December 1, 2011

Amesbury Conservation Commission
Town Hall
62 Friend St
Amesbury, MA 01913

Commissioners:

Please find attached a Notice of Intent (NOI) for the Massachusetts Department of Transportation Highway Division’s (MassDOT) Whittier Bridge replacement and I-95 Widening project in Newburyport, Amesbury and Salisbury. The purpose of the project is to bring the Whittier Bridge up to current safety standards by creating a structure that can accommodate the traffic flow along Interstate 95. The project will improve the bridge by adding a high speed shoulder and breakdown lane in each direction and increasing the travel lanes in each direction from three to four. A multi-use path will be constructed on the northbound side between Newburyport and Amesbury. MassDOT is undertaking the project under the Commonwealth's Accelerated Bridge Program.

An ANRAD for the project area has been reviewed and approved your commission (ORAD dated December 15, 2009). The purpose of the NOI is to quantify impacts to wetland resources, present alternative analyses to minimize impacts, and identify mitigation measures for unavoidable impacts.

The attached NOI application includes plans, calculations and fees only for those impacts within the Town of Amesbury. A supplemental report includes project-wide and town-specific details. Please note that MassDOT Highway is exempt from additional local ordinances and filing fees. Any charges for newspaper announcements should be billed to MassDOT:

Ms. Irene Petsalis
MassDOT
10 Park Plaza - Room 4260
Boston, MA 02116
Phone: (617) 973-7487,
Fax: (617) 973-8879

Please feel free to contact me (603-637-1158) or Mr. Tim Dexter at MassDOT (617-973-8306) with questions or comments regarding this application. Thank you for your attention and we look forward to working with you during this review.

Sincerely,

NORMANDEAU ASSOCIATES INC

Sarah Allen
Principal Wetland Scientist
A. General Information

1. Project Location (Note: electronic filers will click on button to locate project site):
   - East and west of I-95 from the Merrimack River to the Salisbury town line
   - Amesbury
   - Latitude and Longitude: 42° 50' 31.227" N 70° 54' 19.16" W

2. Applicant:
   - Timothy Dexter
     - a. First Name
     - b. Last Name
     - Massachusetts Highway Department
     - 10 Park Plaza
     - Boston
     - c. Organization
     - d. Street Address
     - e. City/Town
     - f. State
     - g. Zip Code
     - h. Phone Number
     - i. Fax Number
     - j. Email Address

3. Property owner (required if different from applicant): Check if more than one owner
   - a. First Name
   - b. Last Name
   - Commonwealth of Massachusetts
     - c. Organization
     - d. Street Address
     - e. City/Town
     - f. State
     - g. Zip Code
     - h. Phone Number
     - i. Fax Number
     - j. Email address

4. Representative (if any):
   - Sarah Allen
     - a. First Name
     - b. Last Name
     - Normandeau Associates
     - 25 Nashua Road
     - Bedford
     - c. Company
     - d. Street Address
     - e. City/Town
     - f. State
     - g. Zip Code
     - h. Phone Number
     - i. Fax Number
     - j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):
   - a. Total Fee Paid: $2,637.50
   - b. State Fee Paid: $1,306.25
   - c. City/Town Fee Paid: $1,331.25
A. General Information (continued)

6. General Project Description:
   Whittier Bridge/I-95 Improvement Project (see attached report)

7a. Project Type Checklist:

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing
4. ☐ Commercial/Industrial
5. ☐ Dock/Pier
6. ☐ Utilities
7. ☐ Coastal Engineering Structure
8. ☐ Agriculture (e.g., cranberries, forestry)
9. ☒ Transportation
10. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project:

   2. Limited Project

8. Property recorded at the Registry of Deeds for:

   N/A
   a. County
   b. Certificate # (if registered land)
   c. Book
   d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Size of Proposed Alteration</th>
<th>Proposed Replacement (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ☐ Bank</td>
<td>1. linear feet</td>
<td>2. linear feet</td>
</tr>
<tr>
<td>b. ☒ Bordering Vegetated Wetland</td>
<td>3,560 sf permanent impact; 1,400 sf temporary impacts</td>
<td>4,950 sf replication; 1,400 sf restoration</td>
</tr>
<tr>
<td>c. ☐ Land Under Waterbodies and Waterways</td>
<td>1. square feet</td>
<td>2. square feet</td>
</tr>
<tr>
<td></td>
<td>3. cubic yards dredged</td>
<td></td>
</tr>
</tbody>
</table>
### B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont’d)

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Size of Proposed Alteration</th>
<th>Proposed Replacement (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. □ Bordering Land Subject to Flooding</td>
<td>1. square feet</td>
<td>2. square feet</td>
</tr>
<tr>
<td>e. □ Isolated Land Subject to Flooding</td>
<td>1. square feet</td>
<td>2. cubic feet of flood storage lost</td>
</tr>
<tr>
<td>f. ✓ Riverfront Area</td>
<td>Merrimack River</td>
<td>1. Name of Waterway (if available)</td>
</tr>
</tbody>
</table>

2. Width of Riverfront Area (check one):
   - □ 25 ft. - Designated Densely Developed Areas only
   - □ 100 ft. - New agricultural projects only
   - ✓ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 64,400 (Amesbury) square feet

4. Proposed alteration of the Riverfront Area:
   - 39,590 (perm + temp)
   - 13,000 (perm + temp)
   - 26,590 (perm + temp)
   - a. total square feet
   - b. square feet within 100 ft.
   - c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ✓ Yes □ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ✓ Yes □ No

### 3. Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>Size of Proposed Alteration</th>
<th>Proposed Replacement (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. □ Designated Port Areas</td>
<td>Indicate size under Land Under the Ocean, below</td>
<td></td>
</tr>
<tr>
<td>b. ✓ Land Under the Ocean</td>
<td>2,870 (net alteration/loss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. square feet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,575</td>
<td>2. cubic yards dredged</td>
</tr>
<tr>
<td>c. □ Barrier Beach</td>
<td>Indicate size under Coastal Beaches and/or Coastal Dunes below</td>
<td></td>
</tr>
<tr>
<td>d. ✓ Coastal Beaches</td>
<td>190 (temporary bridge support)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. square feet</td>
<td>2. cubic yards beach nourishment</td>
</tr>
<tr>
<td>e. □ Coastal Dunes</td>
<td>1. square feet</td>
<td>2. cubic yards dune nourishment</td>
</tr>
</tbody>
</table>
B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont’d)

<table>
<thead>
<tr>
<th>Section</th>
<th>Item</th>
<th>Description</th>
<th>Size of Proposed Alteration</th>
<th>Proposed Replacement (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>f.</td>
<td>Coastal Banks</td>
<td>105 (temporary only)</td>
<td>1. linear feet</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>Rocky Intertidal Shores</td>
<td></td>
<td>1. square feet</td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>Salt Marshes</td>
<td>indirect shading effects only</td>
<td>1. square feet</td>
<td>2. sq ft restoration, rehab., creation</td>
</tr>
<tr>
<td>i.</td>
<td>Land Under Salt Ponds</td>
<td>1. square feet</td>
<td>2. cubic yards dredged</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>Land Containing Shellfish</td>
<td>1. square feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k.</td>
<td>Fish Runs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l.</td>
<td>Land Subject to Coastal Storm Flowage</td>
<td>1,230 permanent + 912 temp.</td>
<td>1. cubic yards dredged</td>
<td>4,575</td>
</tr>
<tr>
<td>4.</td>
<td>Restoration/Enhancement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>square feet of BVW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>square feet of Salt Marsh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Project Involves Stream Crossings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>number of new stream crossings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>number of replacement stream crossings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in Estimated Habitat of Rare Wildlife as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the Massachusetts Natural Heritage Atlas or go to [http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/online_viewer.htm](http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/online_viewer.htm).

   a. Yes ☐ No ☑ If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   Route 135, North Drive
   Westborough, MA 01581

   Oct 1, 2008 ☐
   b. Date of map ☑
C. Other Applicable Standards and Requirements (cont’d)

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); OR complete Section C.1.d, if applicable. If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).

1. c. Submit Supplemental Information for Endangered Species Review

   1. ☒ Percentage/acreage of property to be altered:

      (a) within wetland Resource Area 0.3% / 0.5 acres (permanent, project-wide) percentage/acreage

      (b) outside Resource Area 18% / 32 acres percentage/acreage

   2. ☒ Assessor’s Map or right-of-way plan of site

   3. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work ***

      (a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

      (b) ☒ Photographs representative of the site

      (c) ☐ MESA filing fee (fee information available at: http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to “Commonwealth of Massachusetts - NHESP” and mail to NHESP at above address

      Projects altering 10 or more acres of land, also submit:

      (d) ☒ Vegetation cover type map of site

      (e) ☒ Project plans showing Priority & Estimated Habitat boundaries

   d. OR Check One of the Following

      1. ☐ Project is exempt from MESA review. Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

      2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

* Some projects not in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/dfwele/dfw/nhesp/nhesp.htm, regulatory review tab). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.
C. Other Applicable Standards and Requirements (cont’d)

3. ☐ Separate MESA review completed. Include copy of NHESP “no Take” determination or valid Conservation & Management Permit with approved plan.

2. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?
   a. ☐ Not applicable – project is in inland resource area only
   b. ☒ Yes ☐ No If yes, include proof of mailing or hand delivery of NOI to either:

      South Shore - Cohasset to Rhode Island, and the Cape & Islands:
      Division of Marine Fisheries - Southeast Marine Fisheries Station
      Attn: Environmental Reviewer
      1213 Purchase Street – 3rd Floor
      New Bedford, MA 02740-6694

      North Shore - Hull to New Hampshire: Division of Marine Fisheries -
      North Shore Office
      Attn: Environmental Reviewer
      30 Emerson Avenue
      Gloucester, MA 01930

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP’s Boston Office. For coastal towns in the Southeast Region, please contact MassDEP’s Southeast Regional Office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). Note: electronic filers click on Website.

b. ACEC

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
   a. ☒ Yes ☐ No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
   a. ☐ Yes ☒ No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
      2. ☒ A portion of the site constitutes redevelopment
      3. ☐ Proprietary BMPs are included in the Stormwater Management System.
   b. ☐ No. Check why the project is exempt:
      1. ☐ Single-family house
C. Other Applicable Standards and Requirements (cont’d)

2. □ Emergency road repair

3. □ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☑ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☑ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

3. ☑ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☑ List the titles and dates for all plans and other materials submitted with this NOI.

Reconstruction of Whittier Bridge and Interstate 95 Widening - Notice of Intent Plans

a. Plan Title

MassDOT/Tetra Tech

b. Prepared By

c. Signed and Stamped by

12/1/2011 1" = 40'

d. Final Revision Date e. Scale

e. Additional Plan or Document Title

Stormwater Report, Whittier Bridge/I-95 Improvements 11/16/11

f. Date

5. □ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☑ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☑ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☑ Attach NOI Wetland Fee Transmittal Form

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

- 068501 12/1/2011
- Municipal Check Number
- 068419
- State Check Number
- Normandeau Associates Inc
- 4. State Check Number
- 5. Check date
- 6. Payor name on check: First Name
- 7. Payor name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Timothy ______________ 11/30/11
1. Signature of Applicant

Date

2. Date

3. Signature of Property Owner (if different)

Date

4. Date

5. Signature of Representative (if any)

Date

6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a copy of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the “yes” box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Applicant Information

1. Applicant:
   a. First Name: Timothy
   b. Last Name: Dexter
   c. Organization: Massachusetts Highway Department
   d. Mailing Address: 10 Park Plaza
   e. City/Town: Boston
   f. State: MA
   g. Zip Code: 02116
   h. Phone Number: 617-973-7434
   i. Fax Number: 617-973-8879
   j. Email Address: timothy.dexter@state.ma.us

2. Property Owner (if different):
   a. First Name
   b. Last Name
   c. Organization: Commonwealth of Massachusetts
   d. Mailing Address
   e. City/Town
   f. State
   g. Zip Code
   h. Phone Number
   i. Fax Number
   j. Email Address

3. Project Location:
   a. Street Address
   b. City/Town: Amesbury

B. Fees

The fee should be calculated using the following six-step process and worksheet. Please see Instructions before filling out worksheet.

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

<table>
<thead>
<tr>
<th>Step 1/Type of Activity</th>
<th>Step 2/Number of Activities</th>
<th>Step 3/Individual Activity Fee</th>
<th>Step 4/Subtotal Activity Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Replacement (Category 4f)*</td>
<td>0.5</td>
<td>$1,450 x 1.5</td>
<td>$1,087.50</td>
</tr>
<tr>
<td>Roadway Construct. (Category 3c)</td>
<td>1</td>
<td>$1,050</td>
<td>$1,050</td>
</tr>
<tr>
<td>Shared-use Path (Category 2j)</td>
<td>1</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* activity also impacts RFA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>so fee is increased by 50%</td>
<td></td>
</tr>
</tbody>
</table>

Step 5/Total Project Fee: $2,637.50

Step 6/Fee Payments:

- Total Project Fee: $2,637.50
  - a. Total Fee from Step 5 $1,306.25
  - b. 1/2 Total Fee less $12.50 $1,331.25
- State share of filing Fee:
  - c. 1/2 Total Fee plus $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection  
Box 4062  
Boston, MA 02211

b.) To the Conservation Commission: Send the Notice of Intent or Abbreviated Notice of Intent; a copy of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a copy of this form; and a copy of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)
NORMANDEAU ASSOCIATES, INC.

25 Nashua Road, Bedford, NH 03110-5527
(603) 472-5191  (603) 472-7052 fax

CITIZENS BANK
MASSACHUSETTS
5-7017/2110

CHECK DATE
December 1, 2011

AMOUNT

PAY

1,331 Dollars 25 Cents

TO

Town of Amesbury
Town Hall
62 Friend Street
Amesbury, MA 01913

068501 068501 068501

December 1, 2011

PAY

1,306 Dollars 25 Cents

TO

Commonwealth of Massachusetts
Dept of Environmental Protection
P.O.Box 4062
Boston, MA 02211

Whittier Bridge Project - Amesbury

068419 068419 068419
WHITTIER BRIDGE/I-95 IMPROVEMENT PROJECT
AMESBURY, MASSACHUSETTS
SUPPLEMENT TO WPA FORM 3 - NOTICE OF INTENT

DECEMBER 2011
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3.3 IMPACT MINIMIZATION AND MITIGATION

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4.2 BRIDGE DESIGN ALTERNATIVES

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4.4 PREFERRED ALTERNATIVE

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5.2 LAND UNDER THE OCEAN/FISH RUN

5.3 RIVERFRONT AREA

5.4 COASTAL BEACH

5.5 COASTAL BANK

5.6 SALT MARSH

## 6.0 REFERENCES

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FIGURES
- Figure 1 Locus Map
- Figure 2 Riverfront Impacts

APPENDICES
- Appendix A – Checklist for Stormwater Report
- Appendix B – Order of Resource Area Delineation
- Appendix C – Rare Species Information
- Appendix D – Shading Analysis
- Appendix E – Wetland Mitigation
- Appendix F – DOT Invasive Species Control Plan
- Appendix G - Simplified Wildlife Habitat Evaluation
1.0 OVERVIEW

This Notice of Intent has been prepared for the Whittier Bridge/I-95 Improvement Project in accordance with the Massachusetts Wetlands Protection Act (WPA) (M.G.L. c. 131, §40) and its associated regulations (310 CMR 10.00). The project will provide additional Interstate (I)-95 lane capacity to improve safety and alleviate congestion and will involve replacement/rehabilitation of several structures including the Whittier Bridge over the Merrimack River.

The proposed work will impact Bordering Vegetated Wetland (BVW), Riverfront Area (RFA) and coastal resource areas in Newburyport, Amesbury, and Salisbury. BVW impacts will occur in the town of Amesbury, with permanent impacts totaling less than 5,000 square feet. Coastal resources associated with the Merrimack River will be impacted in Newburyport and Amesbury. Work will occur within RFA in Newburyport and Amesbury.

The project is subject to provisions of the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Performance Standards at 310 CMR 10.05(6)(k) through (q); therefore, a Stormwater Report is attached with this submission (under separate cover). The checklist for the Stormwater Report is included as Appendix A of this report. The Project qualifies as both new development and redevelopment and meets the Stormwater Performance Standards accordingly as detailed in the Stormwater Report.

The project incorporates measures to avoid and minimize impacts, and includes mitigation for loss of wetlands (Section 3.3). An alternatives analysis was prepared demonstrating that there are no practicable and substantially equivalent economic alternatives to the proposed project that would be less damaging to wetland resource areas (Section 4). Performance standards applicable to the project will be met to the maximum extent practicable (Section 5).

2.0 EXISTING CONDITIONS

2.1 LOCATION AND SITE DESCRIPTION

The project area is located within the I-95 right-of-way and extends from Interchange 57 (Route 113/Storey Avenue) in Newburyport, across the Merrimack River, to Interchange 60 (State Route 286/Main Street overpass and the Toll Road overpass) in Salisbury, south of the New Hampshire state line.

The project area includes the John Greenleaf Whittier Bridge, a fixed-span steel-truss bridge, which spans the Merrimack River in Amesbury and Newburyport. The bridge, which has three lanes in each direction, was built in 1951 and is considered structurally deficient and functionally obsolete. The current bridge does not meet current traffic volume requirements, is the location of an elevated number of accidents and fails to meet current Federal Highway Administration Interstate Highway design standards. Other bridges located within the project area include Evans Place Bridge and railroad bridges within the median at Route 110 in Amesbury.

I-95 within the project area currently consists of six lanes, while north and south of the project area I-95 has eight lanes. Peak hour traffic congestion occurs in this area and is highest during summer weekends. The drainage system associated with the existing roadway consists of a combination of
open drainage flow from the roadway and a series of catch basins that are part of a drainage piping system with multiple discharge points. Stormwater flows directly into wetlands along the highway (Wetlands E, F, and H) via paved swales (Wetlands E and F) and ditches (Wetland H) with little apparent treatment.

The stretch of the Merrimack River within the project area is navigable and is tidally influenced. Other water bodies including wetlands, small ponds and unnamed intermittent streams are within or in close proximity to the study area.

2.2 WETLAND RESOURCE AREAS

The following resource areas regulated by the WPA occur within the study area:

- Land Under the Ocean (tidal areas within the Merrimack River);
- Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie an Anadromous/ Catadromous Fish Run (Fish Run);
- Coastal Beach;
- Land Subject to Coastal Storm Flowage (LSCSF);
- Salt Marsh;
- Riverfront Area (RFA);
- Bordering Vegetated Wetlands (BVW); and
- Bank.

Eight BVWs (Wetlands D, E, F, G, H, I, J, and N), Bank associated with unnamed intermittent streams, Land Under the Ocean, Fish Run, Coastal Beach, Coastal Bank, LSCSF, Salt Marsh, and RFA associated with the Merrimack River occur within the project area in Amesbury.

In addition to the resource areas described above, two isolated vegetated wetlands (Wetlands 9 and 11) are located within the project area in Amesbury. These wetlands have no hydrologic connection to other wetland resource areas and are not likely to pond more than 0.25-acre foot. Therefore, they do not fall under jurisdiction of the Massachusetts Wetlands Protection Act, although they meet federal jurisdictional wetland definitions.

The boundaries of resource areas located in Amesbury were approved by the Amesbury Conservation Commission in an Order of Resource Area Delineation dated December 15, 2009 (Appendix B).

There are no certified vernal pools in the study area and 2009 spring surveys identified no pools supporting breeding populations of vernal pool species.

The site is not subject to any known Wetlands Restriction Orders under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105).

2.3 OUTSTANDING RESOURCE WATERS

No areas designated in the Massachusetts Surface Water Quality Standards (314 CMR 4.00) as Outstanding Resource Waters (ORWs) occur within the project area.
2.4 RARE SPECIES AND HABITATS

According to the Massachusetts Natural Heritage and Endangered Species Program (NHESP), the bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), both listed as endangered by the Commonwealth of Massachusetts, are the only state-listed terrestrial species that occur in the project area. The Merrimack River and the adjacent riverbank areas within the project area are designated as Priority Habitat #1321 by the NHESP for the Bald Eagle. Preliminary consultation with the NHESP indicated that impacts to bald eagle habitat will be unlikely. In 2011, the NHESP verified that a pair of peregrine falcon are utilizing the existing Whittier Bridge as nesting habitat. Consultation with the NHESP is ongoing, but currently the NHESP indicates they would prefer not to encourage nesting peregrines on the bridge due to adverse effects on other nearby protected species. Bald eagle and peregrine falcon have been delisted at the federal level and are no longer protected under the Endangered Species Act of 1973 (7 U.S.C. §136, 16 U.S.C. §1531 et seq., ESA). The NHESP will review this NOI jointly under the streamlined MESA/Wetlands Protection Act review process.

Two fish species with special status are known to use the project area, shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrhynchus*). The shortnose sturgeon is listed as endangered by the NHESP and the National Marine Fisheries Service (NMFS). The Atlantic sturgeon is also listed as endangered by the NHESP and as a candidate for listing by NMFS. 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 (ESA) was initiated. Following review of the project, NMFS concluded in a letter dated June 8, 2011 that the proposed work would be unlikely to adversely affect any listed species under NMFS jurisdiction; therefore, no further consultation pursuant to Section 7 of the ESA is required. Consultation with the NHESP and the Division of Marine Fisheries will be necessary to comply with the Massachusetts Endangered Species Act. Letters from the U.S. Fish and Wildlife Service (USFWS), the NMFS, and the Massachusetts Division of Fisheries and Wildlife (DFW) regarding rare species at the site are provided in Appendix C. Consultation with DFW and NMFS is ongoing.

The proposed project does not occur within an Area of Critical Environmental Concern (ACEC).

3.0 PROPOSED WORK

Project-wide proposed work will include the following:

- Replacement of the John Greenleaf Whittier Memorial Bridge over the Merrimack River with a pair of new bridges, each with four travel lanes, a high-speed shoulder and a breakdown lane in each direction.
- Widening, rehabilitation, or replacement of seven adjacent bridges along the I-95 alignment in Amesbury and Newburyport to accommodate eight lanes of traffic on I-95 and to meet current design standards as much as practicable.
- Highway widening improvements from the existing six lanes to eight lanes along the 4.25-mile project alignment from Exit 57 in Newburyport to Exit 59 in Salisbury.
- Construction of a “shared-use path”, which will parallel the I-95 alignment and cross the Merrimack River on the new I-95 northbound bridge.
Stormwater management improvements to achieve compliance with the stormwater management standards. A new collection and conveyance system will be needed where the highway layout is relocated or expanded. In most areas where the layout will remain unchanged, portions of the existing infrastructure will be maintained. A majority of the existing stormwater discharges will remain under the post-development condition, but in some instances, discharges will be improved or relocated.

Construction activities in Amesbury are described in Section 3.1 below. Impacts to resource areas associated with the proposed work are summarized in Section 3.2. Measures to minimize project impacts, including erosion and sedimentation control, stormwater management, and proposed wetland replication areas are described in Section 3.3.

### 3.1 Construction Activities In Amesbury

Project work in Amesbury will include the following:

- Replacement of the Whittier Bridge with a pair of new bridges;
- Widening of I-95 from six to eight lanes from the new Whittier bridges to the Salisbury town line;
- Reconstruction and widening of the I-95 bridge over Evans Place; and
- Rehabilitation and widening of the I-95 northbound and southbound bridges over Route 110 (Elm Street); and
- Widening of three railroad bridges just north of Route 110 (Elm Street).
- Construction of the shared-use path that will parallel the I-95 alignment. In Amesbury this path will cross the Merrimack River along the new I-95 northbound bridge and continue north along I-95 to a point south of Exit 58. At that point the path will fork, with one leg turning to the east and terminating at a parking area to be provided at the end of Merrill Street. The other leg will continue north within the I-95 right-of-way, paralleling I-95 northbound, and then turn to follow the I-95 northbound off-ramp to Route 110 eastbound at Exit 58. The path will continue to the east paralleling Route 110 to the Salisbury town line.
- Stormwater improvements, including installation of four infiltration basins (Infiltration Basins 2, 3A, 4, and 5), one extended detention basin (Detention Basin 3B), an outlet control structure, sediment forebays, water quality swales, three infiltration trenches (2B, 3C, and 3D), and deep sump catch basins;
- Creation of a BVW replication area adjacent to Wetland H to compensate for proposed impacts to Wetlands H and I; and
- Riverfront Area restoration of existing degraded areas.

The overall construction duration for the Project is expected to be 48 months, including a 42-month in-water work period for demolition and construction of the bridges. For the new structures, the in-water work will include installing piles, piers, and footings; in-water demolition activities will require installing temporary cofferdams to facilitate removal of the existing bridge piers.

#### 3.1.1 Work within the Merrimack River

The major activities within the River will include the construction of the bridge substructure such as spread footings (Piers 1 and 2), driven steel H piles and tremie seal (Pier 3), pier construction;
erection of the superstructure, installation of temporary support pier and the demolition of the existing bridge. Cofferdams will be used in conjunction with the construction of the new bridge piers, temporary support piers and around the existing bridge piers during removal. Six new piers will be constructed to support the northbound and southbound structures. For the substructure and superstructure components, the in-water equipment will be similar and include barges, spudded work platforms, cofferdams, temporary support piers, and falsework. The exact methods for removing the substructure and superstructure will be developed by the Contractor, reviewed and approved by MassDOT and forwarded to DEP and the United States Coast Guard (USCG) for final approval as part of the Work Plan deliverable. The Work Plan will also include specific information such as barge tie up locations and work zones. The Contractor will provide specific locations for the operation and storage of all temporary equipment in order to minimize river and shore impacts and maintain navigation.

3.1.1.1 General Construction Sequencing For In Water Work

Construction of the new bridges over the Merrimack River will be completed in three overall stages. The first phase will involve the construction of the new I-95 northbound bridge, on a parallel alignment immediately east (downstream) of the existing Whittier Bridge. The bridge will be constructed wide enough to accommodate all six lanes of I-95 traffic (northbound and southbound) during the subsequent demolition of the existing Whittier Bridge and the construction of the new I-95 southbound bridge.

Once all I-95 traffic is diverted onto the new bridge, demolition of the existing Whittier Bridge will begin. The first step will be the removal of the existing roadway deck. Then the arch truss main span will be disassembled piece by piece and removed from the construction site, and then the remainder of the existing bridge superstructure will be demolished. The existing bridge abutments and one or more of the existing piers will be retained to be used as temporary supports as necessary for the construction of the new southbound bridge.

In the final phase, the new southbound bridge will be constructed along the alignment of the existing Whittier Bridge. Once completed, the remaining piers and abutments from the existing Whittier Bridge will be removed. The piers in the Merrimack River will be removed and the river bottom restored. After completion of the southbound bridge, all southbound traffic will be moved to the new bridge.

Substructure. In-water construction in the navigation channels where depth is sufficient will take place from barges. Cofferdams will be constructed at each proposed pier location to provide work access and allow work to be performed in the “dry.”

Substructure activities will consist primarily of constructing cofferdams (drilling in frame, dropping in steel sheets and cutting to ledge contours at proposed Piers 1 and 2; vibrating in steel sheet piles at proposed Pier 3), dewatering, pile driving steel H piles into river-bottom (Pier 3) followed by a tremie seal foundation, constructing spread footings (Piers 1 and 2), and erecting the bridge pier. Installing the piles will require large-scale construction equipment (pile drivers or cranes) to drive steel H piles. Equipment will be operating from deep-draft barges, where the draft allows. Footings or pile caps will be precast units, floated in by barge, and set into place by spudded anchors or cofferdam construction to allow for placement of concrete and reinforcing steel in the dry. Finally, the pier construction will
take place above the footings and provide vertical support to the superstructure. The granite faced piers will also be constructed from barges and consist of concrete and steel.

Construction of the northbound bridge will require the construction of two (2) temporary piers within the river to support the bridge deck during installation. Temporary floats will be placed adjacent to both banks to support a temporary walkway extending out to Piers 1 and 3. No temporary supports will be required for the construction of the southbound bridge as the existing Whittier Bridge piers will provide support during assembly of the bridge deck. The temporary supports will be required to support the bridge deck as it is installed from the new bridge abutment out towards the first pier (either Pier 1 in Newburyport or Pier 3 in Amesbury), and between Pier 1 or 3 and Pier 2 (the center pier). As soon as the bridge deck is complete from the abutment to the nearest pier or from the center pier to the landward pier, the temporary supports will be removed. It is anticipated that the temporary supports may be in place up to six months at each location. Temporary supports are not required for the new I-95 southbound bridge; the existing abutments and piers will provide support for the bridge deck during construction.

Once the existing bridge piers, temporary cofferdams and support structures are removed, the natural River flow will restore sediment to temporarily dewatered and pier removal areas, and eventually match the surrounding hydrography. The temporary cofferdams associated with the spread footing foundations for Piers 1 and 2 will be removed to the mudline. For Pier 3, which will be constructed with steel H piles driven to bedrock, the foundation will be supported by a tremie seal and the cofferdam will be left in place as part of the outer tremie seal. The cofferdam will be left at the same elevation as the Pier 3 foundation.

Superstructure. Floating cranes and tower cranes will be required to construct the main piers and lift the superstructure. The bridge superstructures will consist of steel-tied arches. Precast segmental concrete deck slab sections will be constructed off-site, barged or trucked in, and then lifted with a crane or overhead gantry system. Barge-mounted cranes may be used if segments arrive by barge. Steel plate girder and steel-tied arch sections will be prefabricated off-site and will be transported by truck or barge, similar to the concrete segments.

3.1.1.2 Demolition Procedures and Methods

Following the construction of the initial six-lane northbound structure, the simultaneous placement of temporary and permanent structures in the waterway for demolishing the existing bridge and constructing the new four-lane southbound structure will occur. During this time the greatest amount of construction-related equipment will be in the waterway.

Demolishing the existing bridge may require placing temporary piles in the river or to provide support while portions are removed. At a minimum, in-water demolition activities will require placing and operating equipment similar to bridge construction, including work platforms, barges, and work zones within the waterway.

Superstructure. Removal of deck structures could be performed by separating them into pieces or by removing them panel by panel. Steel-truss spans over the water will be removed in one of several different ways. One method will be to construct temporary supports under the span and disassemble the truss segment by segment. Other potential methods will include constructing access embankments, or using special shallow-draft barges or rigging devices for sliding sections onto
barges from the bridge deck. Protective measures such as temporary netting will be included to prevent materials or debris from falling into the Merrimack River.

**Substructure.** Large structural elements will be lifted from their bases in one piece or piece-by-piece. Demolishing the concrete foundations at the piers will require reducing the reinforced concrete to pieces that are small enough to be hauled away. Removal of the existing piers will be performed by constructing cofferdams around each pier, dewatering, and demolishing the pier to the existing mud line. Existing Piers 1, 2 and 3 will be removed to the existing river bottom ledge / rock outcrop. Existing Pier 4 will be demolished approximately 1’ below the elevation of the existing substrate (gravel / cobbles), and the river’s ability to transport and disperse sediment will result in the void filling in with natural substrate (Note: existing Piers 1 and 2 exist within Newburyport). The Contractor’s Work Plan will be a required deliverable and include means and methods for in-water work associated with substructure, superstructure and demolition activities. The Work Plan will be submitted to DEP and the USCG for review and approval prior to the start of construction.

3.2 IMPACTS TO RESOURCE AREAS

The project is anticipated to result in permanent and/or temporary direct impacts to the following resource areas in Amesbury:

- Bordering Vegetated Wetland;
- Land Under the Ocean/Fish Run;
- Banks of or Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie an Anadromous/ Catadromous Fish Run (Fish Run);
- Riverfront Area;
- Land Subject to Coastal Storm Flowage; and
- Coastal Beach.

In addition, increased shading from the new bridge design will likely result in limited indirect impacts to BVW and Salt Marsh. No impacts are proposed to Isolated Vegetated Wetlands in Amesbury. The Shared Use Path and some of the proposed stormwater improvements, including Infiltration Basins 3A and 5, will occur partially within Buffer Zone to BVW. Direct and indirect wetland resource impacts are summarized in Tables 3.2.1 and 3.2.2, respectively, and are described in the following sections.

3.2.1 Direct Wetland Resource Impacts

3.2.1.1 Bordering Vegetated Wetland

Two BVWs in Amesbury, Wetlands I and H, will be directly affected by the proposed highway widening.

**Wetland I.** Wetland I is located at the toe of a steep slope east of I-95, north of Main Street and west of Merrill Street in Amesbury (plan sheet 8). It is a small forested and scrub-shrub wetland surrounded on three sides by local roadways and I-95 with a culverted inlet located along a slope on the western side of the wetland. This wetland appears to pond water during periods of runoff. The small size of this wetland and its position between the highway and a secondary road limit its
Wetland I are mapped as 100-year floodplain (associated with flooding from the Merrimack River). This portion of Wetland I is regulated as LSCSF.

The realignment of the I-95 northbound lanes and the construction of the shared-use path will require constructing a retaining wall along the eastern edge of Wetland I, permanently filling approximately 1,800 square feet of wetland (Table 3.2.1). The impact will include 780 square feet of fill for the retaining wall and 1,020 square feet of alteration or fill for construction and permanent maintenance access to the wall. A chain link fence will be installed at the limit of the permanent impact area to ensure that impacts are limited to the area required for the construction and permanent maintenance access. The fence will be installed using techniques that minimize the risk of sedimentation to Wetland I.

The addition of fill will reduce the volume of water that is retained by this wetland. Wildlife habitat will not be appreciably affected by the proposed permanent impacts. The wetland currently provides low habitat value given lack of access (i.e., due to fencing and the highway), low availability of food sources, and the small size of this resource area. The addition of fill to the wetland will not appreciably reduce the amount of habitat or food sources available. Given the fill will occur along the edge of the wetland, including within a sloped area that does not currently hold water, the permanent impacts to all of these functions are expected to be minor. No additional temporary impacts to Wetland I beyond the permanent impacts that are anticipated.

Wetland H. Wetland H is located at the highway toe of slope in Amesbury near the Route 110 interchange on the east side of I-95 (plan sheet 9 & 10). The northern and southern portions of Wetland H are characterized by emergent marsh, while a relatively small area of forested wetland occurs in the middle portion of Wetland H within the project area. An intermittent stream flows east and offshore through the forested portion of Wetland H. A series of man-made drainage channels are located north of the intermittent stream. Flow originates from an approximately 3-foot (0.9 m) wide concrete culvert beneath I-95. Wetland H appears to be hydrologically connected to Wetland G via this culvert. Common reed (*Phragmites australis*) is dominant in the open areas of this wetland. Wetland H is regulated as BVW under the WPA. The principal functions of Wetland H are Floodflow Alteration, Sediment/Toxicant Retention, and Nutrient Removal.

Approximately 1,760 square feet of permanent impact will occur to the wetland from constructing a retaining wall (Table 3.2.1) caused by realigning I-95 northbound and constructing the shared-use path. Temporary impacts totalling 1,400 square feet will occur for construction access to the wall. As with Wetland I, a chain link fence will be installed at the limit of the permanent impact area to ensure that impacts are limited to the area required for construction access.

The permanent impacts will be in emergent marsh at the southern end of the wetland; there will be no impacts to the intermittent stream associated with Wetland H. The decrease in wildlife habitat will be minimal because of the low overall value of the wetland and the location of the permanent impact adjacent to the existing and proposed highways.

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Table 3.2.1. Direct Wetland Resource Impacts In Amesbury
3.2.1.2 Land Under the Ocean/Fish Run

Impacts to Land Under the Ocean and Land Under the Ocean, Ponds, Streams, Rivers, Lakes or Creeks that Underlie an Anadromous/Catadromous Fish Run (LUO/Fish Run) include both permanent impacts from constructing six new bridge piers and temporary impacts from constructing new piers and temporary supports for portions of the I-95 northbound bridge deck, and demolishing the four existing Whittier Bridge piers. The permanent impacts will be offset in part by removal of the four existing bridge piers and restoration of the river bottom.

Two of the new permanent piers and one temporary pier will be constructed in LUO/Fish Run in Amesbury. The other four new permanent piers and one temporary pier will be located in LUO/Fish Run in Newburyport. Currently there are two existing piers in Amesbury and two in Newburyport.

Permanent Impacts

Constructing two piers in the Merrimack River in Amesbury to support the two new network arch bridges for the project will result in the permanent net loss of 2,870 square feet of LUO/Fish Run (Table 3.2.1). The hydraulic cross section for passage will be slightly enlarged due to demolishing the 4-pier alignment and creating a 3-pier alignment, with the proposed piers situated further outside the two channels than existing conditions. The two new bridge piers will permanently alter an area of 8,870 square feet of river bottom. Permanent impacts to the river bottom will be minimized by
removing the two existing Whittier Bridge piers in Amesbury, which total 6,000 square feet in area, and restoring the river bottom at these locations. Natural river flow will restore sediment to this area, followed by repopulation by macroinvertebrates over a period of months to years. These areas will eventually be similar to the surrounding undisturbed areas.

The new piers will be located so there will be minimal change to the existing river flow. Hydraulic analysis of the proposed pier configuration indicates that there will be no changes to the current regime. River hydrology and sedimentation will not be affected by the new bridges. No changes in water quality or quantity are expected because of the new river crossings following demolition and construction. The river channels will be unaffected by the new bridges, so the ability for anadromous and catadromous fish to move through the project area will be unaffected.

**Temporary Impacts**

Temporary impacts to LUO/Fish Run in Amesbury will be approximately 10,790 square feet from the installation of cofferdams around the two new permanent piers during construction, around each of the two existing Whittier Bridge piers during demolition, and from construction of one temporary support structure during construction of the I-95 northbound bridge. The temporary supports will be required to support the bridge deck as it is installed from the new bridge abutment out towards the first pier (either Pier 1 in Newburyport or Pier 3 in Amesbury), and between Pier 1 or 3 and Pier 2 (the center pier). As soon as the bridge deck is complete from the abutment to the nearest pier or from the center pier to the landward pier, the temporary supports will be removed.

It is anticipated that the temporary supports may be in place up to six months at each location. Temporary supports are not required for the new I-95 southbound bridge because the existing abutments and piers will provide support for the bridge deck during construction.

The river bottom will be restored once the existing bridge piers and temporary support piers are removed. The temporary cofferdams associated with the spread footing foundations for Piers 1 and 2 will be removed to rock outcrop elevation and the riverbottom restored. For Pier 3, which will be constructed with steel H piles driven to bedrock, the foundation will be supported by a tremie seal and the cofferdam will be left in place as part of the outer tremie seal. The cofferdam will be left at the same elevation as the Pier 3 foundation. Existing Piers 1, 2 and 3 will be removed to the elevation of the existing substrate (ledge / rock outcrop). Pier 4 will be removed to an elevation 1 foot below the mudline (gravel) and allow for natural sedimentation to fill the void; such has been verbally approved by the National Marine Fisheries Service (Chris Boelke) and the MA Division of Marine Fisheries (John Logan).

Since installing and removing piers could result in sediment disturbance and subsequent increases in turbidity and suspended solid concentrations in the water column, which could adversely affect fish populations, all in-water work will take place within cofferdams to minimize adverse water quality effects. Sediment disturbance is especially a concern when fine sediments are resuspended and settle on spawning areas. However, construction will occur approximately 13 miles from upstream shortnose sturgeon spawning grounds near Haverhill. Therefore, project construction will have no effect on shortnose sturgeon spawning grounds. With the exception of the existing and new bridge piers nearest the Amesbury (northern) shoreline, the substrate in the area of the bridge construction is generally hard bottom or shallow, coarse-grained sediments. Therefore, the resuspension of finer sediments is not expected to occur.
In-water construction, including increased boat traffic, pile driving, pier construction, and other bridge-construction activities, could increase the underwater sound levels experienced by fish. These effects could range from no effect to disturbing or harmful, depending on the frequency and intensity of the sound, as well as the species and age of the fish experiencing the sound. No blasting will occur as part of this project. Increases in sound and associated pressure waves related to pile driving vary depending on the type of piling, method of installation, frequency, and duration of the activity, and size and depth of the water body. Resultant effects on fish depend on the species and life stage. Juveniles and adults could avoid increases in sound, but eggs and larvae do not have this ability. Only limited pile driving will be required and will be performed within cofferdams, minimizing adverse acoustic effects. Therefore there will be no adverse acoustic effects on shortnose sturgeon or other resident and migrating fish species.

Dredging activities will be conducted entirely within cofferdams to be installed around the six new permanent piers, each of the four existing Whittier Bridge piers during demolition, and around two (2) temporary support structures during construction of the I-95 northbound bridge. A total of approximately 7,150 cubic yards of material will be dredged in Amesbury and Newburyport. The area of proposed dredging equals approximately 45,620 square feet. Cofferdams constructed at each proposed pier location will provide work access and allow work to be performed in the “dry.”

Dredging will be conducted with a clamshell excavator located on a barge moored or spudded adjacent to the cofferdam. Dredged material will be allowed to drain much of the entrained water within the confines of the cofferdam before the material is deposited on a barge for transport to an intermediate facility to be identified by the design/build contractor to be selected for project construction. No open water disposal or side casting of dredged material is proposed.

During construction, piers for the new I-95 northbound bridge will be installed before the existing piers are removed, resulting in additional temporary loss of LUO/Fish Run until demolition of the existing Whittier Bridge is complete. The new and existing piers will also result in a temporary presence of additional structures in the water. The river channel will remain free of impediments throughout construction, so that additional structures in the river will not affect fish movements.

The Massachusetts Department of Transportation (MassDOT) is coordinating with the Massachusetts Division of Marine Fisheries (DMF) to develop appropriate work conditions that will avoid and minimize adverse effects to fish (especially threatened and endangered species). In addition, MassDOT has consulted with NMFS on effects to fish species in the river. The Federal Highway Administration authorized MassDOT, as its non-federal representative, to consult directly with NMFS in a letter dated September 8, 2009. A Section 7 consultation regarding potential impacts and impact avoidance measures with the NMFS under the federal Endangered Species Act (ESA) was initiated.

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 will 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. Most of the construction/demolition work will take place using barges, tugs and other vessels. Some vessels may use anchor or spuds that temporarily disturb the bottom substrate and obstruct a small portion of the water column. These activities are not expected to impede sturgeon transit through the study area; therefore the predominant sturgeon use,
upstream/downstream passage, will be maintained throughout construction. Use of a qualified observer during cofferdam construction will further ensure that there will be no adverse effects to shortnose sturgeon.

MassDOT has coordinated with the NMFS and the Massachusetts Division of Marine Fisheries (DMF) in their review of the proposed demolition, construction and dredging activities. DMF has determined, in a letter dated September 8, 2011, that “since the proposed in-water work will include cofferdams to contain siltation, a TOY restriction is not recommended for in-water work.” MassDOT is continuing to coordinate with DMF regarding their request to limit the installation and removal of cofferdams to the period from November 1 to March 1.

In a letter dated June 8, 2011, NMFS stated: “[b]ased 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 [distinct population segment] DPS 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.”

3.2.1.3 Riverfront Area

In Newburyport and Amesbury, there will be alteration to undisturbed RFA (11,310 square feet), existing degraded RFA (39,435 square feet), and previously developed RFA (48,064 square feet). Alterations to riverfront area include impacts due to construction of the I-95 northbound and southbound bridge abutments, grading, temporary construction access, the construction of a utility access path in Newburyport, and new pavement. The project will result in an overall improvement to the RFA by demolishing the existing abutments, building the new abutments approximately 50’ behind the existing abutments, removing existing riprap, and restoring the approximate 80’ slope with bioengineering to create a natural riverfront corridor which connects conservation land on either side of I-95.

In Amesbury, the total amount of 200-foot RFA on the project site is 64,000 square feet (Figure 2). Alteration to undisturbed RFA due to proposed bridge abutment, retaining walls, and pavement will be 5,480 square feet (permanent), and cumulatively is below 10 percent of the RFA on the lot (310 CMR 10.58(4)(d)(1). Alteration to existing degraded RFA will be 16,460 square feet due to reconstruction of existing pavement, retaining walls, and bridge abutments, and does not require mitigation (310 CMR 10.58(5). Alteration to previously developed RFA (engineered side slopes; previously graded areas) due to grading, construction access, and the construction new bridge abutments, wingwalls and pavement will be 11,650 square feet (temporary) and 6,000 square feet (permanent), and will require mitigation for those impacts that alter over 10 percent of the RFA on the site (310 CMR 10.58(5)(c)) as described in Section 3.3.3.
3.2.1.4 Land Subject to Coastal Storm Flowage

Permanent impacts to LSCSF in Amesbury will occur in Wetland I. The placement of 1,230 square feet of fill for construction of the retaining wall between Elevation 7 and Elevation 9 will alter 1,500 cubic feet of 100-year floodplain (Table 3.2.1). As the floodplain is associated with a tidal river and is regulated as LSCSF under the Massachusetts Wetlands Protection Act, there is no regulatory requirement for compensatory flood storage in this instance. Placement of the fill will not adversely affect the passage of floodwaters in the small area of 100-year floodplain, and will not result in adverse flooding impacts elsewhere in the floodplain.

An area of LSCSF totalling approximately 912 square feet adjacent to the existing Whittier Bridge abutment will be temporarily occupied during demolition of the abutment. No permanent fill will be placed at this location, and any temporary work platforms necessary to support construction equipment needed for demolition of the abutment will be removed once the demolition activities are complete. The activities will not affect the passage of floodwaters nor will there be adverse flooding impacts elsewhere in the floodplain.

3.2.1.5 Coastal Beach

Construction of one of the proposed temporary bridge supports on the Amesbury shoreline is assumed to temporarily affect approximately 190 square feet of Coastal Beach (Table 3.2.1). As previously noted, the temporary supports will be in place for up to six months, and then removed and the area restored. The minimal area of Coastal Beach affected and the short duration of the impact are minor, and no adverse impact to the beach is anticipated.

3.2.1.6 Coastal Bank

Coastal bank is located along the north and south sides of the Merrimack River. Along the north bank in Amesbury, approximately 105 linear feet of temporary alteration to the coastal bank will occur to facilitate access to construct the land based south bound bridge abutment (Table 3.2.1).

3.2.2 Indirect Impacts to Wetlands from Bridge Shading

A shading analysis was conducted to assess the potential impacts of the proposed bridge to vegetated wetlands within the I-95 ROW at the Merrimack River. The shading analysis is summarized in this section and is described in detail in Appendix D. Shading was modeled to calculate the number of hours of shade projected by the proposed bridge as compared to the existing bridge. Hours of shade were calculated throughout the day for six representative days during the growing season. These results were compared to existing field conditions to develop a prediction of the potential changes to vegetated wetland communities under the proposed project. A set of studies in the literature were also used to provide a third evaluation method of the potential for significant shade impacts. This analysis addresses the concern that construction of a bridge could alter availability of sunlight and direct precipitation on the underlying vegetation, thereby affecting the functions and values of wetlands under the bridge.

Results of the analysis indicate that shading from the existing Whittier Bridge impacts an average of 5,360 square feet of vegetated wetland resources in Amesbury, including 3,960 square feet with 4-5 hours of shade and 1,400 square feet with 6-7 hours shade. Based on field conditions, 4-5 hours of shade produce minor vegetation impacts and 6-7 hours of shade produce moderate vegetation impacts.
The proposed bridges will result in an average of 8,990 additional square feet of vegetated wetland impacts in Amesbury over existing conditions, averaged over the growing season. These will include 4,790 square feet of minor impacts, 4,020 square feet of moderate impacts, and 180 square feet with 8–9 hours of shade.

Research on shading impacts indicates that the potential for significant impacts will only result for areas with eight or more hours of shade per day, lesser hours of shade could result in a change in the vegetative species composition of the salt marsh and vegetated wetlands (BVW) but no permanent alteration of the resource or loss of wetland functions and values. Therefore the construction of the new bridge structures will result in average net shading impacts (eight or more hours of shade per day) in Amesbury of 180 square feet to salt marsh and no shading impacts to vegetated wetlands (BVW), averaged over the six-month growing season. The 180 square feet of salt marsh subject to 8-9 hours of shade is not expected to be significantly impacted due to the long narrow shape of the impact area, and the high quality of light admitted through the gap between the two bridges during the middle of the day. Sunlight from directly overhead provides a higher insolation value per square foot than sunlight slanting under the bridge late in the day. Additional direct and indirect light resulting from smaller bridge piers and abutments set further from the riverbank is also expected to mitigate light impacts to vegetation (Section 3.3.3).

Although vegetation species composition will be altered under the moderately shaded sections of the proposed bridges, the community structure and density is expected to remain similar to existing conditions. The new vegetation community will continue to provide many salt marsh functions, including shoreline stabilization, prevention of pollution, and fish and wildlife habitat.

Several aspects of the proposed bridge design will improve habitat quality under the bridges, including smaller above-water pier columns and relocation of the bridge abutments 50 feet landward of their current locations. Both design features will increase direct and indirect light availability for vegetation. The vegetated wetlands on the north shore in Amesbury will be improved by the removal of coarse rock and debris, and the placement of fine mineral substrates more suitable for wetland plant species. These actions should allow the salt marsh to accrete sediments and re-establish vegetation.
Table 3.2.2. Average Shading Impacts (in Square Feet) In Amesbury for Existing and Proposed Conditions over the Growing Season

<table>
<thead>
<tr>
<th>Hours of Shade</th>
<th>Existing Bridge</th>
<th>Proposed Bridge</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4–5 6–7 8–9</td>
<td>4–5 6–7 8–9</td>
<td>4–5 6–7 8–9</td>
</tr>
<tr>
<td>BVW</td>
<td>1,200 800 0</td>
<td>1,300 1,000 0</td>
<td>100 200 0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>2,760 600 0</td>
<td>7,450 4,420 180</td>
<td>4,690 3,820 180</td>
</tr>
<tr>
<td>Total</td>
<td>3,960 1,400 0</td>
<td>8,750 5,420 180</td>
<td>4,790 4,020 180</td>
</tr>
</tbody>
</table>

Source: NAI

3.3 IMPACT MINIMIZATION AND MITIGATION

Project planning and alternatives analyses have considered all feasible measures to avoid and/or minimize impacts to wetland resource areas (Section 4.0). Unavoidable impacts to resource areas will be minimized to the extent practicable. The project will include erosion/sedimentation control and stormwater management measures to minimize potential impacts. In addition, wetland replication areas are proposed to mitigate for loss of wetlands. Impacts to RFA have been minimized, and existing degraded RFA will be restored as described in Section 3.3.3.

3.3.1 Erosion/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 sedimentation control measures will be installed prior to excavation or disturbance and will be maintained throughout construction. Proposed erosion and sedimentation controls are described in Section 3.2 of the Stormwater Report (provided under separate cover).

A detailed Storm Water Pollution Prevention Plan (SWPPP) will be prepared in accordance with the requirements of the EPA’s National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities in effect at the time of construction. The SWPPP will specify Best Management Practices (BMPs) and inspection and maintenance requirements to minimize erosion and control sediments. The SWPPP will identify further BMPs (such as good housekeeping strategies, construction equipment maintenance, and waste management) to minimize potential impacts, other than erosion and sedimentation, associated with construction activities. The Contractor will be responsible for preparing the SWPPP in support of construction activities. The NOI plans provide the minimum measures which the Contractor must include in the SWPPP.

3.3.2 Stormwater Management

The stormwater management system to be constructed for the Project will improve water quality associated with stormwater discharges to the Merrimack River and other project areas receiving waters compared to existing conditions.

Stormwater detention, recharge, and improved water quality will be provided through use of the following BMPs:

- Eight infiltration basins (four in Amesbury, two in Newburyport, and two in Salisbury);
- Two wet basins (Salisbury);
- Two extended detention basins (one in Amesbury and one in Salisbury);
- Twelve sediment forebays (for pretreatment prior to discharge to an infiltration basin or wet basin);
- Outlet control structure installed over existing drainage located in Route 110 Loop Ramp (Amesbury);
- Water quality swales (in the median where space is available);
- Three infiltration trenches (in Amesbury);
- Deep sump catch basins (where the highway layout is relocated and where the roadway layout will be expanded).

These BMPs are further described in the Stormwater Report (provided under separate cover), which was prepared for the project study area as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q). Under the provisions of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00), stormwater discharges affecting jurisdictional resource areas or within the 100-foot buffer zone to certain resource areas are required to meet regulatory performance standards. The performance standards are listed at 310 CMR 10.05 and in the MassDEP Massachusetts Stormwater Handbook (2008). The Project qualifies as both new development and redevelopment and meets the Stormwater Performance Standards accordingly as detailed in the Stormwater Report. DEP’s stormwater checklist is provided in Appendix A.

3.3.3 Mitigation Areas

As detailed in Section 3.2.1.1, the project will result in direct impacts to jurisdictional wetlands in Amesbury. Temporary impacts to Wetland H (Amesbury), as well as to Isolated Vegetated Wetland M (Salisbury), will be mitigated on site at each wetland location by in-situ restoration. To mitigate for permanent impacts, the BVW replication concept in Amesbury will consist of expanding Wetland H by excavating approximately 4,950 square feet of upland at its northern end within the ROW (Appendix E).

Lowering grades to approximately 33 feet elevation will allow additional flood storage and sediment and nutrient treatment to occur. The replication will include excavating the existing upland slope to approximately the 33-foot contour. The goal will be to establish forested wetland adjacent to the existing marsh.

Wetland plantings will consist of woody species prevalent in nearby forested wetlands (red maple [Acer rubrum], green ash [Fraxinus pennsylvanica], gray dogwood [Cornus amomum] and winterberry [Ilex verticillata]). A temporary wetland seed mix will be applied to stabilize the soils until the woodland herbaceous species emerge from seedbank in the topsoil. The steep slope of the upland will be reduced to a 3:1 slope or less, and stabilized with a native upland seed mix. It is expected that woody upland species will naturally recolonize the stabilized slope. A long-term monitoring program will 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 will replace the lost acreage at an approximately 1:1.4 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, nutrient transformation/retention, and wildlife habitat. The functional quality for wildlife habitat of the created wetland will be limited most by the disturbed nature of the existing wetland caused by the...
dominating invasive species (purple loosestrife \textit{Lythrum salicaria} and common reed and the developed upland surrounding most of the area.

The proposed mitigation area is shown on the \textit{Conceptual Plan for Compensatory Wetland Mitigation at Wetland H} (Appendix E). Appendix E also contains information on proposed plantings and grading.

Permanently impacted RFA adjacent to the Merrimack River in Amesbury will be mitigated through 11,650 square feet of in situ restoration (Table 3.3.3). 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.

\textit{Monitoring}

A long-term monitoring program will be implemented to ensure that the replicated portion of Wetland H achieves the performance standards specified in the Mass DEP Mass Inland Wetland Replication Guidelines (March 2002).

\textit{Invasive Species Control}

The MassDOT standard invasive species control plan will be implemented to control invasive species at the two mitigation areas. A copy of the plan is provided in Appendix F.

\textit{Mitigation for Indirect Impacts}

Indirect shading impacts to salt marsh and BVW on the Merrimack River shoreline in Amesbury will be minimal and will not require mitigation.

Several design features of the proposed bridges will 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 will be dual columns and will be approximately one half as wide as the existing piers. These design features will 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.

\textbf{4.0 ALTERNATIVES ANALYSIS}

There are no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.

Numerous alternatives to the Preferred Alternative design were screened for engineering, environmental, and cost factors as part of the Environmental Impact Report (EIR)/Massachusetts Environmental Policy Act (MEPA) process. These alternatives are summarized below and include 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.

Table 3.3.3. Riverfront Area Mitigation In Amesbury

<table>
<thead>
<tr>
<th>Impact Estimates</th>
<th>Existing (sf)</th>
<th>Impacted Areas (sf)</th>
<th>Areas Subject to RFA Mitigation (sf)</th>
<th>Mitigation Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Riverfront on Site</td>
<td>64,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Degraded</td>
<td></td>
<td>16,460</td>
<td>N/A</td>
<td>Mitigation not required for redevelopment of Existing Degraded areas.</td>
</tr>
<tr>
<td>Previously Developed (Engineered Sideslopes)</td>
<td></td>
<td>6,000</td>
<td>6,000</td>
<td>Previously Developed areas (i.e. Engineered Side Slopes / Previously Graded Areas) may require mitigation under 310 CMR 10.58(5)(e)</td>
</tr>
<tr>
<td>Undisturbed</td>
<td></td>
<td>5,480</td>
<td>N/A</td>
<td>Does not require mitigation under 310 CMR 10.58(4)(d)1, though undisturbed impacts cannot cumulatively exceed 10% of RFA on the lot.</td>
</tr>
<tr>
<td>Temporary Impacted Riverfront (Undisturbed)</td>
<td></td>
<td>0</td>
<td>N/A</td>
<td>Does not require mitigation under 310 CMR 10.58(4)(d)1, though undisturbed impacts cannot cumulatively exceed 10% of RFA on the lot.</td>
</tr>
<tr>
<td>Temporary Impacted Riverfront (Previously Developed)</td>
<td>11,650</td>
<td>11,650</td>
<td></td>
<td>Temporary Impacts will be mitigated through &quot;in kind&quot; or in situ restoration, and therefore not included in the mitigation calculation below.</td>
</tr>
<tr>
<td>Total</td>
<td>27,940</td>
<td>6,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mitigation Calculations

<table>
<thead>
<tr>
<th>Impact Estimates</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10% of total RFA</td>
<td></td>
<td>6,400</td>
<td></td>
<td>Proposed Impacts to Undisturbed RFA must not exceed 6,400 s.f. under 310 CMR 10.58(4)(d)1. (project is 920 s.f. below threshold).</td>
</tr>
<tr>
<td>Existing Degraded</td>
<td></td>
<td>16,460</td>
<td></td>
<td>The proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area on the site; 310 CMR 10.58(5)(e).</td>
</tr>
<tr>
<td>Difference between 10% of site and Existing Degraded = additional allowed alteration without mitigation</td>
<td></td>
<td>-10,060</td>
<td></td>
<td>The existing degraded area is over 10% of the Riverfront Area on the site, therefore no additional alteration is allowed unless mitigated for; 310 CMR 10.58(5)(e).</td>
</tr>
<tr>
<td>Area Of Permanent Previously Developed Impacts</td>
<td></td>
<td>6,000</td>
<td></td>
<td>Area requiring mitigation</td>
</tr>
<tr>
<td>Required Mitigation under 310 CMR 10.58(e)</td>
<td></td>
<td>6,000</td>
<td></td>
<td>Mitigation provided at an approximate 2:1 ratio for permanent impacts through restoration of existing degraded areas.</td>
</tr>
<tr>
<td>Proposed Restoration Area for Permanent Impacts</td>
<td></td>
<td>11,250</td>
<td></td>
<td>Mitigation provided at 1:1 ratio for temporary impacts.</td>
</tr>
<tr>
<td>Proposed Restoration Area for Temporary Impacts</td>
<td></td>
<td>11,650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Mitigation</td>
<td></td>
<td>22,900</td>
<td></td>
<td>Permanent Impact Mitigation + Temporary Impact Mitigation.</td>
</tr>
</tbody>
</table>

Note: Refer to Figure 2 for locations of impacted and restored areas.
4.1 **Merrimack River Crossing and Highway Widening Alternatives**

The following Merrimack River crossing and highway widening alternatives were analyzed:

- **No Build:** This alternative would involve limited maintenance without additional travel lanes or breakdown shoulders rather than replacing or rehabilitating the Whittier Bridge.

- **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 Widening Highway 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 Widening Highway 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 Widening Highway 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 Widening Highway 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 Widening Highway 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]).

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 Alternatives. These alternatives 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.

4.2 Bridge Design Alternatives

Four bridge designs were evaluated as potential replacement structures for the existing Whittier Bridge. The designs included structural options for the network tied-arch (steel plate or steel box...
girder approach spans), box girder (steel plate, concrete box or segmental concrete box girders), and cable-stayed (concrete or steel box girders). The following list includes a general description of the four overall bridge designs:

- **Network Tied-Arch**: a modern version of an arch-style bridge reminiscent of the existing Whittier Bridge;
- **Box Girder**: a bridge in which the main beams comprise girders in the shape of a hollow box, using either steel, concrete, or a combination;
- **Cable-stayed**: a bridge that consists of one or more columns (towers or pylons) with cables supporting the bridge deck. There are two major types: a harp design with cables nearly parallel, and a fan design where all cables connect to or pass over the top of the towers (as is the case at the I-93 Zakim Bunker Hill Bridge in Boston and Cambridge); and
- **Extradosed**: a type of cable-stayed bridge with a stiffer and stronger bridge deck that allows the cables to be omitted close to the tower and allows the towers to be lower in proportion to the span.

The bridge design alternatives were comparatively evaluated for numerous engineering and environmental factors, including:

- **Structural/Redundancy** (including difficulty of design and redundancy of structure);
- **Highway/Profile Impact** (including profile impact of the structure);
- **Inspection and Maintenance** (including accessibility and frequency);
- **Schedule Impacts** (including suitability for Accelerated Bridge Construction and number of months to complete);
- **Constructability** (including complexity of construction and shipping constraints);
- **Environmental** (including shading [wetlands], loss of river bottom [square feet], noise, fisheries, wildlife, floodplains, historic and visual impacts);
- **Cost** (including preventative maintenance cost, life cycle cost and construction cost);
- **Aesthetics** (including the visual impact of structure, articulation of channel location, and driver’s view); and
- **Section 106 Criteria** (including use of granite in piers [all alternatives], graceful lines, iconic structure, elegant arch [arch alternative], and reuse of artifacts [arch alternative]).

The evaluation concluded that the steel network tied-arch bridge with steel box girder approaches was the highest rated of all the bridge types evaluated, with the steel network arch bridge with steel plate girder approaches ranking as the second-most preferred type. As both of the highest-rated bridge types are network tied-arch designs, MassDOT has selected the network tied-arch as the preferred bridge design for the project. The project described in this Notice of Intent assumes the construction of new network tied-arch bridges over the Merrimack River.

### 4.3 Shared-Use Path Alignment Alternatives

As noted above, and as strongly expressed by the three communities during early coordination, the Preferred Alternative now includes a shared use path from the Exit 57 Park-and-Ride Lot in Newburyport, across the Merrimack River on the new I-95 northbound bridge, and north to Exit 58.
(Route 110) in Amesbury, then east paralleling Route 110 to the intersection of Merrill Street and Rabbit Road with Route 110 in Salisbury.

The shared-use path is intended to provide access and interconnections for alternative modes of transportation between various destinations (nodes) within the existing bicycle transportation network in the project area (the network is illustrated on Figure 2-2 in Chapter 2). Six nodes were identified, including the Exit 57 Park-and-Ride Lot in Newburyport, Maudslay State Park in Newburyport, Moseley Woods park in Newburyport, the Amesbury Visitors Center at the intersection of Main Street/Evans Place and Merrill Road, the western terminus of the Ghost Trail in Salisbury, and the eastern terminus of the Powwow Riverwalk, at the Carriagetown Marketplace on Route 110 west of I-95 in Amesbury. A feasibility study (Parsons Brinckerhoff, 2010) for the shared-use path included various alignment alternatives for the path, and included variations on the origination and destination points of the path, alternative east to west connections between Maudslay State Park and Moseley Woods, and four alternative Merrimack River crossing alternatives. Two southerly path origination points were identified, including the Exit 57 Park-and-Ride Lot and Pine Hill/Ferry Road in Newburyport. The river crossing alternatives are limited to existing bridges in the project area and include:

- U.S. Route 1 between Newburyport and Salisbury;
- The Eastern Route Rail Bridge between Newburyport and Salisbury (west of the U.S. Route 1 crossing);
- The Hines and Chain Bridges between Newburyport and Amesbury, located immediately downstream (east) of the Whittier Bridge; and
- The Rock Bridge (East Main Street/Groveland Street) between West Newbury and Haverhill, located several miles upstream of the Whittier Bridge.

Two potential east to west connections between Moseley Woods and Maudslay State Park in Newburyport were examined, including an on-road connection along Pine Hill Road and Ferry Road across the new Pine Hill/Ferry Road bridge and a connection under the new I-95 bridges along the Merrimack River shoreline through the Newburyport Water Department land. The Merrimack River shoreline option was dismissed because of potential wetland impacts, the presence of Bartlett Springs Pond, an active drinking water reservoir to the west of I-95, and the need for extensive grading to the west of I-95 to ensure that the path would meet accessibility standards. East-west connectivity for alternative transportation modes would be achieved along the new Pine Hill/Ferry Road Bridge.

After considering all shared-use path alternatives, MassDOT selected the path alignment that originates at the Exit 57 Park-and-Ride Lot in Newburyport and extends north parallel to I-95, crosses the Merrimack River on the I-95 northbound bridge, and extends to the intersection of Route 110 and Merrill Street and Rabbit Road in Salisbury.

### 4.4 Preferred Alternative

As there is only one of each of the river crossing and widening highway alternatives remaining after the alternatives evaluation process, the New 8-Lane East Bridge Alternative and the Inside Widening highway alternative were combined into a single project build alternative. The New 8-Lane East Bridge with Inside Widening Highway Alternative with the selection of the Network Tied-Arch bridge design and with the inclusion of the shared-use path was designated as the Preferred Alternative for the EA/DEIR and is the project described in this Notice of Intent.
5.0 **COMPLIANCE WITH PERFORMANCE STANDARDS**

The project will meet relevant performance standards for impacted resource areas in Amesbury as described below.

5.1 **BORDERING VEGETATED WETLAND**

General performance standards for BVW are found at 310 CMR 10.55 (4) and are listed below:

(a) **Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.**

(b) **Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:**

1. **the surface of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area");**

   The proposed replacement area is approximately 4,950 square feet, which slightly exceeds the 3,560 square foot permanent impact areas at Wetlands H and I. Temporary impacts of 1,400 square feet will be restored *in situ*.

2. **the ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;**

   The surface elevation of the proposed replacement area will be within 20 vertical feet of the proposed impact area at Wetland I and within 10 vertical feet at Wetland H.

3. **The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;**

   The replacement area is at the north end of Wetland H and located within the Right-of-Way. It is less linear than either the Wetland I or Wetland H impacts, but is located at the toe of a similar steep bank and will be very similar in habitat and functional value to both wetlands.

4. **the replacement area shall have an unrestricted hydraulic connection to the same water body or waterway associated with the lost area;**

   The wetland mitigation area is in the same wetland as the Wetland H impacts and as such has unrestricted hydraulic connection.

5. **the replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;**

   Wetland H, which ultimately drains east to the Merrimack River and Wetland I, which drains under Merrill Road to a nearby tidal wetland of the Merrimack River, are located within the same general area of water body.

6. **at least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said**
vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods; and

As specified in the Wetland Mitigation Design, at least 75% of the replacement area will be re-established with indigenous wetland plant species within two growing seasons and any exposed soil will be stabilized.

7. the replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00. In the exercise of this discretion, the issuing authority shall consider the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the extent to which adverse impacts can be avoided, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40.

Adverse impacts have been avoided and minimized to the extent practicable, so that less than 5,000 square feet of BVW will be permanently impacted by the project (approximately 3,560 square feet in Amesbury). The area of BVW lost will be replaced in accordance with protocols specified under 310 CMR 10.55(4)(b), as described in Section 3.3.3 of this report. Temporarily impacted BVW will be restored to preconstruction conditions. A Simplified Habitat Evaluation (Appendix A of the Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands) was completed and is provided in Appendix F of this document. No important habitat features listed on the Simplified Wildlife Habitat Evaluation form were observed within the areas of BVW proposed to be impacted.

(c) Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of Bordering Vegetated Wetland when:

1. said portion has a surface area less than 500 square feet;
2. said portion extends in a distinct linear configuration ("finger-like") into adjacent uplands; and
3. in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.

(d) Notwithstanding the provisions of 310 CMR 10.55(4)(a),(b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00. This 310 CMR 10.55(4)(e):

1. supersedes the provisions of 310 CMR 10.55(4)(b) and (c);
2. shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;
3. shall not apply to work proposed under 310 CMR 10.53(3)(l); and
4. shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.

Mapped habitat areas for rare species at the site (shortnose sturgeon, Atlantic sturgeon, bald eagle and peregrine falcon) do not occur in the vicinity of the areas of Wetlands I and H that will be impacted. Therefore, proposed impacts to Wetlands I and H will not adversely affect these species. Also, minor shading effects to BVW near the Merrimack River (associated with the new bridge design) will have negligible effects on these species.

As noted under Section 2.4, the project does not occur within an ACEC.

5.2 LAND UNDER THE OCEAN/FISH RUN

Under 10.25(2), when land under the ocean or nearshore areas of land under the ocean are found to be significant to the protection of marine fisheries, protection of wildlife habitat, storm damage prevention or flood control, 310 CMR 10.25(3) through (7) shall apply:

(3) Improvement dredging for navigational purposes affecting land under the ocean shall be designed and carried out using the best available measures so as to minimize adverse effects on such interests caused by changes in:

(a) bottom topography which will result in increased flooding or erosion caused by an increase in the height or velocity of waves impacting the shore;
(b) sediment transport processes which will increase flood or erosion hazards by affecting the natural replenishment of beaches;
(c) water circulation which will result in an adverse change in flushing rate, temperature, or turbidity levels; or
(d) marine productivity which will result from the suspension or transport of pollutants, the smothering of bottom organisms, the accumulation of pollutants by organisms, or the destruction of marine fisheries habitat or wildlife habitat.

Does not apply.

(4) Maintenance dredging for navigational purposes affecting land under the ocean shall be designed and carried out using the best available measures so as to minimize adverse effects on such interests caused by changes in marine productivity which will result from the suspension or transport of pollutants, increases in turbidity, the smothering of bottom organisms, the accumulation of pollutants by organisms, or the destruction of marine fisheries habitat or wildlife habitat.

Does not apply.

(5) Projects not included in 310 CMR 10.25(3) or 10.25(4) which affect nearshore areas of land under the ocean shall not cause adverse effects by altering the bottom topography so as to increase storm damage or erosion of coastal beaches, coastal banks, coastal dunes, or salt marshes.

The piers are not anticipated to adversely impact coastal beach or salt marsh resources in Amesbury. Small areas of coastal beach (190 square feet) and coastal bank (105 linear feet) will be temporarily impacted during construction but will be restored to existing conditions upon completion.
(6) Projects not included in 310 CMR 10.25(3) which affect land under the ocean shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries habitat or wildlife habitat caused by:

(a) alterations in water circulation;

No changes in water circulation patterns in the Merrimack River are anticipated as a result of the bridge project.

(b) destruction of eelgrass (Zostera marina) or widgeon grass (Rupia maritina) beds;

No eelgrass or widgeon grass beds occur in the vicinity of the project, therefore no impacts are anticipated.

(c) alterations in the distribution of sediment grain size;

No changes in sediment grain size are anticipated as a result of the project.

(d) changes in water quality, including, but not limited to, other than natural fluctuations in the level of dissolved oxygen, temperature or turbidity, or the addition of pollutants; or

No changes in water quality will occur as a result of the project.

(e) alterations of shallow submerged lands with high densities of polychaetes, mollusks or macrophytic algae.

There are no shallow submerged lands in the project area with high densities of polychaetes, mollusks, or macrophytes. The invertebrate and algal populations in the vicinity of the project will be temporarily impacted during project construction, but are expected to recolonize after project completion.

(7) Notwithstanding the provisions of 310 CMR 10.25(3) through (6), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

The new river crossing will not impede anadromous or catadromous fish passage or adversely affect fish, including the state- and federal-listed endangered shortnose sturgeon and state-listed Atlantic sturgeon. There may be some temporary impacts related to construction noise and activity, which will be minimized to the maximum extent practicable using construction methods established through coordination with the USFWS, NMFS, DMF and NHESP. The NHESP may require monitoring of bald eagle and peregrine falcon during construction to gauge their response to noise. Following review of the project, NMFS concluded that the proposed reconstruction of the Whittier Bridge in Amesbury, Massachusetts, will be unlikely to adversely affect any listed species under NMFS jurisdiction. The project will minimize adverse effects to Land Under the Ocean and marine fisheries habitat, as described in Section 3.2.1.2. Due to the removal and restoration of LUO at the existing piers, there will only be a net increase of 2,870 square feet of LUO impacts.

Under 10.35(2), when such land or bank is determined to be significant to the protection of marine fisheries, 310 CMR 10.35(3) through (5) shall apply:

(3) Any project on such land or bank shall not have an adverse effect on the anadromous or catadromous fish run by:
(a) impeding or obstructing the migration of the fish, unless DMF has determined that such impeding or obstructing is acceptable, pursuant to its authority under M.G.L. c. 130, § 19;

The new piers will not impede anadromous fish migration on the Merrimack River.

(b) changing the volume or rate of flow of water within the fish run; or

No changes in volume or flow in the Merrimack River will occur as a result of the project.

(c) impairing the capacity of spawning or nursery habitats necessary to sustain the various life stages of the fish.

The new piers are not expected to impair the capacity of spawning or nursery habitats in the project vicinity.

(4) Unless otherwise allowed by DMF pursuant to M.G.L. c. 130, § 19, dredging, disposal of dredged material or filling in a fish run shall be prohibited between March 15th and June 15th in any year.

MassDOT has coordinated with the NMFS and DMF with respect to construction windows through a series of coordination meetings. NMFS has determined that no Time of Year restrictions are required for the proposed Merrimack River construction activities for endangered species. Consultation with DMF and NMFS with respect to Essential Fish Habitat is ongoing.

(5) Notwithstanding the provisions of 310 CMR 10.35(3), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

The new river crossing will not impede anadromous/catadromous fish passage or adversely affect fish, including the state- and federal-listed endangered shortnose sturgeon and state-listed Atlantic sturgeon. There may be some temporary impacts related to construction noise and activity, which will be minimized to the maximum extent practicable by using construction techniques established through coordination with the USFWS, NMFS, DMF and NHESP. The NHESP may require monitoring of bald eagle and peregrine falcon during construction to gauge their response to noise. Following review of the project, NMFS concluded that the proposed reconstruction of the Whittier Bridge in Amesbury, Massachusetts, will be unlikely to adversely affect any listed species under NMFS jurisdiction. As previously noted, MA DMF has also concluded that the project will not adversely affect listed Merrimack River species under NHESP jurisdiction.

5.3 RIVERFRONT AREA

The following performance standards, listed under 310 CMR 10.58(4) and (5) apply to Riverfront Area:

(4) General Performance Standard. Where the presumption set forth in 310 CMR 10.58(3) is not overcome, the applicant shall prove by a preponderance of the evidence that there are no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c.131 § 40 and that the work, including proposed mitigation, will have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. In the event that the presumption is partially overcome, the issuing authority shall make a written determination
setting forth its grounds in the Order of Conditions and the partial rebuttal shall be taken into account in the application of 310 CMR 10.58 (4)(d)1.a. and c.; the issuing authority shall impose conditions in the Order that contribute to the protection of interests for which the riverfront area is significant.

(a) Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the riverfront area, as identified in 310 CMR 10.30 (coastal bank), 10.32 (salt marsh), 10.55 (Bordering Vegetated Wetland), and 10.57 (Land Subject to Flooding)

The work shall meet the performance standards for all other resource areas within the RFA.

(b) Protection of Rare Species. No project may be permitted within the riverfront area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species, as identified by the procedures established under 310 CMR 10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent.

As described in Section 5.2, the project will not permanently adversely affect rare species habitat, and temporary impacts to rare species will be minimized. No vernal pool habitat is located within the project area.

(c) Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.

Based on an alternatives analysis provided in Section 4, there are no practicable and substantially equivalent economic alternatives to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.

(d) No Significant Adverse Impact. The work, including proposed mitigation measures, must have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131, § 40.

The proposed work will not have a significant adverse impact on the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131, § 40. As noted in Section 3.2.2, no direct impacts will occur to BVW or Salt Marsh within the RFA, and indirect impacts due to shading are not anticipated to alter community structure and density or result in the loss of wetland functions and values.

1. Within 200 foot riverfront areas, the issuing authority may allow the alteration of up to 5000 square feet or 10% of the riverfront area within the lot, whichever is greater, on a lot recorded on or before October 6, 1997 or lots recorded after October 6, 1997 subject to the restrictions of 310 CMR 10.58(4)(c)2.b.vi., or up to 10% of the riverfront area within a lot recorded after October 6, 1997, provided that:

   a. At a minimum, a 100 foot wide area of undisturbed vegetation is provided. This area shall extend from mean annual high-water along the river unless another location would better protect the interests identified in M.G.L. c. 131 § 40. If there is not a 100 foot wide area of undisturbed vegetation within the riverfront area, existing vegetative cover shall be preserved or extended to the maximum extent feasible to approximate a 100 foot wide corridor of natural vegetation. Replication and compensatory storage required to meet other resource area performance standards are...
allowed within this area; structural stormwater management measures may be allowed only when there is no practicable alternative. Temporary impacts where necessary for installation of linear site-related utilities are allowed, provided the area is restored to its natural conditions. Proposed work which does not meet the requirement of 310 CMR 10.58(4)(d)1.a. may be allowed only if an applicant demonstrates by a preponderance of evidence from a competent source that an area of undisturbed vegetation with an overall average width of 100 feet will provide equivalent protection of the riverfront area, or that a partial rebuttal of the presumptions of significance is sufficient to justify a lesser area of undisturbed vegetation;

Upland vegetation under the existing bridge will be enhanced through building the proposed abutment approximately 50 feet behind the existing abutment (to be demolished), and restoring the approximate 70-foot slope with bioengineering. Existing vegetation cover within the inner 100-foot RFA shall be preserved or extended to the maximum extent feasible. The post construction condition will result in an 70-foot side slope with natural vegetation, and consequently there will be a net environmental benefit to the RFA. No direct impacts will occur to the wetlands under the Amesbury end of the bridge.

b. Stormwater is managed according to standards established by the Department in its Stormwater Policy.

The project will provide improvements to stormwater management as required.

c. Proposed work does not impair the capacity of the riverfront area to provide important wildlife habitat functions. Work shall not result in an impairment of the capacity to provide vernal pool habitat identified by evidence from a competent source, but not yet certified. For work within an undeveloped riverfront area which exceeds 5,000 square feet, the issuing authority may require a wildlife habitat evaluation study under 310 CMR 10.60.

Through constructing the new abutments behind the existing abutments, the project will maintain and enhance the corridors that currently allow wildlife to cross under the bridge on both the southern and northern banks of the Merrimack River. All temporarily impacted RFA will be restored in situ. The 6,000 square feet of alteration requiring mitigation will be addressed with 11,250 square feet of on-site restoration of existing degraded areas. The RFA in this area contains a mix of natives and non-native species, including Norway maple (*Acer platanoides*), privet (*Ligustrum* sp.), and oriental bittersweet (*Celastrus orbiculatus*). The proposed impacts to the low-quality habitat present in this area will have little to no effect on overall wildlife habitat quality.

d. Proposed work shall not impair groundwater or surface water quality by incorporating erosion and sedimentation controls and other measures to attenuate nonpoint source pollution.

Proposed work will not impair groundwater or surface water quality and will incorporate erosion and sedimentation controls as described in Section 3.3.

(5) Redevelopment Within Previously Developed Riverfront Areas; Restoration and Mitigation. Notwithstanding the provisions of 310 CMR 10.58(4)(c) and (d), the issuing authority may allow work to redevelop a previously developed riverfront area, provided the
proposed work improves existing conditions. Redevelopment means replacement, rehabilitation or expansion of existing structures, improvement of existing roads, or reuse of degraded or previously developed areas. A previously developed riverfront area contains areas degraded prior to August 7, 1996 by impervious surfaces from existing structures or pavement, absence of topsoil, junkyards, or abandoned dumping grounds. Work to redevelop previously developed riverfront areas shall conform to the following criteria:

(a) At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. When a lot is previously developed but no portion of the riverfront area is degraded, the requirements of 310 CMR 10.58(4) shall be met. Construction of the new I-95 southbound bridge abutments will qualify as Redevelopment Within Previously Developed Riverfront. In accordance with 310 CMR 10.58(5), the proposed redevelopment will improve the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40. To offset impacts to RFA, 11,650 square feet of existing degraded RFA in Amesbury will be restored. The existing 20-foot upland slope will be enlarged to an 80-foot slope, and enhanced with bioengineering to enhance RFA ecosystem functions and provide a natural corridor for wildlife passage.

(b) Stormwater management is provided according to standards established by the Department.

Stormwater management will be provided in accordance with 310 CMR 10.58(5)(b).

(c) Within 200 foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less, or not closer than existing conditions within 25 foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).

The proposed abutments will be located 50 feet farther from the river than under existing conditions.

(d) Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).

The proposed abutments will be located 50 feet farther from the river than under existing conditions.

(e) The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area, except in accordance with 310 CMR 10.58(5)(f) or (g).

The permanent alteration to previously developed RFA will cumulatively result in alteration of over 10 percent of the RFA; 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)(i)).

(f) When an applicant proposes restoration on-site of degraded riverfront area, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(e), (d), and (e) at a ratio in square feet of at least 1:1 of restored area to area of alteration not conforming to the criteria. Areas immediately along the river shall be selected for restoration. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Restoration shall include:
1. removal of all debris, but retaining any trees or other mature vegetation;
2. grading to a topography which reduces runoff and increases infiltration;
3. coverage by topsoil at a depth consistent with natural conditions at the site; and
4. seeding and planting with an erosion control seed mixture, followed by plantings of herbaceous and woody species appropriate to the site;

Restoration will be performed in accordance with 310 CMR 10.58(5)(f).

(g) When an applicant proposes mitigation either on-site or in the riverfront area within the same general area of the river basin, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), or (e) at a ratio in square feet of at least 2:1 of mitigation area to area of alteration not conforming to the criteria or an equivalent level of environmental protection where square footage is not a relevant measure. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Mitigation may include off-site restoration of riverfront areas, conservation restrictions under M.G.L. c. 184, §§ 31 to 33 to preserve undisturbed riverfront areas that could be otherwise altered under 310 CMR 10.00, the purchase of development rights within the riverfront area, the restoration of bordering vegetated wetland, projects to remedy an existing adverse impact on the interests identified in M.G.L. c. 131, § 40 for which the applicant is not legally responsible, or similar activities undertaken voluntarily by the applicant which will support a determination by the issuing authority of no significant adverse impact. Preference shall be given to potential mitigation projects, if any, identified in a River Basin Plan approved by the Secretary of the Executive Office of Environmental Affairs.

On-site restoration is proposed as described above.

(h) The issuing authority shall include a continuing condition in the Certificate of Compliance for projects under 310 CMR 10.58(5)(f) or (g) prohibiting further alteration within the restoration or mitigation area, except as may be required to maintain the area in its restored or mitigated condition. Prior to requesting the issuance of the Certificate of Compliance, the applicant shall demonstrate the restoration or mitigation has been successfully completed for at least two growing seasons.

5.4 COASTAL BEACH

According to 310 CMR 10.27(2), when a coastal beach is determined to be significant to storm damage prevention, flood control, or protection of wildlife habitat, 310 CMR 10.27(3) through (7) shall apply:

(3) Any project on a coastal beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach.

The project includes tidal flat (see 310 CMR 10.27(6), but not coastal beach as defined here.

(4) Any groin, jetty, solid pier, or other such solid fill structure which will interfere with littoral drift, in addition to complying with 310 CMR 10.27(3), shall be constructed as follows:
(a) It shall be the minimum length and height demonstrated to be necessary to maintain beach form and volume. In evaluating necessity, coastal engineering, physical oceanographic and/or coastal geologic information shall be considered.

(b) Immediately after construction any groin shall be filled to entrapment capacity in height and length with sediment of grain size compatible with that of the adjacent beach.

(c) Jetties trapping littoral drift material shall contain a sand by-pass system to transfer sediments to the downdrift side of the inlet or shall be periodically redredged to provide beach nourishment to ensure that downdrift or adjacent beaches are not starved of sediments.

Does not apply.

(5) Notwithstanding 310 CMR 10.27(3), beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.

Does not apply.

When a tidal flat is determined to be significant to marine fisheries or to the protection of wildlife habitat, 310 CMR 10.27(6) shall apply:

(6) In addition to complying with the requirements of 310 CMR 10.27(3) and 10.27(4), a project on a tidal flat shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries and wildlife habitat caused by:

(a) alterations in water circulation,

No alteration in water circulation is anticipated in the tidal flat

(b) alterations in the distribution of sediment grain size, and

No alteration in sediment grain size distribution is anticipated in the tidal flat.

(c) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature or turbidity, or the addition of pollutants.

No changes in water quality will occur as a result of this project.

(7) Notwithstanding the provisions of 310 CMR 10.27(3) through 10.27(6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

Impacts to Coastal Beach are described in Section 3.2.5. As noted in this section, impacts will be minor (190 square feet) and temporary. No long-term impacts will occur to this resource area or to associated marine fisheries or wildlife habitat, including habitat for rare species.

5.5 Coastal Bank

According to 310 CMR 10.30, when a Coastal Bank is determined to be significant to storm damage prevention or flood control because it supplies sediment to Coastal Beaches, Coastal Dunes, or Barrier Beaches, 310 CMR 10.30(3) through (5) shall apply:

(3) No new bulkhead, revetment, seawall, groin or other coastal engineering structure shall be permitted on such a coastal bank except that such a coastal engineering structure shall be permitted when required to prevent storm damage to buildings constructed prior to the effective date of 310 CMR 10.21 through 10.37 or constructed pursuant to a Notice of Intent filed prior to
the effective date of 310 CMR 10.21 through 10.37 (August 10, 1978), including reconstructions of such buildings subsequent to the effective date of 310 CMR 10.21 through 10.37, provided that the following requirements are met:

(a) a coastal engineering structure or a modification thereto shall be designed and constructed so as to minimize, using best available measures, adverse effects on adjacent or nearby coastal beaches due to changes in wave action, and

(b) the applicant demonstrates that no method of protecting the building other than the proposed coastal engineering structure is feasible.

(c) protective planting designed to reduce erosion may be permitted.

Does not apply.

(4) Any project on a coastal bank or within 100 feet landward of the top of a coastal bank, other than a structure permitted by 310 CMR 10.30(3), shall not have an adverse effect due to wave action on the movement of sediment from the coastal bank to coastal beaches or land subject to tidal action. Proposed alterations to Coastal Bank will be minor and temporary and will not affect wave action.

(5) The Order of Conditions and the Certificate of Compliance for any new building within 100 feet landward of the top of a coastal bank permitted by the issuing authority under M.G.L. c. 131, § 40 shall contain the specific condition: 310 CMR 10.30(3), promulgated under M.G.L. c. 131, § 40, requires that no coastal engineering structure, such as a bulkhead, revetment, or seawall shall be permitted on an eroding bank at any time in the future to protect the project allowed by this Order of Conditions. Does not apply.

when a Coastal Bank is determined to be significant to storm damage prevention or flood control because it is a vertical buffer to storm waters, 310 CMR 10.30(6) through (8) shall apply:

(6) Any project on such a coastal bank or within 100 feet landward of the top of such coastal bank shall have no adverse effects on the stability of the coastal bank. As described in Section 3.3.1, sedimentation controls (compost filter tubes) will be will be installed prior to work and will be maintained throughout construction. Alterations to Coastal Bank will be minor and temporary and will not adversely affect the stability of the bank.

(7) Bulkheads, revetments, seawalls, groins or other coastal engineering structures may be permitted on such a coastal bank except when such bank is significant to storm damage prevention or flood control because it supplies sediment to coastal beaches, coastal dunes, and barrier beaches. Does not apply.

(8) Notwithstanding the provisions of 310 CMR 10.30(3) through (7), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37. As described in Section 5.2, the project will not permanently adversely affect rare species habitat, and any temporary impacts to rare species will be minimized.
5.6 SALT MARSH

Under 310 CMR 10.32(2), when a salt marsh is determined to be significant to the protection of marine fisheries, the prevention of pollution, storm damage prevention or ground water supply, 310 CMR 10.32(3) through (6) shall apply:

(3) A proposed project in a salt marsh, on lands within 100 feet of a salt marsh, or in a body of water adjacent to a salt marsh shall not destroy any portion of the salt marsh and shall not have an adverse effect on the productivity of the salt marsh. Alterations in growth, distribution and composition of salt marsh vegetation shall be considered in evaluating adverse effects on productivity. This section shall not be construed to prohibit the harvesting of salt hay.

The shading analysis indicates that moderate changes in species composition and structure may occur as a result of shading under the proposed bridge. These indirect impacts will be similar to the current condition under the existing bridge and are not expected to adversely affect the ecological functioning of the salt marsh.

(4) Notwithstanding the provisions of 310 CMR 10.32(3), a small project within a salt marsh, such as an elevated walkway or other structure which has no adverse effects other than blocking sunlight from the underlying vegetation for a portion of each day, may be permitted if such a project complies with all other applicable requirements of 310 CMR 10.21 through 10.37.

Does not apply.

(5) Notwithstanding the provisions of 310 CMR 10.32(3), a project which will restore or rehabilitate a salt marsh, or create a salt marsh, may be permitted.

Does not apply.

(6) Notwithstanding the provisions of 310 CMR 10.32(3) through (5), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

The project will result in only indirect impacts to salt marsh. Replacement of the Whittier Bridge with two new bridges will increase the amount of shading to the underlying salt marsh. Based on results from a shading analysis, the functional attributes of the salt marsh will be expected to remain approximately the same. Although vegetation species composition will be altered under the moderately shaded sections of the proposed bridges, the community structure and density is expected to remain similar to existing conditions. MassDEP concurred with the conclusions of the shading analysis on February 1, 2011 and stated that a Variance from the Massachusetts Wetlands Protection Act Regulations will not be required.
6.0 REFERENCES


FIGURES
Figure 1. Locus Map, Whittier Bridge/I-95 Improvement Project Newburyport, Amesbury, Salisbury, Massachusetts
Figure 2. Riverfront Impacts
APPENDIX A

Checklist for Stormwater Report
A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.1 This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 82
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

1 The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

2 For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.
B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer’s Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

[Blank space for signature and date]

Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- [ ] New development
- [ ] Redevelopment
- [x] Mix of New Development and Redevelopment
Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- [ ] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [ ] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [x] Use of “country drainage” versus curb and gutter conveyance and pipe
- [ ] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [ ] Treebox Filter
- [x] Water Quality Swale
- [x] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): ________________________________

Standard 1: No New Untreated Discharges

- [x] No new untreated discharges
- [x] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [x] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.
Checklist for Stormwater Report

Checklist (continued)

**Standard 2: Peak Rate Attenuation**

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

**Standard 3: Recharge**

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static  ☐ Simple Dynamic  ☐ Dynamic Field¹

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is not discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum extent practicable for the following reason:

☐ Site is comprised solely of C and D soils and/or bedrock at the land surface

☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.
Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

☐ is within the Zone II or Interim Wellhead Protection Area

☐ is near or to other critical areas

☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.
Checklist (continued)

Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The ½” or 1” Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted prior to the discharge of stormwater to the post-construction stormwater BMPs.

- The NPDES Multi-Sector General Permit does not cover the land use.

- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

- All exposure has been eliminated.

- All exposure has not been eliminated and all BMPs selected are on MassDEP LUHPPL list.

- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

- Critical areas and BMPs are identified in the Stormwater Report.
Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

☐ Limited Project

☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.

☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area

☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff

☐ Bike Path and/or Foot Path

☐ Redevelopment Project

☒ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.
Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control
(continued)

☑ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.

☐ The project is **not** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted **before** land disturbance begins.

Standard 9: Operation and Maintenance Plan

☐ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

☐ Name of the stormwater management system owners;

☐ Party responsible for operation and maintenance;

☐ Schedule for implementation of routine and non-routine maintenance tasks;

☐ Plan showing the location of all stormwater BMPs maintenance access areas;

☐ Description and delineation of public safety features;

☐ Estimated operation and maintenance budget; and

☐ Operation and Maintenance Log Form.

☐ The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

☐ A copy of the legal instrument (deed, homeowner’s association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;

☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☑ NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.
APPENDIX B

Order of Resource Area Delineation
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

From: Amexbury
1. Conservation Commission

2. This Issuance is for (check one):
   a. ☒ Order of Resource Area Delineation Only
   b. ☐ Order of Resource Area Delineation Subject to Simplified Review
      1. ☐ Not Subject to Stormwater Policy
      2. ☐ Subject to Stormwater Policy
   c. ☐ Amended Order of Resource Area Delineation

3. To: Applicant:
Susan McArthur
MA Department of Transportation
a. First Name               b. Last Name               c. Company
10 Park Plaza
MA 02116
d. Mailing Address         f. State                 g. Zip Code
Boston
e. City/Town

4. Property Owner (if different from applicant):
Commonwealth of Massachusetts

a. First Name               b. Last Name               c. Company

5. Project Location:
East and west of I-95 from the Merrimack River to the Salisbury, MA town line
Amesbury
NA
b. City/Town               c. Assessors Map/Plat Number
d. Parcel/Lot Number
NA

Latitude and Longitude (note: electronic filers will click for GIS locator):
42 50' 31,227
a. Latitude               e. Latitude
-70 54' 19.16               f. Longitude

6. Dates:
   a. Date Notice of Intent filed    12.7.09
   b. Date Public Hearing Closed    12.14.09
   c. Date of Issuance

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:
See Appendix 1

a. Title
   b. Date

   c. Title
   d. Date
B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

   a. ☒ Accurate: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

      1. ☒ Bordering Vegetated Wetlands
      2. ☒ Other Resource Area(s), specifically:

         Intermittent streams; Salt marsh (estuarine intertidal emergent); Coastal bank; Forested shrub wetland complex; and Forested deciduous wetlands. See Appendix 1 for details.

   b. ☐ Modified: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

      1. ☐ Bordering Vegetated Wetlands
      2. ☐ Other Resource Area(s), specifically:

   c. ☐ Inaccurate: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

      1. ☐ Bordering Vegetated Wetlands
      2. ☐ Other Resource Area(s), specifically:

      3. The boundaries were determined to be inaccurate because:
C. Simplified Buffer Zone Review

Work within the Buffer Zone pursuant to the Simplified Review (310 CMR 10.02) requires that you must comply with the following conditions. If your project does not meet these requirements, you are required to either file a Determination of Applicability or Notice of Intent or take other corrective measures as directed by the Conservation Commission.

Simplified Review Conditions:

Work conducted under Simplified Review requires the following:

1. No work of any kind shall occur within any wetland resource areas including Riverfront Area and Bordering Land Subject to Flooding.

2. The inner 0-to-50-foot wide area from the delineated wetland boundary that has a Buffer Zone shall not be disturbed by any work associated with this project, including placement of any stormwater management components.

3. No work shall occur in the Buffer Zone bordering an Outstanding Resource Water (e.g., certified vernal pool, public water supply reservoir or tributary), as defined in 314 CMR 4.00 or border coastal resource areas at 310 CMR 10.25-10.35.

4. No work shall occur in the Buffer Zone adjacent to wetland resources with estimated wildlife habitat (which is identified on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife).

5. Erosion and Sedimentation controls shall be installed and maintained at the 50-foot Buffer Zone line or limit of work (whichever is a greater distance from the resource area) to protect resource areas during construction.

6. If the project is subject to the Massachusetts Stormwater Policy, all work shall be conducted in conformance with an approved Stormwater Management Plan.

7. The Buffer Zone does not contain a slope greater than an average of 15% at its steepest gradient across the 100-foot Buffer Zone.

8. The amount of new impervious surface, in combination with existing impervious surfaces, shall not exceed 40% of the Buffer Zone between 50 and 100 feet.

9. No work is allowed, and no additional NOI or RDA shall be filed, for any work within the 0-to-50-foot Buffer Zone during the three-year term of an Order associated with this application.

10. Prior to any work being undertaken pursuant to this Order, the wetland resource boundary shall be flagged; all boundary delineation flagging should be maintained for the term of the Order.

11. If stormwater management structures are proposed in the Buffer Zone, the stormwater management structures shall be maintained as required in the Stormwater Plan. Such maintenance constitutes an ongoing condition and is not subject to further permitting requirements.

12. If this ORAD involves work as part of a Simplified Review, the ORAD shall be recorded at the Registry of Deeds prior to the commencement of work per the requirements of Section F.

13. Prior to proceeding with any work under Simplified Review, applicants are required to provide written notice to the Commission one week prior to commencing any work.

14. If work authorized under Simplified Review is commenced, no work is allowed, and no additional NOI or RDA may be filed, for any work within the 0-to-50-foot buffer zone during the term of an ORAD associated with this application. If work authorized under Simplified Review is not commenced, then future NOIs or RDAs may be filed for work within the 0-to-50-foot portion of the buffer zone.

---End of Conditions---
C. Simplified Buffer Zone Review (cont.)

Stormwater Applicability

1. ☐ The project is not subject to the Stormwater Policy.

2. ☐ The project is subject to the Stormwater Policy and the Stormwater Plan included for the project complies with all stormwater standards.

Ineligibility Determinations

Site Conditions: The applicant is not eligible for Simplified Buffer Zone review and must file a Request for Determination of Applicability or Notice of Intent prior to any work because:

3. ☐ Work is within the Buffer Zone of a Coastal Resource Area as defined at 310 CMR 10.25-10.35.

4. ☐ The Buffer Zone contains existing slopes greater than an average of 15%.

5. ☐ Buffer Zone contains estimated rare wildlife habitat.¹

6. ☐ The site borders an Outstanding Resource Water.²

Stormwater

7. ☐ The project is subject to the Stormwater Policy and the applicant has not submitted sufficient information to demonstrate compliance with the Stormwater Management Policy. Prior to any work, the applicant must submit plans showing compliance with the standards in the Stormwater Policy, the location of the work, the amount of impervious surface, and the location of erosion controls, to the Commission for its concurrence. (See instructions to ANRAD Form 4A.) The following necessary stormwater information was not submitted by the applicant:

a. 

8. ☐ The project is subject to the Stormwater Policy but the project does not comply with one or more of the stormwater standards (specify which standard(s) not met).

   a. Standard #: 

   b. Standard #: 

9. ☐ Impervious surface exceeds 40% of the area of the Buffer Zone between 50 and 100 feet from the resource area.

10. ☐ The applicant did not submit plans depicting adequate erosion and sedimentation controls located at the limit of work or at least 50 feet from any resource areas, whichever will be greater.

11. ☐ Work is proposed within 50 feet of a resource area.

Notice to Commission

Any applicant proposing to proceed under Simplified Buffer Zone Review, as specified in 310 CMR 10.02, must provide written notice to the Commission one week prior to any work.

¹ Identified on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife of the Natural Heritage and Endangered Species Program.

² Certified Vernal Pools, public water supplies, or inland ACECs as identified in 314 CMR 4.00.
D. Findings

This Order of Resource Area Delineation determines that the Stormwater Plan, if applicable, and the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

If the Abbreviated Notice of Resource Area Delineation was filed as Simplified Review for a Buffer Zone project, the applicant has certified that any work associated with the proposed project meets all eligibility requirements for Simplified Review listed in Section C of this Order. Any work that does not comply with the Simplified Review requirements will require a Notice of Intent or Request for Determination of Applicability.

The applicant is responsible for promptly requesting a Certificate of Compliance following completion of any work allowed pursuant to a Simplified Review or no later than three years from the date of the Order of Resource Area Delineation unless the Order is extended.

Failure to comply with the conditions of this Order is grounds for the Conservation Commission or the Department to take enforcement action.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/finyour.htm).

E. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant. Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.
F. Signatures and Notary Acknowledgement

Please indicate the number of members who will sign this form:

1. Number of Signers

[Signatures]

Signature of Conservation Commission Member
Signature of Conservation Commission Member
Signature of Conservation Commission Member
Signature of Conservation Commission Member
Signature of Conservation Commission Member

This Order is valid for three years from the date of issuance.

This Order is issued to the applicant and the property owner (if different) as follows:

☐ by hand delivery on
☐ by certified mail, return receipt requested on

Date
12.15.09

Date

Notary Acknowledgement

Commonwealth of Massachusetts County of

On this 15th of December 2009

Day
Month

Before me, the undersigned Notary Public, personally appeared
Steven Langlois
Name of Document Signer

proved to me through satisfactory evidence of identification, which was/were

Drivers License
Description of evidence of identification

to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

As member of
Amesbury
City/Town

Conservation Commission

Signature of Notary Public
Rite Shauna Becotte
Printed Name of Notary Public

March 25, 2016
My Commission Expires (Date)

Place notary seal and/or any stamp above
G. Recording Information

If this Order is issued for purposes of Resource Area Delineation only, this Order should NOT be recorded.

If this Order of Resource Area Delineation is issued as part of a Simplified Review, this Order must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry’s Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on Page 6 of this form shall be submitted to the Conservation Commission listed below.

Amesbury
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Amesbury
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

East and west of I 95 from the Merrimack River to the Salisbury town line

Project Location

Has been recorded at the Registry of Deeds of:

Essex South
County

for:

Commonwealth of Massachusetts
Property Owner

and has been noted in the chain of title of the affected property in:

Book
Page

In accordance with the Order of Conditions issued on:

12.15.09
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant
## A. Request Information

1. **Person or party making request (if appropriate, name the citizen group’s representative):**

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2. **Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A); or Request for Determination of Applicability (Form 1)):**

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3. **DEP File Number:**

   002-1009

## B. Instructions

1. **When the Departmental action request is for (check one):**

   - [ ] Superseding Order of Conditions
   - [ ] Superseding Determination of Applicability
   - [ ] Superseding Order of Resource Area Delineation

Send this form and check or money order for $100.00 (single family house projects) or $200 (all other projects), payable to the **Commonwealth of Massachusetts** to:

Department of Environmental Protection  
Box 4062  
Boston, MA 02211
B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a copy of this form and a copy of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findeyour.htm).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.
Appendix 1

Whittier Bridge Replacement and Interstate 95 Improvement Project
Time and Date of Final Plans – Order of Resource Area Delineation


APPENDIX C

Rare Species Information
Amesbury Conservation Commission
Town Hall
62 Friend Street
Amesbury MA 01913

Newburyport Conservation Commission
City Hall
60 Pleasant Street
Newburyport MA 01950

Henry Barbaro
Massachusetts Highway Department
10 Park Plaza, Room 4260
Boston MA 02116

RE: Applicant: Henry Barbaro, Massachusetts Highway Department
Project Description: Whittier Bridge Borings
Project Location: Merrimack River Channel at I-95, Amesbury/Newburyport
NHESP Tracking No.: 08-25969

Dear Commissioners and Mr. Barbaro:

The applicant listed above has submitted a Notice of Intent (NOI) with project plans (dated June 2009) to the Natural Heritage & Endangered Species Program (NHESP) of the Division and Fisheries and Wildlife (DFW) for compliance with the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.58(4)(b) and 10.59). The NHESP has also received supporting documentation for review pursuant to the MA Endangered Species Act (MESA) (MGL c131A) and its implementing regulations (321 CMR 10.00). The filing describes a series of drilled borings of the bedrock in the Merrimack River Channel in Amesbury associated with a proposed replacement of the Whittier Bridge.

**NATURAL HERITAGE AND ENDEARED SPECIES PROGRAM COMMENTS**

The NHESP has determined that the proposed project is located within *Priority and Estimated Habitat*, as indicated in the *Natural Heritage Atlas* (13th edition, 2008). Specifically, the proposed project is within the mapped habitat of the following state-listed species:

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common Name</th>
<th>Taxonomic Group</th>
<th>State Status</th>
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<tbody>
<tr>
<td><em>Acipenser brevirostris</em></td>
<td>Shortnose Sturgeon*</td>
<td>Fish</td>
<td>Endangered*</td>
</tr>
<tr>
<td><em>Acipenser oxyrinchus</em></td>
<td>Atlantic Sturgeon</td>
<td>Fish</td>
<td>Endangered</td>
</tr>
<tr>
<td><em>Haliaeetus leucocephalus</em></td>
<td>Bald Eagle</td>
<td>Bird</td>
<td>Endangered</td>
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The NHESP notes that the Shortnose Sturgeon is federally listed as "Endangered" and that this project may require additional coordination with the National Marine Fisheries Service (NMFS).
Provided that work proceeds as outlined above, and provided that the applicant adheres to any conditions required by the NMFS, the NHESP finds that this project, as currently proposed, will not cause adverse effects to the habitat of state-listed rare wildlife (310 CMR 10.58(4)(b) and 10.59), or constitute a “take” of state-listed species pursuant to 321 CMR 10.18(2)(a). This determination is based on the information provided and the information contained in our database.

The NHESP has received an Environmental Notification Form (ENF) related to the proposed replacement of the Whittier Bridge. We anticipate that the demolition and reconstruction of the Whittier Bridge will require additional early coordination between the NHESP and MassHighway.

If project plans change, or if no physical work is commenced on the above proposed project within three years from the date of issuance of this letter, the applicant must contact the NHESP prior to any work. Please do not hesitate to contact Michael T. Jones, Ph.D., Endangered Species Review Biologist, at (508) 389-6386 (michael.t.jones@state.ma.us) with any questions or comments you may have regarding the NHESP determination.

**FISHERIES PROGRAM COMMENTS**

The Merrimack River supports a wide variety of resident and anadromous fish species. Surveys have yielded 28 species: American eel (Anguilla rostrata), American shad (Alosa sapidissima), Atlantic salmon (Salmo salar), Atlantic sturgeon (Acipenser oxyrhynchus), black crappie (Pomoxis nigromaculatus), bluegill (Lepomis macrochirus), brook trout (Salvelinus fontinalis), brown bullhead (Ameiurus nebulosus), brown trout (Salmo trutta), carp (Cyprinus carpio), common shiner (Notropis cornutus), golden shiner (Notemigonus crysoleucas), largemouth bass (Micropterus salmoides), northern pike (Esox lucius), pumpkinseed (Lepomis gibbosus), rainbow trout (Oncorhynchus mykiss), redbreast sunfish (Lepomis auritus), river herring (Alosa sp.), sea lamprey (Petromyzon marinus), shortnose sturgeon (Acipenser brevirostrum), smallmouth bass (Micropterus dolomieu), spottail shiner (Notropis hudsonius), striped bass (Morone saxatilis), walleye (Stizostedion vitreum), white catfish (Ameiurus catus), white perch (Morone americana), white sucker (Catostomus commersoni) and yellow perch (Perca flavescens). Anadromous species are highly susceptible to changes in water quality and/or quantity such as siltation, water level fluctuations, loss of riparian habitat, barriers to migration and alterations of the temperature regime. Therefore, the project must not in any way diminish the ability of the river to support anadromous fish species.

Best management practices for erosion and sedimentation control must be adhered to for all phases of construction to minimize potential impacts to the fisheries resources. To the greatest extent practicable, all in river work should be conducted during low flow periods throughout the year. Times of year when river flow is high due to extended rain and/or snow melt events should be avoided. Also, if the project will alter the riverbed, we request that the existing grade be maintained.

If you have any questions regarding the Fisheries Comments, please contact Richard Hartley, Fisheries Biologist, at (508) 389-6330.

Sincerely,

Thomas W. French, Ph. D.
Assistant Director

cc: MA DEP Northeast Region
Sarah Allen, Normandeau Associates
January 2, 2009

To Whom It May Concern:

This project was reviewed for the presence of federally-listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service’s New England Field Office website:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Based on the information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (Service) are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes the review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office
Sarah A. Barnum  
Normandeau Associates  
25 Nashua Road  
Bedford, New Hampshire 03110-5500

Re: Whittier Bridge I-95 Improvement

Dear Ms. Barnum,

This is in response to your letter regarding Mass Highway’s proposed replacement of the Whittier Bridge which takes I-95 over the Merrimack River in Newburyport, Amesbury and Salisbury, Massachusetts. The existing six lane bridge over the Merrimack River is proposed for replacement. As noted in your letter, a population of federally endangered shortnose sturgeon (Acipenser brevirostrum) occurs in the Merrimack River.

Species Listed Under the Endangered Species Act  
The size of the shortnose sturgeon population in the Merrimack River has been estimated by tag and release studies (conducted in 1988-1990) to be 33 adults with an unknown number of juveniles and sub-adults. Kieffer and Kynard (1996) noted that the low abundance of spawning fish indicate that the shortnose sturgeon population in the Merrimack River is the smallest yet identified and is likely vulnerable to extirpation. Shortnose sturgeon in the Merrimack are not known to exist upstream of the Essex Dam (Lawrence), which represents the first significant impediment to the upstream migration of shortnose sturgeon in this system.

The I-95 bridge is located approximately 5.5 miles from the mouth of the Merrimack River. The best available information indicates that shortnose sturgeon are only likely to occur in this region of the river during the summer. As such, NMFS recommends that sediment-disturbing work, which could affect individual shortnose sturgeon or their prey, be avoided during the time of year when the species is likely to be present in the action area. Alternatively, if work at this time of year cannot be avoided, NMFS recommends that project proponent implement measures to minimize the potential for effects to this species. This may include the use of cofferdams, silt curtains, employing observers, and/or the use of air bubble curtains to minimize the underwater noise associated with the driving of large bore piles.

As you may know, Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended,
states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Any discretionary federal action that may affect a listed species must undergo Section 7 consultation. It is unclear from your letter if the proposed bridge replacement project will be authorized, funded or carried out by any federal agency; however, as approval of the US Coast Guard, Army Corps of Engineers and/or the Federal Highway Administration is likely to be necessary, NMFS recommends that Mass Highway work with these agencies to initiate consultation pursuant to Section 7 of the ESA. The lead Federal agency, or their designated non-Federal representative, should submit a determination of effects along with justification for the determination and a request for concurrence to NMFS. If the lead Federal agency determines that the project is “not likely to adversely affect” any listed species (i.e., when direct or indirect effects of the proposed project or its interdependent and/or interrelated actions on listed species are expected to be discountable, insignificant or completely beneficial) and NMFS concurs with this determination, NMFS will reply in a letter that will convey the concurrence, thus completing Section 7 consultation. If the lead Federal agency determines that the project is “likely to adversely affect” any listed species (i.e., if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effects are not: discountable, insignificant, or beneficial) or NMFS does not concur with the agency’s “not likely to adversely affect” determination, formal Section 7 consultation, resulting in the issuance of a Biological Opinion with an appropriate Incidental Take Statement, may be required. Any effects that amount to the take of a listed species (defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”) are not discountable, insignificant or entirely beneficial. Therefore, if any take is anticipated, formal consultation is required.

Technical Assistance for Candidate Species
Candidate species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NMFS has initiated an ESA status review that it has announced in the Federal Register.

Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus) occur in the Merrimack River. In 2006, NMFS initiated a status review for Atlantic sturgeon to determine if listing as threatened or endangered under the ESA is warranted. The Status Review Report was published on February 23, 2007. NMFS is currently considering the information presented in the Status Review Report to determine if any listing action pursuant to the ESA is warranted at this time. If it is determined that listing is warranted, a final rule listing the species could be published within a year from the date of publication of the listing determination or proposed rule. As a candidate species, Atlantic sturgeon receive no substantive or procedural protection under the ESA; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on Atlantic sturgeon from any proposed project. Please note that once a species is proposed for listing the conference provisions of the ESA apply (see 50 CFR 402.10). As the listing status for this species may change, NMFS recommends that the MBTA obtain updated status information from NMFS prior to the submission of any permit applications.
Essential Fish Habitat
Consultation for Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) may be necessary for this project due to the presence of federally managed species in the project area. If EFH may be adversely affected, then the lead Federal agency must submit an EFH Assessment to NMFS analyzing the effects of the action on EFH and federally managed species. A guide to essential fish habitat designations in the Northeastern United States is located on the Habitat Conservation Division web site at http://www.nero.noaa.gov/hcd/webintro.html. Questions concerning EFH assessments can be directed to Chris Boelke in NMFS Habitat Conservation Division at (978)281-9131.

Please contact Julie Crocker of my staff at (978)282-8480 or by e-mail (julie.crocker@noaa.gov) if you have any questions regarding these comments or the section 7 consultation process.

Sincerely,

Mary Al Colligan
Assistant Regional Administrator
for Protected Resources

EC: Crocker – F/NER3
    Boelke – F/NER4

File Code: Sec 7 Tech Assist 2009 – Mass Highway I-95 Whittier Bridge Replacement
PCTS: T/NER/2009/04275
Susan McArthur
Massachusetts Department of Transportation
Highway Division
Ten Park Plaza
Boston, Massachusetts 02116-3969

Re: Whittier Bridge

Dear Ms. McArthur,

This is in response to your letter dated February 15, 2011, requesting consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA) regarding the Massachusetts Department of Transportation's (MassDOT) proposed reconstruction of the Whittier Bridge in Newburyport and Amesbury, Massachusetts. As noted in the letter dated September 8, 2009 from Lucy Garliauskas of the US Federal Highway Administration (FHWA), MassDOT has been designated by the FHWA as a non-federal representative for the purposes of conducting consultation pursuant to Section 7 of the ESA. MassDOT has made the preliminary determination that the proposed action is not likely to adversely affect any species listed under the jurisdiction of NMFS and has requested that NMFS concur with this determination. MassDOT has also applied to the New England District, Army Corps of Engineers for authorization for the proposed project pursuant to Section 10 of the Rivers and Harbors Act. FHWA is the lead Federal agency for purposes of the section 7 consultation, with MassDOT acting as their non-federal representative. Additional information was received via e-mail from Timothy Dexter of MassDOT on March 30, 2011, April 13, 2011, and May 9, 2011.

Proposed Action
The proposed project will involve the replacement of the Whittier Bridge over the Merrimack River in Amesbury and Newburyport, MA. The work will consist of replacing the existing bridge with two independent parallel bridges. Each of the two structures will consist of four spans supported on two end abutments and three intermediate piers, for a total of six piers in the river. The four existing piers will be removed. The central pier will consist of a pylon or tower extending above the superstructure and tower legs or a wall pier for the substructure supported on the foundation. The total length of the bridge is 1,300 feet. Work is scheduled to occur between March 2013 and December 2016.

The proposed work will involve six piers, three for each of the two parallel bridges. All work on the three piers will take place from within cofferdams (six total). Cofferdams for the northern piers (Pier 3) will consist of sheet piles driven to the gravel bottom, with a vibratory hammer. Steel support piles would then be driven within the completed cofferdam with an impact hammer. The southern piers (Pier 1) are founded on the exposed bedrock river bottom. The cofferdams for these
piers will consist of the installation of a prefabricated cofferdam consisting of sheets attached to king piles which will be drilled into the river bottom. The midpiers (Pier 2) will be constructed on the high rock in the middle of the river. This rock bottom is partially exposed at low water. The cofferdams for Pier 2 will be constructed with drilled king piles and either steel or wood sheets.

The existing piers will be demolished through combination of hydraulic drilling and splitting wedges, and hydraulic impact hammers such as hoe rams. The granite block veneers (12-18 inches in depth) incorporated into the pier face are anchored by iron bars to the concrete core. They will be salvaged for reuse. The unreinforced pier footings will be removed flush to the rock bottom or in the case of pier 3 removed to the original grade and the steel h-piles will be extracted or cut off 1 foot below grade, then the bottom will be restored to its natural material.

**NMFS Listed Species in the Action Area**

The action area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR §402.02). For this project, the action area includes the project footprint as well as the area encompassed by the steel sheet piling cofferdams and silt curtains and the underwater area where effects of pile installation for the cofferdams (i.e., increase in suspended sediment and noise) will be experienced. This area is expected to encompass all of the effects of the proposed action. The Whittier Bridge is located approximately 5.5 miles upstream from the mouth of the river, in an area of the river known as the “lower islands” at approximately rkm 8.

There is a small population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) in the Merrimack River. The size of this population has been estimated by tag and release studies (conducted in 1988-1990) to be 33 adults with an unknown number of juveniles and sub-adults. Kieffer and Kynard (1996) noted that the low abundance of spawning fish indicate that the shortnose sturgeon population in the Merrimack River is the smallest yet identified and is likely vulnerable to extinction. Little research has been conducted on the Merrimack River shortnose population since 1990; although 19 adult male shortnose sturgeon were caught over the course of two days in a gillnet study conducted by USGS in 2008. An updated population estimate is not currently available.

Shortnose sturgeon in the Merrimack River are not known to exist upstream of the Essex Dam (Lawrence), which represents the first significant impediment to the upstream migration of shortnose sturgeon in this system. Sexually mature fish begin to move upriver from freshwater overwintering areas (located in the Amesbury reach) to the spawning site near Haverhill when water temperatures reach about 7°C (typically in April). Spawning occurs within a 2-km reach at river kilometers 30-32 (measured from the mouth) near Haverhill. Spawning takes place over a 5-10 day period in the spring when water temperatures are between 7 and 14°C. Physical characteristics of this spawning site are boulder-rubble substrate, water depth of 1.8-5.5m and bottom water velocity of 0.3-0.7 m/s.

Following spawning in late April-early May, fish move downriver. Some fish remain in a freshwater reach near Amesbury (Rocks Village to Artichoke River) for the remainder of the year while others move into a saline reach near the lower islands for about 6 weeks prior to returning to the freshwater reach. The Deer Island Bridge crosses the most upstream of the lower islands.
Shortnose sturgeon are likely to be present in the lower islands area during the early summer. Individuals migrating between further downstream reaches (such as Joppa Flatts) and upstream overwintering sites (located between rkm 12-23) may be transiting the action area between May and October. Due to the distance from the spawning grounds, no eggs or larvae are likely to be present in the action area. Based on the best available information, the occurrence of shortnose sturgeon in the action area is limited to the May to early October time period.

**Effects of the Action**
As noted above, the proposed project involves the replacement of the Whittier Bridge, which carries Rt. 95 across the Merrimack River. The effects analysis presented below will be limited to work occurring in the Merrimack River, where the action area overlaps with the occurrence of shortnose sturgeon, given that the rest of the project (i.e., roadway improvements) will have no effect on species listed under NMFS jurisdiction. In water work will primarily consist of installation of cofferdams and the demolition of the existing bridge piers.

The cofferdams for Pier 3 will involve the installation of sheet piles with a vibratory hammer and the installation of steel support piles with an impact hammer. Construction of the cofferdams for Piers 1 and 2 will involve the drilling and pinning of king piles and then installation of steel or wood sheets to be attached to the king piles. Estimated cumulative sound exposure level (SEL) values for driving the steel support piles is less than 183 dB re: $1 \mu Pa^2$-sec. Driving of the steel sheet piles is expected to result in cumulative SEL values ranging from 160 dB re: $1 \mu Pa^2$-sec to 165 dB re: $1 \mu Pa^2$-sec. These levels are dependent not only on the pile and hammer characteristics, but also on the geometry and boundaries of the surrounding underwater and benthic environment. Drilling for the king piles is expected to result in underwater noise levels of 162dB RMS at 1 meter, with noise levels attenuating to 139dB at a distance of 28m. As the distance from the source increases, underwater sound levels produced by pile driving are known to dissipate rapidly. Using data from Illingworth and Rodkin, Inc. (2009) underwater noise levels produced from the driving of the 30-inch piles will attenuate approximately 5dB every 10-20 meters and noise levels from the sheet piles will attenuate 3-5dB every 20 meters. This is based on a conservative literature estimate of attenuation rates for the driving of piles (Illingworth and Rodkin, Inc. 2007, 2009).

Pile driving affects fish through underwater noise and pressure which can cause effects to hearing and air containing organs, such as the swim bladder. Effects to fish can range from temporary avoidance of an area to death due to injury of internal organs. The type and size of pile, type of installation method (i.e., vibratory vs. hammer), type and size of fish (smaller fish are more often impacted), and distance from the sound source (i.e., sound dissipates over distance so noise levels are greater closer to the source) all contribute to the likelihood of effects to an individual fish. The available literature on effects of pile driving on aquatic species is difficult to summarize due to inconsistent methods of measuring underwater sound, the diversity of pile driving methods and receiving substrates, and the differing tolerances of aquatic species to underwater noise. Generally, however, the larger the pile and the closer a fish is to the pile, the greater the likelihood of effects.

Popper *et al.* (2006) have proposed a set of criteria for injury to fish exposed to pile driving. They propose that pile strikes which result in a sound exposure level (SEL) of driving. They propose that

---

1 Sound Exposure Level (SEL) is defined as that level which, lasting for one second, has the same acoustic energy as the transient and is expressed as dB re: $1 \mu Pa^2$-sec. SEL values are used in the assessment of underwater noise effects on species of fish.
Pile strikes which result in a sound exposure level (SEL) of 187 dB re 1 μPa as measured 10 meters from the source are expected to produce injuries to fish. These criteria are similar to those adopted by NMFS Northwest Regional Office, the US Fish and Wildlife Service, and the Federal Highway Administration, who determined that based on the best available scientific information, that pile driving resulting in an SEL level of 187 dB re: 1 μPa^2•sec and a peak sound pressure level of 206 dB re: 1 μPa_peak in any single strike has no potential to cause injury or mortality to fish weighing more than 2 grams. All shortnose sturgeon likely to occur in the action area will weigh considerably more than 2 grams.

As different fish species demonstrate differing sensitivities to sound levels and there is little information on the effects of underwater noise on shortnose sturgeon, it is difficult to determine whether this criterion is appropriate for shortnose sturgeon. The NMFS Northwest Region criteria noted above, considered effects to green sturgeon which are biologically similar to shortnose sturgeon. Thus, it is reasonable to consider that acoustic thresholds designed to be protective of green sturgeon would also be protective of shortnose sturgeon.

While no studies have been conducted on the effects of pile driving on shortnose sturgeon, two studies have been conducted on the effects of blasting on this species. Both activities produce sound waves that would act similarly in the water column, making effects comparable. Moser (1999) studied the effects of rock blasting in Wilmington Harbor on caged hatchery reared shortnose sturgeon. A study done in the Cooper River, South Carolina, by Collins and Post (2001) tested the use of blasting caps to possibly repel shortnose sturgeon from a blasting site. These studies indicate that mortality of shortnose sturgeon only occurred when recorded sound levels were 234 dB. At sound levels between 196-229 dB, some shortnose sturgeon were temporarily stunned. These studies suggest that, consistent with the recommendations by Popper et al. 2006, exposure of shortnose sturgeon to sound levels below 187 dB is unlikely to result in effects to this species. Sound levels resulting from the proposed action (183 dB SEL at the source for 30-inch piles and 160-165 dB SEL at the source for sheet piles, 162dB RMS at 1 m for the drilling of king piles) are below the range that could negatively affect shortnose sturgeon. Based on this information, NMFS is able to conclude that the effects of pile driving on shortnose sturgeon are insignificant and discountable.

The existing bridge piers will be demolished through a combination of hydraulic drilling and splitting wedges and hydraulic impact hammers. This equipment will remove the granite block veneers (12-18 inches deep) that are incorporated into the pier face. The center of the piers consist of lightly reinforced concrete. The piers will be removed flush to the rock bottom, with the exception of pier 3 which consists of steel H piles, which will be extracted or cut off 1 foot below grade. The equipment to be used to demolish the piles is similar to that being used to install the new sheet piles and king piles and it is expected that underwater noise levels associated with the demolition will be similar to that used for installation of king piles and sheet piles. As explained above, these noise levels are expected to be below the range that could negatively affect shortnose sturgeon. Based on this information, NMFS is able to conclude that the effects of pile driving on shortnose sturgeon are insignificant and discountable.

Once the cofferdams are installed, the new bridge piers will be constructed. Work within the cofferdams will be ongoing during the time of year when shortnose sturgeon may be present in the action area. While the ongoing work will result in noise, there is expected to be minimal
transmission of this noise to the underwater area where shortnose sturgeon will be present due to the need for noise to transmit through the steel walls. The potential for elevated noise to be experienced within the underwater area is further reduced as sound from one environment (air or water) is not easily transmitted across the air-water interface (Akamatsu, et al. 2002, as referenced in Popper 2003). As such, any increase in underwater noise associated with work ongoing within the cofferdams will be insignificant.

Construction ongoing within the cofferdams will include sediment disturbing activities. However, as the joints of the cofferdams are expected to be water tight, there is not expected to be any increase in suspended sediment outside of the cofferdams. As impacts of noise and suspended sediment are expected to be insignificant, ongoing construction within the cofferdams is extremely unlikely to affect any shortnose sturgeon present in the action area. As such, effects of work ongoing within the cofferdams will be insignificant and discountable.

The cofferdam area will extend in an approximately 10 foot radius from each of the bridge piers. Shortnose sturgeon will not be able to access the habitat within the cofferdams for the period that the cofferdams are in place. However, as the area within the cofferdams is not known to support shortnose sturgeon forage items and use of the action area is limited to migrating shortnose sturgeon and the ability to pass through this reach of the river will not be impacted by the presence of the cofferdams, this temporary loss of access to this benthic habitat will be insignificant.

Section 7 Conclusions
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. Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) If a new species is listed or critical habitat designated that may be affected by the identified action.

Technical Assistance for Proposed Species
On October 6, 2010, NMFS published two proposed rules to list five distinct population segments (DPS) of Atlantic sturgeon under the ESA. NMFS is proposing to list four DPSs as endangered (New York Bight, Chesapeake Bay, Carolina and South Atlantic) and one DPS of Atlantic sturgeon as threatened (Gulf of Maine DPS). As you know, once a species is proposed for listing, as either endangered or threatened, the conference provisions of the ESA may apply (see 50 CFR 402.10 and ESA Section 7(a)(4)). As stated at 50 CFR 402.10, “Federal agencies are required to confer with NMFS on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat.”

NMFS has reviewed the proposed action in order to provide guidance to the FHWA, Mass DOT and ACOE as to whether a conference is required in this case. Atlantic sturgeon are known to occur in
the Merrimack River and may be present in the action area. If present in the action area during construction, NMFS anticipates that effects to Atlantic sturgeon would be similar to those described for shortnose sturgeon above. As such, all effects resulting from pile driving, pier demolition and other in-water construction are expected to be insignificant and discountable.

As 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 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. Should project plans change, NMFS recommends that MassDOT discuss the potential need for conference with NMFS.

Should you have any questions about this correspondence please contact Julie Crocker of my staff at (978) 282-8480 or by e-mail (Julie.Crocker@Noaa.gov).

Sincerely,

[Signature]

Patricia A. Kurkul
Regional Administrator

Ec: Crocker, F/NER3
    Boelke, F/NER4
    Dexter, MassDOT

File Code: Sec 7 FHWA Mass DOT Whittier Bridge Reconstruction
PCTS I/NER/2011/01076
August 31, 2011

Timothy Dexter
MassDOT
10 Park Plaza
Boston, MA 02116

Re: Whittier Bridge I-95 Improvement Project
   I-95, Newburyport, Amesbury, and Salisbury
   NHESP Tracking No. 08-25969

Dear Mr. Dexter,

During the 2011 Spring-Summer season the Natural Heritage and Endangered Species Program (NHESP) was made aware of a pair of Peregrine Falcons (*Falco peregrinus*) establishing a territory in the vicinity of the Whittier Bridge. The NHESP requests that a nesting box be installed at the Whittier Bridge. The NHESP has worked with MassDOT Highway Division to successfully plan and install nest boxes for the species at bridge sites in western Massachusetts. The installation of the box will not affect construction and provide improved nesting habitat at this site. We look forward to working with MassDOT Highway Division in the design and installation of the nesting box.

We appreciate the opportunity to comment. If you have any questions about this letter, please contact David J. Paulson, Endangered Species Review Biologist, at 508-389-6366 (david.paulson@state.ma.us).

Sincerely,

Thomas W. French, Ph.D.
Assistant Director
APPENDIX D

Shading Analysis
Bridge Shading Analysis

A shading analysis was conducted to assess the potential impacts of the Preferred Alternative to vegetated wetlands within the I-95 ROW at the Merrimack River. This analysis addresses the concern that construction of a bridge could alter availability of sunlight and direct precipitation on the underlying vegetation, thereby affecting the functions and values of wetlands under the bridge. The analysis utilizes refined information on bridge design and topography, and existing vegetation conditions. The analysis incorporates a 6-month growing season.

Jurisdictional coastal and freshwater wetlands border both sides of the Merrimack River underneath and on either side of the existing Whittier Bridge. The coastal wetlands consist of a mix of Salt Marsh, Rocky Intertidal Shore, and Coastal Beach. BVW form a fringe along the upper edge of the wetland on the north (Amesbury) side of the river. Only the vegetated wetlands—Salt Marsh and BVW—were evaluated.

Shading was modeled to calculate the number of hours of shade projected by the bridges throughout the day for several representative days for the existing and proposed bridges. These results were compared to existing field conditions to develop a prediction of the potential changes to vegetated wetland communities with the Preferred Alternative. A set of studies in the literature were also used to provide a third evaluation method of the potential for significant shade impacts.

Methods

Bridge Dimensions. The bridge dimensions used in the shading analysis are shown in Table 1. Bridge height above ground and bridge width are the critical dimensions affecting the amount of shade reaching underneath the bridge. The height of the bridges was measured from the ground based on site-specific survey to the underside of the solid portion of the superstructure for the bridge deck. This was considered the primary structure casting shade underneath the bridge; therefore, the girder trusses supporting the existing bridge were not considered in the analysis. The widths were measured to the outer solid surface of each bridge. The source for the existing bridge dimensions is the original design plans (dated 1954). The proposed bridges’ dimensions are taken from the conceptual design for the network tied arch bridge with a shared-use path on the northbound bridge. The shared-use path widens the northbound bridge by approximately 18 feet compared to the southbound bridge. Because of the network tied arch design, the northern end of the bridge is approximately 14 feet wider than the southern end. Both the existing and proposed bridges run approximately northeast-southwest (30°–210° true north).

Field Investigation. The vegetated wetland communities under and adjacent to the north side of the existing bridge were surveyed for visible changes in plant species composition, structure, and density related to the presence of the bridge. The wetlands under the south end of the bridge are unvegetated, predominantly Coastal Beach and Rocky Intertidal Shore, and therefore were not part of this shading impact evaluation. The lack of vegetation under the south end appears to be caused by a combination of factors, including river scour, shallow bedrock, stormwater, and reduced sunlight caused by steep local topography and the existing bridge.
TABLE 1: DIMENSIONS OF THE EXISTING AND PROPOSED BRIDGES

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Existing Bridge (feet)</th>
<th>Proposed Bridges (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width on North Shore (includes arch span)</td>
<td>95</td>
<td>100 Northbound</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84 Southbound</td>
</tr>
<tr>
<td>Width on South Shore</td>
<td>95</td>
<td>86</td>
</tr>
<tr>
<td>Gap Between Bridges</td>
<td>N/A</td>
<td>46</td>
</tr>
<tr>
<td>Height at North Shore</td>
<td>62</td>
<td>55</td>
</tr>
<tr>
<td>Height at South Shore</td>
<td>57</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Normandeau Associates, 2011

The field investigation was performed in late spring (May 25, 2010) with vegetation well developed but not fully grown. While the vegetation boundaries were variable and at times indistinct, the following four zones were created to categorize the bridge effects:

- **No impact** (no visible impact to plant communities);
- **Minor impact** (similar plant species as no impact areas, and less than 50 percent change in plant density);
- **Moderate impact** (more than 50 percent change in plant density or changes in plant species); and
- **Severe impact** (little or no vegetation).

**Modeling.** The shading analysis was performed for six days (April 21, May 21, June 21, July 21, August 21, and September 21, 2010), representing a range of conditions during the growing season. The bridges modeled were the existing Whittier Bridge (a riveted truss design) and the proposed network tied arch bridge. The analysis looked at snapshots of shade cast hourly between 6:00 a.m. and 6:00 p.m. based on the sun’s altitude and azimuth for each hour ([http://www.usno.navy.mil/USNO/astronomical-applications/data-services/alt-az-us](http://www.usno.navy.mil/USNO/astronomical-applications/data-services/alt-az-us)) (Table 2). Google Sketchup® computer drafting software was used to determine shade cast by the bridges for each hour for each day. These numbers were combined to estimate the location and hours of shade cast by the bridges for each date. ArcView’s Spatial Analyst was used to calculate the amount of wetland resource areas that were shaded under the various scenarios along both shores of the Merrimack River.
### Table 2: Solar Data for Amesbury (2010)

<table>
<thead>
<tr>
<th>Date</th>
<th>Sunrise</th>
<th>Sunset</th>
<th>Length of Day</th>
<th>Noon Altitude (degrees)</th>
<th>Noon Azimuth (E of N, degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 21</td>
<td>4:53</td>
<td>6:33</td>
<td>13h 20m</td>
<td>58.9</td>
<td>188.5</td>
</tr>
<tr>
<td>May 21</td>
<td>4:15</td>
<td>7:05</td>
<td>14h 50m</td>
<td>67.1</td>
<td>192.1</td>
</tr>
<tr>
<td>June 21</td>
<td>4:05</td>
<td>7:25</td>
<td>15h 20m</td>
<td>70.4</td>
<td>190.1</td>
</tr>
<tr>
<td>July 21</td>
<td>4:24</td>
<td>7:15</td>
<td>14h 51m</td>
<td>67.5</td>
<td>186.2</td>
</tr>
<tr>
<td>August 21</td>
<td>4:56</td>
<td>6:36</td>
<td>13h 40m</td>
<td>59.0</td>
<td>186.4</td>
</tr>
<tr>
<td>September 21</td>
<td>5:30</td>
<td>5:43</td>
<td>12h 13m</td>
<td>47.4</td>
<td>188.7</td>
</tr>
</tbody>
</table>

Source: US Naval Observatory

### Literature

The literature was surveyed and while little was found relating to bridge shading effects on plant communities, two papers by the same senior authors (Struck et al. 2004 and Broome et al. 2005) looked at seven bridges in North Carolina for the effects of shading on estuarine wetlands and benthic invertebrates. The bridge heights in those studies ranged from 10 feet to 65 feet.

The studies measured relative light attenuation (amount of light under the bridge compared to adjacent full light) and the height to width ratio of the bridges as well as biometrics of plant and invertebrate communities under and adjacent to the bridges. The results of the study showed wetland productivity and function were reduced under bridges with a height to width ratio of less than 0.5, with detectable though fewer impacts between ratios of 0.5 and 0.68, and no detectable difference at ratios greater than 0.7. Findings also included statistically significant impairment of benthic communities under bridges with a height to width ratio of less than 0.7 and light attenuation greater than 85-90%.

An analysis of bridge shading impacts was developed for two, low bridge crossings over freshwater intermittent streams and their associated wetlands for the proposed East-West Parkway at the South Weymouth Naval Air Station in Weymouth and Rockland, Massachusetts (Epsilon Associates, 2007). This study looked at hours of sunlight based on a literature review, and concluded that vegetation can tolerate an 80 percent reduction in sunlight with little or no impact; a 90 percent reduction in sunlight results in severe impacts to vegetation.

### Results

**Field Investigations.** The vegetation under the north end (Amesbury) of the existing bridge was mapped in the field based on distribution, species composition, and density and assigned one of the four impact categories (no visible impact, minor impact, moderate impact and severe impact) (Figure 1). Robust stands of Phragmites (*Phragmites australis*) and cattail (*Typha angustifolia*) flanking the bridge served as clear indicators of areas of no visible impact. The Phragmites grew to within 25 feet of the west edge of the bridge at an even height and density. The cattail stand east of the bridge showed no visible impact until it reached the bridge edge.

The vegetation development under the bridge is currently limited by several factors in addition to shading: the areas of coarse rock substrates along the shore, which displace finer substrates more suitable for vegetation; and the reduced levels of precipitation and runoff from the adjacent hillside caused by the bridge and its abutment. The droughty conditions combined with shading result in very little vegetation growing in the upland directly under the bridge on the north shore.
In the BVW and salt marsh under the north side of the existing bridge, the reduced precipitation and runoff have less effect because of the continued influence of daily tides. As a result, vegetation cover in the wetland under the bridge is much denser than the upland. However, vegetation density and/or species composition under the bridge are altered compared to wetlands adjacent to the bridge with no visible impact. The assessment considered areas that had more than a 50 percent coverage by the same species found adjacent to the bridge to have minor impacts Figure 1). On the east side, the cattail was as tall as or taller than the adjacent full-sun stand, but had 50–75 percent of the cover. On the river’s edge, the cover percentage by salt cordgrass (*Spartina alternifolia*) and salt hay (*Spartina patens*) was reduced but still greater than the 50 percent coverage in the minor impact zone. The reduction appeared to be due as much to substrate changes (more rubble and rock) as to shade. On the west side, the salt marsh grasses changed to salt marsh sedge (*Carex paleacea*). This sedge formed a continuous, dense band from under the bridge out into full sunlight to the west. Salt marsh sedge is typical of the upper edges of salt or brackish marshes. Its presence under the Whittier Bridge probably represents a reduction in river water salinity as much as shading effects, and for this study was considered functionally similar to the *Spartina* species.

Areas having less than 50 percent coverage, or dominated by a different species than adjacent to the bridge, were considered moderately affected (Figure 1). These included an area of BVW directly under the bridge with less than a 50 percent herbaceous cover of the adjacent areas. Two areas of salt marsh were classified as moderately affected: one area was adjacent to the BVW and included areas that had less than 50 percent cattail and another area was densely vegetated with a grass tentatively identified as bent grass (*Agrostis stolonifera*). Along the river edge, the cover percentage of the *Spartina* species dropped to less than 50 percent in a strip approximately 25 feet long, which was, in part, caused by rubble and rock substrates, and presumable, in part, caused by shading effects.

No area of wetland was severely affected, presumably because of sufficient light and tidal hydrology (Figure 1). The asymmetrical distribution of the shading zonation in Figure 1 relates to the orientation of the bridge. Running approximately northeast-southwest (30°–210°), the bridge receives more sun in the morning, particularly on the north (south-facing) side of the river, than in the afternoon.

Taking an average over the 6-month period of analysis, shading impacts under the existing bridge include 4,200 square feet of minor shade impacts and 1,400 square feet of moderate shade impacts, totaling 5,600 square feet (Table 4). These impacts increase under the preferred bridge design to 16,400 square feet of shade, including 10,100 square feet of minor shade and 6,300 square feet of moderate shade (6,200 square feet of 6-7 hours of shade and 100 square feet of 8-9 hours of shade). The total net change between the existing bridge and the proposed bridge is 10,800 square feet.

**Modeling.** The results of the field investigation were used to calibrate the modeled results for the existing bridge. Table 3 summarizes impacts to vegetated wetlands for each scenario by the six dates. Figure 2A shows the shading projections for the existing bridge for June 21, Figure 2B and Figure 2C show the shading projections for the proposed bridges (north and south sides of the river) for June 21 and September 21, respectively. All of the shading figures for both existing and proposed bridges for the six dates are provided in Appendix E.

The modeled results for the existing bridge for June 21 showed shading patterns that generally matched the field findings, with the greatest amount of shade (6-7 hours) under the western half of the bridge,
and zones of 4–5 hours of shade under the eastern half of the bridge, and to the west of the 5–6 hour section. These in turn are bracketed by zones of 1–3 hours of shade. For reference, the 1–3 hour band to the far eastern side of Figures 2A–C is the 6:00 p.m. shadow, and the band furthest to the west is a combination of the 6:00 a.m. and 7:00 a.m. shadows. The zone of 6–7 hours of shade generally corresponds with the field investigation’s zone of moderate impact, although this is a conservative estimate because the modeled shade zone is considerably wider than the area of moderate impact mapped in the field. The zone of 4–5 hours of shade best corresponds with the mapped zone of minor effect. Based on field studies, the areas that receive fewer than 4 hours of shade had no visible effect on vegetation communities.

**Figure 1:** Shading Impact Zones Estimated in Field (Existing)
### Table 3: Modeled Shading Impacts for Existing Conditions and Preferred Alternative Over the Growing Season

<table>
<thead>
<tr>
<th>Hours of Shade</th>
<th>Existing Bridge</th>
<th>Preferred Alternative</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5</td>
<td>6-7</td>
<td>8-9</td>
</tr>
<tr>
<td>April 21, 2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVW</td>
<td>2,200</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>4,100</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>6,300</td>
<td>200</td>
<td>0</td>
</tr>
<tr>
<td>May 21, 2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVW</td>
<td>1,300</td>
<td>1,100</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>3,900</td>
<td>900</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>5,200</td>
<td>2,000</td>
<td>0</td>
</tr>
<tr>
<td>June 21, 2010</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BVW</td>
<td>600</td>
<td>1,900</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>3,700</td>
<td>1,500</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4,300</td>
<td>3,400</td>
<td>0</td>
</tr>
<tr>
<td>July 21, 2010</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BVW</td>
<td>1,000</td>
<td>1,500</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>3,800</td>
<td>1,100</td>
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</tr>
<tr>
<td>Total</td>
<td>4,800</td>
<td>2,600</td>
<td>0</td>
</tr>
<tr>
<td>August 21, 2010</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVW</td>
<td>2,100</td>
<td>300</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
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<tr>
<td>BVW</td>
<td>2,100</td>
<td>0</td>
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</tr>
<tr>
<td>Salt Marsh</td>
<td>2,500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4,600</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: NAI

### Table 4: Average Shading Impacts for Existing Conditions and Preferred Alternative Over the Growing Season

<table>
<thead>
<tr>
<th>Hours of Shade</th>
<th>Existing Bridge</th>
<th>Proposed Bridge</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5</td>
<td>6-7</td>
<td>8-9</td>
</tr>
<tr>
<td>BVW</td>
<td>1,200</td>
<td>800</td>
<td>0</td>
</tr>
<tr>
<td>Salt Marsh</td>
<td>3,000</td>
<td>600</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>4,200</td>
<td>1,400</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: NAI
FIGURE 2A: MODELED SHADE ANALYSIS FOR EXISTING BRIDGE
(JUNE 21, 2010)
FIGURE 2B: MODELED SHADE ANALYSIS FOR PREFERRED ALTERNATIVE (JUNE 21, 2010)
For the Preferred Alternative on June 21, the gap between the northbound and southbound spans creates a more complex shading result (Figure 2B). The variable widths of the shading bands result from the 46-foot gap between the two bridges casting hourly strips of sunlight. The gap was estimated to provide more than 1 hour of sunlight, which has the effect of reducing the actual shade at any given point by that amount of time. The gap also allows more indirect light and precipitation into the center of the bridge, both of which will benefit growing conditions for vegetation.

The most obvious change with the new bridges is the increased area of the moderate zone of impact (6–7 hours of shade). On June 21, most of the area directly under the bridges experienced moderate shade.
In May, June and July, small amounts of wetland are shaded for 8–9 hours. It is expected that this effect would also be moderate due to the narrow widths of the zones and the anticipated indirect light from the gap between the northbound and southbound bridges.

The June 21 timeframe (the solstice) represents the worst-case analysis for shading effects. Earlier or later in the year, the sun’s altitude is lower and its azimuth arc is shorter; therefore, the total bridge effect covers a wider zone, but reduces the concentrated areas of shade. The results for May and July are similar to June, with approximately the same amounts of moderate shade, but with higher amounts of minor shade (4–5 hours) from the gap. The modeling results for the proposed bridges for April and August showed predominantly minor shading with thinner bands of moderate shade, again a result of the gap. There are no zones with 8–9 hours of shading. In September, the bridge area is primarily receiving minor shading, and areas of moderate shading are reduced to very narrow strips.

**Summary.** The existing Whittier Bridge results in shading effects to an average of 5,600 square feet of vegetated wetland resources, including 4,200 square feet with 4-5 hours of shade and 1,400 square feet with 6-7 hours shade. Based on field conditions on the north shore of the river, 4-5 hours of shade produce minor vegetation impacts and 6-7 hours of shade produce moderate vegetation impacts.

The Preferred Alternative bridges would result in an average of 11,300 additional square feet of vegetated wetland impacts over existing conditions, averaged over the growing season. These would include 6,300 square feet of minor impacts, 4,800 square feet of moderate impacts, and 200 square feet with 8–9 hours of shade.

The functional attributes of the BVW and coastal wetlands are expected to remain approximately the same. Although vegetation species composition would be altered under the moderately shaded sections of the proposed bridges, the community structure and density is expected to remain similar to existing conditions. The new vegetation community would continue to provide many salt marsh functions, including shoreline stabilization, prevention of pollution, and fish and wildlife habitat.

Several aspects of the proposed bridge design would improve habitat quality under the bridges, including smaller above-water pier columns and relocation of the bridge abutments 50 feet landward of their current locations. Both design features would increase direct and indirect light availability for vegetation. The vegetated wetlands on the north shore (Amesbury) would be improved by the removal of coarse rock and debris, and the placement of fine mineral substrates more suitable for wetland plant species. On the south shore (Newburyport), the small degraded salt marsh would be protected from scour by relocating the existing 30-inch stormwater outfall that currently bisects it, and strategic placement of rocks to reduce river scour. These actions should allow the salt marsh to accrete sediments and re-establish vegetation.
APPENDIX E

Wetland Mitigation
Mitigation Grading, Planting and Sowing Notes:

1. All grading and planting will occur under the supervision of a qualified wetland mitigation specialist.

2. Erosion control fencing will be established around the perimeter of the work area prior to any earth work.

3. All topsoil lacking invasive plant species will be removed and stockpiled at a suitable location for application on the disturbed upland tank.

4. Subgrades will be inspected by the wetland mitigation specialist prior to topsoiling.

5. Topsoil will be applied as needed to achieve a moderately compacted topsoil depth of 12 inches in the wetland and 6 inches on the disturbed upland slope. Acquired topsoil shall be a natural, loamy, friable loam soil with a minimum of 20% organic matter in the wetland, and 5% organic matter on the disturbed upland bank. The topsoil will be spread of productive soils in the vicinity, without rocks, sand, trash, debris, invasive plant seeds or roots or other objectionable matter. Topsoil for the upland slope may include recompacted topsoil from the original slope provided it is free of invasive species. Topsoil will not be delivered or spread in a frozen or matted condition.

6. Final grades will be inspected by the wetland mitigation specialist prior to planting and seeding. Finished soil surfaces in the wetland will be left irregular to simulate natural conditions.

7. Plant materials and seed will be ordered in advance from a reputable nursery in the northeast and inspected upon arrival by the wetland mitigation specialist. Plants that are in poor health, undersized, or infested will be rejected and replaced by the contractor. Substitution of species or sizes must be pre-approved by the wetland mitigation specialist.

8. Container plants are best installed in spring or early fall. Planting at other times of the year will be at the recommendations of the nursery supplier and at the Contractor’s risk. Irrigation of plant material in the summer may be necessary and is the responsibility of the Contractor.

9. The Contractor is responsible for storage, care, and handling of plants and soil from delivery through installation and for one year following planting and seeding. Plants that die during this period will be replaced by the Contractor and properly seeded areas will be re-seeded.

10. Trees and shrubs will be staked and mulched following the spacing in the planting table. One slow-release fertilizer tablet, as recommended by the nursery, will be installed in the planting hole of each tree and shrub.

11. Seeds will be broadcast at the prescribed rates in the wetland and the disturbed upland slope after completion of the woody plantings. Topsoil will be seeded, moderately compacted, and stabilized with a tackifier.

12. Coarse bark mix will be applied to the base of each tree or shrub after planting to a depth of 3.5 inches in a 1-foot radius circle. Bark mix will be placed to avoid contact with the stem of the tree or shrub.
APPENDIX F

DOT Invasive Species Control Plan
ITEM 102.3  CONTROL OF INVASIVE PLANTS EXISTING ON SITE

The following shall supplement Subsections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property of the MassDOT Highway Standard Specifications:

The Contractor shall ensure that no invasive plant species, as defined and listed by the Massachusetts Invasive Plant Advisory Group, are introduced or moved around the site by construction activities either by improperly cleaned construction equipment or importation of infected materials such as borrow, compost, nursery stock, seed, or hay bales. Corrective measures, if necessary, shall be made by the Contractor as directed by the Engineer. The Contractor shall be solely responsible for all costs associated with ensuring that invasive species are not introduced or moved around the site by construction activities and for all corrective measures required for as long as necessary to eliminate the introduced invasive plant species and prevent re-establishment of same.

DESCRIPTION

Purpose of this item is to document the extent of existing invasive plants within the project area as shown on the plans prior to construction, propose an Invasive Plant Site Assessment and Management Plan (IPSAMP) for their control, and implement this strategy. The overall intent is to improve the habitat value of the site, protect the proposed landscape restoration and attempt to prevent future spread both on-site and to adjacent sites.

PLEASE NOTE: This provision of this item is to include payment for the IPSAMP. Failure to provide a satisfactory management plan in advance of construction activities may cause deletion of this item and removal of invasive plants that are, in the determination of the Engineer, introduced or spread on site, at the Contractor's expense.

Measures to prevent the introduction of invasive plant species to the site and to correct their introduction as a result of construction-related activities shall be covered under the Standard Specifications, Division I - Sections 7.01(D) Plant Pest Control and 7.13 Protection and Restoration of Property as amended.

The definition of invasive plant species shall be as described by Massachusetts Invasive Plant Advisory Group (MIPAG): “non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.”

Priority target species shall include the following

- Common Reed (*Phragmites australis*)
- Purple Loosestrife (*Lythrum salicaria*)
- Japanese Knotweed (*Polygonum cuspidatum*)
- Oriental Bittersweet (*Celastrus orbiculatus*)
- Black Locust (*Robinia pseudoacacia*)
- Multiflora Rose (*Rosa multiflora*)

- All Early Detection Rapid Response species shall be as defined by MIPAG:


Control of invasive plants shall begin immediately with the initiation of construction and continue for a minimum of two (2) growing seasons. Work shall be done during the growing season from May – October.

The general expectation of treatment results is that there is no re-growth of targeted plant species at end of the first season unless otherwise addressed in the Invasive Plant Management Strategy.

Areas identified for vegetation control measures shall be as shown on the plans and as determined in the field by the Engineer and a MassDOT Landscape Architect. Contact at MassDOT Landscape Design Section is George Batchelor at (617) 973 -7857.

The Contractor is strongly advised to familiarize him/herself with the site conditions prior to preparing a bid.

**SUBMITTALS**

The Contractor shall be responsible for making all submittals to the Engineer in a timely and complete manner. Submittals include the following items.

**Qualifications:**

Invasive Plant Control Contractor Qualification:

1. Company must provide proof of qualifications by providing the following:
   
   a. Narrative describing company, its expertise and experience with invasive plant control.
   b. Describe how sensitive areas were managed.
   c. Describe company’s technical qualifications and past performance.

2. Company must meet licensing requirements:

   a. All crew applicators must have a Massachusetts Commercial Applicator License (CORE).
   b. At least one or more applicator must have ROW certification if required for specific project.
   c. Company must provide name(s) of applicator(s) and Applicator License/Certification number for all contractor crew leaders working on the project.
   d. Company must provide documentation of any warnings, penalties or fines received in the last three (3) years.

3. Company must provide proof of experience with invasive plant control to include following:

   a. At least five (5) references from prior invasive plant control work completed in last five (5) years. Provide contact information including address, phone number and email.
   b. Provide a summary of each of these projects including nature of the problem, specific invasive vegetation treated, dates and period of treatment, methodologies used, and summary of success or not in terms of meeting performance objectives. Include summary of equipment used.
   c. Photo documentation of these projects.
d. GPS coordinates of project locations, if available.

4. Crew leader must have expertise with invasive plant control and provide the following:

   a. Have held Core license for at least five (5) years.
   b. Resume listing five (5) or more years of experience applying pesticides with the company or five (5) years of previous experience with another company specializing in vegetation management.
   c. If less than five (5) years of experience, applicator must have taken training course in Invasive Plant Management and be able to provide certification information.

Pre-qualified Contractors include the following or approved equal.

Groundscapes Express, Inc.          New England Wildflower Society
P.O. Box 737                        180 Hemenway Road
Wrentham, MA 02093                  Framingham, MA 01701-2699
Contact: John Engwer                Contact: William Brumbach
Phone: 508-384-7140, FAX: 508-384-0571 Phone: 508-877-7630, FAX: 508-877-3658

New England Environmental, Inc.     Vegetation Control Service, Inc.
15 Research Drive                   2342 Main St.
Amherst, MA 01002                   Athol, MA 01331
Contact: Scott Fischer              Contact: Jeff Taylor
Phone: 413-256-0202, FAX: 413-256-1092 Phone: 800-323-7706

Invasive Plant Site Assessment and Management Plan (IPSAMP):

Prior to the start of any invasive plant control treatment, submit in writing an IPSAMP proposal and Schedule of Control for approval by the Engineer and MassDOT Landscape Architect at least thirty (30) days prior to proposed treatment. All materials and methods proposed shall be consistent with applicable Massachusetts Wetlands Protection Act - Orders of Conditions. The IPSAMP shall include, but not be limited to, the following:

1. Description of treatment areas including identification of targeted invasive plant species, locations, approximate size of areas and digital photos with time/date stamp. Delineate treatment areas with polygons outlining their perimeter or locations of individual plants. A free-hand sketch drawn on construction plans or an aerial photo can be used to show locations.
2. Schedule of proposed invasive plant controls in conjunction with construction activities, to ensure control of invasive plants prior to disturbance.
3. Proposed methods of treatment for each species or area; such as manual removal, cutting, or herbicide treatment.
4. If herbicides are proposed, submit product label including application methods and rates and Material Safety Data Sheet (MSDS) for each.
5. Proposed application rate.
6. Proposed time of treatment based on target plant species and construction schedule.
7. Method for disposing of invasive plant material including stems, trunks, branches, roots, associated soils, etc.
8. General monitoring schedule.
9. Preliminary re-treatment schedule. Re-treatment shall be based on assessment of initial results and time of year.
10. Proposed performance metrics, or measure of treatment success, which shall be agreed upon by MassDOT.

In addition the IPSAMP shall identify all potential sources of organic material to be brought on site including plant material, ordinary borrow, loam borrow, compost, seed, straw mulch, etc.

Follow-up Treatment Schedule:
Depending on treatment results after the first year, the IPSAMP may be re-assessed for the second year to address additional concerns or adjust to conditions. A follow-up treatment schedule shall follow the same format as outlined above and submitted to the Engineer and MassDOT Landscape Architect for approval at least thirty (30) days prior to proposed treatment.

Reporting:
Within two (2) weeks after each application, the Contractor shall provide to the Engineer a completed and signed Massachusetts Pesticide Use Report Form including locations and dates of application. Forms are available from the MDAR Pesticide Program website.

Photo Documentation:
Digital photos with date and time stamp shall be provided with IPSAMP and follow-up reporting.

MATERIALS
All proposed herbicides shall be as approved prior to use in the IPSAMP. Herbicides shall be labeled for the method of treatment and shall meet all federal, state and local regulation requirements. All herbicide used shall be MDAR approved materials for Sensitive Areas. Application rates will depend on herbicide proposed and shall be per the manufacturer’s label for specific application.

METHODS
All methods used shall be as approved in the IPSAMP.

Prior to the start of work, Contractor shall walk the site with the Engineer and the MassDOT Landscape Architect. The purpose of the site inspection is to identify limits of work, mark locations of areas designated for treatment and mark individual plants targeted for treatment or removal according to the IPSAMP. Contractor shall be responsible for marking plants and delineating areas to be preserved, removed, and otherwise treated. Fencing or other materials needed for marking and for delineating protected areas shall be incidental to this item.

Herbicide Applications: General Provisions
All herbicide application shall conform to Massachusetts Pesticide Laws and Regulations per the Massachusetts Department of Agricultural Resources (MDAR) Pesticide Bureau.
Mixing, applying and/or disposing of herbicides shall always be in accordance with instructions on their labels and all applicable federal, state, and local regulations. All applicators must wear the required personal protective equipment specified on the herbicide label. Mixing shall not occur within sensitive areas, wetlands, or buffer zones.

Contractor shall take precautions to avoid herbicide applications before or during rain or precipitation events. The Contractor shall be responsible for monitoring weather conditions and adjusting the work schedule as appropriate for the herbicide and application method to be used.

Targeted vegetation shall be identified and marked prior to treatment. Plants treated by foliar spray, injection or glove application or other methods that leave standing vegetation, as opposed to cut-stump application, shall remain clearly marked for identification through the contract period.

Desirable vegetation shall be protected from both spray and other physical damage.

Contractor is responsible for any damage to vegetation not designated for removal or treatment. Vegetation damaged shall, at the Engineer’s discretion, be replaced or otherwise restored. Cost of replacement plants and/or restoration shall be borne by the Contractor.

Contractor shall ensure that the public does not enter a work area while herbicide application or spraying is underway.

Provide to the Engineer a completed and signed Massachusetts Pesticide Use Report Form as described above.

**Disposal of Invasive Plant Material**

All material to be cleared shall become the property of the Contractor, and the satisfactory disposal of all cleared plant material (seeds, roots, woody vegetation, associated soils, etc.) shall be the Contractor’s responsibility.

The Contractor shall take measures to prevent viable plant material from leading to further infestations (seeds, roots, woody material, etc.) while stockpiled, in transit, or at final disposal locations. All precautions shall be taken to avoid contamination of natural landscapes with invasive plants or invasive plant material.

Chipping, shredding, or on-site burning of plant material shall not be permitted unless written approval is given as part of the Invasive Plant Management Strategy.

Contractor shall be responsible for treating areas of re-growth due to improper disposal.

In some instances, it may be preferable to dispose of plants on site with on-going monitoring for re-sprouting. This may be used only if method and disposal locations have been approved in the IPSAMP. Site work such as grading and seeding to stabilize disposal area shall be incidental to this item.

**RECOMMENDED METHODS:**

The following specific treatments are provided as guidance to the Contractor for development of the Invasive Plant Management Strategy (IPSAMP). Actual treatments used shall be as proposed in the approved IPSAMP.

- **Individual Tree Treatments**
Cut-Stump Application

Application of herbicide for trees designated for cut-stump treatment shall immediately follow cutting.

To the extent possible, time of application shall be late spring and early summer. Treatment in the spring during period of heavy upward sap flows shall be avoided.

Cut-stump application for Norway maple (*Acer platanoides*) and Tree of Heaven (*Ailanthus altissima*) shall be used only on trees 2-4 inches in caliper. Larger trees designated for treatment shall basal bark treatment.

Re-treatment for stumps that re-sprout shall be at no additional cost.

Recommended Procedure:

Cut the top of the stump level to allow uniform herbicide coverage. Thoroughly wet the cambium layer next to the bark so the conducting tissue will carry the herbicide to the roots. On larger trees treat only the outer 2 to 3 inches of the stump (the internal heartwood of the tree is already dead). On trees 3 inches or less in diameter, treat the entire cut surface. Apply treatments immediately after cutting to achieve maximum effectiveness. If application is delayed after cutting, re-cut the stump and apply the herbicide to the live tissue. Moisture stress may affect control during the summer and early fall. Applications during the spring upward sap flow are not as successful as late spring and early summer treatments.

Glove Application Treatment

Woody saplings designated for glove application treatment shall be marked during site walk and treated at the appropriate time.

Recommended Procedure: Apply the herbicide to leaves after they have hardened off and during active growth in late spring through summer. Avoid applying herbicide to leaves in fall after plant begins the dormancy process. Follow safe and excepted practices for application, equipment and disposal of equipment. It is recommended that first application be made in late spring to allow time for a second application later in the season, if necessary. Second and subsequent applications may be necessary and shall be incidental to this item.

Basal Bark Treatment

Similar methods of trunk treatment such as injection or frilling may be used under this item.

Trees designated for basal bark treatment shall be marked during site walk and treated at the appropriate time.

Recommended Procedure: Apply the herbicide to the lower 12 to 18 inches of the tree trunk from early spring to mid-fall. Some species can be treated during winter. Make cuts around the entire circumference of the tree trunk with an axe or hatchet. Immediately apply the selected herbicide into the cuts. Use herbicide spray mixed with oil until the bark is saturated. Avoid application during heavy upward sap flow in the spring, when sap flowing out of the wound will prevent good absorption. This method is effective on trees of all sizes.

Treated and dead trees shall be removed prior to end of the contract.

For all treated trees, a follow-up foliar spray in the second season may be necessary and shall be incidental to this item.

- **Oriental Bittersweet** (*Celastrus orbiculatus*) Control by Herbicide

Oriental Bittersweet shall be treated in locations as identified on the plans and as located in the field by the Engineer and MassDOT Landscape Architect.
Stems cut for application shall be disposed of off-site and burned to ensure that berries don’t establish new plants elsewhere. On-site burning shall not be permitted.

Foliar spray shall be back-pack spray only, unless otherwise approved by the Engineer.

Recommended Methods for Oriental Bittersweet Control:

Cut Stem Application

Stem shall be cut between the first and second node and the remaining stem shall be painted with herbicide. A dye or marking paint shall be used to mark stems treated.

Rates will depend on herbicide used and shall be per the manufacturer’s label for specific application.

Foliar Application

Foliar application shall consist of a low pressure, low-volume spray with marking pigment to identify treated plants. Spraying shall be done from October through November. Steps shall be taken to ensure herbicide does not come in contact with surrounding vegetation.

Oriental Bittersweet may be cut earlier in the season and then the re-growth sprayed in August-September to more easily apply back-pack sprayed herbicide and avoid desirable vegetation. Allow 6 weeks after cutting before applying herbicide to new growth.

Foliar application shall be made with spray equipment designed to apply small droplets over the entire plant (stems and leaves). These may be made with backpack applicators or hose-end sprayers. Applicators shall use care to treat only the target species, and not desirable neighboring vegetation. Foliar applications done within wetland limits shall not contain surfactants and shall meet all wetland requirements.

No spraying shall be done in rain or under windy conditions.

Japanese Knotweed (Polygonum cuspidatum) Control by Herbicide

Recommended Methods for Japanese Knotweed Control:

A. Injection Procedure

Applications shall be made just below the first or second node above the ground to allow for translocation to the root system. A hole in the back of the stem needs to be created to allow pressurized water to escape. An injection gun will do this at the time of injection. Otherwise, use a probe to create a small opening on either side of the stem. Injection gun or syringe shall be metered to inject proper amount of herbicide and the dose shall be delivered as recommended by the manufacturer of the tool or in a downward diagonal through one of the two holes closest to the applicator. A permanent marker may be attached to the injection gun so that stem is marked at time of injection. Otherwise, stem must be separately marked. Plants will normally take up herbicide within 20 minutes of injection. Rates will depend on herbicide used and shall be per the manufacturer’s label for specific application.

To the extent possible, every stem shall be injected as each cane has its own separate rhizome system. Each stem injected must be marked with a permanent marker to indicate which stems have been injected.
Cutting of canes for treatment is not necessary with injection method. Spot spraying of foliage should be used on stems that are too small to successfully inject.

When canes are dead and as approved by the Engineer, remove canes and dispose as specified herein.

B. Cut Stem Application

Cut-stem application may be used in lieu of the injection gun. Canes cut for application shall be disposed of off-site and burned to ensure that berries don’t establish new plants elsewhere.

Stem shall be cut between the first and second node and herbicide shall be delivered into the stem cavity. A dye or marking paint shall be used to mark stems treated.

Rates will depend on herbicide used and shall be per the manufacturer’s label for specific application.

C. Foliar Application

Foliar spray shall be back-pack spray only, unless otherwise approved by the Engineer. No spraying shall be done in rain or under windy conditions.

Foliar application shall consist of a low pressure, low-volume spray with marking pigment to identify treated plants. Spraying shall be done during the bloom season, August through September. Steps shall be taken to ensure herbicide does not come in contact with surrounding vegetation.

For foliar application, Japanese knotweed should be cut earlier in the season and then the re-growth sprayed in August-September to more easily apply back-pack sprayed herbicide and avoid desirable vegetation. Allow 6 weeks after mowing before applying herbicide.

Foliar application shall be made with spray equipment designed to apply small droplets over the entire plant (stems and leaves). These may be made with backpack applicators or hose-end sprayers. Applicators shall use care to treat only the target species, and not desirable neighboring vegetation. Foliar applications done within wetland limits shall not contain surfactants and shall meet all wetland requirements.

D. Control by Cutting

Prior to start of work Contractor shall indicate in writing the proposed disposal of removed Japanese knotweed material for approval by the Engineer. Unless otherwise directed, all cut Japanese knotweed stems shall be disposed of on-site so as to avoid potential spread to new locations.

Contractor shall walk the site with the Resident Engineer and representative MassDOT Landscape Design. Limits of Japanese knotweed to be removed shall be staked in the field for approval by the Engineer. Japanese knotweed canes shall be cut and maintained at a height 4-6 inches. This may require an initial removal of tall canes followed by as many as 8 cuts per growing season. If initial treatment begins once Japanese knotweed is too tall to mow, cutting shall be by sharp knife and thereafter by mowing or as deemed appropriate by Engineer to avoid spreading.

Care shall be taken not to spread rhizomes or crowns by mowing or cutting activities. Care shall be taken to prevent Japanese knotweed from entering waterways.
MONITORING

After initial herbicide treatment, all treated plants and areas shall be monitored through visual observation and re-treated as necessary and appropriate throughout the season and for the duration of the contract per the management proposal and schedule for control submitted by Contract. Monitoring shall be incidental to all items.

A brief Monitoring Report on treatment results that includes digital photographs shall be submitted to the Engineer and MassDOT Landscape Architect at the end of each season.

COMPENSATION

Work under this Item shall be measured and paid at the contract unit price of LUMP SUM, which price shall include all labor, materials, equipment, tools and any incidentals required to complete the work as specified.

Payment of forty (40) % of the contract price shall be made after inspecting successful results at the end of the first season. Incidental to the first season payment is successful completion and approval of the Invasive Plant Species Site Assessment and Management Plan.

Payment of thirty (30) % of the contract price shall be made after inspecting successful results at the end of the second season. Payment of the final thirty (30) % of the contract price shall be paid upon satisfactory final inspection.

Anticipated payment schedule may be amended according to the actual contract schedule and proposed treatment plan submitted by the Contractor.
APPENDIX G

Simplified Wildlife Habitat Evaluation
Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

Important Habitat Features

Direct alterations to the following important habitat features in resource areas may be permitted only if they will have no adverse effect (refer to Section V).

- Habitat for state-listed animal species (receipt of a positive opinion or permit from MNHESP shall be presumed to be correct. Do not refer to Section V).
- Sphagnum hummocks and pools suitable to serve as nesting habitat for four-toed salamanders
- Trees with large cavities (>18" tree diameter at cavity entrance)
- Existing beaver, mink or otter dens
- Areas within 100 feet of existing beaver, mink or otter dens (if significant disturbance)
- Existing nest trees for birds that traditionally reuse nests (bald eagle, osprey, great blue heron)
- Land containing freshwater mussel beds
- Wetlands and waterbodies known to contain open water in winter with the capacity to serve as waterfowl winter habitat
- Turtle nesting areas
- Vertical sandy banks (bank swallows, rough-winged swallows or kingfishers)

The following habitat characteristics when not commonly encountered in the surrounding area:

- Stream bed riffle zones (e.g. in eastern MA)
- Springs
- Gravel stream bottoms (trout and salmon nesting substrate)
- Plunge pools (deep holes) in rivers or streams
- Medium to large, flat rock substrates in streams

Note: None of the important habitat features listed above were observed in the areas of Wetlands I and H proposed to be impacted.
When any one of the following activities is proposed within resource areas, applicants should complete a Detailed Wildlife Habitat Evaluation (refer to Appendix B).

☐ Activities located in mapped “Habitat of Potential Regional or Statewide Importance”

☐ Activities affecting certified or documented vernal pool habitat, including habitat within 100’ of a certified or documented vernal pool when within a resource area

☐ Activities in bank, land under water, bordering land subject to flooding (presumed significant) where alterations are more than twice the size of thresholds

☐ Activities affecting vegetated wetlands >5000 sq. ft. occurring in resource areas other than Bordering Vegetated Wetland

☐ Activities affecting the sole connector between habitats >50 acres in size

☐ Installation of structures that prevent animal movement

☐ Activities for the purpose of bank stabilization using hard structure solutions that significantly affect ability of stream channel to shift and meander, or disrupt continuity in cover that would inhibit animal passage

☐ Dredging (greater than 5,000 sf)