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Environmental Notification Form
Mill Brook Restoration Project

Chilmark, Massachusetts

February 2016

Prepared for:
Sheriff's Meadow Foundation
PO Box 1088
Vineyard Haven, MA 02568

Represented by:
Division of Ecological Restoration
Massachusetts Department of Fish and Game
251 Causeway Street
Boston, MA 02114

Submitted by:
Horsley Witten Group, Inc.

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February 10, 2016

Secretary Matthew A. Beaton
Executive Office of Energy & Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Mill Brook Headwaters Restoration Project
Old Farm Road, Chilmark, Massachusetts

Dear Secretary Beaton and Applicable Regulatory Agencies:

On behalf of the Applicant, the Sheriff's Meadow Foundation (SMF), the Massachusetts Division of Ecological Restoration (DER), and Project Partners, the Horsley Witten Group, Inc. (HW) is pleased to submit this Environmental Notification Form (ENF), and associated permitting packet for the proposed Mill Brook Restoration Project (the Project). The SMF, in conjunction with (DER) and other local, state, and federal agencies, propose the Project in an effort to holistically restore naturalized ecology, geomorphology, and hydrology to an impoundment at the headwaters of Mill Brook in Chilmark, Massachusetts. The Project is located within the Roth Woodlands, a 26-acre protected conservation area owned by SMF. Through coordinated actions, the project seeks to alleviate anthropogenic stress across an approximately 0.36 acres restoration site, and transform approximately 0.4 acres of degraded, impounded stream into self-sustaining, high quality, freshwater wetlands and a cool-water stream network.

The goals of the project are to implement one of the first culvert replacement projects on Martha's Vineyard intended primarily to restore ecological functions, including fish and wildlife passage.

The approach to ecological restoration of Mill Brook is to focus on ecosystem processes that form and maintain habitat and ecological integrity over time ('process-based restoration'), identify limiting factors (or 'stressors') to those processes, and implement actions to relieve stress and promote a natural healing trajectory over time. The project seeks to enhance ecological connectivity, expand biological diversity, and promote conditions for self-sustaining wetland communities. Implementation is expected to involve approximately two months of construction activities, with follow-up planting, and post-construction monitoring.

The Project consists of the restoration of a stream and associated wetlands and riparian habitat; the removal of a culvert and grade controls to return the impoundment to a free-flowing stream; restoration of bordering vegetated wetlands other vegetation communities; restoration of transitional buffer areas; and passive restoration of the headwater stream and wetlands. The primary objectives of the Project are to: encourage the development of a self-sustaining, complex, productive, and dynamic (resilient) system of a stream and bordering vegetated wetlands; to establish a refuge for diverse native plant and animal communities; and to increase the connection between people and the land by providing a beautiful,

protected area for public use and enjoyment. Pending future removal of existing downstream barriers, the Project will also contribute to the potential restoration of an anadromous fish run.

The proposed Project will involve work within regulated resources areas including Land Under Waterbodies and Waterways, Inland Bank, Bordering Vegetated Wetlands, and Riverfront Area. These resource areas and associated buffer zones are regulated under the Massachusetts Wetlands Protection Act and the Town of Chilmark Wetlands Protection Bylaw and implementing Rules and Regulations. The Project is filed as a Limited Project under the provisions at 310 CMR 10.53(4), and short-term resource area impacts will be avoided and minimized to the extent practicable. The overall goal of the project is to improve and restore the stream ecosystem, aquatic habitat and surrounding wetland ecosystems in the Mill Brook watershed. The medium- to long-term benefits to these resource areas from the Project will be substantial.

Implementation of this project will require the Applicant (SMF) to obtain approvals or permits from various regulatory agencies, including:

(1) Review under Massachusetts Environmental Policy Act through an Environmental Notification Form;
(2) Approval under the Massachusetts Wetlands Protection Act [as a limited project under the provisions at 310 CMR 10.53(4)] via an Order of Conditions from the Chilmark Conservation Commission;
(3) Massachusetts Endangered Species Act (MESA) review with Natural Heritage Endangered Species Program (NHESP), pursuant to the MESA Regulations at 321 CMR 10.00 (a joint MESA Review will occur with filing of the NOI);
(4) Coverage as a Category 2 project under the U.S. Army Corps of Engineers' Programmatic General Permit;
(5) Potentially a Chapter 91 Dredge Permit from DEP; and
(6) Water Quality Certification from Division of Water Pollution Control.

All applicable permit applications and associated filing fees will be sent to the appropriate regulatory agencies, and all public notification requirements will be met individually in accordance with the appropriate permit applications.

Thank you for your review of the Project. We look forward to hearing from you. Should you have any questions, please do not hesitate to contact me directly at (508) 833-6600.

Sincerely,

HORSLEY WITTEN GROUP, INC.

Neal M. Price
Senior Project Manager

Enclosures

cc: See attached distribution list

LIST OF APPLICATION DOCUMENTS AND ATTACHMENTS

ENVIRONMENTAL NOTIFICATION FORM
Mill Brook Headwaters Restoration Project
Chilmark, Massachusetts

1. Cover Letter
2. ENF Distribution List
3. ENF Application Form
4. Public Notice
5. Locus Maps
   - Figure 1. USGS Locus Map, Mill Brook, Chilmark, MA
   - Figure 2. Aerial Photo, Mill Brook, Chilmark, MA
   - Figure 3. FEMA Floodzones, Mill Brook, Chilmark, MA
   - Figure 3a. FIRMette, Mill Brook, Chilmark, MA
   - Figure 4. Regulated Areas, Mill Brook, Chilmark, MA
   - Figure 5. Soils, Mill Brook, Chilmark, MA
6. Attachments:
   - Site Photos
   - Resource Area Impacts Plan
   - Site Design Report (90% Design, Inter-Fluve, Inc.)
   - Site Plans (90% Design Plans, Inter-Fluve, Inc.)

ENF DISTRIBUTION LIST
Mill Brook Headwaters Restoration Project
Chilmark, Massachusetts

Secretary Beaton
Exec. Office of Energy and Environmental Affairs
Attn: MEPA Office (2 full sized copies)
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Environmental Protection
Boston Office
Commissioner's Office
Attn: MEPA Coordinator
One Winter Street
Boston, MA 02108

DEP/Southeastern Regional Office
Attn: MEPA Coordinator
20 Riverside Drive
Lakeville, MA 02347

MA Department of Transportation
Public/Private Development Unit
10 Park Plaza
Boston, MA 02116

MA DOT – District #5
Attn: MEPA Coordinator
Box 111
1000 County Street
Taunton, MA 02780

Massachusetts Historical Commission
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Martha's Vineyard Commission
33 New York Ave
Oak Bluffs, MA 02557

Town of Chilmark
Board of Selectmen
c/o Timothy Carroll, Exec Secretary
PO Box 119
Chilmark, MA 02535-0119

Town of Chilmark
Planning Board
c/o Jennifer Christy, Administrative Assist.
PO Box 119
Chilmark, MA 02535-0119

Town of Chilmark
Conservation Commission
c/o Chuck Hodgkinson
PO Box 119
Chilmark, MA 02535-0119

Town of Chilmark
Board of Health
c/o Marina Lent, Administrator
PO Box 119
Chilmark, MA 02535-0119

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

Coastal Zone Management
Attn: Project Review Coordinator
251 Causeway Street, Suite 800
Boston, MA 02114

Division of Marine Fisheries (South Shore)
Attn: Environmental Reviewer
1213 Purchase Street - 3rd Floor
New Bedford, MA 02740-6694

Department of Conservation and Recreation
Attn: MEPA Coordinator
251 Causeway St. Suite 600
Boston MA 02114

Nick Wildman, Restoration Specialist
Division of Ecological Restoration
Massachusetts Dept. of Fish & Game
251 Causeway Street
Boston, MA 02114

Adam Moore, Executive Director
Sheriff's Meadow Foundation
PO Box 1088
Vineyard Haven, MA 02568

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act (MEPA) Office

Environmental Notification Form

For Office Use Only

EEA#: _____

MEPA Analyst: _____

The information requested on this form must be completed in order to submit a document electronically for review under the Massachusetts Environmental Policy Act, 301 CMR 11.00.

Project Name: Mill Brook Headwaters Restoration		
Street Address: Old Farm Rd.		
Municipality: Chilmark	Watershed: Tisbury Great Pond	
Universal Transverse Mercator Coordinates:	Latitude: 41.394404 Longitude: -70.708720	
Estimated commencement date: Fall 2016	Estimated completion date: Winter 2016	
Project Type: culvert replacement	Status of project design: 90 %complete	
Proponent: Sherriff's Meadow Foundation		
Street Address: 57 David Ave		
Municipality: Vineyard Haven	State: MA	Zip Code: 02568
Name of Contact Person: Neal Price		
Firm/Agency: Horsley Witten Group. Inc.	Street Address: 90 Route 6A	
Municipality: Sandwich	State: MA	Zip Code:02563
Phone: 508-833-6600	Fax:	E-mail: nprice@horsleywitten.com

Does this project meet or exceed a mandatory EIR threshold (see 301 CMR 11.03)?
☐ Yes ☒ No

If this is an Expanded Environmental Notification Form (ENF) (see 301 CMR 11.05(7)) or a Notice of Project Change (NPC), are you requesting:

a Single EIR? (see 301 CMR 11.06(8)) ☐Yes ☐No
a Special Review Procedure? (see 301CMR 11.09) ☐Yes ☐No
a Waiver of mandatory EIR? (see 301 CMR 11.11) ☐ Yes ☐No
a Phase I Waiver? (see 301 CMR 11.11) ☐Yes ☐No
(Note: Greenhouse Gas Emissions analysis must be included in the Expanded ENF.)

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?
11.03(3)(b)1.f. alteration of one half or more acres of any other wetlands

Which State Agency Permits will the project require?
DEP Notice of Intent – Order of Conditions, DEP Ch. 91 License

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:
Mass Division of Ecological Restoration provided financial assistance in the amount of $21,000 and Massachusetts Environmental Trust in the amount of $40,000.

Summary of Project Size & Environmental Impacts	Existing	Change	Total
LAND			
Total site acreage	26		
New acres of land altered		0.36	
Acres of impervious area	N/A	N/A	N/A
Square feet of new bordering vegetated wetlands alteration		540	
Square feet of new other wetland alteration		38,095	
Acres of new non-water dependent use of tidelands or waterways		N/A	
STRUCTURES			
Gross square footage	N/A	N/A	N/A
Number of housing units	N/A	N/A	N/A
Maximum height (feet)	N/A	N/A	N/A
TRANSPORTATION			
Vehicle trips per day	N/A	N/A	N/A
Parking spaces	N/A	N/A	N/A
WASTEWATER			
Water Use (Gallons per day)	N/A	N/A	N/A
Water withdrawal (GPD)	N/A	N/A	N/A
Wastewater generation/treatment (GPD)	N/A	N/A	N/A
Length of water mains (miles)	N/A	N/A	N/A
Length of sewer mains (miles)	N/A	N/A	N/A

Has this project been filed with MEPA before?
☐ Yes (EEA #_____) ☒ No

Has any project on this site been filed with MEPA before?
☐ Yes (EEA #_____) ☒ No

GENERAL PROJECT INFORMATION – all proponents must fill out this section

PROJECT DESCRIPTION:

Describe the existing conditions and land uses on the project site:
The project site is located on Roth Woodlands, a 26 acre reserve in Chilmark. Old Farm Road is a private, one-lane dirt road whose alignment crosses the natural course of Mill Brook. Mill Brook originates in the moraine highlands of Martha's Vineyard and flows out to Tisbury Great Pond, a salt pond, in West Tisbury.

Currently, there are two 12-inch corrugated metal pipe (CMP) culverts conveying Mill Brook beneath the Old Farm road berm. The CMP culverts are undersized and perched above the streambed, creating an impoundment upstream of the roadway and erosion of the channel bed downstream. The perched culverts also prevent the upstream movement of aquatic species and pose challenges for the movement of terrestrial species. The species that utilize Mill Brook include river herring, American eel, brook trout and American brook lamprey, which is on the Massachusetts Natural Heritage Endangered Species List of Threatened Species.

Please see the attached 90% Complete Design Report for additional details.

Describe the proposed project and its programmatic and physical elements: The Proponent proposes to replace two existing side by side 12-inch CMP culverts. The culverts will be replaced with a 6 by 8 by 20-foot pre-cast concrete box culvert. The culvert replacement will result in increased drainage of the upstream impoundment, restored ecological functions including fish and wildlife passage, and reliable vehicular access across Mill Brook.

Prior to culvert installation, the existing dirt road will be excavated and the material will be salvaged for future reuse onsite. The culvert will be embedded to a depth of two feet in order to provide a natural substrate within the culverts. The existing soil beneath the existing culverts will be verified to determine if it is suitable sub-grade material for supporting the proposed culvert, and replaced as needed to provide a stable foundation for the culvert/pad. Details are provided on the enclosed project plans, "*90% Design Plans*,"prepared by Inter-Fluve, Inc.

During construction impacts will be minimized. Since the road is not paved there will be no pavement removal. Temporary excavation will be necessary to install the proposed culvert. The excavated material will be stockpiled and used for backfill. Excavation at the ends of the culvert will occur last so as to maintain stream flow. A temporary polyethylene (HDPE) bypass pipe will be installed parallel to the proposed box culvert location to provide for uninterrupted tidal flow during construction. There will be no net increase in excavation area for installation of the temporary culvert. The bypass pipe will have angles and bends added to ensure that it does not impact any wetland resources in excess of the minimum required for culvert replacement. The culvert footprint will be graded, and the existing subgrade prepared for the pre-cast box culvert sections to be installed. The culvert will then be backfilled and the roadway will be restored within the existing footprint with material from the existing road excavation. Following construction of the culvert, temporarily impacted resource areas will be restored in kind with salvaged vegetation and supplemented with nursery stock.

Following the installation of the culvert, the coffer dams will be removed. The old culverts will be reused or disposed of by SMF in the appropriate, material-specific disposal locations.

Due to the proximity of existing wetland resource areas (inland bank, land under water, bordering vegetated wetland, riverfront area) as well as adjacent buffer zone, some alterations to these resource areas is unavoidable. The limit of disturbance (LOD) will encompass approximately 15,750 SF. The perimeter of the LOD will be bound with a combination of barriers such as sand bags and bulk bags, as shown on the plans.

Temporary impacts to Land Under Water (LUW) will occur as a result of the removal of the old culverts and the installation of the proposed culvert and excavation of a pilot channel to initiate a headcut and provide coherent flow to the culvert. Work within LUW will total 1,545 SF. Permanent impacts to LUW will occur as a result of the proposed culvert providing proper drainage allowing the impounded water to flow through the culvert downstream. This will cause the ponding area to regain stream characteristics. The area that was under the impounded water will be able to revert back to bordering vegetated wetland, resulting in a loss of 16,785 SF of LUW, a corresponding gain of the same area of BVW.

Temporary impacts to Inland Bank will occur as a result of the removal of the old culverts and the installation of the proposed culvert. Work within Inland Bank will total 75 LF. Following construction, the impacted areas of Inland Bank will be restored and revegetated in kind.

Temporary impacts to Bordering Vegetated Wetlands will total 540 SF as a result of the culvert installation. New bordering vegetated wetland will be created when the impounded stream drains due to the proposed culvert replacement. This indirect impact will convert 16,785 SF of LUW to bordering vegetated wetland.

The temporary impact to Riverfront will total 7,030 SF. The permanent, indirect impact will total 21,310 SF. The loss of Riverfront area will occur because the conversion of LUW to BVW in the improvement area will narrow the area beneath mean high water.

Approximately 6,490 SF of work will occur in the 100-foot buffer zone to bordering vegetated wetland. This buffer zone impact will be temporary in nature and the buffer zone will be restored. Permanent impact to buffer zone will total 4,525 SF.

Once construction is completed large wood debris, large trees with root wads intact, and slash, salvaged during clearing and grubbing, will be placed in the area formerly covered by impounded stream water, upstream of the culvert, to the farthest extent of the excavator arm reach. This will provide floodplain roughness and habitat improvement.

Please see the attached 90% Complete Design Report for additional details.

NOTE: The project description should summarize both the project's direct and indirect impacts (including construction period impacts) in terms of their magnitude, geographic extent, duration and frequency, and reversibility, as applicable. It should also discuss the infrastructure requirements of the project and the capacity of the municipal and/or regional infrastructure to sustain these requirements into the future.

Describe the on-site project alternatives (and alternative off-site locations, if applicable), considered by the proponent, including at least one feasible alternative that is allowed under current zoning, and the reasons(s) that they were not selected as the preferred alternative:

The purpose of this project is to replace the existing, undersized CMP culverts beneath Old Farm Road to improve upstream drainage, ecosystem habitat and ecological functions to the upstream area. Due to the nature and site specificity of this project, alternative locations are not feasible. A range of culvert types and sizes were evaluated for the restoration. The current proposal was determined to provide the optimal balance of upstream drainage, cost effectiveness, fish passage, and reliable access across Mill Brook.

The project partners have researched conceptual culvert designs and have estimated costs for four options. All options would meet the goals of the project by replacing the two existing 12-inch diameter CMP with a larger opening that would provide hydraulic and hydrologic functions to meet the requirements of the Town of Chilmark, the State of Massachusetts, and standard engineering practice. Additionally, all options would improve the passage of aquatic and terrestrial organisms (including species of concern such as Brook Trout) to a much higher degree than currently exists. All options meet the Massachusetts Stream Crossing Standards minimum width requirement of 1.2 times the bankfull width (7.2 feet). Hydraulic calculations demonstrate that all culvert options with a minimum eight-foot bottom width and a four-foot open height will be capable of conveying at least the 100-year storm without overtopping the road. All culvert options, with the prescribed cover, are rated to at least H-20 loading suitable for a 16,000 pound dual wheel load with a 30% increase for impact.

The other key design objective is habitat improvement. Therefore all options include provisions for a low-flow channel capable of conveying aquatic organisms. Based on the state of Maine Department of Transportation (DOT) Fish Passage Policy and Design Guide, the most sensitive fish species to consider for passage at this site is Brook Trout with a minimum water depth requirement of 4 inches. While Brook Trout likely do not currently exist at the site due to multiple downstream obstructions, our objective was to provide suitable passage for Brook Trout in the event that downstream obstructions are removed in the future.

The four culvert replacement options considered were:

1. An 8-foot wide x 6-foot high concrete box culvert embedded two-feet with a natural substrate low-flow channel constructed by hand in the field;
2. The same 8-foot x 6-foot box culvert with pre-cast baffles added to the bottom of the culvert to aid the creation of the low-flow channel;
3. A 9.6-foot wide x 4.1-foot high, open bottom, aluminum arch culvert; and
4. A 12-foot wide x 6-foot high, CONTECH I-series, concrete culvert with habitat-specific Design.

No-Build Alternative

The No-Build alternative would allow the existing impoundment to remain. While implementing the No-Build alternative would mean that there would be no temporary alterations to the stream and wetland resource areas associated with culvert replacement, it would not alleviate the

restriction and impoundment issues associated with the existing situation, and would not improve the impaired stream and wetland habitat that exists upstream of the existing restriction. In fact, over time, it is likely that the native vegetation within the upstream stream and wetland community will continue to become displaced by non-native invasive species. While no direct costs are involved with the No-Build alternative, the long-term costs of loss of habitat and continued decreased water quality would be incurred. Inland freshwater stream restoration is the primary goal of this proposed project; accordingly, the No-Build alternative would not serve the project purpose.

Summary of Alternatives

Since the No-Build alternative provides no restoration of stream and wetland habitat, it does not meet the project objectives. The other four alternatives provide varying degrees of stream restoration, across a broad range of costs. The preferred alternative is the least expensive of the build alternatives while still meeting the goals of the project.

NOTE*: The purpose of the alternatives analysis is to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment, keeping in mind that the objective of the MEPA review process is to avoid or minimize damage to the environment to the greatest extent feasible. Examples of alternative projects include alternative site locations, alternative site uses, and alternative site configurations.*

Summarize the mitigation measures proposed to offset the impacts of the preferred alternative:
The primary purpose of the project is to restore naturalized riparian hydrology and ecological funtions of the impounded area south of Old Farm Road. The ultimate restoration of this area will serve as mitigation for any temporary impacts incurred at the time of construction. Additionally, there is an erosion and sediment control plan which will be put in place prior to construction activities.

If the project is proposed to be constructed in phases, please describe each phase:
This project will not be phased.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN:

Is the project within or adjacent to an Area of Critical Environmental Concern?

☐ Yes (Specify_____)

☒ No

if yes, does the ACEC have an approved Resource Management Plan? ___ Yes ___ No;
If yes, describe how the project complies with this plan.

_____

Will there be stormwater runoff or discharge to the designated ACEC? ___ Yes _X__ No;
If yes, describe and assess the potential impacts of such stormwater runoff/discharge to the designated ACEC.

_____

RARE SPECIES:

Does the project site include Estimated and/or Priority Habitat of State-Listed Rare Species? (see http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/priority_habitat/priority_habitat_home.htm)

☒ Yes (Specify: Both Estimated and Priority (PH 15) Habitat are mapped at the project site) ☐ No

HISTORICAL /ARCHAEOLOGICAL RESOURCES:

Does the project site include any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?

☐ Yes (Specify_____) ☒ No

If yes, does the project involve any demolition or destruction of any listed or inventoried historic or archaeological resources? ☐Yes (Specify_____) ☐No

WATER RESOURCES:

Is there an Outstanding Resource Water (ORW) on or within a half-mile radius of the project site? ___Yes _X_No; if yes, identify the ORW and its location. _____

(NOTE: Outstanding Resource Waters include Class A public water supplies, their tributaries, and bordering wetlands; active and inactive reservoirs approved by MassDEP; certain waters within Areas of Critical Environmental Concern, and certified vernal pools. Outstanding resource waters are listed in the Surface Water Quality Standards, 314 CMR 4.00.)

Are there any impaired water bodies on or within a half-mile radius of the project site? __X_Yes ___No; if yes, identify the water body and pollutant(s) causing the impairment: Mill Brook - for aesthetics and fish and other aquatic life and wildlife.

Is the project within a medium or high stress basin, as established by the Massachusetts Water Resources Commission? ___Yes _X__No

STORMWATER MANAGEMENT:

Generally describe the project's stormwater impacts and measures that the project will take to comply with the standards found in MassDEP's Stormwater Management Regulations: Post construction stormwater impact will not exceed existing conditions.

MASSACHUSETTS CONTINGENCY PLAN:

Has the project site been, or is it currently being, regulated under M.G.L.c.21E or the Massachusetts Contingency Plan? Yes ___ No ___ ; if yes, please describe the current status of the site (including Release Tracking Number (RTN), cleanup phase, and Response Action Outcome classification): Yes ___ No _X_

Is there an Activity and Use Limitation (AUL) on any portion of the project site? Yes ___ No _X__ if yes, describe which portion of the site and how the project will be consistent with the AUL: _____.

Are you aware of any Reportable Conditions at the property that have not yet been assigned an RTN? Yes ___ No _X__ ; if yes, please describe:_____

SOLID AND HAZARDOUS WASTE:

If the project will generate solid waste during demolition or construction, describe alternatives considered for re-use, recycling, and disposal of, e.g., asphalt, brick, concrete, gypsum, metal, wood: Two 12 inch diameter corrugated metal pipes will be brought to the Sheriff's Meadow Foundation for proper reuse or disposal. Other native geological materials will be reused on site during the construction process.

(NOTE: Asphalt pavement, brick, concrete and metal are banned from disposal at Massachusetts landfills and waste combustion facilities and wood is banned from disposal at Massachusetts landfills. See 310 CMR 19.017 for the complete list of banned materials.)

Will your project disturb asbestos containing materials? Yes ___ No _X__ ; if yes, please consult state asbestos requirements at http://mass.gov/MassDEP/air/asbhom01.htm

Describe anti-idling and other measures to limit emissions from construction equipment: _Selected contractor will be instructed to minimize idling of construction equipment._____

DESIGNATED WILD AND SCENIC RIVER:

Is this project site located wholly or partially within a defined river corridor of a federally designated Wild and Scenic River or a state designated Scenic River? Yes ___ No _X__ ;
if yes, specify name of river and designation:

If yes, does the project have the potential to impact any of the "outstandingly remarkable" resources of a federally Wild and Scenic River or the stated purpose of a state designated Scenic River? Yes ___ No ___ ; if yes, specify name of river and designation: _____;
if yes, will the project will result in any impacts to any of the designated "outstandingly remarkable" resources of the Wild and Scenic River or the stated purposes of a Scenic River.
Yes ___ No ___ ;
if yes,describe the potential impacts to one or more of the "outstandingly remarkable" resources or stated purposes and mitigation measures proposed.

ATTACHMENTS:

1. List of all attachments to this document.
2. U.S.G.S. map (good quality color copy, 8-½ x 11 inches or larger, at a scale of 1:24,000) indicating the project location and boundaries.
3.. Plan, at an appropriate scale, of existing conditions on the project site and its immediate environs, showing all known structures, roadways and parking lots, railroad rights-of-way, wetlands and water bodies, wooded areas, farmland, steep slopes, public open spaces, and major utilities.
4 Plan, at an appropriate scale, depicting environmental constraints on or adjacent to the project site such as Priority and/or Estimated Habitat of state-listed rare species, Areas of Critical Environmental Concern, Chapter 91 jurisdictional areas, Article 97 lands, wetland resource area delineations, water supply protection areas, and historic resources and/or districts.
5. Plan, at an appropriate scale, of proposed conditions upon completion of project (if construction of the project is proposed to be phased, there should be a site plan showing conditions upon the completion of each phase).
6. List of all agencies and persons to whom the proponent circulated the ENF, in accordance with 301 CMR 11.16(2).
7. List of municipal and federal permits and reviews required by the project, as applicable.

LAND SECTION – all proponents must fill out this section

I. Thresholds / Permits

A. Does the project meet or exceed any review thresholds related to **land** (see 301 CMR 11.03(1)
___ Yes _X__ No; if yes, specify each threshold:

II. Impacts and Permits

A. Describe, in acres, the current and proposed character of the project site, as follows:

	Existing	Change	Total
Footprint of buildings	N/A	N/A	N/A
Internal roadways	0.14	0.008	0.132
Parking and other paved areas	N/A	N/A	N/A
Other altered areas	0.22	0.17	0.05
Undeveloped areas	N/A	N/A	N/A
Total: Project Site Acreage	0.36	0.178	0.182

B. Has any part of the project site been in active agricultural use in the last five years?
___ Yes __X_ No; if yes, how many acres of land in agricultural use (with prime state or locally important agricultural soils) will be converted to nonagricultural use?

C. Is any part of the project site currently or proposed to be in active forestry use?
___ Yes __X_ No; if yes, please describe current and proposed forestry activities and indicate whether any part of the site is the subject of a forest management plan approved by the Department of Conservation and Recreation:

D. Does any part of the project involve conversion of land held for natural resources purposes in accordance with Article 97 of the Amendments to the Constitution of the Commonwealth to any purpose not in accordance with Article 97? ___ Yes __X_ No; if yes, describe:

E. Is any part of the project site currently subject to a conservation restriction, preservation restriction, agricultural preservation restriction or watershed preservation restriction? __ Yes_X_ No; if yes, does the project involve the release or modification of such restriction? ___ Yes __ No; if yes, describe:

F. Does the project require approval of a new urban redevelopment project or a fundamental change in an existing urban redevelopment project under M.G.L.c.121A? ___ Yes _X__ No; if yes, describe:

G. Does the project require approval of a new urban renewal plan or a major modification of an existing urban renewal plan under M.G.L.c.121B? Yes ___ No _X__; if yes, describe:

III. Consistency

A. Identify the current municipal comprehensive land use plan
Title: _Chilmark Community Development Plan__ Date___July 28, 2004_____

B. Describe the project's consistency with that plan with regard to:

1) economic development: _The proposed project is not anticipated to have any negative impact on economic development. The proposed culvert replacement will improve the stream and wetland ecosystem which will improve water quality and fish mobility and habitat. Clean water and healthy ecosystems and habitats are vital to the economy, especially an economy dependent on seasonal and visitors and tourists, which rely on the natural beauty to attract and keep tourists._____

2) adequacy of infrastructure: _The proposed project will have no impact on infrastructure adequacy. Vehicular access across Mill Brook will be reliable and safe._____

3) open space impacts: The proposed project will improve the overall ecosystem of the 26 acre Roth Woodlands reserve, which is part of Commonwealth defined Core Habitat for Harrier Hawks and various moths. Improving the health of the stream and associated wetland resource will improve the habitat value for wildlife and aquatic life in the area.

4) compatibility with adjacent land uses: The proposed project is not anticipated to have any significant impact on adjacent land uses.

C. Identify the current Regional Policy Plan of the applicable Regional Planning Agency (RPA)

RPA: Martha's Vineyard Commission

Title: Island Plan Date February 2010

D. Describe the project's consistency with that plan with regard to:

1) economic development: A healthy ecosystem is integral to a healthy economy, especially on an island that depends on seasonal visitors and tourists. A restoration project that will improve environmental resiliency, the health of a freshwater inland stream and its associated resources will have a positive impact on Martha's Vineyard's economy.

2) adequacy of infrastructure: The proposed project will have no impact on infrastructure adequacy.

3) open space impacts: As indicated above the proposed project will improve the value of the open space and will not have any adverse impacts. Removing the existing CMP culverts and replacing them with a large, properly placed culvert will allow for the impounded water upstream of the Old Farm Road to properly drain. This will help to improve habitat continuity and ecological health. This restoration project will restore an inland freshwater stream and allow it to be a healthy ecosystem capable of sustaining a stream and wetland ecosystem similar to what once thrived at Mill Brook.

RARE SPECIES SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **rare species or habitat** (see 301 CMR 11.03(2))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

(NOTE: If you are uncertain, it is recommended that you consult with the Natural Heritage and Endangered Species Program (NHESP) prior to submitting the ENF.)

B. Does the project require any state permits related to **rare species or habitat**? ___ Yes _X_ No

C. Does the project site fall within mapped rare species habitat (Priority or Estimated Habitat?) in the current Massachusetts Natural Heritage Atlas (attach relevant page)? _X__ Yes ___ No. See Figure 4, NHESP

D. If you answered "No" to all questions A, B and C, proceed to the **Wetlands, Waterways, and Tidelands Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Rare Species section below.

II. Impacts and Permits

A. Does the project site fall within Priority or Estimated Habitat in the current Massachusetts Natural Heritage Atlas (attach relevant page)? ___ Yes ___ No. If yes,

1. Have you consulted with the Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (NHESP)? ___Yes __No; if yes, have you received a determination as to whether the project will result in the "take" of a rare species? ___ Yes ___ No; if yes, attach the letter of determination to this submission.

2. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate rare species impacts

3. Which rare species are known to occur within the Priority or Estimated Habitat?

4. Has the site been surveyed for rare species in accordance with the Massachusetts Endangered Species Act? ___ Yes ___ No

4. If your project is within Estimated Habitat, have you filed a Notice of Intent or received an Order of Conditions for this project? ___ Yes ___ No; if yes, did you send a copy of the Notice of Intent to the Natural Heritage and Endangered Species Program, in accordance with the Wetlands Protection Act regulations? ___ Yes ___ No

B. Will the project "take" an endangered, threatened, and/or species of special concern in accordance with M.G.L. c.131A (see also 321 CMR 10.04)? ___ Yes ___ No; if yes, provide a summary of proposed measures to minimize and mitigate impacts to significant habitat:

WETLANDS, WATERWAYS, AND TIDELANDS SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wetlands, waterways, and tidelands** (see 301 CMR 11.03(3))? ___ Yes _X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits (or a local Order of Conditions) related to **wetlands, waterways, or tidelands**? _X_ Yes ___ No; if yes, specify which permit: Order of Conditions (Town of Chilmark); Chapter 91 License.

C. If you answered "No" to both questions A and B, proceed to the **Water Supply Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wetlands, Waterways, and Tidelands Section below.

II. Wetlands Impacts and Permits

A. Does the project require a new or amended Order of Conditions under the Wetlands Protection Act (M.G.L. c.131A)? _X_ Yes ___ No; if yes, has a Notice of Intent been filed? ___ Yes _X_ No; if yes, list the date and MassDEP file number: _____; if yes, has a local Order of Conditions been issued? ___ Yes ___ No; Was the Order of Conditions appealed? ___ Yes ___ No. Will the project require a Variance from the Wetlands regulations? ___ Yes _ _ No.

B. Describe any proposed permanent or temporary impacts to wetland resource areas located on the project site: By replacing the culverts the upstream impoundment will drain, converting Land Under Water to Bordering Vegetated Wetland and restoring the stream to its natural state.

C. Estimate the extent and type of impact that the project will have on wetland resources, and indicate whether the impacts are temporary or permanent:

Coastal Wetlands	Area (square feet) or Length (linear feet)	Temporary or Permanent Impact?
Land Under the Ocean		
Designated Port Areas		
Coastal Beaches		
Coastal Dunes		
Barrier Beaches		
Coastal Banks		
Rocky Intertidal Shores		
Salt Marshes		
Land Under Salt Ponds		
Land Containing Shellfish		
Fish Runs		
Land Subject to Coastal Storm Flowage		
Inland Wetlands		
Bank (lf)	75 / -215	temp / perm
Bordering Vegetated Wetlands	540 / +16,785	temp / perm
Isolated Vegetated Wetlands	N/A	
Land under Water	1,545 / -16,785	temp / perm
Isolated Land Subject to Flooding	N/A	
Bordering Land Subject to Flooding	N/A	
Riverfront Area	9,495 / -21,310	temp / perm

D. Is any part of the project:

1. proposed as a **limited project**? __X_ Yes ___ No; if yes, what is the area (in sf)? 15,750

2. the construction or alteration of a **dam**? ___ Yes _X__ No; if yes, describe:
3. fill or structure in a **velocity zone** or **regulatory floodway**? ___ Yes _X_ No
4. dredging or disposal of dredged material? __X_ Yes ___ No; if yes, describe the volume of dredged material and the proposed disposal site: The volume of the dredged material will be 46 cubic yards and it will be reused on site.
5. a discharge to an **Outstanding Resource Water (ORW)** or an **Area of Critical Environmental Concern (ACEC)**? ___ Yes __X_ No
6. subject to a wetlands restriction order? ___ Yes _X_ No; if yes, identify the area (in sf):
7. located in buffer zones? _X_Yes ___No; if yes, how much (in sf) _4,525 sf___

E. Will the project:
1. be subject to a local wetlands ordinance or bylaw? __X__ Yes ___ No
2. alter any federally-protected wetlands not regulated under state law? ___ Yes _X__ No; if yes, what is the area (sf)?

III. Waterways and Tidelands Impacts and Permits

A. Does the project site contain waterways or tidelands (including filled former tidelands) that are subject to the Waterways Act, M.G.L.c.91? _X_ Yes ___ No; if yes, is there a current Chapter 91 License or Permit affecting the project site? ___ Yes _X__ No; if yes, list the date and license or permit number and provide a copy of the historic map used to determine extent of filled tidelands:

B. Does the project require a new or modified license or permit under M.G.L.c.91? _X_ Yes ___ No; if yes, how many acres of the project site subject to M.G.L.c.91 will be for non-water-dependent use? Current _0_ Change _0_ Total _0_
If yes, how many square feet of solid fill or pile-supported structures (in sf)? 0 sf

C. For non-water-dependent use projects, indicate the following:
Area of filled tidelands on the site:____N/A_____
Area of filled tidelands covered by buildings:___N/A_____
For portions of site on filled tidelands, list ground floor uses and area of each use: __N/A_____
Does the project include new non-water-dependent uses located over flowed tidelands? Yes ___ No _X__
Height of building on filled tidelands___N/A_____

Also show the following on a site plan: Mean High Water, Mean Low Water, Water-dependent Use Zone, location of uses within buildings on tidelands, and interior and exterior areas and facilities dedicated for public use, and historic high and historic low water marks.

D. Is the project located on landlocked tidelands? ___ Yes _X_ No; if yes, describe the project's impact on the public's right to access, use and enjoy jurisdictional tidelands and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

E. Is the project located in an area where low groundwater levels have been identified by a municipality or by a state or federal agency as a threat to building foundations? ___Yes _X_ No; if yes, describe the project's impact on groundwater levels and describe measures the project will implement to avoid, minimize or mitigate any adverse impact:

F. Is the project non-water-dependent **and** located on landlocked tidelands **or** waterways or tidelands subject to the Waterways Act **and** subject to a mandatory EIR? ___ Yes __X_ No;
(NOTE: If yes, then the project will be subject to Public Benefit Review and Determination.)

G. Does the project include dredging? __X_ Yes ___ No; if yes, answer the following questions:

What type of dredging? Improvement _N/A_ Maintenance _N/A_ Both ____

What is the proposed dredge volume, in cubic yards (cys) _46 cy_____

What is the proposed dredge footprint _30__length (ft) _10_width (ft)_4__depth (ft);

Will dredging impact the following resource areas?

Intertidal Yes__ No_X_; if yes, ___ sq ft

Outstanding Resource Waters Yes__ No_X_; if yes, ___ sq ft

Other resource area (i.e. shellfish beds, eel grass beds) Yes__ No_X_; if yes __ sq ft

If yes to any of the above, have you evaluated appropriate and practicable steps to: 1) avoidance; 2) if avoidance is not possible, minimization; 3) if either avoidance or minimize is not possible, mitigation? Avoidance is not possible given that the proposed project will be removing two existing culverts and replacing them with one 6x8 box culvert. The ultimate restoration of the wetland and stream will serve as mitigation for any temporary impacts incurred at the time of construction.

If no to any of the above, what information or documentation was used to support this determination?

Provide a comprehensive analysis of practicable alternatives for improvement dredging in accordance with 314 CMR 9.07(1)(b). Physical and chemical data of the sediment shall be included in the comprehensive analysis.

Sediment Characterization

Existing gradation analysis results? _X_Yes ___No: if yes, provide results.

Existing chemical results for parameters listed in 314 CMR 9.07(2)(b)6? _X_Yes ____No; if yes, provide results.

See attached table with results (Appendix A of 90% Complete Design Report).

Do you have sufficient information to evaluate feasibility of the following management options for dredged sediment? If yes, check the appropriate option.

Beach Nourishment ___

Unconfined Ocean Disposal ___

Confined Disposal:

Confined Aquatic Disposal (CAD) ___

Confined Disposal Facility (CDF) ___

Landfill Reuse in accordance with COMM-97-001 ___

Shoreline Placement ___

Upland Material Reuse__X__

In-State landfill disposal____

Out-of-state landfill disposal ____

(NOTE: This information is required for a 401 Water Quality Certification.)

IV. Consistency:

A. Does the project have effects on the coastal resources or uses, and/or is the project located within the Coastal Zone? ___ Yes __X_ No; if yes, describe these effects and the projects consistency with the policies of the Office of Coastal Zone Management:

B. Is the project located within an area subject to a Municipal Harbor Plan? ___ Yes _X__ No; if yes, identify the Municipal Harbor Plan and describe the project's consistency with that plan:

WATER SUPPLY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **water supply** (see 301 CMR 11.03(4))? ___ Yes _X__ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **water supply**? ___ Yes __X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Wastewater Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Water Supply Section below.

II. Impacts and Permits

A. Describe, in gallons per day (gpd), the volume and source of water use for existing and proposed activities at the project site:

	Existing	Change	Total
Municipal or regional water supply	_____	_____	_____
Withdrawal from groundwater	_____	_____	_____
Withdrawal from surface water	_____	_____	_____
Interbasin transfer	_____	_____	_____

(NOTE: Interbasin Transfer approval will be required if the basin and community where the proposed water supply source is located is different from the basin and community where the wastewater from the source will be discharged.)

B. If the source is a municipal or regional supply, has the municipality or region indicated that there is adequate capacity in the system to accommodate the project? ___ Yes ___ No

C. If the project involves a new or expanded withdrawal from a groundwater or surface water source, has a pumping test been conducted? ___ Yes ___ No; if yes, attach a map of the drilling sites and a summary of the alternatives considered and the results. _____

D. What is the currently permitted withdrawal at the proposed water supply source (in gallons per day)? _____Will the project require an increase in that withdrawal? ___Yes ___No; if yes, then how much of an increase (gpd)? _____

E. Does the project site currently contain a water supply well, a drinking water treatment facility, water main, or other water supply facility, or will the project involve construction of a new facility? ___ Yes ___No. If yes, describe existing and proposed water supply facilities at the project site:

	Permitted Flow	Existing Avg Daily Flow	Project Flow	Total
Capacity of water supply well(s) (gpd)	_____	_____	_____	_____
Capacity of water treatment plant (gpd)	_____	_____	_____	_____

F. If the project involves a new interbasin transfer of water, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or proposed?

G. Does the project involve:

1. new water service by the Massachusetts Water Resources Authority or other agency of the Commonwealth to a municipality or water district? ___ Yes ___ No
2. a Watershed Protection Act variance? ___ Yes ___ No; if yes, how many acres of alteration?
3. a non-bridged stream crossing 1,000 or less feet upstream of a public surface drinking water supply for purpose of forest harvesting activities? ___ Yes ___ No

III. Consistency

Describe the project's consistency with water conservation plans or other plans to enhance water resources, quality, facilities and services:

WASTEWATER SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **wastewater** (see 301 CMR 11.03(5))? ___ Yes __X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **wastewater**? ___ Yes __X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Transportation -- Traffic Generation Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Wastewater Section below.

II. Impacts and Permits

A. Describe the volume (in gallons per day) and type of disposal of wastewater generation for existing and proposed activities at the project site (calculate according to 310 CMR 15.00 for septic systems or 314 CMR 7.00 for sewer systems):

	Existing	Change	Total
Discharge of sanitary wastewater	_____	_____	_____
Discharge of industrial wastewater	_____	_____	_____
TOTAL	_____	_____	_____

	Existing	Change	Total
Discharge to groundwater	_____	_____	_____
Discharge to outstanding resource water	_____	_____	_____
Discharge to surface water	_____	_____	_____
Discharge to municipal or regional wastewater facility	_____	_____	_____
TOTAL	_____	_____	_____

B. Is the existing collection system at or near its capacity? ___ Yes ___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

C. Is the existing wastewater disposal facility at or near its permitted capacity? ___ Yes___ No; if yes, then describe the measures to be undertaken to accommodate the project's wastewater flows:

D. Does the project site currently contain a wastewater treatment facility, sewer main, or other wastewater disposal facility, or will the project involve construction of a new facility? ___ Yes ___ No; if yes, describe as follows:

	Permitted	Existing Avg Daily Flow	Project Flow	Total
Wastewater treatment plant capacity (in gallons per day)	_____	_____	_____	_____

E. If the project requires an interbasin transfer of wastewater, which basins are involved, what is the direction of the transfer, and is the interbasin transfer existing or new?

(NOTE: Interbasin Transfer approval may be needed if the basin and community where wastewater will be discharged is different from the basin and community where the source of water supply is located.)

F. Does the project involve new sewer service by the Massachusetts Water Resources Authority (MWRA) or other Agency of the Commonwealth to a municipality or sewer district? ___ Yes ___ No

G. Is there an existing facility, or is a new facility proposed at the project site for the storage, treatment, processing, combustion or disposal of sewage sludge, sludge ash, grit, screenings, wastewater reuse (gray water) or other sewage residual materials? ___ Yes ___ No; if yes, what is the capacity (tons per day):

	Existing	Change	Total
Storage	_____	_____	_____
Treatment	_____	_____	_____
Processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

H. Describe the water conservation measures to be undertaken by the project, and other wastewater mitigation, such as infiltration and inflow removal.

III. Consistency

A. Describe measures that the proponent will take to comply with applicable state, regional, and local plans and policies related to wastewater management:

B. If the project requires a sewer extension permit, is that extension included in a comprehensive wastewater management plan? ___ Yes ___ No; if yes, indicate the EEA number for the plan and whether the project site is within a sewer service area recommended or approved in that plan:

TRANSPORTATION SECTION (TRAFFIC GENERATION)

I. Thresholds / Permit

A. Will the project meet or exceed any review thresholds related to **traffic generation** (see 301 CMR 11.03(6))? ___ Yes __X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **state-controlled roadways**? ___ Yes _X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Roadways and Other Transportation Facilities Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Traffic Generation Section below.

II. Traffic Impacts and Permits

A. Describe existing and proposed vehicular traffic generated by activities at the project site:

	Existing	Change	Total
Number of parking spaces	_____	_____	_____
Number of vehicle trips per day	_____	_____	_____
ITE Land Use Code(s):	_____	_____	_____

B. What is the estimated average daily traffic on roadways serving the site?

Roadway	Existing	Change	Total
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____

C. If applicable, describe proposed mitigation measures on state-controlled roadways that the project proponent will implement:

D. How will the project implement and/or promote the use of transit, pedestrian and bicycle facilities and services to provide access to and from the project site?

C. Is there a Transportation Management Association (TMA) that provides transportation demand management (TDM) services in the area of the project site? ____ Yes ____ No; if yes, describe if and how will the project will participate in the TMA:

D. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation facilities? ____ Yes ____ No; if yes, generally describe:

E. If the project will penetrate approach airspace of a nearby airport, has the proponent filed a Massachusetts Aeronautics Commission Airspace Review Form (780 CMR 111.7) and a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) (CFR Title 14 Part 77.13, forms 7460-1 and 7460-2)?

III. Consistency

Describe measures that the proponent will take to comply with municipal, regional, state, and federal plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services:

TRANSPORTATION SECTION (ROADWAYS AND OTHER TRANSPORTATION FACILITIES)

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **roadways or other transportation facilities** (see 301 CMR 11.03(6))? ___ Yes __X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **roadways or other transportation facilities**? ___ Yes _X__ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Energy Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Roadways Section below.

II. Transportation Facility Impacts

A. Describe existing and proposed transportation facilities in the immediate vicinity of the project site:

B. Will the project involve any

1. Alteration of bank or terrain (in linear feet)? _____
2. Cutting of living public shade trees (number)? _____
3. Elimination of stone wall (in linear feet)? _____

III. Consistency -- Describe the project's consistency with other federal, state, regional, and local plans and policies related to traffic, transit, pedestrian and bicycle transportation facilities and services, including consistency with the applicable regional transportation plan and the Transportation Improvements Plan (TIP), the State Bicycle Plan, and the State Pedestrian Plan:

ENERGY SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **energy** (see 301 CMR 11.03(7))? ___ Yes __X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **energy**? ___ Yes __X_ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Air Quality Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Energy Section below.

II. Impacts and Permits

A. Describe existing and proposed energy generation and transmission facilities at the project site:

	Existing	Change	Total
Capacity of electric generating facility (megawatts)	_____	_____	_____
Length of fuel line (in miles)	_____	_____	_____
Length of transmission lines (in miles)	_____	_____	_____
Capacity of transmission lines (in kilovolts)	_____	_____	_____

B. If the project involves construction or expansion of an electric generating facility, what are:

1. the facility's current and proposed fuel source(s)?
2. the facility's current and proposed cooling source(s)?

C. If the project involves construction of an electrical transmission line, will it be located on a new, unused, or abandoned right of way? ___Yes ___No; if yes, please describe:

D. Describe the project's other impacts on energy facilities and services:

III. Consistency

Describe the project's consistency with state, municipal, regional, and federal plans and policies for enhancing energy facilities and services:

AIR QUALITY SECTION

I. Thresholds

A. Will the project meet or exceed any review thresholds related to **air quality** (see 301 CMR 11.03(8))? ___ Yes _X__ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **air quality**? ___ Yes _X__ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Solid and Hazardous Waste Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Air Quality Section below.

II. Impacts and Permits

A. Does the project involve construction or modification of a major stationary source (see 310 CMR 7.00, Appendix A)? ___ Yes ___ No; if yes, describe existing and proposed emissions (in tons per day) of:

	Existing	Change	Total
Particulate matter	_____	_____	_____
Carbon monoxide	_____	_____	_____
Sulfur dioxide	_____	_____	_____
Volatile organic compounds	_____	_____	_____
Oxides of nitrogen	_____	_____	_____
Lead	_____	_____	_____
Any hazardous air pollutant	_____	_____	_____
Carbon dioxide	_____	_____	_____

B. Describe the project's other impacts on air resources and air quality, including noise impacts:

III. Consistency

A. Describe the project's consistency with the State Implementation Plan:

B. Describe measures that the proponent will take to comply with other federal, state, regional, and local plans and policies related to air resources and air quality:

SOLID AND HAZARDOUS WASTE SECTION

I. Thresholds / Permits

A. Will the project meet or exceed any review thresholds related to **solid or hazardous waste** (see 301 CMR 11.03(9))? ___ Yes __X_ No; if yes, specify, in quantitative terms:

B. Does the project require any state permits related to **solid and hazardous waste**? ___ Yes _X__ No; if yes, specify which permit:

C. If you answered "No" to both questions A and B, proceed to the **Historical and Archaeological Resources Section**. If you answered "Yes" to either question A or question B, fill out the remainder of the Solid and Hazardous Waste Section below.

II. Impacts and Permits

A. Is there any current or proposed facility at the project site for the storage, treatment, processing, combustion or disposal of solid waste? ___ Yes ___ No; if yes, what is the volume (in tons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Treatment, processing	_____	_____	_____
Combustion	_____	_____	_____
Disposal	_____	_____	_____

B. Is there any current or proposed facility at the project site for the storage, recycling, treatment or disposal of hazardous waste? ___ Yes ___ No; if yes, what is the volume (in tons or gallons per day) of the capacity:

	Existing	Change	Total
Storage	_____	_____	_____
Recycling	_____	_____	_____
Treatment	_____	_____	_____
Disposal	_____	_____	_____

C. If the project will generate solid waste (for example, during demolition or construction), describe alternatives considered for re-use, recycling, and disposal:

D. If the project involves demolition, do any buildings to be demolished contain asbestos? ___ Yes ___ No

E. Describe the project's other solid and hazardous waste impacts (including indirect impacts):

III. Consistency

Describe measures that the proponent will take to comply with the State Solid Waste Master Plan:

HISTORICAL AND ARCHAEOLOGICAL RESOURCES SECTION

I. Thresholds / Impacts

A. Have you consulted with the Massachusetts Historical Commission? ___ Yes _X__ No; if yes, attach correspondence. For project sites involving lands under water, have you consulted with the Massachusetts Board of Underwater Archaeological Resources? ____Yes ____ No; if yes, attach correspondence

B. Is any part of the project site a historic structure, or a structure within a historic district, in either case listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes _X_ No; if yes, does the project involve the demolition of all or any exterior part of such historic structure? ___ Yes ___ No; if yes, please describe:

C. Is any part of the project site an archaeological site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth? ___ Yes _X_ No; if yes, does the project involve the destruction of all or any part of such archaeological site? ___ Yes ___ No; if yes, please describe:

D. If you answered "No" to all parts of both questions A, B and C, proceed to the **Attachments and Certifications** Sections. If you answered "Yes" to any part of either question A or question B, fill out the remainder of the Historical and Archaeological Resources Section below.

II. Impacts

Describe and assess the project's impacts, direct and indirect, on listed or inventoried historical and archaeological resources:

III. Consistency

Describe measures that the proponent will take to comply with federal, state, regional, and local plans and policies related to preserving historical and archaeological resources:

CERTIFICATIONS:

1. The Public Notice of Environmental Review has been/will be published in the following newspapers in accordance with 301 CMR 11.15(1):

   (Name) Martha's Vineyard Times (Date)_____

2. This form has been circulated to Agencies and Persons in accordance with 301 CMR 11.16(2).

Signatures:

Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing ENF (if different from above)
	Adam Moore		Neal Price
	Name (print or type)		Name (print or type)
	Sheriff's Meadow Foundation		Horsley Witten Group, Inc.
	Firm/Agency		Firm/Agency
	57 David Avenue		90 Route 6a
	Street		Street
	Vineyard Haven, MA 02568		Sandwich, MA 02563
	Municipality/State/Zip		Municipality/State/Zip
	508-693-5207		508-833-6600
	Phone		Phone

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

MEPA Office

100 Cambridge St., Suite 900
Boston, MA 02114
Telephone 617-626-1020

The following should be completed and submitted to a local newspaper:

PUBLIC NOTICE OF ENVIRONMENTAL REVIEW

PROJECT: Mill Brook Headwaters Restoration

LOCATION: Old Farm Road, Chilmark

PROPONENT: Sheriff's Meadow Foundation

The undersigned is submitting an Environmental Notification Form ("ENF") to the Secretary of Energy & Environmental Affairs on or before
_____ *(date)*

This will initiate review of the above project pursuant to the Massachusetts Environmental Policy Act ("MEPA", M.G.L. c. 30, s.s. 61-62I). Copies of the ENF may be obtained from:
Neal Price
90 Route 6A, Sandwich, MA 02563
(508) 833-6600
(Name, address, phone number of proponent or proponent's agent)

Copies of the ENF are also being sent to the Conservation Commission and Planning Board of Chilmark *(Municipality)* **where they may be inspected.**

The Secretary of Energy & Environmental Affairs will publish notice of the ENF in the Environmental Monitor, will receive public comments on the project for 20 days, and will then decide, within ten days, if an environmental Impact Report is needed. A site visit and consultation session on the project may also be scheduled. All persons wishing to comment on the project, or to be notified of a site visit or consultation session, should write to the Secretary of Energy & Environmental Affairs, 100 Cambridge St., Suite 900, Boston, Massachusetts 02114, Attention: MEPA Office, referencing the above project.

By Sheriff's Meadow Foundation *(Proponent)*

LOCUS MAPS

Document Path: H:\Projects\2014\14201 Interfluve Mill Brook West Tisbury\GIS\Maps\USGS.mxd

**Vineyard Haven & Naushon Island Topographic Quadrangles*

N

0 1,000

1" = 1,000 feet

Horsley Witten Group
Sustainable Environmental Solutions
90 Route 6A • Sandwich, MA • 02563
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USGS Topographic Quadrangle Mill Brook Chilmark, MA

Date: 1/8/2015

Figure 1

Document Path: H:\Projects\2014\14201 Interfluve Mill Brook West Tisbury\GIS\Maps\Aerial.mxd

Legend

Parcels

**Parcels - MassGIS 2012*

N

0 500

1" = 500 feet

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Aerial Photo
Mill Brook
Chilmark, MA

Date: 1/8/2015

Figure 2

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Legend

**Parcels - MassGIS 2012 & DEP Wetlands 2009*
National Hydrography Dataset (NHD) - USGS

FEMA National Flood Hazard Layer

Flood Zone Designations

- A: 1% Annual Chance of Flooding, no BFE
- AE: 1% Annual Chance of Flooding, with BFE
- AE: Regulatory Floodway

- Site_Locus
- Parcels

N

0 500

1" = 500 feet

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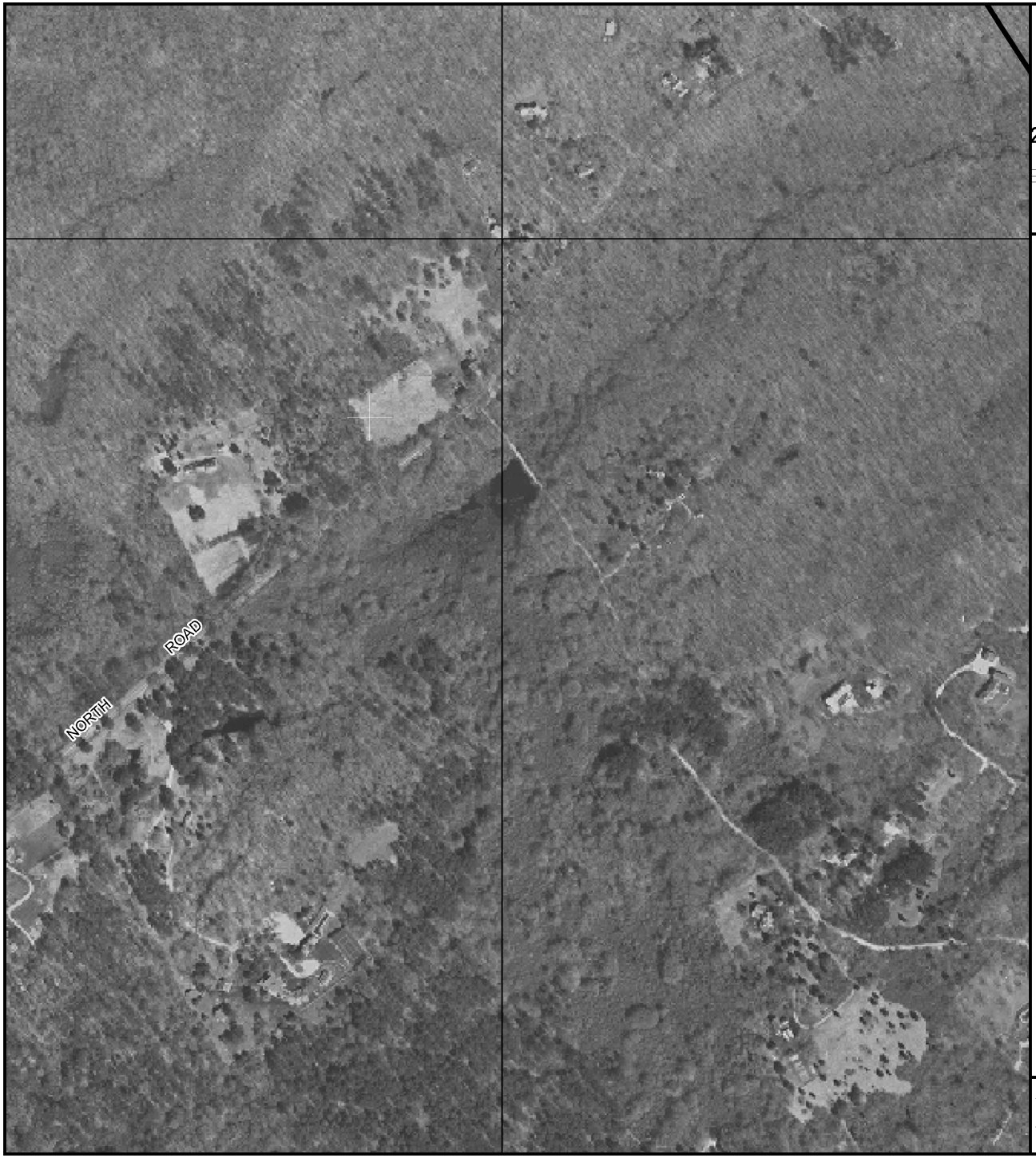
FEMA Floodzones
Mill Brook
Chilmark, MA

Date: 2/4/2016 Figure 3



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METE

NFIP

PANEL 0089H

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

DUKES COUNTY, MASSACHUSETTS

(ALL JURISDICTIONS)

PANEL 89 OF 227

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CHILMARK, TOWN OF	250068	0089	H
WEST TISBURY, TOWN OF	250074	0089	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

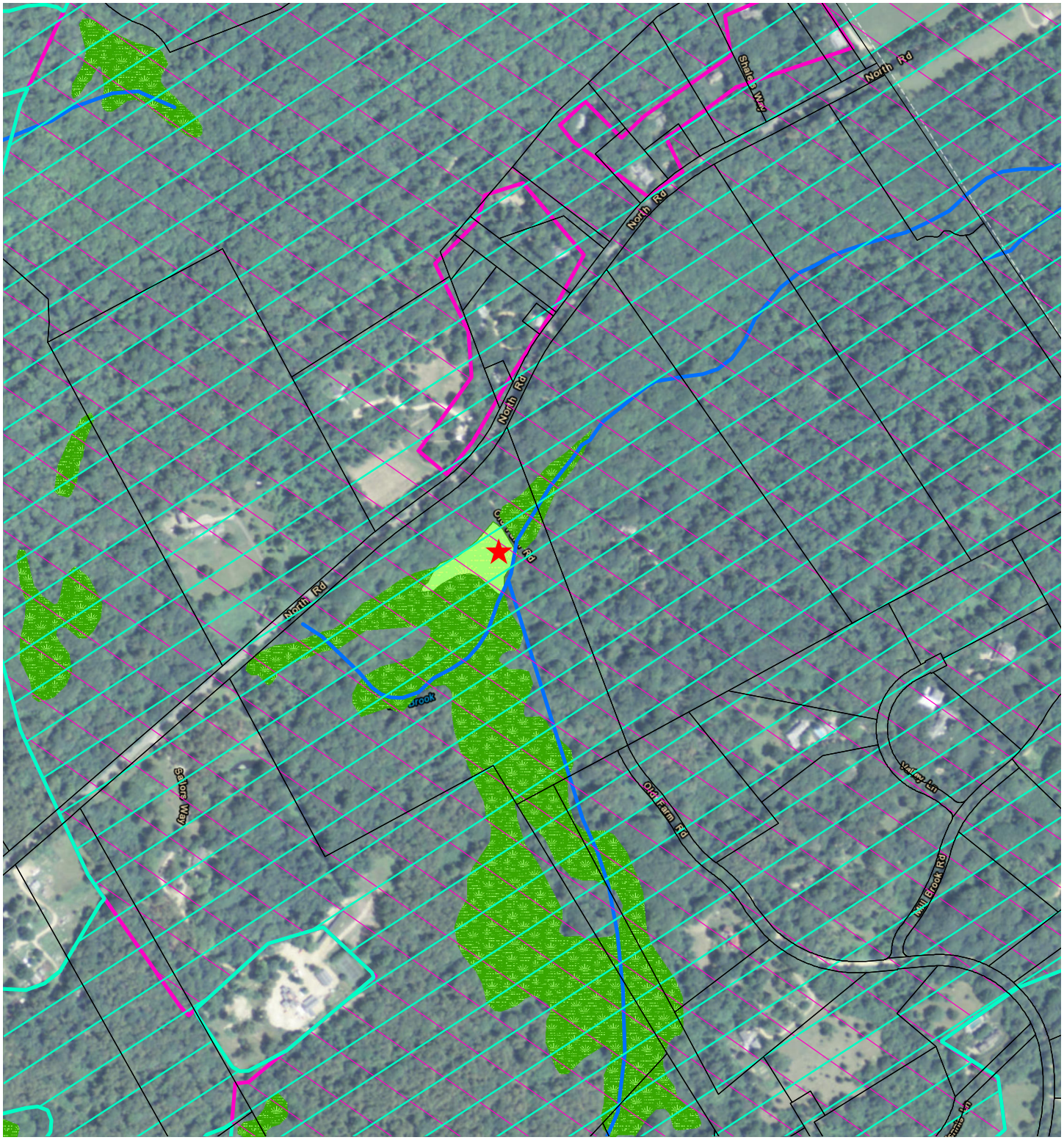
MAP NUMBER
25007C0089H

EFFECTIVE DATE
JULY 6, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Figure 3a



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Legend

*Parcels - MassGIS 2012 & DEP Wetlands 2009
National Hydrography Dataset (NHD) - USGS

- Site_Locus
- Parcels
- NHD Flowline
- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- DEP Wetlands - Marsh/Bog
- DEP Wetlands - Wooded marsh

N

0 500

1" = 500 feet

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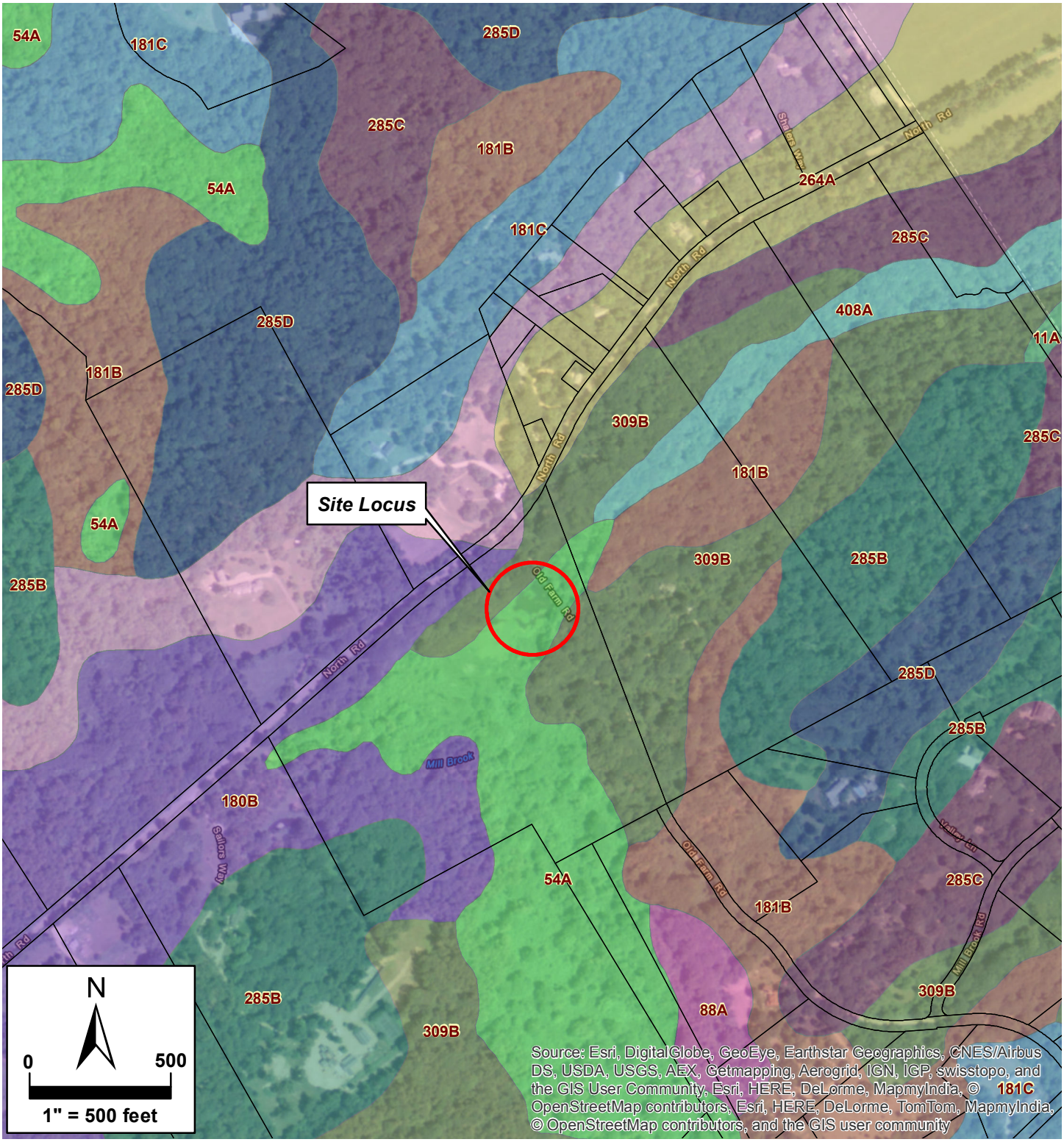
Existing Constraints
Mill Brook
Chilmark, MA

Date: 2/4/2016

Figure 4



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Legend

**Parcels - MassGIS 2012 & NRCS SSURGO-Certified Soils MassGIS 2012*

- Parcels
- 11A, Berryland
- 180B, Chilmark
- 181B, Chilmark
- 181C, Chilmark
- 264A, Eastchop
- 264B, Eastchop
- 285B, Eastchop
- 285C, Eastchop
- 285D, Eastchop
- 309B, Moshup
- 408A, Pompton
- 54A, Freetown
- 88A, Ridgebury Variant

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NRCS SSURGO Certified Soils - Dukes County Mill Brook Chilmark, MA

Date: 2/4/2016

Figure 5

SITE PHOTOS

Existing Site Conditions

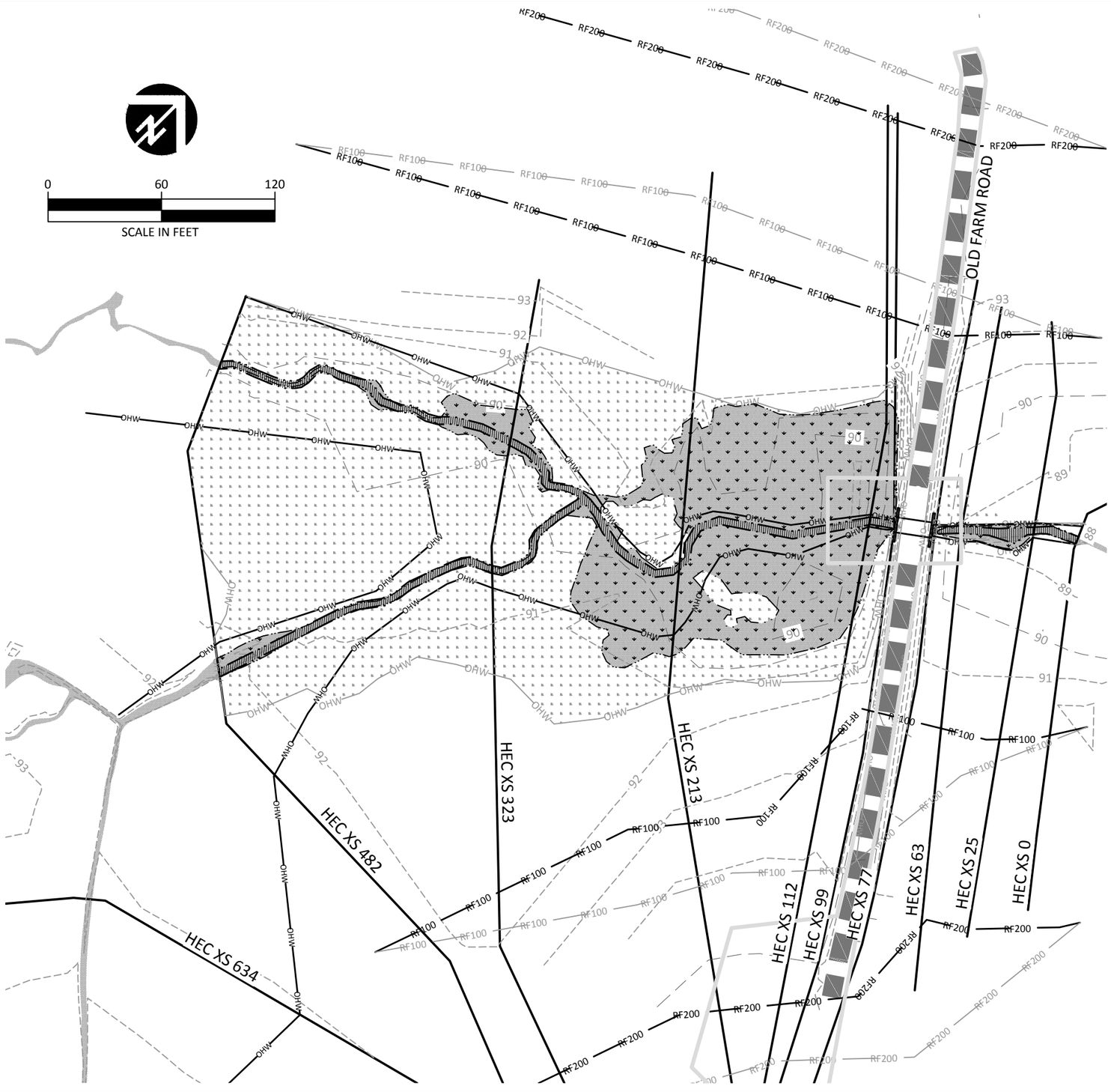
Photo 1. Facing north on Old Farm Road with impounded portion of Mill Brook to the left, west.

Photo 2. Facing west on Old Farm Road at the impounded portion of Mill Brook.

Photo 3. Mill Brook flowing east, away from Old Farm Road and the existing culverts.

Photo 4. View of the existing side by side 12-inch corrugate metal pipe culverts, on the north, downstream side of Old Farm Road.

SITE PLANS AND REPORT (*90% Design*)



LEGEND

- EXISTING CHANNEL ALIGNMENT (4+00)
- EXISTING MAJOR CONTOUR (5 FT) (90)
- EXISTING MINOR CONTOUR (1 FT) (91)
- ROADWAY/CONSTRUCTION ACCESS
- LIMIT OF CONSTRUCTION DISTURBANCE
- HECRAS SECTION
- MEAN ANNUAL HIGH WATER (EXISTING CONDITIONS) (OHW)
- MEAN ANNUAL HIGH WATER (PROPOSED CONDITIONS) (OHW)
- 100 FT. RIVERFRONT (EXISTING CONDITONS) (RF100)
- 100 FT. RIVERFRONT (PROPOSED CONDITONS) (RF100)
- 200 FT. RIVERFRONT (EXISTING CONDITONS) (RF200)
- 200 FT. RIVERFRONT (PROPOSED CONDITONS) (RF200)
- BANK (EXISTING CONDITIONS)
- BANK (PROPOSED CONDITIONS)
- LAND UNDER WATER (EXISTING CONDITIONS)
- LAND UNDER WATER (PROPOSED CONDITIONS)
- BORDERING VEGETATED WETLAND (EXISTING CONDITIONS)
- ADDED BORDERING VEGETATED WETLAND (UNDER PROPOSED CONDITIONS)

RESOURCE AREA IMPACTS

RESOURCE AREAS	EXISTING CONDITIONS	PROPOSED CONDITIONS	TEMPORARY IMPACT	PERMANENT IMPACT
LAND UNDER WATER (SF)	19,670	2,885	1,545	-16,785
BANK (LF)	1,655	1,440	75	-215
BORDERING VEGETATED WETLAND (SF)	43,415	60,200	540	16,785
RIVERFRONT 100 FT (SF)	89,630	106,370	2,465	16,740
RIVERFRONT 200 FT (SF)	160,455	181,765	7,030	21,310

Final design drawings formatted for project permitting coordination. Not for use in project construction.

NO.	BY	DATE	REVISION DESCRIPTION

SJ, DF (DRAWN)	NN,KC (DESIGNED)	MB (CHECKED)
MB (APPROVED)	12/23/15 (DATE)	14-05-10 (PROJECT)

ROTH CULVERT REPLACEMENT
MARTHA'S VINEYARD, MASSACHUSETTS
DIVISION OF ECOLOGICAL RESTORATION

inter·fluve
220 Concord Ave, Second Floor
Cambridge, MA 02138
617.714.5537
www.interfluve.com

PROPOSED CULVERT PERMIT
RESOURCE AREA IMPACTS

SHEET
10 OF 10

Roth Culvert Replacement

Chilmark, MA

90% Complete Design Report

December 23, 2015

Prepared for:

Massachusetts Division of Ecological Restoration

Contact: Nick Wildman
Nick.wildman@state.ma.us

Table of Contents

I. Introduction

The Roth Woodlands is a 26 –acre reserve in Chilmark, MA located off of Old Farm Road (Figure 1) near Chilmark, MA. Old Farm Road is a private way in this area whose alignment crosses the natural course of Mill Brook. Mill Brook originates in the moraine highlands of Martha's Vineyard and flows out of Tisbury Great Pond in West Tisbury.

Currently, two 12 inch diameter corrugated metal pipe culverts convey the flow of Mill Brook through the earthen road berm. The culverts are perched above the streambed, resulting in an impoundment upstream of the roadway. The road crossing is an impassable barrier to migratory fish and also impedes wildlife movement. The species that utilize Mill Brook include river herring, American eel, brook trout and American brook lamprey, the last of which is listed by the MA Natural Heritage and Endangered Species program as "Threatened".

The goals of this project are (1) to restore ecological functions including fish and wildlife passage, and (2) to ensure reliable vehicular access across Mill Brook.

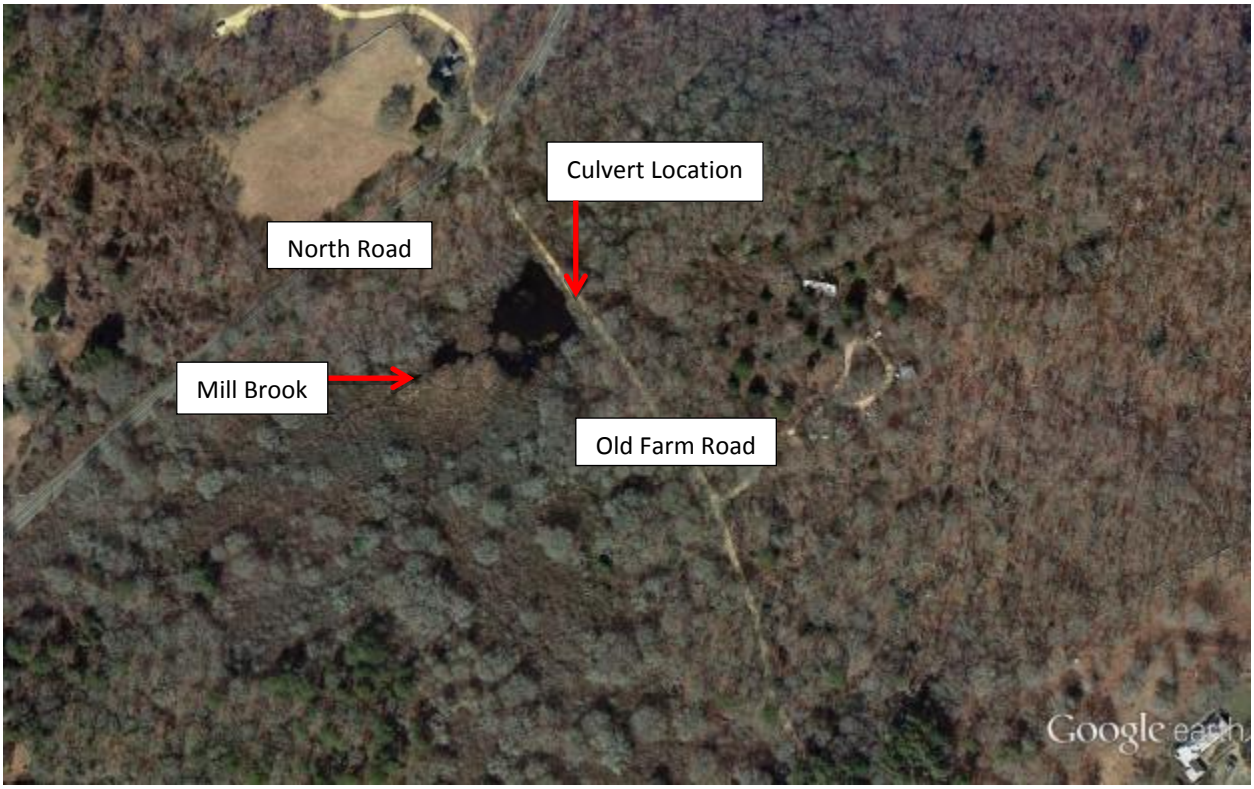


Figure 1: Mill Brook on Martha's Vineyard showing the location of the Old Farm Road culverts

Attendant to the project goals, the project partners have set five primary objectives:

- Implement a novel culvert replacement project on Martha's Vineyard, which will be used as a demonstration project for cost-effective design, permitting, and construction of a crossing that meets the Massachusetts Stream Crossing Guidelines
- Enable passage for native diadramous fish (river herring, American brook lamprey, American eel) and other native aquatic species (eg. brook trout, amphibians).
- Improve ecological functions of Mill Brook.
- Maintain reliable access across Mill Brook.
- Identify potential impacts to and minimize effects on drinking water wells in the local area.

To address these objectives, the project partners selected replacement of the existing culverts with a new pre-cast concrete box culvert as the preferred project.

II. Existing Conditions

Currently, there are two 12-inch corrugated metal pipe culverts conveying Mill Brook through the Old Farm road berm. The culverts are undersized, creating an impoundment upstream of the roadway, and perched on the downstream end, resulting in erosion of the channel bed. The perched culverts also prevent the upstream movement of aquatic species and pose challenges for terrestrial species.

Figure 2: Culvert inlets below Old Farm Road.

HYDROLOGY

Due to the lack of local active or historic USGS or other gaging stations, FEMA studies or other relevant hydrologic data for Mill Brook, we employed multiple methods to develop estimates of flood magnitudes. These included USGS regional regression equations, the NRCS-TR55 method, and the rational method(Wandle, 1983, HydroCAD 2015, Chin 2006). The use of the USGS Stream Stats program (which integrates relevant regional regression equations in an internet-based interactive interface) was initially proposed, but the program does not provide coverage for this project site.

Rational Method:

A HydroCAD model was developed for the area during the construction of the Martha's Vineyard Airport (Dukes County Airport (Dukes County 2015). The Intensity-Duration-Frequency (IDF) curve information used in the HydroCAD model (Table 1) HydroCAD model (Table 1) was applied to the Roth Woodlands drainage area using the Rational Method (Chin 2006) to estimate flow during storm events at the project site. The flood magnitudes predicted ranged from 49 cubic feet per second

(cfs) during the 2 year event to 113 cfs during the 50 year event (

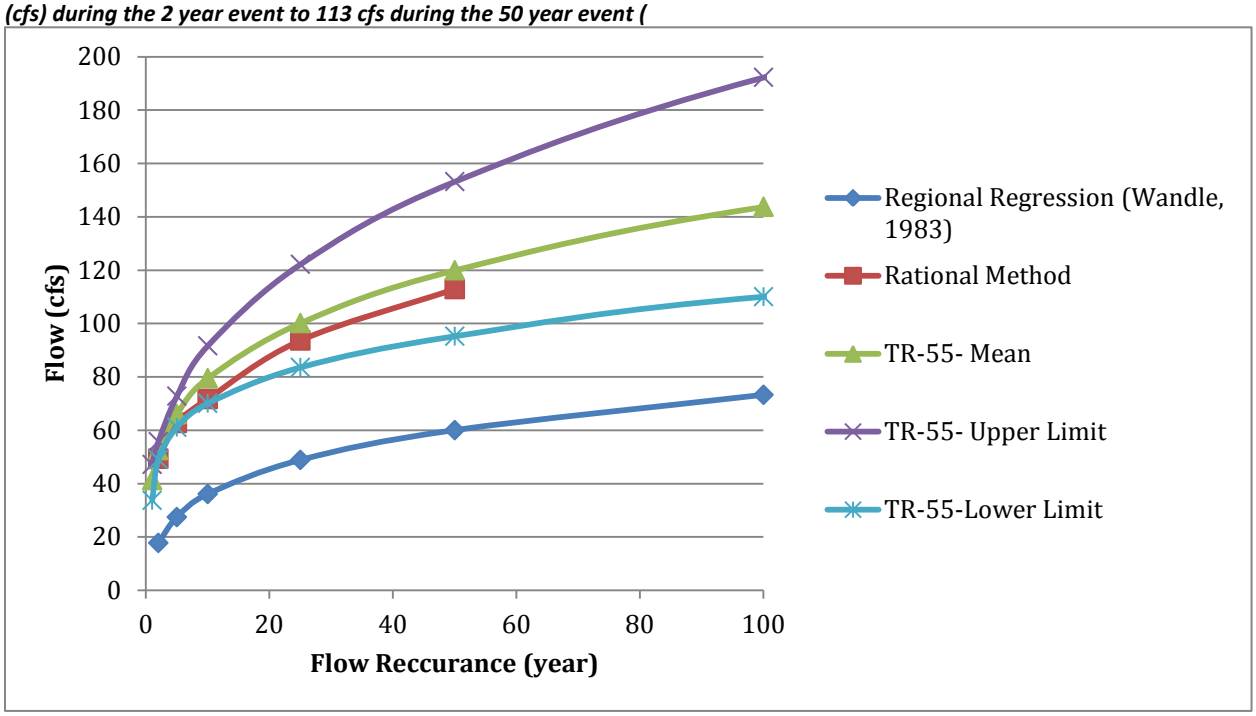


Figure 3). The flow rates were assessed to be unrealistically large given the size of the existing channel above the impoundment and the drainage area (224 acres). Additionally, these flow rates suggested that the road prism would overtop on a frequency of 1 of every 2 years, on average, which is inconsistent with local observations. Therefore, these estimates were not used for culvert designs.

Table 1 Intensity-Duration-Frequency curve extrapolation for the region. Note: Rainfall intensities (rates) are given as inches per hour.

Storm Duration	Rainfall event				
	2-year	5-year	10-year	25-year	50-year
5 minutes	3.4	4.2	4.9	5.5	6
60 minutes	1.1	1.4	1.6	1.9	2.1

TR55 Method:

The TR-55 method was originally developed by SCS (now NRCS) to calculate watershed hydrology in agricultural watersheds and has since been adapted for urban watersheds (HydroCAD 2015). This method integrates, curve numbers that describe the runoff characteristics of the watershed being simulated, drainage area, time of concentration and the 24- hour rainfall quantity (in inches) based on regional rainfall distributions. Precipitation data were obtained from the Northeast Regional Climate Center Extreme Precipitation (NRCCEP) estimates (NRSS/NRCS 2015) which provide mean, upper limit and lower limit rainfall quantities for Dukes County, MA. The resulting flood magnitude estimates for the mean values ranged from 41 cfs during the 1 year event to 144 cfs

during the 100 year event (

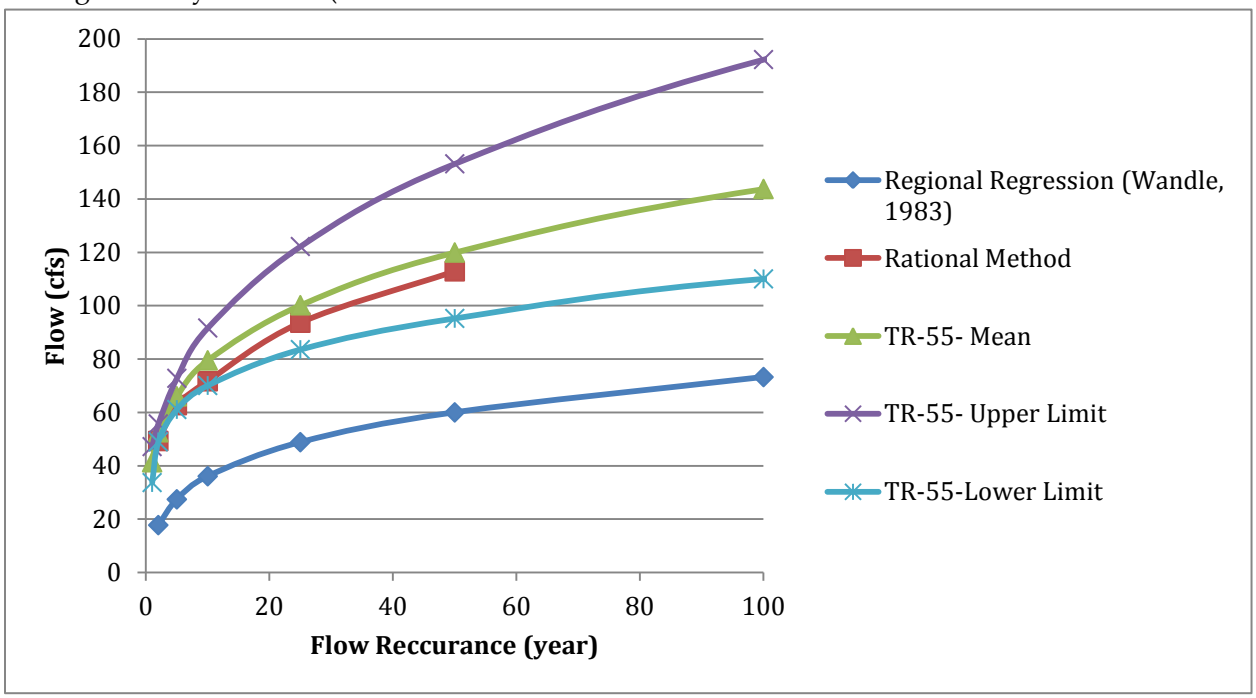


Figure 3 Comparison of the flood reccurence estimates for Roth Woodlands). Again, these values seemed unreasonably high given the site conditions. Similar to the estimates described above, these flow rates suggested that the road prism would overtop on a frequency of 1 of every year, on average, which is inconsistent with local observations. Therefore, these estimates were also not used for culvert designs.

Regional Regression:

Regional curves relate annual peak discharges at USGS gaged sites to a suite of basin characteristics for estimation of flood peak discharges at un-gaged sites (Wandle 1983). The drainage area of the

project site was input into the regression equations to estimate flood flows (

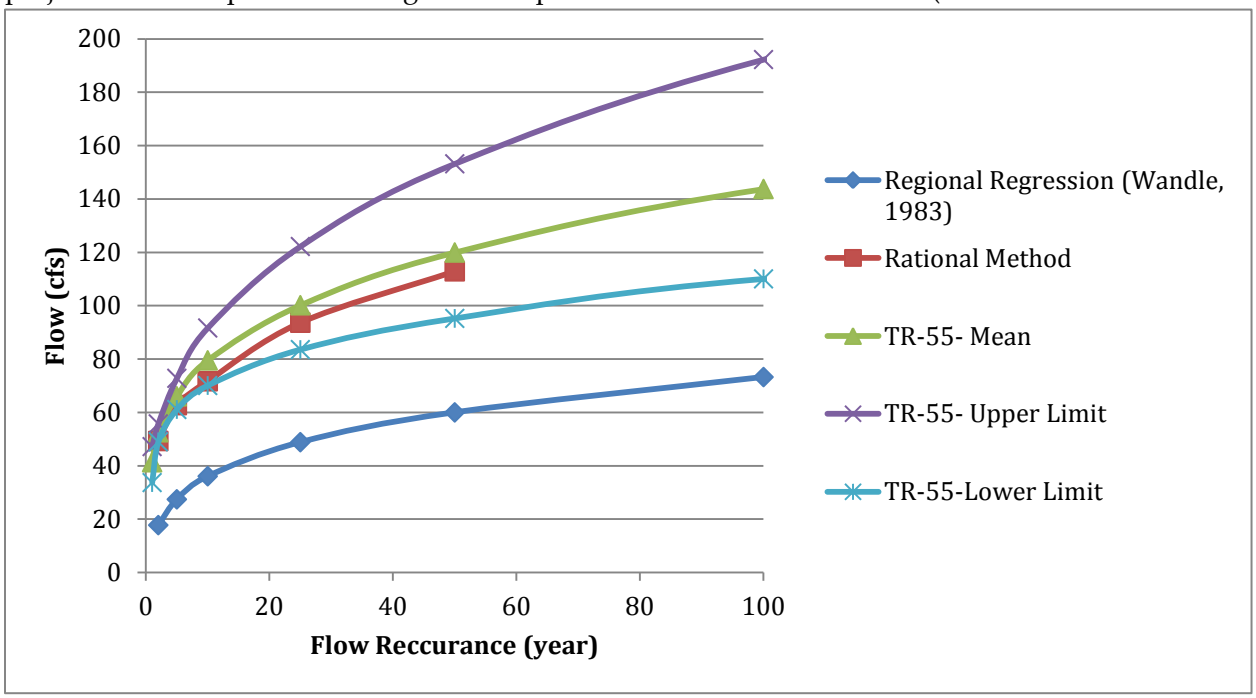


Figure 3). The estimates using this method ranged from 18 cfs during the 2 year storm event to 73 cfs during the 100 year event (

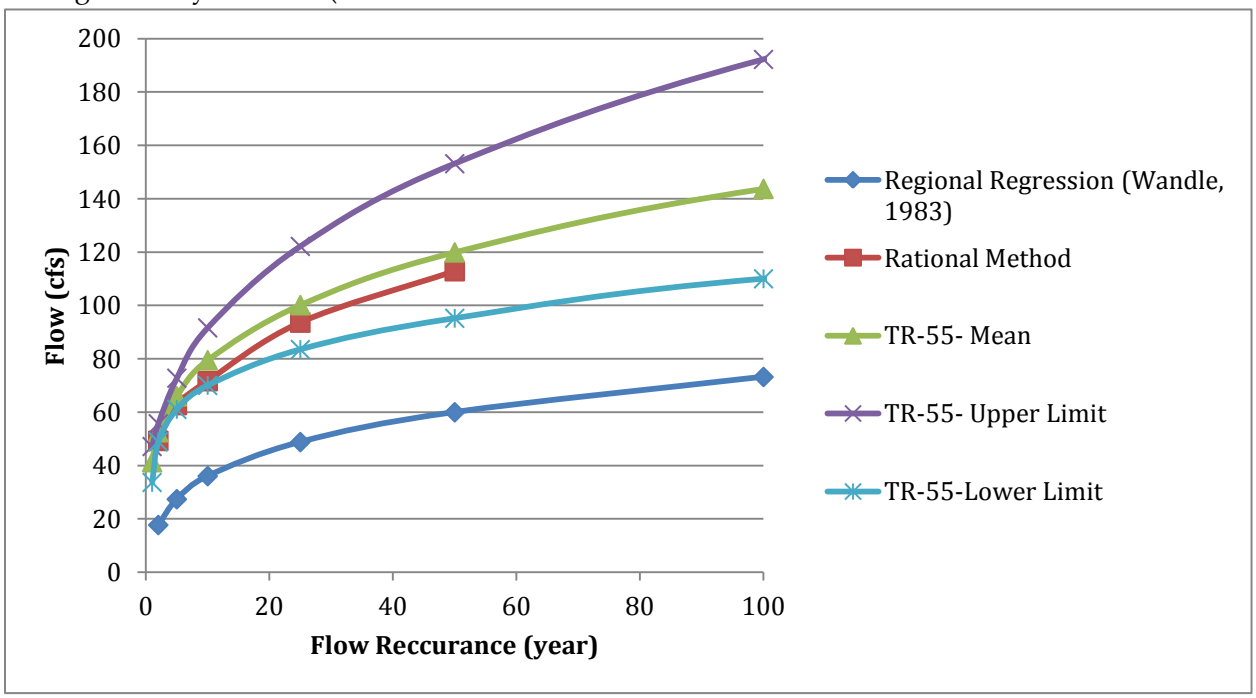


Figure 3). While these values are not the most conservative estimates calculated during the hydrology analysis, they were assessed to be most appropriate given the site conditions and existing upstream channel dimensions. These estimates were therefore accepted for use in the hydraulic modeling of the project area in HEC-RAS (

Table 2) and for design applications.

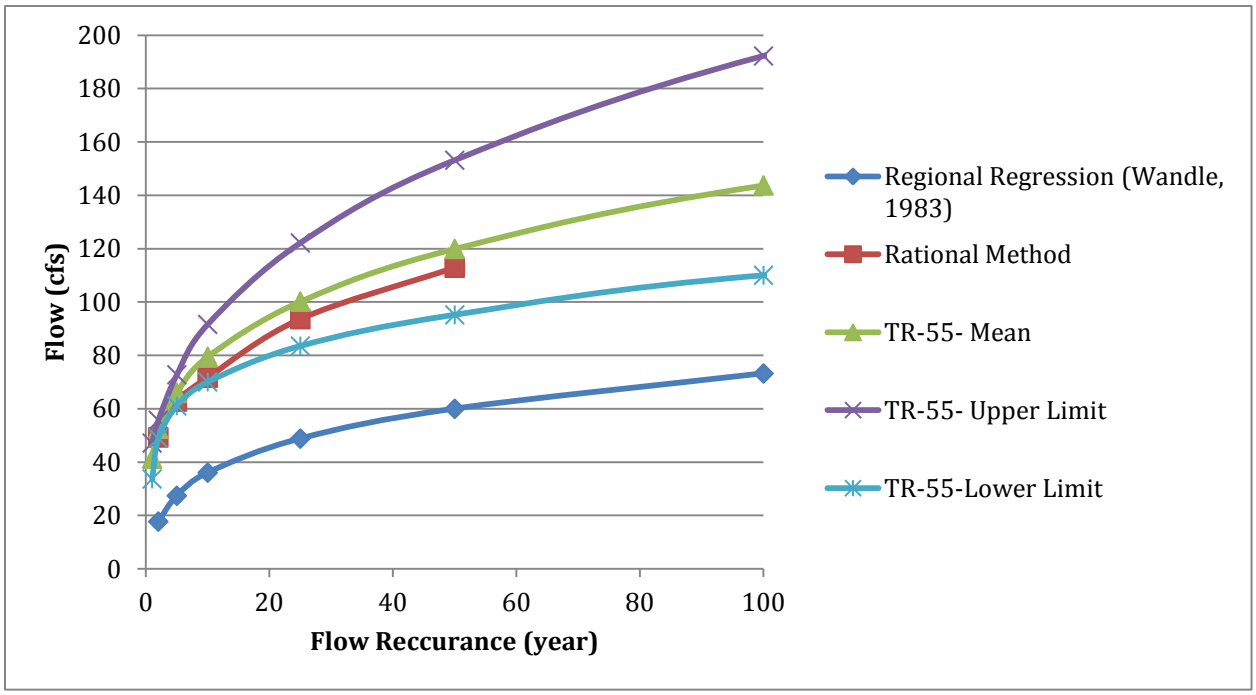


Figure 3 Comparison of the flood reccurence estimates for Roth Woodlands

Table 2 Flow values used in the HEC-RAS model of Roth Woodlands based on the Wandle, 1983 paper.

	Recurrence Interval (years)					
	2	5	10	25	50	100
Flood Flows (CFS)	17.74	27.41	36.07	48.83	60	73.24

ACCUMULATED IMPOUNDMENT SEDIMENT

The undersized culvert, in conjunction with the Old Farm road prism, creates a low energy, backwatered, ponded condition upstream of the structure. As sediment migrates downstream from the upper watershed, it settles out in the impoundment. The volume of sediment that has accumulated in the pond is estimated to be approximately 2,100 cubic yards, and we estimate that approximately 30 cubic yards of this material will become mobile following culvert replacement.

Sediment quality was assessed through sampling completed in 2015. The results from the sampling were compared to the most stringent human health thresholds (S-1/ GW 1) from the Massachusetts

Contingency Plan (MassDEP, 2014) as well as consensus-based ecological screening thresholds from MacDonald et al (2000). In the table in Appendix A, we have reported the results based on the lower reporting limit referred to as the method detection limit (MDL) which allows comparison to ecological and human health thresholds.

None of the sediment samples collected in the impoundment exceeded any human health thresholds. For the sample collected in the likely channel location, phenanthrene was the only analyte that exceeded the Threshold Effects Concentration (TEC), though it did not exceed the Probable Effects Concentration (PEC), both ecological thresholds. For the sample collected in the likely floodplain area, arsenic, DDD, and DDE exceeded the TEC and phenanthrene exceeded the PEC (see Sediment Sampling Results, Appendix A). The concentrations found in these samples is typical of streams in New England and the generally low levels of concentrations suggest that passive release of the impounded sediment is a feasible sediment management option at this site.

EXISTING CONDITIONS HYDRAULICS

Existing hydraulic patterns were assessed to develop a baseline understanding of Mill Brook flow through the study reach, prior to the replacement of the culvert. The analysis was completed using the one-dimensional hydraulic model HEC-RAS, the standard hydraulic model approved for stream crossing replacement design. The model geometry was developed using bathymetric, topographic, and culvert geometry data collected in 2015 (Elevation datum: NAVD88 in units of feet). Roughness coefficients (Manning's n values) applied at each model cross section were estimated based on field observations and comparisons to published reference values (Table 3). The flood events analyzed in the model include the 2-, 5-, 10-, 25-, 50- and 100-year return period floods. Figure 4 shows the estimated water surface profiles under existing conditions for the range of simulated flows. The model results suggest that the roadway would be overtopped during all storms with a recurrence interval of 2 years or greater. Evidence of overtopping of the roadway was not observed during the field investigation and implies that the flood flow estimates are conservative. We continued to use the estimated hydrology described above as it provides conservative flow values for evaluation of proposed conditions resulting from culvert replacement.

Table 3 Roughness coefficients used in the existing conditions model

Description	Manning's n values
Channel/Impoundment, natural substrate	0.04
Floodplain, heavily vegetated	0.1
Concrete	0.011

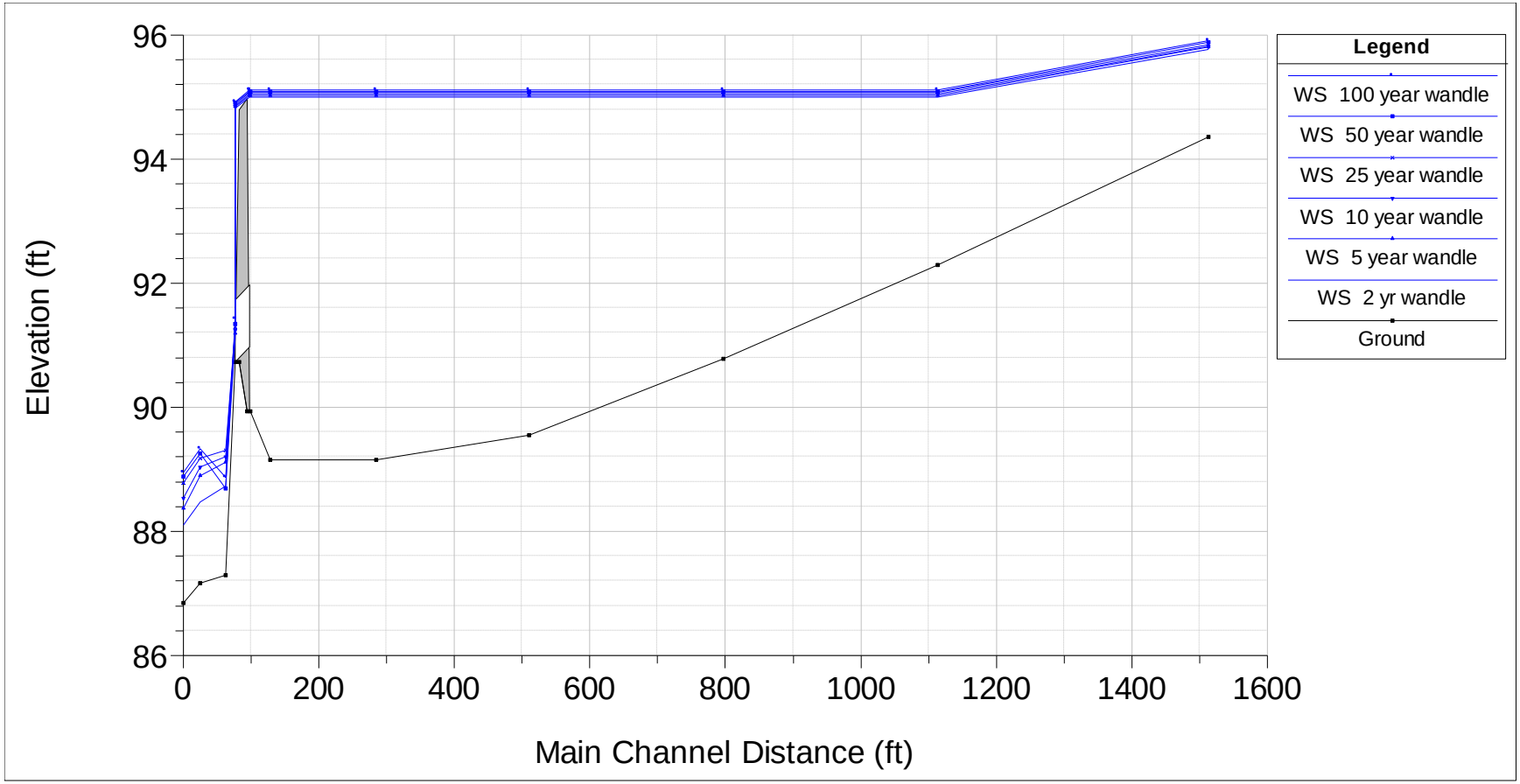


Figure 4 Simulated water surface (WS) profiles for existing conditions during flood events ranging from the 2-year to the 100-year return interval (using the Wandle 1983 regional regression estimates for hydrology).

III. Project Design

The proposed Roth Woodlands culvert replacement design generally includes the following elements, described in more detail below:

- Removal of two existing 12" corrugated metal pipe culverts.
- Construction of a new culvert structure that allows for the passage of animals, sediment and flow.
- Excavation of a short pilot channel to conform the existing stream channel to the new culvert opening
- Passive release of the impounded sediment upstream of the road crossing.
- Construction of a stable low-flow channel within the culvert.
- Planting of native seed in disturbed areas along the road prism.

GEOMORPHOLOGY OF THE PROPOSED PROJECT

The upstream channel is expected to transition from an impoundment that is currently acting as a sediment sink to an active stream corridor. Following culvert replacement, it is anticipated that the channel which exists through the impoundment will progressively incise through the accumulated sediment generally along its present alignment as it adjusts to a new downstream base channel level at the culvert. The channel will function initially as a sediment source through the near-term period of adjustment, until more resistant substrate materials are exhumed and the channel settles at a slope that interacts with these controls and is in balance with the hydrology and upstream sediment load. Over time, the channel and overbanks will transition to a more normative stream corridor that is capable of moving sediment loads through the channel during large flow events.

This longer-term scenario was used for modeling purposes, as it highlights the lasting trends that can be anticipated through time. The anticipated long-term channel bed profile was estimated by projecting an average slope between areas where the channel bed elevation is predicted to remain stable. The channel upstream of station 4+84 is above the influence of the culvert and is predicted to maintain the current channel bed elevation. The slope through the impoundment was projected from station 4+84 to the depth of refusal elevation at station 1+53 (slope of 1%) where there is a natural grade break in the depth of refusal data. A consistent gradient then extends through the depth of refusal data downstream of station 1+53, with the profile tied into the existing bed surface downstream of the culvert (station 0+43) at a slope of 0.4%.

The hydraulic model simulations suggest that the currently impounded reach has very limited sediment transport during flood flows, but under proposed conditions will be competent in transporting sand during flood flows. The impounded sediment consists primarily of silt (46% and 63% in the channel and floodplain samples, respectively) and sand (38% and 32% in the channel and

floodplain samples, respectively, with fine sand predominant in the sand range), so this material would be able to be transported through the culvert under proposed conditions.

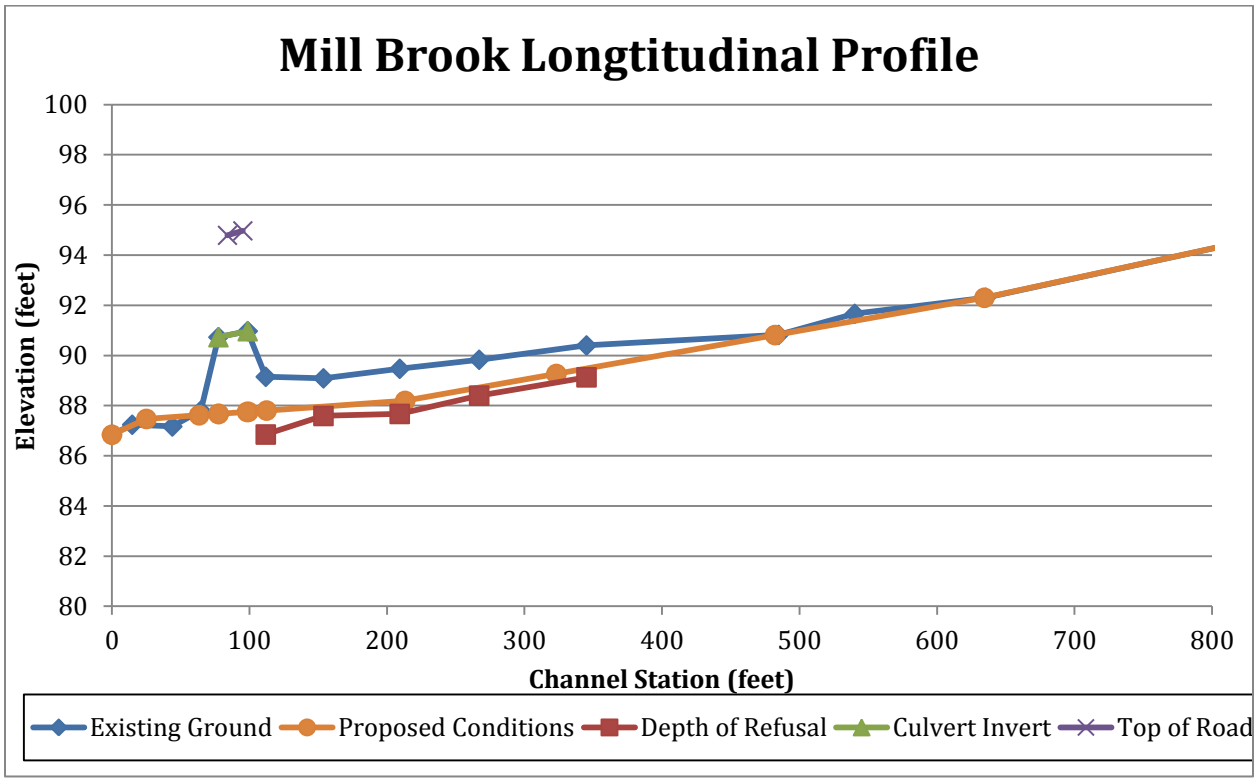


Figure 5 Longitudinal Profile plots of the longer-term proposed conditions (PC), along with the depth of refusal and the existing bed surface. The 'invert' of the culvert is the bottom of the existing culvert.

CULVERT DESIGN

The channel geometry upstream and downstream of the impoundment was used in association with hydraulic modeling to guide the culvert design decisions. The bankfull width for the channel downstream of the culvert is approximately 6 feet. Based on the Massachusetts Stream Crossing Standards for stream simulation culvert design, the resulting minimum width for the culvert is 7.2 feet (based on the width criteria requirement of 1.2 times the bankfull width). We then adjusted this width to 8 feet in order to utilize stock, precast concrete box culvert material as a primary option based on alternatives evaluation with project stakeholders at the feasibility stage, and past project experience. This geometry was checked against the open area ratio criteria in the stream crossing standards. The resulting open area ratio is 1.54 ft, which exceeds the minimum requirement of 0.82 ft.

The culvert will be delivered in sections and, owing to weight limits on the ferry, will be delivered to the site distributed across four truck loads. The culvert will be embedded two feet deep, with a natural-material, low-flow channel constructed inside the culvert. The embedment material will be comprised of 6-inch minus gravel which is suitable for withstanding the shear stresses predicted up

to the 100-year return period flood event. Pre-cast concrete headwalls will be installed at either end of the culvert, along with a standard guardrail. The installation will be generally similar to the example shown in Figure 6, except the proposed culvert will not have wingwalls. Additional information about the culvert design can be found on the Drawings.

Figure 6: a) A similar Precast Concrete Box culvert during installation b) Post-construction image of the same culvert (Horsley-Whitten)

HYDRAULICS OF THE PROPOSED DESIGN

The existing conditions HEC-RAS model was modified to simulate the culvert design and anticipated future hydraulic conditions in the restored channel. The proposed conditions hydraulic model was utilized for assessment of the impact of the project on water surface profile elevations through the project reach, and to provide input into the culvert designs.

The water surface profiles for existing and proposed conditions are shown in Figure 7. As described above, the water surface profile of the existing conditions suggests that the road is overtopping during the 2 year flow event and larger floods (though as discussed above, this is likely an over-estimation). The proposed culvert design allows for flow through the structure without overtopping for all of the flood events that were modeled. The predicted sediment to be mobilized from the impoundment is primarily fine sediment and sand. The predicted shear stresses in the restored reach are estimated to be sufficient to pass released sediment of this caliber through the culvert to the downstream reach during flood events. If there is periodic sediment accumulation within the culvert prior to a large storm event, the elevated shear stresses that occur during the flood should be sufficient to mobilize the sediment and flush the culvert (Figure 8).

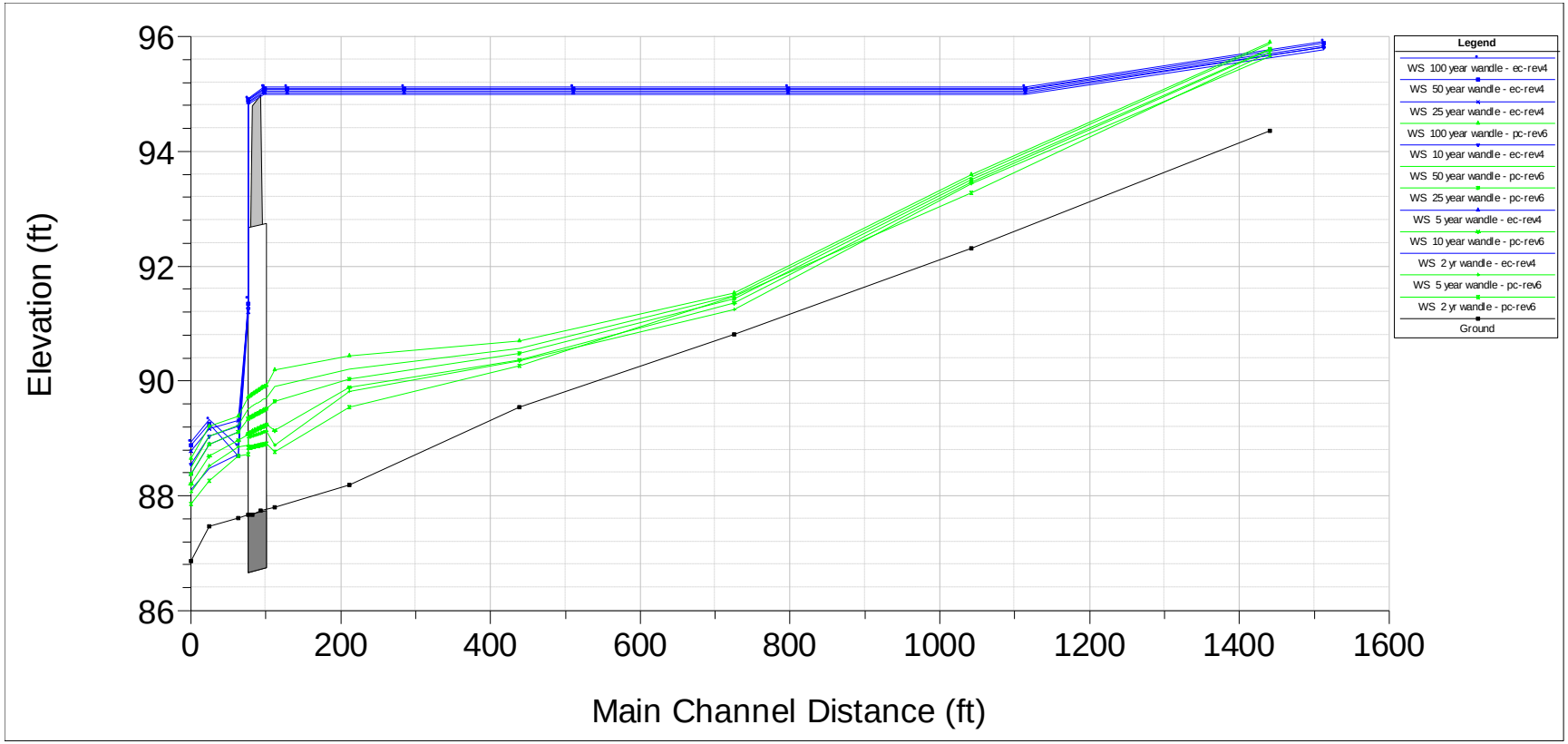


Figure 7 Water surface profiles for existing conditions (blue) and proposed culvert replacement conditions (green). EG = existing conditions; PC = proposed conditions; WS = water surface.

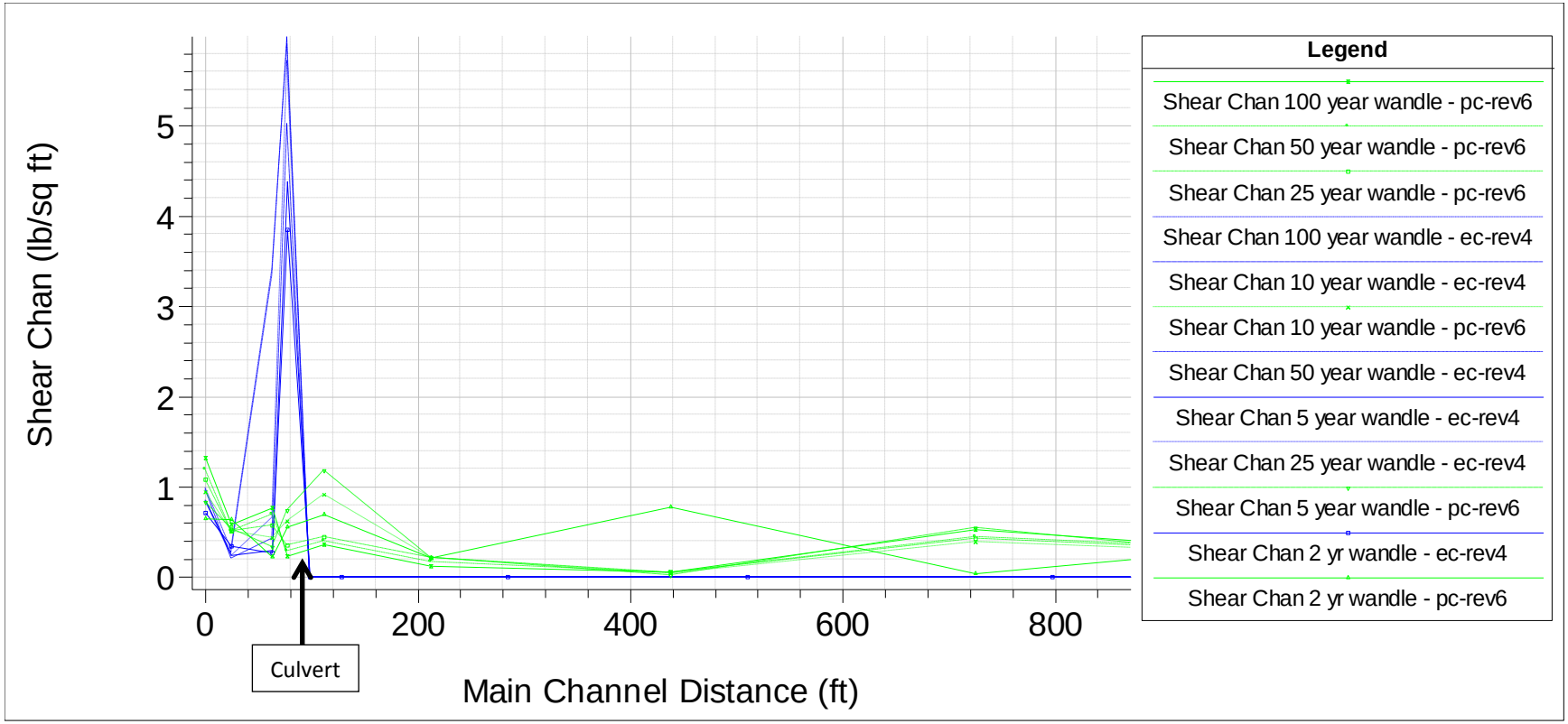


Figure 8 Channel shear stresses for proposed conditions (PC, longer term scenario, solid green lines) and existing conditions (EC, dashed blue lines) associated with replacement of the Old Farm Road culvert under the 2 year to 100 year flood events. For reference, shear stress of 0.5 lbs.sq ft corresponds with incipient motion of 1 inch diameter gravel.

EVALUATION OF POTENTIAL WELL IMPACTS

Private well records were obtained from the Chilmark Board of Health (BOH) to identify the locations of private wells on parcels and, when available, well depth and drawdown/ pumping information. The hydraulic modeling for the project area shows potential for up to a four-foot drop in surface water level behind Old Farm Road following culvert replacement. The potential observable groundwater drawdown impact will fall within a 1,000 foot radius of the culvert replacement. Within this zone, the estimated drawdown is less than a foot at the approximately 600-700 foot distances from the site to the nearest private wells. The minimal estimated drawdown in local water table is also likely conservative based on the assumptions used in the evaluation, and would not be expected to cause any observable impacts to properly constructed and maintained drinking water wells.

However, the BOH records indicate at least two of the wells appear to have been installed at shallow depths and are likely to be experiencing difficulties under current conditions. There are at least six additional wells within the zone of interest for which no records of well depth were available. It is recommended that the owners of all eight suspect wells within the area of interest be contacted and depths to water in those wells be measured under static and pumping conditions. These data will help to establish baseline conditions against which any potential future groundwater changes that may result from the proposed culvert replacement can be compared. Full details of the potential well impacts can be found in the well impacts assessment memo (Horsley-Whitten 2015b).

CULVERT REPLACEMENT LOGISTICS

Construction access will be along Old Farm Road from North Road. Access to the channel will be developed considering preservation of the utility poles downstream of the road prism. The road pull-out adjacent to the impoundment will provide a small staging and stockpiling area for construction. Due to the limited space available, careful coordination with local users of the road will be required leading up to and during construction.

Dewatering and flow management details are shown in the Drawings. This final design for the control of water system will be determined by the installation contractor, subject to engineer review and approval.

IV. 90% Cost Opinion

The 90% complete Engineer's Opinion of Probable Construction Costs is found below. The cost opinion has been developed based on review of construction costs for similar items in past projects and cost information from culvert manufacturers and seed suppliers. The actual cost of implementation of the Roth Woodlands culvert replacement project may vary from the cost opinion due to a variety of factors, including variation in the heavy construction market, seasonal factors,

and other factors such as fuel price fluctuations. To account in part for this, a construction cost contingency has been included in the cost opinion.

V. References

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Appendix A: Sediment Sampling Results

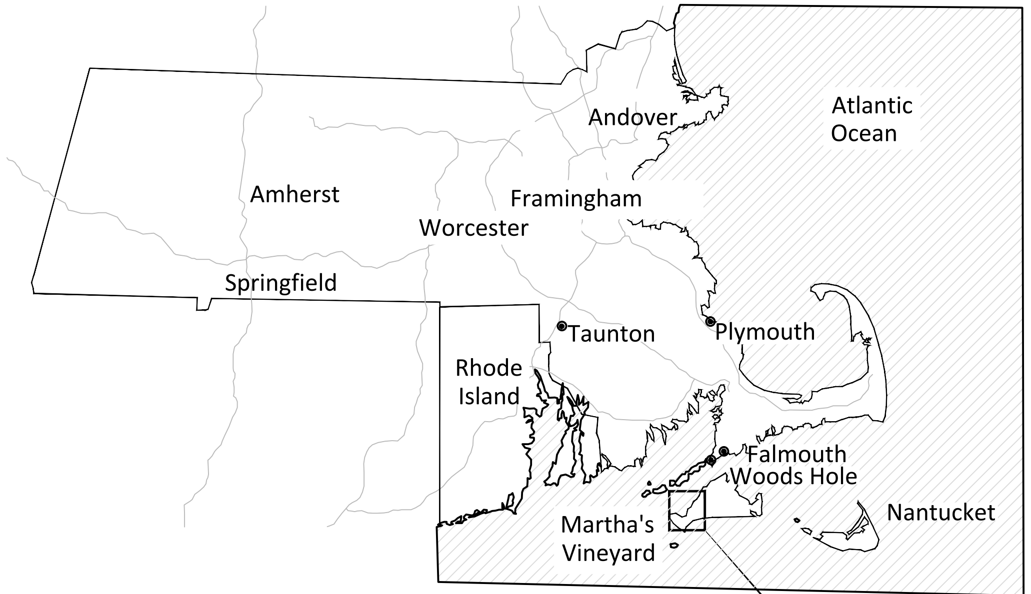
Parameter	CAS No.	Method	Screening Benchmarks			Results based on MDL (method detection limit)	
(Important: Units listed by category below)			MCP S1 / GW1	TEC	PEC		
			Human Health	Freshwater		Channel	Floodplain
Metals [mg/kg]							
Arsenic	7440-38-2	6020A	20.0	9.8	33.0	5.2	15.2
Barium						32.3	101
Cadmium	7440-43-9	6020A	2.0	1.0	5.0	0.30	0.65
Chromium (TOTAL)	7440-47-3	6020A	30.0	43.4	111.0	6.4	14.6
Lead	7439-92-1	6020A	300.0	35.8	128.0	8.6	31.2
Selenium						2.3	4.8
Silver			100.0			ND	ND
SVOCs (**PAHs**)[ug/kg]							
Acenaphthene	83-32-9	8270/8100	4,000.0			ND	520
Acenaphthylene	208-96-8	8270/8100	1,000.0			ND	ND
Anthracene	120-12-7	8270/8100	1,000,000.0	57.2	845.0	ND	ND
Benz[a]anthracene	56-55-3	8270/8100	700.0	108.0	1,050.0	ND	ND
Benzo[a]pyrene	50-32-8	8270/8100	2,000.0	150.0	1,450.0	ND	ND
Benzo[b]fluoranthene	205-99-2	8270/8100	7,000.0	27.3	13,400.0	ND	ND
Benzo[g,h,i]perylene	191-24-2	8270/8100	1,000,000.0	290.0	6,300.0	ND	ND
Benzo[k]fluoranthene	207-08-9	8270/8100	70,000.0			ND	480
Chrysene	218-01-9	8270/8100	70,000.0	166.0	1,290.0	ND	ND
Dibenz[a,h]anthracene	53-70-3	8270/8100	700.0	33.0	260.0	ND	ND
Fluoranthene	206-44-0	8270/8100	1,000,000.0	423.0	2,230.0	ND	ND
Fluorene	86-73-7	8270/8100	1,000,000.0	77.4	536.0	ND	ND
Indeno[1,2,3-cd]pyrene	193-39-5	8270/8100	7,000.0			ND	ND
Phenanthrene	85-01-8	8270/8100	10,000.0	204.0	1,170.0	610	1,500
Pyrene	129-00-0	8270/8100	1,000,000.0	195.0	1,520.0	ND	ND
Naphthalene	91-20-3	8270/8100	4,000.0	176.0	561.0	ND	ND
PCBs (ug/kg)							
Aroclor 1016						ND	ND
Aroclor 1221						ND	ND
Aroclor 1232						ND	ND
Aroclor 1242						ND	ND
Aroclor 1248						ND	ND
Aroclor 1254						ND	ND
Aroclor 1260						ND	ND
Pesticides (ug/kg)							
4,4'-DDD			4,000	3.9	28.0	1.3	7.9
4,4'-DDE			3,000	4.9	31.3	1.7	8.0
4,4'-DDT			3,000	4.2	62.9	ND	ND
Aldrin			40	2.0	80.0	ND	ND
alpha-BHC						0.61	1.7
alpha-Chlordane						ND	ND
beta-BHC						1.0	3.2
Chlordane (technical)						ND	ND
delta-BHC						ND	ND
Dieldrin			50	1.90	61.80	ND	ND
Endosulfan I						ND	ND
Endosulfan II						ND	ND

Endosulfan sulfate						ND	ND
Endrin			8,000	2.22	207.00	ND	ND
Endrin aldehyde						ND	ND
Endrin ketone						ND	ND
gamma Chlordane						ND	ND
Heptachlor						ND	ND
Heptachlor epoxide				2.47	16	ND	ND
Lindane (gamma-BHC)				2.37	4.99	ND	ND
metholxychlor						ND	ND
Toxaphene						ND	ND
EPH (mg/kg)							
C9-C18 Aliphatics		MADEP	1,000.0	NC	NC	13	30
C19-C36 Aliphatics		MADEP	3,000.0	NC	NC	21	65
C11-C22 Aromatics		MADEP	1,000.0	NC	NC	15	47
Physical Characterisitcs							
Total Organic Carbon (mg/kg)						41,500	238,000
Solids (%)						38.2	16.1
Percent Moisture (%)						165.6	345.2
Grain Size Distribution (%)		ASTM D422					
Sand						38.2	32.1
Coarse Sand						0.5	1
Medium Sand						6.7	13.7
Fine Sand						31	17.4
Silt						45.6	63
Clay						16.2	4.9

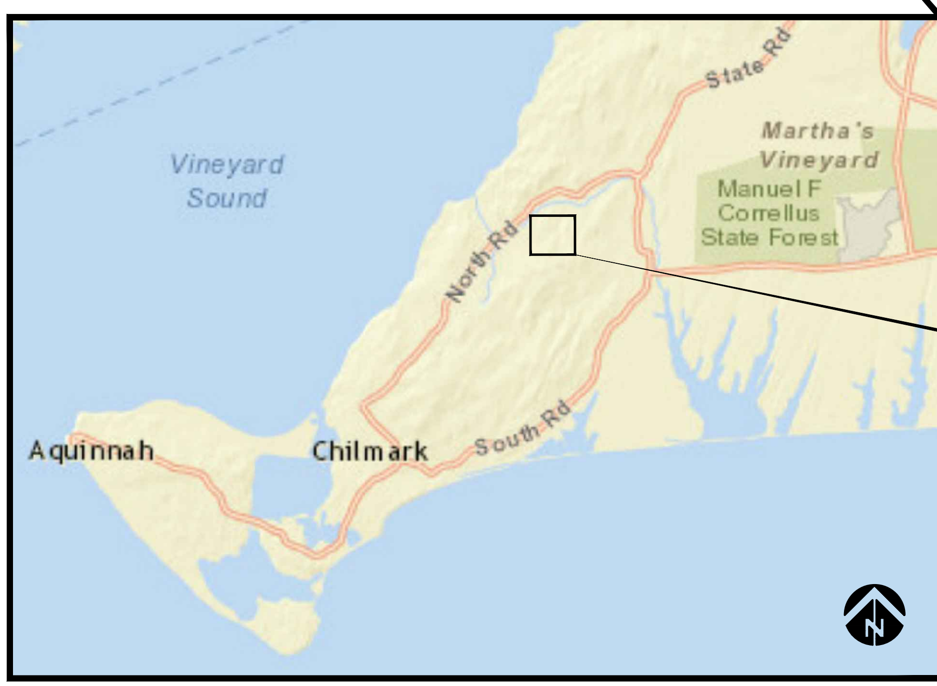
Roth Culvert Replacement
90% Design Submittal

Martha's Vineyard, MA

December 23, 2015



LOCATION MAP
STATE OF MASSACHUSETTS



VICINITY MAP
NOT TO SCALE

SITE MAP
NOT TO SCALE

COORDINATES:
LATITUDE N41°23'39.80"
LONGITUDE W70°42'31.20"

WATERBODY: MILL BROOK
TRIBUTARY OF: TOWN COVE

SHEET LIST

"RESERVED FOR MA DEP STAMP"

"RESERVED FOR DESIGN ENGINEER'S STAMP"

DIG SAFE: STATE LAW REQUIRES ANY PERSON PERFORMING EXCAVATION ON PRIVATE OR PUBLIC PROPERTY TO CALL DIG SAFE: 1-888-DIG-SAFE OR 8-1-1. ALL EXCAVATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH MASSACHUSETTS DIG SAFE LAW.

NO.	BY	DATE	REVISION DESCRIPTION

SJ, DF	NN,KC	MB
DRAWN	DESIGNED	CHECKED
MB	12/23/15	14-05-10
APPROVED	DATE	PROJECT

ROTH CULVERT REPLACEMENT
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DIVISION OF ECOLOGICAL RESTORATION

inter-fluve
220 Concord Ave, Second Floor
Cambridge, MA 02138
617.714.5537
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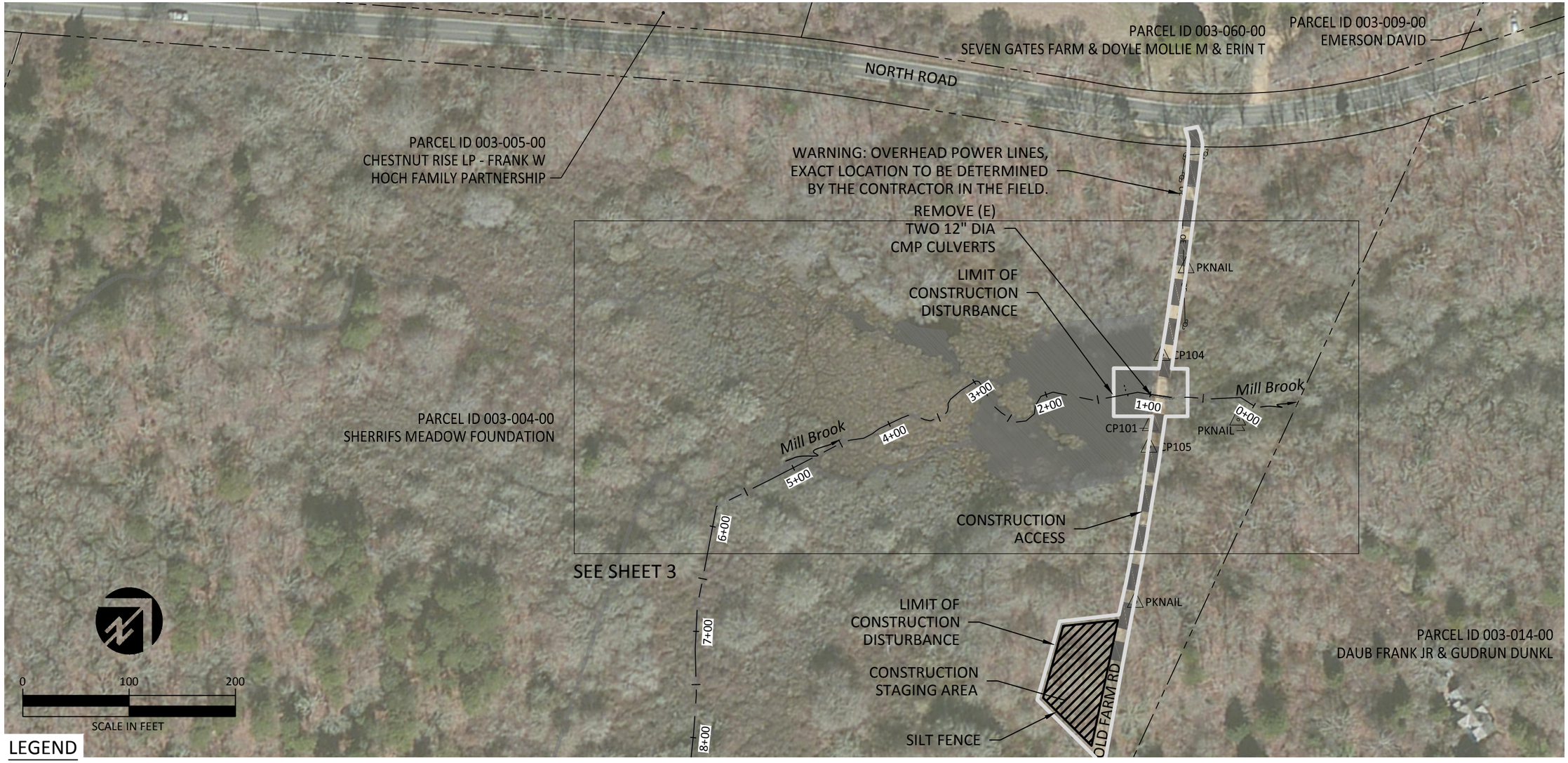
COVER, SHEET INDEX AND LOCATION MAPS

SHEET
1 OF 9



LEGEND

- EXISTING CHANNEL ALIGNMENT (4+00)
- EXISTING PROPERTY LINE
- EXISTING OVERHEAD POWER LINE (OE)
- EXISTING UTILITY POLE
- EXISTING IMPOUNDMENT & TRIBUTARIES
- CONSTRUCTION STAGING AREA
- CONSTRUCTION ACCESS
- LIMIT OF CONSTRUCTION DISTURBANCE
- SILT FENCE

SITE PLAN

SURVEY CONTROL

DESCRIPTION	EASTING	NORTHING	ELEVATION (FT)
PKNAIL	1583099.14	143867.61	99.01
CP101	1583180.16	143738.93	99.17
PKNAIL	1583234.60	143800.54	89.40
CP104	1583141.11	143793.12	94.87
CP105	1583193.59	143723.51	95.16
PKNAIL	1583287.60	143611.37	99.63

SURVEY PERFORMED BY
INTER-FLUVE, INC. IN JANUARY, 2015.

THE HORIZONTAL COORDINATE SYSTEM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83), MASSACHUSETTS STATE PLANE, ISLAND ZONE, US FEET.

THE VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

NO.	BY	DATE	REVISION DESCRIPTION

DRAWN	DESIGNED	CHECKED
SJ, DF	NN,KC	MB
APPROVED	DATE	PROJECT
MB	12/23/15	14-05-10

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EXISTING CONDITIONS, STAGING, ACCESS AND OWNERSHIP

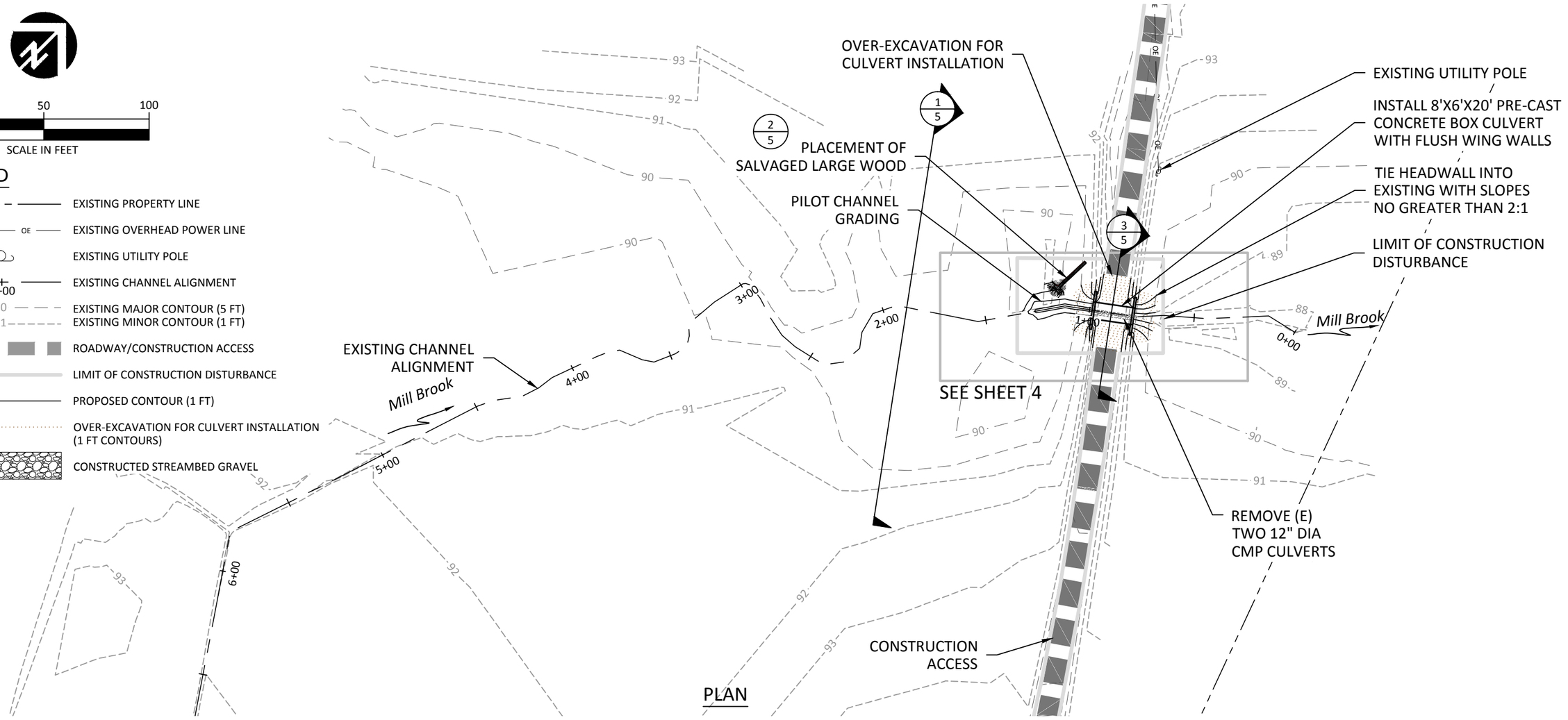
SHEET 2 OF 9

0 50 100

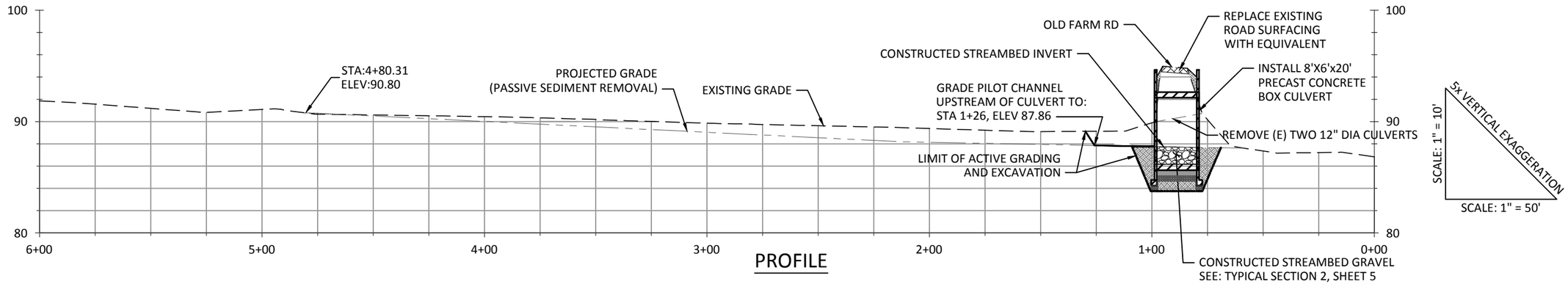
SCALE IN FEET

LEGEND

- EXISTING PROPERTY LINE
- OE OE EXISTING OVERHEAD POWER LINE
- EXISTING UTILITY POLE
- 4+00 EXISTING CHANNEL ALIGNMENT
- 90 EXISTING MAJOR CONTOUR (5 FT)
- 91 EXISTING MINOR CONTOUR (1 FT)
- ROADWAY/CONSTRUCTION ACCESS
- LIMIT OF CONSTRUCTION DISTURBANCE
- PROPOSED CONTOUR (1 FT)
- OVER-EXCAVATION FOR CULVERT INSTALLATION (1 FT CONTOURS)
- CONSTRUCTED STREAMBED GRAVEL



PLAN



PROFILE

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DRAWN	DESIGNED	CHECKED
MB	12/23/15	14-05-10
APPROVED	DATE	PROJECT

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SITE PLAN AND PROFILE

SHEET 3 OF 9

SALVAGE TREES WITH ROOTWADS INTACT DURING CLEARING AND GRUBBING. PLACE LARGE WOOD ON THE FLOODPLAIN UPSTREAM TO FARTHEST EXTENT OF EXCAVATOR ARM REACH

PLACE SLASH AND LARGE WOOD (2/5)

EXCAVATE PILOT CHANNEL TO INITIATE HEADCUT AND PROVIDE COHERENT FLOW TO THE CULVERT

EXISTING CHANNEL ALIGNMENT

MILL BROOK

LIMIT OF CONSTRUCTION DISTURBANCE

CONSTRUCTION ACCESS

OLD FARM ROAD

OVER-EXCAVATION FOR CULVERT INSTALLATION

INSTALL 8'X6'X20' PRE-CAST CONCRETE BOX CULVERT WITH FLUSH WINGWALLS

RIVER STONE BANK STABILIZATION AT HEADWALL, TYP.

HIGH POINT GRADE BREAK ELEV 94.88

1+00

0+50

1+50

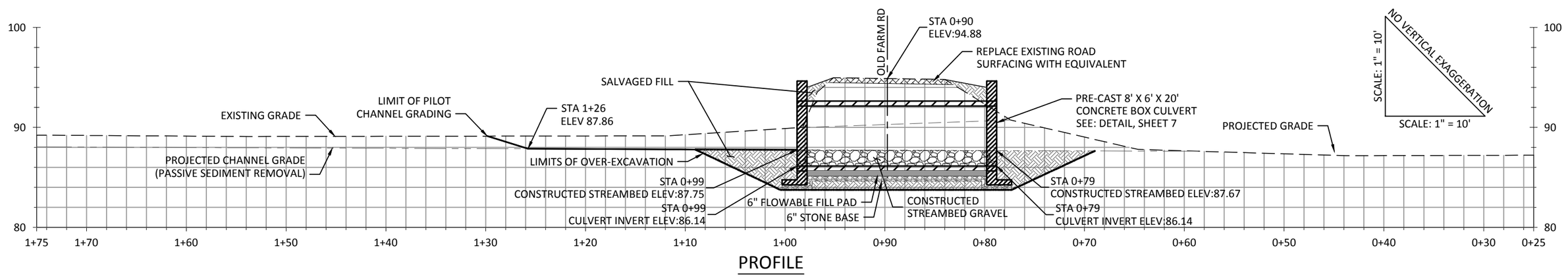
0 10 20

SCALE IN FEET

PLAN

LEGEND

- EXISTING PROPERTY LINE
- OE OE EXISTING OVERHEAD POWER LINE
- 1+00 EXISTING CHANNEL ALIGNMENT
- 90 EXISTING MAJOR CONTOUR (5 FT)
- 91 EXISTING MINOR CONTOUR (1 FT)
- ROADWAY/CONSTRUCTION ACCESS
- LIMIT OF CONSTRUCTION DISTURBANCE
- CONSTRUCTED STREAMBED GRAVEL
- PROPOSED PILOT CHANNEL CONTOURS (1 FT)
- OVER-EXCAVATION FOR CULVERT INSTALLATION (1 FT CONTOURS)



PROFILE

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MB	12/23/15	14-05-10
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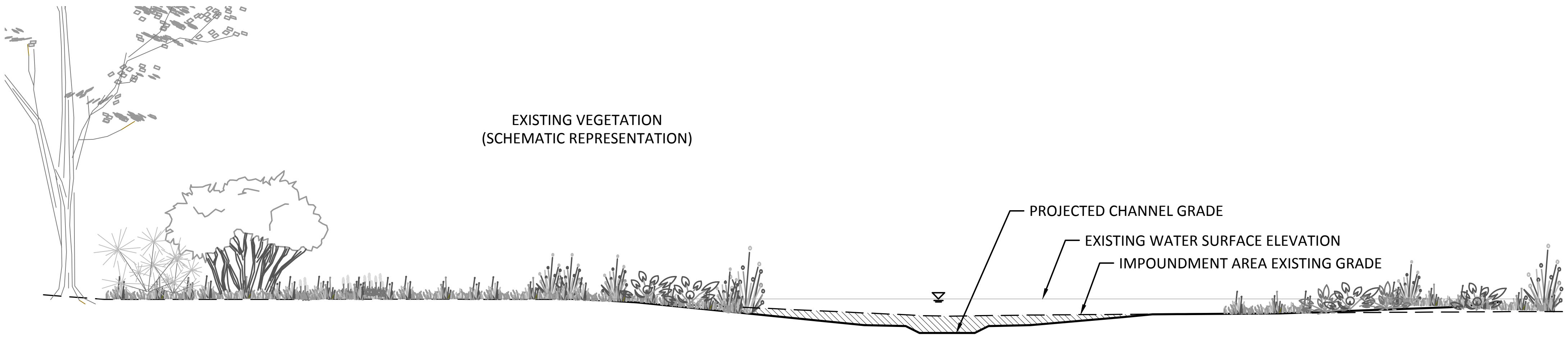
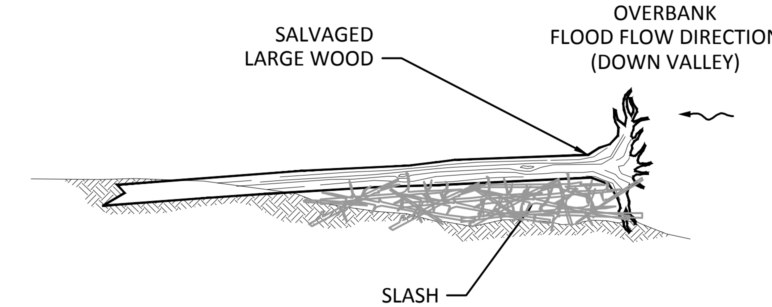
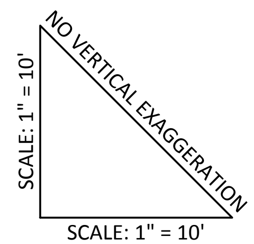
CULVERT PLAN AND PROFILE

SHEET 4 OF 9

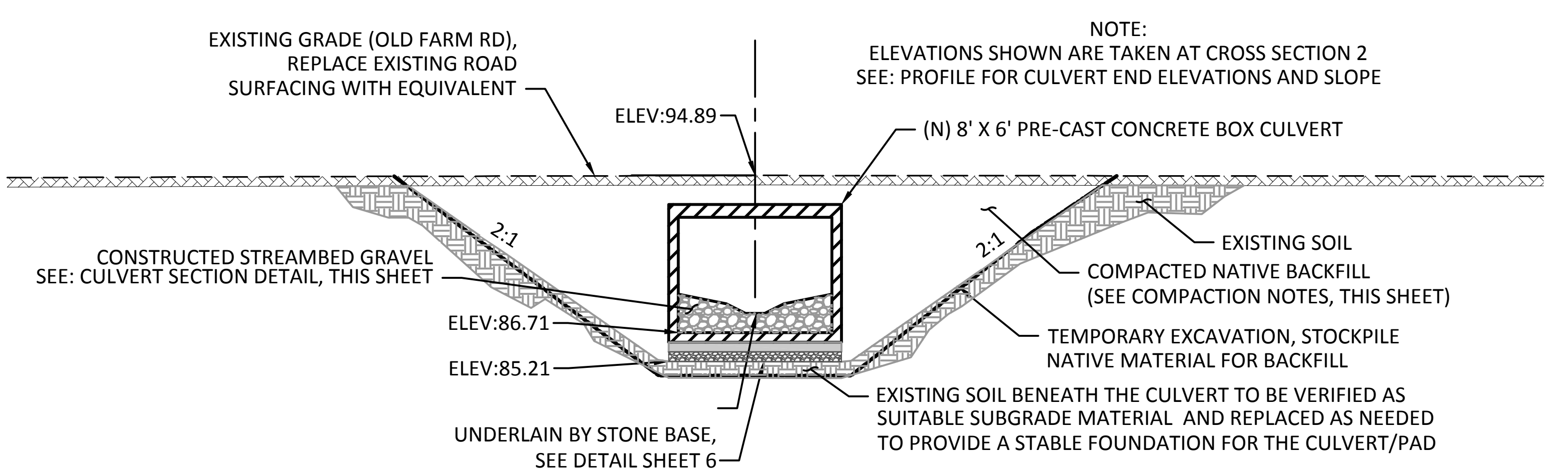


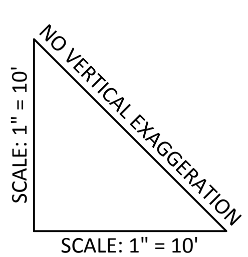


2/5 LARGE WOOD AND SLASH PLACEMENT FOR FLOODPLAIN ROUGHNESS
TYPICAL DETAIL
NTS



1/5 CROSS SECTION THROUGH IMPOUNDMENT
HORIZONTAL AND VERTICAL SCALES: 1" = 10'





3/5 CROSS SECTION AT ROAD
HORIZONTAL AND VERTICAL SCALES: 1" = 10'

COMPACTION NOTES:

PLACE BACKFILL AROUND THE CULVERT EVENLY AND LEVEL IN SIX (6) INCH LIFTS, BELOW THE MIDPOINT OF THE CULVERT. LIFT DEPTH LESS THAN 6", MAY BE NECESSARY TO ACHIEVE DENSITY REQUIREMENTS WHERE HAND OPERATED COMPACTION EQUIPMENT IS USED.

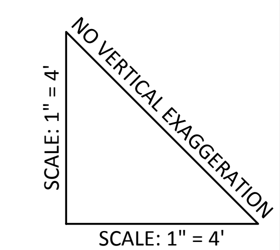
THOROUGHLY COMPACT EACH LIFT TO 95% DENSITY AND +/- 20% MOISTURE AS DETERMINED BY SOIL TYPE AND RELATIVE TO STANDARD PROCTOR BEFORE ADDING SUCCESSIVE LIFTS.

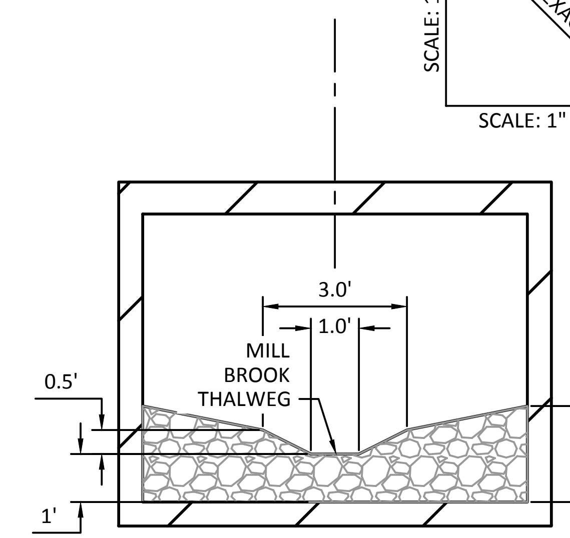
SCARIFY (ROUGHEN) THE TOP TWO (2) INCHES OF COMPACTED SURFACES WHICH HAVE A SLICK, SMOOTH, OR GLOSSY FINISH AFTER EACH COMPACTION.

PLACE BACKFILL ABOVE THE CULVERT MIDPOINT WITH MAXIMUM TWELVE (12) INCH LOOSE LIFTS. SCARIFY COMPACTED SURFACE AS BEFORE.

BACKFILL TO CONTAIN NO DEBRIS, ORGANIC MATTER, FROZEN MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN 1/2 THE THICKNESS OF THE COMPACTED LAYERS BEING PLACED.

DO NOT DAMAGE CULVERT DURING COMPACTING OPERATIONS.





CONSTRUCT STREAMBED GRAVEL:
1' DEPTH AT THALWEG
2' DEPTH AT BOX SIDES

4/5 CULVERT SECTION DETAIL
HORIZONTAL AND VERTICAL SCALES: 1" = 4'

NO.	BY	DATE	REVISION DESCRIPTION

SJ, DF (DRAWN)	NN,KC (DESIGNED)	MB (CHECKED)
MB (APPROVED)	12/23/15 (DATE)	14-05-10 (PROJECT)

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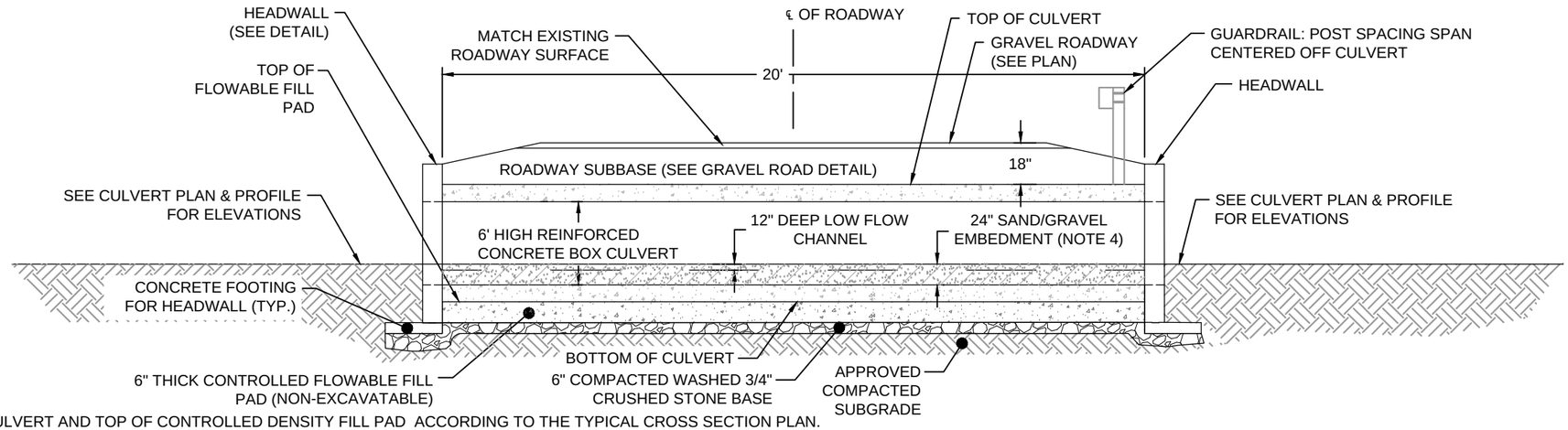
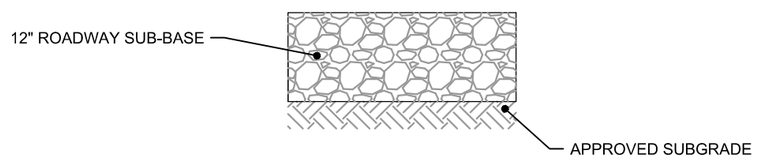
TYPICAL CROSS SECTIONS



NOTES:
1. SET CULVERT AND TOP OF CONTROLLED DENSITY FILL PAD ACCORDING TO THE TYPICAL CROSS SECTION PLAN.
2. DESIGN LOADING FOR THE BOX CULVERT ARE H-20.
3. MANUFACTURER DRAWINGS AND CALCULATIONS FOR ALL SECTIONS OF THE BOX CULVERT SHALL BE PREPARED AND STAMPED BY A MASSACHUSETTS REGISTERED PROFESSIONAL ENGINEER AND SHALL BE SUBMITTED FOR REVIEW.
4. REFER TO PROFILE VIEW OF RESTORED STREAM, CHANNEL FOR DETAILS OF LOW-FLOW CHANNELTHROUGH CULVERT & EMBEDMENT MATERIAL. ALL MATERIALS SHALL BE SUBJECT TO ENGINEER APPROVAL.
5. EXISTING SOILS MUST BE VERIFIED DURING EXCAVATION AND REPLACED AS NECESSARY TO PROVIDE A STABLE FOUNDATION FOR THE PROPOSED CULVERTS / CULVERT FOUNDATION PAD.
6. COMPACT APPROVED GRAVEL BACKFILL TO 95%. PROTECTION IN 6-9" LIFTS

TYPICAL PRECAST CONCRETE BOX CULVERT PROFILE

NOT TO SCALE



GENERAL NOTES:
1. SUB-GRADE (EXISTING MATERIAL) SHALL CONSIST OF INERT MATERIAL THAT IS HARD, DURABLE STONE AND/OR COARSE SAND, FREE FROM LOAM AND CLAY TO A DEPTH NOT LESS THAN 4-FT BELOW THE FINISH ROAD SURFACE.
2. PLACE SUB-BASE IN MAXIMUM 6"-9" LIFTS (COMPACTED TO 95%).
3. COMPACT SUB-GRADE FILL TO 95% COMPACTION.
4. SEE PLANS FOR ROAD WIDTH AND LOCATION.

TYPICAL GRAVEL ROAD DETAIL

NOT TO SCALE

last modified: 12/22/15 printed: 12/22/15 by jh H:\Projects\2014\14201 Interfluve Mill Brook West Tisbury\Drawings\14201-DE.dwg

Revisions

Rev.	Date	By	Appr.	Description

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax

Checked By: NP
Drawn By: GSG
Design By: GSG
Date: APRIL, 2015

Plan Set: ROTH WOODLANDS CULVERT REPLACEMENT
CHILMARK, MASSACHUSETTS

Plan Title: CULVERT DETAILS (1)

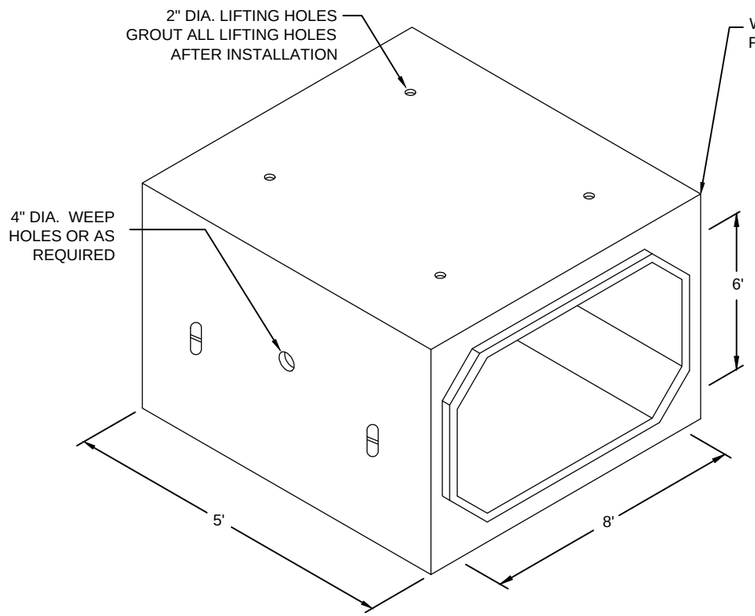
Prepared For: Massachusetts Department of Fish & Game
251 Causeway Steet
Boston, MA 02114
Phone:
Fax: ----

Survey & Preliminary Layout Provided By: Others
Phone:
Fax: |

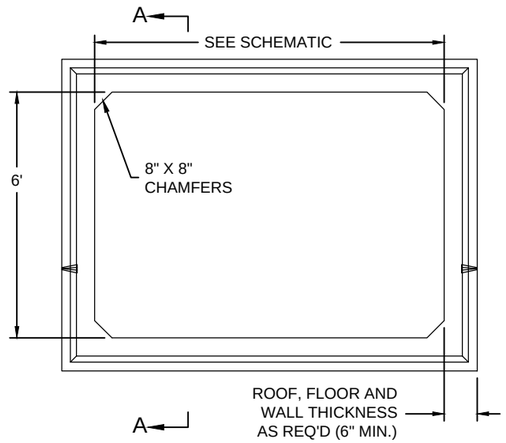
Registration:

Project Number: 14201

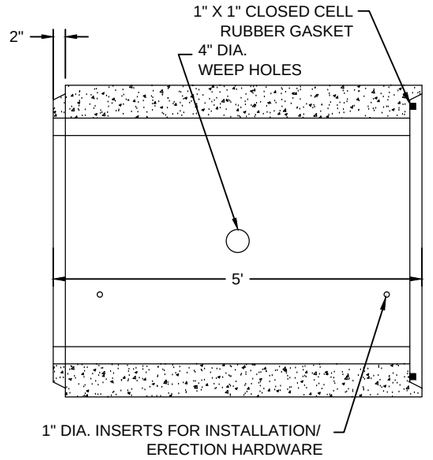
Sheet Number: 6 of 9



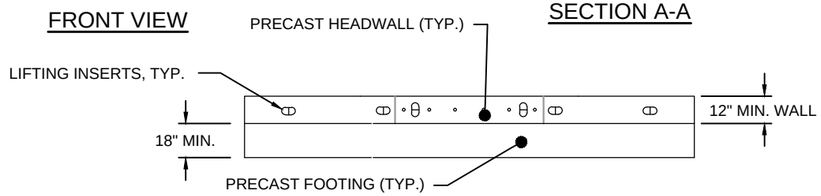
BOX CULVERT SCHEMATIC

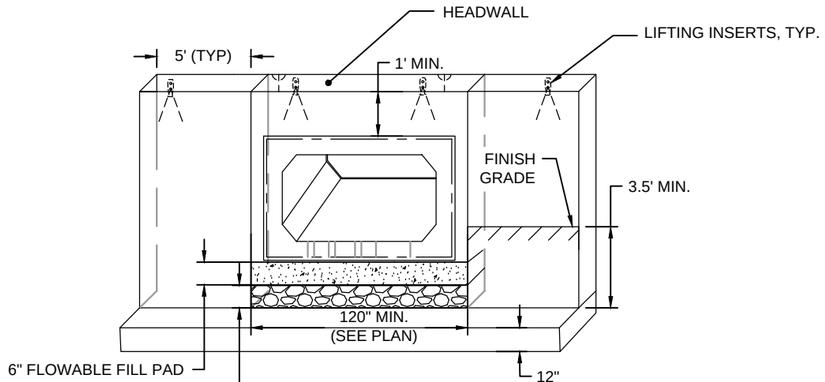


FRONT VIEW



SECTION A-A





FRONT ELEVATION

HEADWALL PLAN VIEW

GENERAL NOTES:

1. CONCRETE: 5,000 P.S.I MINIMUM COMPRESSIVE STRENGTH @ 28 DAYS.
2. STEEL REINFORCING BAR: ASTM A-615, GRADE 60. STEEL REINFORCING BARS TO BE EPOXY COATED (ASTM D3963) TO PREVENT CORROSION OR OTHER APPROVED EQUIVALENT.
3. COVER TO STEEL: 2" MINIMUM UNLESS OTHERWISE NOTED.
4. CULVERT SECTIONS SHALL BE DESIGNED TO MEET ASTM C1433 AND ACI 318 WITH AASHTO HS-20 LOADING.
5. CONSTRUCTION JOINTS:
   - 5.1. CULVERT JOINTS SEALED WITH 1" DIA. BUTYL RUBBER OR EQUIVALENT.
   - 5.2. WINGWALL JOINTS SEALED WITH 1" SQ. NEOPRENE CORD IN SHIPLAP JOINT.
8. WRAP ALL CONSTRUCTION JOINTS WITH A 2' WIDE (MIN.) STRIP OF FILTER FABRIC (MIRAFI 140N OR APPROVED EQUIVALENT). OVERLAP FABRIC BY AT LEAST 12-INCHES.
9. SECTIONS SHALL BE FASTENED TO EACH OTHER PER THE MANUFACTURER REQUIREMENTS.
9. SHOP DRAWING AND SUPPORTING CALCULATIONS OF PROPOSED CULVERT MUST BE SIGNED AND STAMPED BY A MA REGISTERED PROFESSIONAL ENGINEER AND BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OF THE CULVERT.

TYPICAL PRECAST BOX CULVERT & VERTICAL HEADWALL DETAIL

NOT TO SCALE

Revisions

Rev.	Date	By	Appr.	Description

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Date: APRIL, 2015

Plan Set: ROTH WOODLANDS CULVERT REPLACEMENT
CHILMARK, MASSACHUSETTS

Plan Title: CULVERT DETAILS (2)

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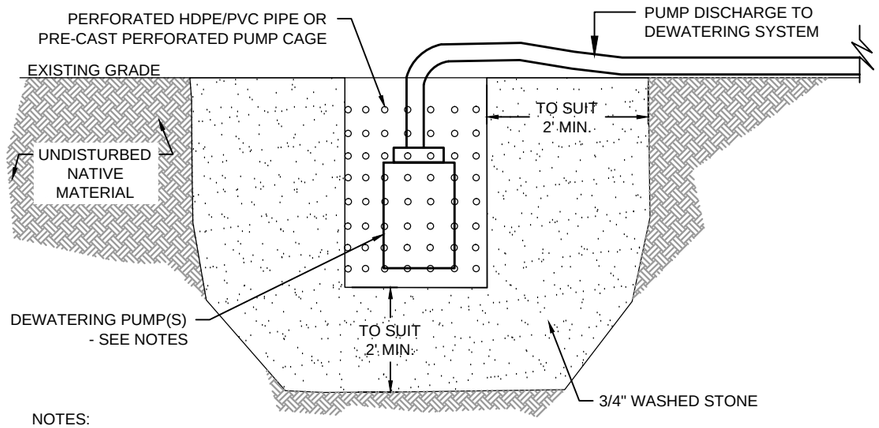
Project Number: 14201

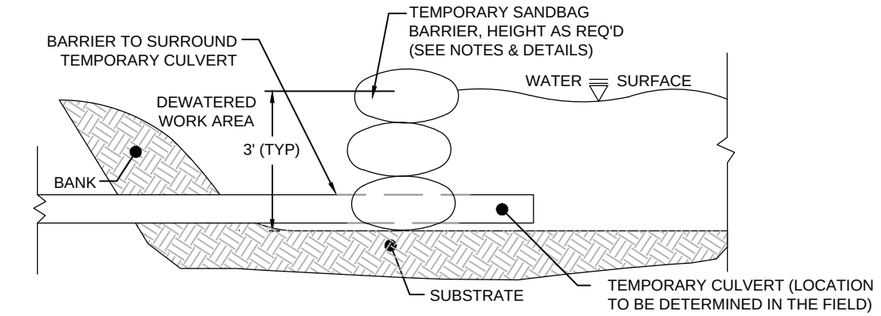
Sheet Number: 7 of 9



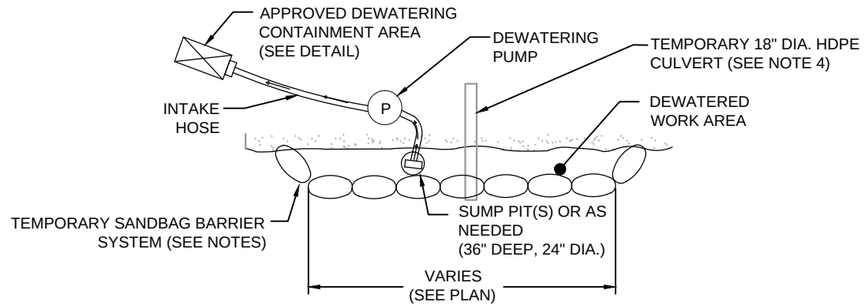
NOTES:
1. ALL EQUIPMENT IS TEMPORARY AND MUST BE REMOVED AFTER USE. STONE AND/OR NATURAL MATERIAL CAN REMAIN.
2. PUMP LOCATION TO SUIT WORK. PUMP SIZE/HP TO SUIT SITE REQUIREMENTS. MULTIPLE PUMPS TO BE INSTALLED WHERE NECESSARY.
3. PUMP CHAMBER SIZE TO BE DETERMINED BASED ON PUMP DIMENSIONS.
4. FINAL DEPTH TO BE DETERMINED BY CONTRACTOR BASED ON EXISTING SITE CONDITIONS.

DEWATERING SUMP DETAIL

NOT TO SCALE



TEMPORARY SANDBAG BARRIER INSTALLATION DETAIL



NOTE: DETAIL APPLICABLE FOR WORK ON EITHER SIDE OF MARSH. MIRROR DETAIL AS APPLICABLE.

DEWATERING PUMPING PLAN
1. THE DEWATERING PLAN, INCLUDING THE TEMPORARY BARRIER SYSTEM TO BE USED, SHALL BE REVIEWED FOR APPROVAL BY THE ENGINEER PRIOR TO DELIVERY TO THE SITE. SANDBAGS, BULK BAGS, WATER-INFLATED BARRIERS BY AQUA-BARRIER, US CONSTRUCTION FABRICS, OR OTHER APPROVED MANUFACTURERS ARE ACCEPTABLE ALTERNATIVES.
2. THE TEMPORARY BARRIER SYSTEM SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER RECOMMENDATIONS, BEGINNING AT THE MOST UPSTREAM LOCATION.
3. ANY SANDBAGS USED IN THE DEWATERING PROCESS SHALL CONSIST OF MATERIALS WHICH ARE RESISTANT TO ULTRA-VIOLET RADIATION, TEAR AND PUNCTURE AND WOVEN TIGHTLY ENOUGH TO PREVENT LEAKAGE OF FILL MATERIAL (I.E. SAND, FINE GRAVEL).
4. TEMPORARY HDPE CULVERT TO BE INSTALLED PARALLEL TO THE PROPOSED CULVERT LOCATION AND WITHIN THE REQUIRED EXCAVATION AREA FOR THE PERMANENT CULVERT. TEMPORARY CULVERT TO BE SEALED THROUGH BARRIER WITH MANUFACTURER APPROVED DEVICE, SUCH AS PIPE PILLOW, OR EQUIVALENT. THERE SHALL BE NO NET INCREASE IN EXCAVATION AREA FOR INSTALLATION OF THE TEMPORARY CULVERT. PIPE BENDS/ANGLES MAY BE REQUIRED TO AVOID IMPACTS TO SURROUNDING WETLANDS. TEMPORARY CULVERT SHALL MAINTAIN STREAM FLOW DURING THE CONSTRUCTION PERIOD UNTIL THE PROPOSED CULVERT IS ON-LINE.
5. ALL DEWATERING CONTAINMENT AREAS AND EROSION/SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY COFFERDAM INSTALLATION AND ACCORDING TO THE CONSTRUCTION PLANS AND DETAILS.
6. ALL EXCAVATED SEDIMENTS OR DEBRIS SHALL BE DISPOSED OF IN AN APPROVED STOCK PILE AREA AND PROTECTED WITH EROSION/SEDIMENT CONTROL BARRIERS. EXCESS SPOILS TO BE DISPOSED AT AN OFFSITE LOCATION, IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS.
7. EROSIONS/SEDIMENT CONTROL DEVICES ARE TO REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE STABILIZED IN ACCORDANCE WITH THE SPECIFICATIONS.

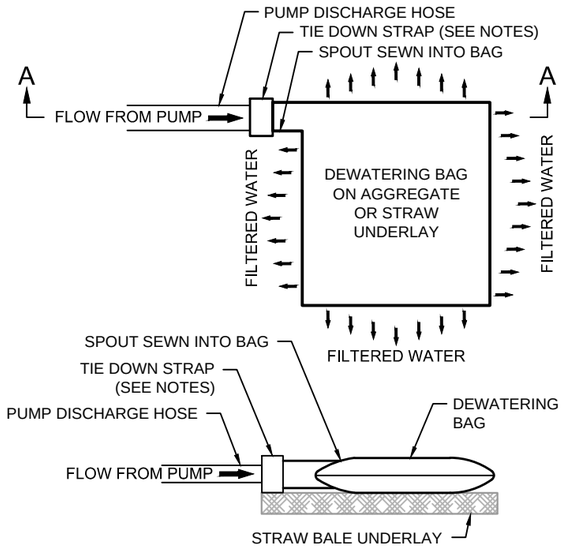
TEMPORARY BARRIER INSTALLATION DETAIL

NOT TO SCALE

INSTALLATION NOTES:
1. PLACE LIFTING STRAPS (NOT INCLUDED) UNDER THE UNIT TO FACILITATE REMOVAL AFTER USAGE
2. UNFOLD DANDY DEWATERING BAG ON STABILIZED AREA OVER DENSE VEGETATION, STRAW, OR GRAVEL (IF AN INCREASED DRAINAGE SURFACE IS NEEDED)
3. INSERT DISCHARGE HOSE FROM PUMP INTO DANDY DEWATERING BAG OR EQUIVALENT A MINIMUM OF SIX INCHES AND TIGHTLY SECURE WITH ATTACHED TIE DOWN STRAP TO PREVENT WATER FROM FLOWING OUT OF THE UNIT WITHOUT BEING FILTERED
4. IF USING OPTIONAL ABSORBENTS, PLACE ABSORBENT BOOM INTO THE DANDY DEWATERING BAG

MAINTENANCE:

5. REPLACE THE UNIT WHEN 1/2 FULL OF SEDIMENT OR WHEN SEDIMENT HAS REDUCED THE FLOW RATE OF THE PUMP DISCHARGE TO AN IMPRACTICAL RATE
6. IF USING OPTIONAL OIL ABSORBENTS, REMOVE AND REPLACE ABSORBENT PILLOW WHEN NEAR SATURATION



SECTION A - A

DEWATERING BAG DETAIL

NOT TO SCALE

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Date: APRIL 2015

Plan Set: ROTH WOODLANDS CULVERT REPLACEMENT
CHILMARK, MASSACHUSETTS

Plan Title: CULVERT DETAILS (3)

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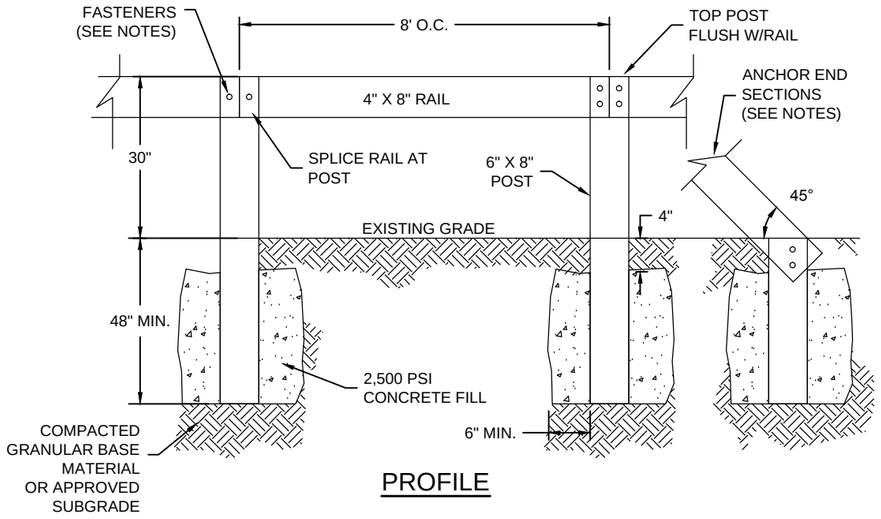
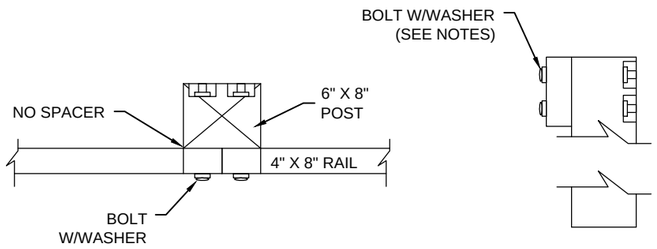


PROFILE



PLAN

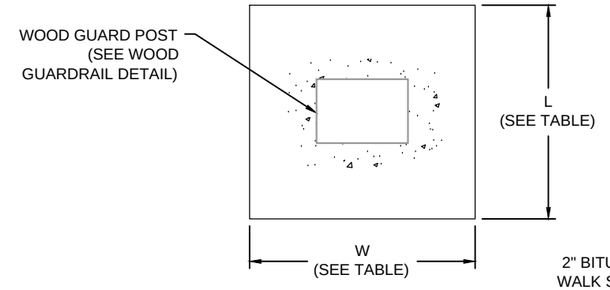
SECTION 1

NOTES:

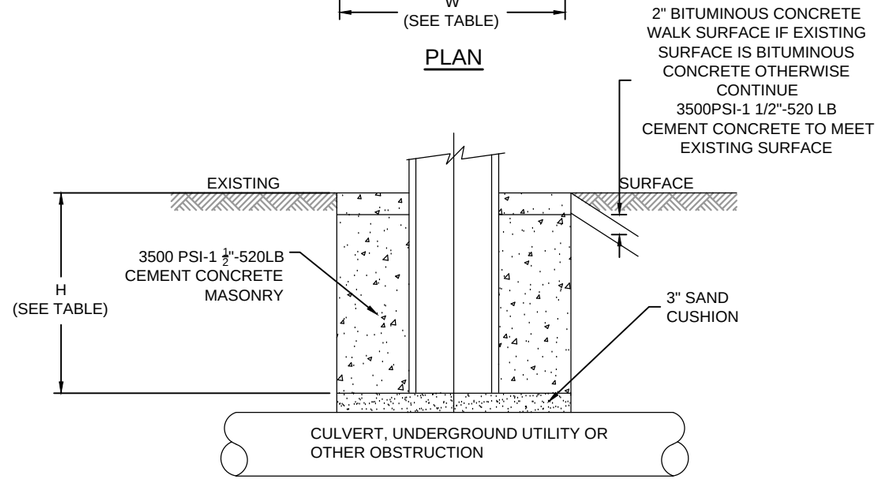
1. POST AND RAILS TO BE PRESSURE TREATED LUMBER.
2. ALL SPLICES ARE TO BE MADE AT POSTS.
3. BUMPER ANCHORS SHALL BE RAIL BOLTS WITH NUTS AND WASHER CONNECTION. FASTENERS SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL MATCHING ASTM A153 AND ASTM A653.
4. THE CONTRACTOR SHALL INSTALL TWO ¾"Ø BOLTS AT EACH RAIL TO POST CONNECTION.
5. COMPACTED GRAVEL BELOW POST AND EXTEND POST TO THE BASE OF THE GRAVEL FOR DRAINAGE PRIOR TO SETTING IN CONCRETE.
6. WOOD POSTS SHALL BE NOTCHED AS NECESSARY TO FACILITATE CURVES AND CHANGES IN DIRECTION. RAIL SHALL BE CUT TO CREATE A RAIL TO RAIL FLUSH FACE JOINT AS NECESSARY.
7. BEGINNING & END SECTIONS SHALL BE ANCHORED INTO THE GROUND A MINIMUM 1-FOOT BELOW FINISH GRADE AND BOLTED TO A POST SET FLUSH WITH FINISH GRADE.
8. ALTERNATIVE FOR POST INSTALLATION, HYDRAULIC DRIVE POST PLUMB, SEE SPEC.

WOOD GUARDRAIL

NOT TO SCALE



PLAN



ELEVATION

HEIGHT OF EXISTING SURFACE ABOVE TOP OF SAND CUSHION	DIMENSION OF CONCRETE ENVELOPE		
	H HEIGHT OF SURFACE ABOVE SAND CUSHION	W	L
1'-0" - 1'-6"	VARIES 1'-0" TO 1'-6"	2'-6"	2'-6"
1'-6" - 2'-6"	VARIES 1'-6" TO 2'-6"	2'-0"	2'-0"
OVER 2'-6"	2'-6"	1'-6"	1'-6"

GENERAL NOTES:

1. DETAIL SHALL BE USED WHERE STANDARD GUARD POST EMBEDMENT IS NOT FEASIBLE.
2. GUARD POST INSTALLATION SHALL CONFORM TO MassDOT CONSTRUCTION STANDARD E401.12.0.
3. NOT TO BE USED ON MORE THAN 2 POSTS IN A ROW.

MODIFIED GUARD POST INSTALLATION DETAIL

NOT TO SCALE

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