GOMEZ AND SULLIVAN ENGINEERS

41 Liberty Hill Road • PO Box 2179 • Henniker, NH 03242 • Phone 603-428-4960 • Fax 603-428-3973

June 4, 2018

Weymouth Conservation Commission
Town Hall
75 Middle Street
Weymouth, MA 02189

Massachusetts Dept. of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Re: Weymouth Herring Passage & Smelt Habitat Restoration Project
Wetlands Protection Act Notice of Intent for an Ecological Restoration Project

Dear Reviewers:

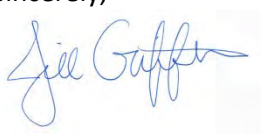
On behalf of the Town of Weymouth Department of Public Works, Gomez and Sullivan Engineers, DPC (Gomez and Sullivan) is submitting the enclosed Notice of Intent (NOI) of an Ecological Restoration Project under the Wetlands Protection Act (WPA) and the Weymouth Wetlands Protection Ordinance for the Weymouth Herring Passage & Smelt Habitat Restoration Project.

The Weymouth Back River (or Back River), located in Hingham and Weymouth, Massachusetts, supports one of the largest river herring runs in Massachusetts. In the upper portion of the watershed, a flood control conduit bypasses Herring Brook storm flows, discharging them in a rectangular concrete channel adjacent to the base of a fish ladder in Jackson Square in Weymouth. An existing fish diversion swing gate at the tunnel outlet is nearing the end of its useful life and has been ineffective at preventing upstream migrating river herring from entering the conduit, where they may become trapped and perish. The goals of this project are to 1) replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel, 2) reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder, 3) restore a resting pool for river herring immediately downstream of the concrete pad, and 4) regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

The original NOI and seven copies have been sent to the Conservation Commission as requested. One copy of the NOI has been sent to the MassDEP Southeast Regional Office. The transmittal forms have been sent to the MassDEP Boston Office. Notice of the NOI has been submitted to the *Environmental Monitor* and a local newspaper (*The Patriot Ledger*) for publication. The NOI was also sent electronically to the Division of Marine Fisheries North Shore Field Station environmental reviewer.

We appreciate your review of this project. Please contact me with any questions or comments at (603) 428-4960 or jgriffiths@gomezandsullivan.com.

Sincerely,



Jill Griffiths, PE, Water Resources Engineer

Enclosures

Weymouth Herring Passage & Smelt Habitat Restoration Project

WETLANDS PROTECTION ACT NOTICE OF INTENT

Herring Brook/Back River, Weymouth, MA

WPA FORM 3A

JUNE 4, 2018

Prepared for:

120 Winter Street, Weymouth, MA 02188

Prepared by:

GOMEZ AND SULLIVAN ENGINEERS

PO Box 2179, Henniker, NH 03242

TABLE OF CONTENTS

1. Transmittal Forms

This section includes the following transmittal forms:

- MassDEP Transmittal Form for Permit Application and Payment
- NOI Wetland Fee Transmittal Form

Enter your transmittal number → X280836 (Transmittal Number)

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

1. Permit Code: 4 to 7 character code from permit instructions	2. Name of Permit Category
WPA Form 3A	NOI for an Ecological Restoration Project

3. Type of Project or Activity: Restoring Fish Passageways - Weymouth Herring Passage & Smelt Habitat Restoration Project

B. Applicant Information – Firm or Individual

1. Name of Firm - Or, if party needing this approval is an individual enter name below: Town of Weymouth Department of Public Works

2. **Last Name** of Individual	3. **First Name** of Individual	4. MI
		P

5. Street Address: 120 Winter Street

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Weymouth	MA	02188	(781) 335-5100	318

11. Contact Person	12. e-mail address
Andrew Fontaine	cfontaine@weymouth.ma.us

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site Or Individual: Herring Run Park

2. Street Address: Intersection of Broad St & Commercial St

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Weymouth	MA	02188	N/A	N/A

8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)
N/A	N/A	N/A

D. Application Prepared by (if different from Section B)*

1. Name of Firm Or Individual: Gomez and Sullivan Engineers, DPC

2. Address: PO Box 2179

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Henniker	NH	03242	(603) 428-4960	N/A

8. Contact Person	9. LSP Number (BWSC Permits only)
Jill Griffiths, PE	N/A

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☒ yes ☐ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit: 15519 (EOEA File Number)

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date

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

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

A. Applicant Information

1. Location of Project:

Intersection of Broad St & Commercial St	Weymouth
a. Street Address	b. City/Town
N/A (Fee Exempt)	N/A (Fee Exempt)
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Andrew	Fontaine	
a. First Name	b. Last Name	
Town of Weymouth Department of Public Works		
c. Organization		
120 Winter Street		
d. Mailing Address		
Weymouth	MA	02188
e. City/Town	f. State	g. Zip Code
(781) 335-5100	(781) 337-6940	cfontaine@weymouth.ma.us
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

a. First Name	b. Last Name	
c. Organization		
d. Mailing Address		
e. City/Town	f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & 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)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
N/A (Fee Exempt)			

Step 5/Total Project Fee: N/A (Fee Exempt)

Step 6/Fee Payments:

Total Project Fee:	N/A (Fee Exempt) a. Total Fee from Step 5
State share of filing Fee:	N/A (Fee Exempt) b. 1/2 Total Fee **less $**12.50
City/Town share of filling Fee:	N/A (Fee Exempt) 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.)

2. WPA Form 3A – Notice of Intent for an Ecological Restoration Project

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands Program

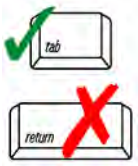
WPA Form 3A - Notice of Intent for an Ecological Restoration Project

MassDEP File Number

Weymouth
City or Town

Project Type

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



Check the Ecological Restoration type that applies:

☐ 1. Dam Removal

☐ 2. Freshwater Stream Crossing Repair and Replacement*

☐ 3. Stream Daylighting

☐ 4. Tidal Restoration

☐ 5. Rare Species Habitat Restoration

☒ 6. Restoring Fish Passageways

Eligibility Criteria:

☒ I am applying for a Restoration Order of Conditions and meet the General Eligibility Criteria [310 CMR 10.13(1)] as described in Section C1 and the Additional Eligibility Criteria for this Ecological Restoration Project type [310 CMR 10.13(2) through (7)] as described in Section C2.

☒ This Notice of Intent includes the required supporting documents as specified in [310 CMR 10.11, 10.12] and outlined in Appendix 1 and Appendix 2 respectively. The NOI also includes a signed Certification of Eligibility in Section G. Signatures and Submittal Requirements.

A. General Information

1. Project Location:

Intersection of Broad Street & Commercial Street
a. Street Address

Weymouth	02188	
b. City/Town	c. Zip Code	
Latitude and Longitude*:	42.215897 N	-70.92263 W
	d. Latitude	e. Longitude
19 & 23	253-25, 26, & 27	
f. Assessors Map/Plat Number	g. Parcel/Lot Number	

2. Applicant:

Andrew	Fontaine
a. First Name	b. Last Name

Town of Weymouth Department of Public Works
c. Organization

** If the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.*

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands Program

WPA Form 3A - Notice of Intent for an Ecological Restoration Project

MassDEP File Number

Weymouth
City or Town

A. General Information (cont.)

120 Winter Street
d. Street Address

Weymouth | MA | 02188
e. City/Town | f. State | g. Zip Code

(781) 335-5100 x318 | (781) 337-6940 | cfontaine@weymouth.ma.us
h. Phone Number | i. Fax Number | j. Email Address

3. Property Owner (required if different from applicant): ☐ Check and attach list if more than one owner

a. First Name | b. Last Name

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):

Jill | Griffiths
a. First Name | b. Last Name

Gomez and Sullivan Engineers, DPC
c. Organization

41 Liberty Hill Road Building 1 / PO Box 2179
d. Street Address

Henniker | NH | 03242
e. City/Town | f. State | g. Zip Code

(603) 428-4960 | (603) 428-3973 | jgriffiths@gomezandsullivan.com
h. Phone Number | i. Fax Number | j. Email Address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form): Category 2 - $500

Fee Exempt | | |
a. Total Fee Paid | b. State Fee Paid | c. City/Town Fee Paid

6. Property recorded at the Registry of Deeds for:

Norfolk | 110553 (for 23-253-27)
a. County | b. Certificate # (if registered land)

2916 (for 23-253-26; no deed for 19-253-25) | 161 (for 23-253-26)
c. Book | d. Page Number

7. Project Narrative: Describe the project's ecological restoration goals and how it furthers at least one of the interests of the Wetland Protection Act (WPA) M.G.L. c. 131, § 40.

Project goals include 1) replace a failing fish diversion structure to improve upstream passage of river herring in the Weymouth Back River and Herring Brook, and 2) restore historic spawning habitat for rainbow smelt downstream of the structure. The project furthers the WPA goal of restoring fish passageways.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands Program

WPA Form 3A - Notice of Intent for an Ecological Restoration Project

MassDEP File Number

Weymouth
City or Town

B. Resource Area Impacts (Temporary & Permanent)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

1. ☒ **Inland Resource Areas**: (See 310 CMR 10.54-10.58)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☒ Bank	45 (temporary disturbance) 1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	0 1. square feet	2. square feet
c. ☒ Land Under Waterbodies and Waterways	8200 (1000 temp. disturbance) 1. square feet 300 3. cubic yards dredged	2. square feet
d. ☐ Bordering Land Subject to Flooding	0 1. square feet 0 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	0 1. square feet 0 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☒ Riverfront Area	Weymouth Back River / Herring Brook 1. Name of Waterway (if available) - **specify inland or coastal**	
2. Proposed alteration of the riverfront area:		**15,000 (temp. disturbance)** a. total square feet

2. ☒ **Coastal Resource Areas:** (see 310 CMR 10.25-10.35)

Check all that apply below. **For coastal riverfront area, see B.1.f. above.**

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	0 1. square feet 0 2. cubic yards dredged	
c. ☐ Barrier Beach**	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	0 1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes**	0 1. square feet	2. cubic yards dune nourishment

** *Note: No armoring of a Coastal Dune or Barrier Beach is permitted.*

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands Program

WPA Form 3A - Notice of Intent for an Ecological Restoration Project

MassDEP File Number

Weymouth
City or Town

B. Resource Area Impacts (Temporary & Permanent) (cont.)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	**0** 1. linear feet	
g. ☐ Rocky Intertidal Shores	0 1. square feet	
h. ☐ Salt Marshes	0 1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	0 1. square feet 0 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	0 1. square feet	
k. ☒ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 300 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	0 1. square feet	

3. ☒ **Restoration/Enhancement**

In addition to the square footage that has been entered in Section B1.b for BVW and B 2.h for Salt Marsh above, please enter the additional amount here for restoration/enhancement.

Land Under Waterbodies and Waterways / Fish Runs	7200 sf
a. Identify the appropriate resource area(s) type/name	Square feet or linear feet
b. Identify the appropriate resource area(s) type/name	Square feet or linear feet

C. Ecological Restoration Project Description

1. Check each box below to confirm that the project complies with each Eligibility Criteria required to obtain a Restoration Order of Conditions and provide the appropriate documentation.

☒ This project will have no short term or long-term adverse effects on Estimated Habitat sites of Rare Species located within resource areas that may be affected by the project or will be carried out according to a habitat management plan approved by NHESP.

☒ The project avoids and minimizes adverse impacts to Resource Areas and the interests identified in the WPA, without impeding the achievement of the ecological restoration goals

☒ The project will utilize best management practices to prevent and minimize adverse impacts to Resource Areas and the WPA interests.

☒ This Project will cause NO significant adverse effects on the interests of flood control and storm damage prevention in relation to the built environment (i.e., the project will not result in a significant increase in flooding or storm damage affecting buildings, wells, septic systems, roads or other man-made structures or infrastructure) **and** documentation on how this is achieved.

Massachusetts Department of Environmental Protection
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WPA Form 3A - Notice of Intent for an Ecological Restoration Project

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C. Ecological Restoration Project Description (cont.)

☒ If the Project involves the dredging of 100 cubic yards of sediment or more or dredging in an ORW, a 401 Water Quality Certification is required and attached. Requires a 401 Water Quality Certification.

☒ The Project will not substantially reduce the capacity of a Resource Area to serve the wildlife habitat functions identified in 310 CMR 10.60(2). A project will be **presumed** to meet this eligibility criteria if the NOI will be carried out in accordance with any Time of Year (TOY) restrictions or other conditions recommended by the DMF for coastal waters, and by the DFW for inland waters in accordance with 310 CMR 10.11(3), (4) and (5). A NOI for an Ecological Restoration Project that meets the requirements of 310 CMR 10.12(1) and (2) it ***is exempt from performing a wildlife habitat evaluation.***

☒ If the project involves work on a **stream crossing**, the stream crossing has been designed in accordance with 310 CMR 10.24(10) for work in coastal resource areas and 310 CMR 10.53(8) for work in inland resource areas, as applicable. See additional requirements below for Freshwater Stream Crossing Repair and Replacement Projects.

☒ The project will not result in a discharge of dredged or fill material within 400 feet of the high water mark of a Class A surface water (exclusive of its tributaries) unless the project is conducted by a public water system under 310 CMR 22.00 or a public agency or authority for the maintenance or repair of existing public roads or railways in accordance with 314 CMR 4.06(1)(d)1.

☒ The project will not result in a discharge of dredged or fill material to a vernal pool certified by the Massachusetts Division of Fisheries and Wildlife (DFW).

☒ The project will not result in a point source discharge to an Outstanding Resource Water.

☒ The project will not involve the armoring of a Coastal Dune or Barrier Beach.

☒ Describe in detail the project plan for invasive species prevention and control.

☒ Provide any TOY restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3), (4) and (5) with attached copies of their written determinations.

☒ If the project involves the construction, repair, replacement or expansion of infrastructure, a proposed operation and maintenance plan is provided to ensure that the infrastructure will continue to function as designed;

2. Check each box as appropriate to confirm that the project complies with the Eligibility Criteria required for this Ecological Restoration Project type.

Dam Removal

☐ The Ecological Restoration Project is a dam removal project. The project meets the eligibility criteria set forth in 310 CMR 10.13(1)(d).

Massachusetts Department of Environmental Protection
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C. Ecological Restoration Project Description (cont.)

☐ The Project **is** consistent with the MassDEP guidance entitled *Dam Removal and the Wetlands Regulations*, dated December 2007, and meets the eligibility criteria set forth in 310 CMR 10.13(1).

☐ The Project is NOT consistent with MassDEP's guidance entitled Dam Removal and the Wetlands Regulations, dated December 2007 and meets the eligibility criteria set forth in 310 CMR 10.13(1).

☐ The project will not involve the removal of a dam that was constructed or is managed for flood control by a municipal, state or federal agency.

☐ The project will not adversely impact public water supply wells or water withdrawals permitted or registered under the Water Management Act, M.G.L. c. 21G, and 310 CMR 36.00 within the reach of the stream impacted by the impoundment.

☐ The project will not adversely impact private water supply wells including agricultural or aquacultural wells or surface water withdrawal points.

☐ The project provides for the removal of the full vertical extent of the dam such that no remnant of the dam will remain at or below the streambed as determined prior to commencement of the dam removal project, or if such determination cannot be made at that time, as determined during construction of the project.

☐ The project provides for the removal of enough of the horizontal extent of the dam such that after removal no water will be impounded during the 500 year flood event.

☐ The project will not involve a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license.

☐ The applicant has obtained from the Department of Conservation and Recreation Office of Dam Safety a written determination in accordance to the General Applicability requirements prior to submitting this NOI.

☐ If the project is exempt from the requirement to obtain a license or permit under 310 CMR 9.05(3)(n), the project will not have an adverse effect on navigation or on any docks, piers or boat ramps authorized under 310 CMR 9.00.

Freshwater Stream Crossing Repair and Replacement (310 CMR 10.13(3))

☐ The Ecological Restoration Project is a freshwater stream crossing repair or replacement project. In addition to the eligibility criteria set forth in 310 CMR 10.13(1), the project meets all of the following eligibility criteria that will meet the MA Stream Crossing (SC) Standards that is completely described below or in the attached:

☐ The width of the structure will be at least 1.2 times bankfull width to facilitate the movement of fish and other aquatic organisms and wildlife species that may utilize riparian corridors.

☐ The structure will be an open-bottom span where practicable or if an open-bottom span is not practicable, the structure bottom will be embedded in a substrate that matches the substrate of the stream channel and that shall be designed to maintain continuity of aquatic and benthic elements of the stream including appropriate substrates and hydraulic characteristics within the culvert (water depths, slope, turbulence, velocities, and flow patterns).

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C. Ecological Restoration Project Description (cont.)

☐ The structure will have an Openness Ratio of at least 0.82 feet, or as close to 0.82 feet as is practicable.

☐ The project includes considerations for site constraints in meeting the SC standards, undesirable effects or risk in meeting the standard, the environmental benefit of meeting the standard compared to the cost in evaluating:

- ☐ The potential for downstream flooding
- ☐ Upstream and downstream habitat (in-stream habitat, wetlands);
- ☐ Potential for erosion and head-cutting;
- ☐ Stream stability;
- ☐ Habitat fragmentation caused by the crossing;
- ☐ The amount of stream mileage made accessible by the improvements;
- ☐ Storm flow conveyance;
- ☐ Engineering design constraints specific to the crossing;
- ☐ Hydrologic constraints specific to the crossing;
- ☐ Impacts to wetlands that would occur by improving the crossing;
- ☐ Potential to affect property and infrastructure; and
- ☐ Cost of replacement.

Stream Daylighting

☐ The Ecological Restoration Project is a stream daylighting project. In addition to the eligibility criteria set forth in 310 CMR 10.13(1), the project meets all of the following eligibility criteria and is completely described narrative below/attached:

- ☐ The project will meet the applicable performance standards for Bank, 310 CMR 10.54, and Land Under Water Bodies and Waterways, 310 CMR 10.56. As set forth in 10.12(3), a person submitting a Notice of Intent that meets the requirements of 310 CMR 10.12 (1) and (2) for a stream daylighting project is exempt from the requirement to perform a wildlife habitat evaluation in accordance with 310 CMR 10.60, notwithstanding the provisions of 310 CMR 10.54(4)(a)5., 310 CMR 10.56(4)(a)4., and 310 CMR 10.60.
- ☐ To the maximum extent practicable, the project is designed to include the revegetation of all disturbed areas with noninvasive indigenous species appropriate to the site.

Massachusetts Department of Environmental Protection
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C. Ecological Restoration Project Description (cont.)

Tidal Restoration Project (310 CMR 10.13(5))

☐ The Ecological Restoration Project is a Tidal Restoration Project designed to restore tidal flow that has been restricted or blocked by a man-made structure. In addition to the eligibility criteria set forth in 310 CMR 10.13(1), the project meets all of the following eligibility criteria that is completely described below or in the attached:

- ☐ If the project will involve work in a Coastal Dune and/or a Coastal Beach, the project meets the applicable performance standard(s) at 310 CMR 10.27 and/or 10.28.
- ☐ The project will not include a new or relocated tidal inlet/breach through a Barrier Beach or additional armoring of a Barrier Beach, but may include the modification, replacement or enlargement of an existing culvert or inlet through a Barrier Beach.
- ☐ The project will not involve installation of new water control devices (i.e., tide gates, flash boards and adjustable weirs) or a change in the management of existing water control devices, when the existing or proposed function of said devices is to prevent flooding or storm damage impacts to the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure.
- ☐ The project's physical specifications are compatible with passage requirements for diadromous fish runs identified at the project location by the Division of Marine Fisheries.
- ☐ Did the project include considerations for site constraints in meeting the SC standards, undesirable effects or risk in meeting the standard, the environmental benefit of meeting the standard compared to the cost in evaluating:
  - ☐ The potential for downstream flooding
  - ☐ Upstream and downstream habitat (in-stream habitat, wetlands);
  - ☐ Potential for erosion and head-cutting;
  - ☐ Stream stability;
  - ☐ Habitat fragmentation caused by the crossing;
  - ☐ The amount of stream mileage made accessible by the improvements;
  - ☐ Storm flow conveyance;
  - ☐ Engineering design constraints specific to the crossing;
  - ☐ Hydrologic constraints specific to the crossing;
  - ☐ Impacts to wetlands that would occur by improving the crossing;
  - ☐ Potential to affect property and infrastructure; and

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Wetlands Program

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City or Town

C. Ecological Restoration Project Description (cont.)

☐ Cost of replacement.

Rare Species Habitat Restoration (310 CMR 10.13(6))

☐ The Ecological Restoration Project is a Rare Species habitat restoration project. In addition to the eligibility criteria set forth in 310 CMR 10.13(1), the project meets all of the following eligibility criteria that is completely described below or in the attached:

☐ The project is exempt from review under 321 CMR 10.00 as a project that involves the active management of Rare Species habitat for the purpose of maintaining or enhancing the habitat for the benefit of Rare Species. A project that involves the active management of Rare Species habitat and is exempt from review under 321 CMR 10.00 may include without limitation the mowing, cutting, burning or pruning of vegetation or the removal of exotic or invasive species.

☐ The project is carried out in accordance with a Habitat Management Plan that has been approved in writing by the Natural Heritage and Endangered Species Program and submitted with this Notice of Intent.

Restoring Fish Passageways (310 CMR 10.13(7))

☒ The Ecological Restoration Project involves the restoration or repair of a fish passageway as identified by the Division of Marine Fisheries in its Marine Fisheries Technical Reports, TR 15 through 18, dated 2004. In addition to the eligibility criteria set forth in 310 CMR 10.13(1), the project meets all of the following eligibility criteria that is completely described below or in the attached:

☒ Proof of submission of a Fishway Permit Application to the Division of Marine Fisheries, pursuant to M.G.L. c. 130, §§ 1 and 19, and 322 CMR 7.01(4)(f) and (14)(m); and

☒ The fish passageway will be operated and maintained in accordance with an Operation and Maintenance Plan approved by the Division of Marine Fisheries.

D. Other Applicable Standards and Requirements

A person submitting a Notice of Intent for an Ecological Restoration Project that meets the requirements of 310 CMR 10.12(1) and (2) and that contains either a written determination from the Natural Heritage Endangered Species Program (NHESP) that the project will have no short or long term adverse effects on the habitat of the local population of state-listed species, or a Conservation and Management Permit issued by NHESP pursuant to the Massachusetts Endangered Species Act (MESA) Regulations at 321 CMR 10.00 for the project, or a habitat management plan for the project approved in writing by NHESP, will be deemed to have satisfied the requirements in 310 CMR 10.37 and 310 CMR 10.59 of sending the Notice of Intent for the same project for a determination by NHESP. For the purposes of this guidance, the “same project” means either there have been no changes to the project reviewed by NHESP in making its determination or that any subsequent changes to the project since the initial review by NHESP have been reviewed and approved in writing by NHESP.

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Bureau of Resource Protection – Wetlands Program

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D. Other Applicable Standards and Requirements (cont.)

Compliance with the above NHESP-related requirements may be demonstrated by providing the following applicable documentation. See Appendix 1 for a complete description of these requirements. Check the applicable box below.

☒ The project is not within Estimated Habitat of State-Listed Rare Wetlands Wildlife as shown on the most recent Estimated Habitat Maps of State-Listed Rare Wetlands Wildlife published by the Natural Heritage and Endangered Species Program.

☐ The NHESP has issued the attached written determination that the project will have no short or long term adverse effects on the habitat of the local population of state-listed species.

☐ The NHESP has issued the attached written approval of the attached habitat management plan for this project, which makes it an eligible Rare Species habitat restoration project under 310 CMR 10.13(6).

☐ The NHESP has issued pursuant to the MESA Regulations at 321 CMR 10.00 the attached Conservation and Management Permit for this project.

☐ There have been no changes to the project reviewed by NHESP in making its determination, or if so, any subsequent changes to the project have been reviewed and approved in writing by NHESP and attached hereto.

1. 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, hand delivery, or electronic delivery of written determination to either:

   South Shore – Cohasset to Rhode Island border, and the Cape & Islands:
   Division of Marine Fisheries –
   South Coast Field Station
   Attn: Environmental Reviewer
   836 South Rodney French Blvd
   New Bedford, MA 02744
   Email: DMF.EnvReview-South@state.ma.us

   North Shore – Hull to New Hampshire border:
   Division of Marine Fisheries –
   North Shore Field Station
   Attn: Environmental Reviewer
   30 Emerson Avenue
   Gloucester, MA 01930
   Email: DMF.EnvReview-North@state.ma.us

2. 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).
   Weymouth Back River ACEC
   b. ACEC

3. 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

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D. Other Applicable Standards and Requirements (cont.)

4. 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

5. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes ☐ No

   If 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:

   ☐ Proprietary BMPs are included in the Stormwater Management System.

6. ☒ If the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan has been submitted to ensure that the infrastructure will continue to function as designed.

7. ☒ The project involves the dredging of 100 cubic yards or more of sediment, or dredging of any amount in an Outstanding Resource Water, and a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00 is attached.

8. ☐ The Ecological Restoration Project involves work on a stream crossing. Sufficient information has been provided to demonstrate that the design meets the requirements in 310 CMR 10.24(10) for work in coastal resources, and 310 CMR 10.53 (8) for work in an inland resource area.

E. Additional Information

Check each box for required documents that are attached to this Notice of Intent (NOI). See instructions for details.

1. ☒ Maps and Plans identifying the location of proposed activities relative to the boundaries of each affected resource area [http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/nwi.html]

2. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

   Herring Passage and Smelt Restoration Project
   a. Plan Title

   Gomez & Sullivan Engineers & Weymouth DPW
   b. Prepared By

   Pending permit approvals
   c. Signed and Stamped by

   May 2018
   d. Final Revision Date

   As shown
   e. Scale

   f. Additional Plan or Document Title

   g. Date

3. ☐ Attach proof of Natural Heritage and Endangered Species Program written determination, if needed.
4. ☒ Attach proof of mailing for Massachusetts Division of Marine Fisheries Time of Year written determination, if needed.

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E. Additional Information (cont.)

5. ☒ Attach NOI Wetland Fee Transmittal Form.

6. ☒ Attach Stormwater Report, if needed.

F. 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:

2. Municipal Check Number	3. Check date
4. State Check Number	5. Check date
6. Payor Name on Check: First Name	7. Payor Name on Check: Last Name

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G. Signatures and Submittal Requirements

Certification of Ecological Restoration Project Notice of Intent

I hereby certify under penalties of perjury that **the Ecological Restoration Project Notice of Intent application meets the Eligibility Criteria set forth in 310 CMR 10.13.** I also certify that I am familiar with the information contained in this Notice of Intent application and that the accompanying plans, documents, and supporting data are to the best of my knowledge and belief true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

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.

1. Signature of Applicant or Authorized Agent

Andrew Fontaine
2. Printed Name of Applicant or Authorized Agent

June 4, 2018
3. Date

4. Signature of Property Owner (if different)

5. Date

6. Signature of Representative (if any)

June 4, 2018
7. Date

The certification must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 6) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application

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:
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.

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Appendix 1: Ecological Restoration Notice of Intent (WPA 3a) - Required Actions (310 CMR 10.11)

Complete the Required Actions before submitting a Notice of Intent Application for an Ecological Restoration Project and submit a completed copy of this Checklist with the Notice of Intent.

☒ **Environmental Monitor /Massachusetts Environmental Policy Act (MEPA)**
http://www.mass.gov/eea/agencies/mepa/submitting-notices-to-the-environmental-monitor.html

☒ Submit written notification at least 14 days **prior** to the filing of a Notice of Intent (NOI) to the *Environmental Monitor* for publication. A copy of the written notification is attached and provides at minimum:

- ☒ A brief description of the proposed project.
- ☒ The anticipated NOI submission date to the conservation commission.
- ☒ The name and address of the conservation commission that will review the NOI.
- ☒ Specific details as to where copies of the NOI may be examined or acquired **and** where to obtain the date, time, and location of the public hearing.

☐ **Massachusetts Endangered Species Act (MESA) /Wetlands Protection Act Review**

☐ Preliminary Massachusetts Endangered Species Act Review from the Natural Heritage and Endangered Species Program (NHESP) has been met and the written determination is attached.

☐ Supplemental Information for Endangered Species Review has been submitted.

1. ☐ Percentage/acreage of property to be altered:
   a. Within Wetland Resource Area _____ Percentage/acreage
   b. Outside Wetland Resource Area _____ 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.
4. ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)
5. ☐ Photographs representative of the site
6. ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm)

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Make check payable to "Commonwealth of Massachusetts - NHESP" and mail to NHESP:

Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

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

   a. ☐ Vegetation cover type map of site

   b. ☐ Project plans showing Priority & Estimated Habitat boundaries

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/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59 – see C4 below)

2. ☐ Separate MESA review ongoing.

   a. NHESP Tracking # _____ b. Date submitted to NHESP _____

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

☐ **Estimated Habitat Map of State-Listed Rare Wetlands Wildlife**

If a portion of the proposed project is 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), complete the portion below. To view habitat maps, see the **Massachusetts Natural Heritage Atlas** or view the maps electronically at: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review

☐ A preliminary written determination from Natural Heritage and Endangered Species Program (NHESP) must be obtained indicating that:

- ☒ Project will NOT impact an area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by *NHESP.*
- ☐ Project will impact an area located within estimated habitat indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetlands Wildlife published by NHESP. A copy of NHESP's written preliminary determination in accordance with 310 CMR 10.11(2) is attached. This specifies:

  ☐ Date of the map: _____

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☐ If the Rare Species identified is/are likely to continue to be located on or near the project, and if so, whether the Resource Area to be altered is in fact part of the habitat of the Rare Species.

☐ That if the project alters Resource Area(s) within the habitat of a Rare Species:

☐ The Rare Species is identified;

☐ NHESP's recommended changes or conditions necessary to ensure that the project will have **no** short or long term adverse effect on the habitat of the local population of the Rare Species is provided; **or**

☐ An approved NHESP habitat management plan is attached with this Notice of Intent.

Send the request for a preliminary determination to:
Natural Heritage & Endangered Species Program
MA Division of Fisheries & Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

☐ **Division of Marine Fisheries**

☒ If the project will occur within a coastal waterbody with a restricted Time of Year, [see Appendix B of the Division of Marine Fisheries (DMF) Technical Report TR 47 "Marine Fisheries Time of Year Restrictions (TOYs) for Coastal Alteration Projects" dated April 2011 http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/NEGP/MADMFTR-47.pdf].

☒ Obtain a DMF written determination stating:

☐ The proposed work does NOT require a TOY restriction.

☒ The proposed work requires a TOY restriction. Specific recommended TOY restriction and recommended conditions on the proposed work is attached.

☒ If the project may affect a diadromous fish run [re: Division of Marine Fisheries (DMF) Technical Reports TR 15 through 18, dated 2004: http://www.mass.gov/eea/agencies/dfg/dmf/publications/technical.html]

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☒ Obtain a DMF written determination stating:

☒ The design specifications and operational plan for the project are compatible with the passage requirements of the fish run.

☐ The design specifications and operational plan for the project are not compatible with the passage requirements of the fish run.

Send the request for a written determination to:

South Shore – Cohasset to Rhode Island border, and the Cape & Islands:
Division of Marine Fisheries –
South Coast Field Station
Attn: Environmental Reviewer
836 South Rodney French Blvd
New Bedford, MA 02744
Email: DMF_EnvReview.South@state.ma.us

North Shore – Hull to New Hampshire border:

Division of Marine Fisheries –
North Shore Field Station
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF_EnvReview.North@state.ma.us

☐ **Division of Fisheries and Wildlife –** http://www.mass.gov/eea/agencies/dfg/dfw/

☐ Projects that involve silt-generating, in-water work that will impact a non-tidal perennial river or stream and the in-water work will ***not*** occur between May 1 and August 30.

☐ Obtain a written determination from the Division of Fisheries and Wildlife (DFW) as to whether the proposed work requires a TOY restriction.

☐ The proposed work does NOT require a TOY restriction.

☐ The proposed work requires a TOY restriction. The DFW determination with TOY restriction and other conditions is attached.

☒ **MassDEP Water Quality Certification**

☒ Project involves dredging of 100 cubic yards or more in a Resource Area or dredging of any amount in an Outstanding Resource Water (ORW). A copy and proof of the MassDEP Water Quality Certification pursuant to 314 CMR 9.00 is attached to the NOI.

☒ This project is a Combined Permit Application for 401 Dredging and Restoration (BRP WW 26).

☐ **MassDEP Wetlands Restriction Order**

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)?

☐ Yes ☒ No

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Appendix 1: Ecological Restoration Notice of Intent (WPA 3a) - Required Actions (310 CMR 10.11)

☐ **Department of Conservation and Recreation**

Office of Dam Safety

☐ For Dam Removal Projects, obtain a written determination from the Department of Conservation and Recreation Office of Dam Safety that the dam is not subject to the jurisdiction of the Office under 302 CMR 10.00, a written determination that the dam removal does not require a permit under 302 CMR 10.00 or a permit authorizing the dam removal in accordance with 302 CMR 10.00 has been issued.

Areas of Critical Environmental Concern (ACECs)

Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

☒ Yes ☐ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations).

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Appendix 2: Ecological Restoration Notice of Intent (WPA 3a) - Minimum Required Documents (310 CMR 10.12)

Complete the Required Documents Checklist below and provide supporting materials before submitting a Notice of Intent Application for an Ecological Restoration Project.

☒ This Notice of Intent meets all applicable requirements outlined in for Ecological Restoration Projects in 310 CMR 10.12. Use the checklist below to insure that all documentation is included with the NOI.

At a minimum, a Notice of Intent for an Ecological Restoration Project shall include the following:

☒ Description of the project's ecological restoration goals;

☒ The location of the Ecological Restoration Project;

☒ Description of the construction sequence for completing the project;

☒ A map of the Areas Subject to Protection Under M.G.L. c. 131, § 40, that will be temporarily or permanently altered by the project or include habitat for Rare Species, Habitat of Potential Regional and Statewide Importance, eel grass beds, or Shellfish Suitability Areas.

☒ 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.) is attached with documentation methodology.

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

Herring Passage and Smelt Restoration Project
a. Plan Title

Gomez & Sullivan Engrs. & Weymouth DPW
b. Prepared by

Pending permit approvals
c. Signed and Stamped by

May 2018
d. Final Revision Date

As shown
e. Scale

f. Additional Plan or Document Title

g. Date

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

☒ Attach NOI Wetland Fee Transmittal Form.

☒ An evaluation of any flood impacts that may affect the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure as well as any proposed flood impact mitigation measures;

☒ A plan for invasive species prevention and control;

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Appendix 2: Ecological Restoration Notice of Intent (WPA 3a) - Minimum Required Documents (310 CMR 10.12)

☐ The Natural Heritage and Endangered Species Program written determination in accordance with 310 CMR 10.11(2), if needed;

☒ Any Time of Year restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3), (4), (5), if needed;

☒ Proof that notice was published in the *Environmental Monitor* as required by 310 CMR 10.11(1;

☒ A certification by the applicant under the penalties of perjury that the project meets the eligibility criteria set forth in 310 CMR 10.13;

☒ If the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan to ensure that the infrastructure will continue to function as designed;

☒ If the project involves dredging of 100 cubic yards or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00;

☐ If the Ecological Restoration Project involves work on a stream crossing, information sufficient to make the showing required by 310 CMR 10.24(10) for work in a coastal resource area and 310 CMR 10.53(8) for work in an inland resource area; and

☐ If the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.

☒ This project is subject to provisions of the MassDEP Stormwater Management Standards. A copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) is attached.

☒ Provide information as the whether the project has the potential to impact private water supply wells including agricultural or aquacultural wells or surface water withdrawal points.

3. Weymouth Notice of Intent Form

NOTICE OF INTENT
UNDER THE TOWN OF WEYMOUTH
WETLANDS PROTECTION ORDINANCE, CHAPTER 7, SECTION 301

1. Project Location Herring Run Park (intersection of Broad Street & Commercial Street)

2. Town of Weymouth Atlas Reference 19-253-25, 23-253-26, 23-253-27

3. Project Description Weymouth Herring Passage & Smelt Habitat Restoration Project

4. Registry of Deeds: County Norfolk Book 2916 Page 161 (for parcel 26 only)

5. *Applicant Weymouth Department of Public Works *Telephone# (781) 335-5100

6. *Applicant Address 120 Winter Street, Weymouth, MA 02188

7. Property Owner Town of Weymouth

8. Representative Jill Griffiths, Gomez and Sullivan Engineers Telephone# (603) 428-4960

9. Representative's Address PO Box 2179, Henniker, NH 03242

10. Has the Conservation Commission received the original material plus five copies of the Notice of Intent form, 8.5"X11", U.S.G.S. locus and 8.5"X11" sheet clearly showing the proposed site and work in addition to labeled resource areas? YES X NO____

11. Are the following additional interests relevant to the proposed project? If so, Notice of Intent must include a discussion of these interests. Aesthetics_____ Wildlife_____Recreation _____ Erosion Control___X___

12. Have you filed your Local Wetland Fees? State Fees? N/A YES_____NO____

I, THE UNDERSIGNED, HEREBY APPLY FOR A PERMIT PURSUANT TO THE CODE OF ORDINANCES, TOWN OF WEYMOUTH, CHAPTER 7, SECTION 301

Signature

June 4, 2018
Date

*THE WEYMOUTH CONSERVATION OFFICE WILL SUBMIT THE NECESSARY LEGAL AD, AND THE APPLICANT WILL BE BILLED DIRECTLY BY THE PATRIOT LEDGER. FOR BILLING PURPOSES, THE PATRIOT LEDGER REQUIRES THAT THE TELEPHONE NUMBER SUBMITTED MUST BE THE DIRECT CONTACT NUMBER THAT MATCHES THE NAME AND ADDRESS OF THE APPLICANT, OTHERWISE THE LEGAL AD WILL NOT BE PUBLISHED AND THE HEARING WILL BE DELAYED.

/ap

4. Project Narrative

This narrative is intended to supplement the NOI application forms with specifically requested and other relevant project information. Additional description of the project and design process can be found in the final design report in **Section 14**. Note that some minor details of the project may have been modified since the completion of the design report. In the event of conflicting information, this narrative and the updated design plans (**Section 6**) represent the most current iteration of the design.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AUL	Activity and Use Limitation
BMPs	Best Management Practices
BWSC	Bureau of Waste Site Cleanup
CAB	Cellulose Acetate Butyrate
cfs	cubic feet per second
CY	cubic yards
DCR	Massachusetts Department of Conservation and Recreation
DMF	Massachusetts Division of Marine Fisheries
ENF	Environmental Notification Form
GSE	Gomez and Sullivan Engineers, DPC
LSP	Licensed Site Professional
MCP	Massachusetts Contingency Plan
NHESP	Natural Heritage Endangered Species Program
ODS	Office of Dam Safety
ORW	Outstanding Resource Waters
PEC	Probable Effects Concentration
RTN	Release Tracking Number
sf	square feet
TEC	Threshold Effects Concentration
TOC	total organic carbon
TOY	time of year

4.1 Ecological Restoration Project Requirements

4.1.1 Eligibility Criteria

The project meets all the eligibility criteria for an Ecological Restoration Project Per 310 CMR 10.13(1) as follows:

(a) The project is an Ecological Restoration Project as defined in 310 CMR 10.04, is a project type listed in 310 CMR 10.13(2) through (7), and the applicant has submitted a Notice of Intent that meets all applicable requirements of 310 CMR 10.12.

- The project is an Ecological Restoration project as defined in 310 CMR 10.04 because its "primary purpose is to restore or otherwise improve the natural capacity of a Resource Area(s) to protect and sustain the interests identified in M.G.L. c. 131, § 40, when such interests have been degraded or destroyed by anthropogenic influences." In this case, the resource area being restored is "land under water bodies and waterways" to further the identified interest of protecting fisheries.

- The project type is "Restoring Fish Passageways" per 310 CMR 10.13(7).

- The NOI meets all applicable requirements of 310 CMR 10.12 as demonstrated in **Section 4.1.2** of this application package.

(b) The project will further at least one of the interests identified in M.G.L. c. 131, § 40.

- The project will further the identified interest of protecting fisheries.

(c) The project will not have any short-term or long-term adverse effect, as identified by the procedures established by 310 CMR 10.11, on specified habitat sites of Rare Species located within the Resource Areas that may be affected by the project or will be carried out in accordance with a habitat management plan that has been approved in writing by the Natural Heritage and Endangered Species Program and submitted with the Notice of Intent.

- The project is not located within any mapped Priority or Estimated Habitats of Rare Species designated by the Natural Heritage and Endangered Species Program (NHESP).

(d) To the maximum extent practicable, the project will:

1. avoid adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that can be avoided without impeding the achievement of the project's ecological restoration goals;

- Measures to avoid, minimize, and mitigate environmental impacts of the proposed project include: minimizing loss or change in size of wetland resource areas; maintaining continuous flow during construction within a gravity pipe system to allow juvenile fish to migrate safely downstream; use of cofferdams; adherence to time-of-year restrictions to limit impacts to fisheries; use of erosion, sedimentation, water, and pollution control Best Management Practices (BMPs) during construction; and restoration of access/staging areas in the Riverfront Area following construction. In addition, the potential impacts

associated with effects of climate change were considered in the project design by conducting an updated flood frequency analysis.

2. *minimize adverse impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40, that are necessary to the achievement of the project's ecological restoration goals; and*

   - See response to item 1 above.

3. *utilize best management practices such as erosion and siltation controls and proper construction sequencing to prevent and minimize adverse construction impacts to Resource Areas and the interests identified in M.G.L. c. 131, § 40*

   - During construction, temporary erosion, sedimentation, water, and pollution controls will be utilized in accordance with BMP guidelines recommended by MassDEP. To prepare the site, natural vegetation will be preserved to the extent practicable. Erosion of proposed access routes (along existing paved and grassed areas) will be controlled by installing a stabilized construction entrance and gravel access roads with geotextile underlayments. Erosion and sedimentation due to stormwater runoff will be managed with approved measures such as silt socks or entrenched silt fences installed at the limits of all work/disturbances. Disturbed and stockpile areas will receive temporary seeding/ mulching/rip-rap as appropriate. Dust will be controlled as necessary. As noted, pumping will only be needed during initial dewatering and then for minimal maintenance needs thereafter. Pump discharge will be directed into weir tanks to separate fine sediments. The site will be restored to its former condition following construction.

(e) *The project will not have significant adverse effects on the interests of flood control and storm damage prevention in relation to the built environment (i.e., the project will not result in a significant increase in flooding or storm damage affecting buildings, wells, septic systems, roads or other human-made structures or infrastructure).*

   - The proposed project is not anticipated to significant adverse effects on the interests of flood control and storm damage prevention in relation to the built environment. A detailed analysis of potential impacts to the capacity of the upstream flood control conduit was conducted as part of the design process. Additional details can be found in the design report in **Section 14**.

(f) *If the project will involve the dredging of 100 cubic yards of sediment or more or dredging of any amount in an Outstanding Resource Water, the Notice of Intent includes a Water Quality Certification issued by the Department in accordance with 314 CMR 9.00:401 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Disposal in Waters of the United States Within the Commonwealth.*

   - An Application for BRP WW 26 – Combined License/Permit for Waterways & Water Quality was filed for the project on February 1, 2018. Based on the typical review period of 120 days, the Water Quality Certification was expected by June 1, 2018, but has not yet been received. The Certification is anticipated to be issued by June 14, 2018 and will be forwarded to the Conservation Commission and DEP Southeast Regional Office and included in **Section 12** of this application package when received.

(g) The project will not substantially reduce the capacity of a Resource Area to serve the habitat functions identified in 310 CMR 10.60(2). A project will be presumed to meet this eligibility criteria if the project as proposed in the Notice of Intent will be carried out in accordance with any time of year restrictions or other conditions recommended by the Division of Marine Fisheries for coastal waters, and by the Division of Fisheries and Wildlife for inland waters in accordance with 310 CMR 10.11(3) through (5). As set forth in 310 CMR 10.12(3), a person submitting a Notice of Intent for an Ecological Restoration Project that meets the requirements of 310 CMR 10.12(1) and (2) is exempt from the requirement to perform a wildlife habitat evaluation in accordance with 310 CMR 10.60.

- The project is located in coastal waters and will be carried out in accordance with any time of year restrictions or other conditions recommended by the Division of Marine Fisheries (provided in **Section 13** of this application package).

- The project is not located within any mapped Priority or Estimated Habitats of Rare Species designated by the NHESP and is exempt from the requirement to perform a wildlife habitat evaluation.

(h) If the Ecological Restoration Project involves work on a stream crossing, the stream crossing has been designed in accordance with 310 CMR 10.24(10) for work in coastal resource areas and 310 CMR 10.53(8) for work in inland resource areas, as applicable.

- The project does not involve work on a stream crossing.

(i) The Ecological Restoration Project will not result in a discharge of dredged or fill material within 400 feet of the high water mark of a Class A surface water (exclusive of its tributaries) unless the project is conducted by a public water system under 310 CMR 22.00: Drinking Water or a public agency or authority for the maintenance or repair of existing public roads or railways in accordance with 314 CMR 4.06(1)(d)1.

- The project will not result in a discharge of dredged or fill material within 400 feet of a Class A surface water.

(j) The Ecological Restoration Project will not result in a discharge of dredged or fill material to a vernal pool certified by the Division of Fisheries and Wildlife.

- The project will not impact any certified vernal pools.

(k) The Ecological Restoration Project will not result in a point source discharge to an Outstanding Resource Water.

- The project will not result in a point source discharge to an Outstanding Resource Water (ORW). Pump discharges due to dewatering activities will be directed to weir tanks.

(l) The Ecological Restoration Project will not involve the armoring of a Coastal Dune or Barrier Beach.

- The project will not involve the armoring of a Coastal Dune or Barrier Beach.

4.1.2 Supporting Documentation

This NOI includes the following items required for an Ecological Restoration Project per 310 CMR 10.12(1):

(a) the project's ecological restoration goals;

- See **Section 4.2**

(b) the location of the Ecological Restoration Project;

- See **Section 4.2** and location map in **Section 5**.

*(c) the **construction sequence** for completing the project;*

- See **Section 4.6.9**.

(d) a map of the Areas Subject to Protection under M.G.L. c. 131, § 40, that will be temporarily or permanently altered by the project or include habitat for Rare Species, Habitat of Potential Regional and Statewide Importance, eel grass beds, or Shellfish Suitability Areas;

- Areas Subject to Protection under M.G.L. c. 131, § 40 in the project area are mapped on **Drawing 2** of the design plans in **Section 6**.

- The project is not located within any mapped Priority or Estimated Habitats of Rare Species designated by the NHESP or other listed areas subject to projection, so no habitat map is included.

(e) an evaluation of any flood impacts that may affect the built environment, including without limitation, buildings, wells, septic systems, roads or other man-made structures or infrastructure as well as any proposed flood impact mitigation measures;

- The proposed project is not anticipated to significant adverse effects on the interests of flood control and storm damage prevention in relation to the built environment. A detailed analysis of potential impacts to the capacity of the upstream flood control conduit was conducted as part of the design process. Additional details can be found in the design report in **Section 14**.

(f) a plan for invasive species prevention and control;

- See **Section 4.6.8**.

(g) any preliminary written determinations obtained from the Natural Heritage and Endangered Species Program in accordance with 310 CMR 10.11(2);

- The project is not located within any mapped Priority or Estimated Habitats of Rare Species designated by the NHESP, so no determination was requested.

(h) any Time of Year restrictions and/or other conditions recommended by the Division of Marine Fisheries or the Division of Fisheries and Wildlife in accordance with 310 CMR 10.11(3) through (5);

- See **Section 13**.

(i) proof that notice was published in the Environmental Monitor as required by 310 CMR 10.11(1);

- See **Section 10**.

(j) a certification by the applicant under the penalties of perjury that the project meets the eligibility criteria set forth in 310 CMR 10.13, 10.24(8) or 10.53(4), whichever is applicable;

- See **Section 2**.

(k) if the Ecological Restoration Project involves the construction, repair, replacement or expansion of infrastructure, an operation and maintenance plan to ensure that the infrastructure will continue to function as designed;

- See **Section 7**.

(l) If the project involves dredging of 100 cubic yards or more or dredging of any amount in an Outstanding Resource Water, a Water Quality Certification issued by the Department pursuant to 314 CMR 9.00: 401 Water Quality Certification for Discharge of Dredged or Fill Material, Dredging, and Dredged Material Disposal in Waters of the United States Within the Commonwealth;

- An Application for BRP WW 26 – Combined License/Permit for Waterways & Water Quality was filed for the project on February 1, 2018. Based on the typical review period of 120 days, the Water Quality Certification was expected by June 1, 2018, but has not yet been received. The Certification is anticipated to be issued by June 14, 2018 and will be forwarded to the Conservation Commission and DEP Southeast Regional Office and included in **Section 12** of this application package when received.

(m) if the Ecological Restoration Project involves work on a stream crossing, information sufficient to make the showing required by 310 CMR 10.24(10) for work in a coastal resource area and 310 CMR 10.53(8) for work in an inland resource area; and

- The project does not involve work on a stream crossing.

(n) if the Ecological Restoration Project involves work on a stream crossing, baseline photo-points that capture longitudinal views of the crossing inlet, the crossing outlet and the upstream and downstream channel beds during low flow conditions. The latitude and longitude coordinates of the photo-points shall be included in the baseline data.

- The project does not involve work on a stream crossing.

4.2 Project Overview and Goals

The Weymouth Back River (or Back River), located in Hingham and Weymouth, Massachusetts, supports one of the largest river herring runs in Massachusetts Bay. From the tidal waters in Hingham Bay, river herring ascend a total of six fishways on the Back River and Herring Brook to reach their spawning habitat in Whitmans Pond. A flood control conduit was constructed, in the 1960s, in the upper portion of the Back River watershed, to bypass storm flows past Jackson Square in Weymouth. The tunnel inlet is located just below Whitmans Pond Dam at Iron Hill Dam, with the outlet discharging adjacent to the lowermost fishway in Jackson Square. An existing fish diversion swing gate at the tunnel outlet has been ineffective at preventing upstream migrating river herring from entering the conduit, where they may become trapped and perish.

The Town of Weymouth secured funding from the Massachusetts Division of Marine Fisheries (DMF) to contract Gomez and Sullivan Engineers, DPC (GSE) to prepare design plans, bid documents, and permit applications for an alternative solution to the problem of fish accessing the flood control tunnel. Project goals include implementing the following fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square:

- Replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel.
- Reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder.
- Restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment primarily washed off roadways.
- Regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

The primary target species for the redesign of the fish diversion are the anadromous alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), known collectively as river herring. The diversion redesign also considered the catadromous American river eel (*Anguilla rostrata*). Additional project goals include establishing spawning substrate for rainbow smelt (*Osmerus mordax*) on the concrete pad downstream of the diversion, as well as a resting pool for river herring below the concrete pad.

DMF has been an active technical partner on this project since its conception. DMF staff have participated in and reviewed the design plans, specifications, and operations and maintenance plan. DMF will continue to assist with the review process to finalize these documents prior to the commencement of construction.

4.3 Description of the Site

The existing fish diversion gate was constructed in the early 1980s. It is approximately 6.5 feet high by 23 feet wide and is situated on a concrete slab between two vertical concrete walls. An elevated concrete deck with a bottom elevation approximately 13.5 feet above the concrete slab supports a walkway above. The gate is constructed of metal grating framed by 8-inch-diameter horizontal metal pipes on the top and bottom and 8-inch by 12-inch by approximately 11-foot high vertical metal tubes at each side, the upper half of which are filled with lead. The entire gate rotates on a hinge attached to the channel wall.

The gate was designed to swing open during periods of high flows. However, the gate would swing open under moderate flows, which had the unintended consequence of allowing river herring to enter the

tunnel. As there is no way for fish to gain access through to Whitmans Pond from the tunnel, the only exit for herring is at the outlet where they entered. Normally this would not be a significant issue, as fish would recede with the flow out of the tunnel following a high flow event; however, during two known events (2000 and 2010), a steady period of moderate to high flow occurred (i.e., flow was not decreasing; therefore river herring were not receding). The fish remained in the tunnel long enough to deplete the available dissolved oxygen, which led to the suffocation and eventual death of thousands of river herring.

Even when in the closed position, the original swing gate was insufficient at preventing river herring from entering the system. In 2004, a cooperative effort was made by DMF and the Town to repair and improve the functionality of the gate. The repairs included adding a fine stainless-steel mesh to the gate surface, installing stop logs, and performing concrete and steel repairs to the gate and superstructure. Since these modifications, the Town has observed that the gate now opens under even more moderate flows, not just flood events, resulting in river herring entering the flood control tunnel much more frequently under a wide range of spring flows. The gate is also experiencing corrosion, as it is now over 30 years old, and does not seal well and can remain stuck open and not return to a closed position when flows recede.

Regarding the channel downstream of the diversion, DMF has indicated that the existing concrete pad was previously covered with stone substrate. This material washed out during a flood event around 2005. It is thought that this material washed downstream and filled in a former river herring resting pool that had been located immediately downstream of the concrete pad. The dimensions of this former pool were previously observed to be about 3 to 4 feet deep and on the order of 15 to 20 feet wide. Throughout the project area, the channel has also filled in with sediment washed off roadways, impacting fish habitat and passage.

Additionally, at the downstream end of the concrete-walled channel (about 350 feet downstream of the tunnel outlet), an unauthorized rock weir has been built, likely by people seeking to cross the stream. It backwaters Herring Brook up to the fish ladder, which has nearly eliminated spawning riffles for smelt at a location that DMF has considered for decades as one of the three largest smelt runs in MA.

The project site is a public park adjacent to the Lovell Field complex. It is located within the Weymouth Back River Area of Critical Environmental Concern (ACEC). Weymouth Back River and Whitmans Pond are classified as Outstanding Resource Waters (ORW) and segments of each are categorized as impaired water bodies.

It should be noted that the Lovell Field complex adjacent to the project site was reconstructed in 2017, so the proposed access and staging areas for the project have changed slightly since the Environmental Notification Form (ENF) was submitted in 2016. The aerial images in **Section 5** represent the current post-construction condition of Lovell Field and the design plans in **Section 6** have been updated accordingly.

4.4 Proposed Design

4.4.1 Fish Diversion Structure

The proposed fish diversion will consist of a reinforced concrete, cantilever type retaining wall. The wall will be 8.5 feet high with an overall length of approximately 55 feet and a thickness varying from 2 to 3 feet. The existing metal swing gate and concrete pad will be removed. The stem of the new concrete wall will extend vertically from a new concrete footing and pad. A metal angle will be placed on the downstream side of the wall to act as a diversion for climbing eels.

A 6-foot-wide by 3.5-foot-high stainless-steel slide gate (upward opening) will be installed as a low-level outlet. The gate will be closed to prevent herring from accessing the flood control conduit during their upstream migration period (approximately March 1 through June 30), but will be kept open at other times of the year to allow water to freely flow from the flood control conduit and not be impounded by the wall.

The proposed wall will be angled to align with the existing fish ladder. This configuration will provide increased weir length for flood protection and will enhance attraction to the fish ladder, because the majority of the water spilled over the diversion will fall at the base of the fish ladder. Presently, under some conditions of higher flows, fish can be more attracted to the flood control conduit than the fish ladder because the conduit flow is undiluted Whitmans Pond water whereas the fish ladder can receive more stormwater runoff. This alignment also allows the operable gate to be located out from underneath the existing elevated deck allowing for easier access, maintenance, and operation. For all these reasons, a wall angled with relation to the channel was preferred to a wall perpendicular to the channel such as the existing metal gate.

Hydraulics in the channel are complex and are influenced by the flood conduit's siphon spillway inlet, open channel flow in Herring Brook, tidal conditions, and a downstream railroad crossing constriction. Considering all of these factors, the wall was designed to pass the 100-year flood flow (1,100 cubic feet per second, cfs) with over 1 foot of freeboard to an existing elevated deck concrete support beam above the wall with the gate closed, and in excess of the 500-year flood flow (1,860 cfs) with no freeboard and the gate opened. At the 500-year flow, the structure will impound less than 5 acre-feet, contained entirely within the existing flood control conduit.

In a letter to the Secretary of Environment and Energy dated June 14, 2016 (provided in **Section 11** of this application package), the Massachusetts Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS) determined that the new diversion structure will not impact the function or hydraulic capacity of the flood control conduit. Since the diversion structure will be 8.5 feet high and therefore exceed the jurisdictional height identified in the dam safety regulations, ODS requested that a Chapter 253 jurisdictional determination request be submitted. However, because the maximum volume of 4.4 acre-feet that will be impounded by the structure (between March 1 and June 30 annually) is below the jurisdictional threshold of 15 acre-feet, ODS determined that the proposed structure will be non-jurisdictional.

4.4.2 Channel Improvements

Improvements to the channel downstream of the fish diversion will be constructed to reestablish smelt spawning habitat and to restore a resting pool for herring. For the smelt spawning habitat, the concrete pad below the fish ladder and wall will be covered with a 12-inch layer of grouted rip-rap (consisting of 6- to 12-inch-diameter stone) topped by a 12-inch layer of loose 4- to 8-inch-diameter cracked stone. An additional 2 cubic yards of 4- to 8-inch cracked stone will be spread over the channel downstream of the grouted section. For the resting pool, the channel downstream of the concrete pad will be excavated to approximate the former pool dimensions of about 3 to 4 feet deep, 15 feet wide, and 40 feet long (for a total volume of 25 cubic yards (CY)). Large stones with major dimensions on the order of three feet and weighing approximately one ton will be used to define the extent of the restored resting pool and act as energy dissipaters to help prevent future washouts of the substrate. Additional sediment due to stormwater runoff may be dredged from the project area under the direction of DMF. Lastly, an unauthorized rock weir at the downstream extent of the concrete-walled channel will be regraded to restore flow depths and velocities suitable for smelt spawning. This will involve distributing the approximately 25 CY of rocks comprising the weir downstream over a length of about 150 feet.

4.5 Project Impacts

4.5.1 Dredging

The proposed project will include dredging of approximately 300 CY of sediment within a footprint of approximately 7,200 square feet (sf) as follows:

- Dredging of approximately 25 CY of sediment to restore the former herring resting pool over an area of about 800 sf
- Regrading of approximately 25 CY of rocks comprising the unauthorized rock weir over an area of about 4,700 sf
- Removal of approximately 40 CY of concrete (existing slab), 10 CY of concrete paver block, and 170 CY of earth (below the slab), totaling 220 CY, to be replaced with gravel subbase, new concrete wall footings and slab, and channel substrate rock fill over an area of about 1,700 sf
- Potential dredging of additional sediment associated with stormwater runoff as directed by DMF

4.5.2 Fill/Structures

The proposed project will involve the following fill volumes and structures:

- 40 CY of concrete fill above existing grade for the diversion wall (the only net loss of channel volume due to fill, minus the volume of the existing metal gate to be demolished, which is assumed to be less than 5 CY)
- 100 CY of concrete fill below existing grade for the wall footing and slab
- 60 CY of gravel subbase fill below existing grade for the new diversion wall footing and slab
- 50 CY of rip-rap (25 CY) and modified rockfill (25 CY) for fish spawning substrate (the top of this fill will be equal to the existing grade, so there will be no net loss in channel volume due to substrate improvements)

4.5.3 Impacts to Wetlands/Waterways

Impacts to wetland resources within the project site will include 1) temporary disturbances associated with dewatering of the work area and in-water construction, as well as 2) permanent alterations to the channel bottom substrate and grade. All impacts will occur in wetlands classified as Land under Water Bodies and Waterways. No loss or change in size of wetland resources is anticipated.

Due to the nature of the wetlands in the project site, which consist of a manmade concrete-lined channel with vertical side walls (or "banks"), wetlands were delineated simply as the top of bank using existing site plans of the concrete channel as well as aerial imagery and ground truthing. No bordering vegetated wetlands or other wetland types exist in the project vicinity.

The affected wetland area totals about 7,200 sf, shown approximately as two outlined areas within the channel in **Figure 5-3** of **Section 5**. The upstream area (approximately 2,500 sf) is the area that will be dewatered to construct the fish diversion wall, channel improvements, and resting pool. The downstream area (approximately 4,700 sf) is the area over which the unauthorized rock weir will be graded.

Potential environmental impacts associated with the project include:

- temporary disturbance of approximately 15,000 sf of land within the Riverfront Area (for access/staging activities)

- temporary disturbance of 45 linear feet of Bank (for cofferdam installation)
- creation of approximately 360 sf of new impervious area (for the extension of the concrete slab in the channel underneath the restored smelt habitat)
- loss of approximately 40 CY of LUW (the volume of the new diversion wall)
- permanent alteration of approximately 7,200 sf of LUW/Fish Runs (for the channel habitat improvements and diversion wall construction)
- temporary disturbance of approximately 1,000 sf of LUW/Fish Runs (for cofferdam installation)

4.5.4 Other Potential Impacts

Flood Impacts

The proposed project is not anticipated to significant adverse effects on the interests of flood control and storm damage prevention in relation to the built environment. A detailed analysis of potential impacts to the capacity of the upstream flood control conduit was conducted as part of the design process. Additional details can be found in the design report in **Section 14**.

Water Supply

The proposed project is not anticipated to impact private water supply wells or surface water withdrawal points.

4.6 Construction Methods

The following sections summarize the proposed construction methods with respect to timing, access and staging, erosion and sedimentation control, water control, traffic control, sediment management, and material disposal. Detailed design plans are provided in **Section 6** of this permit application package. Note that the proposed plan only represents the recommendation of the engineer. The selected contractor for the project will be required to submit a construction sequence plan, which will include proposed means, methods, and phasing required for water, erosion, and sedimentation control. The plan will need to be approved by the project engineer and project partners and adhere to all conditions contained in relevant permits.

4.6.1 Timing

The project should ideally be constructed during a period of relatively low flow and at a time that will have the lowest impact on marine resources (including smelt spawning and river herring migration). About 2 to 3 months should be allotted for the entire construction period.

The project area is located in a coastal zone and therefore is subject to DMF's recommendations for seasonal or "time of year" restrictions (TOYs) on in-water construction work. In their draft Fishway Construction Permit (**Section 13**), DMF specifies that no in-water construction or activities contributing silt or sediment to the Back River shall be conducted from March 1 to June 30. This period primarily protects the migrations of river herring, rainbow smelt, and American eel. A summer and fall TOY for August 15 to November 15 will be needed to protect juvenile river herring downstream passage, unless water control and juvenile herring bypass plans are prepared and approved by DMF. It is anticipated that the gravity bypass system currently proposed for water control (described below) can safely juvenile herring and DMF has approved this approach, but will need to approve the final contractor submittal for water control before making a final determination.

Therefore, the recommended construction period is August through October to minimize impacts to marine resources and take advantage of relatively low flows.

4.6.2 Access & Staging

Construction access and staging areas for the project will primarily be located on existing paved and grassed areas on Town lands within the Lovell Field complex on the west side of Herring Brook. A crane is recommended to lift a mini-excavator or small skid-steer loader into the channel to conduct the work. The machine would be removed from the channel at the end of each work day. The temporary access pad for the crane is proposed to be located on Town lands on the east side of Herring Brook. Temporary gravel access roads will be constructed for routes crossing vegetated areas or existing paved paths.

The total disturbance area is anticipated to be less than 1 acre (approximately 15,000 sf). Work that is not proposed to be conducted on existing pavement (e.g., dewatering area, crane pad) will be sited to minimize disturbance to existing plantings and all disturbed areas will be restored in coordination with the Weymouth Conservation Commission.

4.6.3 Water Control

Water control at the site will consist of 1) stopping inflow into the flood control conduit at the intake, 2) bypassing water from the surface channel of Herring Brook (i.e., upstream of the fish ladder) around the work area, and 3) controlling backwater from downstream (including tidal surges).

In order to address the inflow into the flood control conduit, stoplog slots in the existing siphon intakes at Iron Hill Dam can be fitted with boards to close the conduit. With the siphons closed, all flow will be diverted to the surface channel of Herring Brook.

To control surface channel flow and tidal surges at the construction area, a cofferdam and gravity bypass pipe system is recommended. This system will divert flow around the work area and safely pass any juvenile herring migrating downstream. The cofferdams will need to be on the order of five to six feet tall to effectively isolate the construction site. Because of the narrow nature of the channel and the need for a relatively tall structure, a prefabricated cofferdam such as Portadam is recommended. Dewatering of the work area will be accomplished by pumps directed to weir tanks in a dewatering area in Lovell Field. After initial dewatering, only minimal maintenance pumping of runoff entering the work area is anticipated. The discharge water is not expected to be contaminated. The rock weir grading is proposed to be completed within the wetted channel downstream of the cofferdam diversion during a period of low flow.

During the recommended in-water work period from August through October, the mean flow in the river at the project site is estimated to be 11 cfs, and a flow of 23 cfs is exceeded 10% of the time. Monthly flow duration curves will be provided to construction contract bidders to allow for the proposal of alternative water management techniques. The selected construction contractor will ultimately be responsible for managing water to complete the project within the specified timeframe. In the event of flows higher than the low-level outlet capacity, work will be suspended.

4.6.4 Stormwater Management

The proposed project is a fish passage improvement/habitat restoration project, not a development project; therefore, only stormwater standards related to temporary construction impacts (Standard 8)

would apply. A Stormwater Report Checklist is provided in **Section 8** of this application package, although most of the sections are not applicable to this project.

The project is not anticipated to have significant stormwater impacts as the site and the nature of the construction activities are not particularly susceptible to erosion. The proposed construction access and staging area is essentially flat with no steep slopes. The Herring Brook channel through the project area has vertical concrete side walls and a bottom lined with either solid concrete or concrete block pavers.

Recommended erosion and sedimentation control measures are described in **Section 4.6.5** below and included on the construction drawings. The selected contractor will be responsible for developing and implementing a plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities. The plan will be required to comply with all conditions contained in relevant permits and must be approved by the engineer and the Town.

During construction, temporary erosion, sedimentation, water, and pollution controls will be utilized in accordance with BMP guidelines recommended by DEP. To prepare the site, natural vegetation will be preserved to the extent practicable. Erosion of proposed access routes (through a mowed field and along existing paved footpaths) will be controlled by installing a stabilized construction entrance and gravel access roads. Erosion and sedimentation due to stormwater runoff will be managed with approved measures such as silt socks installed at the limits of all work/disturbances. Disturbed and stockpile areas will receive temporary seeding/mulching/rip-rap as appropriate. Dust will be controlled as necessary. Pump discharge (due to dewatering) will be directed into weir tanks to capture fine sediments.

4.6.5 Erosion & Sedimentation Control

The project is not anticipated to have significant erosion and sedimentation impacts as the site and the nature of the construction activities are not particularly susceptible to erosion. The proposed construction access and staging area is essentially flat with no steep slopes. The Herring Brook channel through the project area has vertical concrete side walls and a bottom lined with either solid concrete or concrete block pavers.

The selected contractor will be responsible for developing and implementing a plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities. The plan will be required to comply with all conditions contained in relevant permits and must be approved by the engineer and the Town.

During construction, temporary erosion, sedimentation, water, and pollution controls will be utilized in accordance with Best Management Practice (BMP) guidelines recommended by MassDEP. To prepare the site, natural vegetation will be preserved to the extent practicable. Erosion of proposed access routes (along existing paved and grassed areas) will be controlled by installing a stabilized construction entrance and gravel access roads with geotextile underlayment. Erosion and sedimentation due to stormwater runoff will be managed with approved measures such as silt socks or entrenched silt fences installed at the limits of all work/disturbances. Disturbed and stockpile areas will receive temporary seeding/ mulching/rip-rap as appropriate. Dust will be controlled as necessary. As noted, pumping will only be needed during initial dewatering and then for minimal maintenance needs thereafter. Pump discharge will be directed into weir tanks to separate fine sediments. The site will be restored to its former condition following construction.

4.6.6 Material Disposal

All sediment dredged during construction will be stockpiled onsite until sediment samples can be taken and analyzed by a lab (see **Section 4.8** for a proposed sediment sampling plan) to inform the appropriate disposal site(s). If deemed 'clean', appropriate material will be graded on site to remove 4- to 12-inch stone for use in augmenting smelt spawning habitat in the project area. Remaining material will be removed from the site for lawful disposal or upland reuse as appropriate. The material could be disposed of at a local sand/gravel borrow pit or other location accepting clean fill. If it is clean and relatively sandy, it could potentially be accepted as landfill cover (i.e., "Landfill Reuse" in accordance with COMM-97-001). Clean sediment could also be regraded elsewhere on the upland portion of the property (i.e., outside of the top-of-bank lines, which is known as "Upland Material Reuse"); however, this may not be feasible given the constraints of the site. Lastly, either clean or contaminated sediment could be disposed of at an in-state landfill or a hazardous waste facility per MassDEP regulations. Concrete paver blocks will be salvaged and turned over to the Town. Concrete and metal demolition material (from the existing gate and slab) will be hauled offsite for lawful disposal or recycling at an approved facility.

4.6.7 Idling Restrictions

Excessive idling during the construction period will be prohibited. The methods of reducing idling will include posting signage limiting idling to five minutes or less at the project site, driver training, and periodic inspections by site supervisors to ensure compliance with this regulation once the project is occupied. Finally, staging areas will be established in a manner that minimizes impacts to abutting properties from construction equipment emissions.

4.6.8 Invasive Species Prevention and Control Plan

Per consultations with the Weymouth Conservation Administrator, invasive species are not anticipated to be a significant issue for this project. The proposed work will occur primarily within the water, in a concrete-lined channel where no invasive species are present. Construction access and staging will occur on maintained parkland that was recently redeveloped (within the last two years), and there are no known invasive species requiring management on site. Standard precautions will be recommended to prevent the spread of any potential invasive species during construction (e.g., use of a stabilized construction entrance, cleaning of equipment, etc.).

4.6.9 Construction Sequence

The contractor will be required to submit a construction sequence plan for approval by the Town and the engineer. The plan will show the location of temporary facilities and laydown and storage areas, list the sequence of construction activities, and include for each phase the maximum disturbed areas, required cuts and fills, and temporary water, erosion, and sediment control measures. The following is a general recommended construction sequence that will be refined by the contractor for the site-specific requirements as needed.

1. Install erosion and sedimentation control practices as indicated in the plans and the contractor's construction sequence plan.
2. Flag limits of clearing, to be approved by the Town prior to any tree removal. Take care to limit disturbance and protect existing plantings.
3. Stake out utilities and notify the engineer of any conflicts with other utilities.
4. Commence site work.
5. Maintain erosion controls until all areas are stabilized and approved by the Town.

6. Remove temporary erosion and sediment controls after the Town's final acceptance of stabilization of disturbed areas.

4.7 Alternatives Analysis

4.7.1 Fish Diversion Alternatives Analysis

Due to poor design and functioning of the existing metal swing gate, the Town was not interested in a gate rehabilitation alternative to deal with the declining condition of the gate. Through discussions with project partners, the following attributes were identified as design criteria for a replacement fish diversion:

- Provide the ability to be fully closed such that herring cannot access the tunnel via gaps or openings
- Be of sufficient height to exclude herring from gaining access to the tunnel over the top of the diversion as close to 100% of the time as possible
- Provide sufficient open area (above or through the structure) to safely pass anticipated flows
- Provide the ability to fully drain the tunnel, such that water behind the diversion structure does not become stagnant
- Provide an opening of sufficient size and geometry to allow any herring that may become trapped to exit the tunnel with limited stress
- Include a structure to exclude American eel from moving over the diversion

Alternatives that could potentially meet these criteria were identified as either a replacement gate or a wall with a gated opening located at the floor elevation. A concrete wall with a gated opening became the selected design concept when it became apparent that a full gate replacement had notably higher construction costs with less expected longevity than a diversion wall.

Preliminary Design

The preliminary design for the fish diversion included an angled wall with a total effective (centerline) length of about 40 feet. It was determined that if the diversion height were fixed at 9 feet to exclude herring 99% of the time based on the results of the tidal surge analysis, it would only be able to pass a flow of about 1,270 cfs without impacting the 3-foot-deep beam supporting the elevated concrete deck above, which is less than the flood conduit inlet capacity of 1,700 cfs. Furthermore, a freeboard of at least one foot between the top of the water surface over the diversion and the bottom of the beam is desired for safety.

Reducing the height of the preliminary 40-foot-long diversion wall to 7 feet would allow it to pass a flow of approximately 1,713 cfs (greater than the conduit inlet capacity of 1,700 cfs) with a freeboard of 1 foot to the beam. Therefore, for the preliminary design, it was suggested that the fixed height of the diversion wall should be 7 feet for flood safety purposes, and that water control structures could be added to raise the height to 9 feet to exclude fish 99% of the time during herring migration period.

Various water control structures were considered, including rubber dams, slide or drum gates, and flashboards. Flashboards appeared to be the simplest and most economical option with the significant advantage of not relying on operation or intervention to pass flood flows. As such, the recommended water control structure for the preliminary design was two-foot high wooden flashboards designed to

automatically trip at a head of about 2 feet. A concept plan of the preliminary design is shown in Figure 2.6-1 of the design report (**Section 14**).

However, project partners decided that the use of flashboards was not ideal. Flashboards require various components that would need to be purchased, maintained, and eventually replaced. Additionally, they could potentially fail at flows lower than intended and be difficult to replace during high spring flows, resulting in the possibility for fish to enter the flood control conduit. The most effective fish barriers have no crest operations or movable parts. The project team concluded that a slight reduction in percent of fish excluded (down to a minimum of 90%) would be acceptable in order to obtain a fixed height structure with lower operation and maintenance requirements.

Concept Design Alternatives

Based on this feedback, three alternative design concepts were developed to provide additional flood flow capacity with a higher fixed height. All three alternatives included a concrete diversion wall with a fixed height of 8.5 feet above the concrete pad. According to the results of a tidal surge analysis, a wall height of 8.5 feet would still be expected to exclude herring 99% of the time, but with a lower factor of safety (1.5 feet of separation between the downstream water surface elevation and the top of the wall, instead of the recommended 2 feet). Concept plans of each alternative are shown in **Figures 2.6-2** through **2.6-4** of the design report (**Section 14**). A description of the alternatives follows:

1. **Alternative 1 – One Gate:** This alternative included one gate with an overflow weir section. Above the gate would be a non-overflow section that would be the same elevation as the adjacent existing grade and allow for direct operation of the gate from that level. Hydraulically, the flow would be split between the gate and the weir during the design flood.

2. **Alternative 2 – Two Gates:** This alternative included a long weir for overflow plus two gates that would pass about 40% of the flow during the design flood. One gate would be operated from the side of the channel and the other would be operated from the elevated deck above. The entire weir would overtop with flow. The wall would be reoriented from the preliminary design to direct the gate discharges downstream.

3. **Alternative 3 – Extended Weir:** This alternative included a weir that was extended approximately 15 feet farther downstream than the two other options. A small (6 feet wide by 3.5 feet high), upward opening slide gate would be installed as a low-level outlet. It would not require operation during a storm, but would be opened outside of fish migration period to allow the flood conduit to drain. This gate would be operable from the canal wall.

The first option was attractive from a structural design perspective. However, it would require gate operation during a flood event, which is not ideal due to the potential for gates to become stuck, lose power (if electric), become inaccessible due to inundated roads, and tie up emergency personnel resources. From a hydraulic standpoint, the second alternative (with two gates) provided redundancy in case one gate becomes stuck and can't be opened during a flood. However, it would be more complex to build and operate, and would likely have a higher associated cost as well.

In the end, the third option with the extended weir length (totaling approximately 55 feet) was selected as the preferred alternative for final design as it would provide passive flood capacity and does not require gate operation during most flood events. The capacity of the proposed diversion wall to pass flood flows is discussed in the design report.

4.7.2 Construction Method Alternatives Analysis

Several alternatives for construction access routes and erosion, sedimentation, and water controls were considered throughout the design process. One access route option involved accessing the work area from the southern end of Lovell Field near the upstream cofferdam. However, it was determined that this route should be avoided to minimize impacts to existing tree plantings along the channel.

For water control, a pump diversion was considered but abandoned due to potential impacts to juvenile fish migrating downstream. Instead, a large diameter gravity bypass pipe system is proposed to safely pass both flows and juvenile fish.

4.8 Proposed Sediment Sampling & Analysis Plan

Pre-application discussions were held with MassDEP regarding sediment sampling requirements for the proposed project. MassDEP acknowledged the challenges in obtaining representative sediment samples for this site prior to construction since most of the sediment to be dredged is either coarse material (such as concrete, paver blocks, or larger rocks), or is currently inaccessible (i.e., below concrete slab). MassDEP's proposed alternative is to sample the sediment during construction.

This section serves as a project-specific proposed sediment sampling and analysis plan for review and comment by MassDEP. The management of the dredged materials will be informed by the sediment analysis results in consultation with MassDEP.

4.8.1 Due Diligence Review

To inform the sediment sampling plan for this site, a due diligence review of the watershed upstream of the project site was conducted to determine the potential for the sediment proposed to be dredged to have concentrations of oil or hazardous materials, as defined in the Massachusetts Contingency Plan (MCP) (310 CMR 40.0000).

The land use in the project area is open space/public park surrounded by urban development. The concrete canal and flood control conduit containing Herring Brook within the project area were constructed in the 1960s. Since the sediment proposed to be dredged has accumulated since that time, only potential sources of contamination occurring after that period should be considered.

Releases of oil and/or hazardous material to the environment are required to be reported to the MassDEP's Bureau of Waste Site Cleanup (BWSC), in accordance with M.G.L. Chapter 21E and procedures established within the MCP. All reported releases are given a period of one year to either be cleaned up or be classified as either Tier I (indicating groundwater contamination in a current drinking water resource area, presence of an imminent hazard or Critical Exposure Pathway, or ongoing Immediate Response Action that involves remedial action) or Tier II (all other sites) in order to undergo a comprehensive assessment and cleanup program. Failure to comply with cleanup or "tier classify" in the one-year timeframe results in the site being automatically classified as a Tier ID (Default) site. In cases where cleanup cannot be achieved to the most protective use, a Notice of Activity and Use Limitation (AUL) must be attached to the deed of the contaminated property to document the location of residual contamination and specify restricted and permitted activities and uses of the property in this location (AUL area).

According to the January 2016 MassGIS publication of the MassDEP waste site data, there are currently three tier classified sites in the watershed for which a Permanent Solution (permanent site closure) has

not yet been achieved (i.e., "active sites"). All three are classified as Tier ID. Of the sites with a Permanent Solution (i.e., "closed sites") in the watershed, 9 have AULs.

Of these 12 waste sites, only one is located in the portion of the project site's watershed below the drainage area to Iron Hill Dam (which would be anticipated to limit the transport of contaminated sediments from upstream). It is a closed site with an AUL located at 1305 Pleasant Street in Weymouth, approximately 1,500 feet south of the project area. The site was occupied by a gasoline service station from 1925 to 1973. A natural gas explosion occurred in an on-site building in 1973, leading to the station's closure. In 1975 it was remodeled for commercial space. In 1988, five underground storage tanks were excavated and removed, one of which contained holes. Soil samples indicated elevated levels of volatile organic compounds and total petroleum hydrocarbon.

On June 14, 2016 the MassDEP Southeast Regional Office submitted their review of the ENF to the Secretary of Environment and Energy. As part of their review, MassDEP had the Bureau of Waste Site Cleanup search its databases for disposal sites and release notifications that might impact the project area. Their findings were as follows:

Based upon the information provided in the ENF, the BWSC also searched its databases for disposal sites and release notifications that have occurred at or might impact the proposed project area. Their findings, which were provided in a MassDEP letter to the Secretary of Environment and Energy dated June 14, 2016, are described below.

Release Tracking Number (RTN) 4-20447, a property on Wharf Street, Weymouth, is located approximately 1,000 feet north of the proposed project area. Continued response actions are required at the site prior to closure under the MCP. Ongoing MCP response actions at the site are unlikely to impact the proposed project.

RTN 4-3000844—the Quincy Oil Station at 930 Broad Street, Weymouth—is located within or immediately adjacent to the proposed project area. The site was closed under the MCP on 8/9/1996 and is unlikely to impact the proposed MEPA project.

There are no other listed MCP disposal sites located at or in the vicinity of the proposed project area that might impact the site.

4.8.2 Dewatering and Dredging Methods

Dewatering

The location and physical boundaries of the proposed dewatering activities of the dredged material are shown approximately in **Figures 5-2** and **5-3** of **Section 5**. All impacts (approximately 7,200 sf), will occur in LUW and no loss or change in size of wetland resources is anticipated. The upstream area (approximately 2,500 sf) is the area that will be dewatered to construct the fish diversion wall, channel improvements, and resting pool. The downstream area (approximately 4,500 sf) is the area over which the unauthorized rock weir will be graded.

Water control at the site will consist of 1) stopping inflow into the flood control conduit at the intake, 2) bypassing water from the surface channel of Herring Brook (i.e., upstream of the fish ladder) around the work area, and 3) controlling backwater from downstream (including tidal surges).

In order to address the inflow into the flood control conduit, stoplog slots in the existing siphon intakes at Iron Hill Dam can be fitted with boards to close the conduit. With the siphons closed, all flow will be diverted to the surface channel of Herring Brook.

To control surface channel flow and tidal surges at the construction area, a cofferdam and gravity bypass pipe system is recommended. This system will divert flow around the work area and safely pass any juvenile herring migrating downstream. The cofferdams will need to be on the order of five to six feet tall to effectively isolate the construction site. Because of the narrow nature of the channel and the need for a relatively tall structure, a prefabricated cofferdam such as Portadam is recommended. Dewatering of the work area will be accomplished by pumps directed to a dewatering area in the adjacent park. After initial dewatering, only minimal maintenance pumping of runoff entering the work area is anticipated. The discharge water is not expected to be contaminated. The rock weir grading is proposed to be completed within the wetted channel downstream of the cofferdam diversion during a period of low flow.

During construction, temporary erosion, sedimentation, water, and pollution controls will be utilized in accordance with BMP guidelines recommended by MassDEP. To prepare the site, natural and planted vegetation will be preserved to the extent practicable. Erosion of proposed access routes (on existing paved and grassed areas) will be controlled by installing a stabilized construction entrance and gravel access roads with geotextile underlayment. Erosion and sedimentation due to stormwater runoff will be managed with approved measures such as silt socks or entrenched silt fences installed at the limits of all work/disturbances. Disturbed and stockpile areas will receive temporary seeding/ mulching/rip-rap as appropriate. Dust will be controlled as necessary. Pump discharge (due to dewatering) will be directed into weir tanks to capture fine sediments. The site will be restored to its former condition following construction.

Dredging and dewatering activities will be timed appropriately per TOY restrictions and conducted in accordance with BMPs and applicable permit conditions to avoid and minimize adverse impacts on water quality, physical processes, marine productivity, and public health.

Dredging

Dredging Quantity

The proposed project will include dredging of approximately 300 CY of sediment within a footprint of approximately 7,200 square feet (sf) as follows:

- Dredging of approximately 25 CY of sediment to restore the former herring resting pool over an area of about 800 sf
- Regrading of approximately 25 CY of rocks comprising the unauthorized rock weir over an area of about 4,700 sf
- Removal of approximately 40 CY of concrete (existing slab), 10 CY of concrete paver block, and 170 CY of earth (below the slab), totaling 220 CY, to be replaced with gravel subbase, new concrete wall footings and slab, and channel substrate rock fill over an area of about 1,700 sf
- Potential dredging of additional sediment associated with stormwater runoff as directed by DMF

Dredging Alternatives

An alternatives analysis for the project is provided in **Section 4.7**. The design process sought to avoid, minimize, and/or mitigate (in that order of preference) potential adverse impacts to land under water. Specific to dredging, no practicable alternatives were identified that could avoid related impacts while still

meeting the project goals of restoring the herring resting pool and smelt habitat. However, impacts are expected to be minor and primarily temporary in nature during the construction period. These impacts will be minimized and mitigated using BMPs as discussed previously.

Sediment Characterization

No physical or chemical data of the sediment has been collected at this time. Typically, MassDEP requires one sample per 1,000 CY to be dredged with a minimum of two samples for a given project. However, it would be difficult to obtain representative sediment samples for this project prior to construction because most of the "sediment" is either coarse material such as concrete, paver blocks, or larger rocks (i.e., the rock weir), or is currently inaccessible. The soil being removed from under the existing slab cannot be accessed for sampling prior to construction due to the concrete above it. The sediment to be dredged for the herring resting pool is the only place where a sample could be potentially obtained, but this area may or may not have concrete paver blocks which would impede a core sample. Even if it doesn't, the sediment from the resting pool wouldn't be representative of all the sediment to be dredged.

Pre-application discussions with MassDEP have acknowledged that it would be impractical to require sediment samples at this time given the site constraints. MassDEP's proposed alternative is to sample the sediment during construction instead. The sediment dredged from the channel would be stockpiled during construction, and samples would be pulled from the pile(s) and sent to a lab for analysis prior to deciding how to manage or dispose of the sediment. Due to the fact that the sediment would be mixed during removal, MassDEP would likely require additional samples (potentially four total samples). A grain size analysis would also be conducted for these samples obtained during construction to fulfill the Chapter 91 requirements.

Disposal Site

All sediment dredged during construction will be stockpiled onsite until sediment samples can be taken and analyzed by a lab to inform the appropriate disposal site(s) in consultation with MassDEP. If deemed 'clean', appropriate material will be graded on site to remove 4- to 12-inch stone for use in augmenting smelt spawning habitat in the project area. Remaining material will be removed from the site for lawful disposal or upland reuse as appropriate. The material could be disposed of at a local sand/gravel borrow pit or other location accepting clean fill. If it is clean and relatively sandy, it could potentially be accepted as landfill cover (i.e., "Landfill Reuse" in accordance with COMM-97-001). Clean sediment could also be regraded elsewhere on the upland portion of the property (i.e., outside of the top-of-bank lines, which is known as "Upland Material Reuse"); however, this may not be feasible given the constraints of the site. Lastly, either clean or contaminated sediment could be disposed of at an in-state landfill or a hazardous waste facility per MassDEP regulations. Concrete paver blocks will be salvaged and turned over to the Town. Concrete and metal demolition material (from the existing gate and slab) will be hauled offsite for lawful disposal or recycling at an approved facility.

Proposed Sediment Sampling & Analysis Plan

The proposed sediment sampling and analysis plan involves collecting four sediment samples from the stockpiled sediment per pre-application consultation with MassDEP. Once the samples are collected, they will be delivered to a certified laboratory for analysis. Laboratory analysis will include the following parameters per 314 CMR 9.07(2)(b)(6)):

Parameter[1]	**Reporting Limit** *(mg/kg dry weight unless otherwise noted)[2]*
Arsenic	0.5
Cadmium	0.1
Chromium	1.0
Copper	1.0
Lead	1.0
Mercury	0.02
Nickel	1.0
Zinc	1.0
Polycyclic Aromatic Hydrocarbons (PAHs)	0.02
Polychlorinated Biphenyls (PCBs) (by NOAA Summation of Congeners)	0.01
Extractable Petroleum Hydrocarbons (EPHs)[3]	25
Volatile Organic Compounds (VOCs)[4]	0.1
Total Organic Carbon (TOC)	0.1%
Percent Water	1.0%
Toxicity Characteristic Leaching Procedure[5]	As applicable
Grain Size Distribution – wet sieve (ASTM D422)	Sieve Nos. 4, 10, 40, 60, 200

[1] The due diligence review will be used in consultation with MassDEP to determine whether additional parameters should also be analyzed.

[2] If one or more of the Reporting Limits cannot be met; a discussion of the reason(s) for the inability to achieve the reporting limit (e.g., matrix interference) will be provided.

[3] The current method for the determination of EPHs is MassDEP January 1998

[4] Required for sediment to be reused or disposed of in the upland environment unless the due diligence review indicates that VOC contamination is unlikely to be present.

[5] Required to be performed when sediment is to be managed in the upland environment and if the total concentrations of metals or organic compounds are equal to or greater than the theoretical concentration at which TCLP criteria may be exceeded: As > 100 mg/kg, Cd > 20 mg/kg, Cr > 100 mg/kg, Pb > 100 mg/kg, Hg > 4 mg/kg.

The test results will be compared to screening criteria including MacDonald's [1] Threshold Effects Concentration (TEC) and Probable Effects Concentration (PEC) as well as the Massachusetts Contingency Plan Method 1 Cleanup Standards for S-1 (soils) and GW-1 (groundwater).

Preparation

Sediment sampling equipment will be prepared and thoroughly cleaned prior to sampling. Equipment will be soaked (fully immersed) for three days in a 0.5 percent solution of Alconox™ detergent and water. Equipment will then be scrubbed and rinsed three times with deionized water and left to dry in a clean place. Equipment that will be pre-cleaned includes a hand corer, coring tubes, eggshell core catchers, sample scoops, a compositing bucket, and wash bottles. Equipment will be double-checked prior to mobilization.

[1] MacDonald DD, Ingersoll CG, Berger T. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems.

Sample Procedures

Sediment samples will be collected with a stainless-steel hand corer outfitted with a Cellulose Acetate Butyrate (CAB) liner, which can obtain sediment samples to a depth of 5 feet, or as a surficial grab sample. The samples will be placed in a compositing bucket, homogenized (stirred), and placed into the appropriate sample containers for analysis. The sediment samples will be transported on ice under chain of custody to a certified laboratory.

The sample containers will either be supplied by the laboratory, or will be manufacturer-supplied, pre-cleaned containers. In order to obtain the appropriate volume needed for each sample, subsamples may be collected from each location. The subsamples will be placed into a compositing bucket, homogenized (stirred), and scooped into the appropriate sample containers for analysis of chemistry, total organic carbon (TOC), and grain size. The samples will be held on ice in a cooler for transportation. The amount of sediment in each sub-sample will be noted on the field data collection sheet. Photographs will be taken of each sample.

Prior to collecting the next sample, the equipment will be scrubbed with a solution of Alconox™ detergent and rinsed with deionized water.

Sample Locations

Four samples will be collected from the sediment stockpiled in the proposed construction dewatering area. Samples will be spatially distributed to capture samples that are representative of the dredged material.

5. Project Location & Site Maps

This section contains the following figures:

- **Figure 5-1:** Project Location Map
- **Figure 5-2:** Aerial Site Map – North Section
- **Figure 5-3:** Aerial Site Map – South Section

Note that the aerial images in **Figures 5-2** and **5-3** were captured by the Town of Weymouth in January 2018 and reflect the installation of the Lovell Field complex improvements.

Figure 5-1: Project Location Map

Figure 5-2: Aerial Site Map – North Section

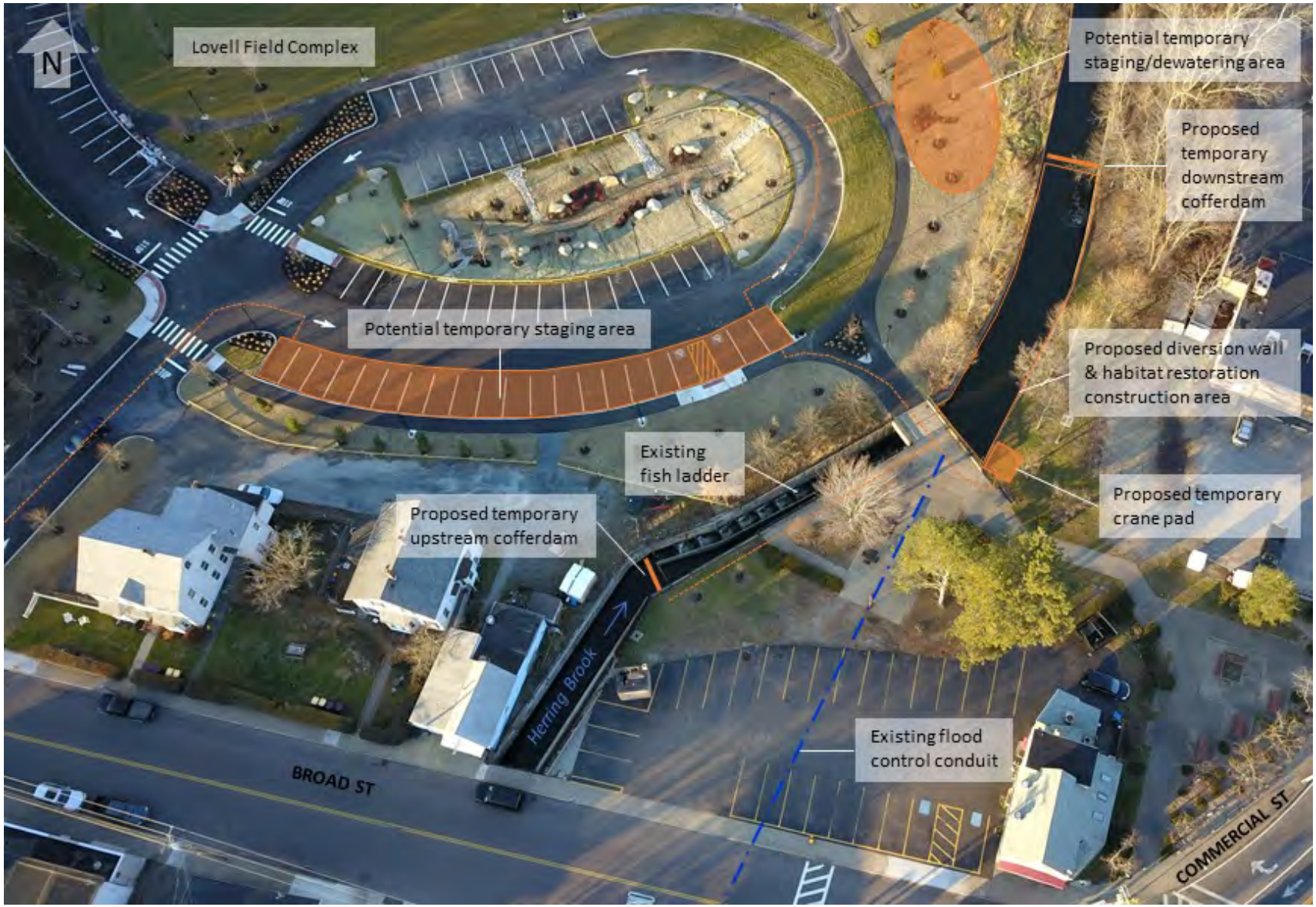


Figure 5-3: Aerial Site Map – South Section

6. Design Plans

This section contains the following drawing sheets:

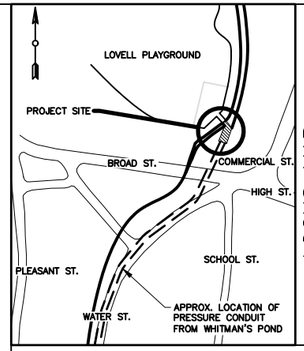
Design plans prepared by Gomez and Sullivan Engineers:

1. Access and Water Control Plan
2. Regulatory Boundaries Plan
3. Existing Conditions/Removals Plan & Section
4. Diversion Wall Plan & Section
5. Existing Removals/Sections
6. Resting Pool Section & Weir Grading
7. Diversion Wall Section
8. Diversion Wall Section
9. Diversion Wall Section
10. Diversion Wall Section
11. Gate Sections

Design addendum for resting pool & weir grading prepared by Town of Weymouth DPW:

12. Existing Profile – Herring Brook
13. Proposed Profile – Herring Brook
14. Proposed Resting Pool Section

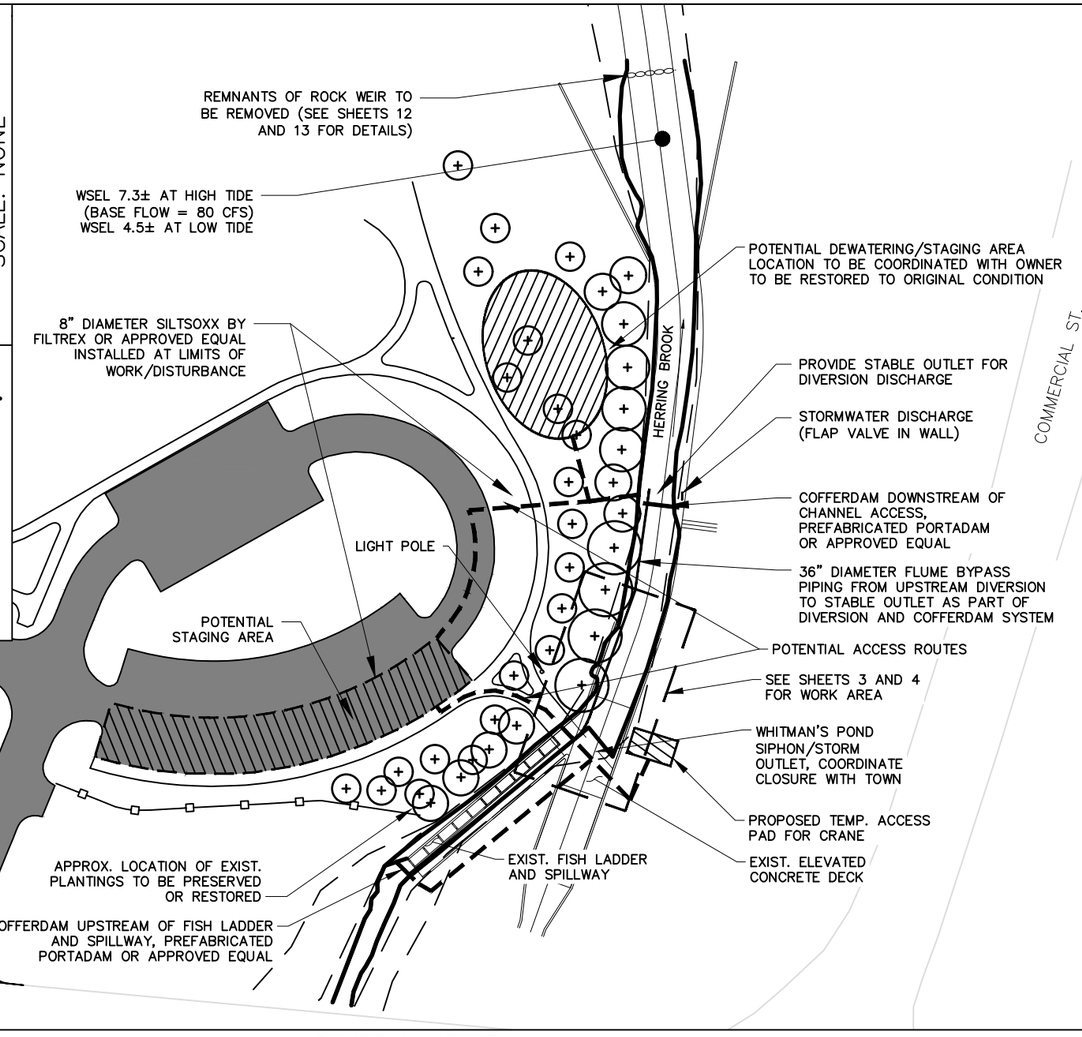
I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



LOCUS MAP
SCALE: NONE

LEGEND

ORDINARY HIGH WATER (OHW)
MEAN HIGH WATER (MHW)
MEAN LOW WATER (MLW)
WEYMOUTH BACK RIVER AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)
LAND UNDER WATER



80' 40' 0 80' 160'
SCALE: 1" = 80'

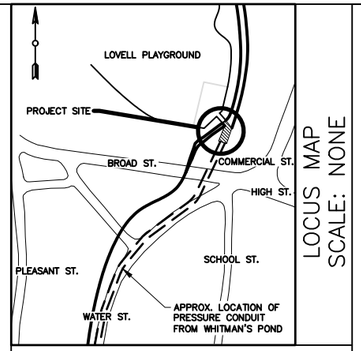
GENERAL NOTES:
1. HORIZONTAL DATUM: NAD 1983 MASSACHUSSETS MAINLAND (FT)
2. VERTICAL DATUM: NGVD 29

ACCESS AND WATER CONTROL PLAN

PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



LOCUS MAP
SCALE: NONE

LEGEND

TAX PARCEL

ORDINARY HIGH WATER (OHW)
MEAN HIGH WATER (MHW)
MEAN LOW WATER (MLW)
WEYMOUTH BACK RIVER AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)
LAND UNDER WATER

FEMA FLOOD ZONE
(100-YEAR FLOOD)

80' 40' 0 80' 160'
SCALE: 1" = 80'

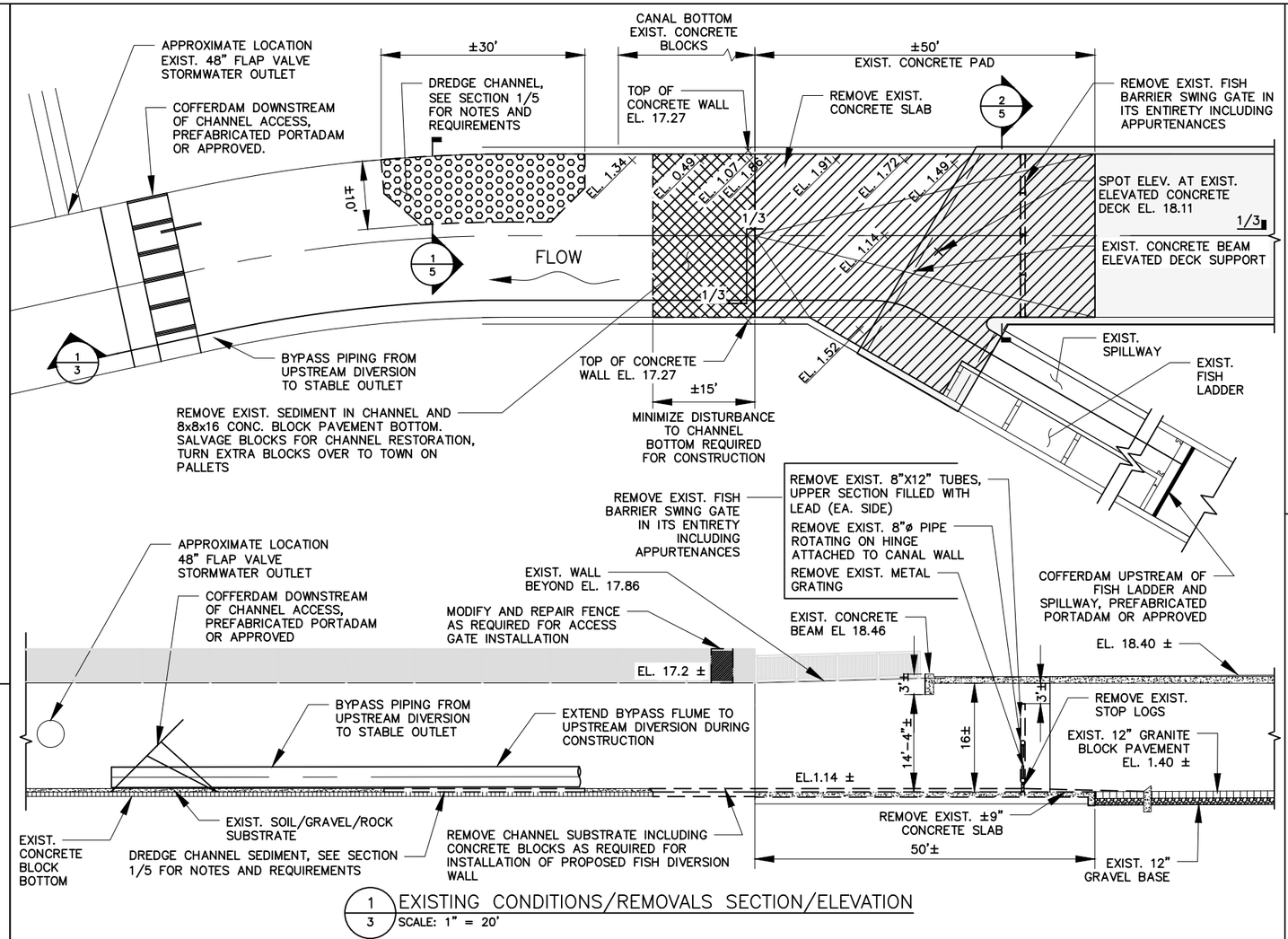
REGULATORY BOUNDARIES PLAN

PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

SHEET 2 OF 14

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



NOTE: RESTING POOL DESIGN IS SUPERSEDED BY THE PLAN ADDENDUM PREPARED BY THE TOWN OF WEYMOUTH DPW AS SHOWN ON SHEETS 12 THROUGH 14.

EXIST. CONDITIONS/REMOVALS PLAN & SECTION

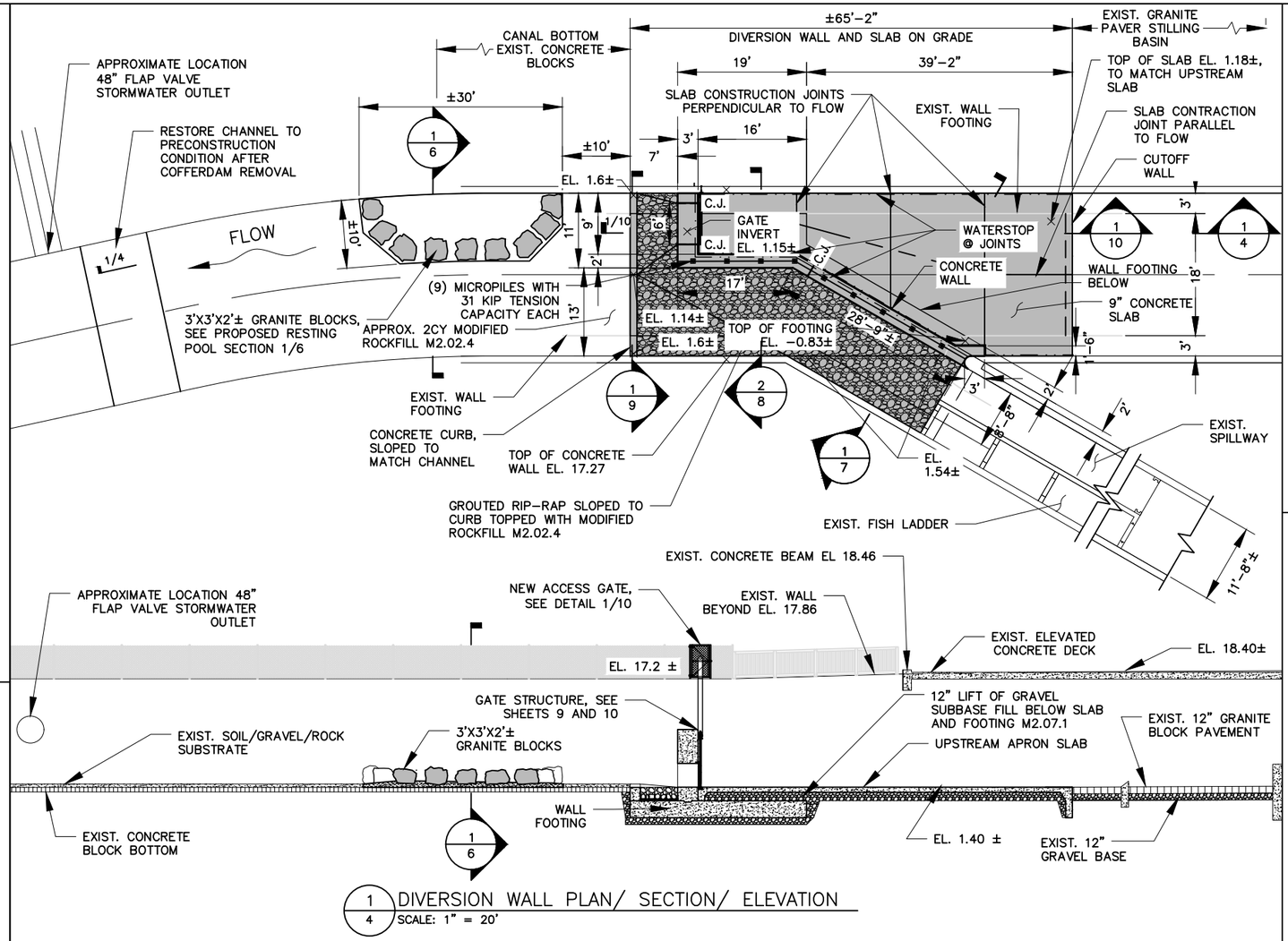
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018

THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

SHEET 3 OF 14

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



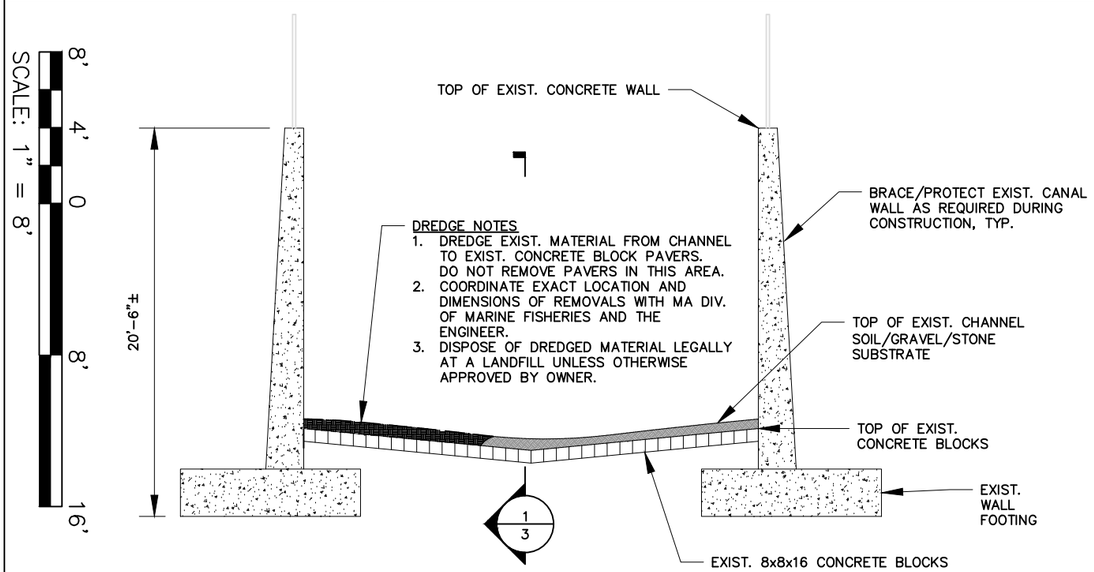
NOTE: RESTING POOL DESIGN IS SUPERSEDED BY THE PLAN ADDENDUM PREPARED BY THE TOWN OF WEYMOUTH DPW AS SHOWN ON SHEETS 12 THROUGH 14.

DIVERSION WALL PLAN & SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

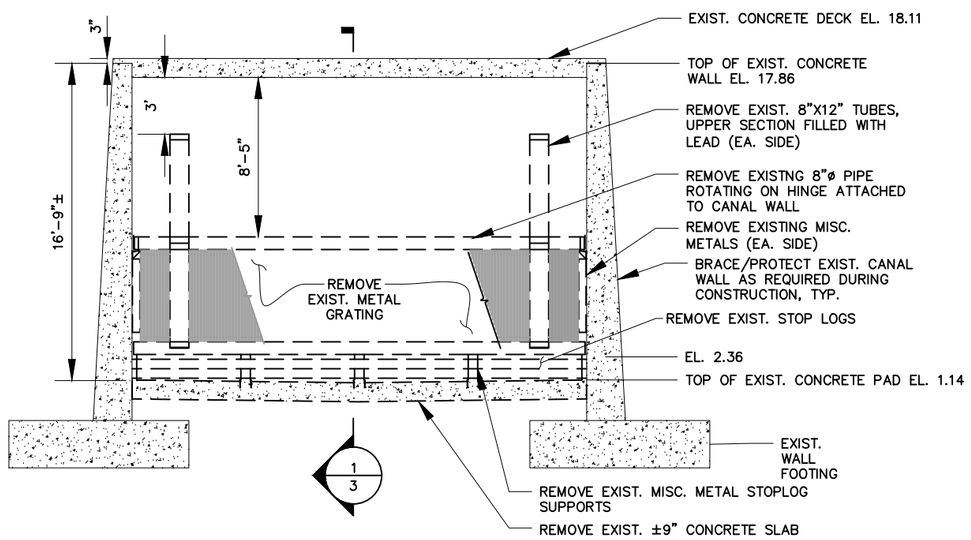
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018

THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



1/5 EXIST/REMOVALS SECTION (LOOKING UPSTREAM)
SCALE: 1" = 8'



2/5 EXIST/REMOVALS SECTION (LOOKING UPSTREAM)
SCALE: 1" = 8'

NOTE: RESTING POOL DESIGN IS SUPERSEDED BY THE PLAN ADDENDUM PREPARED BY THE TOWN OF WEYMOUTH DPW AS SHOWN ON SHEETS 12 THROUGH 14.

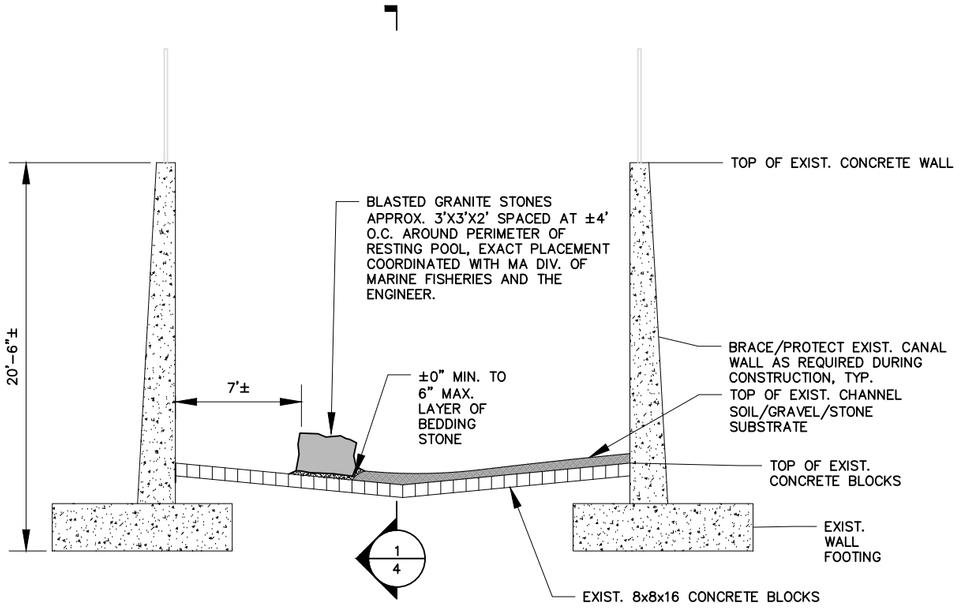
EXISTING/REMOVALS SECTIONS
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS

_____

SCALE: 1" = 8'

8' 4' 0 8' 16'

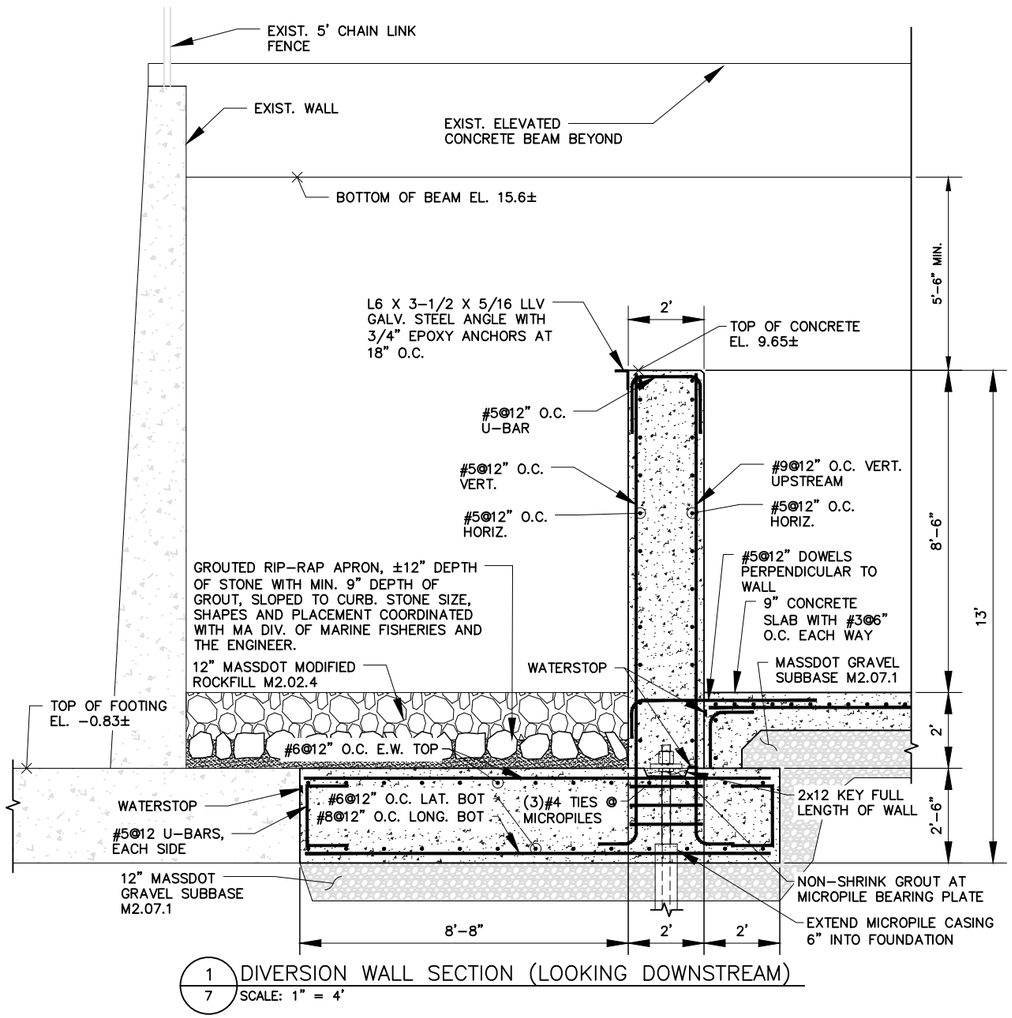


1/6 PROPOSED RESTING POOL SECTION (LOOKING UPSTREAM)
SCALE: 1" = 8'

NOTE: RESTING POOL DESIGN IS SUPERSEDED BY THE PLAN ADDENDUM PREPARED BY THE TOWN OF WEYMOUTH DPW AS SHOWN ON SHEETS 12 THROUGH 14.

RESTING POOL SECTION & WEIR GRADING
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

I CERTIFY THAT THIS PLAN,
AS PREPARED, CONFORMS TO THE
RULES AND REGULATIONS OF THE
REGISTRY OF DEEDS



1/7 DIVERSION WALL SECTION (LOOKING DOWNSTREAM)
SCALE: 1" = 4'

4' 2' 0 4' 8'
SCALE: 1" = 4'

DIVERSION WALL SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
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SHEET 7 OF 14

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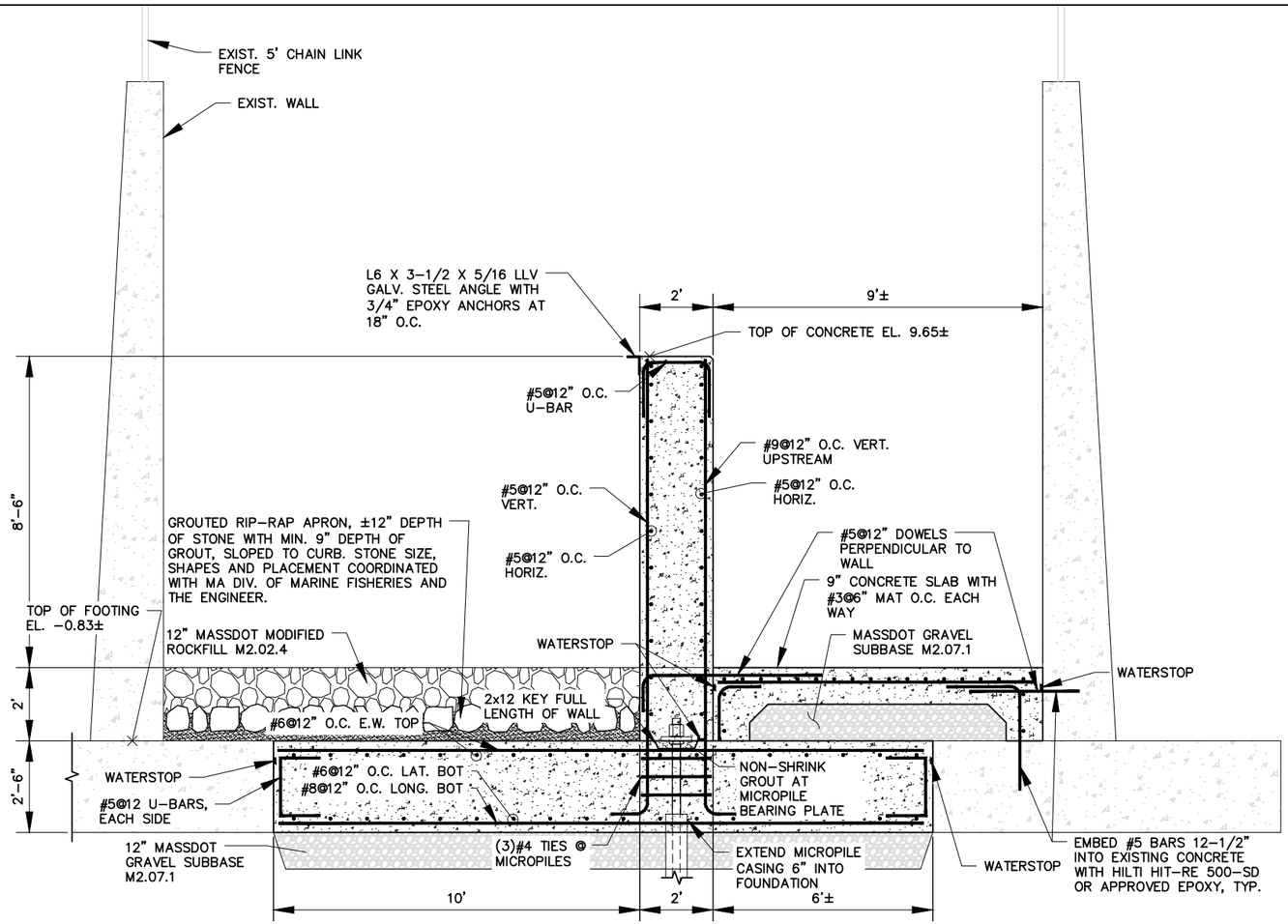

1/8 DIVERSION WALL SECTION (LOOKING DOWNSTREAM)
SCALE: 1" = 4'

4' 2' 0 4' 8'
SCALE: 1" = 4'

DIVERSION WALL SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
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SHEET 8 OF 14

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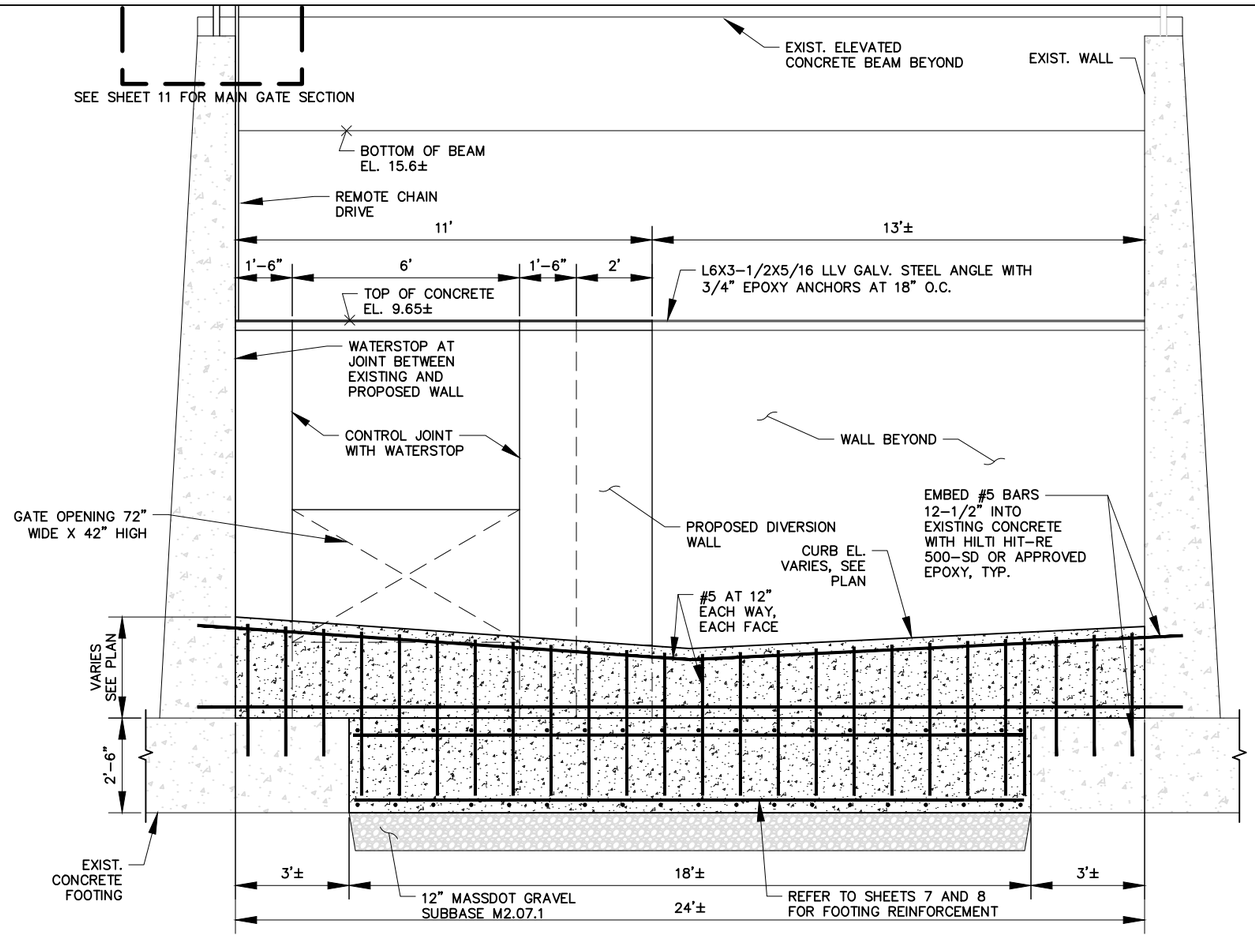

1/9 DIVERSION WALL SECTION (LOOKING DOWNSTREAM)
SCALE: 1" = 4'

4' 2' 0 4' 8'
SCALE: 1" = 4'

DIVERSION WALL SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

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MAY 2018
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SHEET 9 OF 14

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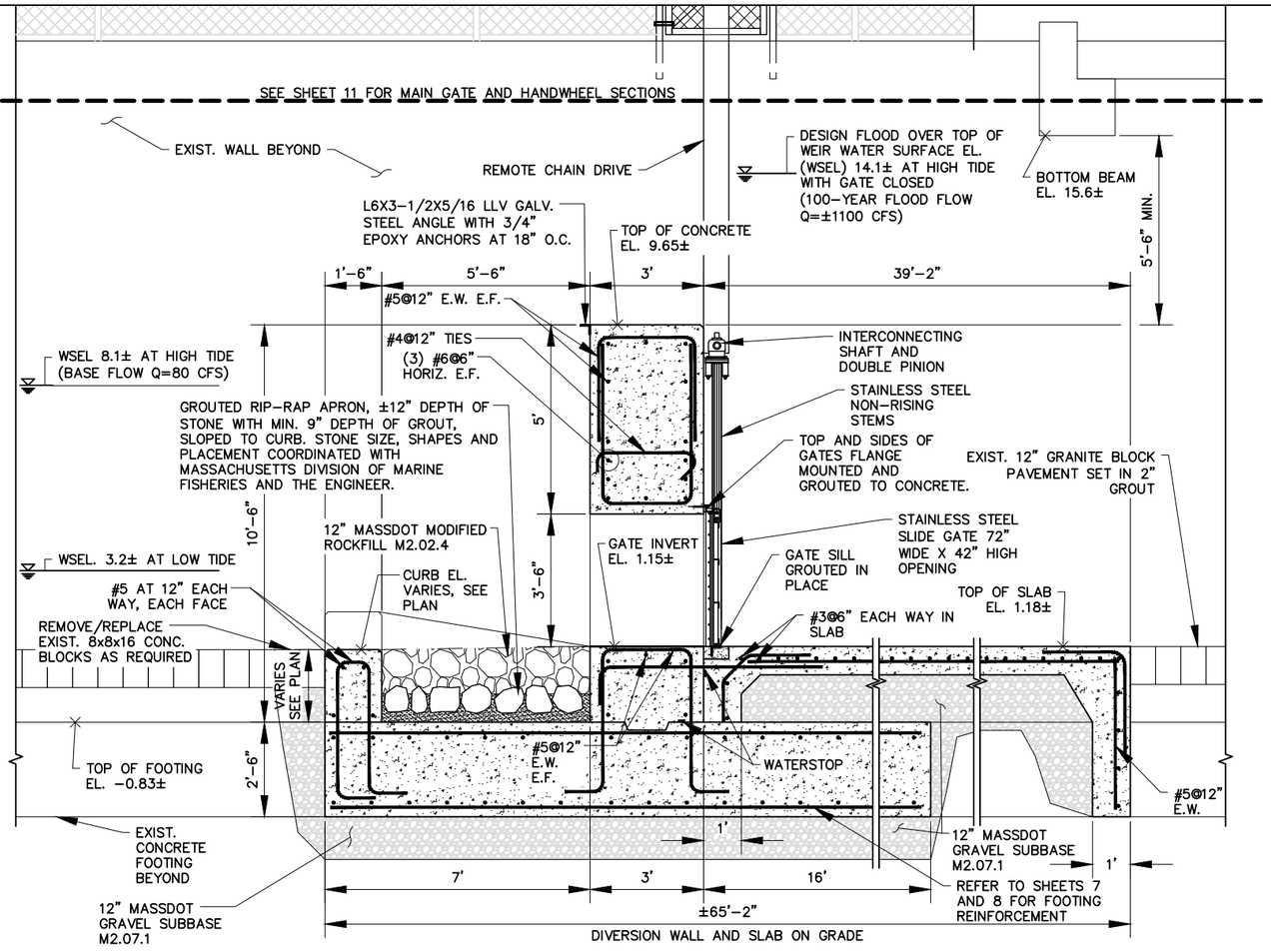

1/10 DIVERSION WALL SECTION
SCALE: 1" = 4'

4' 2' 0 4' 8'
SCALE: 1" = 4'

DIVERSION WALL SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
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GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
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SHEET 10 OF 14

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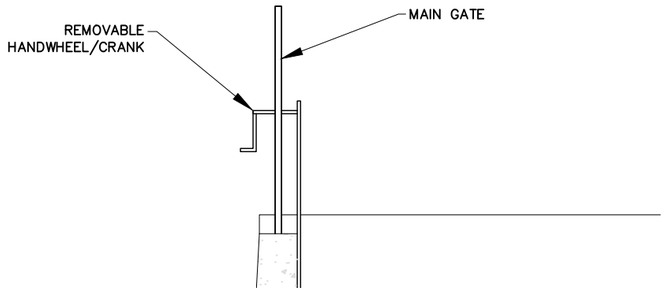
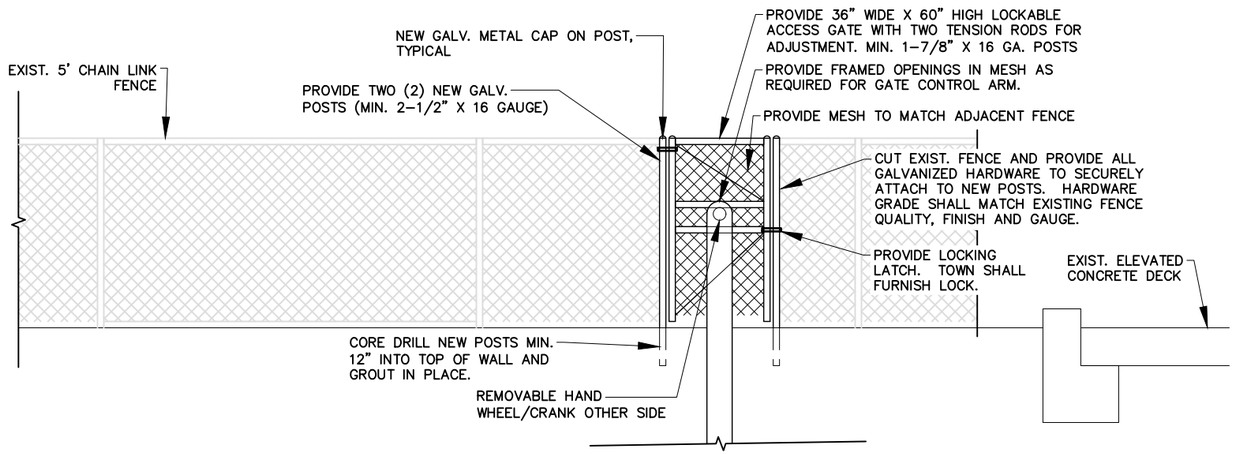


1/11 GATE SECTION
SCALE: 1" = 4'



2/11 GATE SECTION
SCALE: 1" = 4'

4' 2' 0 4' 8'
SCALE: 1" = 4'

GATE SECTIONS
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
GOMEZ AND SULLIVAN ENGINEERS, DPC
MAY 2018
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SHEET 11 OF 14

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RULES AND REGULATIONS OF THE
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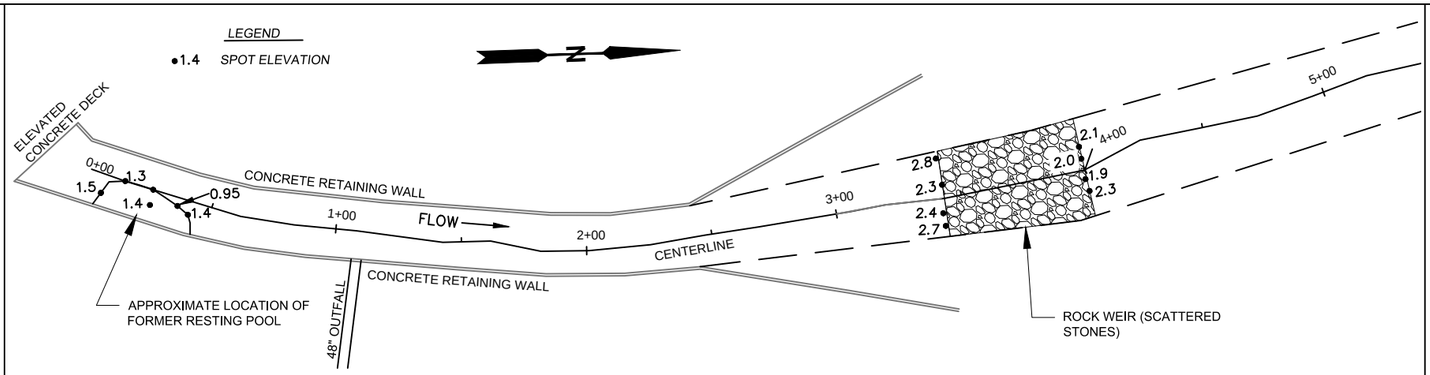
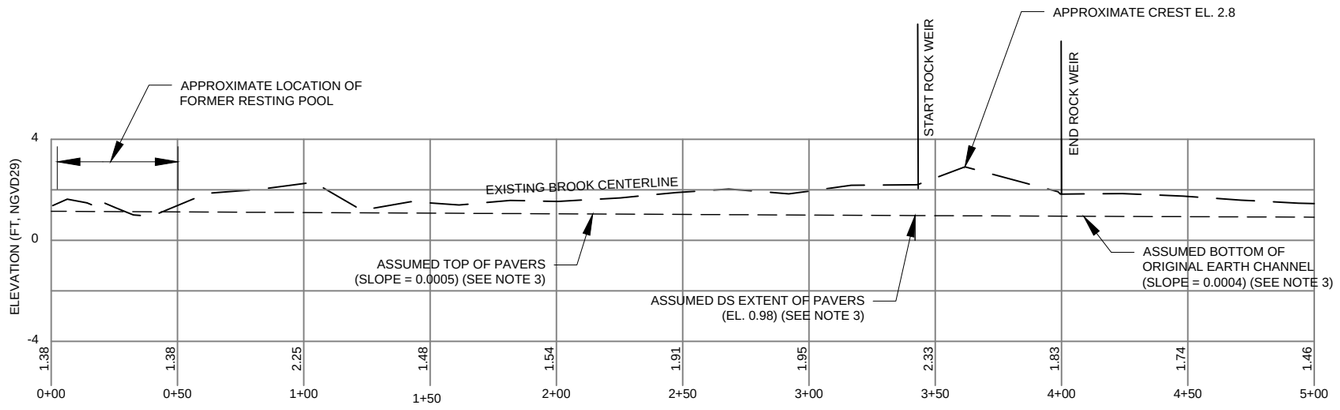


1/12 EXISTING PLAN
SCALE: 1" = 60'



2/12 EXISTING PROFILE
SCALE: 1" = 60'

6' 3' 0 6' 12'
VERTICAL SCALE: 1" = 6'

60' 30' 0 60' 120'
HORIZONTAL SCALE: 1" = 60'

GENERAL NOTES:
1. VERTICAL DATUM: NGVD29
2. SURVEY COMPLETED ON 3/26/2018
3. ELEVATIONS AND EXTENTS OF CONCRETE PAVERS AND ORIGINAL EARTH CHANNEL BOTTOM ARE FROM 1960 PROPOSED CHANNEL DESIGN PLANS AND HAVE NOT BEEN CONFIRMED.

EXISTING PROFILE–HERRING BROOK
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
WEYMOUTH PUBLIC WORKS
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

SHEET 12 OF 14

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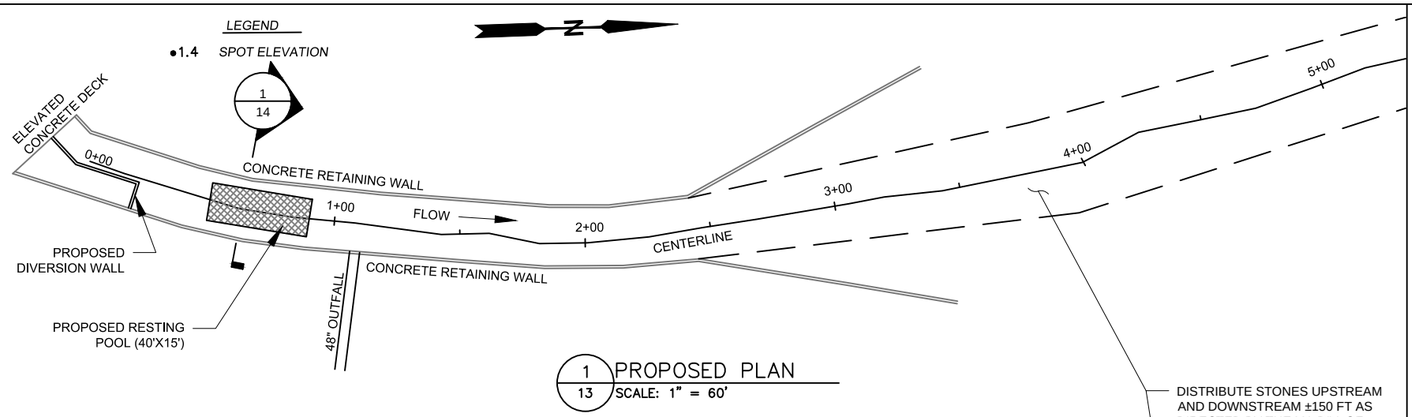
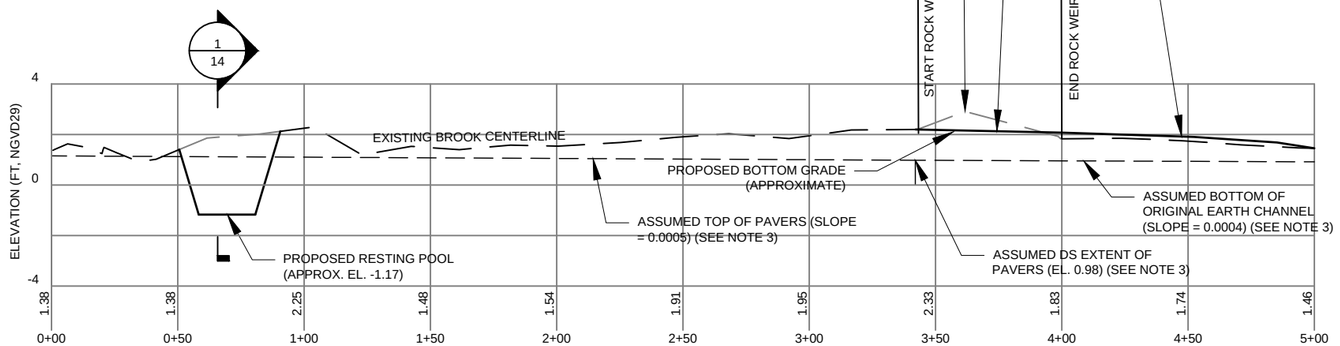


1/13 PROPOSED PLAN
SCALE: 1" = 60'

DISTRIBUTE STONES UPSTREAM AND DOWNSTREAM ±150 FT AS DIRECTED BY THE MA DIV. OF MARINE FISHERIES AND ENGINEER

REMOVE ROCK WEIR TO CHANNEL SUBSTRATE.
DO NOT EXCAVATE BELOW CHANNEL BOTTOM .
DO NOT REMOVE PAVERS IF ENCOUNTERED.



2/13 PROPOSED PROFILE
SCALE: 1" = 60'

6' 3' 0 6' 12'
VERTICAL SCALE: 1" = 6'

60' 30' 0 60' 120'
HORIZONTAL SCALE: 1" = 60'

GENERAL NOTES:
1. VERTICAL DATUM: NGVD29
2. SURVEY COMPLETED ON 3/26/2018
3. ELEVATIONS AND EXTENTS OF CONCRETE PAVERS AND ORIGINAL EARTH CHANNEL BOTTOM ARE FROM 1960 PROPOSED CHANNEL DESIGN PLANS AND HAVE NOT BEEN CONFIRMED.

PROPOSED PROFILE–HERRING BROOK

PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT

PREPARED BY
WEYMOUTH PUBLIC WORKS
MAY 2018
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SHEET 13 OF 14

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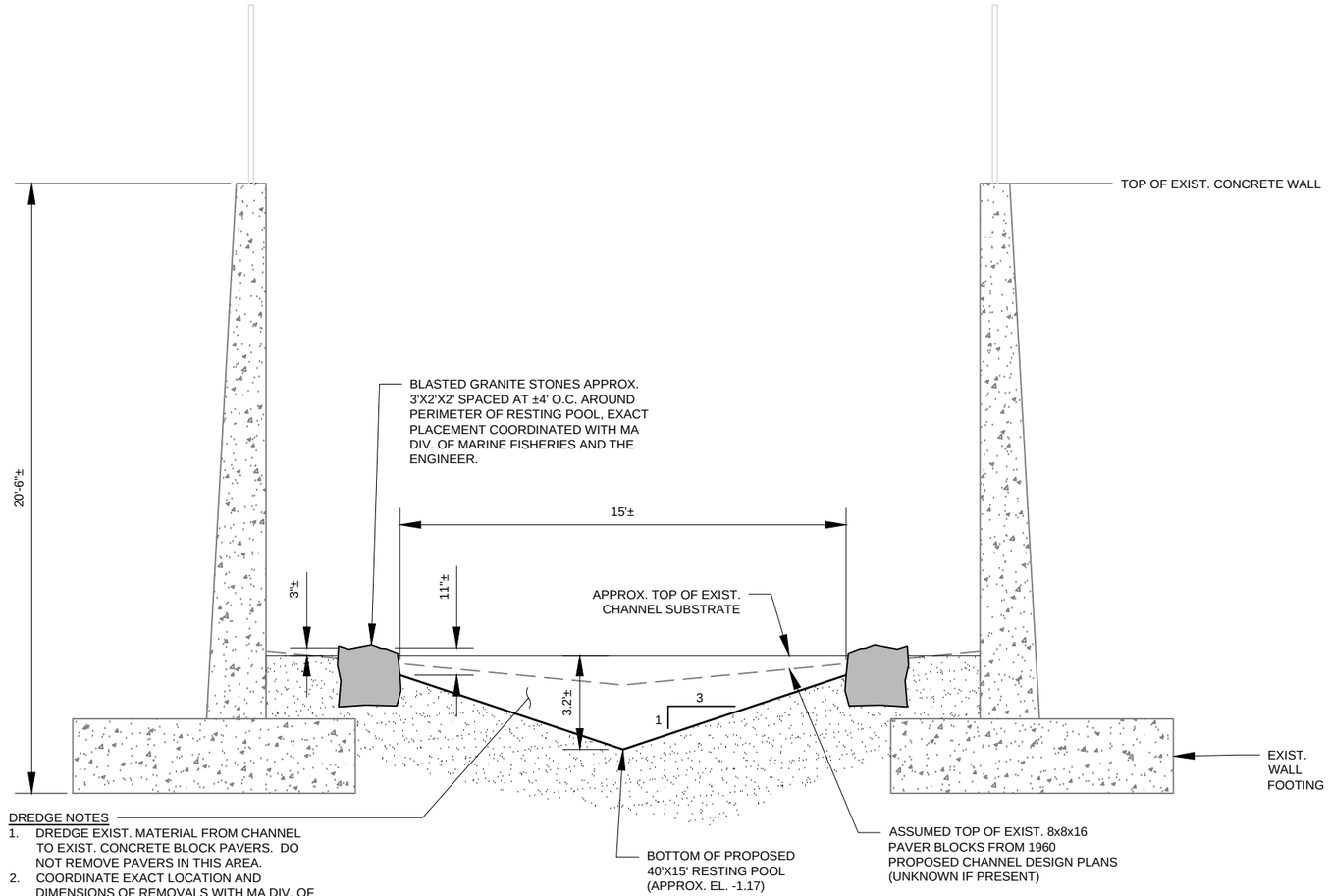


DREDGE NOTES

1. DREDGE EXIST. MATERIAL FROM CHANNEL TO EXIST. CONCRETE BLOCK PAVERS. DO NOT REMOVE PAVERS IN THIS AREA.
2. COORDINATE EXACT LOCATION AND DIMENSIONS OF REMOVALS WITH MA DIV. OF MARINE FISHERIES AND THE ENGINEER.
3. DISPOSE OF DREDGED MATERIAL LEGALLY AT A LANDFILL UNLESS OTHERWISE APPROVED BY OWNER.

1/14 PROPOSED RESTING POOL SECTION (LOOKING UPSTREAM)
SCALE: 1" = 8'

8' 4' 0 8' 16'
SCALE: 1" = 8'

PROPOSED RESTING POOL SECTION
PLANS ACCOMPANYING PETITION OF
TOWN OF WEYMOUTH, MA
HERRING PASSAGE AND SMELT RESTORATION PROJECT
PREPARED BY
WEYMOUTH PUBLIC WORKS
MAY 2018
THIS PLAN IS FOR PERMITTING PROCESSES ONLY.

SHEET 14 OF 14

7. Operation & Maintenance Plan

Weymouth Herring Passage & Smelt Habitat Restoration Project

OPERATION & MAINTENANCE PLAN

Herring Brook/Back River, Weymouth, MA

REVISION 0

JUNE 2018

Prepared for:

120 Winter Street, Weymouth, MA 02188

Prepared by:

GOMEZ AND SULLIVAN ENGINEERS

PO Box 2179, Henniker, NH 03242

TABLE OF CONTENTS

LIST OF APPENDICES

1. PROJECT DESCRIPTION

1.1 Background

The Weymouth Back River (or Back River), located in Hingham and Weymouth, Massachusetts, supports one of the largest river herring runs in Massachusetts Bay. From the tidal waters in Hingham Bay, river herring ascend a total of six fishways on the Back River and Herring Brook to reach their spawning habitat in Whitmans Pond. A flood control conduit was constructed in the 1960s in the upper portion of the Back River watershed, to bypass storm flows past Jackson Square in Weymouth. The tunnel inlet is located just below Whitmans Pond Dam at Iron Hill Dam, with the outlet discharging adjacent to the lowermost fishway in Jackson Square. A former fish diversion swing gate at the tunnel outlet was ineffective at preventing upstream migrating river herring from entering the conduit, where they could become trapped and perish.

The Town of Weymouth secured funding from the Massachusetts Division of Marine Fisheries (DMF) to contract Gomez and Sullivan Engineers, DPC (GSE) to prepare design plans, bid documents, and permit applications for an alternative solution to the problem of fish accessing the flood control tunnel. Project goals included implementing the following fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square:

- Replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel.
- Reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder.
- Restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment primarily washed off roadways.
- Regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

The primary target species for the redesign of the fish diversion were the anadromous alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), known collectively as river herring. The diversion redesign also considered the catadromous American river eel (*Anguilla rostrata*). Additional project goals included establishing spawning substrate for rainbow smelt (*Osmerus mordax*) on the concrete pad downstream of the diversion, as well as a resting pool for river herring below the concrete pad.

The project site is a public park known as Herring Run Park adjacent to the Lovell Field complex. It is located within the Weymouth Back River Area of Critical Environmental Concern (ACEC). Weymouth Back River and Whitmans Pond are classified as Outstanding Resource Waters (ORW) and segments of each are categorized as impaired water bodies.

1.2 Project Design

As-built construction drawings for the project are provided in **Appendix A**.

1.2.1 Fish Diversion Structure

The fish diversion structure of a reinforced concrete, cantilever type retaining wall. The wall is 8.5 feet high with an overall length of approximately 55 feet and a thickness varying from 2 to 3 feet. The stem of the concrete wall extends vertically from a new concrete footing and pad. A metal angle is attached to

the downstream side of the wall to act as a diversion for climbing eels. A 6-foot-wide by 3.5-foot-high stainless-steel slide gate (upward opening) is installed as a low-level outlet.

The wall is angled to align with the existing fish ladder. This configuration provides increased weir length for flood protection and enhances attraction to the fish ladder, because the majority of the water spilled over the diversion falls at the base of the fish ladder. This alignment also allows the operable gate to be located out from underneath the existing elevated deck allowing for easier access, maintenance, and operation.

In a letter to the Secretary of Environment and Energy dated June 14, 2016, the Massachusetts Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS) determined that the new diversion structure will not impact the function or hydraulic capacity of the flood control conduit. Since the diversion structure is 8.5 feet high and therefore exceeds the jurisdictional height identified in the dam safety regulations, ODS requested that a Chapter 253 jurisdictional determination request be submitted. However, because the maximum volume of 4.4 acre-feet that is impounded by the structure (between March 1 and June 30 annually) is below the jurisdictional threshold of 15 acre-feet, ODS determined that the proposed structure will be non-jurisdictional.

1.2.2 Channel Improvements

Improvements to the channel downstream of the fish diversion were constructed to reestablish smelt spawning habitat and to restore a resting pool for herring.

Smelt Spawning Habitat

For the smelt spawning habitat, the concrete pad below the fish ladder and diversion wall was covered with a 12-inch layer of grouted rip-rap (consisting of 6- to 12-inch-diameter stone) topped by a 12-inch layer of loose 4- to 8-inch-diameter cracked stone. An additional 2 cubic yards of 4- to 8-inch cracked stone was spread over the channel downstream of the grouted section.

Herring Resting Pool

For the resting pool, the channel downstream of the concrete pad was excavated to approximate dimensions of a former pool of about 3 to 4 feet deep, 15 feet wide, and 40 feet long. Large stones with major dimensions on the order of three feet and weighing approximately one ton were used to define the extent of the restored resting pool and act as energy dissipaters to help prevent future washouts of the substrate. Additional sediment due to stormwater runoff was dredged from the project area.

Rock Weir Regrading

At the downstream end of the concrete-walled channel (about 350 feet downstream of the tunnel outlet), an unauthorized rock weir had previously been built, likely by people seeking to cross the stream. It backwatered Herring Brook up to the fish ladder, which had nearly eliminated spawning riffles for smelt at a location that DMF has considered for decades as one of the three largest smelt runs in MA. As part of this project, the rock weir was regraded to restore flow depths and velocities suitable for smelt spawning. This involved distributing the approximately 25 CY of rocks comprising the weir downstream over a length of about 150 feet.

2. OPERATIONAL PROCEDURES

2.1.1 Fish Diversion Structure

Operational procedures for the low-level outlet gate during seasonal and flood flows are provided below. No other operational procedures are specified for the diversion structure.

Low-Level Outlet Gate

Seasonal Adjustment

The low-level outlet slide gate shall be closed to prevent river herring from accessing the flood control conduit during their upstream migration period, but shall be kept open at other times of the year to allow water to freely flow from the flood control conduit and not be impounded by the wall. Approximate dates for opening and closing the gate are as follows:

- **March 1 – June 30:** Gate CLOSED (herring upstream migration period)
- **July 1 – February 28:** Gate OPEN

The gate opening and closing dates should be confirmed annually with DMF prior to adjustment.

Flood Adjustment

The diversion wall was designed to pass the Federal Emergency Management Agency regulatory 100-year flood flow (1,100 cubic feet per second, cfs) with over 1 foot of freeboard to an existing elevated deck concrete support beam above the wall with the low-level outlet gate closed, and in excess of the 500-year flood flow (1,860 cfs) with no freeboard and the gate opened. If the gate is not opened during the 500-year flood flow, the elevated deck beam would be impacted. Therefore, the gate shall be opened in advance of flood flows anticipated to exceed the 100-year flood flow (1,100 cfs), regardless of whether the flooding occurs during the herring upstream migration period. If the flood occurs during the herring upstream migration period, the gate shall be closed again after flood flows decrease below 1,100 cfs. Below is a summary of recommended gate adjustments based on flood flows:

- **Flow > 1,100 cfs:** Gate OPEN
- **Flow < 1,100 cfs:** Follow seasonal adjustment schedule above

To estimate the flow at the project site, the United States Geological Survey (USGS) Gage No. 01105606 ("Whitman's Pond Dam at E. Weymouth, MA") should be referenced at the following website: https://waterdata.usgs.gov/nwis/uv?site_no=01105606. The reported flow at the gage should be multiplied by a factor of 1.14 to adjust to the project site (based on a ratio of drainage areas of 14.1 square miles at the site divided by 12.4 square miles at the gage).

2.1.2 Channel Improvements

No operational procedures are specified for the channel improvements.

3. INSPECTION & MAINTENANCE PROCEDURES

3.1 Fish Diversion Structure

Low-Level Gate

The low-level slide gate manufacturer's recommendations for inspection and maintenance procedures are provided in in **Appendix B**. The gate should be periodically cleaned, lubricated, and exercised as recommended by the manufacturer.

Concrete Structures

Check concrete structures periodically for cracks, spalls, or other damage. Seal cracks and repair other identified defects as needed.

Metal Structures

Check metal structures periodically for corrosion, loose fasteners, stressed components, or other damage. Repair damaged coatings and tighten fasteners. Replace damaged or stressed metal works with equivalent materials.

3.2 Channel Improvements

Smelt Spawning Habitat

Check smelt spawning habitat substrate periodically for washouts of rock fill and/or accumulation of sediment from stormwater runoff. Replace substrate and/or perform maintenance dredging as needed to maintain the smelt spawning habitat as designed.

Herring Resting Pool

Check resting pool periodically for accumulation of sediment from stormwater runoff. Perform maintenance dredging as needed to maintain target pool bottom elevation of approximately -1.17 feet in the National Geodetic Vertical Datum of 1929 (NGVD29)[1]. This elevation is approximately 18.44 feet below the top of the adjacent concrete channel walls.

Check resting pool periodically for washout of erosion of side slopes and/or undermining of granite perimeter stones. Repair erosion with stone fill as needed.

Rock Weir Regrading

Check former rock weir area periodically for reestablishment of an unauthorized rock weir and redistribute stones as needed.

[1] Also referred to as mean sea level (msl) datum. To convert to the North American Vertical Datum of 1988 (NAVD88), subtract 0.08. To convert to the Town of Weymouth local datum, add 5.83 feet.

8. Stormwater Report Checklist

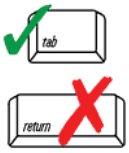
The proposed project is a fish passage improvement/habitat restoration project, not a development project; therefore, only stormwater standards related to temporary construction impacts (Standard 8) would apply. See **Section 4.6.4** of this application package for a narrative of proposed construction-related stormwater management measures.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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



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 8[2]
- 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 (LUHPPL), 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

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.

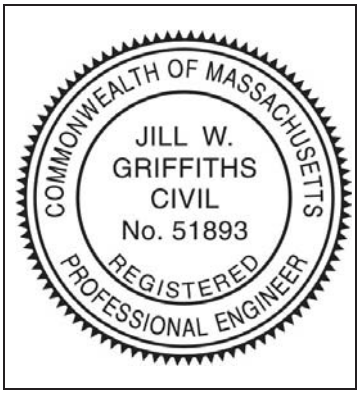
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



June 4, 2018

Signature and Date

Checklist

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

☐ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

N/A - Restoration Project

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
- ☐ 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
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges N/A

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation N/A

☐ 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 N/A

☐ 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 Field[1]

☐ 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) N/A

☐ 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 N/A

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 for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued) N/A

☐ 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) N/A

☐ 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 N/A

☐ 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 for Stormwater Report

Checklist (continued)

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

☐ 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 for 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 N/A

☐ 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 N/A

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

☐ An Illicit Discharge Compliance Statement is attached;

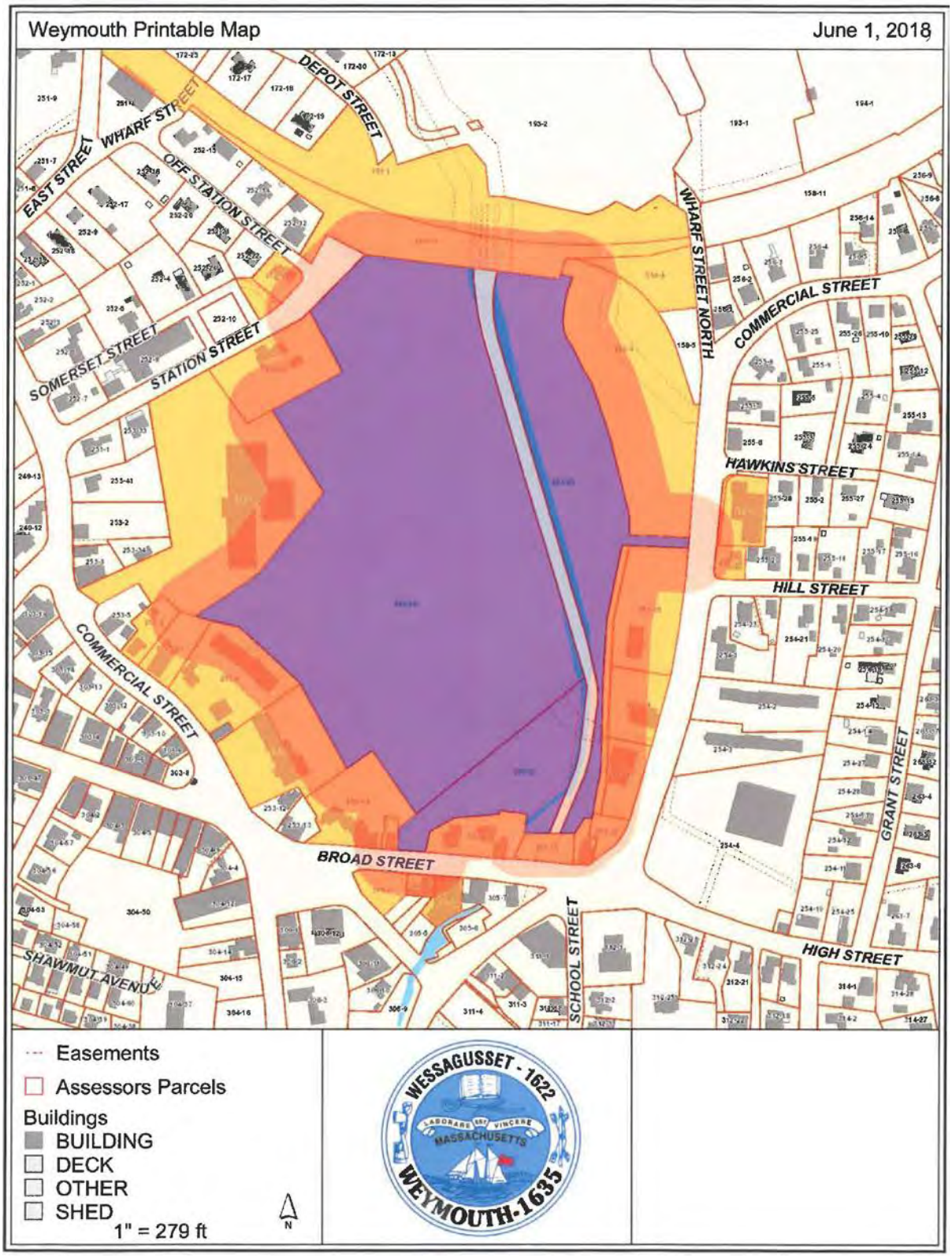
☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

9. Property Abutters

This section contains the following items:

- **Figure 9-1:** Map of Project & Abutter Property Parcels
- **Table 9-1:** List of Project & Abutter Property Parcels
- Abutter Notification Letter
- Abutter Notification Form

Figure 9-1: Map of Project & Abutter Property Parcels



Note: Purple indicates Town-owned parcels where project activities will occur. Yellow indicate abutter parcels within a 100-foot buffer of the project parcels.

Table 9-1: List of Project Property Abutters

6/1/2018

PARCEL #	LOCATION	OWNER NAME/ADDRESS	CERTIFIED YES	CERTIFIED NO
MAP: 23 BLOCK: 253 LOT: 14 EXT: 0	864--884 BROAD ST	PECK MORTIMER N FUNERAL CHAPELS INC 870 BROAD STREET WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 305 LOT: 1 EXT: 0	881 BROAD ST	PICA JOHN H JR & DIANE M 5 OAKCREST RD HINGHAM, MA, 02043	X	
MAP: 23 BLOCK: 253 LOT: 16 EXT: 0	890 BROAD ST	AGNITTI ANTHONY L & LAWRENCE M C/O JACKSON SQUARE TRUST 21 FRANKLIN ST QUINCY, MA, 02169	X	
MAP: 23 BLOCK: 253 LOT: 27 EXT: 0	894--896 BROAD ST	TOWN OF WEYMOUTH PARK DEPT 75 MIDDLE ST E WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 305 LOT: 10 EXT: 0	899 BROAD ST	PICA JOHN H JR & GREGORY P TR JAG REALTY TRUST 909 BROAD ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 305 LOT: 9 EXT: 0	909 BROAD ST	PICA JOHN H JR & GREGORY P TRS JAG REALTY TRUST 909 BROAD ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 17 EXT: 0	910-&920 BROAD ST	PICA JAMES J P O BOX 890124-003 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 18 EXT: 0	930 BROAD ST	PAPACHRISTOS DESPINA & NICHOLAS 66 IRON HILL ST E WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 21 EXT: 0	948 BROAD ST	PAPACHRISTOS DESPINA & NICHOLAS 66 IRON HILL ST E WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 22 EXT: 0	0 COMMERCIAL ST	TOWN OF WEYMOUTH 75 MIDDLE ST E WEYMOUTH, MA, 02189	X	

6/1/2018

PARCEL #	LOCATION	OWNER NAME/ADDRESS	CERTIFIED YES	CERTIFIED NO
MAP: 16 BLOCK: 158 LOT: 1 EXT: 0	0 COMMERCIAL ST	MBTA - MASSACHUSETTS BAY TRANSORTATION AUTHORITY 10 PARK PLAZA RM 5750 BOSTON, MA, 02116	X	
MAP: 19 BLOCK: 253 LOT: 25 EXT: 0	0 COMMERCIAL ST	TOWN OF WEYMOUTH CONSERVATION 75 MIDDLE ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 36 EXT: 0	0 COMMERCIAL ST	BAILEY KATHLEEN E TRUSTEE BRADY FAMILY TRUST 1165 PLEASANT STREET WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 37 EXT: 0	0 COMMERCIAL ST	TOWN OF WEYMOUTH 75 MIDDLE ST E WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 253 LOT: 8 EXT: 0	1250 COMMERCIAL ST	TOWN OF WEYMOUTH SCHOOL DEPT 75 MIDDLE ST E WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 6 EXT: 0	1274 COMMERCIAL ST	WALSH KATHLEEN A 1274 COMMERCIAL ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 7 EXT: 0	1282 COMMERCIAL ST	BONFIGLIOLO STEPHEN E TRS STEPHEN E BONFIGLIOLI REVOC TR 596 HANCOCK STREET QUINCY, MA, 02170	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 9	1284-9 COMMERCIAL ST	LAPENNA DAWN & DONNA M JT 1284-9 COMMERCIAL ST WEYMOUTH, MA, 02190	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 10	1286-10 COMMERCIAL ST	YANG CHIAYING & PAN LILI TBE 1286 COMMERCIAL ST #10 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 1	1288-1 COMMERCIAL ST	GALO THEODORE 1288 COMMERCIAL ST #1 WEYMOUTH, MA, 02189	X	

6/1/2018

PARCEL #	LOCATION	OWNER NAME/ADDRESS	CERTIFIED YES	CERTIFIED NO
MAP: 23 BLOCK: 253 LOT: 9 EXT: 2	1290-2 COMMERCIAL ST	TEMPLE MICHAEL 1290 COMMERCIAL ST UNIT #2 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 3	1292-3 COMMERCIAL ST	ANDRADE CHRISTOPHER & DY-ANDRADE ATHEENA TBE 1292-3 COMMERCIAL ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 4	1294-4 COMMERCIAL ST	HAGER ELYSE N/O MOSKOWITZ MARY BILLINGS 1294 COMMERCIAL ST UNIT #4 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 5	1296-5 COMMERCIAL ST	ROSSI YVONNE 1296 COMMERCIAL ST # 5 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 6	1298-6 COMMERCIAL ST	RASER MARGARET M & STEVEN TBE 1298 COMMERCIAL ST #6 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 7	1300-7 COMMERCIAL ST	REMINGTON MARY E 1300 COMMERCIAL ST #7 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 8	1302-8 COMMERCIAL ST	BRAGDON CHARLES N/O NASH CATHERINE 1302 COMMERCIAL ST #8 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 11	1304-11 COMMERCIAL ST	SWIDER EDWARD F 1304 COMMERCIAL ST #11 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 9 EXT: 12	1306-12 COMMERCIAL ST	MULLIN ELAINE N/O CONKLIN THOMAS O JR 1306 COMMERCIAL ST #12 WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 11 EXT: 0	1320 COMMERCIAL ST	CONGREGATIONAL CHURCH MICHAEL G FULLER-TREASURER 1320 COMMERCIAL ST E WEYMOUTH, MA, 02189	X	

6/1/2018

PARCEL #	LOCATION	OWNER NAME/ADDRESS	CERTIFIED YES	CERTIFIED NO
MAP: 23 BLOCK: 253 LOT: 23 EXT: 0	1516 COMMERCIAL ST	BRADY GEORGE F C/O BRADY'S PKG STORE 1516 COMMERCIAL ST WEYMOUTH, MA, 02189	X	
MAP: 23 BLOCK: 253 LOT: 24 EXT: 0	1530 COMMERCIAL ST	STOKES MICHAEL & CATHERINE TRS STOKES FAMILY REAL ESTATE TRST 74 PUTNAM ST WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 253 LOT: 35 EXT: 0	1540 COMMERCIAL ST	BELLAS JOHN P 9 INDEPENDENCE LN HINGHAM, MA, 02043	X	
MAP: 19 BLOCK: 255 LOT: 1 EXT: 0	1569 COMMERCIAL ST	ST OURS FREDERICK H P O BOX 566 NORWELL, MA, 02061	X	
MAP: 19 BLOCK: 255 LOT: 31 EXT: 0	1575 COMMERCIAL ST	TOWN OF WEYMOUTH 75 MIDDLE ST E. WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 158 LOT: 3 EXT: 0	1580 COMMERCIAL ST	MBTA C/O SLEEPER PETER P O BOX 455 ARLINGTON, MA, 02474	X	
MAP: 23 BLOCK: 253 LOT: 26 EXT: 0	0 COMMERCIAL ST REAR	TOWN OF WEYMOUTH PARK DEPT 75 MIDDLE ST E WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 255 LOT: 21 EXT: 0	6 HILL ST	WEINER DANIEL & COLLEEN TBE 6 HILL ST WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 252 LOT: 23 EXT: 0	0 SOMERSET ST	MCLEOD MARILYN N & CHRISTOPHER W TRUSTEES 32 SOMERSET ST WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 158 LOT: 10 EXT: 0	0 STATION ST	MBTA - MASSACHUSETTS BAY TRANSPORTATION AUTHORITY 10 PARK PLAZA RM 5750 BOSTON, MA, 02116	X	

6/1/2018

PARCEL #	LOCATION	OWNER NAME/ADDRESS	CERTIFIED YES	CERTIFIED NO
MAP: 19 BLOCK: 253 LOT: 29 EXT: 0	41 STATION ST	BACON RITA A 31 STATION ST E WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 252 LOT: 11 EXT: 0	54 STATION ST	KELLEY LEO G & JOHN F JR TRS N/O COATES JEFFREY 54 STATION ST WEYMOUTH, MA, 02189	X	
MAP: 19 BLOCK: 158 LOT: 4 EXT: 0	16 WHARF ST NORTH	MBTA C/O SLEEPER PETER P O BOX 455 ARLINGTON, MA, 02474	X	

This list of abutters is a certified copy of the Town of Weymouth's tax records for fiscal year 2018.
The record of ownership is accurate to July 1, 2017.

Prepared by: 6/1/18

Reviewed by: PAG 6.1.18

GOMEZ AND SULLIVAN ENGINEERS

41 Liberty Hill Road • PO Box 2179 • Henniker, NH 03242 • Phone 603-428-4960 • Fax 603-428-3973

June 11, 2018

Re: Weymouth Herring Passage & Smelt Habitat Restoration Project
Wetlands Protection Act Notice of Intent for an Ecological Restoration Project

To Whom It May Concern:

On behalf of the Town of Weymouth Department of Public Works, Gomez and Sullivan Engineers, DPC (Gomez and Sullivan) filed a Notice of Intent (NOI) of an Ecological Restoration Project under the Wetlands Protection Act (WPA) and the Weymouth Wetlands Protection Ordinance for the Weymouth Herring Passage & Smelt Habitat Restoration Project on June 4, 2018. Pursuant to 310 CMR 10.05(4)(a), the Applicant is also required to concurrently provide notification to all abutters owning property sharing a boundary with or located within a 100-foot buffer of parcels on which the project work will occur.

The NOI will be reviewed by the Weymouth Conservation Commission. Copies of the NOI may be viewed at the Conservation Commission office at the Town Hall (75 Middle Street), which is open Monday through Friday from 8:30 am to 4:30 pm and can be contacted at (781) 340-5007. An electronic version of the NOI is available online at https://tinyurl.com/WeymouthHerringRunNOI. It is anticipated that this project will be presented at Conservation Commission meeting scheduled for Wednesday, June 20, 2018 at 7:00 pm. A legal notice of NOI public hearing was published in The Patriot Ledger. The agenda for the meeting will be posted by June 15, 2018 on the Conservation Commission's website (https://www.weymouth.ma.us/conservation-commission).

The Weymouth Back River (or Back River), located in Hingham and Weymouth, Massachusetts, supports one of the largest river herring runs in Massachusetts. In the upper portion of the watershed, a flood control conduit bypasses Herring Brook storm flows, discharging them in a rectangular concrete channel adjacent to the base of a fish ladder in Jackson Square in Weymouth. An existing fish diversion swing gate at the tunnel outlet is nearing the end of its useful life and has been ineffective at preventing upstream migrating river herring from entering the conduit, where they may become trapped and perish. The goals of this project are to 1) replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel, 2) reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder, 3) restore a resting pool for river herring immediately downstream of the concrete pad, and 4) regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning. A location map and site plan schematics for the project are enclosed.

Please contact me at jgriffiths@gomezandsullivan.com or (603) 428-4960 to request a hardcopy or more information about the project.

Sincerely,

Jill Griffiths, PE
Water Resources Engineer

TOWN OF WEYMOUTH

NOTIFICATION TO ABUTTERS UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT AND LOCAL WETLANDS PROTECTION ORDINANCE, CHAPTER 7, SECTION 301

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the applicant is Town of Weymouth Department of Public Works

B. The applicant has filed a ☐ Notice of Intent or a Request for Determination with the Conservation Commission for the municipality of Weymouth seeking permission to remove, fill, dredge or alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40).

C. The address of the lot where the activity is proposed and a brief description including square footage and/or dimensions of proposed project:

Herring Run Park (corner of Broad St & Commercial St). Approximately 7,200 square feet (sf) of Herring Brook will be altered for improvements to restore fish passage and spawning habitat. Approx. 15,000 sf of adjacent park land will be temporarily disturbed for construction access.

D. Copies of the Notice of Intent or Request for Determination may be examined at The Weymouth Conservation Commission Office, Weymouth Town Hall, between the hours of 8:30 and 4:30, Monday through Friday.

E. Copies of the Notice of Intent or Request for Determination may be obtained from (check one):

✔ the Applicant or ☐ the Applicant's Representative

by calling this telephone number (603) 428-4960 contact person Jill Griffiths, PE

between the hours of: 8:30 am - 5:00 pm on the following days of the week: M-Th

F. Information regarding the date, time, and place of the public hearing may be obtained from:

Weymouth Conservation Commission

By calling this telephone number: **781-340-5007**
Between the hours of: **8:30 – 4:30 Mon. though Friday**

G. Check One:
☐ This is the Applicant
✔ This is the Applicant's Representative
☐ Other (specify) Town of Weymouth Conservation Commission

NOTE: Notice of the public hearing/meeting, including its date, time and place will be published at least five days in advance in the Patriot Ledger, and will also be posted in the Town Hall not less than forty-eight hours in advance. You may also contact the Weymouth Conservation Commission or the Department of Environment Protection Regional office for more information about this application or the Wetland Protection Act. To contact DEP call 508-946-2700.

10. Environmental Monitor Notification

Notice of Intent for Weymouth Herring Passage & Smelt Habitat Restoration Project

June 4, 2018

Description:

Pursuant to 310 CMR 10.11(1), notice is given of a Wetlands Protection Act Notice of Intent (NOI) for an Ecological Restoration Project to be submitted by the Town of Weymouth Department of Public Works for the Weymouth Herring Passage & Smelt Habitat Restoration Project at Herring Run Park (1494 Commercial Street, Weymouth, MA). Project goals include 1) replace a failing fish diversion structure to improve upstream passage of river herring in the Weymouth Back River and Herring Brook, and 2) restore historic spawning habitat for rainbow smelt downstream of the structure.

Anticipated NOI Submission Date:

June 4, 2018

Reviewing Conservation Commission:

Weymouth Conservation Commission
Town Hall
75 Middle Street
Weymouth, MA 02189
781-340-5007
Monday – Friday, 8:30 am – 4:30 pm

NOI Copies:

Copies of the NOI may be examined at the Conservation Commission office.

Public Hearing:

The Conservation Commission typically meets monthly on Wednesdays at 7:00 pm. It is anticipated that this project will be presented at the June 20, 2018 meeting. Legal notices of NOI public hearings are published before each Commission meeting in The Patriot Ledger. Meeting details should be confirmed with the Conservation Commission prior to attending.

11. MEPA Certificate

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
http://www.mass.gov/envir

June 24, 2016

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Weymouth Herring Passage and Smelt Habitat Restoration Project
PROJECT MUNICIPALITY	: Weymouth
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15519
PROJECT PROPONENT	: Town of Weymouth
DATE NOTICED IN MONITOR	: May 25, 2016

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project **does not require** an Environmental Impact Report (EIR).

Project Description

As described in the Environmental Notification Form (ENF), the project consists of fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square in Weymouth. The project is proposed by the Town of Weymouth in partnership with the Massachusetts Division of Marine Fisheries (DMF) to restore aquatic habitat for river herring and smelt. This habitat restoration project will replace an ineffective existing fish diversion gate within the Herring Brook at the tunnel outlet with an 8.5-foot concrete cantilever-type wall approximately 55 feet in length that will be aligned with the existing fish ladder at the site. The Town conducted an analysis of the flow capacity of the existing flood control conduit to ensure that the proposed fish diversion could pass the maximum flood flows and provide freeboard to an existing elevated concrete deck support beam over the conduit outflow. The proposed diversion wall will include a 6-foot wide by 3.5-foot high stainless steel upward opening slide gate in the

weir as a low-level outlet. The gate will be closed to prevent herring from accessing the flood control conduit during their migration period, but will remain open at other times to allow water to flow unimpeded. The project will benefit several species of fish including alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American river eel (*Anguilla rostrata*), and rainbow smelt (*Osmerus mordax*).

The project will also include channel improvements downstream of the fish diversion gate to reestablish smelt spawning habitat and restore a resting pool for herring. Smelt spawning habitat improvements will include covering the concrete pad downstream from the fish diversion gate and fish ladder with grouted rip-rap topped with a layer of cracked stone. In addition, cracked stone will also be spread over the channel downstream of the grouted section. To restore the resting pool, the site will be excavated to a three to four-foot depth and defined by larger stones. Additional sediment due to stormwater runoff may be dredged from the project area as directed by DMF. Finally, the project will restore flow depths and velocities suitable for smelt spawning by regrading an authorized rock weir downstream of the concrete channel.

Project Site

The Weymouth Back River is a short, tidal river located in Hingham and Weymouth and supports one of the largest river herring runs in Massachusetts. The project site includes a segment of the herring run extending from Whitman's Pond (river herring spawning habitat) through Herring Brook and downstream into the Weymouth Back River. The Herring Run includes six fishways; the project site includes the lowermost fishway located near Jackson Square in Weymouth. In the 1960s, a flood control conduit was constructed at the Iron Hill Dam at Whitman's Pond to allow floodwater to bypass the fish ladder at Jackson Square. This portion of the Herring Brook has vertical concrete walls and the bottom is lined with concrete.

The existing fish diversion swing gate at the tunnel outlet is nearing the end of its useful life and has been ineffective at preventing upstream migrating river herring from entering the conduit, where they become trapped and perish. The gate is approximately 6.5 feet high by 23 feet wide and was constructed in the early 1980s. The ladder was designed to open only during periods of high flows. However in its current condition it opens during moderate flows, allowing herring to enter and become stuck within the flood control tunnel resulting in fish kills.

The project site is located within the Weymouth Back River Area of Critical Environmental Concern (ACEC). Weymouth Back River and Whitman's Pond are classified as Outstanding Resource Waters (ORW) and segments of each are categorized as impaired water bodies.

Jurisdiction and Permitting

The project is subject to MEPA review and preparation of an ENF pursuant to 301 CMR 11.03(3)(b)(1)(c), 301 CMR11.03(3)(b)(1)(e), 301 CMR11.03(3)(b)(6), and 301 CMR11.03(11)(b) because it requires State Agency Actions and will alter 1,000 or more square feet (sf) of ORW, require new fill or structure in a regulatory floodway, involve the reconstruction and expansion of an existing solid fill structure of 1,000 or more sf base area, and

is located within an ACEC. The project requires a Section 401 Water Quality Certification (401 WQC) and Chapter 91 (c. 91) License from the Massachusetts Department of Environmental Protection (MassDEP), a Fishway Permit from DMF, and a Chapter 253 Dam Safety Jurisdictional Determination from the Massachusetts Department of Conservation and Recreation (DCR) Office of Dam Safety (ODS).[1]

The project will also require an Order of Conditions from the Weymouth Conservation Commission (or in the case of an appeal, a Superseding Order of Conditions from MassDEP), a Section 404/10 Permit from the United States Army Corps of Engineers (ACOE) in accordance with the Federal Clean Water Act (CWA). The project is also subject to Federal Consistency Review by the Massachusetts Office of Coastal Zone Management (CZM) and review by the Massachusetts Historical Commission (MHC) acting as the State Historic Preservation Officer (SHPO) pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800).

Because the project is being undertaken in partnership with DMF, a State Agency, which has provided Financial Assistance for project design and permitting, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment as defined in the MEPA regulations.

Environmental Impacts and Mitigation

This is an ecological restoration project designed to improve fish passage and restore habitat at the site. The project will provide a significant net environmental benefit but will include temporary and permanent environmental impacts, particularly to wetland resource areas. Potential environmental impacts associated with the project include temporary alteration of approximately 13,000 square feet (sf) of land, creation of approximately 350 sf of new impervious area, permanent alteration of approximately 7,200 sf of Land Under Water (LUW) and Fish Runs (coincidental), and temporary alteration of 45 linear feet (lf) of Bank and 13,600 sf of Riverfront Area. The project will dredge approximately 300 to 400 cubic yards (cy) of sediment.

Measures to avoid, minimize and mitigate environmental impacts include: avoiding loss or change in size of wetland resource areas, maintaining continuous flow within a gravity pipe system to allow juvenile fish to migrate safely downstream, use of cofferdams, adherence to time-of-year (TOY) restrictions to limit impacts to fisheries, erosion, sedimentation, water, and pollution control best management practices (BMPs) during construction, and restoration of Riverfront Area following construction. In addition, potential impacts associated with effects of climate change were considered in the project design. The Town conducted an updated flood frequency analysis to compare with the FEMA Flood Insurance Study (FIS; July 16, 2015) for the Town of Weymouth.

[1] The ENF indicates that the project may potentially exceed the EIR threshold at 11.03(3)(a)(3) for construction of a new dam. The Town submitted a Chapter 253 Jurisdictional Determination Request to DCR ODS during the MEPA review period. Comments from DCR indicate that it determined the fish passage structure to be non-jurisdictional.

Review of the ENF

The ENF includes a description of the project and an alternatives analysis, and identifies measures to avoid, minimize and mitigate project-related impacts. The ENF includes the Final Design Report (FDR) for the project. Comments from State Agencies and MassAudubon indicate support for the project.

The Town rejected rehabilitation of the existing gate because of its poor design and function. The alternatives analysis identified the following design criteria for replacement of the fish diversion structure:

- ability to be fully closed to prevent herring access into the tunnel;
- adequate height to prevent herring access to the tunnel over the top of the diversion almost 100 percent of the time;
- adequate open area to safely pass anticipated flows;
- ability to fully drain the tunnel to prevent water stagnation behind diversion;
- adequate opening size and geometry to allow potential trapped herring to exit tunnel; and,
- include a structure to exclude American eel from moving over the diversion.

Based on these criteria, the Town preferred a concrete wall with a gated opening to a full gate replacement which would be more costly and have less longevity. The alternatives analysis describes the preliminary design process from which three alternative design concepts were developed. All three alternatives included a concrete diversion wall with a fixed height of 8.5 feet above the concrete pad, which would exclude herring 99 percent of the time, based on the tidal surge analysis.

Alternative 1 included one gate with an overflow weir section; flows would be split between them during the design flood. Although this alternative was structurally favorable, it would require gate operation during a flood event, and the gate could become stuck, lose power (if electric), become inaccessible, and require emergency personnel. Alternative 2 included a long weir for overflow in addition to two gates that would pass 40 percent of the flow during the design flood. The gates would be operated from the side of the channel and the elevated deck above, respectively. While this alternative would provide redundancy, it would be more complex to build and operate, and it would likely incur higher costs.

Alternative 3 (Preferred Alternative) includes a weir extended approximately 15 feet farther downstream than Alternatives 1 or 2 and a small upward opening slide gate as a low level outlet that will be operable from the canal wall. This alternative will provide passive flood capacity and will not require gate operation during most flood events.

Wetlands and Waterways

The project will directly impact LUW, Fish Runs, Riverfront Area, and Bank. Comments from MassDEP also note that the project may impact Land Subject to Coastal Storm Flowage (LSCSF). The Weymouth Conservation Commission will review the project to determine its

consistency with the Wetlands Protection Act (WPA), the Wetlands Regulations (310 CMR 10.00), and associated performance standards. MassDEP will review the project to determine its consistency with the c. 91 regulations (310 CMR 9.00) and the 401 WQC regulations (314 CMR 9.00). The Town may choose to file a combined c. 91 and WQC application with MassDEP (BRP WW26). Finally, ACOE will review the project to determine its consistency with Section 404 of the Federal CWA.

Comments from MassDEP indicate that it can address outstanding issues during the permitting processes. The Town should review the MassDEP comment letter for guidance on the content of the Notice of Intent, c. 91 and 401 WQC applications.

The ENF discusses project compliance with the eligibility criteria for Ecological Restoration Projects (ERP) pursuant to 310 CMR 10.13(7) for restoration of fish passageways. The project's goals include restoration and improvement of the natural capacity of resource areas which have been degraded by anthropogenic influences (i.e., the flood control conduit, concrete-lined channel, and rock weir). The project will further interests of the WPA, including protection of fisheries habitat. Unavoidable permanent impacts to wetland resource areas include alteration of the ORW associated with restoration of a herring resting pool and smelt habitat and grading of an authorized rock weir. MassDEP comments indicate that the Town must demonstrate that the project meets all of the eligibility criteria set forth at 310 CMR 10.13(1)(a – l) for ERPs and 310 CMR 10.13(7) for restoring fish passageways.

The project will include dredging of approximately 300 to 400 cy of sediment within an ORW (proposed dredge footprint of 7,200 sf) comprised of the following:

- dredging of approximately 50-90 cy of sediment to restore the former herring resting pool;
- potential dredging of additional sediment associated with stormwater runoff as directed by DMF;
- regrading approximately 10 cy of rocks comprising the unauthorized rock weir over a length of 150 feet at a slope of 0.5 percent; and
- removal of approximately 40 cy of concrete (existing slab), 10 cy of concrete paver block, and 170 cy of earth (below concrete slab) and replacement with gravel sub-base, new concrete wall footings and slab, and of channel substrate rock fill.

The Town will need to submit an alternatives analysis as part of the 401 WQC application for the discharge of dredged or fill material to an ORW. The ENF indicates that no practicable alternatives were identified that could avoid impacts that would still meet the project goals of restoring the herring resting pool and smelt habitat. The ENF also indicates that the Town has not analyzed physical or chemical data of the sediment. The Town has consulted with MassDEP to discuss the challenge in obtaining representative sediment samples because most of it is either coarse material such as concrete, paver blocks, or larger rocks, or is currently inaccessible (i.e. below concrete slab). The proposed alternative is to sample the sediment during construction. The Town should develop a project-specific sampling and analysis plan that consider the management of the dredged materials and submit this plan to MassDEP as part of the pre-application process.

The project will stockpile all sediment dredged during construction on-site until sediment samples can be taken and analyzed to guide the appropriate disposal option. Some clean material will be used to restore smelt spawning habitat. Remaining clean material will be taken off-site for disposal (i.e. sand/gravel borrow pit) or reuse (i.e. landfill cover or upland material reuse). Clean or contaminated material could be disposed of at landfill or hazardous waste facility. Concrete paver blocks will be reused by the Town. Concrete demolition material will be recycled.

The MassDEP comment letter identifies information that must be included in the 401 WQC application to demonstrate that the project has been designed consistent with regulations associated with ERPs. As recommended by MassDEP, the Town should reference the Weymouth Back River ACEC Natural Resources Inventory which identifies resource management strategies. MassDEP comments also indicate that the Town should determine if a National Pollutant Discharge Elimination System (NPDES) Dewatering Permit may be required from the U.S. Environmental Protection Agency (EPA).

The project will include new fill (concrete pad and sub-base, spawning substrate rock fill) and structure (proposed fish diversion wall) in a regulatory floodway. The project area includes both flowed and filled tidelands. Work will occur in flowed tidelands. The project will reconstruct 1,400 sf of concrete slab and extend the fish diversion wall approximately 360 sf. The project is considered a water-dependent project under the c. 91 regulations (310 CMR 9.00); as such, it is exempt from the Riverfront Protection Act so long as it receives a Waterway License. The MassDEP comment letter identifies information necessary for permitting.

The Town proposes to construct the project between August and October 2017 during a period of relatively low flow and outside TOY restrictions for the smelt spawning period (March through May) and upstream migrations of river herring (March through June) and American eel (April through July). While downstream migration of juvenile herring occurs from July through November, it is anticipated that fish can safely pass downstream through the proposed gravity bypass system.

The Town should continue to work, in partnership with DMF, with MassDEP during the permitting processes to ensure protection of wetland resource areas and fish species and their habitats. Comments from CZM indicate that the Town and DMF should develop an operation and maintenance plan identifying respective responsibilities as part of the permitting process. CZM comments also encourage the Town to develop educational opportunities involving the nearby elementary school including field trips and support in required monitoring efforts.

Historical and Archaeological Resources

Jackson Square is a historic district and the Herring Run is a historic structure listed in the *Inventory of Historic and Archaeological Assets of the Commonwealth* (Inventory). The Jackson Square Area is eligible for listing in the National Register of Historic Places. As indicated earlier, the project requires review pursuant to Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800), and Massachusetts General Laws Chapter 9, Section 26-

27C (301 CMR 11). The ACOE, in consultation with MHC acting as the SHPO, will review the project to determine whether it would result in an adverse effect. The Town should consult with ACOE and MHC during their review of the project.

According to the ENF, the Inventory does not clearly identify the extent of the historic Herring Run. The Town assumes that it is limited to the fish ladder itself. The project does not propose modifications to the fish ladder and the work footprint will be located within the walled channel of the 1960s and 1790s flood control project. The only proposed demolition is to a concrete slab and an early 1980s metal swing gate downstream of the fish ladder. The slab will be replaced by a similar concrete slab and the metal gate will be replaced by the proposed fish diversion wall. The ENF indicates that the project is not expected to affect the overall character of the concrete channel in the vicinity of the Herring Run fish ladder historic structure and the broader Jackson Square historic district. The Town maintains that the MEPA review threshold at 310 CMR 11.03(10)(b)(1) for demolition of all or any exterior part of any Historic Structure listed in or located in any Historic District listed in the State Register of Historic Places or the Inventory will not be exceeded unless the Herring Run historic structure extended into the proposed demolition area.

According to the Massachusetts Board of Underwater Archaeological Resources (BUAR), no record exists of underwater archaeological resources exists within the project area. If any heretofore unknown archaeological resources are detected during construction, the Town should take appropriate measures to prevent impacts to the resources and contact BUAR, the Massachusetts Historical Commission, and other appropriate agencies.

Climate Change

The FDR included the hydrologic and hydraulic analysis used to estimate flood flows for the design of the proposed fish diversion and channel improvements. The proposed diversion was evaluated to ensure that it could pass flood flows without impacting the support beam for the elevated concrete deck above. This project is susceptible to the potential effects of climate change, including sea level rise and increased storm intensity and frequency. Sea level rise is likely to exacerbate the impacts associated with storm damage, flooding, and erosion in this location and as the rate of rise accelerates the impacts from coastal storm events will become more frequent and widespread. The FDR considered the effects of climate change by conducting an updated flood frequency analysis to compare with the Federal Emergency Management Act (FEMA) FIS estimates for Herring Brook. The FDR described the methodology for the analysis and provided a summary of flood discharges from the updated analysis. The wall will be designed to pass the 100-year flood flow with over one foot of freeboard to the existing elevated deck support beam above the wall with the gate closed, and in excess of the 500-year flood flow with no freeboard and the gate opened. At the 500-year flow, the wall will impound less than five acre-feet which will be contained entirely within the existing flood control conduit.

Construction Period

The project must comply with the Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. c.40, s.54. All construction activities should be undertaken in compliance

with the conditions of all State and local permits. The project will occur over a two to three month period between August and October 2017 in consideration of various TOY restrictions for herring, smelt, and work proposed in the Weymouth Back River ACEC.

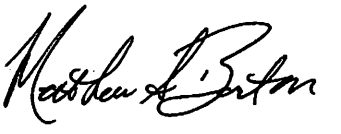
Temporary gravel construction access and staging areas will be primarily located on existing parking area, open field, and paved paths on Town-owned land. The project will minimize impacts to existing park vegetation. Water control at the site will consist of: stopping flow into the flood control conduit at the intake and diverting flow to the surface channel of Herring Brook, bypassing water from the surface channel of Herring Brook (upstream of the fish ladder) around the work area through the use of a gravity bypass pipe system which will provide safe passage to any juvenile herring migrating downstream, and controlling backwater from downstream (including tidal surges). Prefabricated cofferdams (five to six feet in height) will be placed upstream of the fish ladder and spillway and downstream of the channel access to isolate the work area. Pumps will dewater the work area initially over a period of one to two days and discharge water to an open field subsequent to filtration; only minimal maintenance pumping will be required to remove runoff entering the work area.

The project will install erosion, sedimentation, water, and pollution controls during the construction period in accordance with best management practice (BMP) guidelines recommended by MassDEP. The site will be restored to its existing condition following construction.

I encourage the Town to select project contractors that have installed retrofit emissions control devices, or vehicles that use alternative fuels to reduce emissions of VOCs, carbon monoxide (CO) and particulate matter (PM) from diesel-powered equipment. Off-road vehicles are required to use ultra-low sulfur diesel fuel (ULSD). The Town is advised that if oil and/or hazardous material are identified during the implementation of this project, notification pursuant to the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000) must be made to MassDEP.

Conclusion

The ENF has sufficiently defined the nature and general elements of the project for the purposes of MEPA review and demonstrated that the project's environmental impacts will be avoided, minimized and/or mitigated to the extent practicable. Based on the information in the ENF and after consultation with State Agencies, I find that no further MEPA review is required. Remaining issues can be addressed through the local, state and federal permitting and review processes.



June 24, 2016
Date

Matthew A. Beaton

Comments Received:

06/10/2016	Massachusetts Board of Underwater Archaeological Resources (BUAR)
06/13/2016	MassAudubon
06/14/2016	Massachusetts Division of Marine Fisheries (DMF)
06/14/2016	Massachusetts Department of Conservation and Recreation (DCR)
06/14/2016	Massachusetts Department of Environmental Protection (MassDEP) / Southeast Regional Office (SERO)
06/14/2016	Massachusetts Office of Coastal Zone Management

MAB/PPP/ppp

The COMMONWEALTH OF MASSACHUSETTS
BOARD OF UNDERWATER ARCHAEOLOGICAL RESOURCES
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
251 Causeway Street, Suite 800, Boston, MA 02114-2136
Tel. (617) 626-1141 Fax (617) 626-1240 Web Site: www.mass.gov/eea/agencies/czm/buar/

June 10, 2016

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Attention: Purvi Patel, MEPA Unit
100 Cambridge St., Suite 900
Boston, MA 02114

RE: Weymouth Herring Passage and Smelt Habitat Restoration, Weymouth (EEA#15519)

Dear Secretary Beaton,

The staff of the Massachusetts Board of Underwater Archaeological Resources has reviewed the above referenced project's ENF (EEA#15519) and supporting materials prepared by Gomez and Sullivan Engineers, DPC, on behalf of the Town of Weymouth. We offer the following comments.

The Board has conducted a preliminary review of its files and secondary literature sources to identify known and potential submerged cultural resources in the proposed project area. No record of any underwater archaeological resources was found. Based on the results of this review and the modern nature and associated disturbance when the passage was constructed, the Board expects that this project is unlikely to impact submerged cultural resources.

However, should heretofore-unknown submerged cultural resources be encountered during the course of the project, the Board expects that the project's sponsor will take steps to limit adverse affects and notify the Board, as well as other appropriate agencies, immediately in accordance with the Board's *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*.

The Board appreciates the opportunity to provide these comments as part of the review process. Should you have any questions regarding this letter, please do not hesitate to contact me at the address above, by email at victor.mastone@state.ma.us, or by telephone at (617) 626-1141.

Sincerely,

Victor T. Mastone
Director

/vtm
Cc: Brona Simon, MHC
Bob Boeri and Lisa Engler, MCZM

Mass Audubon

Advocacy Department
208 South Great Road ▲ Lincoln, Massachusetts 01773
tel 781-259-2172 ▲ email hricci@massaudubon.org

June 13, 2016

Secretary Matthew Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office, EEA #15519
100 Cambridge Street, Suite 900
Boston, MA 02114

Via Email: Purvi.Patel@state.ma.us

Re: **EOEEA# 15519, Weymouth Herring Passage and Smelt Habitat Restoration Project**

Dear Secretary Beaton:

On behalf of Mass Audubon, I submit the following comments on the Environmental Notification Form (ENF) for this project. The project involves work to restore anadromous fish passage and spawning habitat in the Weymouth Back River, which supports one of the largest river herring runs in Massachusetts. The project is sponsored by the Town of Weymouth with support from the Division of Marine Fisheries. Mass Audubon supports the project and recommends that no further MEPA review be required.

The project is designed to address existing issues with the intersection of a stormwater flood diversion channel with the herring run as well as making habitat improvements within the run itself. An existing but deteriorated fish diversion gate at the flood diversion channel outlet is allowing migrating fish to enter the flood channel where they tend to become trapped and die. The project will replace this gate with an improved design that will prevent fish from entering the tunnel while allowing it to serve the intended flood control function. Fish habitat will also be improved by installing substrate for smelt spawning, restoring a resting pool that has become filled with sediment, and regrading a rock weir to provide flow depths and velocities appropriate for smelt spawning. The project will benefit several species of fish including alewife (*Alosa pseudoharengus*). blueback herring (*Alosa aestivalis*), American river eel (*Anguilla rostrata*), and rainbow smelt (*Osmerus mordax*).

The ENF contains ample documentation including hydrologic and hydraulic analyses, alternatives analysis, and engineering design plans. Any remaining details should be able to be addressed through the required permitting.

Thank you for considering these comments.

Sincerely,

E. Heidi Ricci

E. Heidi Ricci
Senior Policy Analyst

cc: Jill Griffiths, Gomez and Sullivan Engineers
Brad Chase, DMF
Mary Ellen Schloss, Weymouth Conservation Administrator

Commonwealth of Massachusetts
Division of Marine Fisheries
251 Causeway Street, Suite 400
Boston, Massachusetts 02114
(617)626-1520
fax (617)626-1509

David E. Pierce
Director

Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Matthew A. Beaton
Secretary
George N. Peterson, Jr.
Commissioner
Mary-Lee King
Deputy Commissioner

June 14, 2016

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
Alex Strysky, EEA No.15507
100 Cambridge Street, Suite 900
Boston MA 02114

Re: Town of Weymouth and *MarineFisheries* Herring Passage and Smelt Habitat Restoration

Dear Secretary Beaton:

Divisions of Marine Fisheries (*MarineFisheries*) environmental review staff have reviewed the above referenced Environmental Notification Form for work within the Weymouth Back River to improve fish passage and habitat. As *MarineFisheries* is a partner on this project, the environmental reviewers met with the Diadromous Fish Project staff to discuss the project and any related fisheries habitat concerns. The proposal will improve fish habitat and fix a passage obstruction and has been designed to avoid and minimize impacts to fisheries resources and habitats.

The project has been planned to avoid sensitive migratory time periods for diadromous fish and no in-water work shall be conducted from March 1 to June 30 of any year.

Thank you for considering our comments. Please contact Tay Evans of my staff if you have any questions about this review.

Sincerely,

David E. Pierce, Ph.D.
Director

cc.
R. Lehan (DFG)
B. Chase (DMF)
K. Ford (DMF)
M. Schloss (Weymouth)
C. Fontaine (Weymouth)
B. Boeri (CZM)

PD/te/sd

dcr
Massachusetts

June 14, 2016

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office, Purvi Patel
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

RE: EOEEA # 15519 Weymouth Herring Passage and Smelt Habitat Restoration Project

Dear Secretary Beaton:

The Department of Conservation and Recreation ("DCR") Office of Dam Safety ("ODS") has reviewed the Environmental Notification Form ("ENF") for the proposed habitat restoration project located in the Town of Weymouth and submitted by the Town of Weymouth (the "Proponent").

Background
The Town of Weymouth is seeking to reconstruct an existing fish diversion structure on the Back River. Since this will be a concrete weir structure which will impound water within an existing flood conveyance conduit for the fish passage season, the Town is seeking clarification on whether the new structure would be considered a non-jurisdictional dam per DCR dam safety regulations.

Project Description
As described in the ENF, the proposed fish diversion structure will be constructed of reinforced concrete as a cantilever type wall. The wall will be 8.5 feet high with a length of 55 feet and extend at an angle across the outlet of an existing flood conveyance conduit. An existing metal swing gate which functioned as a fish diversion structure will be removed. The new diversion structure will impound a pool of water within the flood conveyance conduit from March 1 to June 30 (fish passage season) each year. After the fish passage season, a slide gate, located within the concrete diversion structure, will be opened and the conduit will be drained and remain free flowing for the remainder of the year. The proposed structure has been analyzed by the Proponent's engineer and it appears that it has been determined that the new diversion structure will not impact the function or hydraulic capacity of the flood conveyance conduit.

Since the diversion structure will be 8.5 feet high and therefore exceed the jurisdictional height identified in the dam safety regulations, ODS requested that the design engineer submit a Chapter 253 jurisdictional determination request. In addition to structure height, the normal and maximum volume impounded were presented in the jurisdictional determination request, stating that the maximum volume impounded between March 1 and June 30 will be 4.4 acre feet. Since this is below the jurisdictional threshold of 15 acre feet, the proposed structure is determined to be non-jurisdictional.

If any substantial changes or modifications occur, such as a larger structure or an increase in the volume of water impounded, during implementation of this project, please notify ODS for a determination as to any change in jurisdictional status. DCR appreciates the opportunity to comment on this project.

Please contact Mark Geib at (617) 626-1396 with any questions or to request additional information or coordination with the Office of Dam Safety.

Sincerely,

Leo Roy
Commissioner

cc: Norman Orrall, DCR Chief Planning and Engineering
William Salomaa, Dam Safety Director
Nat Tipton, MEPA Review Coordinator

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

June 14, 2016

Mathew A. Beaton,
Secretary of Environment and Energy
ATTN: MEPA Office
RE: ENF Review EOEEA # 15512-
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

ENF Review EOEEA # 15519.
WEYMOUTH. Herring Passage and Smelt Habitat Restoration Project at Herring Run Park

Dear Secretary Beaton,

The Southeast Regional Office of the Department of Environmental Protection (MassDEP) has reviewed the Environmental Notification Form (ENF) for the proposed Herring Passage and Smelt Habitat Restoration Project, located at Herring Run Park (Intersection of Broad and Commercial Streets, Weymouth, Massachusetts for the proposed (EOEEA # 15519). The project proponent provides the following information for the project:

The Town of Weymouth secured funding from *MarineFisheries* to contract Gomez and Sullivan Engineers, DPC (Gomez and Sullivan) to prepare design plans, bid documents, and permit applications for an alternative solution to the problem of fish accessing the flood control tunnel. Project goals include implementing the following fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square:

- Replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel.
- Reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder.
- Restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment primarily washed off roadways.
- Regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

The primary target species for the redesign of the fish diversion are the anadromous alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), known collectively as river herring. The diversion redesign also considered the catadromous American river eel (*Anguilla rostrata*). Additional project goals include establishing spawning substrate for rainbow smelt (*Osmerus mordax*) on the concrete pad downstream of the diversion, as well as a resting pool for river herring below the concrete pad.

Which State Agency Permits will the project require?

- **BRP WW 26 Combined Licenses/Permits for Waterways & Water Quality Certification**
- **Chapter 253 Dam Safety Jurisdictional Determination (DCR)**
- **Project Notification Form (MHC)**
- **Fishway Permit (DMF)**
- **Wetlands Protection Act Notice of Intent & Restoration Order of Conditions (DEP/Town)**
- **Coastal Zone Management Act Federal Consistency Review (CZM)**

Wetlands and Waterways Comments:

The SERO Wetlands & Waterways Program has reviewed the ENF submitted by the Town of Weymouth proposing to replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel, reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder, restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment and regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

- Portions of the work are proposed in Bank (310 CMR 10.54), Land Under Water (LUW 310 CMR 10.56), Riverfront Area (RA 310 CMR 10.58) and Land Subject to Coastal Storm Flowage. This project involves work within a jurisdictional river therefore the Proponent will be required to submit a Chapter 91 License Application. Based on the information contained in the ENF, it is the opinion of the Waterways Program that the project would be classified as a water-dependent use pursuant to the Waterways Regulations at 310 CMR 9.12.

- The ENF recognizes the necessity to file a Notice of Intent (NOI) with the Town of Weymouth and MassDEP for the project. MassDEP notes that once the NOI minimum submittal requirements have been met, a MassDEP File Number will be issued. It is anticipated that the Weymouth Conservation Commission will conduct a public Hearing and issue an Order of Conditions. A final Order of Conditions must be obtained before any work within Areas Subject to Jurisdiction commences.

- 310 CMR 10.11 describes the actions required before submitting a NOI for an Ecological Restoration project that meets the eligibility criteria for a Restoration Order of Conditions set forth in 310 CMR 10.13 or for approval as an Ecological Restoration Limited Project pursuant to 310 CMR 10.24(8) or 310 CMR 10.53(4).

- Although the Waterways Regulations are more restrictive for projects located within an ACEC, the proposed improvement dredging may be allowed because the sole purpose of the project is for fisheries enhancement as part of an Ecological Restoration Project (see 310 CMR 9.40(1)(b)).

- It is the Department's opinion that the proposed fish diversion gate, diversion wall and resting pool, would be considered a structure, as defined in the Waterways Regulations at 9.02, and requires a Chapter 91 License. The Department may approve publicly-owned structures for water-dependent use within an ACEC, provided that the structures are to accommodate an Ecological Restoration Project (see 9.32(1)(e)3.).

- If the applicant intends to pursue the project as regulated by a Restoration Order of Conditions, they will need to demonstrate that the project meets all of the eligibility criteria

set forth at 310 CMR 10.13(1)(a – l) as well as the additional eligibility criteria for restoring fish passageways at 310 CMR 10.13(7). Additional information not provided in the ENF will be necessary to determine if these eligibility criteria can be met. 310 CMR 10.12 outlines the requirements for the submission of a NOI for an Ecological Restoration Project.

- Per 310 CMR 10.53(4)(e)5, a project that will improve the natural capacity of a Resource Area to protect the interests of the WPA may be permitted as an Ecological Restoration Limited Project provided that the project meets the eligibility criteria set forth 310 CMR 10.53(4)(a) through (d).

- Although the project appears to exceed the allowable wildlife habitat alteration "thresholds" established in 310 CMR 10.56(4)(a)4 (LUW), and 10.58(4)(d)1.c (RA), a project that meets the requirements of 310 CMR 10.12(1) and (2) to be considered for an Ecological Restoration Order of Conditions is exempt from the requirement to perform a wildlife habitat evaluation.

- Per 310 CMR 10.58(6)(i), structures and activities subject to a M.G.L. c. 91 waterways license or permit, or authorized prior to 1973 by a special act, are exempt from requirements for the Riverfront Area, provided the structure or activity is subject to jurisdiction and obtains a license, permit, or authorization under 310 CMR 9.00.

- A 401 Water Quality Certification application is required per 314 CMR 9.04(2) & (12) and is subject to the Criteria for Evaluation of Applications for the Discharge of Dredged or Fill Material in 314 CMR 9.06, and the Criteria for Evaluation of Applications for Dredging and Dredged Material Management at 314 CMR 9.07, as well as the requirements of the Massachusetts Surface Water Quality Standards at 314 CMR 4.00. An alternatives analysis that demonstrates measures taken to avoid, minimize and mitigate for the dredging and placement of fill must be submitted with the 401 Water Quality Certificate application. The Proponent may choose to file a MassDEP BRP WW26 Combined Application for Chapter 91 and WQC.

- Per 314 CMR 9.06(1)(c) and 9.07(1)(b), for dredging and discharges of dredged or fill material associated with an Ecological Restoration Project, the alternatives analysis shall include a consideration of the following:
  1. Any time of year restrictions or other conditions recommended by the Division of Marine Fisheries for coastal waters and the Division of Fisheries and Wildlife for inland waters.
  2. The condition of the existing ecosystem and the wetlands and waters contained therein.
  3. The magnitude and significance of the benefits of the Ecological Restoration Project in improving the capacity of the affected ecosystem and the waters and wetlands contained therein to sustain their designated uses, as identified in 314 CMR 4.00: *Massachusetts Surface Water Quality Standards.*
  4. The magnitude and significance of the impacts of the Ecological Restoration Project on the existing ecosystem and the wetlands and waters contained therein and the extent to which the applicant will:
     a. avoid adverse impacts to the existing ecosystem that can be avoided without impeding the achievement of the project's ecological restoration goals;
     b. minimize adverse impacts to the existing ecosystem that are necessary to the achievement of the project's ecological restoration goals; and

c. utilize best management practices such as erosion and siltation controls and proper construction sequencing to avoid and minimize adverse construction impacts to the existing ecosystem and the waters and wetlands contained therein.

- Per 314 CMR 9.06(3)(b), the discharge of dredged or fill material to an Outstanding Resource Water in association with an Ecological Restoration Project may be permitted without requiring the applicant to obtain a variance in accordance with 314 CMR 9.08 provided that the Department determines that the discharge of dredged or fill material may be permitted in accordance with 314 CMR 9.06(1), (2), (4), (5), and (7), and is not identified in 314 CMR 9.06(4) as a discharge of dredged or fill material that requires a variance.

- Per 314 CMR 9.07(1)(k)(2), dredging may be permitted in Outstanding Resource Waters, in association with Ecological Restoration Projects provided that the Department determines that the dredging and dredged materials management may be permitted in accordance with 314 CMR 9.07(1)(a) through (j).

- Per 314 CMR 9.07(2)(b)5., for Ecological Restoration Projects involving the dredging of over 100 cubic yards, the applicant shall develop a project-specific sampling and analysis plan, taking into account the likely requirement for the alternative(s) being considered for management of the dredged materials. This plan shall be submitted in draft form to the Department for review and comment as part of the pre-application process. The Department suggests reviewing 314 CMR 9.07 (2)(b) for specific analysis requirements when proceeding with sampling and analysis of dredged materials.

- The 401 Water Quality Certification Regulations at 314 CMR 9.06(3) and 314 CMR 9.07(1)(k) do allow for discharge of dredged or fill material and dredging to be permitted in an Outstanding Resource Water that is located within an Area of Critical Environmental Concern provided that if there is a resource management plan for the ACEC that has been adopted by the municipality and approved by the Secretary, the Department determines that: the enlargement of structures or facilities is consistent with said plan and the fill or structure associated with the enlargement activity is located entirely within an area of previously filled tidelands. No ACEC resource management plan is listed for this project area within the ENF, however in 1996 the DEM published the Weymouth Back River ACEC Natural Resource Inventory, which does include an outline of suggested resource management strategies that can be referred to by the Proponent in order to be sure they are in compliance with resource management strategies.
  http://www.mass.gov/eea/agencies/dcr/conservation/ecology-acec/weymouth-back-river.html

- The Waterways Regulations at 310 CMR 9:40 (2) Resource Protection Requirements state that design and timing of dredging and dredge material disposal activities shall be such as to avoid interference with anadromous/catadromous fish runs. The proponent should consult with DMF on appropriate time-of-year (TOY).

- Based on information provided in the ENF, if eligibility criteria are met, it appears that an application could be submitted to MassDEP for a BRP WW 26 Combined License/Permit for Waterways & Water Quality Certification, Water-Dependent Chapter 91 Waterways

License/Permit (310 CMR 9.00), and 401 Dredging, Fill/Excavation Water Quality Certification (314 CMR 9.00).

- MassDEP commends the Town of Weymouth for its initiative to replace the Bark River fish diversion gate to improve habitat and improve fish passage.

- MassDEP believes that any remaining issues can be addressed and no further MEPA review is necessary.

Solid Waste Dredging
If any solid waste is found in the dredged material, it must be disposed of at an appropriate facility

Dewatering Activities
Depending on the nature of the activities at the Project site, the proponent may have to obtain an EPA NPDES Dewatering General Permit http://www.epa.gov/region1/npdes/dewatering.html or a Remediation General Permit http://www.epa.gov/region1/npdes/rgp.html .

Bureau of Waste Site Cleanup
Based upon the information provided, the Bureau of Waste Site Cleanup (BWSC) searched its databases for disposal sites and release notifications that have occurred at or might impact the proposed project area. A disposal site is a location where there has been a release to the environment of oil and/or hazardous material that is regulated under M.G.L. c. 21E, and the Massachusetts Contingency Plan [MCP – 310 CMR 40.0000].

Release Tracking Number (RTN) 4-20447, property on Wharf Street, Weymouth, is located approximately 1000-feet north of the proposed project area. Continued response actions are required at the site prior to closure under the MCP. Ongoing MCP response actions at the site are unlikely to impact the proposed MEPA project. RTN 4-3000844, Quincy Oil Station, 930 Broad Street, Weymouth, is located within or immediately adjacent to the proposed project area. The site was closed under the MCP on 8/9/1996 and is unlikely to impact the proposed MEPA project.

There are no other listed MCP disposal sites located at or in the vicinity of the proposed project area that might impact the site. Interested parties may view a map showing the location of BWSC disposal sites using the MassGIS data viewer (Oliver) at: http://maps.massgis.state.ma.us/map_ol/oliver.php Under "Available Data Layers" select "Regulated Areas", and then "DEP Tier Classified 21E Sites". The compliance status and report submittals for specific MCP disposal sites may be viewed using the BWSC Waste Sites/Reportable Release Lookup at: http://public.dep.state.ma.us/SearchableSites2/Search.aspx

The Project Proponent is advised that if oil and/or hazardous material are identified during the implementation of this project, notification pursuant to the Massachusetts Contingency Plan (310 CMR 40.0000) must be made to MassDEP, if necessary. A Licensed Site Professional (LSP) should be retained to determine if notification is required and, if need be, to render appropriate opinions. The LSP may evaluate whether risk reduction measures are necessary if contamination is present. The BWSC may be contacted for guidance if questions arise regarding cleanup.

Air Quality

Construction and operation activities shall not cause or contribute to a condition of air pollution due to dust, odor or noise. To determine the appropriate requirements please refer to:

310 CMR 7.09 Dust, Odor, Construction, and Demolition
310 CMR 7.10 Noise

Massachusetts Idling Regulation

MassDEP requests that the proponent state specifically in the subsequent environmental filing how it plans to prohibit the excessive idling during the construction period. Typical methods of reducing idling include driver training, periodic inspections by site supervisors, and posting signage. In addition, to ensure compliance with this regulation once the project is occupied, MassDEP requests that the proponent establish permanent signs limiting idling to five minutes or less at the completed project.

Proposed s.61 Findings

The "Certificate of the Secretary of Energy and Environmental Affairs on the Environmental Notification Form" may indicate that this project requires further MEPA review and the preparation of an Environmental Impact Report. Pursuant to MEPA Regulations 301 CMR 11.12(5)(d), the Proponent will prepare Proposed Section 61 Findings to be included in the EIR in a separate chapter updating and summarizing proposed mitigation measures. In accordance with 301 CMR 11.07(6)(k), this chapter should also include separate updated draft Section 61 Findings for each State agency that will issue permits for the project. The draft Section 61 Findings should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and contain a schedule for implementation.

Very truly yours,

Jonathan E. Hobill,
Regional Engineer,
Bureau of Water Resources

JH/GZ

Cc: DEP/SERO

ATTN: Millie Garcia-Serrano, Regional Director
David Johnston, Deputy Regional Director, BWR
Maria Pinaud, Deputy Regional Director, BAW
Gerard Martin, Deputy Regional Director, BWSC
Jennifer Viveiros, Deputy Regional Director, ADMIN
Allen Hemberger, Site Management
Jim Mahala, Chief, Wetlands and Waterways

David Hill, Wetlands and Waterways
Greg DeCesare, Wetlands and Waterways
Dahlia Medeiros, Wetlands and Waterways

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

MEMORANDUM

TO: Matthew A. Beaton, Secretary, EEA
ATTN: Purvi Patel, MEPA Unit
FROM: Bruce Carlisle, Director, CZM
DATE: June 10, 2016
RE: EEA 15519, Herring Passage and Smelt Habitat Restoration, Weymouth

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The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Environmental Notification Form (ENF), noticed in the *Environmental Monitor* dated May 25, 2016, and offers the following comments.

Project Description

The proposed Weymouth Herring Passage and Smelt Habitat Restoration project will improve fish passage in the Herring Brook in Weymouth where a stormwater bypass tunnel intersects with the brook at an existing fish ladder. This project is located within the Weymouth Back River Area of Critical Environmental Concern (ACEC). The original flood control conduit, installed in the 1960's, conveys stormwater flows around the heavily developed Jackson Square area of Weymouth. A fish diversion gate was added in the 1980's to prevent migrating fish from entering the conduit where they became trapped. The fish diversion gate has been modified since installation because it did not operate as intended. Despite the modifications, the gate continues to malfunction allowing fish to enter and remain trapped.

This project proposes to redesign the flood control conduit and diversion gate as well as make improvements to downstream herring and smelt habitat. The project includes four components: 1) Replace the existing gate with a new fish diversion weir and steel slide gate; 2) Replace substrate suitable for smelt downstream of the tunnel; 3) Restore a resting pool downstream of the tunnel; and 4) Re-grade/remove a downstream rock weir.

Project Comments

CZM supports this project and the Town of Weymouth's efforts to improve herring passage and anadromous/catadromous fish habitat in an ACEC. We commend the proponent for incorporating the potential effects of climate change including the likely increase in frequency and quantity of precipitation in the design of the proposed fish diversion and new steel slide gate. An operation and maintenance plan indicating Town and Division of Marine Fisheries responsibilities should be developed as part of the permit application process. Also, we encourage the Town to develop educational opportunities involving the nearby elementary school including field trips and support in required monitoring efforts.

Federal Consistency

The proposed project may be subject to CZM federal consistency review. For further information on this process, please contact, Robert Boeri, Project Review Coordinator, at 617-626-1050 or visit the CZM web site at www.state.ma.us/czm/fcr.htm.

BKC/bw/lbe

cc: Vic Mastone, BUAR
Brad Washburn, CZM

12. Water Quality Certification

An Application for BRP WW 26 – Combined License/Permit for Waterways & Water Quality was filed for the project on February 1, 2018. Based on the typical review period of 120 days, the Water Quality Certification was expected by June 1, 2018, but has not yet been received. The Certification is anticipated to be issued by June 14, 2018 and will be forwarded to the Conservation Commission and DEP Southeast Regional Office and included in this section when received.

13. Fishway Construction Permit

This section includes the following items:

- Fishway Permit Request Letter
- Draft Fishway Construction Permit

GOMEZ AND SULLIVAN ENGINEERS

41 Liberty Hill Road • PO Box 2179 • Henniker, NH 03242 • Phone 603-428-4960 • Fax 603-428-3973

VIA EMAIL

May 30, 2018

Brad Chase, Diadromous Fish Biology and Management Project
Massachusetts Division of Marine Fisheries
836 Rodney French Blvd
New Bedford, MA 02740
brad.chase@state.ma.us

Re: Weymouth Herring Passage and Smelt Habitat Restoration Project Fishway Permit & Determinations

Dear Brad:

On behalf of the Town of Weymouth Department of Public Works, Gomez and Sullivan Engineers, DPC respectfully requests a *MarineFisheries* Fishway Permit for construction activities related to anadromous fish passage as defined in M.G.L. c. 130, §§1 and 19 for the Weymouth Herring Passage and Smelt Habitat Restoration Project.

Additionally, the Wetlands Protection Act Notice of Intent (NOI) for an Ecological Restoration Project requires the following:

> Per 310 CMR 10.11(3), "if the project will occur within a coastal waterbody with a restricted Time of Year…the applicant shall obtain a written determination from the Division of Marine Fisheries as to whether the proposed work requires a TOY [time-of-year] restriction, and if so, the written determination shall specify the recommended TOY restriction and any other recommended conditions on the proposed work.
>
> Per 310 CMR 10.11(4), "if the project may affect a diadromous fish run…the applicant shall obtain a written determination from the Division of Marine Fisheries as to whether the design specifications and operational plan for the project are compatible with the passage requirements of the fish run."

Please provide written determinations to address these two requirements. A draft of the operation and maintenance plan is attached for your review. Additional details and project plans can be found in the Application for a Combined License/Permit for Waterways & Water Quality at: https://app.box.com/s/pp8f4cmdbfnk52pcwfi8iv9b87tzmu75.

The Town plans to submit the NOI for the Conservation Commission's review at their June 20, 2018 meeting, so we would appreciate your response prior to that date if possible. Please contact me with any questions or comments at (603) 428-4960 or jgriffiths@gomezandsullivan.com.

Sincerely,

Jill Griffiths, PE
Water Resources Engineer

Commonwealth of Massachusetts

Division of Marine Fisheries

251 Causeway Street, Suite 400
Boston, Massachusetts 02114
(617)626-1520
fax (617)626-1509

David E. Pierce, Ph.D.
Director

Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Matthew A. Beaton
Secretary
Ronald Amidon
Commissioner
Mary-Lee King
Deputy Commissioner

Fishway Construction Permit

DRAFT

Date: June 11, 2018 **Permit** #01-18

Pursuant to M.G.L. Chapter 130 §1 and 19, and 322 CMR Sections 7.01 4(f) and 14(m), the Massachusetts Division of Marine Fisheries (MA DMF) grants the authority to the Town of Weymouth to modify the existing fishway at the Broad Street Dam (also known as Herring Brook Park) on the Weymouth-Back River (DMF Anadromous Fish Survey, TR-18, p. 16) as part of the Weymouth Herring Passage and Smelt Habitat Restoration Project.

Project Manager:
Town of Weymouth
Dept. of Public Works
120 Winter Street
Weymouth, MA 02188
Attn: Andrew Fontaine, Town Engineer, 781- 337-5100 x 43718

Project Engineer:
Gomez and Sullivan Engineers
41 Liberty Hill Road
Henniker, NH 03242
Attn: Jill Griffiths, PE, 603-428-4960

Project Construction Contractor: *PENDING*

Description of work:

The project will resolve a long-term source of river herring mortality while improving passage conditions for river herring and spawning habitat for rainbow smelt. A flood control conduit was constructed in the 1960s in the Back River watershed, to bypass storm flows past Jackson Square in Weymouth. The tunnel outlet discharges adjacent to the lowermost fishway in Jackson Square where a diversion swing gate was installed to keep fish out of the tunnel, but was ineffective and a source of annual fish mortality and periodic larger fish kills as fish became trapped and impinged on the screened gate. The Town of Weymouth contracted Gomez and Sullivan Engineers, DPC (GSE) to prepare design plans, bid documents, and permit applications for an alternative solution to the problem of fish accessing the flood control tunnel. Project goals included implementing the following fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square:

1.) Replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel.
2.) Reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder.
3.) Restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment primarily washed off roadways.
4.) Regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

MA DMF has been an active partner with the project development, and staff has participated in the design plan preparations and reviewed the final engineering plans.

Requirements

Construction Time-of-Year: No in-water construction or activities contributing silt or sediment to the Back River shall be conducted from March 1st to June 30th. This period primarily protects the migrations of river herring, rainbow smelt and American eel. A summer and fall TOY for August 15th to November 15th will be needed to protect juvenile river herring downstream passage, unless water control and juvenile herring bypass plans are prepared and approved by DMF.

Pre-Construction Meeting. The project construction contractor shall invite DMF to a preconstruction meeting to discuss project details and schedule.

As-Built Survey. An as-built survey is required and should be submitted to DMF within one year of the project completion date.

Staff Gauge. A staff gauge shall be installed on the downstream/tidal side of the diversion wall to allow the recording of water surface elevation relative to the diversion wall crest.

Fishway Operation and Maintenance Plan. A draft project O&M plan for the project has been prepared by the Town's project engineer. MA DMF has reviewed this draft O&M plan and is supportive of all features. However, the O&M should remain as a draft until the experiences drawn from three spring seasons of operations can be documented to allow the finalization of the O&M plan.

Monitoring. The Town of Weymouth shall maintain a Fishway Diversion Log to record staff gauge measurements, low-level outlet gate operations, and stream discharge. MA DMF will make field measurements to determine water depth and water velocity changes that occur to the smelt spawning habitat in response to modifications in the channel downstream of the fishway. These observations and measurements will occur for three years and be documented in a project monitoring report.

Fish Passage Suitability. The owners of dams, mills and fishways in Massachusetts are responsible to provide safe and efficient passage of sea-run fish (M.G.L. Chapter 130 § 19). Any deficiencies in the constructed project that limit diadromous fish passage identified by DMF must be corrected by the Town of Weymouth within one year of the conclusion of the 3-year monitoring period.

Reporting. A copy of the permit must be in the possession of the primary contractor at the work site. A brief narrative report describing the completed project with any project changes shall be submitted by one year following the project completion. Project changes prompted by on-site conditions or other reasons must be reviewed and approved by DMF (contact – Brad Chase, 508-742-9747).

_____

David E. Pierce, Director Date:

Cc:
Michael Armstrong Ph.D., and Greg Skomal Ph.D., MA DMF

14. Final Design Report

Note that since the construction of the Lovell Field Project adjacent to the project site in 2017, some minor information in this 2016 design report has become outdated. In particular, **Section 3.2** mentions potential access near a skate park, which has been replaced by a parking lot. Additionally, in **Appendix A** (Site Photographs), **Photos 1** through **4** show outdated aerial images of Lovell Field and **Photos 41** through **50** show outdated views of the potential access and staging areas (current aerial images are provided in **Section 5** of this permit application package).

Appendix B (Final Design Drawings) of the report is not included with this permit application package because the design plans for the project have been reformatted to meet DEP permit application checklist requirements and are provided in **Section 6** of this permit application package.

Weymouth Herring Passage & Smelt Habitat Restoration Project

Herring Brook, Weymouth, MA

FINAL DESIGN REPORT

MAY 2016

Prepared for:

120 Winter Street, Weymouth, MA 02188

In partnership with:

251 Causeway Street, Boston, MA 02114

Prepared by:

GOMEZ AND SULLIVAN ENGINEERS

41 Liberty Hill Road, Building 1, PO Box 2179, Henniker, NH 03242

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List of Abbreviations

ACEC	Area of Critical Environmental Concern
CFD	computational fluid dynamics
cfs	cubic feet per second
CY	cubic yards
DCR	Massachusetts Department of Conservation and Recreation
DFG	Massachusetts Department of Fish and Game
DFW	Massachusetts Division of Fisheries and Wildlife
DOT	Massachusetts Department of Transportation
ea	each
elev	elevation
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
ft	feet
ft/s	feet per second
Gomez and Sullivan	Gomez and Sullivan Engineers, DPC
lb	pounds
LF	linear feet
LS	lump sum
MarineFisheries	Massachusetts Division of Marine Fisheries
MassDEP	Massachusetts Department of Environmental Protection
MEPA	Massachusetts Environmental Policy Act
MHC	Massachusetts Historical Commission
MLW	mean low water
mo	month
msl	mean sea level (equal to NGVD 29)
NAVD 88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929 (all elevations given in NGVD 29)
NOAA	National Oceanic and Atmospheric Administration
ODS	Office of Dam Safety
OPCC	opinion of probable construction cost
ORW	Outstanding Resource Water
PMF	Probable Maximum Flood
qty	quantity
SY	square yards
TOW	Town of Weymouth
TOY	time of year [restriction]
USGS	US Geological Survey
yr/yrs	year/years

1. Introduction

1.1 Project Overview & Goals

The Weymouth Back River (or Back River), located in Hingham and Weymouth, Massachusetts, supports one of the largest river herring runs in Massachusetts Bay. From the tidal waters in Hingham Bay, river herring ascend a total of six fishways on the Back River and Herring Brook to reach their spawning habitat in Whitmans Pond.

A flood control conduit was constructed in the 1960s in the upper portion of the Back River watershed to bypass storm flows past Jackson Square in Weymouth. The tunnel inlet is located just below Whitmans Pond Dam at Iron Hill Dam, with the outlet discharging adjacent to the lowermost fishway in Jackson Square. An existing fish diversion swing gate at the tunnel outlet has been ineffective at preventing upstream migrating river herring from entering the conduit, where they may become trapped and perish.

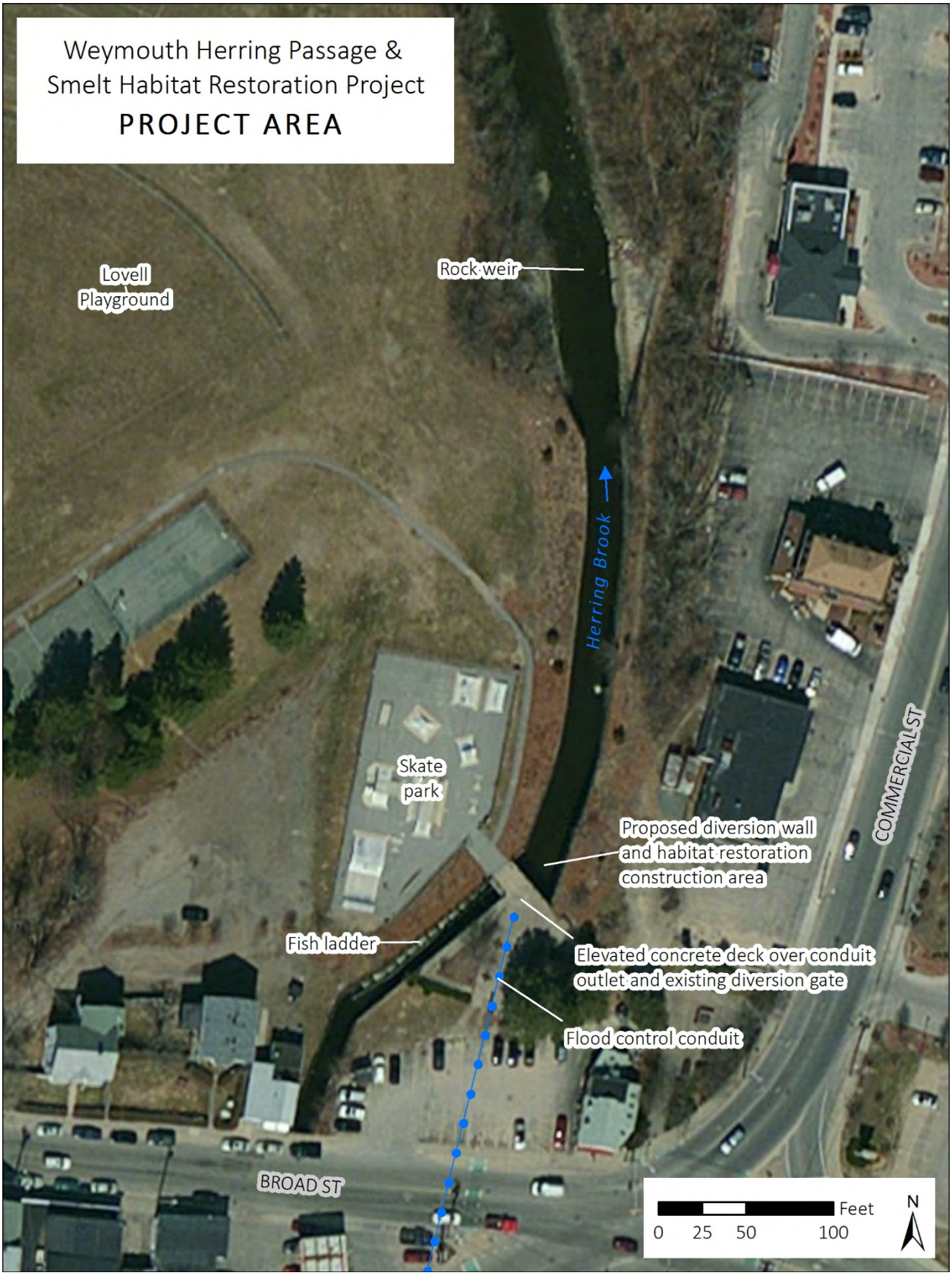
The Town of Weymouth secured funding from the Massachusetts Division of Marine Fisheries (*MarineFisheries*) to contract Gomez and Sullivan Engineers, DPC (Gomez and Sullivan) to prepare design plans, bid documents, and permit applications for an alternative solution to the problem of fish accessing the flood control tunnel. Project goals include implementing the following fish passage improvements in Herring Brook at the flood control conduit outlet near Jackson Square:

- Replace the existing fish diversion gate at the tunnel outlet with a more effective design that will prevent fish from entering the tunnel.
- Reestablish substrate suitable for smelt spawning on the concrete pad downstream of the tunnel outlet and fish ladder.
- Restore a resting pool for river herring immediately downstream of the concrete pad that has filled in with sediment primarily washed off roadways.
- Regrade an unauthorized rock weir downstream of the concrete channel to restore flow depths and velocities suitable for smelt spawning.

A project location map is shown in **Figure 1.1-1** and an aerial image of the project area is shown in **Figure 1.1-2**.

Figure 1.1-1: Project Location Map

Figure 1.1-2: Project Area Map



1.2 Background

The existing fish diversion gate was constructed in the early 1980s. It is approximately 6.5 feet high by 23 feet wide and is situated on a concrete slab between two vertical concrete walls. An elevated concrete deck with a bottom elevation approximately 13.5 feet above the concrete slab supports a walkway above. The gate is constructed of metal grating framed by 8-inch-diameter horizontal metal pipes on the top and bottom and 8-inch by 12-inch by approximately 11-foot high vertical metal tubes at each side, the upper half of which are filled with lead. The entire gate rotates on a hinge attached to the channel wall.

The gate was designed to swing open during periods of high flows. However, the gate would swing open under moderate flows, which had the unintended consequence of allowing river herring to enter the tunnel. As there is no way for fish to gain access through to Whitmans Pond from the tunnel, the only exit for herring is at the outlet where they entered. Normally this would not be a significant issue, as fish would recede with the flow out of the tunnel following a high flow event; however, during two known events (2000 and 2010), a steady period of moderate to high flow occurred (i.e., flow was not decreasing; therefore river herring were not receding). The fish remained in the tunnel long enough to deplete the available dissolved oxygen, which led to the suffocation and eventual death of thousands of river herring.

Even when in the closed position, the original swing gate was insufficient at preventing river herring from entering the system. In 2004, a cooperative effort was made by *MarineFisheries* and the Town to repair and improve the functionality of the gate. The repairs included adding a fine stainless steel mesh to the gate surface, installing stop logs, and performing concrete and steel repairs to the gate and superstructure. Since these modifications, the Town has observed that the gate now opens under even more moderate flows, not just flood events, resulting in river herring entering the flood control tunnel much more frequently under a wide range of spring flows.

The gate is also experiencing corrosion, as it is now over 30 years old, and does not seal well and can remain stuck open and not return to a closed position when flows recede.

Regarding the channel downstream of the diversion, *MarineFisheries* has indicated that the existing concrete pad was previously covered with stone substrate. This material washed out during a flood event around 2005. It is thought that this material washed downstream and filled in a former river herring resting pool that had been located immediately downstream of the concrete pad. The dimensions of this former pool were observed to be about 3 to 5 feet deep and on the order of 15 to 20 feet wide. Throughout the project area, the channel has also filled in with sediment washed off roadways, impacting fish habitat and passage.

Additionally, at the downstream end of the concrete-walled channel (about 350 feet downstream of the tunnel outlet), an unauthorized rock weir has been built up, likely by people seeking to cross the stream. It backwaters Herring Brook up to the fish ladder, which has nearly eliminated spawning riffles for smelt at a location that MarineFisheries has considered for decades as one of the three largest smelt runs in Massachusetts. Restoring the channel slope by grading the rock weir is an important goal for improving migratory fish habitat at this location, and is also related to restoring a stable resting pool.

The project site is a public open space park adjacent to Lovell Playground and the Pingree Elementary School.

1.3 Design Criteria

Due to poor design and functioning of the gate, the Town was not interested in a gate rehabilitation alternative to deal with the declining condition of the gate. Through discussions with project partners, the following attributes were identified as design criteria for a replacement fish diversion:

- Provide the ability to be fully closed such that herring cannot access the tunnel via gaps or other openings
- Be of sufficient height to exclude herring from gaining access to the tunnel over the top of the diversion as close to 100% of the time as possible
- Provide sufficient open area (above or through the diversion) to safely pass anticipated flow conditions
- Provide the ability to fully drain the tunnel, such that water behind the diversion structure does not become stagnant
- Provide an opening of sufficient size and geometry to allow any herring that may become trapped to exit the tunnel with limited stress
- Include a structure to exclude American eel from moving over the diversion

Alternatives that could potentially meet these criteria were identified as either a replacement gate or a wall with a gated opening located at the floor elevation. A concrete wall with a gated opening became the selected design concept when it became apparent that a full gate replacement had notably higher construction costs with less expected longevity than a diversion wall.

1.4 Target Species

The primary target species for the redesign of the fish diversion are the anadromous alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), known collectively as river herring. The diversion redesign also considered the catadromous American river eel (*Anguilla rostrata*). Additional project goals include establishing spawning substrate for rainbow smelt (*Osmerus mordax*) on the concrete pad downstream of the diversion, as well as a resting pool for river herring below the concrete pad.

Table 1.4-1 outlines the timing of important life cycle events for target species throughout the year, based on discussions with *MarineFisheries*.

Table 1.4-1: Timing of important life cycle events for target diadromous species

Species	Event	Month								
		MAR	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*
Rainbow smelt	*Spawning & egg incubation*									
River herring	*Upstream migration*									
	Downstream migration									
American eel	*Upstream migration*									
	Downstream migration									

For the primary project goal of redesigning the fish diversion, the main hydraulic design consideration (from a fisheries perspective) is ensuring that the diversion is high enough to exclude river herring from passing over it during the range of flows expected for the migration period. Because the site is tidally influenced, this parameter is more a factor of the site hydrology than river herring life history; see **Section 2.4** for further discussion.

However, life history is an important consideration for the design of the rainbow smelt spawning habitat. Rainbow smelt eggs will adhere to the channel substrate and the eggs must remain inundated until fry emerge. If water levels drop, exposed eggs will suffer mortality. Based on discussions with *MarineFisheries*, water depth should be at least 0.5 feet in the smelt spawning habitat area. Additionally, the target water velocity to support smelt spawning should be 2.6 feet per second (ft/s), and velocities outside the range of 1 to 4 ft/s are considered unsuitable. These values are acceptable for river herring migrations as well, although glass eels prefer somewhat slower velocities.

2. Hydrologic & Hydraulic Analysis

The following types of hydrologic and hydraulic data were important for this project:

Channel Improvements

- **Flood Flows –** To check that the stone size to be used for the smelt spawning substrate and river herring resting pool can withstand the design flood

- **Typical Fish Migration Period Flows** – To check whether target flow depths and velocities (identified in **Section 1.4**) are achieved the majority of the time in the smelt spawning area

Fish Diversion

- **Tidal Surge Depths –** To determine the maximum water surface elevation at the downstream face of the proposed fish diversion in order to set the minimum diversion height to exclude herring

- **Flood Flows –** To ensure that the proposed fish diversion can pass certain flood flows without impacting the concrete beam supporting the elevated concrete deck above (separated by a distance of about 13.5 feet)

- **Flow Capacity of Existing Flood Control Conduit –** To ensure that the proposed fish diversion can pass the maximum flow that could be conveyed by the flood control conduit upstream without impacting the concrete beam supporting the elevated concrete deck above

These parameters are discussed in the following sections.

2.1 Stream Flow Gages

The Back River is a short, primarily tidal river in the towns of Hingham and Weymouth, Massachusetts that flows northward into Hingham Bay. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), the Back River technically begins at a point approximately 1,000 feet downstream of the railroad bridge located below the project site (FEMA, 2015). From this point upstream to the base of Whitmans Pond Dam (including the project site), the stream is known as Herring Brook. Whitmans Pond is fed primarily by Old Swamp River (which is considered the source of the Back River) and Mill River (which drains Weymouth Great Pond).

Four United States Geological Survey (USGS) stream gages are located in the Back River watershed near the site[1]. A summary of the gages is presented in **Table 2.1-1** on the following page. In the table, flows are given in cubic feet per second (cfs).

[1] Note that the names and descriptions of the Whitmans Pond gages are not entirely clear on the USGS website. In fact, there appears to be an error in the "LOCATION" field for Gage No. 01105607. The "LOCATION" field for Gage No. 01105606 gives an identical description except for the latitude and longitude. However, the gages appear to be mapped correctly on the "Location Map" pages. Gage No. 01105606 is at Whitmans Pond Dam, Gage No. 01105607 is at Iron Hill Dam, and Gage No. 01105608 is below the Iron Hill Dam fish ladder.

Table 2.1-1 shows that there are three gages in the vicinity of the Whitmans Pond and Iron Hill Dams. The Whitmans Pond Dam gage is located just upstream of the inlet to the flood bypass tunnel and thus represents the total flow at the upstream extent of Herring Brook. The two gages located just downstream near Iron Hill Dam—one at the inlet of the flood bypass tunnel and one at the fish ladder—could theoretically be summed to equal flow at the Whitmans Pond Dam gage. However, these three gages have relatively short periods of record (12 to 13 years), and limited peak discharge data[2].

In contrast, the Old Swamp River gage upstream of Whitmans Pond has a relatively long period of record (48 years) and is above points of water withdrawals/diversions. To evaluate the appropriateness of using the Old Swamp River gage instead of the Whitmans Pond Dam gage to estimate flows at the project site, a regression analysis was performed for average daily flows at the two sites during their common period of record (2002 to present). The results, shown in **Figure 2.1-1**, do not indicate a very strong correlation (R^2 value of 0.70).

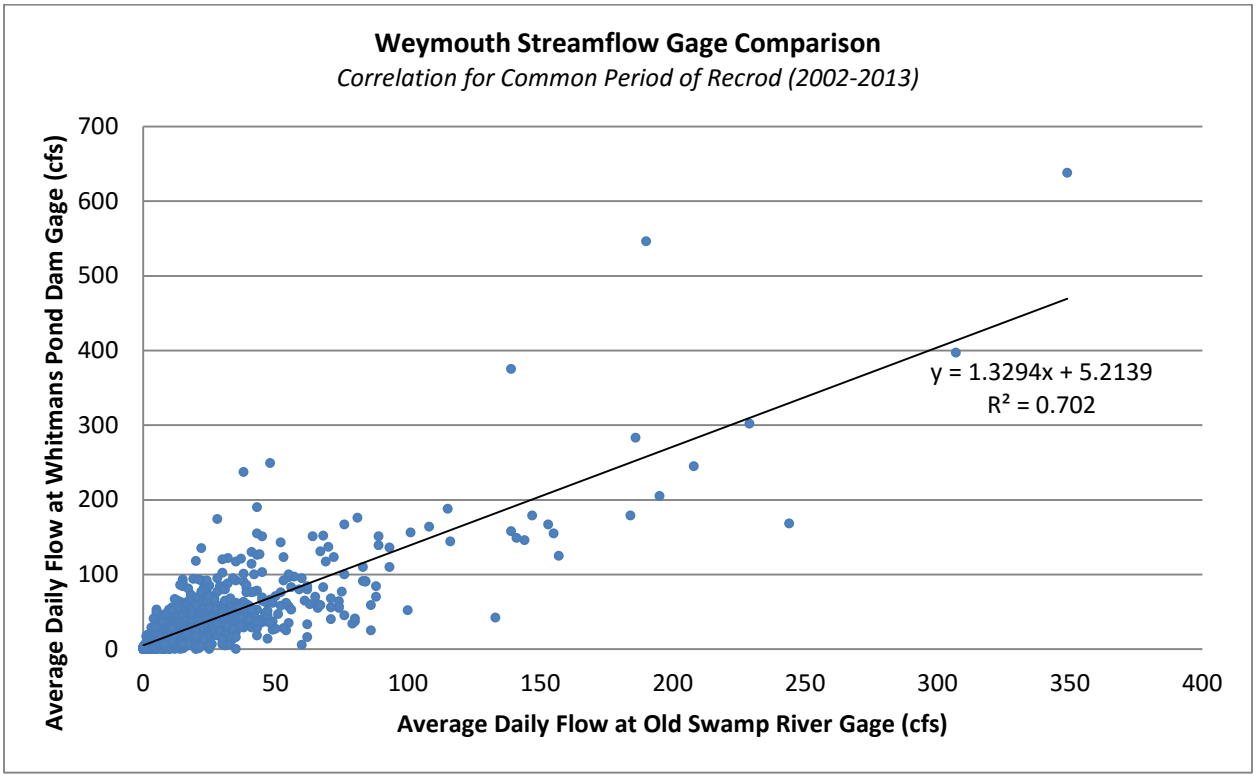
Therefore, the Whitmans Pond Dam gage represents the best available data that should be used to estimate average daily flows at the project site. Because the record for this gage has limited data on peak discharges, the FEMA FIS is the best available data for flood flow estimates at the site, as discussed in the following sections. However, for both cases, flows based on the Old Swamp River gage are also provided in this report for comparison purposes.

[2] At least 10 years of peak discharge values are recommended to perform a log-Pearson Type III flood frequency analysis according to USGS Bulletin 17B. No published peak discharge values were located for the Whitmans Pond Dam gage, and the flood bypass tunnel gage has recorded only 5 peak values. The fish ladder gage has recorded 12 peak values, but they do not represent the combined flow in Herring Brook and thus cannot be used.

Table 2.1-1: Summary of USGS Gages in the Vicinity of the Project Site

Water Body	Old Swamp River	Whitmans Pond		
Location	0.4 mi upstream of Whitmans Pond (at State Route 3 southbound lane)	Whitmans Pond Dam	Flood Bypass at Iron Hill Dam (~850 ft downstream of Whitmans Pond Dam)	Fish Ladder (~1450 ft downstream of Whitmans Pond Dam)
Gage No.	1105600	1105606	1105607	1105608
Drainage Area (mi^2)	4.5	12.4	12.4	12.5
Daily Flow Data	1966-present (48 yrs)	2001-present (13 yrs)	2002-present (12 yrs)	2001-present (13 yrs)
Peak Flow Data	1967-2013 (47 yrs)	None	2002-2005 (5 yrs)	2002-2013 (12 yrs)
Annual Mean Flow (cfs)	9.18	18.1	11.5	6.61
Max Peak Flow (cfs)	590 (5/31/84)	811 (3/15/10)	632 (3/15/10)	94 (10/15/05)
Accuracy	Records good except those for estimated daily discharges, which are poor. Gage is upstream of points of water withdrawals and diversions.	Records fair except those for flows less than 5 cfs and those for estimated daily discharge, which are poor. Periods of missing gage height record are not estimated. Flow affected by diversions for municipal use.	Records poor. Discharge affected by board changes in fish ladders at Whitmans Pond Dam and Iron Hill Dam, and by diversions from Whitmans Pond for municipal supply of Weymouth.	Records good except estimated daily discharges and discharges less than 0.2 cfs, which are fair. Includes flow through fish-ladder system. Discharge affected by gate changes at Whitmans Pond Dam, board changes at fish ladders, and diversions from Whitmans Pond for municipal supply of Weymouth. High flows affected by diversions to flood bypass system.
Notes	Closest FIS location: "At State Route 3 Northbound lane" (drainage area of 4.7 mi^2).	Daily mean discharge records previously published under Station No. 011056081, "Whitmans Pond Combined By-Pass and Fish-Ladder Flow," from water years 2002 through 2009, are now included in the daily and historical statistics for this streamgage.	Sum of these two gages is approximately equal to gage at Whitmans Pond Dam. Flow rejoins at project site.	

Figure 2.1-1: Weymouth Streamflow Gage Comparison



2.2 Flood Flows

For this project, it was important to have an estimate of flood flows (i.e., the 100-year and 500-year floods) for the design of the proposed fish diversion and channel improvements. The proposed diversion was evaluated to ensure that it could pass flood flows without impacting the support beam for the elevated concrete deck above (**Section 2.7**)[3]. Additionally, flow velocities associated with estimated peak discharges were used to ensure that the smelt spawning substrate and river herring resting pool can withstand flood flows (i.e., to determine the minimum stone size needed for these improvements).

FIS reports provide one source of information on local flood flows. The effective FEMA FIS for the Town of Weymouth (No. 25021CV001) was published on July 16, 2015 (FEMA, 2015). The hydrologic analysis for the Back River and Herring Brook in the FIS was initially conducted in 1980. A multiple regression analysis, developed by Johnson and Tasker, was applied to find runoff discharges for riverine flooding in Weymouth. Standard USGS topographic maps were used to determine watershed areas and local topography. An annual precipitation value of 3.67 feet per year, representative of the southeastern Massachusetts region, was obtained from the US Weather Bureau Technical Paper 40 (TP-40). By determining values for slope and area and using them in conjunction with the precipitation value in the Johnson-Tasker formulas, values for runoff from 10-, 2-, and 1-percent-annual-chance exceedance (i.e., 10-, 50-, and 100-year) storms were predicted. Exponents for the 0.2-percent-annual-chance (500-year) storm frequency equation were extrapolated. A check with a log-Pearson Type III analysis of the Old Swamp River gage data (using 10 years of record available at the time) found the discharge values

[3] Since flows reaching the fish diversion are regulated by the flood control conduit upstream, the flow capacity of the existing conduit was also considered in this analysis (**Section 2.5**).

computed using the Johnson and Tasker method to be within expected ranges. No new hydrologic analyses were conducted for the revised 2015 FIS.

The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service has published guidance for considering climate change when developing flood frequency estimates for river restoration projects (Collins, 2011). The publication recommends extending the flood record beyond dated FEMA studies and recalculating flood flows. Thus, an updated flood frequency analysis was conducted to compare with the FIS estimates for Herring Brook. Annual peak flows at the Old Swamp River gage for the period of record (published data available for water years 1967-2013) were entered into the USGS's PeakFQ program to estimate storm events for various recurrence intervals using the Bulletin 17B methodology, which creates a Log Pearson Type III statistical evaluation of the data. The results were prorated to Herring Brook at the project site based on a ratio of drainage areas (4.5 square miles at Old Swamp River Gage vs. 14.1 square miles at project site).

A summary of flood discharges from updated flood frequency analysis as well as the effective FIS for Herring Brook at Broad Street[4] is given in **Table 2.2-1** and **Figure 2.2-1** below. Note that these values represent the total flow in both the bypass tunnel and surface channel (i.e., fishway and adjacent spillway). This is appropriate for the design of the smelt spawning substrate and herring resting pool, which would experience the combined flow. Based on the three common peak flow events on record for the gages at the inlet of the bypass tunnel and fish ladder upstream near Whitmans Pond Dam, approximately 84% of flood flows are diverted through the tunnel.

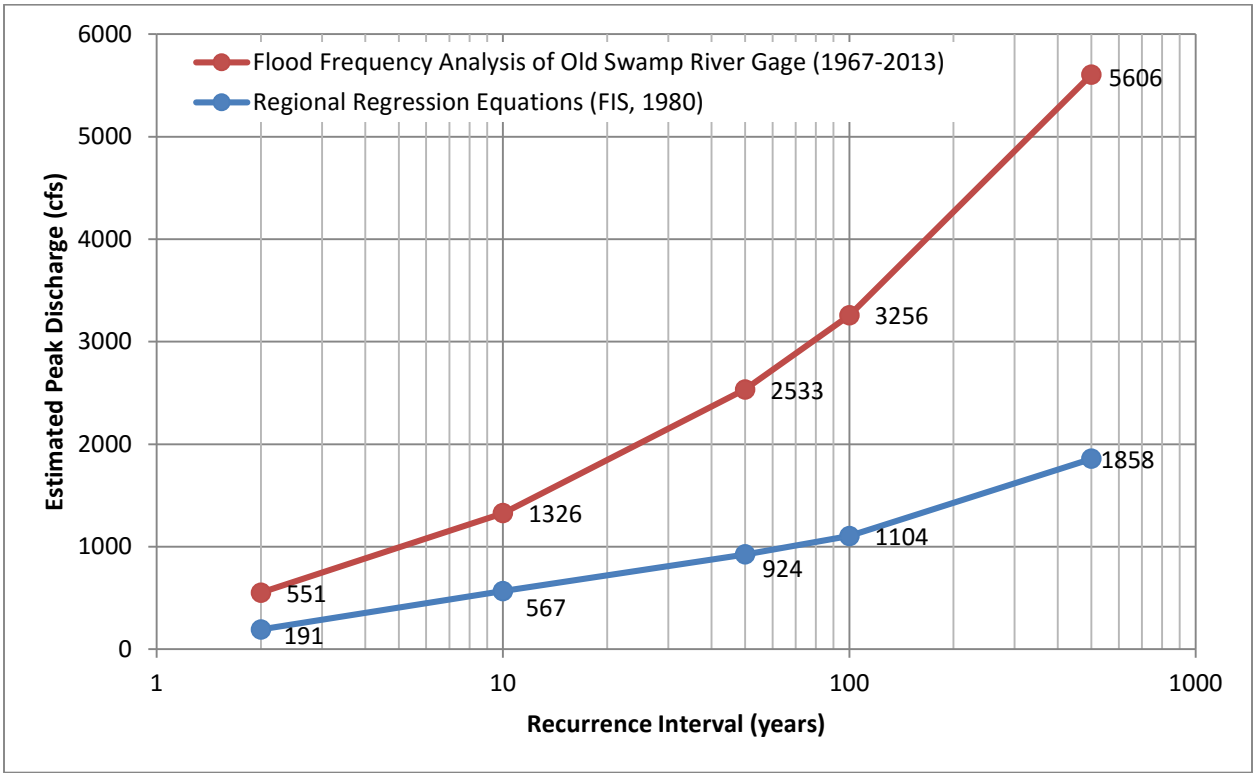
Table 2.2-1: Summary of Flood Frequency Estimates for Herring Brook at Broad Street

Annual Exceedance Probability	**Recurrence Interval** (yrs)	**Estimated Peak Discharge** (cfs)	
		Regional Regression Equations (FIS, 1980)	**Log Pearson Type III Analysis of Old Swamp Gage** (1967-2013)
50%	2	191[1]	551
10%	10	567	1326
2%	50	924	2533
1%	100	1104	3256
0.2%	500	1858	5606

[1] *2-year flood flow for FIS series extrapolated from natural log best fit line of 10-, 50-, and 100-year flows.*

[4] Broad Street is just upstream of the project site with a published drainage area of 14.1 square miles in the FIS. The difference in drainage area between Broad Street and the tunnel outlet is negligible; thus the published FIS data was used. The FIS peak discharges at this location consider the combined flow of both the flood bypass tunnel and Herring Brook.

Figure 2.2-1: Summary of Flood Frequency Estimates for Herring Brook at Broad Street



Note: 2-year flood flow for FIS series extrapolated from natural log best fit line of 10-, 50-, and 100-year flows.

The 100-year flood flow is generally adequate for the design of channel improvements such as those proposed for the project site. As indicated in the table and figure, the regulatory (FIS) 100-year flood flow for Herring Brook at the project site is 1,104 cfs.

Based on recommendations by *MarineFisheries*, the recommended stone size to meet the needs for smelt spawning habitat as well as withstand flood flows is 6-12 inches. The closest Massachusetts Department of Transportation (DOT) standard size meeting these requirements is "modified rockfill", with a median size of approximately 5 inches and a range of about 2.5 to 9 inches. Using the Manning's equation, the depth and velocity of the FIS 100-year flood flow (1,104 cfs) in the 24-foot-wide channel downstream of the fish diversion were estimated as 8.1 feet and 4 ft/s, respectively[5]. The US Department of Transportation's HEC-11 – Design of Riprap Revetment (1989) was used to verify that the modified rockfill stone size proposed for the smelt spawning substrate is anticipated to withstand the 100-year flood.

2.3 Typical Fish Migration Period Flows

The range of flows experienced at the project site during fish migration period were important for the design of both the diversion and the channel improvements. These flows were estimated using nearby stream flow gages. Average daily discharges from both the Whitmans Pond Dam (drainage area 12.4

[5] To be conservative, this analysis did not consider backwater effects from the railroad crossing downstream of the project site, which would increase water depth and decrease water velocity during high flows.

square miles) and Old Swamp River (drainage area 4.5 square miles) gages were adjusted to the project site (Herring Brook at Jackson Square, drainage area 14.1 square miles) by ratio of drainage areas. Annual average daily flow duration curves are shown in **Figure 2.3-1**. **Figures 2.3-2** and **2.3-3** show flow duration curves for the period of March 1 to June 30 only, which covers the typical river herring migration and smelt spawning seasons. (**Figure 2.3-3** is a close-up of the high flow range for the fish passage period.) Monthly and annual flow statistics are shown in **Table 2.3-1** at the end of this section.

Based on the Whitmans Pond Dam gage, the median flow at the project site during the river herring migration period is approximately 18 cfs, and typically ranges from 5 to 55 cfs (90 and 10 percent exceedance values, respectively). These values are similar to those for the smelt spawning period (March through May) and were used for the smelt spawning habitat and river herring resting pool hydraulic design targets.

Figure 2.3-1: Avg. Daily Flow Duration Curves for Herring Brook at Broad St (Annual)

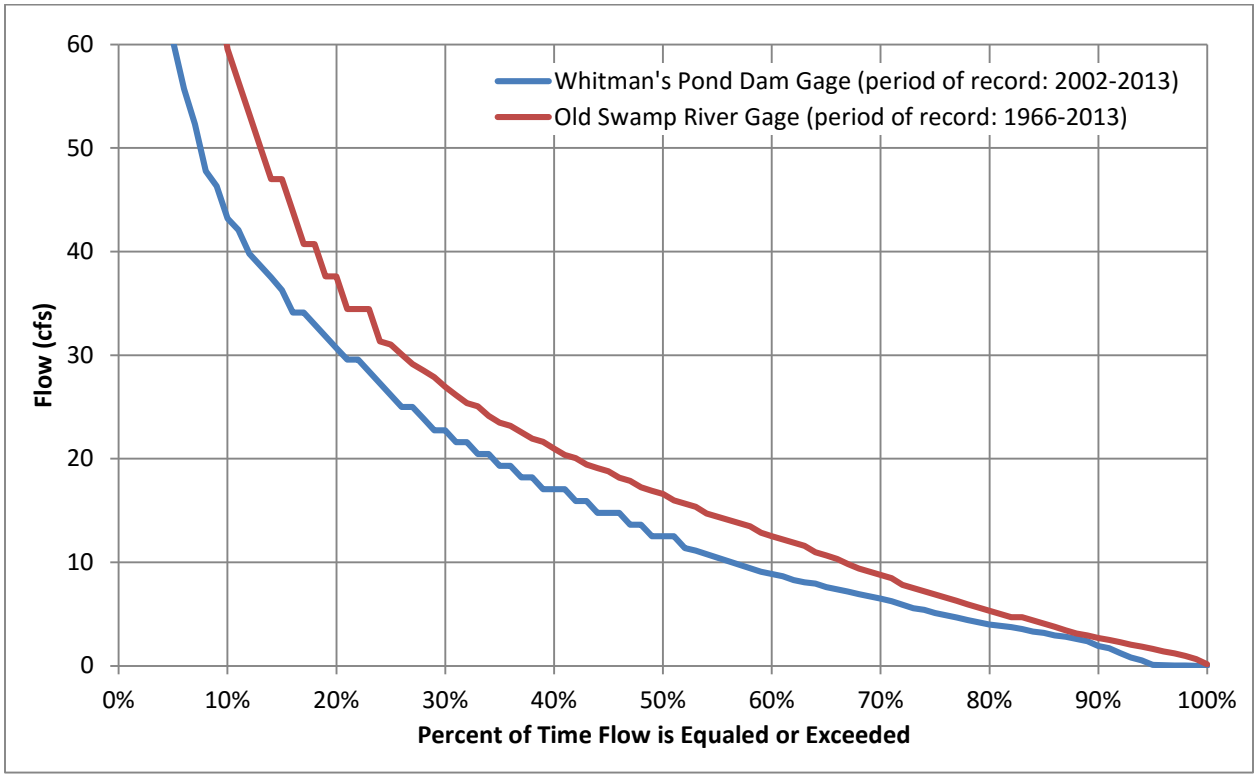


Figure 2.3-2: Avg. Daily Flow Duration Curves for Herring Brook at Broad St (Mar – Jun)

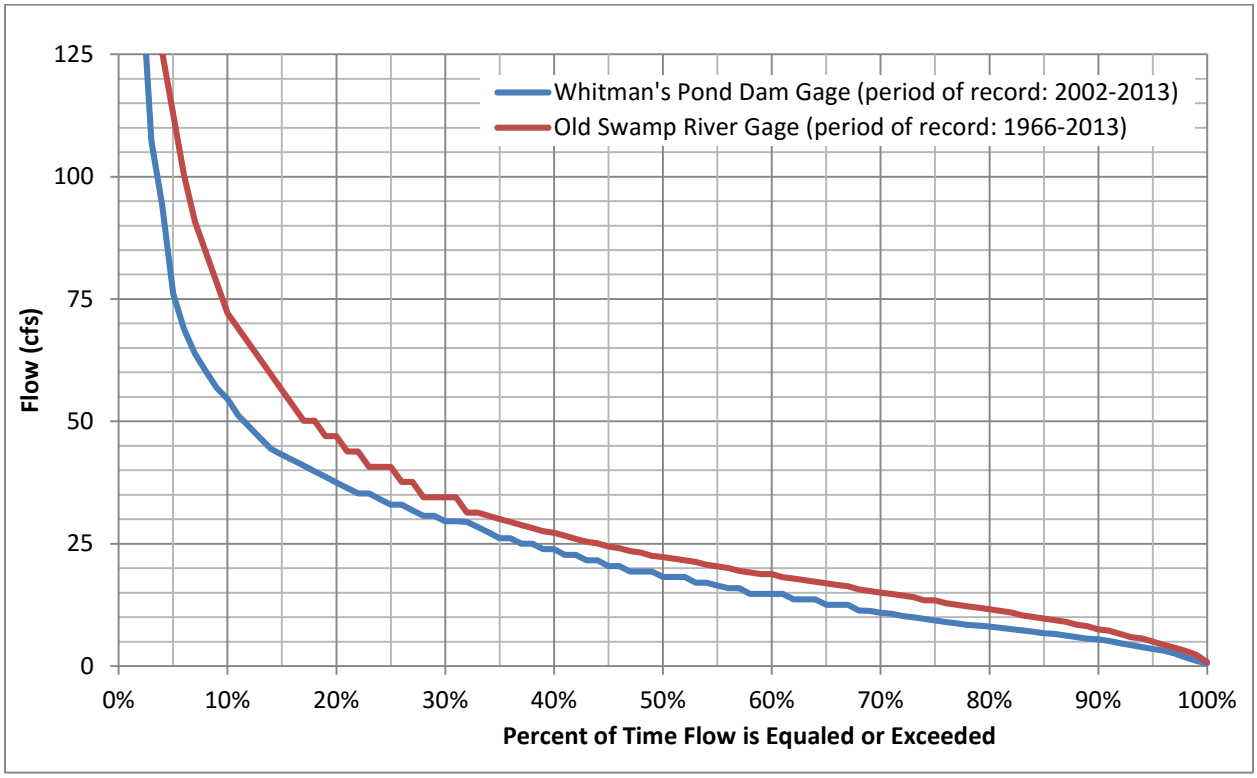


Figure 2.3-3: Avg. Daily Flow Duration Curves for Herring Brook at Broad St (Mar – Jun, High Flows)

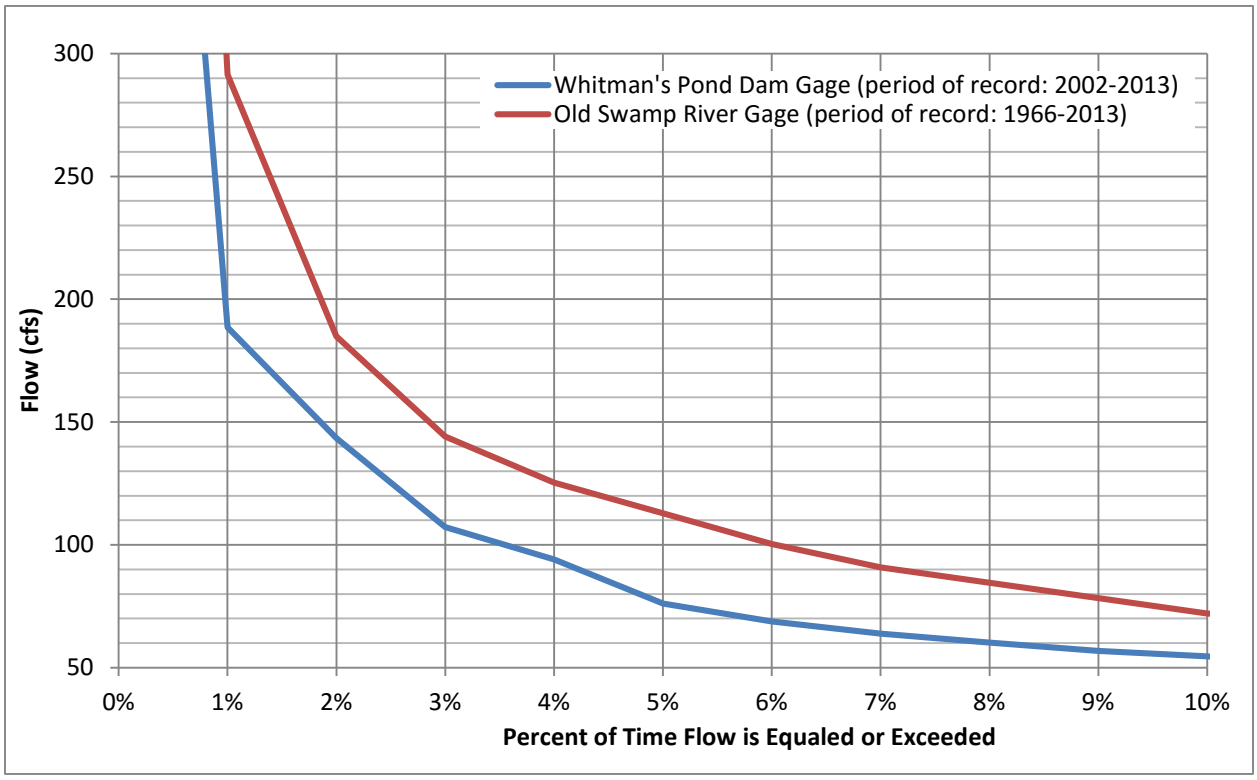


Table 2.3-1: Summary of Average Daily Flow Statistics for Herring Brook at Broad St

	Flow (cfs) for Time Period														
	JAN	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*	*ANNUAL*	*River Herring migration (MAR-JUN)*	*Smelt Spawning (MAR-MAY)*
Data Source: Whitmans Pond Dam at USGS Gage No. 01105606 *(adjusted to project site based on drainage area ratio)*															
Mean	23	27	42	30	23	19	8	8	8	16	19	26	21	29	32
Minimum	3	3	3	2	4	0.5	0.05	0.02	0.01	0.01	0.01	0.03	0.01	0.5	2
90% exceeds	7	10	8	6	8	2	0.3	0.06	0.1	0.03	3	3	2	5	8
50% exceeds (median)	18	19	30	25	16	8	4	5	4	6	11	23	13	18	22
10% exceeds	43	51	69	53	39	39	19	15	17	40	39	52	43	55	56
Maximum	125	190	725	269	204	279	102	125	81	451	725	173	725	725	725
Data Source: Old Swamp River at USGS Gage No. 01105600 *(adjusted to project site based on drainage area ratio)*															
Mean	37	41	55	42	29	24	9	11	11	19	30	39	29	38	42
Minimum	5	5	8	4	5	0.8	0.4	0.2	0.2	0.4	0.2	3	0.2	0.8	4
90% exceeds	11	13	16	13	10	3	1	1	1	3	7	10	3	8	12
50% exceeds (median)	23	26	34	27	19	10	4	4	4	8	15	23	17	22	26
10% exceeds	72	81	103	85	53	41	19	22	22	38	60	78	60	72	81
Maximum	655	479	1131	624	849	1009	291	260	470	962	1131	965	1131	1131	1131

The Manning's equation was used to estimate flow depths and velocities associated with the typical flows experienced at the project site during herring migration period with the proposed channel improvements in place[6]. **Figures 2.3-4** and **2.3-5** show the proposed depths and velocities, respectively. Two curves are shown—one for the narrow section of channel immediately downstream of the existing fish ladder and adjacent to the proposed fish diversion (with a width of 11 feet), and another for the wider section of channel downstream of the proposed diversion (24 feet).

Figure 2.3-4 shows that the minimum flow depth of 0.5 feet recommended for smelt spawning or river herring migration is met at flows of about 5 cfs below the fish ladder or 10 cfs below the fish diversion. These flows are exceeded approximately 90% and 73% of the time during herring migration period, respectively.

Figure 2.3-5 shows that the minimum flow velocity of 1 ft/s recommended for smelt spawning is met at flows of about 8 cfs below the fish ladder or 16 cfs below the fish diversion. These flows are exceeded approximately 80% and 56% of the time during herring migration period, respectively.

In summary, the median herring migration period flow of 18 cfs will meet all flow depth and velocity targets for smelt spawning and river herring passage. As the project progresses, *MarineFisheries* plans to work with the Town of Weymouth to optimize the design of the proposed channel modifications (i.e., rock weir grading, smelt habitat restoration) to further enhance the potential for depth and velocity improvements for smelt spawning.

[6] These curves do not include the effects of tidal surges, but rather were intentionally based only on upstream inflow and channel dimensions to allow for estimation of conservatively low water depths and high water velocities.

Figure 2.3-4: Estimated Flow Depth in Channel Downstream of Proposed Diversion

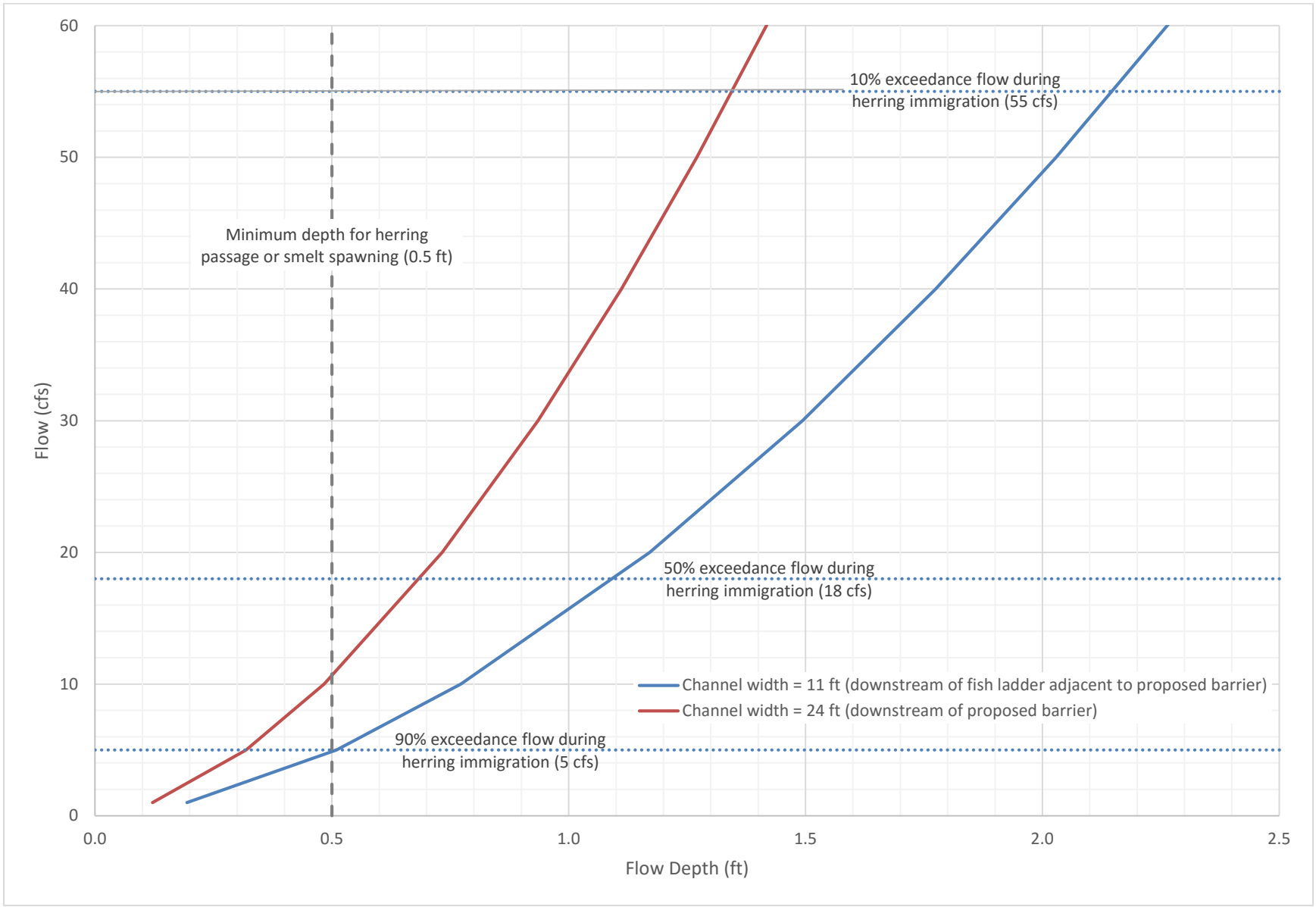
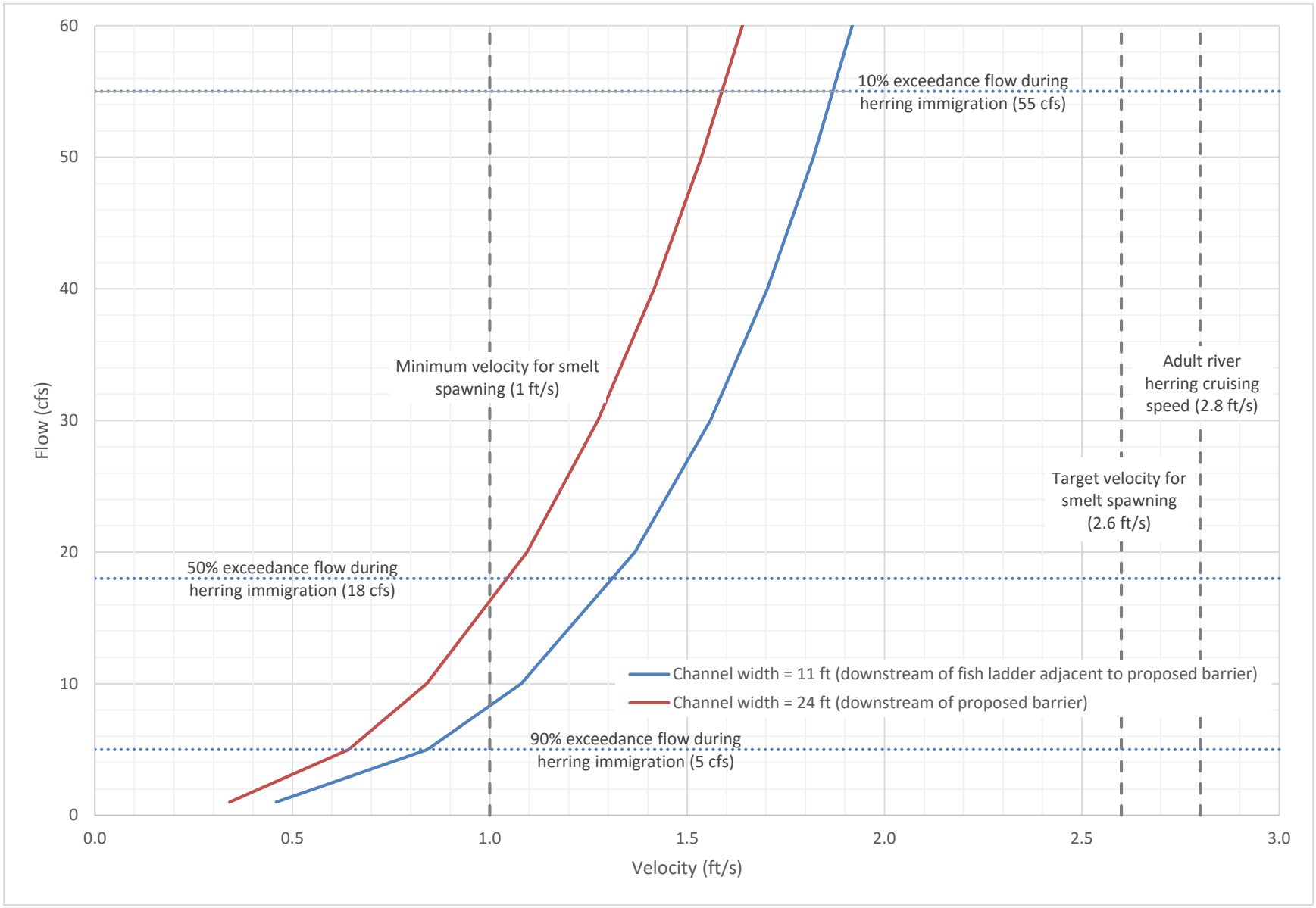


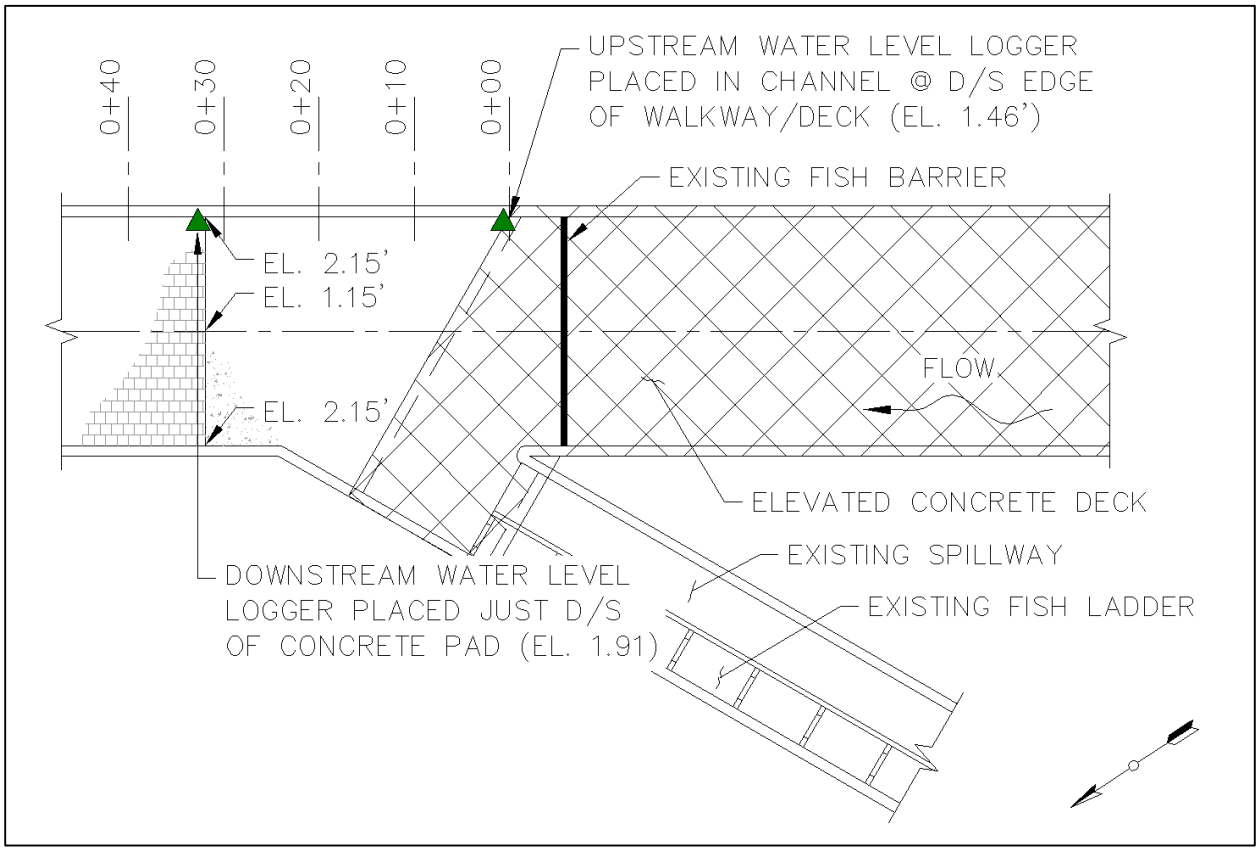
Figure 2.3-5: Estimated Flow Velocity in Channel Downstream of Proposed Diversion



2.4 Tidal Surge Depths

To gain a better understanding of the relationship between flow, tidal surges, and water surface elevations at the project site, two water level loggers were installed in the vicinity of the existing fish diversion for the period of February 28, 2014 through April 8, 2014. The locations of the loggers are shown in **Figure 2.4-1**. The logger referred to as "Upstream Water Level Logger" was placed just below the existing fish diversion gate at the downstream edge of the walkway/deck. The "Downstream Water Level Logger" was installed approximately 35 feet downstream, just below the extent of the concrete pad.

Figure 2.4-1: Location of Installed Water Level Loggers



Note: All elevations given in feet in National Geodetic Vertical Datum of 1929 (NGVD 29), also referred to as Mean Sea Level (MSL). Conversion factors for other vertical datums are given in ***Table 2.4-1****.*

Table 2.4-1: Vertical Datum Conversion Factors for the Project Area

Starting Vertical Datum	Datum Conversion Factor (feet)			
	NGVD 29 /MSL	NAVD 88	MLW	TOW
National Geodetic Vertical Datum of 1929 (NGVD 29) or Mean Sea Level (msl)	-	-0.08	4.37	5.83
North American Vertical Datum of 1988 (NAVD 88)	0.08	-	5.17	6.63
Mean Low Water (MLW)	-4.37	-5.17	-	1.46
Town of Weymouth (TOW)	-5.83	-6.63	-1.46	-

A summary of water depth statistics at the two loggers is provided in **Table 2.4-2**. **Figures 2.4-2** and **2.4-3** provide the raw time series water depth and flow data for the upstream and downstream loggers, respectively. **Figure 2.4-4** provides water depth duration curves for both loggers.

Because the tides are influenced by both the moon and the sun, when these two gravitational bodies are aligned, as during a new moon or full moon, the tidal effect is increased (i.e., high tides are higher). These are known as spring tides, named not for the season, but for the fact that the water "springs" higher than normal. Conversely, when the sun and moon are 90 degrees apart, as during the first and third quarter moons, high tides are at their lowest point, known as a neap tide. For reference, moon phases are shown on **Figures 2.4-2** and **2.4-3**.

Table 2.4-2: Summary of Water Depth Statistics for Water Level Loggers

		Water Depth Statistics *(ft, during 2/28/14 through 4/8/14)*		
		Daily Maximum (baseflow + tide)	*Daily Minimum (baseflow only)*	*Daily Surge (tide only)**
Upstream Water Level Logger	MIN	2.9	1.5	1.3
	MEDIAN	4.6	1.7	2.9
	MEAN	4.6	1.8	2.9
	MAX	6.7	2.6	4.8
Downstream Water Level Logger	MIN	3.9	2.1	1.3
	MEDIAN	5.1	2.3	2.7
	MEAN	5.2	2.4	2.8
	MAX	7.3	3.6	4.8

**Daily surge was calculated by subtracting the minimum (baseflow) depth from the maximum (high tide) depth for each day, not for the overall min/median/mean/max values.*

The water level logging period captured a high flow event on March 31, 2014 with a peak discharge of 207 cfs[7] at approximately 12:45 PM. According to the flow duration analysis (see **Figure 2.3-3**), this flow is exceeded about 1% of the time during the river herring migration period. Therefore, the maximum water depth recorded by the water level loggers during this high flow event (6.7 feet at the upstream

[7] Based on the Whitmans Pond Dam gage adjusted by ratio of drainage area to the project site.

logger or 7.3 at the downstream logger, or the average of 7 feet) would be a conservative height for the redesigned fish diversion to avoid overtopping 99% of the time.

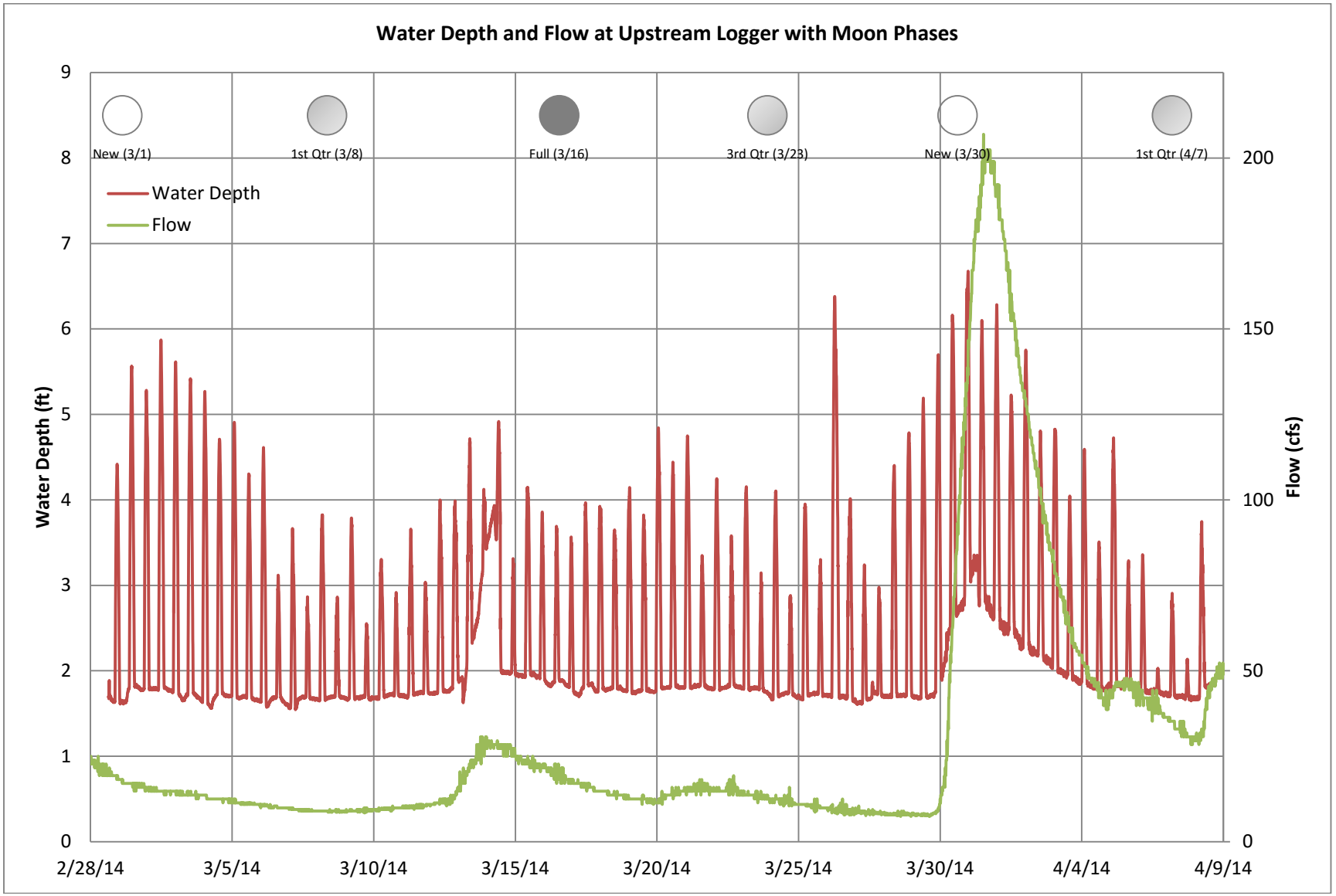
A buffer of 2 feet of separation between the maximum water depth and the top of the wall is recommended as a factor of safety to avoid the potential for fish overtopping the wall. Therefore, a fish diversion wall height on the order of 9 feet should exclude river herring for about 99% of the flows during river herring migration period.

In general, maximum daily (high tide) water surface elevations at the site seem to be more influenced by the moon phase than by the base flow. It appears that base flows below about 50 cfs do not have a significant impact on the high tide elevation. Based on the gage data, a flow of 50 cfs is exceeded about 3-10%[8] of the time during the river herring migration period (March through June). Looking at the water depth duration curve (**Figure 2.4-4**), it can be seen that water depths due to tidal surge are generally below 5 feet most of the time[9]. Therefore, a diversion wall height of 7 feet (5 feet to avoid overtopping plus 2 feet of separation buffer) would be expected to exclude river herring approximately 90-97% of the time during their migration period.

A 9-foot-high wall would provide about 2-9% of additional river herring exclusion, while a 7-foot-high wall would provide greater flow capacity. With a lower wall, the crest elevation could be adjusted through downward opening gates, flashboards, or other operable systems to accommodate higher heights to restrict fish passage, but lower heights to allow for increased flood passage. Conversely, if a higher wall is selected for design, additional flow capacity could be achieved through sluice gates and/or by extending the length of the wall (discussed in **Section 2.6**).

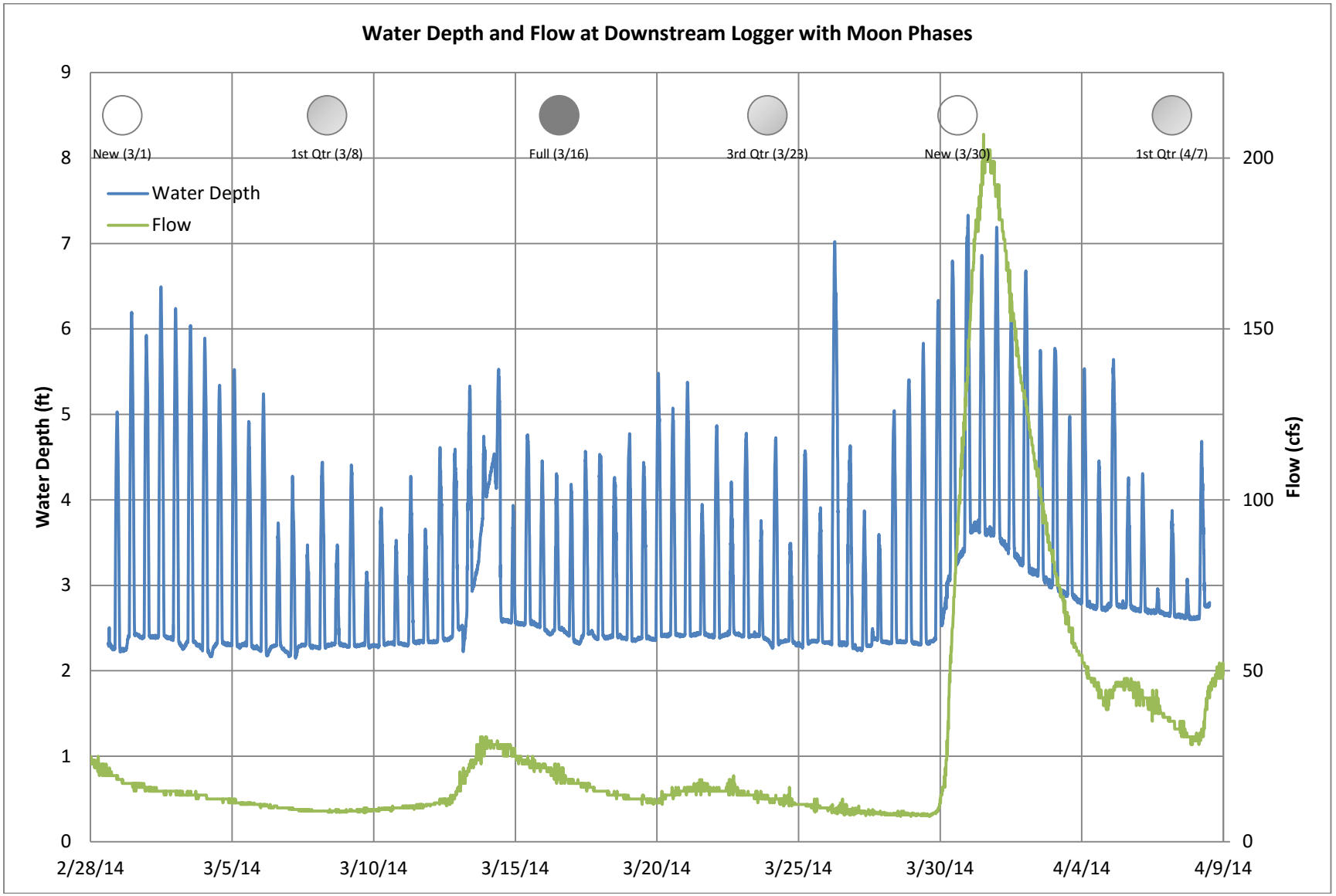
[8] Range of values provided for both the Whitmans Pond Dam gage (10%) and Old Swamp River gage (3%).
[9] About 95% of the time (averaging the upstream and downstream loggers).

Figure 2.4-2: Water Depth and Flow at Upstream Water Level Logger



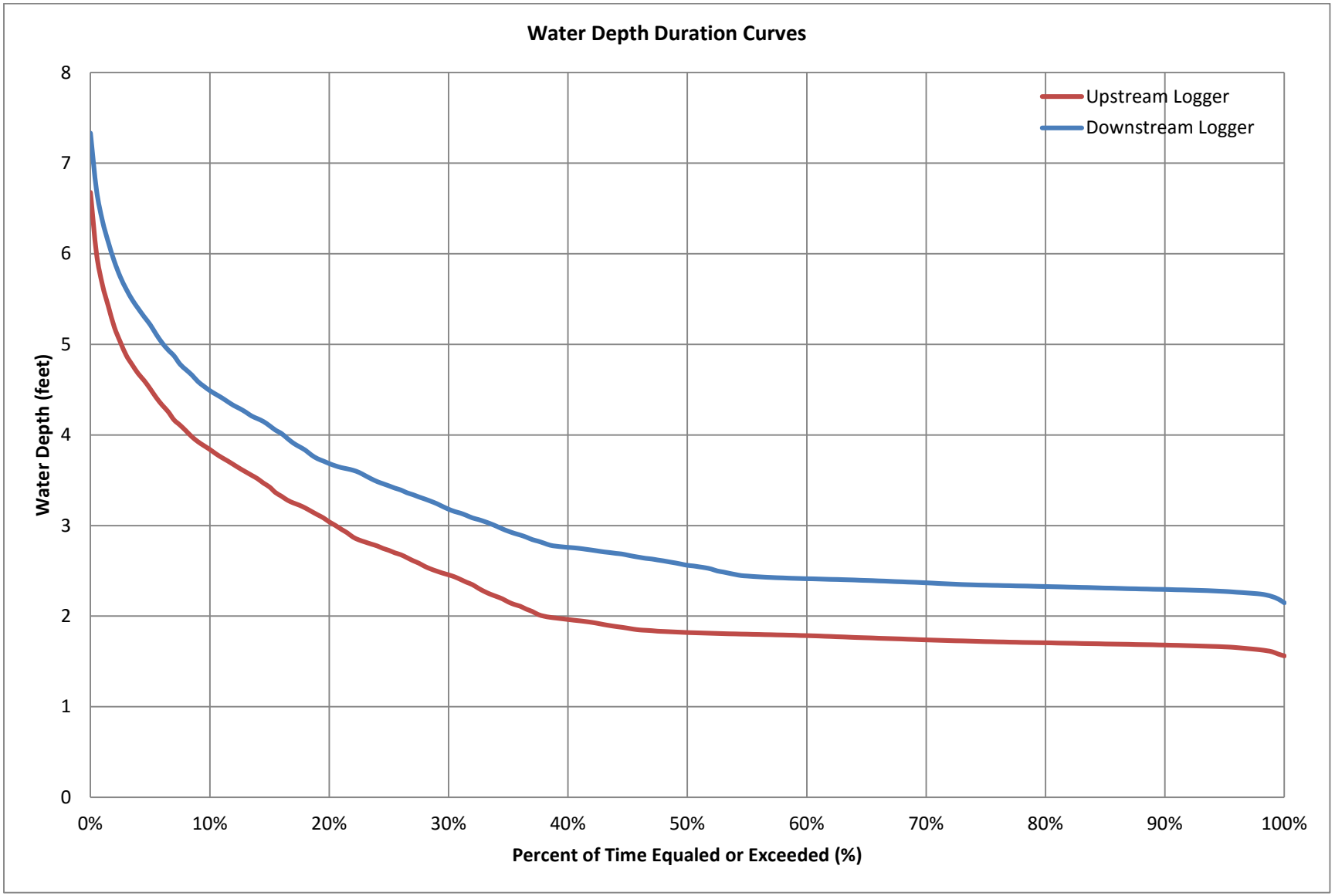
Flow recorded by USGS Gage No. 01105606 at Whitmans Pond Dam, adjusted by ratio of drainage area to the project site (14.1 mi^2 at site / 12.4 mi^2 at gage).

Figure 2.4-3: Water Depth and Flow at Downstream Water Level Logger



Flow recorded by USGS Gage No. 01105606 at Whitmans Pond Dam, adjusted by ratio of drainage area to the project site (14.1 mi^2 at site / 12.4 mi^2 at gage).

Figure 2.4-4: Water Depth Duration Curves at Upstream and Downstream Water Level Loggers



2.5 Flow Capacity of Existing Flood Control Conduit

Due to the uncertain nature of flood frequency estimates for the project site, as well as the fact that flows at the proposed fish diversion location are regulated by the flood control conduit upstream, it was important to estimate the flow capacity of the existing conduit. Various existing sources of information about the conduit as well as a new hydraulic analysis were considered to arrive at a capacity estimate.

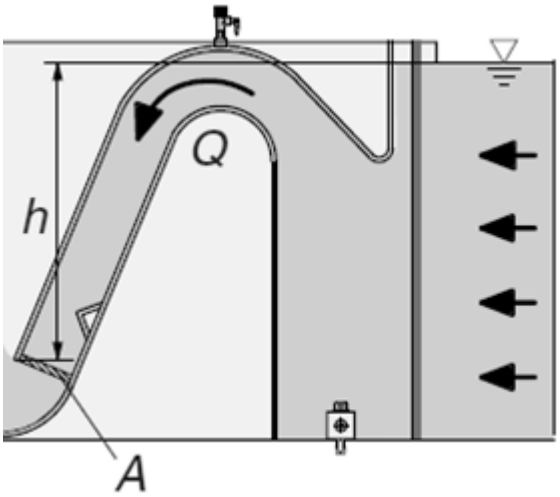
The Herring Brook Flood Control Conduit was constructed by the Massachusetts Department of Public Works, Division of Waterways in two phases—a downstream section (Contract No. 2163) completed sometime in the 1960s, and an upstream section (Contract No. 2664) completed around 1971. The upstream inlet structure is part of Iron Hill Dam (MA 02492, located about 850 feet below Whitmans Pond Dam). It appears that this portion of the conduit was designed/constructed concurrently with Whitmans Pond Dam (MA 00775) just upstream as part of Contract No. 2664. Relevant design plans and reports for the flood control conduit are included in the references in **Section 4**.

Flow to the flood control conduit is regulated by a siphon spillway system at the upstream inlet at Iron Hill Dam. The inlet consists of a set of four rectangular siphon spillways, each approximately 5.5 feet wide by 4.9 feet high, for a total cross-sectional area of 108 feet.

Design Discharge

According to the design report for the structure (Metcalf & Eddy, 1969), the capacity of each siphon is 575 cfs, for a total capacity of 2,300 cfs. However, the report does not provide any design calculations or information about how the capacity was determined. It does note that the maximum reservoir elevation is 62.6 feet msl.[10] Using this information, an attempt was made to verify the reported capacity. It was determined that a flow of 2,300 cfs could be reasonably obtained using the equation for flow through an orifice:

$$Q = C\,A\,(2\,g\,H)^{1/2}$$



[10] Note that a maximum reservoir elevation of 62.4 feet msl is given in the text of the design report, which conflicts with the value of 62.6 feet msl indicated in Figure 5 of the report, so the more conservative (higher) value was assumed.

where:

Q = discharge through an orifice (2,300 cfs)
C = discharge coefficient
A = orifice area (5.5 ft wide x 4.9 ft high x 4 siphons = 108 ft^2)
g = gravitational acceleration (32.2 ft/s^2)
H = head (62.6 ft max reservoir elevation – 47 ft average top of outlet orifice elevation = 15.6 ft)

Back-calculating for the discharge coefficient using these assumptions, a coefficient of 0.67 is obtained. Given that discharge coefficients for siphon spillways typically range from 0.6 to 0.8 (Stickney, 1922), this seems reasonable.

Theoretical Maximum Discharge

However, the theoretical maximum discharge of a siphon spillway is not governed by the orifice equation, but rather the free vortex equation:

$$Q_{max} = V_{crest,\ max}\ R_{crest}\ b\ [ln\ (R_{crown}/R_{crest})]$$

where:

Q_{max} = maximum discharge through a siphon (cfs)
$V_{crest,\ max}$ = maximum velocity of flow over siphon spillway crest (ft/s)
R_{crest} = radius of curvature at crest of siphon (1)
R_{crown} = radius of curvature at crown of siphon (6)
b = width of siphon throat section (5.5 ft x 4 siphons = 22 ft)

It is known that the maximum pressure at the spillway crest is theoretically 34 feet of water at sea level. Allowing for the vapor pressure of water, loss due to turbulence, etc., the maximum net effective head is rarely more than about 25 feet, which corresponds to a maximum velocity of 40 feet per second (Khatsuria, 2004). Using this information in the free vortex equation yields a maximum discharge of about 1,700 cfs, which was assumed to be the limiting capacity of the existing flood control conduit for this analysis.

Dam Safety Inspection Information

The Massachusetts Department of Conservation and Recreation (DCR), Office of Dam Safety (ODS) requires periodic dam safety inspections for jurisdictional dams. Recent dam safety inspection reports for Iron Hill Dam (Pare, 2009 and 2013) also contain flow information about the siphon spillway. However, there are discrepancies in the reported capacities and design flows for the structure:

- 1,195 cfs – reported siphon spillway capacity (Pare, 2013, page 7)
- 2,100 cfs – reported siphon spillway flow for spillway design flood (Pare, 2013, page 12)
- 600 cfs – reported siphon spillway capacity (Pare, 2009, page 7)

Likewise, there are discrepancies in the reported spillway design flood for the dam, which is one half the Probable Maximum Flood (½ PMF):

- 3,544 cfs – Reported ½ PMF (Pare, 2013, page 7 and multiple locations in text)
- 3,520 cfs – Reported ½ PMF (Pare, 2013, page 12; Pare, 2009, page 7)

For this study, Pare was consulted about the discrepancies and their calculation methods. Pare responded that the discrepancies in reported siphon spillway discharges are likely errors due to tables not updating properly, and that the correct value is 2,100 cfs. This corresponds to the design flow for the dam, which is the ½ PMF, or 3,544 cfs. It was calculated using the orifice flow equation assuming a head of 18.5 feet (from the top of the dam crest at elevation 65.5 feet to the top of the outlet orifice at average elevation 47 feet). Back-calculating from those assumptions using the orifice flow equation provided above, it appears that Pare used an orifice discharge coefficient around 0.56 (A. Orsi, personal communication, July 14, 2014).

Pare indicated that the siphon spillway discharge was also calculated for the 100-year flood flow. The FIS 100-year flood flow of 1,040 cfs (approximately 300 feet upstream of Ironhill Street) was used, resulting in a siphon flow of 643 cfs. This calculation was based on the assumption of ogee weir flow (i.e., assuming that siphon flow is not activated during the 100-year flood) (A. Orsi, personal communication, July 14, 2014). Pare's reasoning for this assumption is unclear and does not seem appropriate, given that the siphons were designed to pass flood flows and would likely fulfill that function using the relatively more efficient siphonic action.

It is important to note that the two siphon flows Pare calculated (i.e., 2,100 cfs and 643 cfs) are not actual capacities (as labeled in some locations within the dam safety reports); but rather, they are estimated discharge rates corresponding to specific flood flows (i.e., the ½ PMF or FIS 100-year flood, respectively). In contrast, the 1,700 cfs value calculated using the free vortex equation above is a true capacity based on the physical dimensions of the structure, independent of inflow or head. Therefore, based on the research conducted for this study, it is assumed that flow through the siphon spillway would be limited to 1,700 cfs.

The dam safety reports also indicated that, at the time of the 2009 inspection, Iron Hill Dam could not pass the design flow, or ½ PMF (Pare, 2009). To address this, in 2012, the overflow spillway and primary outlet structure were replaced, raising the total capacity of the dam to be able to pass the design flow with no freeboard[11] (Pare, 2013).

2.6 Proposed Fish Diversion Alternatives Analysis

This section documents the various hydraulic and other factors that were considered to arrive at the selected design for the proposed fish diversion. As a quick check on the hydraulic capacity of the alternative layouts of the diversion wall, the equation for flow over a broad-crested weir was used:

$$Q = C\,L\,H^{3/2}$$

where:

Q = discharge over a broad-crested weir (cfs)
C = weir coefficient (assumed as 3.32[12])
L = effective weir length (ft)
H = head, or water depth over weir (ft)

[11] Freeboard refers to the vertical "buffer" or distance between the reservoir elevation for the given flood and the crest elevation of the dam, above which it would be overtopped by floodwaters. Typically a certain amount of freeboard, such as 1 foot, is desired for the spillway design flood.

[12] Assuming a weir breadth, b, of 2 feet. Coefficients for heads above about 4 feet remain relatively constant (3.32) for b values between 0.5 and 3 feet.

For alternatives that included one or more gates in the diversion wall, the equation for flow through an orifice (provided in **Section 2.5**) was used. In this case, the head parameter would be the difference between the upstream water surface elevation and the elevation of the centroid of the gate opening.

As noted previously, several design concepts were considered during the early project goal development phase, but were dismissed for various reasons. Due to poor design and functioning of the existing gate, the Town was not interested in a gate rehabilitation alternative to deal with the declining condition of the gate. Other alternatives included either a full gate replacement or a wall with a gated opening located at the floor elevation. A concrete wall with a gated opening became the selected design concept when it became apparent that a full gate replacement had notably higher construction costs with less expected longevity than a wall.

Preliminary Design

The preliminary design for the fish diversion included an angled wall with a total effective (centerline) length of about 40 feet. Using the weir flow equation and solving for head, it was determined that if the diversion height were fixed at 9 feet to exclude herring 99% of the time based on the results of the tidal surge analysis (**Section 2.4**), it would only be able to pass a flow of about 1,270 cfs without impacting the 3-foot-deep beam supporting the elevated concrete deck above,[13] which is less than the siphon capacity of 1,700 cfs. Furthermore, a freeboard of at least one foot between the top of the water surface over the diversion and the bottom of the beam is desired for safety.

Reducing the height of the preliminary 40-foot-long diversion wall to 7 feet would allow it to pass a flow of approximately 1,713 cfs (greater than the siphon capacity of 1,700 cfs) with a freeboard of 1 foot to the beam. Therefore, for the preliminary design, it was suggested that the fixed height of the diversion wall should be 7 feet for flood safety purposes, and that water control structures could be added to raise the height to 9 feet to exclude fish 99% of the time during herring migration period.

Various water control structures were considered, including rubber dams, slide or drum gates, and flashboards. Flashboards appeared to be the simplest and most economical option with the significant advantage of not relying on operation or intervention to pass flood flows. As such, the recommended water control structure for the preliminary design was two-foot high wooden flashboards designed to automatically trip at a head of about 2 feet. A concept plan of the preliminary design is shown in **Figure 2.6-1** at the end of this section.

However, project partners decided that the use of flashboards was not ideal. Flashboards require various components that would need to be purchased, maintained, and eventually replaced. Additionally, they could potentially fail at flows lower than intended and be difficult to replace during high spring flows, resulting in the possibility for fish to enter the flood control conduit. The most effective fish barriers have no crest operations or movable parts. The project team concluded that a slight reduction in percent of fish excluded (down to a minimum of 90%) would be acceptable in order to obtain a fixed height structure with lower operation and maintenance requirements.

[13] The total clearance between the existing concrete pad and the bottom of the beam is about 13.5 feet.

Concept Design Alternatives

Based on this feedback, three alternative design concepts were developed to provide additional flood flow capacity with a higher fixed height. All three alternatives included a concrete diversion wall with a fixed height of 8.5 feet above the concrete pad. According to the results of the tidal surge analysis (**Section 2.4**), a wall height of 8.5 feet would still be expected to exclude herring 99% of the time, but with a lower factor of safety (1.5 feet of separation between the downstream water surface elevation and the top of the wall, instead of the recommended 2 feet). Concept plans of each alternative are shown in **Figures 2.6-2** through **2.6-4** at the end of this section. A description of the alternatives follows:

1. **Alternative 1 – One Gate:** This alternative included one gate with an overflow weir section. Above the gate would be a non-overflow section that would be the same elevation as the adjacent existing grade and allow for direct operation of the gate from that level. Hydraulically, the flow would be split between the gate and the weir during the design flood.

2. **Alternative 2 – Two Gates:** This alternative included a long weir for overflow plus two gates that would pass about 40% of the flow during the design flood. One gate would be operated from the side of the channel and the other would be operated from the elevated deck above. The entire weir would overtop with flow. The wall would be reoriented from the preliminary design to direct the gate discharges downstream.

3. **Alternative 3 – Extended Weir:** This alternative included a weir that was extended approximately 15 feet farther downstream than the two other options. A small (6 feet wide by 3.5 feet high), upward opening slide gate would be installed as a low level outlet. It would not require operation during a storm, but would be opened outside of fish migration period to allow the flood conduit to drain. This gate would be operable from the canal wall.

The first option was attractive from a structural design perspective. However, it would require gate operation during a flood event, which is not ideal due to the potential for gates to become stuck, lose power (if electric), become inaccessible due to inundated roads, and tie up emergency personnel resources. From a hydraulic standpoint, the second alternative (with two gates) provided redundancy in case one gate becomes stuck and can't be opened during a flood. However, it would be more complex to build and operate, and would likely have a higher associated cost as well.

In the end, the third option with the extended weir length (totaling approximately 55 feet) was selected as the preferred alternative for final design as it would provide passive flood capacity and does not require gate operation during most flood events. The capacity of the proposed diversion wall to pass flood flows is discussed in **Section 2.7** and additional details of the proposed design are presented in **Section 3**.

Figure 2.6-1: Preliminary Design Alternative

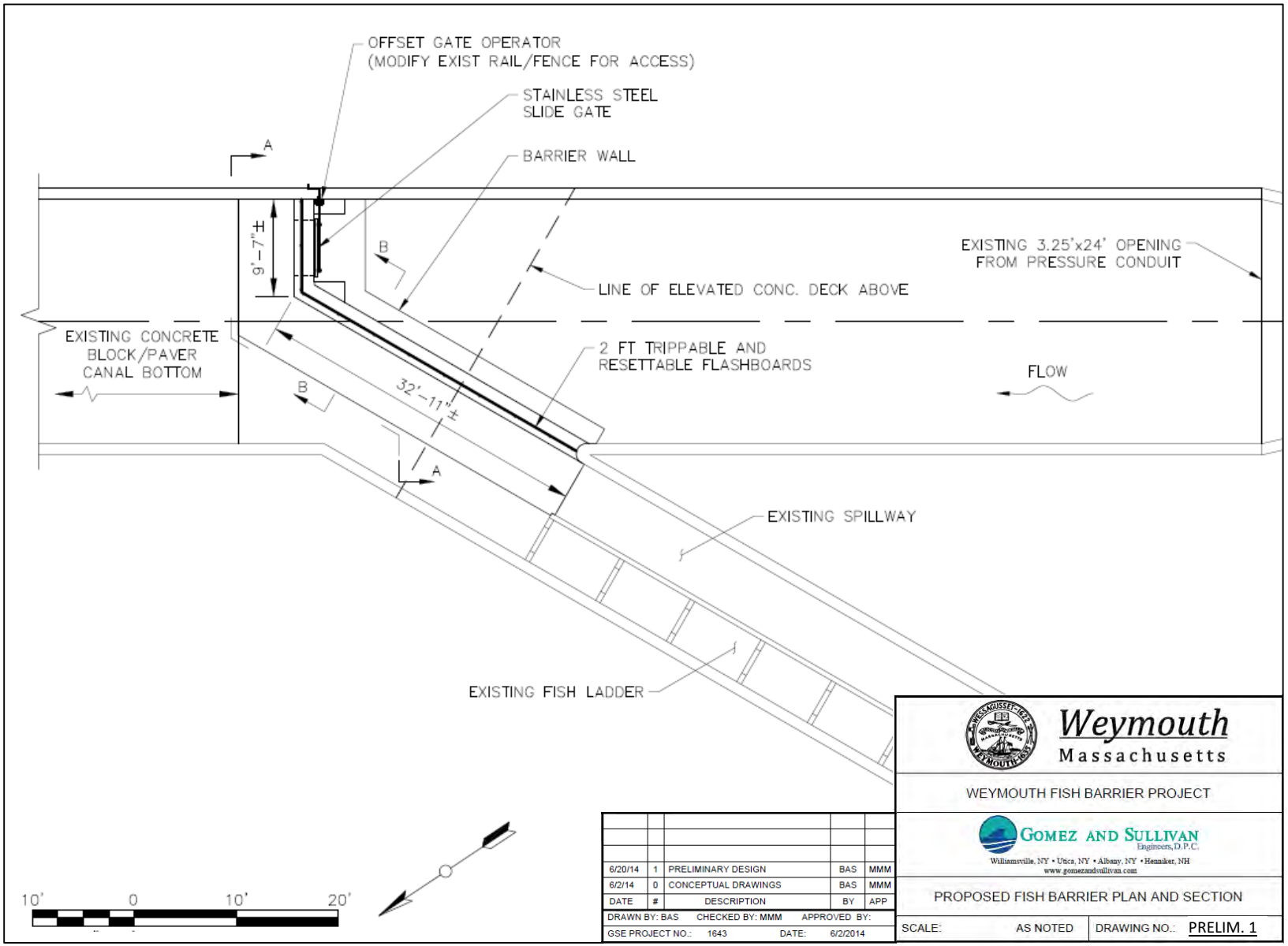


Figure 2.6-2: Concept Design Alternative #1 – One Gate

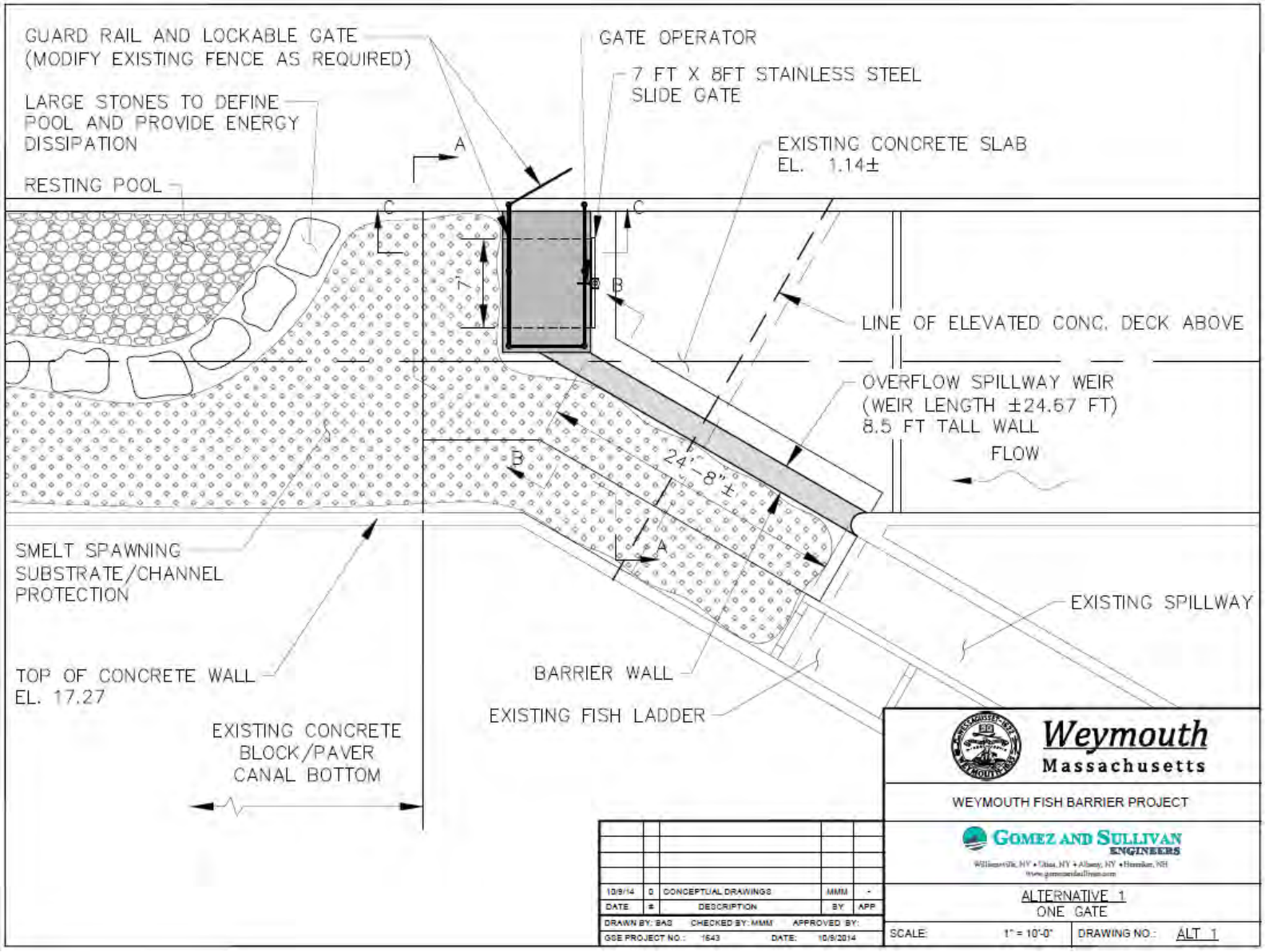


Figure 2.6-3: Concept Design Alternative #2 – Two Gates

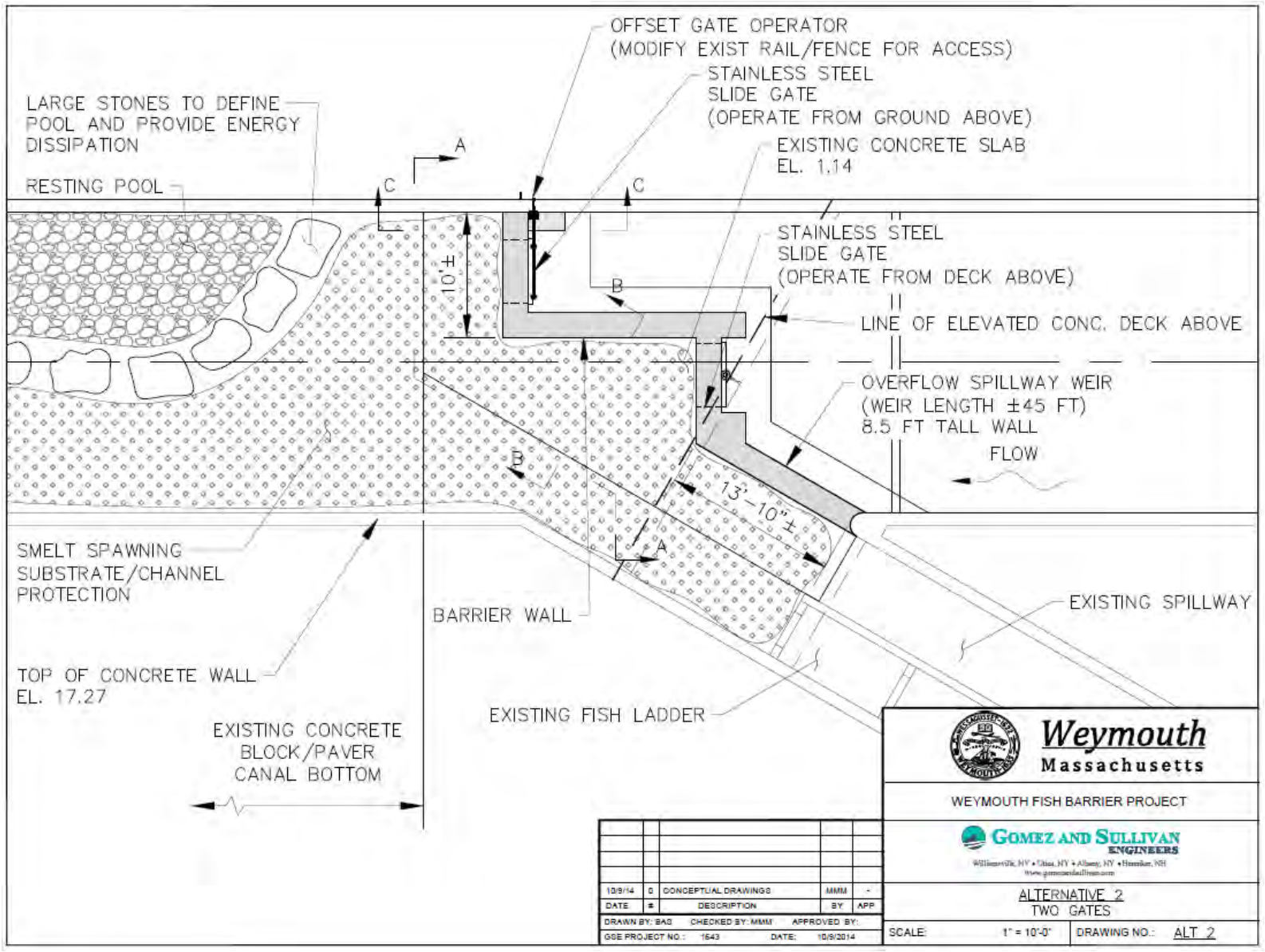
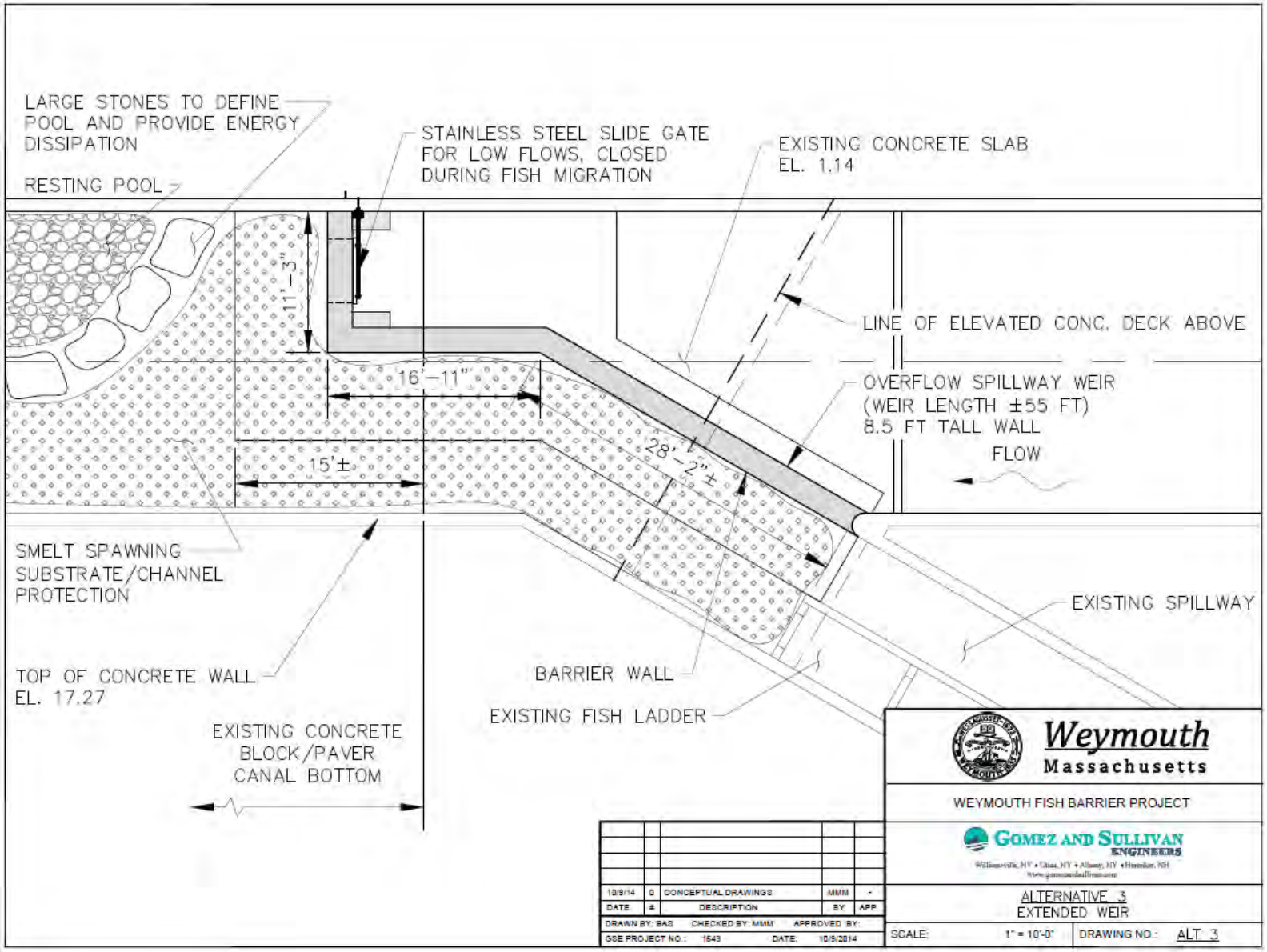


Figure 2.6-4: Concept Design Alternative #3 – Extended Weir



2.7 Hydraulic Capacity of Proposed Fish Diversion

The proposed diversion wall is approximately 8.5 feet high with an overall length of approximately 55 feet and a thickness varying from 2 to 3 feet. A 6-foot-wide by 3.5-foot-high stainless steel slide gate (upward opening) will be installed as a low level outlet. Using this information, the hydraulic capacity of the proposed wall to pass flood flows was estimated.

The weir flow equation (provided in **Section 2.6**) indicates that the proposed structure could pass approximately 1,460 cfs with the gate closed and 1 foot of freeboard to the support beam above. With the gate opened and no freeboard between the water surface and the beam, a combination of weir flow and orifice flow (provided in **Section 2.5**) equations indicate that the structure could pass up to about 2,450 cfs. For reference, the 100- and 500-year flood flows (according to the FIS) are about 1,100 and 1,860 cfs, respectively, and the capacity of the siphons at the inlet to the flood control conduit is assumed to be 1,700 cfs.

However, hydraulics in the project area are complex and are influenced by the flood conduit's siphon spillway inlet, open channel flow in Herring Brook, tidal conditions, and a downstream railroad crossing constriction. The weir and orifice flow equations do not take into account any potential reduction in the efficiency of the weir to pass flood flows due to a high "tailwater," or downstream water surface elevation. If the tailwater is high enough, the weir may become "submerged" which reduces its capacity. As such, a three-dimensional computational fluid dynamics (CFD) model was developed in order to more thoroughly analyze the capacity of the proposed diversion wall to pass flood flows without impacting the beam supporting the elevated concrete deck above.

A schematic of the model layout is shown in **Figure 2.7-1**. It encompasses approximately 500 linear feet, including the fish ladder, a portion of the existing flood control conduit, the stilling basin at the outlet of the flood control conduit, and the downstream channel. Existing drawings indicate that the elevation of the channel bottom in the area of the proposed wall vary from approximately 1.1 to 1.5 feet. The top of the new diversion was set to be a minimum of 8.5 feet above the channel bottom at elevation 10.0 feet. A separate model geometry was created to represent the gate opening[14]. Sensitivity analyses were run with each of these geometries to determine the impacts of operating the gate.

Boundary Conditions

A CFD model requires boundary conditions, which are known inputs (such as known water surface elevations or source flows) that allow the model to establish starting water surface elevations at the upstream and downstream extents.

For the downstream boundary condition, the known water surface elevation for the 500-year flood was used. The FIS indicates that the water surface elevation expected in the vicinity of the downstream channel under a 500-year flood event (1,858 cfs) is approximately 14.5 feet (i.e., 4.5 feet above the

[14] The model was developed with an earlier iteration of the gate opening width (7 feet instead of the final design width of 6 feet). However, the slight reduction in gate opening area (less than 15%) is not expected to significantly affect the modeling results, as the gate contributes a low percentage of the overall structure capacity. Additionally, as described in the results, the modeled flows are conservative and more than account for the slight reduction in flow through the gate.

proposed fish diversion) [15]. As such, a specified water surface elevation of 14.5 feet was utilized for the downstream boundary condition. Sensitivity analyses were run for each of the geometries (i.e., gate closed and gate open) with the downstream boundary at elevations 10.5 and 12.5 feet (i.e., 0.5 and 2.5 feet above the fish diversion) as well.

For the upstream boundary conditions, inflows for the flood control conduit and the surface channel of Herring Brook (i.e., to the fish ladder channel adjacent to the tunnel outlet) were needed. However, no stage versus discharge rating curve was found for Iron Hill Dam. As such, the distribution of flow between the flood control conduit and the surface channel for a given flood (e.g., the 500- year flood) was not known. The dam safety report does indicate, though, that for the Iron Hill Dam spillway design flood (i.e., the ½ PMF or 3,544 cfs), approximately 2,100 cfs (60% of the total flow) would be conveyed by the flood control conduit and 1,435 cfs would enter the surface channel. These values represent the best available information and are conservatively higher than the 100- and 500-year floods (1,100 and 1,860 cfs, respectively) and the assumed capacity of the conduit (1,700 cfs).

As such, the inflow value of 2,100 cfs was used as the upstream boundary condition for the flood control conduit in the model. However, weir calculations indicate that the reported flow for the surface channel (1,435 cfs) would not be contained by the concrete channel in the area of the fish ladder (just upstream of the tunnel outlet) without overtopping the channel walls. Therefore, a specified water surface elevation of 17.85 feet (corresponding to the top of the concrete channel walls upstream of the fish ladder) was set as the upstream boundary condition for the surface channel.

Model Results

The model indicates that the surface channel of Herring Brook in the area of the fish ladder (just upstream of the tunnel outlet) is able to pass approximately 520 cfs prior to overtopping the concrete channel walls. Therefore, the total amount of flow reaching the area downstream of the proposed diversion in the model is approximately 2,620 cfs (which is still conservatively higher than the 100- and 500-year floods). Additional results of the various model runs are presented in **Table 2.7-1** below.

The results show that the proposed fish diversion structure would be able to pass in excess of the 500-year flood without impacting the elevated concrete deck if the gate is open. Furthermore, from the data, it can reasonably be assumed that the structure would be able to pass the 100-year flood with the gate closed and still maintain at least 1 foot of freeboard between the water surface elevation and the support beam. This is based on the fact that the FIS reported tailwater drops over 3 feet from the 500-year to the 100-year flood and the model indicates that the height of water over the weir drops with the tailwater (in addition to the flow dropping from the modeled 2,620 cfs to the 100-year flood flow of 1,100 cfs). It can also be inferred that the weir should not limit the discharge from the siphons or impact the spillway capacity of Iron Hill Dam under these conditions (i.e., 100-year flood with gate closed or 500-year flood with gate open). The operation and maintenance manual for the fish diversion structure will specify that the gate should be opened if flows are anticipated to be in excess of the 100 year storm.

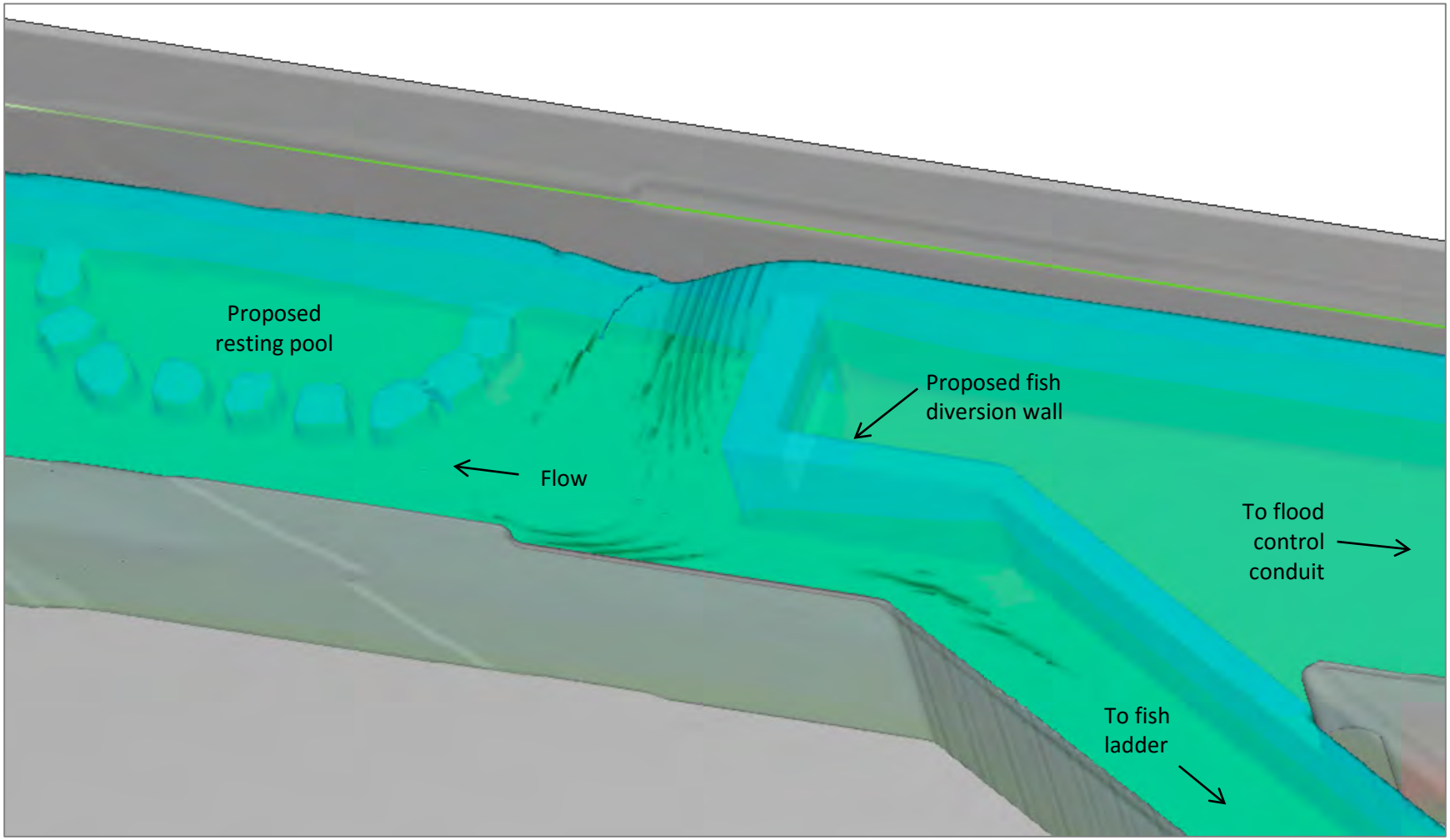
[15] Note that the FIS water surface profiles incorrectly show the Herring Brook channel bottom rising steeply between the railroad crossing and Broad Street. In reality, the elevation change does not occur until upstream of the project site at the fish ladder, around station 2,200 feet upstream of the confluence with Weymouth Back River. Consequently, the elevation of the 500-year flood was extrapolated from the flat backwater area upstream of the railroad crossing.

Table 2.7-1: Summary of CFD Model Results

Gate Position	Downstream Water Surface Elev. (ft)	Flow through Gate (cfs)	Water Surface Elev. at Fish Diversion (ft)	Beam Impacted*
Gate Closed	10.5	N/A	15.9	Yes
	12.5	N/A	16.4	Yes
	14.5	N/A	17.1	Yes
Gate Open	10.5	430	14.4	No
	12.5	390	15.0	No
	14.5	370	15.8	No

**The bottom of the concrete deck support beam is approximately at elevation 15.8 feet where it crosses over the proposed fish diversion wall.*

Figure 2.7-1: CFD Model Schematic



This screenshot from the CFD model shows the concrete channels leading from the flood control conduit and fish ladder, the proposed fish diversion wall, the proposed resting pool (bordered by large granite blocks), and the modeled water surface.

3. Proposed Design

3.1 Details of the Proposed Design

Drawings of the proposed design are provided in **Appendix B**.

Fish Diversion

The proposed fish diversion will be constructed of reinforced concrete as a cantilever type wall. The wall will be 8.5 feet high with an overall length of approximately 55 feet and a thickness varying from 2 to 3 feet. The existing metal swing gate and concrete pad will be removed. The new concrete wall stem will extend vertically from a new concrete footing and pad. The proposed wall will have an extended toe (downstream section of footing apron) and narrow heel (upstream section of footing apron) to maximize overturning resistance. A key placed below the existing apron will provide protection against potential undermining of the soil at the foundation. A metal angle will be placed on the downstream side of the wall to act as a diversion for climbing eels.

A 6-foot-wide by 3.5-foot-high stainless steel slide gate (upward opening) will be installed as a low level outlet. Type 316L stainless steel was specified by the Town for the added corrosion protection in the harsh environment. The gate will be closed to prevent herring from accessing the flood control conduit during the herring migration period (approximately March 1 through June 30), but will be kept open at other times of the year to allow water to freely flow from the flood control conduit and not be impounded by the wall.

Due to the extent of overtopping and the ground conditions indicated by soil boring logs prepared for the original construction of the flood control conduit, micropile anchors were selected to resist the significant forces anticipated during flood flows. These anchors will be drilled into the ground and grouted into the subsurface soil, or rock if encountered, and will extend into the wall stem. The anchors are designed to allow the wall to remain stable at the anticipated flood loads.

The proposed wall will be angled to align with the existing fish ladder. This configuration will provide increased weir length for flood protection and will enhance attraction to the fish ladder because the majority of the water spilled over the diversion will fall at the base of the fish ladder. Presently, under some conditions of higher flows, fish can be more attracted to the flood control conduit than the fish ladder because the conduit flow is undiluted Whitmans Pond water whereas the fish ladder can receive more stormwater runoff. This alignment also allows the operable gate to be located out from underneath the existing elevated deck allowing for easier access, maintenance, and operation. For all of these reasons, a wall angled with relation to the channel was preferred to a wall perpendicular to the channel such as the existing metal gate.

Hydraulics in the channel are complex and are influenced by the flood conduit's siphon spillway inlet, open channel flow in Herring Brook, tidal conditions, and a downstream railroad crossing constriction. Considering all of these factors, the diversion wall was designed to pass the 100-year flood flow (1,100 cfs) with over 1 foot of freeboard to an existing elevated deck concrete support beam above the wall with the gate closed, and in excess of the 500-year flood flow (1,860 cfs) with no freeboard and the gate opened. At the 500-year flood flow, the structure will impound less than 5 acre-feet, contained entirely within the existing flood control conduit.

Channel Improvements

Improvements to the channel downstream of the fish diversion will be constructed to reestablish smelt spawning habitat and to restore a resting pool for herring. For the smelt spawning habitat, the concrete pad below the fish ladder and wall will be covered with a 12-inch layer of grouted rip-rap (consisting of 6- to 12-inch-diameter stone) topped by a 12-inch layer of loose 4- to 8-inch-diameter cracked stone. An additional 2 cubic yards of 4- to 8-inch cracked stone will be spread over the channel downstream of the grouted section. For the resting pool, the channel downstream of the concrete pad will be excavated to approximate the former pool dimensions of about 3 to 4 feet deep, 15 to 20 feet wide, and 30 feet long (for a total volume of 50 to 90 cubic yards (CY)).[16] Large stones with major dimensions on the order of three feet and weighing approximately one ton will be used to define the extent of the restored resting pool and act as energy dissipaters to help prevent future washouts of the substrate.[17] Additionally, an unauthorized rock weir at the downstream extent of the concrete-walled channel will be regraded to restore flow depths and velocities suitable for smelt spawning. This will involve distributing the approximately 10 CY of rocks comprising the weir up- and downstream over a length of about 150 feet and a slope of approximately 0.5%.

3.2 Construction Methods

An overview of the proposed construction plan is shown in **Figure 3.2-1**. A more detailed proposed plan for construction access and water, erosion, and sedimentation controls is shown on **Drawing C1** of the design plans in **Appendix B**. Additional notes are provided on the cover sheet and details of the proposed water control system are shown on **Drawings C2**. Note that the proposed plan only represents the recommendation of the engineer. The selected contractor for the project will be required to submit a construction sequence plan, which will include proposed means, methods, and phasing required for water, erosion, and sedimentation control. The plan will need to be approved by the project engineer and the Town and adhere to all conditions contained in relevant permits.

Access

Construction access and staging areas for the project will primarily be located on an existing parking area, open field, and paved paths on Town lands adjacent to the Lovell Playground and a skate park on the west side of Herring Brook. The total disturbance area is anticipated to be less than 1 acre. Disturbance to existing park plantings will be minimized. A crane is recommended to lift a mini-excavator or small skid-steer loader into the channel to conduct the work. The machine would be removed from the channel at the end of each work day. Temporary gravel access roads will be constructed for routes crossing vegetated areas or existing paved paths.

Water Control

Water control at the site will consist of 1) stopping inflow into the flood control conduit at the intake, 2) bypassing water from the surface channel of Herring Brook (i.e., upstream of the fish ladder) around the work area, and 3) controlling backwater from downstream (including tidal surges).

[16] Note that the design plans indicate excavating an area only 10 feet wide and only to the depth of the existing concrete block pavers, not below. The 15 to 20 foot width and 3 to 5 foot depth (approximating the former dimensions of the resting pool) will be specified in a design addendum to be developed by the Town of Weymouth.
[17] The Town's design addendum will also specify sinking the large perimeter stones deeper so they rise only 6 to 12 inches above the surrounding substrate.

In order to address the inflow into the flood control conduit, stoplog slots in the existing siphon intakes at Iron Hill Dam can be fitted with boards to close the conduit. With the siphons closed, all flow will be diverted to the surface channel of Herring Brook.

To control surface channel flow and tidal surges at the construction area, a cofferdam and gravity bypass pipe system is recommended. This system will divert flow around the work area and safely pass any juvenile herring migrating downstream. The cofferdams will need to be on the order of five to six feet tall to effectively isolate the construction site. Because of the narrow nature of the channel and the need for a relatively tall structure, a prefabricated cofferdam such as Portadam is recommended. Dewatering of the work area will be accomplished by pumps directed to a dewatering area in an open field. After initial dewatering, only minimal maintenance pumping of runoff entering the work area is anticipated. The discharge water is not expected to be contaminated.

The rock weir grading is proposed to be completed within the wetted channel downstream of the cofferdam diversion during a period of low flow.

Erosion and Sedimentation Control

The project is not anticipated to have significant erosion and sedimentation impacts as the site and the nature of the construction activities are not particularly susceptible to erosion. The proposed construction access and staging area is essentially flat with no steep slopes. The Herring Brook channel through the project area has vertical concrete side walls and a bottom lined with either solid concrete or concrete block pavers.

Applicable soil erosion and sedimentation control notes are shown on the cover sheet and Drawing C1 of the design drawings (**Appendix B**). The selected contractor will be responsible for developing and implementing a plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities. The plan will be required to comply with all conditions contained in relevant permits and must be approved by the engineer and the Town.

During construction, temporary erosion, sedimentation, water, and pollution controls will be utilized in accordance with Best Management Practice (BMP) guidelines recommended by MassDEP. To prepare the site, natural vegetation will be preserved to the extent practicable. (For this reason, a preliminary access route option passing south of the skate park was abandoned to preserve existing tree plantings.) Erosion of proposed access routes (through a mowed field and along existing paved footpaths) will be controlled by installing a stabilized construction entrance and gravel access roads. Erosion and sedimentation due to stormwater runoff will be managed with approved measures such as silt socks or entrenched silt fences installed at the limits of all work/disturbances. Disturbed and stockpile areas will receive temporary seeding/mulching/rip-rap as appropriate. Dust will be controlled as necessary. As noted, pumping will only be needed during initial dewatering and then for minimal maintenance needs thereafter. Pump discharge will be directed into filter bags to capture fine sediments. The site will be restored to its former condition following construction.

Timing

The project should be constructed during a period of relatively low flow and at a time that will have the lowest impact on marine resources (including smelt spawning and river herring migration).

Construction of the fish diversion would likely take on the order of 1 week for cofferdam installation and dewatering, 1 week for demolition, 2 weeks to form and pour the concrete, 1 week for the gate installation, and 1 week to remove the cofferdam system, totaling approximately 6 weeks. Considering additional time needed for mobilization/demobilization, construction of temporary access roads, installation of sedimentation and erosion controls, implementation of the channel improvements, and site restoration, about 2 to 3 months should be allotted for the entire construction period.

The project area is located in a coastal zone and therefore is subject to *MarineFisheries'* recommendations for seasonal or "time of year" restrictions (TOYs) on in-water construction work. The TOY date ranges were established to provide protection to marine resources during times when there is a higher risk of known or anticipated significant lethal, sublethal, or behavioral impacts. Adverse impacts to marine fisheries resources can result from suspension of fine grain sediments, lowered dissolved oxygen levels, impediments to migration, direct removal of important shelter, forage, or spawning habitat, and direct mortality. The TOY restriction for the Weymouth Back River Area of Critical Environmental Concern (ACEC; within which the project area is located) recommends avoiding in-water construction work from February 15 through November 15 (Evans et al., 2015). At least a spring TOY is likely for this project.

Table 1.4-1 provided information about the timing of important life cycle events for target diadromous species that utilize the project area seasonally. Spring construction is not recommended due to smelt spawning (March through May) and upstream migrations of river herring (March through June) and American eel (April through July), as well as typically high flows. Downstream migration of juvenile herring occurs from July through November. However, it is anticipated that fish can be safely passed downstream by the proposed gravity bypass system. Therefore, the recommended construction period is August through October to minimize impacts to marine resources and take advantage of relatively low flows, pending approval by *MarineFisheries*. Alternatively, flows are also low in the winter (December to February) and diadromous fish species are not likely to be present in the project area during this time. Construction during the winter would require freeze protection for concrete.

3.3 Opinion of Probable Construction Cost

An opinion of probable construction cost (OPCC) for the proposed fish diversion and channel improvements is provided in **Table 3.3-1**. The OPCC was developed using the DOT's published weighted average bid prices[18], R. S. Means Construction Cost Data, and available final costs from comparable projects. The OPCC itemizes costs for mobilization/ demobilization, access and water handling, erosion and sediment control, removal of the existing diversion, and construction of the new diversion, smelt spawning habitat, resting pool, and downstream rock weir grading. A contingency of 20% was included and an allowance of $25,000 was added for bidding and construction phase services.

[18] Median prices for all districts from the period of 2013 to 2014. DOT's Standard Specifications for Highways and Bridges provide more detail about methods and included services for each item.

Table 3.3-1: Cost Estimate for Weymouth Herring Passage & Smelt Habitat Restoration Project

Category	Item	Unit*	Qty	Unit Cost	Total Cost
Mobilization/ Demobilization	Mobilization/demobilization	LS	10%	$451,165	$45,116
				SUBTOTAL	**$45,116**
Site Access	Temporary fence	LF	310	$11	$3,410
	Silt fence	LF	240	$5	$1,200
	Selective clearing & thinning	SY	190	$3	$570
	Clearing & grubbing	SY	170	$4	$680
	Geotextile fabric (for separation)	SY	170	$6	$1,020
	Gravel subbase (M2.01.7)	CY	250	$56	$14,000
	Crushed stone, 1-1/4" (M2.01.3)	TON	20	$40	$800
	Chain link fence removed & reset	FT	30	$25	$750
	Crane	MO	1	$5,100	$5,100
				SUBTOTAL	**$27,530**
Water Control	Cofferdam	LS	1	$19,685	$19,685
	Sandbags	EA	125	$1	$125
	Sand borrow (M1.04.0 a)	CY	60	$40	$2,400
	Water diversion pump	LS	1	$7,400	$7,400
	Bypass pipe	LS	1	$22,300	$22,300
	Dewatering bag	EA	1	$75	$75
	Stoplogs (3 x 12 x 12' lumber)	EA	40	$20	$800
				SUBTOTAL	**$52,785**
Diversion Wall	Demolition	LS	1	$7,440	$7,440
	Concrete excavation	CY	40	$500	$20,000
	Concrete block removal/salvage	LS	1	$2,400	$2,400
	Earth excavation	CY	170	$25	$4,250
	Micropiles	LF	360	$155	$55,800
	Gravel subbase (M2.01.7)	CY	70	$56	$3,920
	Concrete (4500 psi)	CY	143	$1,370	$196,088
	Water resistant admix	LB	663	$3	$1,990
	Waterstops	LF	225	$7	$1,572
	Stainless steel slide gate, 72" x 42"	EA	1	$28,500	$28,500
	Chain link fence gate with posts, 60"	FT	3	$142	$426
				SUBTOTAL	**$322,386**
Habitat Restoration	Dredging & disposal of material	CY	5	$45	$225
	Grouted rip-rap	SY	292	$120	$35,040
	Modified rockfill (M2.02.2)	CY	26	$75	$1,975
	Granite blocks (3' x 3' x 2')	LS	1	$8,824	$8,824
	Rock weir grading	DAY	1	$2,400	$2,400
				SUBTOTAL	**$48,464**
				SUBTOTAL Direct Construction Cost	**$496,281**
				Contingency Allowance (20%)	*$99,256*
				TOTAL Direct Construction Cost *(rounded up to the nearest $1000)*	**$596,000**
				Bidding & Construction Phase Services	*$25,000*
				TOTAL OPINION OF PROBABLE CONSTRUCTION COST ($2015)	**$621,000**

**See List of Abbreviations for descriptions of unit abbreviations.*

3.4 Regulatory Review

The following regulatory submittals, reviews, and permits are anticipated to be required for this project. Applications and forms will be submitted to the appropriate agencies as part of this contract.

Table 3.4-1: List of Anticipated Required Regulatory Reviews and Permits

Permit/Review	Agency	Applicability
Environmental Notification Form (ENF)	MA Environmental Policy Act (MEPA) Office	Review thresholds exceeded include: 1) alteration of 1,000 or more sf of outstanding resource waters, 2) new fill or structure or expansion of existing fill or structure in a regulatory floodway, 3) construction, reconstruction or expansion of an existing solid fill structure of 1,000 or more sf base area occupying flowed tidelands or other waterways, and 4) any Project within a designated ACEC.
401 Water Quality Certificate (WQC)	MA Dept. of Environmental Protection (MassDEP)	Dredging or any activity resulting in the discharge of dredged or fill material (e.g., sediment release) greater than 100 CY or any amount in an Outstanding Resource Water (ORW) that is also subject to federal regulation. Major Project Certification for Fill & Excavation required due to fill in an ORW.
Chapter 91 Waterways License	MassDEP	Dredging of a navigable waterway.
Chapter 253 Jurisdictional Determination	MA Dept. of Conservation & Recreation (DCR) Office of Dam Safety (ODS)	Any project to construct, repair, materially alter, breach, or remove a dam. Proposed structure is 8.5 ft high and impounds less than 5 ac-ft (in the existing flood control conduit) at maximum pool. As such it does not meet the definition of a dam (> 25 ft or > 50 ac-ft), but does meet criteria requiring a jurisdictional determination (> 6 ft or > 15 ac-ft).
Project Notification Form (PNF)	MA Historical Commission (MHC)	Projects that require state funding, licenses, or permitting.
Section 106 Historic Review		Projects that require federal funding, licenses, or permitting. Jackson Square is a historic district and the Herring Run is a historic structure.
Coastal Zone Management Act (CZMA) Federal Consistency Review	MA Office of Coastal Zone Management (CZM)	Most projects that: 1) are in or can reasonably be expected to affect a use or resource of the MA coastal zone, and/or 2) require federal licenses or permits, receive certain federal funds, or are a direct action of a federal agency.
Clean Water Act Section 404 Programmatic General Permit	US Army Corps of Engineers (USACE)	Discharge of dredged or fill material in a water of the United States, or instream construction activities. Anticipated to require Category II review due to proposed fill.
Fishway Permit	MA Div. of Marine Fisheries (DMF)	Any activity to construct, reconstruct, rebuild, repair, or alter any anadromous fish passageway.
Wetlands Protection Act Notice of Intent (NOI) & Order of Conditions	MassDEP / Conservation Commission	Any construction in or near a wetland resource. Anticipated to qualify for a Restoration Order of Conditions general permit as a fish passage improvement project. Project is not located within Estimated or Priority Habitat of Rare Species, so is not subject to the Massachusetts Endangered Species Act (MESA) review.
National Pollutant Discharge Elimination System (NPDES) Permit	Environmental Protection Agency (EPA)	Discharges from certain construction sites, including clearing, grading, and excavation activities. Since disturbance will be < 1 acre and discharge is not anticipated to be contaminated, a Dewatering General Permit (DGP) may be required, or the project may potentially be covered as allowable non-stormwater discharge under the community's Small MS4 Permit, or there may be no NPDES permit requirement.

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APPENDIX A

Photographs

Weymouth Herring Passage & Smelt Habitat Restoration Project

List of Photographs

Photo 1: Aerial Image of Project Site

Looking east (Bing Maps, 2016)

Photo 2: Aerial Image of Project Site

Looking west (Bing Maps, 2016)

Photo 3: Aerial Image of Project Site

Looking north (Bing Maps, 2016)

Photo 4: Aerial Image of Project Site

Looking south (Bing Maps, 2016)

Photo 5: Existing Metal Swing Gate

Looking upstream; note fish ladder entrance at right (GSE, 6/12/14)

Photo 6: Existing Metal Swing Gate

Looking upstream; note fish ladder entrance at right (GSE, 6/10/13)

Photo 7: Existing Metal Swing Gate

Looking upstream (GSE, 6/12/14)

Photo 8: Existing Metal Swing Gate

Looking upstream (GSE, 6/12/14)

Photo 9: Existing Metal Swing Gate

Looking upstream; note fish ladder entrance at right (GSE, 6/10/13)

Photo 10: Flood Control Conduit Outlet

Looking upstream (from existing metal swing gate)

Photo 11: Herring Brook

Looking upstream at existing metal swing gate and fish ladder (GSE, 6/10/13)

Photo 12: Herring Brook Channel

Looking upstream; note elevated concrete deck above existing swing gate (GSE, 5/25/14)

Photo 13: Herring Brook Channel

River left channel wall, with downstream to the right (GSE, 5/25/14)

Photo 14: Herring Brook Channel

Showing existing channel substrate on concrete pad and downstream (GSE, 5/25/14)

Photo 15: Herring Brook Channel

Looking upstream at fish diversion gate (GSE, 6/12/14)

Photo 16: Herring Brook Channel

Looking upstream at fish diversion gate (GSE, 6/12/14)

Photo 17: Herring Brook Channel

Looking downstream toward end of concrete walls (GSE, 6/12/14)

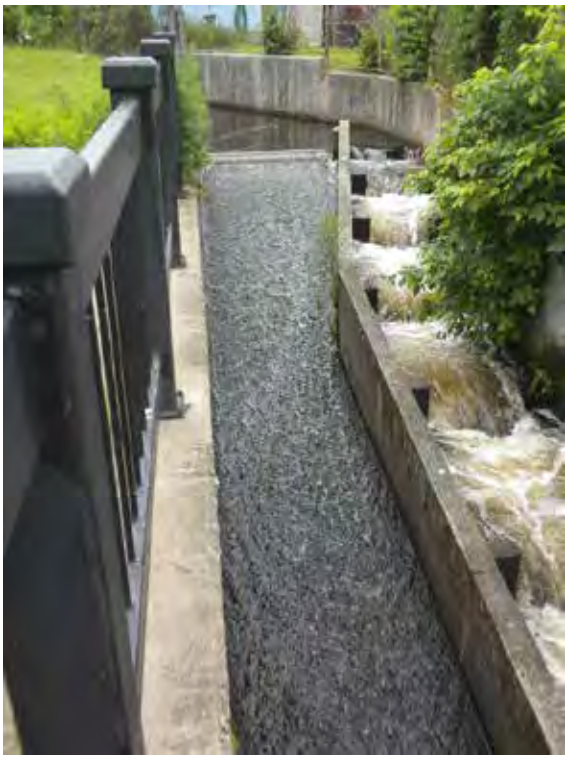
Photo 18: Herring Brook Channel

Looking downstream toward end of concrete walls (GSE, 6/12/14)

Photo 19: Fish Ladder

Looking upstream (GSE, 6/12/14)

Photo 20: Fish Ladder



Looking upstream (GSE, 6/10/13)

Photo 21: Fish Ladder

Looking downstream (GSE, 6/10/13)

Photo 22: Fish Ladder

Looking downstream (GSE, 5/25/14)

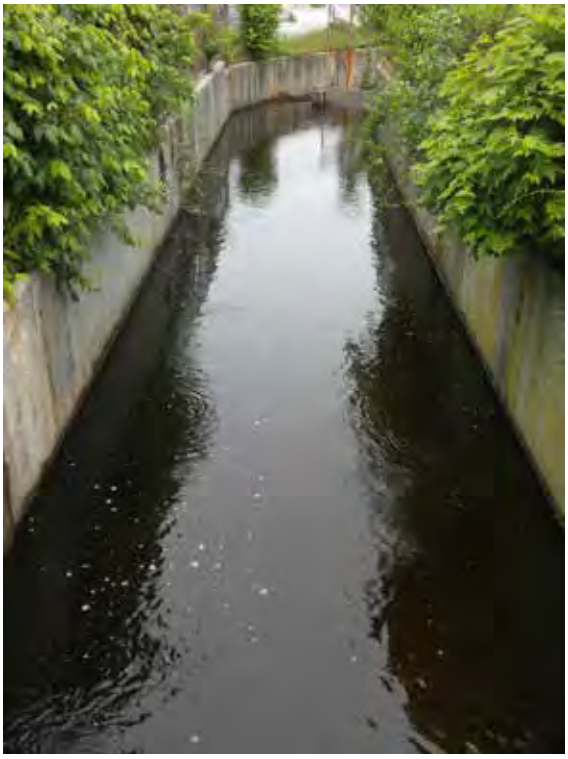
Photo 23: Fish Ladder

Looking downstream at upper exit (GSE, 5/25/14)

Photo 24: Fish Ladder

Looking downstream at upper exit (GSE, 5/25/14)

Photo 25: Herring Brook Channel



Looking upstream from fish ladder (GSE, 6/10/13)

Photo 26: Herring Brook Channel

Looking upstream from fish ladder (GSE, 5/25/14)

Photo 27: Rock Weir

Looking downstream (GSE, 2011)

Photo 28: Rock Weir

From river left bank (GSE, 2011)

Photo 29: Rock Weir

Looking upstream (GSE, 2011)

Photo 30: Rock Weir

Looking downstream toward railroad culvert from rock weir (GSE, 2011)

Photo 31: Railroad Culvert

Upstream face from left bank (GSE, 2011)

Photo 32: Herring Brook Channel

Looking upstream from railroad culvert (GSE, 2011)

Photo 33: Herring Run Park

Looking northwest at elevated concrete walkway over Herring Brook (GSE, 6/10/13)

Photo 34: Herring Run Park

Looking northwest at elevated concrete walkway over Herring Brook (GSE, 6/12/14)

Photo 35: Herring Run Park

Looking upstream from elevated walkway (GSE, 5/25/14)

Photo 36: Herring Run Park

Looking downstream from elevated walkway (GSE, 6/12/14)

Photo 37: Herring Run Park

Looking at channel from river right (east) bank (GSE, 6/12/14)

Photo 38: Herring Run Park

Looking at channel from river right (east) bank (GSE, 6/12/14)

Photo 39: Herring Run Park

Looking at park from river right (east) bank (GSE, 6/12/14)

Photo 40: Herring Run Park

Looking at park from river right (east) bank (GSE, 6/12/14)

Photo 41: Herring Run Park

Skate park (Town of Weymouth, 11/17/15)

Photo 42: Herring Run Park

Skate park (GSE, 6/12/14)

Photo 43: Herring Run Park

Looking upstream along river left (west) bank (Town of Weymouth, 12/21/15)

Photo 44: Herring Run Park

Looking upstream along river left (west) bank (Town of Weymouth, 8/27/13)

Photo 45: Herring Run Park

Looking downstream along river left (west) bank (Town of Weymouth, 11/17/15)

Photo 46: Herring Run Park

Looking downstream along river left (west) bank (GSE, 6/12/14)

Photo 47: Herring Run Park

Looking upstream along river left (west) bank (Town of Weymouth, 9/24/12)

Photo 48: Herring Run Park

Looking upstream along river left (west) bank (Town of Weymouth, 12/21/15)

Photo 49: Herring Run Park

Looking downstream along river left (west) bank (Town of Weymouth, 12/21/15)

Photo 50: Herring Run Park

Potential dewatering area (Town of Weymouth, 12/21/15)

Photo 51: Iron Hill Dam

Siphon spillway inlets (GSE, 6/11/14)

Photo 52: Iron Hill Dam

Siphon spillway inlets (GSE, 6/11/14)