOT to consult directly with the NMFS as its non-federal representative in a letter dated September 8, 2009.

TABLE 6-4: ADDITIONAL TRAFFIC NOISE BARRIER EVALUATIONS FOR MORE COST-EFFECTIVE RESULTS

Barrier No. for Category B Receptors	Barrier Height (feet) ^(a)	Barrier Length (feet)	Barrier Cost (\$) ^(b)	No. of Receptors Behind Barrier	"Feasibility" Percent of Front Row	"Design Goal" Max Insertion Loss for Front	Ave Insertion Loss of Benefiting	No. of Benefiting Receptors with	Cost-Effectiveness Index (CEI)	Meets all MassDOT Criteria ^(f)
1 OPT	25	2924	\$3,655,000	30	100%	17	12	24	\$13,185	NO
	23	2924	\$3,362,600	30	100%	17	11	24	\$12,477	NO
	21	2924	\$3,070,200	30	100%	16	11	24	\$11,772	NO
	19	2924	\$2,777,800	30	100%	15	10	24	\$11,071	NO
	17	2924	\$2,485,400	30	100%	15	10	24	\$10,343	NO
	15	2924	\$2,193,000	30	100%	14	9	24	\$9,661	NO
	13	2924	\$1,900,600	30	93%	13	9	21	\$9,648	NO
	11	2924	\$1,608,200	30	93%	12	9	20	\$9,211	NO
1-S	25	1801	\$2,251,250	16	100%	16	11	12	\$17,384	NO
	23	1801	\$2,071,150	16	100%	16	11	12	\$16,399	NO
	21	1801	\$1,891,050	16	100%	15	10	12	\$15,437	NO
	19	1801	\$1,710,950	16	100%	15	10	12	\$14,463	NO
	17	1801	\$1,530,850	16	100%	14	9	12	\$13,488	NO
	15	1801	\$1,350,750	16	100%	14	9	12	\$12,553	NO
	13	1801	\$1,170,650	16	100%	13	9	11	\$12,169	NO
	11	1801	\$990,550	16	100%	12	8	11	\$11,193	NO
1-N	25	1432	\$1,790,000	14	100%	15	11	12	\$13,643	NO
	23	1432	\$1,646,800	14	100%	15	11	12	\$12,816	NO
	21	1432	\$1,503,600	14	100%	14	10	12	\$12,048	NO
	19	1432	\$1,360,400	14	100%	14	10	12	\$11,262	NO
	17	1432	\$1,217,200	14	100%	14	10	12	\$10,484	NO
	15	1432	\$1,074,000	14	100%	13	9	12	\$9,719	NO
	13	1432	\$930,800	14	100%	12	9	12	\$9,002	NO
	11	1432	\$787,600	14	100%	11	9	10	\$9,266	NO

(a) - Barrier height relative to roadway pavement, maximum height 25 feet

(b) - Barrier unit cost of \$50/SF per MassDOT policy

(c) - Feasibility test of at least 50% front row receptors benefiting by at least 5 dBIL

(d) - Noise reduction design goal of at least one front row receptor benefiting by 10 dBIL

(e) - Category B residential receptors CEI limit of \$8,400/dBIL/Unit per MassDOT policy

(f) - Barrier meets all acoustical feasibility and reasonableness tests, yes or no

TABLE 6-5: DISTANCES TO TRAFFIC NOISE IMPACT FOR UNDEVELOPED/UNPERMITTED PROPERTIES

I-95 Segment	Side of I-95	Distance from Roadway Edge to Exterior NAC by Activity Category (feet)						
		A	B	C	D	E	F	G
		56 dBA	66 dBA	66 dBA	N/A	71 dBA	N/A	N/A
Between Exits 57 and 58	East	1,100	300	300	—	175	—	—
	West	1,100	275	275	—	150	—	—
Between Exits 58 and 59	East	1,000	250	250	—	125	—	—
	West	1,000	225	225	—	125	—	—
Between Exits 59 and 60	East	1,300	425	425	—	225	—	—
	West	1,300	400	400	—	225	—	—

The construction of the Preferred Alternative would occur approximately 13 miles from upstream spawning grounds near Haverhill, and construction in the river would occur within cofferdams, which would contain sediment disturbance and minimize suspended sediment transport; therefore, project construction would have no effect on sturgeon spawning grounds. No blasting would be needed for this project. Furthermore, only limited pile driving would be required and would be performed within cofferdams, which would minimize adverse acoustic effects; therefore, there would be no adverse acoustic effects on shortnose sturgeon. No dredging would be performed as part of this project.

The primary use by shortnose sturgeon of the Whittier Bridge area of the Merrimack River is for upstream/downstream passage. The ability of shortnose sturgeon to transit the project site would not be adversely affected considering the 1,000-foot-wide expanse of the river and the limited reduction in river cross section during construction. In-water construction sequencing combined with the use of temporary cofferdams to facilitate construction of new piers or the removal of existing piers will further minimize disturbance. Use of a qualified observer during cofferdam construction will further ensure that there would be no adverse effects to shortnose sturgeon.

MassDOT is coordinating with NMFS and the Massachusetts Department of Marine Fisheries (DMF) under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act regarding potential impacts to EFH, and EFH and non-EFH species in the Merrimack River. An updated EFH Assessment, which includes consideration of EFH species and non-EFH species (listed in Section 4.9 of Chapter 4), is being reviewed by NMFS and DMF.

6.9 WILDLIFE

The Preferred Alternative would have a small negative impact on wildlife. The Preferred Alternative would widen the existing wildlife passage under the Whittier Bridge by relocating bridge abutments farther back from the Merrimack River shoreline. In areas where I-95 would be relocated to the east, larger culverts would enable passage for small- to medium-sized animals. MassDOT will investigate feasible methods to enhance wildlife habitat along the Merrimack River corridor, including installation of bird nesting boxes, plantings with native species with food value for wildlife, and other feasible methods that will not interfere with future maintenance of the new Merrimack River bridges.

No impacts to threatened and endangered species are anticipated, except for minor, temporary noise impacts related to constructing the bridge. Existing nesting pairs of bald eagles are located both to the east and west of the I-95 ROW. The Massachusetts Natural Heritage & Endangered Species Program (NHESP) may require monitoring of eagles during construction to gauge their response to noise. MassDOT will continue to coordinate with NHESP to develop appropriate mitigation measures, if required.

6.10 JURISDICTIONAL WETLANDS

As detailed in Chapter 5.11, the Preferred Alternative would result in direct impacts to jurisdictional wetlands in Amesbury and Salisbury.

The Bordering Vegetated Wetland (BVW) replication concept in Amesbury consists of expanding Wetland H by excavating approximately 4,950 square feet of upland at its northern end within the ROW (Figure 6-5).

The proposed mitigation would be configured to avoid the area of the existing butternut tree (*Juglans cinerea*). Although not listed as threatened or endangered (or as a species of special concern) under either federal or Massachusetts law, the butternut tree is threatened by the spread of the butternut canker (*Sirococcus clavigignati-juglandacearum*). Between the years 1980 to 1994, there was a dramatic decrease in the number of live butternut trees throughout the United States and southeastern Canada.¹

In addition, the location of the proposed shared-use path would be modified slightly to accommodate the mitigation area. Lowering grades to approximately 33 feet elevation would allow additional flood storage and sediment and nutrient treatment to occur.

The replication would include excavating the existing upland slope to approximately the 33-foot contour. The goal would be to establish forested wetland adjacent to the existing marsh. Wetland plantings would consist of woody species prevalent in nearby forested wetlands (red maple, green ash (*Fraxinus pennsylvanica*), gray dogwood (*Cornus amomum*) and winterberry (*Ilex verticillata*). A temporary wetland seed mix would be applied to stabilize the soils until the woodland herbaceous species emerge from seedbank in the topsoil. The steep slope of the upland would be reduced to a 3:1 slope or less, and stabilized with a native upland seed mix. It is expected that woody upland species would quickly recolonize the stabilized slope. A long-term monitoring program would be

implemented to ensure that the replicated portion of the wetland achieved the performance standards specified in the 2002 *Massachusetts Inland Wetland Replication Guidelines*. This plan would replace the lost acreage at an approximately 1:1 ratio and would replace the lost principle functions of Floodflow Alteration, Sediment/Toxicant Retention and Nutrient Removal. Functions gained by the wetland creation would include flood storage, sediment/toxicant retention, nutrient transformation/retention, and wildlife habitat. The functional quality for wildlife habitat of the created wetland would be limited most by the disturbed nature of the existing wetland caused by the dominating invasive species (purple loosestrife and common reed) and the developed upland surrounding most of the area.

In Salisbury, the BVW replication concept consists of expanding Wetland O by excavating approximately 1,500 square feet of upland within the ROW adjacent to Wetland O (Figure 6-6). The wetland replication would include excavating the existing upland slope to approximately the 52-foot contour. The goal would be to establish shrub wetland adjacent to the existing emergent marsh. Wetland plantings would consist of shrub species prevalent in the area (gray dogwood (*Cornus amomum*), winterberry (*Ilex verticillata*), black chokeberry (*Aronia melanocarpa*) and highbush blueberry (*Vaccinium corymbosum*). A temporary wetland seed mix would be applied to stabilize the soils and deter emergent invasives until the shrub species become established. The adjacent upland slope disturbed during grading would be seeded with a native upland seed mix. It is expected that woody upland species would quickly recolonize the stabilized slope.

Full size plans of the replication areas at 1:20 scale are included in map pockets at the end of the chapter.

A long-term monitoring program will be implemented to ensure that the replicated portion of the wetland achieves the performance standards specified in the 2002 *Massachusetts Inland Wetland Replication Guidelines*. This plan will replace the lost acreage at an approximately 1:1 ratio and will replace the lost principle functions of Floodflow Alteration, Sediment/Toxicant Retention, and Nutrient Removal. Functions gained by the wetland creation will include flood storage, sediment/toxicant retention, and nutrient transformation/retention. The functional quality for wildlife habitat of the created wetland will be limited by the disturbed nature of the existing wetland caused by the dominating invasive species (purple loosestrife and common reed) and the developed upland surrounding most of the area.

¹ Conservation Assessment for Butternut or White walnut (*Juglans cinerea*) L., USDA Forest Service, Eastern Region, 2003

FIGURE 6-5: CONCEPTUAL PLAN FOR COMPENSATORY WETLAND MITIGATION AT WETLAND H (AMESBURY)

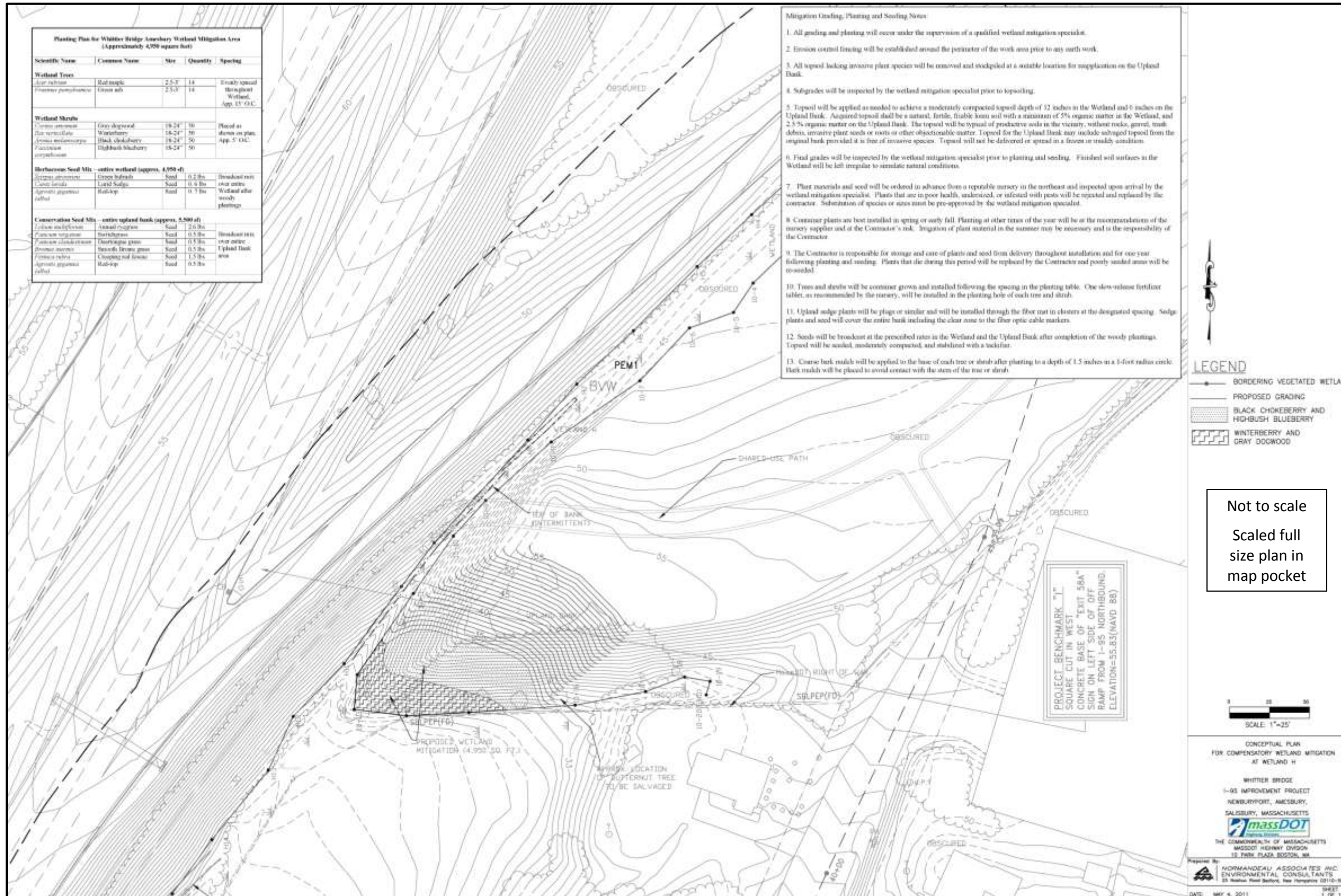
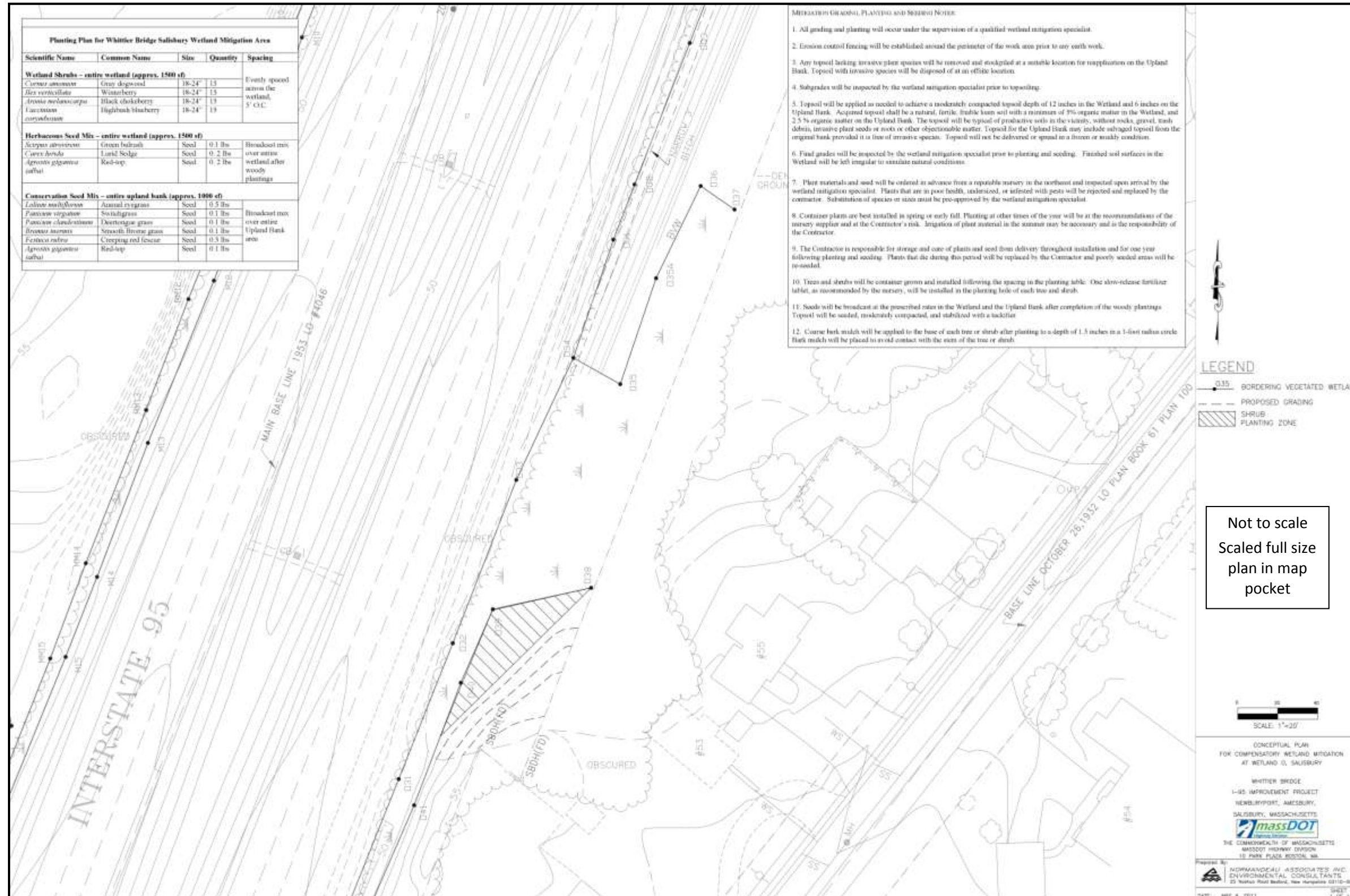


FIGURE 6-6: CONCEPTUAL PLAN FOR COMPENSATORY WETLAND MITIGATION AT WETLAND O (SALISBURY)



Temporarily impacted Riverfront Area (RFA) in Newburyport will be mitigated through 20,300 square feet of in situ restoration. The permanent alteration to previously developed RFA will cumulatively result in alteration of over 10 percent of the RFA (310 CMR 10.58(5)(e)); therefore, the additional 2,259 square feet of alteration requiring mitigation will be mitigated through 11,600 square feet of on-site restoration of existing degraded areas (in accordance with 310 CMR 10.58(5)(f)). The mitigation in Newburyport will consist of demolishing the existing Whittier Bridge abutment, building the new abutment approximately 50 feet behind the existing abutment, removing existing riprap, reclaiming and restoring median, and restoring the proposed approximate 80-foot slope with bioengineering.

Temporarily impacted RFA adjacent to the Merrimack River in Amesbury will also be mitigated through 11,650 square feet of in situ restoration. The permanent alteration to previously developed RFA will cumulatively result in alteration of over 10 percent of the RFA (310 CMR 10.58(5)(e)); therefore, the additional 6,000 square feet of alteration requiring mitigation will be mitigated with 11,250 square feet of on-site restoration of existing degraded areas (in accordance with 310 CMR 10.58(5)(f)). The mitigation in Amesbury will consist of demolishing the existing Whittier Bridge abutment, building the new abutment approximately 50 feet behind the existing abutment, removing existing riprap, reclaiming and restoring median, and restoring the proposed approximate 80-foot slope with bioengineering.

Indirect shading impacts to salt marsh and BVW on the Merrimack River shoreline in Newburyport and Amesbury would be minimal and would not require mitigation. On the south shore (Newburyport), shade from the steep hillside would be the primary factor limiting light availability, which would be exacerbated by the existing bridge further reducing direct and indirect light. Several small salt marshes occur on the east (downstream) side of the bridge, but are poorly developed. Given their location at the edge of the bridge, light limitation probably does not play a significant role in the ecology of these marsh areas. They appear more likely to be limited by scouring from the river and a stormwater outfall from which high flows have bisected the marsh. MassDOT will upgrade and relocate the outfall to an area where no salt marsh currently exists directly under the proposed southbound bridge. Relocating the outfall should encourage the former salt marsh bisected by stormwater flows from the outfall to reestablish. MassDOT will enhance re-establishment by removing the existing outfall pipe and placing boulders within the mid-intertidal zone to allow sediment to accrete behind them. The presence of finer sediments would allow natural recolonization of salt marsh species to occur.

Several design features of the proposed bridges would further reduce their shading effects on both shores, including the use of smaller piers than currently exist and relocating the bridge abutments approximately 50 feet inland of the existing abutments. The above-water portions of the proposed piers would be dual columns and would be approximately one-half as wide as the existing piers. These design features would allow more direct and indirect light to reach the wetland resources under the bridges on both the north and south shores to the benefit of salt marsh and BVW plant communities.

6.11 FLOODPLAINS

The Preferred Alternative would not result in a measureable impact to the 100-year floodplain or the Regulatory Floodway in the Merrimack River; therefore, no mitigation measures are proposed.

6.12 HISTORIC AND ARCHEOLOGICAL RESOURCES

The FHWA has determined that the proposed removal and replacement of the Whittier Memorial Bridge will have an unavoidable adverse effect on that National Register-eligible structure under Section 106 of the National Historic Preservation Act of 1966, as amended. The regulations governing Section 106 require the lead federal agency for a federal undertaking to "seek ways to avoid, minimize, or mitigate adverse effects" in consultation with the Advisory Council on Historic Preservation, the State Historic Preservation Officer, any appropriate Tribal Historic Preservation Officer (THPO), and other consulting parties. If those parties agree on how the adverse effects will be resolved then they should execute a memorandum of agreement (MOA) [36 CFR 800.6(b)(2)]. A fully executed MOA "evidences the agency official's compliance with Section 106 ... and shall govern the undertaking" [36 CFR 800.6(c)].

6.12.1 Section 106 Consultation

FHWA and MassDOT undertook an extensive public outreach process in 2010 to ensure that the views of the consulting parties, the local governments, and the public were considered in the resolution of the adverse effect. This outreach included numerous public informational meetings, presentations to the historical commissions of Amesbury, Newburyport, and Salisbury, and biweekly meetings with the Whittier Working Group (WWG) comprised of the CEOs of the three municipalities and other members appointed by the CEOs. The WWG serves as a conduit of information about the Whittier Bridge project between MassDOT and the local communities and provides suggestions and recommendations to MassDOT about the project, including the Section 106 process. MassDOT and FHWA also met with representatives from the

Council and the SHPO in company with the Mayor of Newburyport at the Whittier Bridge on August 20, 2010. No THPOs had responded to FHWA's request for comments on this project.

All Section 106 consulting parties concurred with FHWA and MassDOT's determination that the National Register-eligible Whittier Memorial Bridge is structurally deficient and functionally obsolete and must be replaced with a new bridge. All consulting parties also expressed overwhelming support for MassDOT's preferred alternative: a double-barrel network tied-arch superstructure with steel girder approach spans constructed within the existing Interstate Highway layout on a parallel alignment to the existing bridge. The proposed design of the replacement bridge will partially mitigate the adverse effect associated with the removal of the existing National Register-eligible bridge by providing a new context-sensitive monumental gateway structure at this important crossing of the Merrimack River near the state's northern border.

6.12.2 Memorandum of Agreement

FHWA, the Council, and the SHPO have executed a Section 106 MOA, with MassDOT as an invited signatory, to ensure that FHWA and MassDOT will carry out certain measures to minimize or mitigate the adverse effect caused by the removal and replacement of the National Register-eligible Whittier Memorial Bridge. The Chief Executive Officers of the three municipalities have signed the MOA as concurring parties. The MOA was fully executed on March 23, 2011.

Under the terms of the MOA, FHWA and MassDOT have agreed to carry out the following stipulations:

- MassDOT will prepare archival recordation of the National Register-eligible Whittier Memorial Bridge that will include the following:
 - A written historical narrative similar to a Historic American Engineering Record "narrative format" report, describing the bridge and discussing its engineering, architectural, and historical significance at the local, state, and national levels.
 - Archival quality photographic documentation of the bridge and its surroundings in the form of black and white prints made from medium format (2½" x 2½") and large format (4" x 5") negatives. Photographs will include views of the bridge's elevations, deck, abutments, piers, and plaques, and context views showing the bridge in relation to its setting. Black and white prints also will be provided showing individual exterior views of the following structures and buildings: the National Register-eligible Essex-Merrimack Bridge between Amesbury and Newburyport, the National Historic Landmark Lowell's Boat Shop in Amesbury, and

the National Register-eligible Smith's Chain Bridge Filling Station No. 3 in Amesbury, as well as at least one streetscape view of the National Register-eligible Salisbury Point area in Amesbury. Views also will be provided of the Whittier Memorial Bridge from the Salisbury Point area in Amesbury and from Moseley Pines Park in Newburyport.

- Photocopies of selected pages from the original 1951 construction plans for the Whittier Memorial Bridge, including a site plan, elevations, and details.
- The original archival materials, including photographic negatives, will be submitted to the SHPO for transfer to the State Archives. Sets of archival quality copies, without photographic negatives, will be submitted to each of the three historical commissions of Amesbury, Newburyport, and Salisbury for transmittal to appropriate local repositories.
- FHWA and MassDOT will afford the local historical commissions, the WWG, and the SHPO the opportunity to review and comment on the structural type and the sketch plans for the new replacement bridge, as those plans are developed.
- FHWA and MassDOT will ensure that certain ornamental artifacts on the existing bridge are salvaged for reuse on the replacement bridge or at the trailheads of the shared-use path, specifically including the four porcelain state seals on the bridge portals, the four carved granite state seals on the bridge wingwalls, and the two bronze state seal medallions and the two bronze builder's plaques on the bridge end posts. Other artifacts from the bridge also may be salvaged for reuse on the replacement bridge or along the shared-use path, as determined to be appropriate by FHWA and MassDOT in consultation with the SHPO, the local historical commissions, and the WWG.
- FHWA, with the assistance of MassDOT, will ensure that interpretive signage will be prepared, designed, fabricated, and installed at the overlooks along the shared-use path on the new bridge and abutments and at the trailheads and termini of the shared-use path. At a minimum, these signs will address the following themes: 1) the life, works, and time of John Greenleaf Whittier; 2) a transportation history of the lower Merrimack River, including a discussion of the design of the existing John Greenleaf Whittier Memorial Bridge; and 3) the natural heritage of the crossing, including a discussion of native wildlife. The text, graphics, and design of the signs, additional thematic subjects, and the total number and locations of the signs will be determined by FHWA and MassDOT in consultation with the SHPO, the Council, the local historical commissions, and the WWG.

- FHWA and MassDOT will choose an appropriate paint color for the structural steel on the replacement bridge in consultation with the SHPO, the Council, the local historical commissions, and the WWG.
- If FHWA or MassDOT determines that the undertaking will affect a previously unidentified property that may be eligible for listing in the National Register of Historic Places, or will affect a known historic property in an unanticipated manner, the FHWA and MassDOT will make reasonable efforts to avoid, minimize or mitigate adverse effects to such properties and determine actions that they can take to resolve adverse effects following the procedures in 36 CFR 800.13(b). In the event that a post-review discovery involves a property or properties that may have traditional cultural and religious significance to federally recognized Indian tribes, FHWA, in coordination with MassDOT, will consult with the appropriate Indian tribe(s) in accordance with the requirements of 36 CFR 800.13(b) and established procedures for Section 106 tribal consultation for Massachusetts. If pre-contact cultural resources are discovered or unanticipated effects on pre-contact period resources are found, FHWA, in coordination with MassDOT, will consult with the appropriate federally recognized Indian tribes in accordance with established procedures for Section 106 tribal consultation for Massachusetts.

6.13 OIL AND HAZARDOUS MATERIALS

No adverse impacts resulting from the Preferred Alternative were identified that would require special mitigation measures under the Massachusetts Contingency Plan. In accordance with the MassDOT specifications for Oil and Hazardous Materials, the design/build contractor will be required to monitor excavated soils during construction to ensure that any soils encountered that could require special handling will be identified and properly managed. (A copy of the specifications is included in Appendix G.)

All hazardous materials will be handled and disposed of in accordance with state and federal laws, including the Massachusetts Contingency Plan. A soil and groundwater management plan will be developed and implemented by the design/build contractor during construction. An additional pre-characterization program for areas where construction and/or excavation activities may occur within the project limits of work will be completed by MassDOT prior to issuing final bid documents for the design-build contract. This additional data will provide information on current soil and groundwater conditions at the site and will be used to develop soil and groundwater management and disposal options.

No asbestos or asbestos-containing material is known to exist along the project alignment. The design/build contractor will be required to comply

with MassDOT specifications for proper removal of bridge components coated with lead-based paint. These specifications require specific protective measures for land and water during paint removal operations. For activities over land (and wetland resources), an approved impervious covering must be placed on the ground under the work and decontamination areas and under waste containers. In the event that it is not practical to place tarpaulins directly on the ground, shielding devices must be supported by suitable frame works to prevent falling contaminants from escaping. Specific language for the protection of water below the bridge requires the contractor to take all necessary precautions to prevent debris due to paint related activities from entering the water. Any notification and clean-up procedures required to abate lead contamination in sediments or water shall be the responsibility of the contractor. The contractor must protect all drains to prevent debris from entering the storm sewer system. The contractor shall provide water booms, a method for anchoring the water booms and a procedure for removing the debris that inadvertently enters the water.

6.14 NAVIGATION

The Preferred Alternative would maintain existing vertical clearance and widen horizontal clearance in the navigation channels in the Merrimack River. Appropriate fendering systems and navigational lighting will be integrated into the bridge design to provide permanent navigation safety features. Additional navigation buoys will be placed to mark the edges of the "Steamboat Channel" as determined by the USCG. Additional mitigation measures are not proposed.

During construction of the new bridge crossing, there would be barges, falsework, work platforms, staging, and/or cofferdams placed or constructed in the waterway in conjunction with building the permanent bridge structures and demolishing the existing bridge. The type of temporary system will be determined by the final design of the substructure and superstructure; however, the project specifications will include provisions that the contractor must follow to ensure that navigation beneath the bridges will be maintained, except for those circumstances where limited closures will occur for public safety purposes. The directives will include staging plans showing zones where barges and equipment will be allowed to operate during each phase of construction and demolition; locations where equipment could be moored or stored while not in use; provisions for temporary aids to navigation including temporary lighting, establishing temporary routes for marine traffic; and, most importantly, timely notices to mariners throughout the construction and demolition duration. The contractor will be required to prepare a navigation plan for review and approval by the USCG, U.S. Army Corps of

Engineers (USACE), harbor masters, boating community, and other marine interests. The plan will address methods to minimize impacts to all mariners, management of vessel traffic and overall safety issues.

Temporary closures of the waterway could be required for safety reasons; however, since there are two channels, it is anticipated that the contractor will be able to maintain one channel at all times during construction and demolition. If there are instances when both channels must be temporarily closed for safety purposes or the channel that can accommodate only a larger vessel is closed, mariners will be informed in advance by the USCG through the weekly updates and monthly publication of the “Local Notice to Mariners.” The notice provides detailed information, including the nature of the work, work location coordinates, closing schedule, and contact information. In addition, broadcasts of temporary closures will be made in advance over the VHF marine radio. Temporarily suspending marine traffic for public safety reasons could be warranted during barge operations where sections or spans will be lifted and/or steel components will be hoisted or lowered into place. There would be temporary impacts to navigation during construction resulting from placing and operating temporary equipment within the waterway. Impacts to navigation will be minimized to the greatest extent possible through implementing a variety of measures intended to inform, notify, and provide as much information as possible to the marine community in advance of any work that could preclude and/or temporarily affect navigation.

6.15 CONSTRUCTION MANAGEMENT

6.15.1 Mitigation Staging

The work will be staged, to the most practicable extent, to have mitigation measures in place before the activity creating the disturbance commences. Erosion and sedimentation controls will be installed prior to earthwork disturbance. Portions of the proposed sedimentation forebays and basins will be graded to allow at least limited operation as these areas become available. Connections with the existing drainage systems will be made to these facilities if hydraulically feasible at that time. Sections of the proposed and altered existing drainage systems will be connected as they are completed.

Mitigation will be implemented in the following general sequence:

- Install erosion and sedimentation controls – interchange and wetland mitigation site;
- Establish equipment wash off areas at equipment and material lay down sites;
- Construct wetland mitigation site, coordinated with the rate of wetland affected on-site and the need for embankment material construction;
- Construct stormwater sedimentation forebays and recharge basins to the extent feasible and expand to final condition as soon as practicable; and
- Construct embankment grading and noise walls as construction becomes feasible, by location.

To mitigate traffic impacts, work that requires lane closures that cause unacceptable travel delay will be conducted at night. The goal will be to minimize nighttime construction as much as possible.

6.15.2 Erosion and Sedimentation Control

Erosion and sedimentation controls will be employed to minimize the transport of sediment into the existing drainage system and adjacent resource areas during the initial earthwork and subsequent construction phases of the project. All erosion and sedimentation control measures will be installed prior to excavation or disturbance and will be maintained throughout construction. The work will be sequenced to minimize the extent of land disturbed at any one time.

Erosion control techniques proposed could include hay bale and sedimentation fence barriers, catch basin filters and inlet sediment traps, temporary diversion drainpipes and sandbags, and stone check dams. A detailed description of each technique is discussed below. During the growing season, slope stabilization will be achieved by applying topsoil followed by seeding and mulching as soon as final grades are achieved. Organic mulching or jute netting could be used to stabilize slopes completed outside of the growing season. Permanent drainage structures and treatments will be constructed as soon as possible.

Controls during construction will be incorporated in an SWPPP that complies with the NPDES requirements for construction. An SWPPP will be prepared for the project prior to initiating earth-disturbing activities and provided to the Conservation Commissions in Newburyport, Amesbury, and Salisbury through the wetlands permitting process. The plan will include consideration of the following measures:

- **Hay Bale and Sedimentation Fence Barriers** – Hay bale barriers will be placed to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site. In areas where high runoff velocities or high sediment loads are expected, hay bale barriers will be backed up with sedimentation fences. This semi-permeable barrier made of a synthetic porous fabric will provide additional

protection. The sedimentation fence and hay bale barrier will be replaced as determined by periodic field inspection. Hay bales will be staked into the earth and reset as necessary. Hay bale barriers and sedimentation fence will be maintained and cleaned until all slopes are stabilized with permanent growth.

- **Catch Basin Filters and Inlet Sedimentation Traps** – Catch basin filters will be placed in existing catch basins, as practical, prior to commencement of construction and in new catch basins as they are installed. Filters will remain in place and will be maintained until all surfaces over which contributing runoff flows are fully stabilized. Hay bale sediment traps will be installed at all locations deemed appropriate and will be maintained and cleaned until all slopes are stabilized with permanent growth. Catch basin drain manholes and storm drainpipes will be cleaned of all sediment and debris after completing construction. Sediment collected in structures will be disposed of properly.
- **Temporary Diversion Drainpipes and Sandbags** – Diversion pipes that intercept and divert channel flow or pipe flow from work areas will be placed as necessary during construction. These installations will be expected at most outlet locations as work is conducted to extend existing outfalls, reconstruct and stabilize drainage channels, and construct new headwalls. Sandbags will be placed to direct flow to and from the temporary pipes. Temporary diversions will remain in place until the work in their immediate vicinity is completed.
- **Stone Check Dams** – Temporary check dams will be placed in channels to retain runoff for a sufficient time to allow suspended soil particles to settle. These temporary installations will be located as appropriate within temporary drainage swales or permanent drainage channels. Points of discharge will also be stabilized with stone to minimize erosion. The upstream side of check dams will be cleaned periodically and the sediment removed and properly disposed.
- **Slope Stabilization** – The area of disturbed land exposed at any one time will be minimized as much as practicable. A layer of plantable soil and a temporary seed and mulch application will be placed on disturbed slopes exposed for extended periods. All disturbed areas will be stabilized with permanent ground cover as soon as possible.
- **Maintenance Program of Structural Pollutant Controls** – During construction, the sediment and erosion control structures will be inspected regularly. Silt will be removed from hay bales if the silt depth becomes excessive. Damaged and deteriorated erosion control measures will be repaired immediately after identification. The underside of the hay bales will be kept in close contact with the earth

and reset as necessary. Erosion control measures will remain in place until all construction is completed and all disturbed earth is stabilized.

6.15.3 Dust Control

Dust suppression and dust control measures will be employed during excavation and construction so that no visible dust emissions leave the work sites for the duration of the work. The primary suppression methods will include applying water to site soil. No salts or other wetting agents will be used. In evaluating the effectiveness of dust control measures for a particular activity, weather conditions such as wind speed and direction will be considered. The use of wind and/or construction fence, blasting mats and gravel or paving at entrance/exit drives, parking areas and transit paths will minimize dust generation and transport.

6.15.4 Construction Noise Mitigation Measures

MassDOT will require the design/build contractor to submit a noise control plan for review and approval. The noise control plan will be implemented to minimize noise during construction. Noise monitoring will be required to document compliance with the noise monitoring plan. Predicted or measured noise levels that exceed or approach the recommended construction noise limits shown in Table 6-6 will be mitigated.

TABLE 6-6: CONSTRUCTION NOISE LIMITS

Site	Receptor Address	Existing Noise Level (L10,dBA)		Noise Limit (L10,dBA)	
		Daytime	Nighttime	Daytime	Nighttime
1	8 Curzondale Court	68	64	75	69
2	93 Clipper Way (Village at Newburyport)	63	61	75	66
3	16 Laurel Road	67	63	75	68
4	525 Main Street #4 (Whittier Point Condos)	68	64	75	69
5	503 Main Street #18 (Hawkswood Estates)	68	64	75	69
6	57 Old Merrill Street	63	59	75	64
7	47 Rabbit Road	78	74	83	77
8	25 Lena Maes Way	69	66	75	71
9	24 Locust Street	73	68	78	73
10	4 Natowich Way	68	65	75	70

Noise mitigation measures to reduce construction noise will include both general and task-specific control measures. General “best practice” noise control measures will be employed whenever possible to reduce noise at its source, along the pathway, or at the receptor location directly. Examples of best practice mitigation options include:

- **Source Controls**
 - Time Constraints – prohibiting work during sensitive nighttime hours;
 - Scheduling – performing noisy work during less sensitive time periods;
 - Equipment Restrictions – restricting the type of equipment used;
 - Emission Restrictions – specifying stringent noise emission limits;
 - Substitute Methods – using quieter methods/equipment when possible;
 - Exhaust Mufflers – ensuring all pieces of equipment have quality mufflers installed;
 - Lubrication and Maintenance – maintaining equipment to ensure quieter devices;
 - Reduced Power Operation – using equipment of only necessary size and power;
 - Limit Equipment On-Site – having only necessary equipment on-site; and
 - Noise Compliance Monitoring – performing community noise monitoring for compliance.

- **Pathway Controls**
 - Enclosures – encasing localized and stationary noise sources; and
 - Increased Distance – performing noisy activities farther away from receptors.

- **Receptor Controls**
 - Community Participation – involving affected resident through open dialog; and
 - Noise Complaint Process – creating the ability to log and respond to noise complaints.

Task-specific noise mitigation measures that could attenuate pile driving noise will include (1) the use of hydraulic “push piles” provided that ground resistance conditions allow their use; (2) pre-augering pile holes to loosen the substrata; (3) the use of hard rubber pile cushions; or (4) the use or a collapsible bellows system to enclose the piles as they are being driven into the ground. MassDOT will develop a Construction Noise Control Specification specifically for this project and include it in the contractor’s bid documents and contract.

6.16 DRAFT SECTION 61 FINDING

This section includes a draft MassDOT Section 61 Finding as required under the provisions of MGL Chapter 30, Section 61 and the MEPA Regulations at 301 CMR 11.07. Information contained herein is suitable for use by Massachusetts permitting agencies in the preparation of their Section 61 Findings for issuance of required permits.

6.16.1 Introduction

MassDOT proposes to replace the existing I-95 six-lane John Greenleaf Whittier Bridge/I-95 Improvement Memorial Bridge (Whittier Bridge) over the Merrimack River. The project is located in Newburyport, Amesbury, and Salisbury, Massachusetts.

The need to improve I-95 north of Boston has been recognized since the 1960s. Originally constructed between 1951 and 1954, the “Relocated US 1” was built to provide expressway service from Boston and its northern suburbs connecting to the New Hampshire turnpike and the Maine turnpike, both of which were constructed in the late 1940s. The four-lane expressway (two lanes in each direction) was constructed from Danvers to immediately south of the New Hampshire state line in Salisbury.

From 1967 to 1969, I-95 was widened to provide six lanes of traffic from Danvers over the Merrimack River north to I-495 in Salisbury, and eight lanes of traffic from I-495 north to the Massachusetts-New Hampshire border. The four Whittier Bridge traffic lanes were reconfigured to three 12-foot travel lanes and two 2-foot shoulders in each direction. The reconstructed I-95 was designed to handle the traffic loads of the newly completed I-495, as well as the then-proposed expansion of the New Hampshire Turnpike (I-95). From 1973 to 1977, I-95 was widened further to provide eight lanes of traffic from south of the Merrimack River south to U.S. Route 1 in Danvers.

Since opening to traffic in 1951, the Whittier Bridge has undergone major rehabilitation on two occasions: in 1977, the original reinforced concrete roadway deck was replaced and concrete traffic barriers were installed along the curb lines; and in 1991, the original bearings were replaced.

Since 2003, MassDOT has been carrying out structural repairs to the bridge on a regular basis. The repairs have been temporary/short-term fixes on an “as needed” basis to maintain the bridge in a safe condition until the bridge can be replaced. These repairs have been driven by the results of bridge inspection and load rating reports provided by engineering consultants hired by MassDOT.

The 2003 repairs included installing vertical steel rods to supplement the existing deteriorated wire rope hangers, repairing corroded floorbeams and stringers, and repairing bracing members. Strengthening steel plates are currently being installed to reinforce several heavily corroded floorbeam and stringer ends in response to low load ratings. The gusset plates (typical structural elements of a truss bridge) are load rated in accordance with the February 2009 Federal Highway Administration's (FHWA) *Gusset Plate Load Rating Guidance*, which was issued following the catastrophic collapse of the I-35W truss bridge in Minneapolis, Minnesota on August 1, 2007.

6.16.2 Purpose and Need

The replacement of the existing Whittier Bridge with a pair of new bridges will remedy the structural deficiencies and functional obsolescence of the existing bridge. In addition, MassDOT will widen the existing three-lane cross section of I-95 within the existing highway median to a consistent four-lane cross section from immediately north of the I-95/Route 113 Interchange (Exit 57) in Newburyport, through Amesbury, to just north of the I-495 northbound entrance ramp to I-95 in Salisbury (Exit 59)—a distance of approximately 4.25 miles.

The purpose of the Whittier Bridge/I-95 Improvement Project is to:

- Improve safety along I-95 and the Merrimack River bridge crossing by providing geometric features in keeping more with the Highway Design Standards;
- Provide the infrastructure to support alternative (or non-motorized) modes of transportation within the project area;
- Reduce congestion and improve the flow of traffic on I-95 through the project area; and
- Improve air quality by reducing congestion on I-95 and offering alternative (or non-motorized) modes of transportation.

6.16.3 The MEPA Review Process

In June 2009, MassDOT prepared and filed an Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) office of the Executive Office of Energy and Environmental Affairs (EEA), initiating the MEPA review process for the project. The ENF presented a series of build and rehabilitation alternatives. At the time of the ENF filing, a Preferred Alternative had not been selected for the project. On July 10, 2009, the Secretary of EEA issued a Certificate on the ENF, requiring that a Draft Environmental Impact Report (DEIR) be prepared for the proposed project. Similarly, on May 18, 2009, the FHWA determined that an Environmental Assessment (EA) should be prepared for the project to

assess NEPA requirements. Accordingly, a combined document, an EA/DEIR, has been prepared.

The project is included in the Accelerated Bridge Program (ABP), which was enacted by the Massachusetts Legislature and signed into law by Massachusetts Governor Deval Patrick in August 2008.

6.16.4 Potential Impacts and Mitigation

The Whittier Bridge I-95 Improvement Project is anticipated to involve the following potential environmental impacts as they related to state permitting.

6.16.5 Wetlands - MassDEP

Introduction

State jurisdictional wetland resource areas located in the vicinity of the Project include Bank, Riverfront Area (RFA), Land Under Water Bodies and Waterways (LUW), Salt Marsh, Coastal Beach, Rocky Intertidal Shore, Coastal Bank, and Land Subject to Coastal Storm Flowage (LSCSF). The project will result in impacts to BVW, RFA, LUW, LSCSF and Coastal Beach. There will be no impacts to Bank, Salt Marsh, Rocky Intertidal Shore or Coastal Bank. The following section provides a summary of River Crossing Alternatives and Highway Widening Alternatives, activities impacting the resource areas, quantification of resource areas impacts and associated mitigation commitments.

Numerous alternatives to the current Project design were screened for engineering, environmental, and cost factors. Alternatives analyzed included highway widening and Merrimack River crossing alignment alternatives, alternative designs for the proposed replacement Merrimack River bridges, and alternative alignments and routes for the proposed shared-use path.

River Crossing Alternatives

- *Progressive Alternative:* This alternative would replace the existing Whittier Bridge with a new eight-lane bridge to be constructed in several stages of construction.
- *Rehabilitation Alternative:* This alternative would involve extensive rehabilitation of the existing Whittier Bridge without widening of the bridge for additional travel lanes.
- *Retrofit with Adjacent Structure Alternative:* This alternative would be similar to the Rehabilitation Alternative with the addition of a temporary bridge to carry traffic during construction. No additional travel lanes would be constructed.

- *New 6-Lane Bridge Alternative:* This alternative would provide two new bridges, which would carry three lanes of traffic northbound and three lanes of traffic southbound.
- *New 8-Lane East – West Bridge Alternative:* Under this alternative, two new four-lane bridges would be constructed to the east and west of the existing bridge. Traffic would then be transferred to the new bridges, and the existing bridge would be demolished.
- *New 8-Lane East Bridge Alternative:* This alternative would provide a new bridge to the east of the existing bridge, to which all traffic would be temporarily relocated. The existing Whittier Bridge would then be demolished, and a second new bridge would be constructed in its place. When construction is completed, the two new bridges would be configured to carry four lanes of traffic northbound and four lanes of traffic southbound.
- *New 8-Lane West Bridge Alternative:* This alternative is similar to the previous alternative, except a new bridge would be constructed to the west of the existing bridge.

Highway Widening Alternatives

- *Inside Highway Widening Alternative (Northern Terminus to Route 286):* This alternative would begin at the Route 110 interchange and end at the Route 286 interchange. The alternative would widen the northbound and southbound barrels within the existing median.
- *Outside Highway Widening Alternative (Northern Terminus to Route 286):* This alternative would begin at the Route 110 interchange and end at the Route 286 interchange. This alternative would widen the northbound and southbound barrels to the outside of the existing highway.
- *Inside Northbound/Outside Southbound Highway Widening Alternative (Northern Terminus to Route 286):* This alternative would begin at the Route 110 interchange and end at the Route 286 interchange. This alternative would widen the northbound barrel into the existing median and widen the southbound barrel to the outside of the existing highway.
- *Outside Northbound/Inside Southbound Highway Widening Alternative (Northern Terminus to Route 286):* This alternative would also begin at the Route 110 interchange and end at the Route 286 interchange. This alternative would widen the northbound barrel to the outside of the existing highway and widen the southbound barrel into the existing median.
- *Northern Terminus to Route 110 Highway Widening Alternative:* This alternative would involve widening both the northbound and

southbound barrels with a fourth lane to the outside of the existing highway between Route 110 and I-95.

Evaluation Criteria

The following engineering and environmental criteria were developed to screen the Merrimack River crossing and highway widening alternatives:

- **Purpose and Need** (how each alternative met the Purpose and Need);
- **Highway Configuration** (including horizontal alignment, vertical alignment and impacts to existing infrastructure);
- **Bridge Configuration** (including design standards/complexities, structural safety, constructability, context sensitive structures, maintenance and inspection and life cycle/cost);
- **Traffic** (including travel time, level of service, and capacity);
- **Right-of-Way** (including fee taking, permanent easement and temporary/construction easement);
- **Cost** (the relative cost differences of each alternative considering constructability, site access, construction staging ease/restraints, traffic management, ease of demolition, and schedule impact because of extended construction);
- **Construction** (including utility relocation, constructability/demolition of existing structures, and maintenance of traffic during construction);
- **Schedule** (the relative difference between alternatives for the estimated construction schedule duration of each alternative); and
- **Environmental** (including stormwater [ability of each alternative to meet MassDEP stormwater performance standards], drinking water quality [the degree of impact on local drinking water supply protection areas], wetlands [total estimated impact to wetland resource areas within the project area], visual/viewpoints [the level of visual impact], historic [potential impact on the historic Whittier Bridge] and navigation [potential impacts to navigation on the Merrimack River]).

Avoidance and Minimization

After a thorough evaluation of the river crossing and highway widening alternatives, the New 8-Lane East Bridge River Crossing Alternative and the Inside Widening Highway Alternative (Northern Terminus to Route 286) were identified as the Preferred Alternative. This alternative best met the Purpose and Need, as well as Highway Configuration, Traffic (capacity), Bridge Configuration (design standards, structural safety, maintenance and inspection, and life cycle/costs), Construction (constructability), Right-of-Way, and Environmental criteria.

During the alternatives analysis, it was determined that any widening to the west would result in adverse water quality impacts, which would require a variance under Section 401 of the Clean Water Act. Bartlett Spring Pond serves as a surface water supply for Newburyport Water Department and is located within 400 feet west of the existing I-95 southbound travel lanes to the north of Ferry Road Extension.

Any widening of the I-95 southbound lanes to the west would result in alterations to the existing terrain and additional impervious surface within 400-feet of the pond. MassDOT has consulted with MassDEP on the status of the Zone A surface water supply protection zone for Bartlett Spring Pond. MassDEP, in an email dated April 6, 2011, stated that there is currently no 400-foot Zone A associated with Bartlett Spring Pond "...since it is not so listed in 314 CMR 4.00, and it was not approved by [Mass]DEP after December 29, 2006 in accordance with 314 CMR 4.06(3)." MassDEP does note that the use of Bartlett Spring Pond as a public water supply must be protected and maintained and that conditions that are reasonable to protect the pond as a drinking water source may be included in any permit approvals (e.g., strict compliance with stormwater standards.) MassDEP also notes that the pond may be listed as a public water supply/Outstanding Resource Water (ORW) in the next revisions to 314 CMR 4.00 and that the current status may change. If it does become listed as a Class A – ORW, the provisions applicable to waters designated as public water supplies and ORWs in 314 CMR 4.00, such as no discharge of dredged or fill material into wetlands or waters within 400-feet of the high water mark of Bartlett Spring Pond per 314 CMR 4.06(1)(d)(1) without a variance under 314 CMR 9.00, would be applicable. Additionally, provisions in other regulations pertaining to ORWs and/or waters designated as public water supplies may also apply.

I-95 crosses Zone II of groundwater wells for Newburyport near the southern terminus of the project. I-95 also crosses Zone II of Salisbury's groundwater wells near Exits 59 and 60. Numerous highway approach and bridge crossing alternatives were evaluated during the Alternatives Analysis process.

Highway widening to the west of existing I-95 would have led to an increase in impervious surface within 400 feet of Bartlett Spring Pond. Because of this, all widening opportunities on the west side of I-95 were eliminated from further evaluation; therefore, the widening to the east of existing I-95 represents the least damaging alternative to the environment in terms of wetland and water quality impacts.

Impacts and Mitigation

Two **Bordering Vegetated Wetlands (BVW)** would be directly affected by the proposed highway widening including Wetlands I and H in Amesbury.

Total permanent impacts will be 3,560 square feet of BVW. BVW replication will consist of expanding Wetland H in Amesbury by excavating approximately 4,950 square feet of upland at its northern end within the ROW and expanding Wetland O by excavating approximately 1,500 square feet of upland south of the proposed Detention Basin 7A within the I-95 ROW. The proposed mitigation ratio is 1.8:1 which exceeds the 1:1 ratio mandated under the Massachusetts Wetlands Regulations at 310 CMR 10.54(4)(b).

Land Under Ocean (LUO): Construction of six piers for the proposed I-95 bridges would result in permanent and temporary impacts to LUO in the Merrimack River in Newburyport and Amesbury. The permanent impacts will be offset in part by removal of the four existing bridge piers and restoration of the river bottom. The new bridges would alter 17,100 square feet of river bottom habitat under state jurisdiction as Land Under the Ocean and Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie an Anadromous/Catadromous Fish Run. An additional 28,520 square feet of temporary impact to river bottom (LUO) would result from the installation of cofferdams around the six new permanent piers during construction, around each of the four existing Whittier Bridge piers during demolition, and from construction of up to three temporary support structures during construction of the I-95 northbound bridge. Approximately 11,500 square feet of new river bottom (LUO) habitat will be recovered when the existing piers are removed down to the substrate for a net permanent loss of 5,600 square feet.

Riverfront Area (RFA) would be affected on both sides of the Merrimack River in Newburyport and Amesbury. The impact would consist of fill associated with the proposed bridge abutments for the I-95 northbound and southbound bridges.

Temporarily impacted RFA in Newburyport will be mitigated through 20,300 square feet of in situ restoration. The permanent alteration to previously developed RFA will cumulatively result in alteration of over 10 percent of the RFA (310 CMR 10.58(5)(e)); therefore, the additional 2,259 square feet of alteration requiring mitigation will be mitigated through 11,600 square feet on-site restoration of existing degraded areas (in accordance with 310 CMR 10.58(5)(f)). The mitigation in Newburyport will consist of demolishing the existing Whittier Bridge abutment, building the new abutment approximately 50 feet behind the existing abutment, removing existing riprap, reclaiming and restoring median, and restoring the proposed approximate 80-foot slope with bioengineering.

Temporarily impacted RFA adjacent to the Merrimack River in Amesbury will also be mitigated through 11,650 square feet of in situ restoration. The permanent alteration to previously developed RFA will cumulatively result

in alteration over 10 percent of the RFA (310 CMR 10.58(5)(e)); therefore, the additional 6,000 square feet of alteration requiring mitigation will be mitigated with 11,250 square feet of on-site restoration of existing degraded areas (in accordance with 310 CMR 10.58(5)(f)). The mitigation in Amesbury will consist of demolishing the existing Whittier Bridge abutment, building the new abutment approximately 50 feet behind the existing abutment, removing existing riprap, reclaiming and restoring median, and restoring the proposed approximate 80-foot slope with bioengineering.

An area of **Land Subject to Coastal Storm Flowage (LSCSF)** on the south bank of the Merrimack River in Newburyport would be temporarily affected by installation of temporary I-95 northbound bridge support and a temporary work zone on the south bank. An additional area of LSCSF located within Wetland I in Amesbury would be affected by construction of a highway retaining wall. Additional temporary impacts to a small area of LSCSF on the north bank in Amesbury would result from the construction of a temporary support during construction of the I-95 northbound bridge. The total impact to LSCSF from these activities is 2,797 square feet. The project would not result in a measureable impact to the 100-year floodplain or the Regulatory Floodway in the Merrimack River; therefore, no mitigation measures are proposed.

Coastal Beach: Construction of one of the proposed temporary bridge supports on the Amesbury shoreline would temporarily affect approximately 190 square feet of Coastal Beach. The temporary supports would be in place for up to six months, and then removed and the area restored.

6.16.6 Chapter 91 Waterways – MassDEP

Navigation

Construction Term Navigation. During construction of the new bridge crossing, there would be barges, falsework, work platforms, staging, and/or cofferdams constructed in the waterway in conjunction with constructing the permanent bridge structures and demolishing the existing bridge. The type of temporary system will be determined by the final design of the substructure and superstructure; however, the project specifications will include provisions that the contractor must follow to ensure that navigation beneath the bridges will be maintained, except for those circumstances where limited closures will occur for public safety purposes. The directives will include staging plans showing zones where barges and equipment will be allowed to operate during each phase of construction and demolition; locations where equipment could be moored or stored while not in use; provisions for temporary aids to navigation including temporary lighting, establishing temporary routes for marine

traffic; and, most importantly, timely notices to mariners throughout the construction and demolition duration. The contractor will be required to prepare a navigation plan for review and approval by the USCG, USACE, harbormasters, boating community, and other marine interests. The plan will address methods to minimize impacts to all mariners, management of vessel traffic and overall safety issues.

Temporary closures of the waterway could be required for safety reasons; however, since there are two channels, it is anticipated that the contractor will be able to maintain one channel at all times during construction and demolition. If there are instances when both channels must be temporarily closed for safety purposes or the channel that can only accommodate a larger vessel is closed, the mariner will be informed in advance by the USCG through the weekly updates and monthly publication of the “Local Notice to Mariners.”

The notice provides detailed information, including the nature of the work, work location coordinates, closing schedule, and contact information. In addition to notifying mariners in advance in the notice, broadcasts of temporary closures will be made in advance over the VHF marine radio. Temporarily suspending marine traffic for public safety reasons could be warranted during barge operations where sections or spans will be lifted and/or steel components will be hoisted or lowered into place. There would be temporary impacts to navigation during construction resulting from placing and operating temporary equipment within the waterway. Impacts to navigation will be minimized (to the greatest extent possible) through implementing a variety of measures intended to inform, notify, and provide as much information as possible to the marine community in advance of any work that could preclude and/or temporarily affect navigation.

Long Term Navigation. Construction of the project would not result in permanent adverse impacts to existing navigation in the Merrimack River. The existing horizontal and vertical clearances for both the federal navigation channel (under the main span of the existing and proposed new bridges) will be maintained. For the locally-designated secondary channel (the “Steamboat” channel), the project will maintain the existing vertical clearance and widen the existing horizontal clearance under the new bridges. Permanent navigational lighting will be installed on the new bridges and navigational aids will be installed in the Merrimack River to mark both navigation channels.

The existing Whittier Bridge includes four piers within the waterway and five spans or openings beneath the bridge. There are two navigation channels under the bridge, namely the north (primary) and south (secondary) channels, which maintain vertical clearances of 56 feet and 32

feet, respectively. The north channel is mapped and maintained by the USACE as a 150-foot-wide federal channel (herein referred to as Federal Channel) with a 7-foot channel depth. The maintained horizontal channel width is a minimum of 150 feet along the entire length of the Merrimack River.

The project design includes three sets of piers for each bridge structure, totaling six piers in the waterway for the northbound and southbound structures. There would be four spans or openings beneath both bridges, with the two existing navigable Federal and Steamboat Channels maintained for marine traffic. The bridge piers for both structures will be constructed in the same east-west alignment. The distance between the existing piers within the Federal Channel is approximately 280 feet, while distance between the proposed piers will provide a wider 360-foot opening beneath the bridge. Similarly for the Steamboat Channel, the opening will increase from approximately 200 feet between the piers to a width of 360 feet.

The project would not reduce existing vertical or horizontal clearance in the navigation channels in the Merrimack River. Appropriate fendering systems and navigational lighting will be integrated into the bridge design to provide permanent navigation safety features. Additional navigation buoys will be placed to mark the edges of the “Steamboat Channel” as determined by the USCG.

Public Access

The project incorporates a shared-use path as a means of providing increased transportation connectivity for alternative transportation modes as well as providing a connection to existing and planned bicycle/recreational trails within the project area. The shared-use path will make a significant advancement in the Merrimack Valley region bicycle/trail network with connections to the Exit 57 Newburyport Park-and-Ride lot through to the Ghost Trail in Salisbury (which connects to U.S. Route 1):

- Providing for the eventual hub connection to the Amesbury Powwow Riverwalk and Salisbury Point Ghost Trail;
- Providing connections to existing and planned trails; and
- Improving access to and interconnections between Moseley Woods and Maudslay State Park and other regional recreational resources.

The incorporation of the shared-use path will be consistent with the USDOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (March 15, 2010) and MassDOT’s GreenDOT initiatives policy. The shared-use path will be constructed

during all construction stages since it is directly related to the I-95 northbound bridge and roadway approach sequencing. Cost to construct the path is expected to be \$8.5 million.

6.16.7 Section 401 Water Quality Certification – MassDEP

Construction of six piers for the proposed I-95 bridges would result in permanent and temporary impacts to Land Under the Ocean (LUO) in the Merrimack River in Newburyport and Amesbury. The permanent impacts will be offset in part by removal of the four existing bridge piers and restoration of the river bottom. The new bridges would alter 17,100 square feet of river bottom habitat under state jurisdiction as Land Under the Ocean and Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie an Anadromous/Catadromous Fish Run. An additional 31,950 square feet of temporary impact to river bottom (LUO) would result from the installation of cofferdams around the six new permanent piers during construction, around each of the four existing Whittier Bridge piers during demolition, and from construction of up to three temporary support structures during construction of the I-95 northbound bridge. Approximately 11,500 square feet of new river bottom (LUO) habitat will be recovered when the existing piers are removed down to the substrate for a net permanent loss of 5,600 square feet.

- The work will be performed in accordance with the Plans filed with the Application. MassDOT will notify MassDEP of any changes in the plans affecting waters or wetlands.
- No more than 5,600 square feet of LUO will be permanently altered by the project.
- Work that will occur within the Merrimack River or impact LUO will be conducted during the low flow period.
- All sedimentation barriers will be maintained in good repair until all disturbed areas have achieved final stabilization. Sediment will not be deposited in a wetland or waterway. The sediment and erosion control measures will be inspected on a daily basis and accumulated sediments removed as needed. Any erosion problems will be immediately controlled and MassDEP immediately notified.

6.16.8 Massachusetts Endangered Species Act – Massachusetts Natural Heritage & Endangered Species Program

The only terrestrial species with special status known to be present in the project area is the bald eagle, which is listed as endangered by the Massachusetts NHESP. Although the bald eagle was recently delisted by the U.S. Fish and Wildlife Service (USFWS), it does remain protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Based on its state and federal status, a consultation regarding

potential impacts and impact avoidance measures will be required with NHESP, but not with USFWS. No impacts to threatened and endangered species are anticipated, except for temporary noise impacts related to constructing the bridge. The Massachusetts NHESP could require monitoring of eagles during construction to gauge their response to noise.

There are two fish species with special status known to use the project area including the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinchus*). There may be some temporary impacts related to construction noise and activity, which will be minimized with appropriate permit conditions developed in concert with the USFWS, NMFS, and DMF. Based on the listing status of the two sturgeon species, an informal Section 7 consultation regarding potential impacts and impact avoidance measures with NMFS under the federal Endangered Species Act has been initiated. MassDOT is coordinating with NMFS and has requested a “No Effect” determination with no time of year restrictions. A response from NMFS is anticipated shortly. Correspondence with NMFS is included in Appendix E. The FHWA authorized MassDOT to consult directly with the NMFS as its non-federal representative in a letter dated September 8, 2009.

MassDOT is coordinating with NMFS and the DMF under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act regarding potential impacts to EFH, and EFH and non-EFH species in the Merrimack River. An updated EFH Assessment, which includes consideration of EFH species and non-EFH species (listed in Section 4.9 of Chapter 4), is being reviewed by NMFS and DMF.

6.16.9 Section 106 – Massachusetts Historical Commission

The MassDOT Cultural Resources Unit has identified the Area of Potential Effects (APE) for the Section 106 review of the Whittier Bridge replacement project as comprising the following:

- The Whittier Bridge;
- A 4.25 mile segment of I-95 beginning south of the bridge at a point just north of Interchange 57 in Newburyport, extending north across the bridge through Amesbury and Salisbury, and terminating just south of the New Hampshire state line;
- All properties that abut that segment of the I-95 corridor; and
- All properties along the north and south banks of the Merrimack River within view of the Whittier Memorial Bridge.

To identify historic properties within the APE, Cultural Resources Unit staff has considered an extensive Historic Resources Reconnaissance Survey (PAL 2009a), and also has relied on several visits to the project area, aerial photographs, and reviews of the National Register of Historic Places and the Inventory of Historic and Archaeological Assets of the Commonwealth maintained by the Massachusetts Historic Commission.

A review of the National Register revealed no listed properties within or immediately adjacent to the project limits. The NHL Lowell’s Boat Shop on Main Street in Amesbury, however, is located along the northerly bank of the Merrimack River approximately ½ mile upstream of the project area within view of the Whittier Bridge. The National Park Service designated Lowell’s Boat Shop as an NHL in 1990 for its association with Simeon Lowell, who designed the dory type fishing boat, and as an example of an 18th-through-20th century boat shop preserved on its original waterfront site. Lowell’s Boat Shop faces south onto a panoramic view of the Merrimack River. The two southerly deck truss approach spans of the Whittier Bridge are in full view from Lowell’s Boat Shop. The top of the arch truss span also is visible as it rises above Salisbury Point over a modern riverside condominium complex.

The National Register-eligible Essex-Merrimack Bridge (A-07-014=N-11-010), also known as the Chain Bridge, is located approximately 1,400 feet downstream from the Whittier Bridge.

Demolishing the historic John Greenleaf Whittier Memorial Bridge, a property determined eligible for listing in the National Register and the State Register, would have a negative impact on the bridge because of the complete removal of a historic property and would constitute a finding of adverse effect. Demolishing the bridge and constructing a replacement bridge would also have an impact (primarily visual) on one NHL (Lowell’s Boat Shop, Amesbury), one State- and National-Register-eligible historic district (Spofford Street – Deer Island Area, Amesbury and Newburyport), as well as two State- and National-Register-eligible properties (Essex-Merrimack Bridge-Chain Bridge, Amesbury and Newburyport, and Smith’s Chain Bridge Filling Station No. 3, Amesbury).

MassDOT proposes to mitigate the adverse effect to the Whittier Bridge through implementation of the measures agreed to by the Section 106 parties (FHWA, MassDOT, ACHP, MHC, and representatives from Amesbury, Newburyport, and Salisbury) as described in the March 2, 2011 Section 106 Memorandum of Agreement. These measures are described below:

Historic Recordation

- MassDOT will prepare a written report similar to a Historic American Engineering Record “narrative format” report, describing the bridge and discussing its engineering, architectural, and historical significance at the local, state, and national levels. The report shall be copied onto archival-quality paper.
- MassDOT will prepare archival photographic documentation in the form of black and white prints made from medium format (2½" x 2½") and large format (4" x 5") negatives. All photographs shall be identified on the back in pencil, with no affixed labels, unmounted but sleeved in archival-quality, unbuffered envelopes, the contents of each envelope identified and numbered in pencil on the envelope. The negatives shall be sleeved in appropriate archival-quality negative holders, which shall be suitably labeled. All photographs shall be keyed by number to a site plan printed on archival-quality paper. A list of photographic views printed on archival-quality paper also shall be included.
- Photographs will include, but will not be limited to aerial views of the existing bridge and its surroundings, views of the bridge’s elevations, deck, abutments, piers, and plaques, and context views showing the bridge in relation to its setting. Black and white prints also will be provided showing individual exterior views of the following structures and buildings: the Essex-Merrimack Bridge between Amesbury and Newburyport, the National Historic Landmark Lowell’s Boat Shop in Amesbury, as well as at least one streetscape view of the National Register-eligible Salisbury Point area in Amesbury. Views also shall be provided of the Whittier Memorial Bridge from the Salisbury Point area in Amesbury and from Moseley Pines Park in Newburyport.
- All photographic documentation described above will be completed prior to the commencement of any construction associated with the proposed bridge replacement project.
- MassDOT will include photocopies of selected pages from the original 1951 construction plans for the Whittier Memorial Bridge, including a site plan, elevations, and details. Photocopies will be printed on archival-quality 11" x 17" paper, which will be folded in half for storage.
- MassDOT will submit one original set of photographic documentation (with negatives) to the SHPO for subsequent transmittal to the Massachusetts State Archives and one original set of photos (without negatives) to each of the three local historical commissions for transmittal to appropriate local repositories. One set of all paper documentation described above will be enclosed in an archival-quality file folder and included with each set of photographic documentation.

Each set of documentation, including photographs, will be enclosed in an archival-quality box.

- A reproducible compact disc containing all photographic and paper documentation shall be included with each set of archival documentation.

Review of New Replacement Bridges

FHWA and MassDOT will afford the local historical commissions, the Whittier Working Group (WWG), and the SHPO the opportunity to review and comment on the sketch plans for the new replacement bridges, as those plans are developed.

Salvage

FHWA and MassDOT will ensure that certain ornamental artifacts on the existing bridge are salvaged for reuse on the replacement bridges or along the shared-use path, specifically including the four porcelain state seals on the bridge portals, the four carved granite state seals on the bridge wingwalls, and the two bronze state seal medallions and the two bronze builder’s plaques on the bridge end posts. Other artifacts from the bridge also may be salvaged for reuse on the replacement bridge or along the shared-use path, as determined to be appropriate by FHWA and MassDOT in consultation with the SHPO, the local historical commissions, and the WWG.

Interpretive Signage

FHWA, with the assistance of MassDOT, shall ensure that interpretive signage shall be prepared, designed, fabricated, and installed at the overlooks along the shared-use path on the new bridge and abutments and at the trailheads and termini of the shared-use path. At a minimum, these signs shall address the following themes: 1) the life, works, and time of John Greenleaf Whittier; 2) a transportation history of the lower Merrimack River, including a discussion of the design of the existing John Greenleaf Whittier Memorial Bridge; and 3) the natural heritage of the crossing, including a discussion of native wildlife. The text, graphics, and design of the signs, additional thematic subjects, and the total number and locations of the signs shall be determined by FHWA and MassDOT in consultation with the local historical commissions, the WWG, and the SHPO.

Paint Color

FHWA and MassDOT will choose an appropriate paint color for the structural steel on the replacement bridge in consultation with the local historical commissions, the WWG, and the SHPO.

Post-Review Discoveries

If FHWA or MassDOT determines that the undertaking will affect a previously unidentified property that may be eligible for listing in the National Register of Historic Places, or will affect a known historic property in an unanticipated manner, the FHWA and MassDOT shall make reasonable efforts to avoid, minimize or mitigate adverse effects to such properties and determine actions that they can take to resolve adverse effects following the procedures in 36 CFR 800.13(b). In the event that a post-review discovery involves a property or properties that may have traditional cultural and religious significance to federally-recognized Indian tribes, FHWA, in coordination with MassDOT, shall consult with the appropriate Indian tribe(s) in accordance with the requirements of 36 CFR 800.13(b) and established procedures for Section 106 tribal consultation for Massachusetts. If pre-contact cultural resources are discovered or unanticipated effects on pre-contact period resources are found, FHWA, in coordination with MassDOT, will consult with the appropriate federally-recognized Indian tribes in accordance with established procedures for Section 106 tribal consultation for Massachusetts.

6.16.10 Coastal Zone Management Consistency – Massachusetts Office of Coastal Zone Management

The project was designed to be consistent with the applicable program policies and management principles of the Massachusetts Office of Coastal Zone Management program, and no mitigation is proposed.

6.16.11 Mitigation Implementation Cost and Schedule**Wetlands**

BVW mitigation in Amesbury and Salisbury will be performed in conjunction with the widening of the I-95 corridor, during the initial project stages. The cost associated with the migration is expected to be \$135,000.

Riverfront Area mitigation in Newburyport and Amesbury will be performed in conjunction with the construction of the I-95 southbound bridge during later project stages. As the mitigation for RFA impacts is closely tied to construction of the new bridges, mitigation costs are largely inseparable from project construction costs.

Salt Marsh Enhancement on the south bank of the Merrimack River

Although there will be no direct or indirect impacts to the salt marsh located along the Merrimack River at the bridge crossing, the proposed relocation of the existing 36-inch stormwater outfall on the Newburyport (south) shore will enable MassDOT to propose an enhancement of the existing degraded salt marsh at the existing outfall. MassDOT has decided to include this resource enhancement measure as part of the Preferred

Alternative. The proposed placement of boulders for salt marsh enhancement will provide a stable substrate to allow for sediment disposition over the boulders and the opportunity for the salt marsh to reestablish in this area.

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Temporary aids to navigation during in-water work (42 months) will be used as needed.

Permanent lighting, fendering, and a navigation buoy will be constructed during the last phase of the project when bridge work is complete. The cost to provide temporary and permanent navigation aids is expected to be \$100,000.

Section 401 Water Quality Certificate

Mitigation measures will be performed during demolition and construction activities to minimize the impacts to water quality during the in-water portion of the work associated with the construction of new bridge piers and removal of the existing piers. Cofferdams will be installed to enclose existing and new bridge piers to eliminate impacts from resuspended sediments in the water column. The cost of the cofferdams is estimated at \$7.5 million.

Section 106 Massachusetts Historical Commission

Preconstruction mitigation measures will include the historic recordation, including a narrative report, similar to a Historic American Engineering Record “narrative format” describing the bridge and discussing its engineering, architectural, and historical significance at the local, state, and national levels.

Archival photographic documentation will be completed prior to the commencement of any construction associated with the proposed bridge replacement project.

Photographic views will include, at minimum, aerial views of the existing bridge and its surrounding views of the bridge’s elevations, deck, abutment, piers, and plaques, and context views showing the bridge in relationship to its setting. Black and white prints will also be provided showing individual exterior views of the following structures and the aforementioned buildings.

During construction, certain ornamental artifacts on the existing bridge will be salvaged for reuse on the replacement bridges or along the shared-use path, specifically including the four porcelain state seals on the bridge portals, the four carved granite state seals on the bridge wingwalls, and

the two bronze state seal medallions and the two bronze builder’s plaques on the bridge end posts.

6.16.12 Responsible Parties

MassDOT will be fully responsible for the implementation of the mitigation commitments associated with the Whittier Bridge/I-95 Improvement Project.

6.16.13 Findings/Commitments

The MassDOT finds that the foregoing describes the environmental impacts of the Whittier Bridge/I-95 Improvement Project and that, with the implementation of the mitigation measures described above, all feasible means and measures will have been taken to avoid or minimize adverse impacts to the environment.

The potential environmental impacts of the Whittier Bridge/I-95 Improvement Project have been characterized and quantified in the 2010 DEIR and Environmental Assessment, which are incorporated by reference into this Section 61 Finding. Throughout the planning and environmental review process, MassDOT has been working to develop measures to mitigate significant impacts of the project. With the mitigation proposed and carried out in cooperation with state agencies, the MassDOT finds that all feasible means and measures have been adopted to minimize and mitigate impacts on the environment.

MassDOT is committed to implementing the mitigation measures set forth in conjunction with the Whittier/I-95 Improvement Project.

Richard A. Davey

Secretary of Transportation
Massachusetts Department of Transportation

Date

6.17 MITIGATION AND COMMITMENT MONITORING PLAN

Environmental commitments are established via NEPA/MEPA documents (EA/EIR); Memorandum of Agreement (MOA) under Section 106 with the State Historic Preservation Officer and Advisory Council on Historic Preservation and the three towns as concurring parties; Section 7 consultation under the Endangered Species Act and Essential Fish Habitat consultation under the Magnuson-Stevens Act with NMFS and

corresponding coordination with DMF; and permits from federal (USACE, USCG, USEPA), state (MDEP, MCZM) and local (Conservation Commissions) regulatory agencies. Effective implementation of environmental commitments requires established procedures for communicating and tracking these for compliance through the construction, operations and maintenance phases. Commitments are tracked using a spreadsheet created and maintained by MassDOT, which contains a comprehensive record of the environmental commitments. The spreadsheet is organized by topic to enable key word searches to retrieve reports by subject area tied back to the specific source documents. It includes responsible party, status and action date for each commitment.

Key roles in tracking and reporting environmental compliance during the construction phase are played by the independent Environmental Monitor and the MassDOT Resident Engineer (RE) and the Manager of Environmental Compliance for Construction. The Environmental Monitor’s qualifications must be submitted to the Manager of Environmental Compliance for Construction (ECM) for review and approval prior to the start of Construction. The Environmental Monitor is responsible for directly overseeing compliance with environmental commitments and reporting information back to the RE and ECM. The Environmental Monitor reports directly to the RE as well as the ECM. This requires weekly contact with Resident Engineers and construction contractors. The Environmental Monitor is familiar with commitments from the NEPA/MEPA documents and permits. The Environmental Monitor meets frequently with the Resident Engineer throughout the construction phase. The Resident Engineer has direct authority to supervise the construction contractor and therefore any communication and site inspection reporting by the Environmental Monitor goes through the Resident Engineer. Therefore, a reporting protocol is established from the pre-construction phase documenting each inspection including protocols for violations such as spills or illegal discharges.

In the event of an unanticipated field condition, the Environmental Monitor will assist in expediting corrective action based on best management practices spelled out in the commitments and contract documents. In such cases, the Environmental Monitor advises the action to the Resident Engineer. The Resident Engineer is responsible for informing the appropriate MassDOT staff and regulatory agencies. In certain cases, this scenario could lead to stop work orders issued by the Resident Engineer.

Documentation of field inspection reports by the Environmental Monitor will be sent electronically to the RE and the ECM and incorporated into reports issued monthly, which serve to update the commitment tracking spreadsheet.