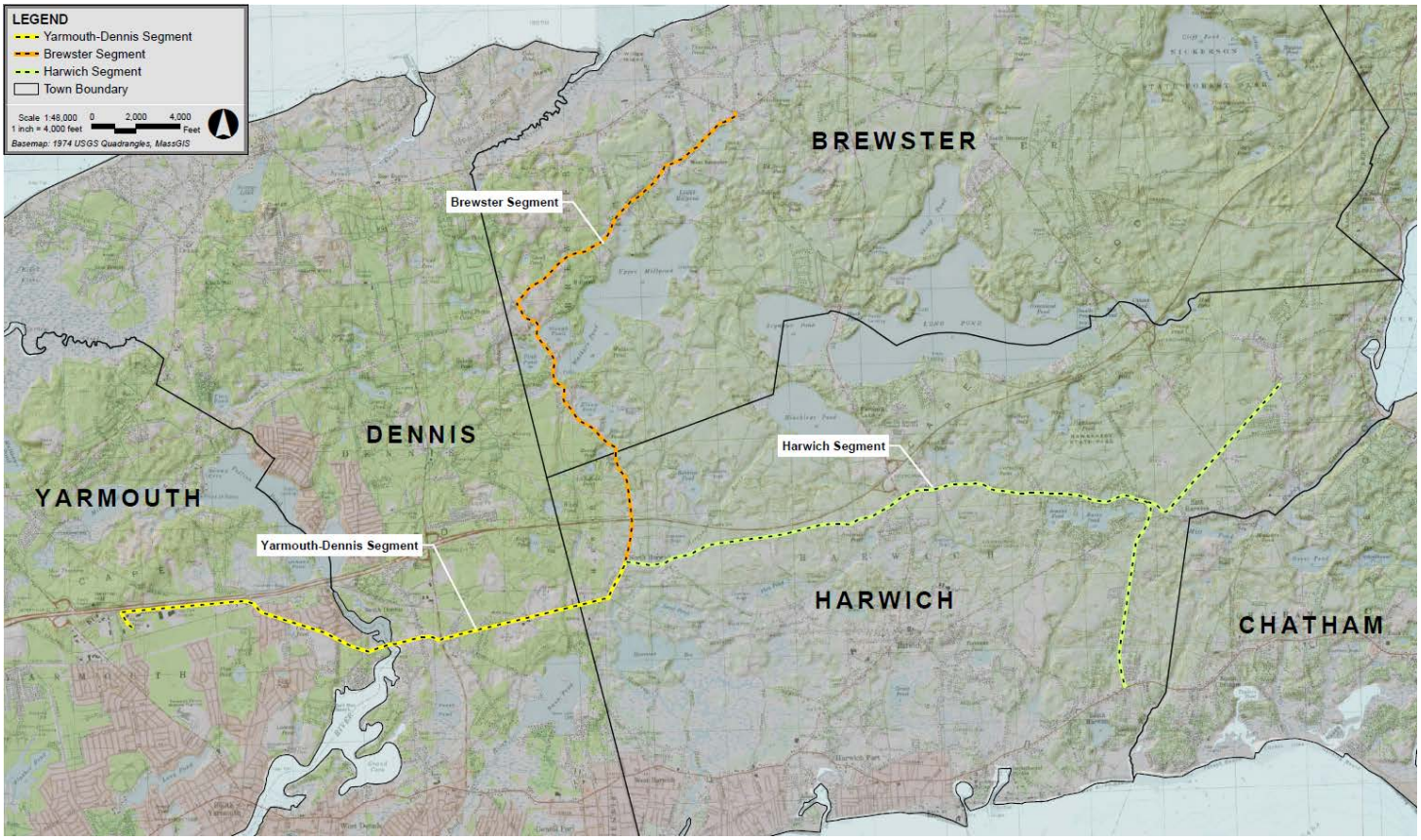
DEVELOPMENT OF REGIONAL IMPACT EXEMPTION APPLICATION

Mid-Cape Main Replacement Project



Submitted to:
Cape Cod Commission
3225 Main Street
Barnstable, Massachusetts 02630

Submitted by:
Colonial Gas Company d/b/a National Grid
40 Sylvan Road
Waltham, Massachusetts 02451

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In Association with:
CHA Companies
Gray & Pape, Inc.
Keegan Werlin LLP

April 26, 2016

Epsilon ASSOCIATES INC.

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List of Acronyms

AUL Activity and Use Limitation
BMP Best Management Practice
BREPC Barnstable County Regional Emergency Planning Committee
CCC Cape Cod Commission
CMR Code of Massachusetts Regulations

CS	Coated steel
DPU	Department of Public Utilities
DPW	Department of Public Works
DRI	Development of Regional Impact
ECP	Environmental Construction Plan
EEA	Executive Office of Energy and Environmental Affairs
EFSB	Energy Facilities Siting Board
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
HDPE	High Density Polyethylene
LNG	Liquefied Natural Gas
LSCSF	Land Subject to Coastal Storm Flowage
LSP	Licensed Site Professional
MAOP	Maximum Allowable Operating Pressure
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MCP	Massachusetts Contingency Plan
MEOW	Maximum Envelope of Water
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MHHW	Mean High High Water
MOM	Maximum of Maximums
MPS	Minimum Performance Standard
NESHAP	National Emission Standards for Hazardous Pollutants
NHESP	Natural Heritage and Endangered Species Program
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PE	Polyethylene
PLAAP	Priority Land Acquisition Assessment Project
PSIG	Pounds per square inch gauge
PVC	Polyvinyl Chloride
RFA	Riverfront Area
RPP	Regional Policy Plan
RTN	Release Tracking Number
SCADA	Supervisory Control and Data Acquisition
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SLRP	Sagamore Line Reinforcement Project
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
TMP	Traffic Management Plan
TSS	Total Suspended Solids
ULSD	Ultra-Low Sulfur Diesel
URAM	Utility-Related Abatement Measure

Section 1.0

Introduction/Application Cover Sheet

1.0 INTRODUCTION/APPLICATION COVER SHEET

Colonial Gas Company d/b/a National Grid ("Colonial Gas" or the "Company") is proposing to undertake the "Mid-Cape Main Replacement Project" to replace approximately 18.1 miles of its existing 200-pound per square inch gauge ("psig") natural gas distribution main system in the Towns of Yarmouth, Dennis, Harwich, and Brewster (the "Project") (see Figures 1-1 and 1-2 in Attachment A). In mid-2014, while investigating the existing 200-psig system, the Company made the precautionary decision to reduce the pressure to an operating pressure of less than 125 psig. This decision was made to ensure public safety. The lower operating pressure reduces the volume of gas the Company can supply under high-demand conditions. As a result, the Company decided to institute a moratorium on new and expanded gas services (including conversions) on portions of the mid-Cape and all of the lower Cape Cod regions.[1] Based on the inspections, the Company also determined that approximately 18.1 miles of the 200-psig system needed to be replaced.

Approximately 17.9 miles of the replacement main will be new 12-inch-diameter coated steel ("CS") pipe. The westernmost 0.2 miles (approximately 1,000 feet) of the Project (from the current Regulator Station #3920 in South Yarmouth to the existing 12-inch "Middle Segment" main in Whites Path) is proposed as 20-inch-diameter CS pipe that will replace the existing single 12-inch-diameter pipe to eliminate a bottleneck in the system. The Project will be installed within the existing roadway layout, either beneath pavement or within 10 feet of pavement.[2] There will be no changes to land use, nor any significant environmental impacts from the Project.

This Development of Regional Impact ("DRI") Application to the Cape Cod Commission ("CCC") demonstrates that, due to the lack of regional impacts, this Project should be exempt from further review. The Application is structured as follows:

- The remainder of this section provides the required Application Cover Sheet ("Attachment 2" to the Cover Sheet is provided as Attachment B of this Application);
- Section 2 includes a detailed narrative describing the Project, its potential impacts, and proposed mitigation measures; and

---

[1] The moratorium means that the Company cannot connect new customers to the network or increase the amount of natural gas supplied to existing customers in the following communities: Dennis, Harwich, Brewster, Chatham, Orleans, and Eastham. Barnstable and Yarmouth are also affected, but certain new customers may connect in those towns following review/approval from the Company. Certain new customers in Barnstable and Yarmouth may connect to the extent the customer requests do not trigger incremental Liquefied Natural Gas ("LNG") needs at portable sites in Chatham and Eastham.

[2] Almost all of the proposed replacement main will be installed under pavement, with the exception of the remotely-controlled operating valves, where minor offsets are required to locate the valve vaults in the shoulder of the roadway. These remotely-controlled operating valves will be installed within 10 feet of pavement.

- Section 3 is a detailed discussion of the Project's consistency with the Regional Policy Plan ("RPP").

Additional information is provided in various attachments to this application as follows:

- Figures (Attachment A);
- Attachment 2 to the Cover Sheet, DRI Exemption Application (Attachment B);
- Project Engineering Plans (Attachment C);
- List of parcels within 400 feet of the Project that potentially contain private wells (Attachment D);
- Massachusetts Environmental Policy Act ("MEPA") Certificates and comment letters (Attachment E);
- Draft Environmental Construction Plan ("ECP") (Attachment F), which will be a "living" document that can be updated as conditions require;
- Wetlands Assessment Maps (Attachment G);
- DRI Exemption Application Circulation List (Attachment H);
- Draft Traffic Management Plans ("TMPs") (Attachment I); and
- Letter from the Energy Facilities Siting Board ("EFSB") determining that no further inquiry is required for the 1.6 miles along Orleans Road in Harwich (i.e., the Eastern Segment of the Sagamore Line Reinforcement Project) (Attachment J).

The Company will provide the entire record of prior MEPA and EFSB proceedings, or any part thereof, upon request of the Commission or its staff.

Application Cover Sheet

Cape Cod Commission
3225 Main Street, PO Box 226
Barnstable, MA 02630
Tel: (508) 362-3828 • Fax: (508) 362-3136

For Commission Use Only
Date Received:
Fee ($):
Check No:
File No:

A Type of Application (check all that apply)

- [ ] Development of Regional Impact (DRI)
- [ ] Hardship Exemption
- [ ] Limited DRI Review
- [ ] Jurisdictional Determination
- [X] DRI Exemption
- [ ] Request for Joint MEPA/DRI Review

B Project Information

Project Name: Mid-Cape Main Replacement

Total Site Acreage: ~8.2 acres

Project/Property Location: Yarmouth, Dennis, Harwich, Brewster

Zoning: Residential, commercial, industrial

Brief Project Description:
Include total square footage of proposed and existing development, gross floor area, number of lots existing or to be created, specific uses, description of existing conditions, as applicable (attach additional sheets if necessary).

The Mid-Cape Main Replacement Project involves construction of an 18.1-mile replacement main, which will be 12-inch-diameter with the exception of the first approximately 1,000 feet, which will be 20-inch-diameter. The replacement main will extend along existing roadway layouts in the towns of Yarmouth, Dennis, Harwich, and Brewster.

C Owner(s) of Record

List the following information for all involved parcels. Provide copies of each Deed and Purchase and Sale Agreement and/or evidence of leasehold interest, if applicable, for all involved parcels. Proof of ownership/legal rights for Applicant(s) to proceed with the proposed development must be documented prior to the Commission deeming any application complete (attach additional sheets if necessary).

Map/Parcel	Owner's Name	Lot & Plan	Land Court Certificate of Title #	Registry of Deeds Book/Page #
see attached sheet				

There **ARE/ARE NOT** (circle one) court claims, pending or completed, involving this property (if yes, please attach relevant information).

D Certification

I hereby certify that all information provided on this application form and in the required attachments is true and accurate to the best of my knowledge. I agree to notify the Cape Cod Commission of any changes on the information provided in this application, in writing, as soon as is practicable. I understand failure to provide the required information and any fees may result in a procedural denial of my project.
NOTE: For wireless communication facilities, a licensed carrier should be either an applicant or a co-applicant.

APPLICANT

Applicant(s) Name: Colonial Gas Company d/b/a National Grid Tel: _____ Fax: _____
Address: Attn: Bradley Wheeler, 40 Sylvan Road, Waltham, MA 02451
Signature: [signature] Date: 4-13-16

CO-APPLICANT

Co-Applicant(s) Name: _____ Tel: _____ Fax: _____
Address: _____
Signature: _____ Date: _____

CONTACT

Contact: Holly Carlson Tel: 978-461-6268 Fax: 978-897-0099
Address: Epsilon Associates, Inc., 3 Clock Tower Place, Maynard, MA 01754
Signature: [signature] Date: 4/20/2016

PROPERTY OWNER

Property Owner: _____ Tel: _____ Fax: _____
Address: _____
Signature: _____ Date: _____

BILLABLE ENTITY

Name: _____ Tel: _____ Fax: _____
Address: _____

REQUIRED FILING MATERIALS

The following must be attached to the Application Form at the time of its filing:

☒ Certified List of Abutters (required for all application types except Attachment 5, Jurisdictional Determination). A list of abutting property owners within 300 feet of the boundaries of the development site and their addresses. Include both local and off-Cape addresses when applicable.

- ☒ This list **must** be formatted in three columns consistent with the Standard Label Format designed to print on Avery Labels #5160.
- ☒ List must be certified by the Town Assessor's office. Note: Assessor's offices may take up to 10 days to certify an abutter's list.
- ☒ If there are more than 50 abutters, applicants must provide **three sets** of the certified list on self-adhesive labels.

☒ Required Filing Fee. Please calculate according to the Schedule of Fees (see Enabling Regulations, Section 14). Please make check payable to **BARNSTABLE COUNTY TREASURER.**

☒ An 8 1/2"x 11" copy of the U.S.G.S. quadrangle map of the area, containing sufficient information for the Commission to locate the site of the proposed development. See Figure 2-1 in Attachment A.

☒ Development Plans. File as required for each application type you are making. See list of Attachment(s) below for specific instructions. See Attachment C.

☒ Permits or Actions. List of local, state, or federal agencies or boards from which a permit or other actions have, will, or may need to be sought. Include agency/board name, type of permit, date filed, and file number. If one of the listed permits or actions requires the filing of an Environmental Notification Form under the Massachusetts Environmental Policy Act (MEPA), please contact the Commission's Chief Regulatory Officer to discuss the potential for joint Commission and MEPA review. For information on MEPA regulations contact the Executive Office of Energy and Environmental Affairs, MEPA Unit, at (617) 626-1020. Please attach all relevant MEPA documents and describe the status of the MEPA filing. See Table 2-3.

Applicants must also submit the necessary attachment(s) based on the type of application(s) being made:

Attachment 1:	DRI Application Filing Procedures & Requirements
Attachment 2:	DRI Exemption Application Filing Procedures & Requirements
Attachment 3:	Hardship Exemption Application Filing Procedures & Requirements
Attachment 4:	Limited DRI Review Application Filing Procedures & Requirements
Attachment 5:	Jurisdictional Determination Application Filing Procedures & Requirements
Attachment 6:	Joint MEPA/DRI Review Application

ATTACHMENT TO APPLICATION COVER SHEET (SECTION C)

SECTION C OWNERS OF RECORD

Map/Parcel	Owner's Name
Whites Path	Town of Yarmouth
North Main Street	Town of Yarmouth
Great Western Road	Town of Dennis
Highbank Road	Town of Dennis
Upper County Road	Town of Dennis
Great Western Road	Town of Dennis
Depot Street	Town of Harwich
Main Street	Town of Harwich
Queen Anne Road	Town of Harwich
Depot Road	Town of Harwich
Orleans Road	Town of Harwich
Depot Road	Town of Harwich
Slough Road	Town of Brewster
Satucket Road	Town of Brewster
Stony Brook Road	Town of Brewster

Section 2.0

Project Narrative

2.0 PROJECT NARRATIVE

The Project that is the subject of this Application is construction of a 200-psig replacement main in the towns of Yarmouth, Dennis, Harwich, and Brewster. Because the replacement main will be installed within existing roadway layouts either beneath pavement or within 10 feet of pavement (but mostly beneath pavement), there will be no significant permanent impacts. In addition, as described herein, limited and temporary construction-related impacts have been avoided, minimized, and mitigated through route selection, installation methods, and construction best management practices ("BMPs"). The Project will have no permanent impacts to land uses, will not change existing land uses, and will have no significant visual impacts.

2.1 Standard for Project Approval

The statutory standard for a DRI Exemption is from Section 12(k) of the Cape Cod Commission Act:

> *"Any applicant may apply to the commission for an exemption from commission review because the location, character and environmental effects of the development will prevent its having any significant impacts on the values and purposes protected by this act outside of the municipality in which the development is to be located..."*

As demonstrated in this DRI Exemption Application, the Project meets this standard for a number of reasons. Given that the replacement main is proposed entirely within existing roadway layout, either beneath pavement or within 10 feet of pavement, the Project is entirely within previously-disturbed areas and will have no impacts to archaeological resources. Furthermore, the Project will not result in any change in land use, and the replacement main will be installed parallel to the existing main. The Project will have no adverse impacts to floodplain or wetland resource areas, and will have no impacts to rare species or protected habitats. The Project will not result in any tree cutting, and if minor vegetation trimming is needed to accommodate construction, those areas will be returned to their preexisting condition upon completion of construction. There will be no significant visual impacts from the Project.

Because the Project is proposed entirely within existing roadway layouts, construction-period traffic management is being carefully considered and will be coordinated with the affected towns to ensure that any temporary traffic impacts from construction are minimized to the extent possible and that safe and efficient travel is maintained. Finally, the Project is consistent with the goals and Minimum Performance Standards ("MPS") in the Cape Cod Commission's Regional Policy Plan, further demonstrating the lack of significant and permanent environmental or human/community-related impacts.

For all of these reasons, the Project's location, character, and environmental effects will not have any significant impacts of a regional scale, and qualifies for a DRI Exemption from further Cape Cod Commission review.

2.2 Project Description and Need

The Mid-Cape Main Replacement Project involves replacing approximately 18.1 miles of existing 200-psig natural gas distribution main system in the Towns of Yarmouth, Dennis, Harwich and Brewster (the "Project") (see Figures 2-1 and 2-2). The Company's existing 200-psig system includes 10-inch, 8-inch and 6-inch-diameter CS pipe. The oldest portions of the 200-psig system date to the mid-1960s and 1970s (on the Yarmouth-Dennis Segment as well as the southeastern-most portion of the Harwich Segment of this Project), with other portions having been installed in the mid-1990s (most of the Harwich Segment as well as the Brewster Segment). Figure 1-1 is a simple locational map of the Company's existing 200-psig system on an aerial photo base; Figure 1-2 provides the same simple locational mapping, but on a USGS topographic base map.

As a local natural gas distribution company, the Company's core obligation is to provide safe, reliable, and low-cost gas service to its customers. The primary driver of the Project need is the condition of the existing system and its effect on the Company's ability to provide safe and reliable service to existing and future customers on the Cape Cod gas distribution network during periods of peak demand (i.e., design weather conditions).

The Company's investigation into the condition of the 200-psig system on the Mid- and Lower-Cape started in early 2014, when the Company responded to a gas odor complaint. The Company discovered a substandard condition on a service connected to the 200-psig distribution main. The Company took immediate action to address the safety-related condition. The finding prompted the Company to initiate an investigation that involved inspection of the 200-psig system in Yarmouth, Dennis, Brewster, and Harwich and a review of its records. Specifically, the Company completed inspections of the system and confirmed a total of 30 substandard gas services connected to the 200-psig system. In each case, these services were immediately replaced. In addition, the Company systematically sampled (i.e., excavated and examined) 27 welds on the 200-psig system. Nondestructive testing of the welds confirmed that 9 welds did not meet present day welding codes. Further, the Company found three discrepancies where field conditions (i.e., actual diameter of pipe installed) differed from Company records.

In mid-2014, while continuing its investigation, the Company made the precautionary decision to reduce the pressure in the 200-psig system to an operating pressure of less than 125 psig. This decision was made to ensure public safety. The lower operating pressure reduces the volume of gas the Company can supply under high-demand conditions. As a result, the Company decided to institute a moratorium on new and expanded gas services

(including conversions) on portions of the mid-Cape and all of the lower Cape Cod regions.[1] The reduction in operating pressure to less than 125 psig has also resulted in increased reliance on existing portable LNG units to meet peak demand for existing customers. As a result of the inspections and record review, the Company also determined that approximately 18.1 miles of the 200-psig system needed to be replaced in order to lift the moratorium.

Construction of the proposed 18.1-mile replacement main will allow the Company to restore system pressures to 200 psig, thus strengthening downstream pressure and providing for adequate supply to lift restrictions on new services, expanded services, and conversions on the Mid- and Lower-Cape. It will also once again reduce the Company's reliance on portable LNG. Prior to the new customer demand restrictions, the Company's most recent forecast (from 2014) of customer growth predicted that demand for natural gas on the Cape would increase by 15% over the next five years, with an average annual growth rate of 3%. This demand for natural gas service comes both from new development and the continuing demand from oil-to-gas conversions, primarily for heating. Because of the moratorium and deferral of new customer connections, pent-up demand is anticipated to be high when capacity becomes available again. The Mid-Cape Main Replacement Project is a multi-stage project designed to ensure the continued reliability of the natural gas distribution system and to restore the operating pressure of the distribution main at 200 psig. Upon completion, the Project will provide integrity of construction, supported with appropriate testing and construction records, to ensure safe and reliable operations into the future.

2.3 Project Overview

To satisfy the Project need, the Company is proposing to replace approximately 18.1 miles of its existing 200-psig natural gas distribution system in the Towns of Yarmouth, Dennis, Harwich, and Brewster. The proposed Project is shown on Figures 2-1 and 2-2. A set of larger-scale maps showing the route on an aerial base is provided as Figure 2-3. Approximately 17.9 miles of the replacement main will be new 12-inch-diameter CS pipe. The westernmost 0.2 miles (approximately 1,000 feet) of the Project (from the current Regulator Station #3920 in South Yarmouth to the existing 12-inch "Middle Segment" main in Whites Path) is proposed as 20-inch-diameter CS pipe that will replace the existing single 12-inch-diameter pipe to eliminate a bottleneck in the system. Use of this short segment of larger-diameter main will allow increased flow into the two 12-inch pipes fed by this short segment of pipe: the existing 12-inch "Middle Segment" main in Whites Path and the

[1] The moratorium means that the Company cannot connect new customers to the network or increase the amount of natural gas supplied to existing customers in the following communities: Dennis, Harwich, Brewster, Chatham, Orleans, and Eastham. Barnstable and Yarmouth are also affected, but certain new customers may connect in those towns following review/approval from the Company. Certain new customers in Barnstable and Yarmouth may connect to the extent the customer requests do not trigger incremental LNG needs at portable sites in Chatham and Eastham.

parallel 12-inch replacement main (to be constructed). This increased flow will improve pressures at the end of the 200-psig system (meaning higher inlet pressures at 60-psig regulator stations) during peak periods of demand, thus maintaining appropriate outlet pressures at the 60-psig regulator stations.

The 18.1-mile replacement main will be designed and tested for 270 psig, with normal operation at 200 psig. Pre-operational testing of the replacement main for 270 psig will facilitate future capacity increases of the main, should an increase become necessary, without having to take the main out of service for testing at that time. While the Company has no plans to operate this main above 200 psig for the foreseeable future, testing for an operating pressure of 270 psig at the time of original installation is also much more cost effective. Prior to any future increase in the main's operating pressure from 200 psig to 270 psig, the Company would be required to develop a formal up-rating plan for review by the Massachusetts Department of Public Utilities ("DPU") in accordance with Federal Code Part 192 and Code of Massachusetts Regulations ("CMR") 220.

Using uniform 12-inch steel pipe (aside from the short stretch of 20-inch main on Company property at the westernmost end of the Project) will enable more efficient future in-line inspections of the entire main, thus helping to maintain system integrity in the future. The Company's present-day policies and standards require the replacement main to be "piggable," or designed to allow for in-line inspections. This allows in-line inspection tools to travel through the pipe and measure and record any irregularities to the pipe wall that could be the result of corrosion or damages caused by external forces. Constructing an in-line, inspection-enabled main allows for improved safety and reliability of the asset. Furthermore, present-day pipeline construction standards call for consistent diameters along new mains.

Once the replacement main is complete, the vast majority of the existing main will be decommissioned and abandoned in place. However, a few short sections of the existing main are proposed for continued use at a reduced pressure of 60 psig to allow the Company to eliminate existing high pressure services, or "farm taps" currently connected to the existing 200-psig system (see Section 2.3.2).

The proposed replacement main will be installed along the same route as the existing main, with the only exception being the easternmost 800 feet on Queen Anne Road, where there is no existing main; this minor deviation from the existing route will reduce sharp bends and minimize temporary construction impacts to the Route 39 rotary.[2] The majority of the replacement main will be installed under pavement, and no portion of the Project will be

[2] At the eastern end of the Harwich Segment, the existing 200-psig distribution main travels east on Queen Anne Road before turning south onto Depot Road and turning northeast on Orleans Road, ending at the intersection with Church Street (see Figures 1-1 and 1-2).

more than 10 feet off the paved surface. There will be no permanent impact to any land uses as a result of the Project. The majority of the replacement main will be installed within three feet of the existing main, with only a few locations where replacement pipe will need to be installed across the street but parallel to the existing line. The Company's design engineers have been working with Town Department of Public Works ("DPW") Directors, Town Engineers, and other officials throughout the design process to ensure that the proposed replacement main alignment does not impact existing underground infrastructure or any proposed projects.

The replacement main will supply the existing 60-psig distribution system via six existing regulator stations.

2.3.1 Project Segments

The Project consists of three segments, each of which is described below. Overview graphics showing the Project route are provided on Figures 2-1 and 2-2, while a larger-scale set of graphics is provided as Figure 2-3.

- Yarmouth-Dennis Segment (4.9 miles): This segment involves the replacement of approximately 4.9 miles of 10-inch CS main (200 psig) primarily with 12-inch main. The only exception is approximately 1,000 feet from the Company's property in South Yarmouth at 127 Whites Path to the existing 12-inch Sagamore Line Reinforcement Project ("SLRP") Middle Segment main and existing 200-psig pipeline in Whites Path, which will be replaced with 20-inch main; from this point the diameter of the replacement main will be 12 inches the rest of the way as it travels through portions of the Towns of Yarmouth and Dennis to the intersection of Main Street and Depot Street in North Harwich. The existing 4.7 miles of 12-inch CS main parallel to the existing 200-psig pipeline along this length was installed between 2007 and 2010 as the SLRP's Middle Segment. This existing pipe will not be affected by this Project and will continue to operate at 200 psig.

- Harwich Segment (~8.0-8.1 miles):

  - Replace approximately 4.8 miles of 8-inch CS main with 12-inch CS main from the end of the Yarmouth-Dennis Segment in North Harwich to the intersection of Orleans Road and Depot Road, where the route splits and extends into East Harwich and South Harwich;

- Replace approximately 1.6 miles of 6-inch CS main with 12-inch CS main from the intersection of Orleans Road and Queen Anne Road in East Harwich north along Orleans Road to the end of the 200-psig main at Route 39 and Church Street;[3] and

- Replace approximately 1.6 miles of 6-inch and 8-inch CS main with 12-inch CS main from the intersection of Queen Anne Road and Depot Road in East Harwich south to the end of the 200-psig main at the intersection of Main Street (Route 28) and Depot Road in South Harwich.

♦ Brewster Segment (5.2 miles): This segment involves the replacement of approximately 5.2 miles of 10-inch CS main with 12-inch CS main from the end of the Yarmouth-Dennis Segment at the intersection of Main Street and Depot Street in North Harwich to the intersection of Main Street and Stony Brook Road in Brewster.

2.3.2 High Pressure Service Transfers/Farm Taps

Service lines to individual homes and businesses are typically supplied from smaller-diameter, lower-pressure (60-psig) distribution lines. However, service along certain portions of the existing 200-psig distribution main is currently accomplished via connections directly to the 200-psig main rather than from a separate 60-psig distribution line. This is primarily due to the absence of a 60-psig distribution main in these areas. These direct connections are referred to as "farm taps," where a pressure regulator provides a first-stage pressure reduction at the property line to the standard operating pressure of the service to the premise where a service regulator further reduces the pressure to the appropriate level for standard natural gas equipment inputs suitable for household use. To eliminate 38 farm tap services and provide more typical service through a 60-psig line, the Company is proposing continued use of four sections of the existing 200-psig line, totaling approximately 11,445 linear feet, at a reduced operating pressure of 60 psig. This re-use of infrastructure that is already in the ground is an added Project benefit because the elimination of farm taps simplifies system operations and standardizes the service design to customers. It also minimizes the need for future installation of a new pipe to facilitate farm tap elimination.

The Company is conducting further testing of the existing line, expected to be completed by late Fall 2016, to validate the condition of the pipe, including material properties and welds. This is to ensure that the segments are suitable for continued use at a reduced

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[3] This 1.6 miles of 12-inch-diameter CS main on the easternmost portion of the Harwich Segment was previously reviewed and approved by the MEPA Office and the EFSB as part of the SLRP Eastern Segment in 2005. MEPA required that the Eastern Segment be included in the Company's MEPA filings for the Project. The EFSB's 2006 approval of the Eastern Segment is still in full force and effect. This Project incorporates the Eastern Segment from the SLRP, superseding the need for that separate project, but as a replacement main rather than a new parallel main.

pressure of 60 psig. Although it is anticipated that the existing line will be suitable for use at 60 psig, if for any reason it is deemed unsuitable, then 4-inch and 2-inch polyethylene ("PE") mains will be installed instead to eliminate the high-pressure services and provide the necessary connections to the 60-psig system. The four sections proposed for continued use at 60 psig are described below and are shown on Figure 2-4:

- On the Yarmouth-Dennis Segment:
  - A minimum 60-psig main extension of approximately 5,965 feet on Whites Path in South Yarmouth is required to eliminate farm taps. Continued use of a total of approximately 6,120 linear feet of the existing main from 127 Whites Path to 454 North Main Street in South Yarmouth is proposed to eliminate 22 farm taps and connect the ends of the 60-psig system (if continued use is not possible, this would be accomplished with 4-inch PE);
  - A minimum 60-psig main extension of approximately 1,785 feet on Great Western Road in south Dennis and north Harwich is required to eliminate farm taps. Continued use of a total of approximately 2,225 linear feet of the existing main from 259 Great Western Road in south Dennis to 50 Great Western Road in north Harwich is proposed to eliminate 9 active farm taps and connect the ends of the 60-psig system (if continued use is not possible, this would be accomplished with 4-inch PE).
- On the Harwich Segment (eastern end):
  - A minimum 60-psig main extension of approximately 945 feet on Orleans Road in east Harwich is required to eliminate farm taps. Continued use of a total of approximately 2,600 linear feet of the existing main from 1380 Orleans Road (Route 39) to 1470 Orleans Road is proposed to eliminate 6 active farm taps providing service to a total of 15 customers and connect the ends of the 60-psig system (if continued use is not possible, this would be accomplished with 4-inch PE); and
  - A minimum 60-psig main extension of approximately 100 feet on Orleans Road in east Harwich is required to eliminate farm taps. Continued use of a total of approximately 500 linear feet of the existing main from 1595 Orleans Road (Route 39) to 286 Church Street is proposed to eliminate one active farm tap providing service to one customer and connect the ends of the 60-psig system (if continued use is not possible, this would be accomplished with 2-inch PE to connect to existing 2-inch on either end).

If continued use of the existing main is not possible, the small diameter PE mains would be installed using a one-foot-wide, four-foot-deep trench. If necessary, the approximately 6,120 linear feet of PE main along Whites Path would be installed below pavement. The

remaining PE portions, if needed, would likely be installed in the shoulder of the road within a few feet of existing pavement, and would be located to avoid impacts to trees. These areas would be restored to their existing condition. These activities, which would have the same construction-period controls used for the remainder of the Project, would have no additional environmental impacts. Since this work would occur beneath pavement or within a few feet of that pavement, and thus would be within the disturbed roadbed, archaeological impacts are not anticipated. The construction period would perhaps be slightly longer unless a dedicated crew was used for PE main installation.

Although there would be no significant impacts from installation of the 2-inch and 4-inch PE mains, there are advantages to utilizing the 200-psig segments at a reduced pressure of 60 psig. These are as follows:

- Potential reduction of overall construction timeline;
- Increased efficiency by repurposing infrastructure; and
- Cost savings.

2.3.3 Proposed Project Route

As previously stated, the proposed route for the replacement main follows the routing of the existing 10-inch, 8-inch, and 6-inch 200-psig system. This facilitates the necessary connections to the distribution regulator stations and is consistent with the replacement objective of the Project. The proposed route begins in Yarmouth and passes through Dennis and into Harwich before splitting and extending north into Brewster and further east across Harwich, where the end of the route also has a southern spur. Table 2-1 identifies the proposed replacement main route along roadways, and includes lengths along those roadways. Figure 2-2 shows an overview of the replacement main route, while a larger-scale map of the route is provided as Figure 2-3.

Table 2-1 Replacement Main Route, by roadway/street

Roadway	*Lengths per Current Design Plans*	
	Feet	*Miles*
Yarmouth-Dennis Segment		
Driveway	1,127	0.21
Whites Path	5,932	1.12
North Main Street	479	0.09
Great Western Road	5,272	1.0
Highbank Road (passing into Dennis)	2,925	0.55
Upper County Road	281	0.05
Great Western Way	459	0.09
Great Western Road (passing into Harwich)	7,180	1.36
Depot Street	1,792	0.34

Table 2-1 Replacement Main Route, by roadway/street (Continued)

Roadway	*Lengths per Current Design Plans*	
	Feet	*Miles*
Harwich Segment		
Main Street	1,711	0.32
Queen Anne Road	23,786	4.4
Orleans Road	7,850	1.49
Depot Road (southern spur)	8,645	1.64
Brewster Segment		
Depot Street	5,146	0.97
Slough Road	8,801	1.67
Satucket Road	9,743	1.84
Stony Brook Road	3,905	0.74
Brier Lane	155	0.3

The proposed route will have a number of "special crossings" of features such as waterbodies, culverts, and state roads. These crossings are listed in Table 2-2, along with the proposed method of accomplishing each crossing.

Crossings of waterbodies and drainage features (e.g., culverts) will all be accomplished on existing bridges or within the existing road bed. As shown in Table 2-2:

- There is one river crossing (the Bass River), which will be accomplished by installing the proposed replacement main in an existing utility bay beneath the bridge, from which the existing 1960s-vintage 200-psig main would be removed;
- There are two stream crossings (Herring River and Stony Brook), which will be accomplished by open-cut trenching in the pavement above the existing concrete/granite culverts; and
- There are a number of crossings of drainage pipes that connect wetland areas, where the route will cross by open-cut trenching in pavement above culverts.

The Project will not be attached to any culvert. The Company expects that installation of the replacement main in a utility bay of the Highbank Road Bridge over the Bass River can be accomplished without an in-water vessel. However, it is possible that the installation of the replacement main on the bridge may require an in-water support vessel or, alternatively, scaffolding extended from the bridge deck to ensure proper placement of the main. This may require navigation to be temporarily limited. All required approvals will be secured, and the Company will coordinate as appropriate with the municipalities, MassDOT (which owns the bridge), and the Dennis Harbormaster to the extent such in-water activity is determined to be necessary for construction.

Table 2-2 Bridge and Special Feature Crossings (west to east).

Feature	*Description*	*Crossing Technique*
WATERBODY CROSSINGS		
Yarmouth-Dennis Segment		
Bass River, Highbank Road	Crossing of Bass River via Highbank Road bridge	12-inch pipe will be installed in existing utility bay of bridge
Harwich Segment		
West Reservoir Stream/Herring River, Main Street	Stream crossing: (3) 30″ corrugated metal pipes & granite culvert	Open cut trench (in pavement)
Pipe culvert, Queen Anne Road	24″ reinforced concrete pipe connecting wetlands	
Pipe culvert, Queen Anne Road	12″ reinforced concrete pipe connecting wetlands	
Brewster Segment		
Possible pipe culvert, Slough Road	Drainage pipe connecting to wetlands at Round Pond	Open cut trench (in pavement)
Possible pipe culvert, Slough Road	Drainage pipe connecting wetlands to Elbow Pond	
Pipe culvert at Elbow Pond	18″ drainage pipe connecting wetlands	
Pipe culvert at Slough Pond	12″ corrugated metal pipe connecting wetlands	
Stony Brook/Grist Mill/Herring Run, Stony Brook Road	Stream crossing: 24″ concrete culvert	
SPECIAL ROAD CROSSINGS		
Harwich Segment		
Route 28 (Main Street) & Depot Road	MassDOT road crossing (120 feet)	Trenchless crossing under consideration (possibly open cut trench in pavement)
Brewster Segment		
Route 6 and Depot Street	MassDOT road crossing – Project alignment crosses under Route 6 on Depot Street (no work on Route 6 is required)	Open cut trench (in pavement)

All general open-cut trenching and crossings will be completed according to the typical trench detail shown in Figure 2-5. Where it will not be possible to achieve the normal three-foot (36-inch) cover from top of pavement and a 6-inch clearance above any existing culvert structure below the proposed replacement main, steel plating will be used as shown in the cross-section in Figure 2-6.

A trenchless crossing technique such as jack-and-bore is being considered at the intersection of Route 28 (Main Street) and Depot Road in Harwich. Trenchless crossing techniques are described in Section 2.7.10.2. However, due to space constraints in this area, the Company is working with MassDOT to determine whether open cut trenching may actually have fewer impacts, hence negating the need for a trenchless crossing.

2.4 Project Schedule

The Project is currently planned as three construction phases, with some possibly running concurrently. An additional phase is also possible, as the Company is considering construction of the easternmost 1.6 miles in Harwich prior to the rest of the Project, potentially in the Fall of 2016.[4] Assuming that the Project's environmental reviews, licensing, and permitting can be completed by early 2017, the entire Project is currently slated for completion in 2019. Completion of the Project can occur even earlier if permitting is completed earlier than 2017. As sections of the new replacement main are installed and completed, the Company will analyze whether those sections can be placed into service.

2.5 Permitting and Regulatory Approvals and Consistency with State and Local Environmental Policies

The Project will obtain all environmental approvals and permits required by federal, state, and local agencies and will be constructed and operated to fully comply with federal, state, and local environmental policies. Thus, the Project will contribute to a reliable, low cost, diverse energy supply for the Commonwealth with minimal environmental impact. The Project will secure state permits and necessary authorizations from the Massachusetts Department of Environmental Protection ("MassDEP") and the Massachusetts Department of Transportation ("MassDOT"). The Company has filed a Petition with the EFSB, and completed MEPA review with a final Certificate issued on April 15, 2016 (see Attachment E).

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[4] Construction of 1.6 miles of 12-inch-diameter CS main on the easternmost portion of the Harwich Segment was previously reviewed by the MEPA Office and the EFSB as part of the SLRP's, Eastern Segment in 2005. Subject to review by the Cape Cod Commission and receipt of the necessary Town of Harwich approvals, the Company is considering constructing this segment early in the Mid-Cape Main Replacement Project construction sequence because it does not require a new Section 69J approval by the EFSB (see Attachment J for a letter from the EFSB determining that no further inquiry is required with respect to the Eastern Segment).

On the local level, the Project will work with the Conservation Commissions in each municipality to confirm the exemption under local wetland bylaws for replacement of existing and lawfully located utility facilities and structures, as well as with other local authorities for road opening permits/grants of location pursuant to Chapter 164, Section 70 of the Massachusetts General Laws ("Gas Statute").

Table 2-3, below, identifies the anticipated permits, reviews, and approvals required for the Project. By meeting the requirements for acquiring each of these approvals and permits, the Project will be in compliance with applicable state and local environmental policies. In addition, the Project is also consistent with the Commonwealth's Environmental Justice Policy, because the Company is pursuing an inclusive community outreach plan to facilitate the meaningful opportunity to participate by all and because the Project does not exceed any environmental impacts thresholds that would necessitate enhanced analysis under MEPA. As such, the Project is consistent with the Commonwealth's environmental policies.

Table 2-3 Permits, Reviews, and Approvals Required for the Project

Agency/Regulatory Authority	Permit and/or Purpose of Approval
Federal	
U.S. Environmental Protection Agency ("EPA")	National Pollutant Discharge Elimination System ("NPDES") General Permit for Stormwater
State	
Executive Office of Energy and Environmental Affairs	Massachusetts Environmental Policy Act review
Energy Facilities Siting Board	G.L. c. 164, § 69J Approval
MassDEP	Possible Chapter 91 Minor Project Modifications for culvert crossings of Herring River and Stony Brook, and a Minor Project Modification for the crossing of Bass River via existing road bridge
MassDOT	Access Permit
Regional	
Cape Cod Commission	DRI Review (Exemption)
Local [5]	
Yarmouth Conservation Commission	Negative Determination or Order of Conditions
Yarmouth DPW and/or Board of Selectmen	Approval pursuant to Gas Statute (MGL c. 164, s. 70)
Dennis Conservation Commission	Negative Determination or Order of Conditions
Dennis DPW and/or Board of Selectmen	Approval pursuant to Gas Statute (MGL c. 164, s. 70)
Harwich Conservation Commission	Negative Determination or Order of Conditions
Harwich DPW and/or Board of Selectmen	Approval pursuant to Gas Statute (MGL c. 164, s. 70)
Brewster Conservation Commission	Negative Determination or Order of Conditions
Brewster DPW and/or Board of Selectmen	Approval pursuant to Gas Statute (MGL c. 164, s. 70)

[5] The specific step required to confirm the exemption under local wetland bylaws for replacement of existing and lawfully located utility facilities and structures will be reviewed with each local commission.

2.6 Outreach

2.6.1 Agency Meetings and Consultations

The Company has been actively consulting with state agencies, the CCC, and affected municipalities. A list of meetings conducted to date with municipalities and the CCC is provided in Table 2-4. The Company plans to maintain an active level of consultation and outreach as the design effort continues and the Project enters the licensing and permitting phase.

Table 2-4 Consultations with agencies and municipalities.

Date	*Group and Topic*
November 26, 2014	Cape Cod Delegation (conference call)
December 2, 2014	Town Administrators and Representatives from Yarmouth, Harwich, and Brewster (sales moratorium, main replacement)
December 8, 2014	Brewster Fire Chief Robert Moran
December 16-17, 2014	Eastham and Chatham (LNG contingency plan, fire department training)
December 19, 2014	Harwich Fire Chief Norman Clarke (Project need)
December 30, 2014	Plumbing and Gas Inspectors from Yarmouth, Dennis, Harwich, Brewster (moratorium, Project need)
January 12, 2015	Cape Cod Commission (initial meeting for Project background)
January 16, 2015	Dennis Fire Chief Mark Dellner and Deputy Chief Bob Brown (Project need)
February 6, 2015	Town of Brewster, Town Administrator (Project need)
February 23, 2015	Barnstable County Regional Emergency Planning Committee ("BREPC") and the Towns of Chatham and Eastham (LNG contingency)
March 4, 2015	Plumbing and Gas inspectors from the Towns affected by sales moratorium (moratorium)
March 6, 2015	Cape Cod Commission; delegation representing residents and businesses (Cape Cod Task Force); DPU
March 10, 2015	Highway Superintendent Chris Nickerson and DPW Director Lincoln Hooper (Project design)
March 26, 2015	Barnstable Regional Fire Chiefs Association (Project need, moratorium, LNG contingency)
April 15, 2015	Town of Harwich, CHA Engineering (design)
April 16, 2015	Town of Yarmouth (Project update)
April 17, 2015	Cape Cod Commission (Project update)
May 14, 2015	Town of Harwich (moratorium and excavation plans)
June 2, 2015	Dennis DPW Director (moratorium)
June 9, 2015	Town of Brewster (Project update and excavation plans)
June 15, 2015	Cape Cod Commission (Project update and schedule)
July 15, 2015	MEPA and Executive Office of Energy and Environmental Affairs ("EEA") (Project update and environmental review requirements)
July 22, 2015	Town of Dennis (design)
July 22, 2015	Town of Yarmouth (design)
July 27, 2015	Town of Brewster (design)
July 28, 2015	Cape Cod Delegation (conference call)

Table 2-4 Consultations with agencies and municipalities (Continued)

Date	*Group and Topic*
August 3, 2015	MEPA (Project update and environmental review requirements)
August 13, 2015	Harwich Department of Public Works (design)
August 19, 2015	Cape Cod Commission (Project update)
August 21, 2015	Harwich Board of Selectmen
September 21, 2015	Harwich Town Council public meeting (Project need)
October 1, 2015	MassDEP (Project permitting)
October 6, 2015	MEPA pre-filing meeting
November 4, 2015	Cape Cod Commission (Project permitting)
November 24, 2015	Harwich DPW (Project design)
December 1, 2015	Representative Keating's staff (Project update)
December 10, 2015	MEPA Site Visit
December 14, 2015	Dennis DPW
December 17, 2015	Brewster DPW (Project design)
January 13, 2016	Yarmouth DPW (Project design)
February 10, 2016	Cape Cod Commission (Project update)
March 3, 2016	EFSB Public Hearing
March 7, 2016	EFSB Public Hearing
March 30, 2016	Cape Cod Commission Pre-Application Meeting

2.6.1.1 Energy Facilities Siting Board

On January 26, 2016, the Company submitted a Petition to the EFSB to begin Project review. Public hearings were held on March 3 and March 7, 2016. The intervention deadline was March 21, 2016, and no petitions to intervene were received by the EFSB. On March 25, 2016, the EFSB issued 114 information requests to the Company as part of the EFSB's standard procedure for reviewing and analyzing the Company's Petition. The Company responded to each of these information requests on April 15, 2016, the deadline set by the EFSB. EFSB evidentiary hearings have been scheduled for the week of June 13, 2015.

2.6.1.2 Massachusetts Environmental Policy Act Office

The Company submitted its Single Environmental Impact Report ("EIR") to the MEPA Office on February 29, 2016, and received a final Certificate on April 15, 2016 determining no additional MEPA review was necessary. This Certificate is provided in Attachment E.

2.6.1.3 Municipalities

As listed in Table 2-4 above, the Project and its design engineering firm, CHA Companies, has held a considerable number of meetings with officials in Yarmouth, Dennis, Harwich, and Brewster to review the need for the Project and to solicit Town input on alignment location and construction sequencing. These consultations have been particularly useful for coordinating the Project design with existing underground utilities to avoid impacts and to ensure adequate space to accommodate future utility work.

The Company has also kept up ongoing communications with the towns of Barnstable, Chatham, Eastham, and Orleans about the Project and the moratorium on added load.

2.6.2 Stakeholder Meetings

The Company has been consulting with a variety of stakeholders to keep them informed of the Project design and schedule. The CCC has hosted stakeholder meetings on the dates listed in Table 2-5. Advertisements were placed in the Cape Cod Times on July 21, 23, and 26, 2015 to explain the need for the Project and the nuances of the moratorium to the public, and in October 2015 the Company established a Project website (ngrid.com/midcape) to educate the general public and keep key stakeholders informed throughout the Project's duration. In late January 2016, the Company held two Open Houses, one in Harwich and one in Dennis, to provide additional opportunities for communication with stakeholders and the public.

A list of stakeholder meetings is provided in Table 2-5.

Table 2-5 Consultations with stakeholders.

Date	*Group/Topic*
December 9, 2014	Homebuilders and Remodelers Association of Cape Cod
December 18, 2014	Cape Cod Times Editorial Board
January 12, 2015	Cape Cod Plumbers Association (project concept and moratorium)
March 6, 2015	Cape Cod Task Force (delegation representing residents and businesses)
April 17, 2015	Stakeholder group (Project update)
May 12, 2015	Homebuilders and Remodelers Association of Cape Cod (moratorium)
June 11, 2015	Homebuilders and Remodelers Association of Cape Cod (Project update)
June 15, 2015	Stakeholder meeting (with CCC) (Project schedule)
August 19, 2015	Stakeholder meeting (with CCC) (Project update)
August 21, 2015	Stakeholders from general public (with Harwich Board of Selectmen)
August 30, 2015	Cape Cod Times Editorial Board
November 4, 2015	Stakeholder meeting (with CCC) (Project update)
November 16, 2015	Association to Preserve Cape Cod briefing
January 12, 2016	Homebuilders and Remodelers Association of Cape Cod (Project update)
January 20, 2016	Harwich Open House
January 28, 2016	Dennis Open House
February 10, 2016	Stakeholder meeting (with CCC) (Project update)
March 2, 2016	Realty Association of Dennis (Project update)

The Company plans to host additional informational briefings and open houses later in 2016.

2.6.3 Customer Outreach

The Company has performed outreach to customers and the general public on Cape Cod, and will continue to communicate as the Project develops. Direct communications to customers included a letter about the Project and ongoing moratorium to all 30,000+

customers in the affected towns. This letter was also shared with the towns (some of whom posted it to town websites and/or Facebook pages) and other stakeholders such as the Homebuilders and Remodelers Association of Cape Cod. Customers in the affected towns also received on-bill messages about the Project during the month of August.

All customers who applied for added load in the affected towns during October 2014 (before the decision to implement the moratorium) were contacted directly by early December 2014 to explain the moratorium and confirm that the Company would not be able to fulfill the request.

In addition, the Proponent has completed a door-to-door effort to inform residents along the Project route of the Project and to answer their questions.

2.7 Summary of Project Impacts

The discussion below provides a summary of Project-related impacts.

2.7.1 Land Use

Other than temporary construction-period restrictions, the Project will have no effect on existing land uses. The proposed replacement main has been designed for installation within the existing roadway layout, beneath pavement or within 10 feet of pavement, and as such will only be located in previously-disturbed areas. Furthermore, the Project route parallels the route of the existing 200-psig main, with the sole exception being an 800-foot-long piece on the easternmost portion of Queen Anne Road in Harwich, where there is no existing main; this minor deviation from the existing route will reduce sharp bends and minimize impacts to the Route 39 rotary.[6]

2.7.2 Wetlands

The Project will have no direct impacts to any wetland resource areas. The Company has designed the Project to be constructed within existing roadway layout beneath pavement and within 10 feet of that pavement, thus eliminating any filling of or permanent impacts to wetlands. Wetland resource areas are shown on Figures 2-7 and 2-8. While no direct impacts to wetlands are anticipated, construction will require temporary activity within the buffer zones of several wetland resource areas and over culverted segments of several waterbodies. In addition, approximately 5,510 square feet of road surface within previously developed and degraded Riverfront Area will be temporarily altered to complete the Project. Plans depicting the proposed replacement main at each wetland area are provided in Attachment G.

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[6] Under existing conditions, at the eastern end of the Harwich Segment the main travels east on Queen Anne Road before turning south onto Depot Road and turning northeast on Orleans Road, ending at the intersection with Church Street (see Figures 1-1 and 1-2).

There will be no construction performed on or below the banks at any waterbody crossing. The crossing of the Bass River will be accomplished by using space in a utility bay of the existing bridge, and stream crossings will be accomplished by open-cut trench in the road bed above existing culverts (see Figure 2-9 for an example).

Installation and maintenance of appropriate controls will be implemented to avoid and minimize erosion and sedimentation, as discussed in greater detail in the draft ECP (see Attachment F). These controls will be monitored and maintained until the affected area is determined to be suitably stabilized and restored in compliance with applicable permit conditions. The engineering plans provided in Attachment C include erosion controls around sensitive environmental areas, and also contain construction notes that list BMPs (e.g., silt sacks, catch basins).

The Project will comply with the NPDES General Permit for Stormwater, and Stormwater Pollution Prevention Plan ("SWPPP") requirements, and with other restrictions as may be applied by the local conservation commissions in accordance with local wetlands-related bylaws, regulations, and codes. Appropriate erosion control and spill prevention technology will be provided where needed, and these controls will be closely monitored and managed.

2.7.3 Water Quality and Water Supply Protection

Figures 2-10 and 2-11 illustrate water resources in the Project area, and show that portions of the Project route pass through MassDEP-approved Zone II[7] areas. These are wellhead protection areas determined by hydro-geologic modeling and approved under MassDEP's Drinking Water Program. Portions of the route that pass through Zone II areas include the western portion of the Yarmouth-Dennis Segment, the eastern half of the Harwich Segment (including the southern spur), and the middle portion of the Brewster Segment. The route is not located near any Interim Wellhead Protection Areas. There are no MassDEP-approved Zone I[8] areas within 500 feet of the Project route.

Freshwater recharge areas identified by the CCC's Regional Policy Plan are also located along the Project route, particularly in the northern portion of the Brewster Segment and eastern portion of the Harwich Segment. The route also passes adjacent to several areas mapped as Potential Public Water Supply Areas. These are located at the east end of the Yarmouth-Dennis Segment, scattered along the western half of the Harwich Segment, and

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[7] As defined in 310 CMR 22.02, Zone II "means that area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation)... The Zone II must include the entire Zone I area..."

[8] As defined in 310 CMR 22.02, Zone I "means the protective radius required around a public water supply well or Wellfield..."

in a couple of locations on the Brewster Segment. Potential Public Water Supply Areas were mapped by the CCC's Priority Land Acquisition Assessment Project ("PLAAP"), which focused on the Upper and Mid-Cape Towns with public water supplies.

The Project will have no impacts on water supplies. Nearly all vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard. A few pieces of large, less mobile equipment (e.g., excavators, paving equipment) will be refueled as necessary on-site. Any such field refueling will not be performed within 100 feet of wetlands waterways, or within 100 feet of known private or community potable wells. The fuel transfer operation will be conducted by an operator knowledgeable about the equipment, the location, and with the use of the work zone spill kit. Proper spill containment gear and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks. During construction, equipment will be inspected for incidental leaks (e.g., hydraulic fluid, diesel fuel, gasoline, anti-freeze) prior to site access and on a daily basis at the commencement of each work shift. Small pieces of powered equipment such as generators and pavement saws will be placed in containment bins or on absorbent blankets or pads to contain any accidental fuel spills or leaks. These measures will protect the water resources along the Project route while also allowing efficient construction procedures. Refueling procedures and an emergency response plan are addressed in the ECP provided in Attachment F.

There are no hazardous liquids associated with operation of the Project.

2.7.4 Rare Species

The proposed route passes through areas mapped as Priority Habitat of Rare Species and/or Estimated Habitat of Rare Wildlife by the Natural Heritage and Endangered Species Program ("NHESP") under the Massachusetts Endangered Species Act ("MESA") and the Massachusetts Wetlands Protection Act, respectively (Natural Heritage Atlas, 2008). These areas are shown on Figures 2-7 and 2-8.

The implementing regulations of MESA (321 CMR 10.00) contain an exemption from review for projects in Priority Habitat for *"installation, repair, replacement, and maintenance of utility lines (gas, water, sewer, phone, electrical) for which all associated work is within ten feet from the edge of existing paved roads"* (321 CMR 10.14(b)).

The proposed Project will have no impacts on rare species habitat. Where it passes through designated Priority Habitat, it will remain on paved roadway or shoulder within ten feet of pavement, and as such is exempt from NHESP review.

NHESP has identified Cape Cod as having roost trees for the Northern Long-Eared Bat. However, because the Project will not result in any tree cutting, the federal Endangered Species Act is not implicated.

2.7.5 Floodplain

The Project route is not located in the floodplain as mapped by the Federal Emergency Management Agency ("FEMA"), although it does pass over the floodplain associated with the Bass River and Herring River. As shown on Figure 2-12, the route also passes just to the west of floodplain associated with a series of ponds along the northern portion of the Brewster Segment.

2.7.6 Historic and Archaeological Resources

The Company retained Gray and Pape, Inc. to assess historic and archaeological resources along the Project route. Gray and Pape, Inc. concluded that the Project would have no impact on identified historic or archaeological resources, largely because no previously undisturbed areas will be affected by the Project. This conclusion was included in the MEPA submittals, and no concerns were raised.

The Project is below grade and along previously disturbed roadways. Because the Project is proposed within existing roadway layout, it is not expected to encounter any previously-undisturbed areas, and as such no impacts to archaeological resources are expected.

The only above-grade features associated with the Project are steel control box enclosures (sometimes referred to as "street boxes") associated with the four remotely-controlled isolation valves, two of which will be within North Harwich Village.[9] These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder in close proximity to the valves with circuitry connected to the valve actuators located in below-ground prefabricated concrete vaults. The Project will not affect properties listed on the State or National Register of Historic Places, nor will it affect historic districts or properties and areas listed in the Inventory of Historic and Archaeological Assets of the Commonwealth.

2.7.7 Transportation

Temporary work space approximately 20 to 25 feet in width will be required as construction proceeds along the route. Depending on the location, either one lane of the existing roadway will be utilized for workspace or a portion of the workspace will extend onto the shoulder of the road. Although the Company will seek to minimize road closures,

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[9] The Harwich Historic District Commission has jurisdiction over the Harwich Center Historic District in Harwich, but not the North Harwich Village. Thus, compliance with the Harwich Historic District Commission's guidelines is not expected to be required for the above-ground features to be contained in the North Harwich Village.

there may be locations where temporary road closures are necessary where the main will cross the road or installation is needed closer to the middle of the road to avoid existing underground utilities.

Police details and other appropriate traffic management measures will be used to maintain traffic flow, and traffic management will always be coordinated with Town officials.

The Company is coordinating with each municipality to finalize TMPs, which will ensure appropriate traffic management and minimize impacts. Draft TMPs for 10 major locations are included in Attachment I. The current draft TMPs assume construction will proceed west-to-east; the actual construction sequence may differ, in which case TMPs will be updated prior to construction to reflect any changes.

2.7.8 Subsurface Contamination

A review of the MassDEP on-line database of release sites was performed to determine the potential to encounter subsurface contamination along the proposed Project route. Only one reportable release was identified adjacent to the Project route: Angell Property (Release Tracking Number ("RTN") 4-0012473) at 389 Whites Path in Yarmouth, which is just west of the intersection between Whites Path and Great Western Road. This release was classified as Tier I on October 7, 2013. No Activity and Use Limitation ("AUL") is associated with this release.

Although the Project is not expected to encounter contaminated soils, if contaminated soils are encountered during construction, the soils will be managed pursuant to the Utility-Related Abatement Measure ("URAM") provisions of the Massachusetts Contingency Plan ("MCP"). The Company will prepare a soil and groundwater management plan, and will contract with a Licensed Site Professional ("LSP") as necessitated by conditions encountered along the Project alignment, consistent with the requirements of the MCP at 310 C.M.R. 40.0460 et seq.

2.7.9 Visual Impact

Other than during the construction period, this Project will have minimal visual impact. Almost the entire Project will be underground, installed in existing roadway layouts either beneath pavement or within ten feet of pavement. The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves, two of which will be on the Company's own property on Whites Path. Figure 2-13 shows a rendering of a typical control box enclosure. These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder of the roadways in close proximity to the valves with circuitry connected to the valve actuators located in below-ground prefabricated concrete vaults.

No tree clearing will be needed to accommodate construction.

2.7.10 Construction Impacts

2.7.10.1 Construction Methodology

The Project will be constructed using the "stove pipe" method of construction, which is commonly employed in space-constrained areas. This technique normally involves installing the replacement main two approximately 40-foot double random[10] lengths at a time. Work required to join the two 40-foot sections (welding, radiography, and coating) will predominantly be performed at-grade, after which a side-boom tractor or backhoe will lower the pipe into a limited length of open trench. The same general installation steps will also occur when advancing open trench construction, typically required when connecting two pieces of pre-installed main or at tie-ins to existing infrastructure. As the work-day proceeds, newly installed main will be backfilled and compacted, and pavement will be restored.

The footprint for trench excavation will typically be three feet wide by five feet deep. In locations where in-line welding will be performed or where the proposed replacement main will pass under existing utilities, the excavated area will be larger, typically 10 feet long by 6 feet wide and up to 8 feet deep to accommodate a shoring box. These shoring boxes will be required approximately every 40 to 80 feet along the proposed replacement main.

During installation, all replacement main welds will be nondestructively tested. In non-destructive testing, a radiographic or X-Ray test is performed on every weld in the field. An X-Ray is taken of the weld around the pipe's circumference and the X-Ray is reviewed by a trained technician to confirm the acceptability of the weld in accordance with API Standard 1104. If any unacceptable flaws are detected, that portion of the weld will be ground out and repaired. This test is termed "nondestructive" testing because it does not degrade the integrity of the weld.

Replacement main construction is expected to proceed at a rate of approximately 120 feet per day, with not more than 200 feet of trench open at any particular location.

The construction sequence will proceed as follows:

Establishment of Controls. The Contractor will mobilize. Existing utilities will be flagged. Erosion and sedimentation control measures will be set up per the draft ECP provided as Attachment F, which will be capable of incorporating input from local agencies and Project contractor. The ECP addresses construction staging, materials delivery, and other

[10] The term "double random" is an industry term used for the manufacturing process. "Double random" pipe lengths are approximately 40 feet in length (typical lengths vary between 41 and 44 feet when shipped to the site).

considerations associated with construction including relevant environmental protection issues. As agreed upon with local authorities, measures called for by a TMP (e.g., barrels, warning signs, police details) will be put in place. Draft TMPs for 10 major intersections and a typical TMP are provided in Attachment I; the Company will be coordinating with each municipality to finalize TMPs.

Worksite Preparation. The trench location will be staked on the ground or marked on the pavement. As necessary, pavement will be saw-cut and removed for off-site recycling or proper disposal. If the trench passes near utility poles, the poles and lines will be temporarily supported as needed.

Excavation/Trenching. The trench will be excavated using a backhoe or excavator, and a trench box and/or shoring will be installed where needed. For the proposed replacement main, the trench will be approximately three feet wide and five feet deep. At locations of in-trench welds, the trench will be widened to accommodate two welders. To minimize hauling by truck and expedite backfilling, excavate will be stockpiled next to the trench on the pavement or shoulder, or will be temporarily stockpiled in a dump truck. At locations where stockpiling is unacceptable due to pavement width or local environmental conditions, excavate will be loaded onto trucks for transport to a prepared storage location, which will be coordinated with local authorities. Suitable bedding materials (typically, six inches of sand) will be placed in the trench. Pipe sections will be 40 feet (double random) in length, and two sections of pipe will be positioned next to the trench for welding.

Once excavated, the trench will be sheeted and shored as required by soil conditions, Occupational Safety and Health Administration ("OSHA") safety rules, and local and state regulations. Shoring is designed to permit passage of traffic adjacent to the trench and will allow for the trench to be covered with a steel plate to allow traffic over the trench during non-working hours.

Welding. The Company's welding procedures will be utilized on this Project. All welding will be performed in accordance with all applicable state and federal codes (USDOT Title 49, Part 192) as well as industry standards. In addition, one hundred percent (100%) of welds will be radiographically (i.e., X-Ray) inspected. Typically, pipe lengths will be set out adjacent to the trench and two sections will be welded together before the welded sections are placed into the trench. Relatively small equipment (i.e., a single standard excavator or backhoe and a side boom as opposed to several large side boom crawler tractors) will be used to place the pipe.

Cathodic Protection. The coated steel replacement main will be protected from corrosion in three ways: (1) the replacement main will be shipped to the Project site with a protective exterior coating (called Pritec), which is added after the manufacturing process; (2) a similar coating (tape or shrink sleeves) will be applied to all field welds and any locations identified

during inspection of the pipe where the pipe coating was damaged due to handling prior to backfilling; and (3) cathodic protective devices (e.g., Magnesium Anode bed system)[11] will be installed during construction.

Backfill and Compaction. Four to six inches of sand padding will be placed around the circumference of the installed pipe, and then suitable backfill will be placed above the pipe and compacted. A broad plastic marking/warning tape will be placed above the pipe to help ensure that future excavation does not inadvertently damage the pipe. Generally, three feet of cover is placed above the pipe; where the pipe must be shallower (i.e., with less than two feet of cover) due to utility conflicts or ledge, concrete shielding or steel plates will be placed above the pipe for protection. Backfill beneath paved areas will generally be placed in lifts six to twelve inches thick, with proper compaction performed after placement of each lift.

Backfill and compaction operations will be carried out in strict compliance with procedures established by the DPU (*Standards To Be Employed by Public Utility Operators When Restoring any of the Streets, Lanes and Highways in Municipalities* ("Street Restoration Standards", D.T.E. 98-22, 1999). These procedures contain specific provisions for the Suitability of Backfill Material, Evaluation of Excavated Material, Proper Moisture Content, Compaction and Verification, and Training and Certification.

Pavement Restoration. Where the trench location requires cutting of pavement, pavement restoration will be carried out in compliance with Section 9.0 of the DPU Street Restoration Standards. Generally, all pavement excavations will be repaired with same-day permanent patches unless specifically agreed to by the town. Typically, temporary patches are only permitted for work between December 1 and March 31, when bituminous concrete is not available, or if the excavation must be reopened within five working days (e.g., to continue work after a weekend). In general, the length of new excavation completed each day will equal the length of replacement main installed, backfilled, and compacted. The Company expects to install approximately 120 feet of pipe per day per crew.

If, at the end of the day, construction is not complete along an active section, any street openings will be covered with steel plates and marked with drums and yellow flashers until pavement patching is accomplished. Openings in the shoulder will be protected and barricaded to ensure traffic and pedestrian safety.

Shoulder Repair and Revegetation. The shoulder will be graded to its pre-existing contours, with slight mounding to allow for settlement. Any disturbed vegetated areas will be loamed and seeded to match pre-existing vegetation. Any lawn-edge that has been affected by

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[11] A Magnesium Anode bed system imparts a slight current on the main, thus inhibiting corrosive forces in the surrounding soil.

replacement main installation, including equipment passage, will be hand-dressed, seeded, and mulched.

Bridge Crossing. At the Highbank Road crossing of the Bass River, an existing utility bay will be prepared to receive the replacement main, and it will be installed similar to placement in a trench (e.g., welding, coating, X-Ray). The replacement main will be attached and supported to the bridge via pipe hangers or pipe rollers. This technique was successfully used for the SLRP Middle Segment crossing.

The replacement main will be designed to accommodate thermal expansion and contraction of the main itself. Colonial Gas will work with Town Engineers and their consultants to make sure that the added load from the pipe is within acceptable limits.

Where the Project crosses the Bass River, Herring River, and Stony Brook, appropriate erosion and sedimentation controls will be deployed to protect the waterbodies and avoid impacts while the Project is installed within the roadbed or existing bridge utility bay.

Final inspection and alignment marking. The alignment will be checked by a supervisor to ensure the area is properly restored, swept, and tidy. Alignment markers will not be required for the replacement main.

2.7.10.2 Special Crossing Techniques

Trenchless crossing techniques (e.g., jack-and-bore) are typically used where either: (1) open trenching is not feasible from a construction perspective due to subsurface infrastructure, bridges, culverts, or railroad tracks; or (2) open trench construction is not practical due to traffic conditions. These techniques are described briefly below.

A trenchless crossing is being considered at the Route 28 (Main Street) and Depot Road intersection in Harwich, although discussions are underway with MassDOT to see whether an open cut trenching technique would be more appropriate. Should a trenchless crossing be carried out at this intersection, jack-and-bore is the method under consideration.

Jack-and-bore techniques are used to install a steel or concrete casing horizontally under a conflicting object. This method is typically used for shorter crossings (less than approximately 200 feet), such as for the crossing of railroads, ditches, streams, streets, interstate highway crossings, and crossing under shallower existing underground facilities. A jack-and-bore installation is accomplished by digging a bore pit on one side of the feature to be crossed and a receiving pit on the other side to the designed depth. The bore pit houses the drilling and jacking equipment, while the receiving pit receives the pipe on the other side of the feature being crossed.

The casing is then jacked (pushed) in the bore hole as it is being drilled under the feature. After the casing has been cleaned out, smaller High Density Polyethylene ("HDPE") or

Polyvinyl Chloride ("PVC") pipes are installed inside the casing in which the replacement main will later be installed.

Once the jack-and-bore equipment is in place, it must remain in place and the drill pits must remain open until the operation is completed. Dimensions of the bore pit and receiving pit will be approximately 40 feet long, 10 feet wide, and 16 feet deep. Although the specific placement of these pits at the two potential jack-and-bore locations have not been selected, they will be within the existing rights-of-way and will not be located in the buffer zone to any wetland resource areas or in any mapped habitat for rare or endangered species.

2.7.10.3 Cleaning and Testing Procedures

Following replacement main installation, pressure testing is required by code and Company standards to verify that the replacement main is leak-tight and capable of safely withstanding its rated pressure. For testing purposes, the line is pressurized to a minimum one-and-one-half times its Maximum Allowable Operating Pressure ("MAOP") (i.e., 1.5 x 270 psig, or 405 psig). The replacement main in this Project will be tested with a hydrostatic test, likely performed in phases as Project segments are complete so they can be put into service.

As an initial step, the newly-constructed replacement main will be checked for proper roundness using a gauge "pig." The pipe will then be cleaned using a cleaning or scarifying pig, removing most welding slag and any incidental soil that may have been inadvertently introduced during placement of the pipe sections.

The pipe will then be filled with potable water, pressurized to the test pressure, stabilized, and monitored for a period of time depending on the length of the pipeline being tested. In total, approximately 572,960 gallons of water will be required to test the replacement main (although testing will likely be performed in segments), and municipal water will be the likely source. Once the pipe is demonstrated to be leak-tight, the pressure will be relieved and the Company will pump the test water into storage tanks; no chemical additives will be added to the water. The Company is prepared to haul the test water to an off-site wastewater treatment facility for disposal, if necessary. However, the Company intends to coordinate with each municipality along the Project route regarding the possibility of discharging the test water to approved locations adjacent to the Project area, in a manner consistent with applicable statutory and regulatory requirements and the Company's environmental policies. Such discharge would be performed in accordance with BMPs prepared specifically for this Project and documented in the draft ECP (see Attachment F).

If such arrangements can be made, discharging the test water would be the Company's preferred method for handling this water. The test water would be containerized as the testing of each section of the replacement main is completed, and the water would be filtered through an appropriate combination of filter media and discharged to an upland area, provided that pre-characterization results reveal it is suitable for such discharge. Discharge would be carried out in a location and at a rate that the water could be absorbed without creating impacts to the surrounding area. Hydrostatic testing procedures will be performed in a manner consistent with the EPA General Permit.

Once the hydrostatic test water is drained from the pipe and fittings, a thorough drying and cleaning process will be performed. Drying will be accomplished using foam spheres or swabs which are run through the pipe until the line is in a "dusty, dry" condition. Final cleaning will be accomplished with a power brush pig driven with nitrogen or dry air, followed by multiple passes of a foam swab. The dry air/foam swab runs will be continued until all evidence of moisture is removed from the line and a minimum dew point of -40°F is verified. The final step in the process will be to charge the line with dry air or nitrogen to a minimum of 15 psig. Once charged, the desired dew point of -40°F is re-verified.

The Company plans to use portable pig launching and receiving facilities for the initial testing/cleaning/drying process. Each line segment will include the necessary fittings housed in below-ground vaults to allow for connection of the temporary launcher and receiver. These fittings and portable launcher/receiver will also be used for any necessary internal inspections of the operating replacement main.

2.7.10.4 Monitoring

The Company operates a Gas Control Center, where all of its New England natural gas distribution systems are continuously monitored through a Supervisory Control and Data Acquisition ("SCADA") system. The proposed gas main will be monitored as part of this SCADA system, with monitoring points at various regulator stations along the line and at the South Yarmouth LNG facility. Attributes such as gas pressure, gas flow rate, gas temperature and gas heating content will be monitored through the SCADA system.

The proposed replacement main will be designed to be "piggable" with a smart pig for internal inspection. As a general matter, "pigs" are scrubbing and scraping devices that are used to clean the inside of pipes by reducing build-up of contaminants along the pipe's interior. Sophisticated and sensitive in-line inspection tools travel through the pipe and measure and record irregularities that may represent corrosion, cracks, laminations, deformations, etc. Because these tools run inside the pipe, they are often referred to as "smart" pigs.

2.7.10.5 Soil Management

To minimize hauling by truck and expedite backfilling, excavated soils will be stockpiled next to the trench on the pavement or shoulder, or will be temporarily stockpiled in a dump truck. At locations where stockpiling is unacceptable because of pavement width or local environmental conditions, excavated soils will be loaded onto trucks for transport to a prepared storage location, which will be coordinated with local authorities, and re-used and/or disposed of in accordance with applicable laws and regulations.

2.7.10.6 Environmental Inspections

The Company will engage the services of a qualified Environmental Inspector to manage the environmental inspection program, to ensure that the ECP is carried out by the contractor, and to ensure that construction activities will be in compliance with requirements of applicable federal, state, and local environmental permits and approvals. The Environmental Inspector will be independent of the contractor and will report directly to the Company. The Environmental Inspector will have immediate access to the Company's Chief Inspector and will have "stop work" authority relative to environmental non-compliance.

2.7.10.7 Air Quality

During Project construction, temporary and minor impacts on ambient air quality from construction vehicles will be limited to areas adjacent to active construction. Project impacts associated with construction include construction vehicle emissions and possibly the generation of fugitive dust during construction.

The ECP shall require all construction to be performed in accordance with applicable sections of the MassDEP Air Pollution Control Regulations at 310 CMR 7.02 and 310 CMR 7.09. Specific air quality mitigation measures incorporated into the ECP include:

- Use of appropriately designed wheel wash facilities as necessary to prevent off-site migration of soils;
- Mechanical street sweeping of construction areas and surrounding streets and sidewalks as necessary;
- Removal of construction waste in covered or enclosed trailers;
- Wetting of exposed soils and stockpiles to prevent dust generation;
- Minimizing stockpiling of materials on site;
- Turning off construction equipment when not in use and minimizing idling times;

- Minimizing the storage of construction waste on site; and
- Minimizing the duration that soils are left exposed.

Many of these measures are intended to minimize potential impacts associated with construction activities that may generate fugitive dust and result in localized increases in airborne particulate levels. Fugitive dust emissions from construction activities will depend on such factors as the properties of the emitting surfaces (e.g., moisture content and volume of spoils), meteorological variables, and construction practices employed.

Although fugitive dust may be generated during construction activities, the relatively short duration of construction at any single location for this Project makes it unlikely that the migration of dust will cause off-site impacts. Furthermore, soil excavation does not typically generate dust due to the natural moisture content of subsurface soils. Nonetheless, the contractor will implement dust control measures as needed during active construction that will primarily consist of street sweeping and using wetting agents to control and suppress dust. The contractor will comply with the National Emission Standards for Hazardous Pollutants ("NESHAP") throughout construction activities.

Pavement will be cut with a pavement saw, which cuts a trench line in the pavement and across driveways and any intersecting roadways. Pavement will then be removed, trucked away and disposed of in accordance with applicable regulations. No pavement crushing will occur on-site.

The Company requires contractors to use ultra-low sulfur diesel ("ULSD") in off-road diesel vehicles, and the Company will comply with the requirements of MassDEP's Diesel Retrofit Program. The Diesel Retrofit Program, formerly called the Clear Air Construction Initiative of the Clean Construction Equipment Initiative, originated as an air quality mitigation measure for the Central Artery/Tunnel Project. The program encourages users of diesel construction equipment to install exhaust emission controls such as oxidation catalysts or particulate filters on their diesel engines. While MassDEP requires participation in the Diesel Retrofit Program by municipalities applying for funding under the State Revolving Fund for water and wastewater projects, there is no MassDEP requirement for participation by other project proponents.

All diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of Project construction will either be EPA Tier 4–compliant or will have EPA-verified (or equivalent) emission control devices such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine.

In addition, vehicle idling will be minimized in accordance with Massachusetts' anti-idling law, G.L. c. 90, § 16A, c. 111, §§ 142A–142M, and 310 C.M.R. 7.11. The Company requires the use of ULSD in its diesel-powered construction equipment and limits idling time to five minutes except when engine power is necessary for the delivery of materials or to operate accessories to the vehicle such as power lifts. The Company will require its contractors to follow these procedures.

2.7.10.8 Noise

While intermittent increases in noise levels are expected during construction activities, the Company is committed to minimizing these impacts. Construction-related noise levels will comply with applicable sections of MassDEP's Air Quality Regulations at 310 CMR 7.10, particularly subsections (1) and (2), which pertain to the use of sound-emitting equipment in a considerate manner as to reduce unnecessary noise. The Project will make every reasonable effort to minimize noise impacts from construction.

Noise mitigation measures expected to be incorporated into the ECP include:

- Minimizing the amount of work conducted outside of typical construction hours;
- Ensuring that appropriate mufflers are installed and maintained on construction equipment;
- Ensuring appropriate maintenance and lubrication of construction equipment to provide the quietest performance;
- Requiring muffling enclosures on continuously-operating equipment such as air compressors and welding generators;
- Turning off construction equipment when not in use and minimizing idling times; and
- Mitigating the impact of noisy equipment on sensitive locations by using shielding or buffering distance to the extent practical.

Blasting is not anticipated.

2.7.10.9 Water Quality, Drainage, and Water Supply Protection

The Project will have no long-term impact on drainage or water quality. Construction of the new replacement main is designed to avoid any impact to existing drainage systems. The operational Project will generate no nitrogen or hazardous liquids that could potentially contaminate water systems on the Cape.

Nearly all vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard. A few pieces of large, less mobile equipment (e.g., excavators, paving equipment) will be refueled as necessary on-site. Any such field refueling will not be performed within 100 feet of wetlands or waterways, or within 100 feet of known private or community potable wells. The fuel transfer operation shall be conducted by an operator knowledgeable about the equipment, the location, and with the use of the work zone spill kit. Proper spill containment gear and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks.

During construction, no liquid or solid wastes or fuels will be deposited on the ground of into water bodies. Equipment will be inspected for incidental leaks (of hydraulic fluid, diesel fuel, gasoline, anti-freeze, etc.) prior to site access and on a daily basis at the commencement of each work shift. Small pieces of powered equipment such as generators and pavement saws will be placed in containment bins or on absorbent blankets or pads to contain any accidental fuel spills or leaks.

The average depth to groundwater is between approximately 4.5 and 40 feet below ground surface along the Project route.[12] It is expected that the trench will be excavated to a depth of approximately five feet. Groundwater may, therefore, be encountered during construction. Depending on the relative elevation of the replacement main, dewatering may be necessary in the trench during construction and if affected by stormwater. Should it be necessary, dewatering procedures will include the following:

- Hose intakes will be elevated off the ditch bottom to prevent sediment intake;
- Secondary containment of pumps will be used to avoid fuel and contaminants from entering wetlands and waterbodies;
- Dewatering locations will be approved by an Environmental Inspector, whose role is described above in Section 2.7.10.6;
- Discharges:
    - Greater than 100 feet from a wetland or stream bank will be directed into a well-vegetated area; or
    - Less than 100 feet from a wetland or stream bank will be directed to a filter bag.

[12] Source: USGS National Water Information System, http://maps.waterdata.usgs.gov/mapper/index.html.

Under no circumstances will trench water or other forms of turbid water be directly discharged onto exposed soil or into any wetland or waterbody. Standard erosion control practices will be employed to minimize erosion during trenching and construction activities, as described in further detail in Section 2.7.10.10.

The Project passes through and/or adjacent to several Zone II and a Potential Public Water Supply Areas (see Figures 2-10 and 2-11 in Attachment A). A Zone II is an area identified by the MassDEP as that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). Potential Public Water Supply Areas are areas identified by the CCC as potential future well sites and their associated recharge areas that have been identified by towns, water districts, or private water companies.

The Project will have no impacts on water supplies, and there are no hazardous liquids associated with operation of the Project.

2.7.10.10 Erosion and Sediment Control

The Company's objective is to minimize the potential for erosion and sedimentation impact during replacement main construction, and to effectively restore any disturbed areas. The Company will meet these objectives by implementing the erosion and sediment control measures described in this section. In general, the measures are designed to minimize erosion and sedimentation by:

- Minimizing the quantity and duration of soil exposure;
- Protecting areas of critical concern during construction by redirecting and reducing the velocity of runoff;
- Installing and maintaining erosion and sediment control measures during construction;
- Establishing vegetation where required as soon as possible following final grading; and
- Inspecting the construction route and maintaining erosion and sediment controls as necessary until final stabilization is achieved and final inspections completed.

It will be the responsibility of the contractor to implement and maintain erosion and sediment control measures during construction. The Environmental Inspector or designee (such as a construction supervisor) will provide oversight of the contractor's activities. The sections below include erosion and sediment control techniques that apply to all areas of construction.

Temporary Erosion Control Barriers

Hay/straw bales and silt fences are interchangeable, except where noted below. Temporary erosion control barriers will be installed prior to initial disturbance of soil and maintained as described below:

- At the outlet of a slope break when existing vegetation is not adequate to control erosion;
- Down slope of any stockpiled soil in the vicinity of waterbodies and vegetated wetlands;
- At sideslope and downslope boundaries of the construction area where run-off is not otherwise directed by a slope break;
- Maintained throughout construction and remain in place until permanent revegetation has been judged successful, upon which they will be removed;
- At boundaries between wetlands and adjacent disturbed upland areas;
- As necessary to prevent siltation of ponds, wetlands, or other waterbodies adjacent to/downslope of the Project;
- At the edge of the construction area as needed to contain soil and sediment;
- Catch basins along the work area will be protected using "silt sacks" and perimeter hay bales. The silt sacks and hay bales will be installed before pavement removal and trench excavation begins and will remain in place until the area is repaired and the shoulder repaved and revegetated.

Temporary erosion control barriers will be inspected on a daily basis in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of a storm event that is 0.5 inches or greater.

Silt Fence Installation and Maintenance

Any silt fence used as a construction-period control will be installed as directed by manufacturer and applicable permit conditions. Accumulated sediment will be removed and the fence inspected to ensure it remains embedded in the soil as directed. Sufficient silt fence will be stockpiled onsite for emergency use and maintenance.

Hay/Straw Bale Installation and Maintenance

Hay/straw bale installation and maintenance will be performed as follows:

- Hay/straw bales will be anchored in place with at least two properly sized wooden stakes;
- Bindings on bales will be horizontal;
- Bales shall be replaced if damaged or are allowing water to flow underneath;
- Damaged bales will be replaced with new bales as deemed necessary by the Environmental Inspector;
- A sufficient supply of bales will be maintained on site for emergency use;
- Bales bound with wire or plastic will not be used; and
- Properly placed and staked straw wattles or fiber rolls may be used in lieu of hay bales in certain circumstances. Such substitutions will be approved by the Environmental Inspector in advance.

2.8 Consideration of Alternatives

2.8.1 Routing Alternatives

To ensure that the Project is superior to feasible routing alternatives, the Company performed a thorough review of potential alternative routes during the MEPA and EFSB reviews. The alternative routes evaluated each had greater environmental impacts and scheduling concerns. The proposed Project was far superior to each routing alternative.

2.8.2 Project Alternatives

The Company's EFSB Petition contained a thorough discussion of various strategic and technological alternatives to the proposed replacement main. Each of the alternatives was assessed for environmental impacts, reliability, and cost. The proposed Project was far superior to each of the alternatives, which included a No-Build Alternative, installation of a new LNG facility, in-kind replacement of the existing mains, replacement of the existing SLRP Middle Segment and 200-psig parallel mains with one 20-inch 270-psig main, energy efficiency measures, and alternative heating and cooling techniques.

2.8.3 Summary of Mitigation Measures

Table 2-6 summarizes the mitigation measures that were identified in the Single EIR submitted pursuant to MEPA for the Mid-Cape Main Replacement Project.

Table 2-6 Summary of Impacts and Mitigation Measures

Subject Matter	*Impact*	*Mitigation Measures*	*Schedule*
Wetlands	Temporary: The Project will have no direct impacts to adjacent wetlands, but will involve construction in and along roadways that pass through the buffer zones of several wetland areas. In total, approximately 5,510 square feet of road surface within previously developed and degraded RFA will be temporarily altered to complete the Project.	The Company is committed to ensuring that indirect impacts from erosion and sedimentation are avoided and minimized, and as such a SWPPP will be prepared for the Project that will specify implementation of erosion control measures, including: ♦ Environmental monitoring of the Project to ensure compliance with the SWPPP, NPDES General Permit, and all other environmental permits; ♦ Placement of erosion and sedimentation controls at appropriate locations along road shoulders whenever the work zone is located within 100 feet of a wetland or within 200 feet of a perennial waterbody; ♦ In roads where stormwater is directed to a local storm drain, filter fabric barriers will be installed and maintained to prevent sedimentation to the storm drain system, and trench spoils will be stockpiled in a manner that will prevent them from being washed with stormwater into nearby storm drains; and ♦ Trenches will be closed at the end of each work day. During construction, certain heavy construction equipment may be fueled and lubricated as necessary. Procedures for refueling and lubricating construction equipment will ensure safety and spill prevention, as described in Section 2.7.3. In all cases, secondary containment, spill containment gear, and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks. The Project is a minor activity as specified in the Massachusetts WPA Regulations and is specifically exempted from regulatory review. However, the Project will comply with the NPDES General Permit and SWPPP requirements, requirements of the WPA and the Federal Clean Water Act and implementing regulations, and other restrictions as may be applied by the local conservation commissions in accordance with local wetlands protection bylaws. Appropriate erosion control and spill prevention technology will be provided where needed, and these controls will be closely monitored and managed as described in Section 2.7.10.10.	During construction.

Table 2-6 Summary of Impacts and Mitigation Measures (Continued)

Subject Matter	*Impact*	*Mitigation Measures*	*Schedule*
Historic and Archaeological Resources	No impacts: The Project is proposed beneath existing paved roads and within 10 feet of that pavement, and as such is located within previously-disturbed roadbeds.	No previously undisturbed areas will be affected by the Project route. The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves, two of which will be within the North Harwich Village. These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder in close proximity to the valves with circuitry connected to the valve actuators located in below-ground prefabricated concrete vaults. The Project will not affect properties listed on the State or National Register of Historic Places, nor will it affect historic districts or properties and areas listed in the Inventory of Historic and Archaeological Assets of the Commonwealth.	During construction.
Construction	Temporary: Temporary impacts on traffic, air quality, noise.	The Company will engage the services of a qualified Environmental Inspector to manage the environmental inspection program. This program will ensure that construction activities will be in compliance with requirements of applicable federal, state and local environmental permits and approvals. The Environmental Inspector will have immediate access to the Company's Chief Inspector and will have "stop work" authority relative to environmental non-compliance. Prior to construction, the Company will work closely with the municipalities to develop TMPs for construction; drafts of TMPs for 10 major intersections are provided in Attachment I along with a typical TMP. Issues addressed in the TMPs include: ♦ Width and lane locations of the work zone to minimize impacts to vehicular traffic; ♦ Work schedule and duration of lane closures, road closures, or detours (where applicable); ♦ Traffic-control devices such as barricades, reflective barriers, advance warning signs, traffic regulation signs, traffic-control drums, flashers, detour signs, and other protective devices will be placed as shown on plans and as approved by the applicable municipalities;	During construction.

Table 2-6 Summary of Impacts and Mitigation Measures (Continued)

Subject Matter	*Impact*	*Mitigation Measures*	*Schedule*
Construction (continued)		♦ Locations where temporary provisions may be made to maintain access to homes and businesses; ♦ Routing and protection of pedestrian and bicycle traffic; ♦ Maintenance of school bus service; ♦ Communication with adjacent businesses so critical product deliveries are not interrupted by construction; ♦ Determination of the impact to roadway level of service due to short-term lane closure(s), if necessary; ♦ Notification to municipal officials, local businesses, and the public of the timing and duration of closed curbside parking spaces and travel way restrictions; ♦ Coordination with police and fire departments; and ♦ Management of impact to egress by emergency vehicles. The TMPs reflect an analysis of the roads affected by Project construction. Each TMP will be submitted for review and approval by appropriate municipal authorities prior to construction. Specific air quality mitigation measures incorporated into the draft ECP include: ♦ Use of appropriately designed wheel wash facilities as necessary to prevent off-site migration of soils; ♦ Mechanical street sweeping of construction areas and surrounding streets and sidewalks as necessary; ♦ Removal of construction waste in covered or enclosed trailers; ♦ Wetting of exposed soils and stockpiles to prevent dust generation; ♦ Minimizing stockpiling of materials on site; ♦ Turning off construction equipment when not in use and minimizing idling times; ♦ Minimizing the storage of construction waste on site; and ♦ Minimizing the duration that soils are left exposed.	

Table 2-6 Summary of Impacts and Mitigation Measures (Continued)

Subject Matter	*Impact*	*Mitigation Measures*	*Schedule*
Construction (cont'd)	Temporary impacts on traffic, air quality, noise.	Many of these measures are intended to minimize potential impacts associated with construction activities that may generate fugitive dust, which will result in localized increases in airborne particulate levels. The Company requires contractors to use ULSD in off-road diesel vehicles and will comply with the requirements of MassDEP's Diesel Retrofit Program. The Company and its contractors will comply with state law (M.G.L. Chapter 90, Section 16A) and MassDEP regulations (310 CMR 7.11(1)(b)), which limit vehicle idling to no more than five minutes in most cases. Noise mitigation measures incorporated into the draft ECP include: ♦ Minimizing the amount of work conducted outside of typical construction hours; ♦ Ensuring that appropriate mufflers are installed and maintained on construction equipment; ♦ Ensuring appropriate maintenance and lubrication of construction equipment to provide the quietest performance; ♦ Requiring muffling enclosures on continuously-operating equipment such as air compressors and welding generators; ♦ Turning off construction equipment when not in use and minimizing idling times; and ♦ Mitigating the impact of noisy equipment on sensitive locations by using shielding or buffering distance to the extent practical. The Project will have no impacts on water supplies. Measures designed to minimize erosion and sedimentation include: ♦ Minimizing the quantity and duration of soil exposure; ♦ Protecting areas of critical concern during construction by redirecting and reducing the velocity of runoff; ♦ Installing and maintaining erosion and sediment control measures during construction; ♦ Establishing vegetation where required as soon as possible following final grading; and ♦ Inspecting the construction route and maintaining erosion and sediment controls as necessary until final stabilization is achieved and final inspections completed. It will be the responsibility of the contractor to implement and maintain erosion and sediment control measures during construction.	During construction.

2.9 Conclusion

The Project is a critical infrastructure project, the construction of which will enable the Company to restore system pressures to 200 psig, thus strengthening downstream pressure and providing for adequate supply to lift restrictions on new services, expanded services, and conversions on the Mid-Cape. The Project will not result in any change in land use, nor will it have any permanent environmental or human/community-related impacts. Because the Project is proposed entirely within existing roadway layouts beneath pavement or within ten feet of pavement, the Project will have no significant permanent or temporary impacts. Construction-period traffic management is being carefully considered and will be coordinated with the affected towns to ensure that any temporary traffic impacts are minimized to the extent possible and that safe and efficient travel is maintained. The Project will not result in any tree cutting, and if minor vegetation trimming is needed to accommodate construction, those areas will be returned to their preexisting condition upon completion of construction. There will be no significant visual impacts from the Project. Finally, the Project is consistent with the goals and MPS in the Cape Cod Commission's Regional Policy Plan, further demonstrating the lack of significant and permanent environmental or human/community-related impacts.

For all of these reasons, the Project has no regional impacts and is eligible for a DRI Exemption.

Section 3.0

Consistency with Regional Policy Plan

3.0 CONSISTENCY WITH REGIONAL POLICY PLAN

This section describes the Project's consistency with the Cape Cod RPP. The most recent version of the RPP became effective on January 16, 2009, and was amended in August 2012. As described below, the Project complies with all applicable elements of the RPP and will have no impact on its protected interests.

3.1 Land Use/Growth Management

The Land Use/Growth management section of the RPP addresses patterns of growth on the Cape by, in part, emphasizing the importance of compact growth, reinforcing existing development patterns and streetscapes, and preserving open space. Project consistency with the applicable goals and MPS related to land use and growth management is addressed below.

Goal LU2 – Capital Facilities and Infrastructure

Goal LU2 is *"[t]o use capital facilities and infrastructure efficiently and in a manner that is consistent with Cape Cod's environment, character, and economic strengths, and that reinforces traditional village-centered development patterns."* Project consistency with the applicable MPS relevant to this goal is addressed below.

LU2.1 – Connections to Existing Infrastructure

Proposed or expanded infrastructure shall support compact development patterns, and in towns with a Land Use Vision Map, shall support the land use categories and characteristics of designated Economic centers, Industrial and Service Trade Areas, and Villages, that have been designated on the Regional Land Use Vision Map.

The towns of Yarmouth, Dennis, and Harwich have Land Use Vision Maps (in draft form in Dennis and Harwich), while the town of Brewster does not; the Project will not alter land use patterns, and is consistent with existing and intended future uses. Since the Project will replace existing gas distribution infrastructure, it is consistent with supporting existing patterns of development. The Project follows the existing alignment of the 200-psig main that will be replaced, except for an 800-foot stretch on Queen Anne Road where the slight route deviation eliminates some sharp bends and reduces impacts to the Route 39 rotary. The Project will enable a lifting of the moratorium on new and expanded natural gas services in the area.

3.2 Economic Development

The Economic Development section of the RPP addresses the effort to promote economic growth while maintaining the characteristics of the Cape's natural and human environments. Project consistency with the applicable goals and MPS related to economic development is addressed below.

Goal ED4 – Infrastructure Capacity

Goal ED4 is *"[t]o provide adequate capital facilities and infrastructure that meet community and regional needs, expand community access to services, and improve the reliability and quality of services."*

ED4.1 – Demonstrated Need and Public Benefit

Development of infrastructure and/or capital facilities shall be in response to existing regional demand and shall improve the availability, reliability, quality, and cost of services.

As a local natural gas distribution company, the Company's core obligation is to provide safe, reliable, and least-cost gas service to its customers. The primary driver for the Project is the condition of the existing system and its effect on the Company's ability to provide safe and reliable service to existing and future customers on the Cape Cod gas distribution network during periods of peak demand (i.e., design weather conditions). For reasons described in Section 2.2, the Company has reduced the operating pressure of the system to less than 125 psig, resulting in a moratorium on new and expanded gas services (including conversions) on portions of the mid-Cape and all of the lower Cape Cod regions. The reduction in operating pressure has also resulted in increased reliance on portable LNG units to meet peak demand for existing customers.

Construction of the proposed 18.1-mile replacement main will allow the Company to restore system pressures to 200 psig, thus strengthening downstream pressure and providing for adequate supply to lift restrictions on new services, expanded services, and conversions on the Mid and Lower Cape. It will also once again reduce the Company's reliance on portable LNG, thus reducing the need for trucking operations to and from Chatham and Eastham and improving reliability. Prior to the new customer demand restrictions, the Company's most recent forecast (from 2014) of customer growth predicted that demand for natural gas on the Cape would increase by 15% over the next five years, with an average annual growth rate of 3%. This demand for natural gas service comes both from new development and the continuing demand from oil-to-gas conversions, primarily for heating. Because of the moratorium and deferral of new customer connections, pent-up demand is anticipated to be high when capacity becomes available again.

3.3 Water Resources

The Natural Systems section of the RPP contains the goals and policies applicable to water resources on the Cape. Consistency with the applicable goals and MPS related to water resources is addressed below.

Goal WR1 – General Aquifer Protection

Goal WR1 is *"[t]o maintain the hydrogeologic balance and quality of Cape Cod's aquifer, considering such factors as groundwater withdrawals, wastewater disposal, stormwater recharge, and adequate surface water levels."*

WR1.2 – Identification of Drinking Water Wells

Development and redevelopment shall identify their proposed drinking water wells and existing private drinking water wells on abutting properties within 400 feet and assess the impact of the development on the water quality of these wells and all other existing wells that may potentially be affected by the proposed development. Septic systems and other sources of contamination shall be sited to avoid adversely affecting downgradient existing or proposed wells.

The Project will have no impacts on drainage or water supplies. Construction of the new replacement main is designed to avoid any impact to existing drainage systems. The operational Project will generate no nitrogen or hazardous liquids that could potentially contaminate water systems on the Cape. Furthermore, the cathodic protection applied to the steel main will prevent corrosion (see Section 2.7.10.1), even if the replacement main is surrounded by saturated soils. Even without such cathodic protection, corrosion of a steel pipe would not result in the leaching or release of any harmful substances.

Potable water used in hydrostatic testing will be pumped into storage tanks, and the Company is prepared to haul the test water to an off-site wastewater treatment facility for disposal, if necessary. However, no chemical additives will be added to the test water and the water is expected to be clean; the recovered test water will be tested to confirm this is the case. If suitable, the Company intends to coordinate with each municipality along the Project route regarding arrangements to discharge the test water to approved locations adjacent to the Project area, in a manner consistent with applicable statutory and regulatory requirements and the Company's environmental policies (see Section 2.7.10.3). Such discharge would be performed in accordance with BMPs prepared specifically for this Project and documented in the draft ECP (see Attachment F).

Once the replacement main has been placed and the trenches are backfilled and repaved, there will be no Project-related sources of erosion or sedimentation at any point along the route; furthermore, construction-period controls will be in place to avoid and minimize construction-related erosion and sedimentation. No sources of total suspended solids ("TSS") will be created specific to the replacement main.

Attachment D contains a list of parcels within 400 feet of the Project that potentially contain private wells. Health Departments for Yarmouth, Dennis, and Harwich confirmed they do not keep records of private well locations. Upon suggestion from the Towns, the Company contacted Town Water Departments to acquire lists of property addresses with *public*

drinking water. Next, the Company cross-referenced those lists against a list of parcels within 400 feet of the Project, identifying parcels that do not have public water and hence likely have private wells (or are vacant lots). The Project will have no adverse effect on wells.

Nearly all vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard. A few pieces of large, less mobile equipment (e.g., excavators, paving equipment) will be refueled as necessary on-site. Any such field refueling will not be performed within 100 feet of wetlands or waterways, or within 100 feet of known private or community potable wells. The fuel transfer operation shall be conducted by an operator knowledgeable about the equipment, the location, and with the use of the work zone spill kit. Proper spill containment gear and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks. During construction, equipment will be inspected for incidental leaks (e.g., hydraulic fluid, diesel fuel, gasoline, anti-freeze) prior to site access and on a daily basis at the commencement of each work shift. Small pieces of powered equipment such as generators and pavement saws will be placed in containment bins or on absorbent blankets or pads to contain any accidental fuel spills or leaks.

Goal WR2 – Drinking Water Quality and Quantity

Goal WR2 is *"[t]o maintain the overall quality and quantity of Cape Cod's groundwater to ensure a sustainable supply of untreated high-quality drinking water."*

WR2.2 – Prohibition on Hazardous Materials/Wastes

Development and redevelopment that involves the use, treatment, generation, handling, storage, or disposal of Hazardous Materials or Hazardous Wastes, with the exception of household quantities, shall not be permitted in Wellhead Protection Areas, except as provided in WM1.2 and WM1.3.

Wellhead Protection Areas, as established by the CCC, consist of areas that contribute groundwater to existing public and community water supply wells and are recognized in conjunction with state standards for Zone II Aquifers (as defined in 310 CMR 22.02). Potential Public Water Supply Areas are areas identified by the CCC as potential future well sites and their associated recharge areas that have been identified by towns, water districts, or private water companies.

The Project passes through and/or adjacent to several Zone II and a Potential Public Water Supply Areas (see Figures 2-10 and 2-11 in Attachment A). A Zone II is an area identified by MassDEP as that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). There are no MassDEP-approved Zone I areas within 500 feet of the Project route (see Figure 2-11).

Construction of the proposed replacement main will involve the use of equipment that requires fuel and lubricants; Table 3-1 lists potential contaminants of ground or surface waters used in the construction process. The Company has developed and will maintain a detailed ECP to effectively manage these risks and avoid and minimize potential impacts to water resources (see Attachment F).

Table 3-1 Potential construction site ground and/or surface water pollutants

Trade Name	*Chemical/Physical Description*	*Water Supply Pollutants*
Fertilizer (for reseeding)	Liquid or solid grains	Nitrogen, Phosphorous
Asphalt	Black solid	Oil, petroleum distillates
Hydraulic oil/fluids	Oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil and grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Potential construction stage erosion	Solid particles	Soil, sediment

To minimize the possibility of spills or leaks of fuel and/or lubricants, nearly all vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard. A few pieces of large, less mobile equipment (e.g., excavators, paving equipment) will be refueled as necessary on-site. Any such field refueling will not be performed within 100 feet of wetlands or waterways, or within 100 feet of known private or community potable wells. The fuel transfer operation shall be conducted by an operator knowledgeable about the equipment, the location, and with the use of the work zone spill kit. Proper spill containment gear and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks. During construction, equipment will be inspected for incidental leaks (e.g., hydraulic fluid, diesel fuel, gasoline, anti-freeze) prior to site access and on a daily basis at the commencement of each work shift. Small pieces of powered equipment such as generators and pavement saws will be placed in containment bins or on absorbent blankets or pads to contain any accidental fuel spills or leaks. An emergency response plan is included in the draft ECP in Attachment F.

A review of the MassDEP on-line database of release sites was performed to determine the potential to encounter subsurface contamination along the proposed Project route. Only one reportable release was identified adjacent to the Project route: Angell Property (RTN 4-0012473) at 389 Whites Path in Yarmouth, which is just west of the intersection between Whites Path and Great Western Road. This release was classified as Tier I on October 7, 2013. No AUL is associated with this release. Although the Project is not expected to

encounter contaminated soils, if contaminated soils are encountered during construction, the soils will be managed pursuant to the URAM provisions of the MCP. The Company will prepare a soil and groundwater management plan, and will contract with an LSP as necessitated by conditions encountered along the Project alignment, consistent with the requirements of the MCP at 310 C.M.R. 40.0460 et seq.

WR2.4 – Prohibited Uses under State Regulations

Uses prohibited in Zone IIs by state regulations shall not be permitted.

The Project will pass through Zone II Aquifers as shown on Figures 2-10 and 2-11 in Attachment A; however, the use is permitted in Zone IIs.

WR2.5 – Future Well Site Restrictions

No development shall be permitted within 400 feet of an identified future well site.

There are no mapped public water supply wells located within 400 feet of the Project, and there are no known future well sites located within 400 feet of the Project. The Project will not result in any change in land use.

Goal WR7 – Stormwater Quality

Goal WR7 is *"[t]o protect the overall water quality of the aquifer and its resources by minimizing impervious surfaces and improving stormwater quality as much as possible."*

WR7.1 – No New Direct Discharges of Untreated Stormwater

New direct discharge of untreated stormwater, parking-lot runoff, and/or wastewater into marine and fresh surface water and natural wetlands shall not be permitted.

The Project will not result in any permanent change in land use. Stormwater management and erosion control during construction will be managed through the BMPs described in the draft ECP (see Attachment F). There will be no new direct discharges of untreated stormwater as a result of the Project.

WR7.2 – On-Site Infiltration

Stormwater for all roadways and parking areas shall be managed and infiltrated on site, close to the source, to minimize runoff and maximize water quality treatment. Stormwater water quality treatment shall be provided for the first inch of rainfall (25-year 24-hour storm) consistent with 310 CMR and the Massachusetts Stormwater Management Handbook to attain 80-percent total suspended solids removal and to reduce nutrients. All designs shall provide for at least 44-percent total suspended solids removal shall be designed prior to discharge into structured infiltration systems.

The Project does not involve the expansion or new construction of a roadway, parking area, or other paved surface, and it will not alter the existing area covered by pervious and impervious surfaces. During construction, stormwater management will occur in accordance with the ECP provided in Attachment F.

WR7.9 – Best Management Practices during Construction

Construction best management practices for erosion and sedimentation controls shall be specified on project plans to prevent erosion, control sediment movement and stabilize exposed soils.

Construction BMPs are described in the draft ECP and are shown on the engineering plans provided in Attachment C.

WR7.10 – Stormwater Maintenance and Operation Plan

Development and redevelopment shall submit a Professional Engineer-certified stormwater maintenance and operation plan demonstrating compliance with the Massachusetts Stormwater Guidelines including a schedule for inspection, monitoring, and maintenance. The plan shall identify the parties responsible for plan implementation, operation and maintenance. The identified responsible party shall keep documentation of the maintenance and inspection records and make these available to the Commission or local board of health upon request. One year from completion of the system, a Professional Engineer shall inspect the system and submit a letter certifying that the system was installed and functions are designed.

The Project will not result in any permanent change in land use, and the Project does not involve a stormwater management system. However, construction-period stormwater maintenance will be performed in accordance with the SWPPP contained within the ECP (see Attachment F).

3.4 Coastal Resources

The Coastal Resources section of the RPP contains the goals and policies applicable to the coastal zone on the Cape. Consistency with the applicable goals and MPS related to coastal resources is addressed below.

Goal CR2 – Coastal Hazard Mitigation

Goal CR2 is *"[t]o limit development in the coastal zone, particularly high-hazard areas, in order to protect the natural beneficial functions of coastal resources so that they serve to prevent or minimize human suffering and loss of life and property or environmental damage resulting from storms, flooding, erosion, and relative sea-level rise."*

WR2.1 – Prohibiting Development in V-Zones

No development or redevelopment shall be permitted within V-Zones, except as specified in MPS CR2.7… As an exception, where there is no feasible alternative, water-dependent structures and uses and maintenance of marine infrastructure may be permitted provided the activity minimizes impacts to coastal resources and is subject to the approval of all permitting authorities.

The Project route is not located in the floodplain as mapped by FEMA, although it does pass over the floodplain associated with the Bass River and Herring River. The Project does not involve development or redevelopment within V-Zones.

WR2.2 – Accommodating Relative Sea-level Rise

All new buildings, including replacements, or substantial improvements to existing structures shall be designed as follows to accommodate documented relative sea-level rise rates in Massachusetts: 1) within A-Zones, the lowest horizontal structural member shall be a minimum of one foot above Base Flood Elevation ("BFE"); or 2) within V-Zones, due to wave action, the lowest horizontal structural member shall be a minimum of two feet above BFE.

The Company has evaluated the Project's vulnerability to sea level rise and hurricane storm surge inundation by using: (1) a "bathtub model" to calculate sea level rise measurements; and (2) the SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model, a storm surge model from the National Weather Service.

The bathtub model accounts for rising water levels, but does *not* take into account natural events like storm surge and does not model the rate of sea level rise. Rather, it evaluates effects from a consistent rise of water (like filling a bathtub). Results from using this methodology were modeled using mean-high-high-water ("MHHW") as the baseline, because most structures and development are usually at higher elevations. To achieve this, NOAA's VDATUM tool was used to convert tidal data and compute local tidal variance for specific locations using elevation and vertical datum information. Hydrologically-correct digital elevation models (i.e., elevation models merged with bathymetric measurements) were created from LIDAR data to model the coastline water depth. Sea level was then raised in one-foot increments to illustrate inundation under various sea level rise scenarios. The modeling performed for the analysis of this Project included hydrologically-connected areas to show inland flooding connected to inlets on the coast. Modeled scenarios such as these are meant to represent potential flooding to inform planning decisions, but are not suitable for use as actual calculations.

The SLOSH model is a mathematical and spatial model that estimates and models storm surge heights under different circumstances. The model uses a number of variables to define and compute storm surge potential, and provides estimates of surge heights using

temporal data for past, present, and theoretical hurricanes. These variables include storm size, wind speed, track, and pressure. Once these variables have been calculated in the model, it is then applied to a specific shoreline of the user's choice, determined using a hydrologically-correct digital elevation model to account for rivers, roads, bathymetry, and other features. The output is a spatial grid that represents different surge levels for different scenarios.

The National Hurricane Center provides inputs for the SLOSH model, mainly Maximum Envelopes of Water ("MEOWs"), which are then used to create MOMs (Maximum of Maximums). These MOMs are the model outputs used to define surge levels depending on the strength of the hurricane using variables described above. The surge grid is then processed with the digital elevation model, and the result is a near-to-worst-case scenario with the output being the surge height above ground (in feet). For the model for this Project, the data that came from the National Hurricane Center was at estimated high tide.

Results from the sea level rise and storm surge inundation analyses show that there are no Project vulnerabilities (with one minor exception) resulting from projected inundation by 1-, 3-, or 6-foot sea level rise scenarios (see Figure 3-1). The three profiles shown in Figure 3-2 also illustrate that the Project would not be vulnerable to 1-, 3-, or 6-foot magnitudes of sea level rise.

The analysis of hurricane storm surge inundation shows that the Project area immediately adjacent to the Bass River, where the replacement main will be installed within Highbank Road, has some limited vulnerability (see Figure 3-3). However, there are no widespread areas of anticipated storm surge inundation along the Project route.

WR2.4 – Damage Prevention and Flood Minimization

To maintain the storm damage prevention and flood control functions of Land Subject to Coastal Storm Flowage ("LSCSF"): 1) No activity within a V-Zone shall increase the existing site elevations; and 2) No activity within a V- or A-Zone shall increase the velocity of flood waters or increase flows due to a change in drainage or flowage characteristics on the subject site, adjacent properties, or any public or private way; and 3) Placement of fill in hydraulically constricted areas shall not be permitted.

The Project does not involve any fill within LSCSF, and will not result in any significant changes in grade or elevation. The Project will not create any features that could increase the velocity of flood waters or change drainage or flow characteristics of the existing land surface along the Project route.

WR2.10 – General Exceptions

Notwithstanding MPS CR2.1, CR2.3, CR2.4, and CR2.8, the following activities may be permitted provided the applicant demonstrates to the satisfaction of the Commission that best available measures are utilized to minimize adverse impacts on all critical characteristics of LSCSF, and provided that all of the RPP MPS for underlying resources are met: … 7) Underground utility crossings that do not disturb protected resources.

The Project route is not located in LSCSF, but it does pass over LSCSF associated with the Bass River and Herring River. For the Bass River crossing, the proposed replacement main will be located within an existing utility bay of the Highbank Road Bridge, which extends over LSCSF. For the Herring River crossing, the replacement main will be installed within the roadbed above an existing culvert, and will not impact the culvert. The Project does not involve any filling of LSCSF and will not result in any significant changes to existing grading or elevation along the route.

3.5 Wetlands

The Natural Systems section of the RPP contains the goals and policies applicable to wetlands on the Cape. Project consistency with the applicable goals and MPS related to wetlands is addressed below.

Goal WET1 – Wetlands Protection

Goal WET1 is *"[t]o preserve and restore the quality and quantity of inland and coastal wetlands and their buffers on Cape Cod."*

WET1.3 – Wetlands, Buffers, and Utility Line Installation

Disturbance of wetlands and buffer areas for operation and maintenance of underground and overhead utility lines (electrical, communication, sewer, water, and gas lines) may occur as provided below. Installation of new utility lines through these areas may occur where the Cape Cod Commission finds no feasible alternative to the proposed route for such facilities. In all instances, disturbance of wetland and buffer areas shall be minimized and surface vegetation, topography, and water flow shall be restored substantially to the original condition.

The Project will not result in any permanent change in land use. The Company has designed the Project to be constructed within existing roadway layout beneath pavement and within 10 feet of that pavement, thus eliminating any filling of or permanent impacts to wetlands. While no direct impacts to wetlands are anticipated, construction will require temporary activity within the buffer zones of several wetland resource areas and over culverted segments of several waterbodies. Where the work is within 100 feet of wetland resource areas, appropriate controls will be installed at the edge of pavement to confine construction to the paved roadway.

There will be no construction performed on the banks at any waterbody crossing. The crossing of the Bass River will be accomplished by using space in a utility bay of the existing bridge, and stream crossings will be accomplished by open-cut trench in the road bed above existing culverts (see Figure 2-9 for an example). The Company expects that installation of the replacement main in a utility bay of the Highbank Road Bridge over the Bass River can be accomplished without an in-water vessel. However, it is possible that the installation of the replacement main on the bridge may require an in-water support vessel or, alternatively, scaffolding extended from the bridge deck to ensure proper placement of the main. This may require navigation to be temporarily limited. All required approvals will be secured, and the Company will coordinate as appropriate with the municipalities, MassDOT (which owns the bridge), and the Dennis Harbormaster to the extent such in-water activity is determined to be necessary for construction.

The proposed replacement main crosses over approximately 250 linear feet of Land Subject to Coastal Storm Flowage ("LSCSF") in the vicinity of the Bass River in the towns of Yarmouth and Dennis. Although there are no established performance standards for work within LSCSF, the Project will have no direct alteration of lands mapped as LSCSF, and no effect on the ability of the resource area to perform its primary function of storm damage prevention and flood control. Installation of the replacement main within an existing utility bay of the bridge will not in any way alter the flow characteristics or flood storage capacity of the resource area. Thus, the primary functions of the resource area will be maintained.

Proposed construction will occur in Riverfront Areas ("RFAs") that are classified under the WPA regulations as "previously developed," which includes existing paved areas within 200 feet of the banks of any perennially flowing watercourse. In total, approximately 5,510 square feet of road surface within previously developed and degraded RFA will be temporarily altered to complete the Project.

Replacement main construction is expected to proceed at a rate of approximately 120 feet per day, with not more than 200 feet of trench open at any particular location. The trench will be closed at the end of each work day. Limiting the amount of disturbance in this manner will reduce the already limited potential for adverse impacts to adjacent wetland resource areas from stormwater runoff and sedimentation.

The Project will have no direct impacts to adjacent wetlands, but will involve construction in and along roadways that pass through the buffer zones of several wetland areas (see Figures 2-7 and 2-8). Plans depicting the proposed replacement main at each wetland area are provided in Attachment G. Construction in close proximity to wetlands will be managed to avoid indirect impacts related to erosion and sedimentation. The Company is committed to ensuring that indirect impacts are avoided and minimized, and as such a SWPPP will be prepared for the Project that will specify implementation of erosion control measures, including (see Attachment F):

- Environmental monitoring of the Project to ensure compliance with the SWPPP, NPDES General Permit, and all other environmental permits;

- Placement of erosion and sedimentation controls at appropriate locations along road shoulders whenever the work zone is located within 100 feet of a wetland or within 200 feet of a perennial waterbody; and

- In roads where stormwater is directed to a local storm drain, installation and maintenance of filter fabric bags within each catch basin to prevent sedimentation to the storm drain system, and stockpiling of trench spoils in a manner that will prevent them from being washed with stormwater into nearby storm drains.

WET1.4 – Stormwater

Stormwater management plans for new development shall preclude direct discharge of untreated stormwater into natural wetlands and water bodies. New stormwater discharges shall be located a minimum of 100 feet from wetlands and water bodies.

The Project will not result in any change in land use. Construction-period stormwater management and erosion control will be managed through the ECP provided in Attachment F and will preclude direct discharge of untreated stormwater into natural wetlands and water bodies.

3.6 Wildlife and Plant Habitat

The Natural Systems section of the RPP contains the goals and policies applicable to wildlife and plant habitat on the Cape. Project consistency with the applicable goals and MPS related to wildlife and plant habitat is addressed below.

Goal WPH1 – Prevent Loss, Minimize Adverse Impact, and Maintain Diversity

Goal WPH1 is *"[t]o prevent loss or degradation of critical wildlife and plant habitat, to minimize the adverse impact of new development on wildlife and plant habitat, and to maintain existing populations and species diversity."*

WPH1.1 – Natural Resources Inventory

Applications for Developments of Regional Impact that propose to alter undeveloped areas shall contain a natural resources inventory. Such inventory shall identify the presence and location of wildlife and plant habitat, including vernal pools, and serve as a guide for the layout of the development. Developments shall be planned to minimize adverse impacts to wildlife and plant habitat. Guidance on preparation of natural resources inventories can be found in Development of Regional Impact Guidelines for Natural Resources Inventory (Plant and Wildlife Habitat Assessment), Technical Bulletin 92-002, as amended.

The Project in its entirety will be installed within existing roadway layout, either beneath pavement or within 10 feet of that pavement. There will be no change in land use associated with the Project. No tree clearing will be required, and no undisturbed habitat will be impacted.

WPH1.2 – Clearing and Grading

Clearing of vegetation and alteration of natural topography shall be minimized, with native vegetation planted as needed to enhance or restore wildlife habitat. Standing specimen trees shall be protected. The Commission may require designation of building envelopes (for structures, driveways, lawns, etc.), where appropriate, to limit removal of vegetation.

As the Project in its entirety will be installed within existing roadway layout, either beneath pavement or within 10 feet of that pavement, no significant clearing or grading is anticipated. The Project does not involve any change in land use.

WPH1.3 – Wildlife and Plant Habitat

Fragmentation of wildlife and plant habitat shall be minimized by the establishment of greenways and wildlife corridors of sufficient width to protect not only edge species but also species that inhabit the interior forest, as well as by the protection of large unfragmented areas, and the use of open space or cluster development. Wildlife shall be provided with opportunities for passage under or across roads and through developments where such opportunities will maintain the integrity of wildlife corridors. Fencing shall not be constructed so as to interfere with identified wildlife migration corridors.

The Project will not be creating any new roads or barriers to wildlife passage. Rather, the Project will be installed within existing roadway layouts and, as such, will avoid impacting previously-undisturbed areas. Where the Project route passes over a waterbody (e.g., within the roadbed above a culvert), appropriate erosion and sedimentation controls such as hay bales, silt fence, and catch basin protection will be deployed to avoid impacts. At the Stony Brook crossing on Stony Brook Road in Brewster, where the herring run begins in mid-March and continues through the busy visitors' season, the Company will perform construction in the off-season.

WPH1.4 – Rare Species

DRIs within critical wildlife and plant habitat areas shall submit the development proposal to the Massachusetts Natural Heritage Program for review and comment. DRIs that would adversely affect habitat of local populations of rare wildlife and plants shall not be permitted. Development may be permitted where the proponent can demonstrate that such development will not adversely affect such habitat. A wildlife and plant habitat management plan may be required as a condition of approval when development or redevelopment is permitted in critical wildlife and plant habitat areas.

The proposed route passes through areas mapped as Priority Habitat of Rare Species and/or Estimated Habitat of Rare Wildlife by the NHESP under MESA and the Massachusetts Wetlands Protection Act, respectively (Natural Heritage Atlas, 2008). These areas are shown on Figures 2-7 and 2-8.

The implementing regulations of MESA (321 CMR 10.00) contain an exemption from review for projects in Priority Habitat for *"installation, repair, replacement, and maintenance of utility lines (gas, water, sewer, phone, electrical) for which all associated work is within ten feet from the edge of existing paved roads"* (321 CMR 10.14(b)).

The proposed Project will have no impacts on rare species habitat. Where it passes through designated Priority Habitat, it will remain on paved roadway or shoulder within ten feet of pavement, and as such is exempt from NHESP review.

NHESP has identified Cape Cod as having roost trees for the Northern Long-Eared Bat. However, because the Project will not result in any tree cutting, the federal Endangered Species Act is not implicated.

WPH1.5 – Vernal Pools

Where a project site is located adjacent to a vernal pool (as defined herein), development shall be prohibited within a 350-foot undisturbed buffer around these resources. New stormwater discharges shall be located a minimum of 100 feet from vernal pools.

A total of six certified vernal pools are located within 300 feet of the Project. However, any construction disturbance related to the Project will be within the existing previously-disturbed roadway layout. Construction-period stormwater controls will be deployed in accordance to the ECP provided in Attachment F. The Project will have no new stormwater discharges located within 100 feet of any vernal pool.

3.7 Open Space Protection and Recreation

The Natural Systems section of the RPP contains the goals and policies applicable to open space and recreation on the Cape. Project consistency with the applicable goals and MPS related to open space and recreation is addressed below.

Goal OS1 – Open Space and Natural Resources

Goal OS1 is *"[t]o preserve and enhance the availability of open space that provides wildlife habitat and recreational opportunities, and protects the region's natural resources and character, Barnstable County shall strive to protect remaining developable land."*

OS1.3 – Open Space Requirements

All development, excepting municipal projects serving municipal purposes, that qualifies as a DRI shall provide permanently restricted upland open space in accordance with the proportional calculation described below…"

The Project is proposed within existing roadway layouts, either beneath pavement or within 10 feet of pavement, and as such will not impact open space. In addition, the Project will have no permanent effects on land use, and will not change the land use in any location.

OS1.4 – Sensitive Natural Resources

In the design of developments, significant natural and fragile areas including critical wildlife and plant habitat, significant natural communities, water resources such as ponds and lakes, rivers, aquifers, shore lands, and wetlands; 100-foot buffers to wetlands; historic, cultural, and archaeological areas; significant scenic roads and views; and significant landforms shall be protected. Development should be located outside of 300-foot buffers to ponds and lakes and 200-foot buffers to rivers to the greatest extent feasible, and consistent with state law.

The Project does not involve work in significant natural or fragile areas; rather, the Project in its entirety will be located within existing roadway layout, with the proposed replacement main installed beneath pavement or within 10 feet of that pavement. The Project will not alter existing land uses. All necessary precautions, including implementation of construction-period stormwater, erosion, and spill-prevention controls included in the ECP (see Attachment F) will be taken to ensure that there are no impacts to water resources or wetland resource areas.

As described in Section 2.7.6, the Project is not expected to result in any impacts to historic, cultural, or archaeological resources.

OS1.6 – Sensitive Open Space Resources

Where development is proposed adjacent to land held for conservation and preservation purposes, or adjacent to rural landscapes or lands in active agricultural production, the development shall be configured so as to prevent adverse impacts to these lands and in a manner that maximizes contiguous open space. Additional vegetated buffers may be required where necessary to screen or separate uses.

The Project in its entirety will be confined to the existing roadway layout, and the replacement main will be installed beneath pavement or within 10 feet of that pavement. In addition, the Project will not alter existing land uses. Thus, the Project will have no impacts to open space.

3.8 Transportation

The goals of the transportation section of the RPP are to ensure the safety of the roads, reduce/offset the expected increase in vehicle trips and dependency on the automobile, to maintain travel times and Level of Service on roads and to ensure that road construction or reconstruction is consistent with community character. The RPP MPS are designed for developments that will have some permanent effect on traffic. The Project, once constructed, will have no effect on traffic. Temporary construction impacts will be mitigated through the use of TMPs. Draft TMPs for 10 major intersections are provided in Attachment I, along with a typical TMP. TMPs will be finalized through coordination with each municipality to avoid and minimize temporary traffic-related impacts, and to avoid any regional impacts during construction.

The TMPs use information from a variety of sources to develop a reasonable and appropriate method of avoiding and minimizing traffic disruptions. For example, information on the proposed alignment of the pipeline, information on the necessary width of the construction corridor, the proximity of public transportation facilities, and the proximity of other roads and curb cuts (e.g., driveways, parking lots, and loading docks) is compiled and analyzed to determine the most appropriate means and timing of construction to limit the impact of that construction on local traffic. Where any such impacts are likely to occur, the TMP identifies the necessary mitigation to ensure a safe route for vehicle and pedestrian passage and a safe work zone for the construction crews.

Construction will be coordinated with each municipality, and construction during the summer will be performed only where municipalities provide specific approval. To expedite Project completion, the Company intends to work simultaneously on each of the three Project segments. Replacement main construction is expected to proceed at a rate of approximately 120 feet per day, with not more than 200 feet of trench open at any particular location. Temporary work space approximately 20 to 25 feet in width will be required as construction proceeds along the route. Depending on the location, either one lane of the existing roadway will be utilized for workspace or a portion of the workspace will extend onto the shoulder of the road. Although the Company will seek to minimize road closures, there may be locations where temporary road closures are necessary where the main will cross the road or installation is needed closer to the middle of the road to avoid existing underground utilities. Police details and other appropriate traffic management measures will be used to maintain traffic flow, and traffic management will always be coordinated with Town officials.

3.9 Waste Management

The issue of waste management in the RPP relates to the challenges Cape Cod faces in managing its solid and hazardous wastes in an environmentally sound manner. Waste will only be generated during construction of the Project and will be limited to construction-related materials. Consistency with MPS that would be relevant to construction activities is described below.

Goal WM1 – Hazardous Materials and Waste

Goal WM1 is *"[t]o protect Cape Cod's drinking water by prohibiting land use activities involving the handling, storage, and disposal of hazardous materials and wastes that pose a significant threat to groundwater supplies."*

WM1.1 – Hazardous Materials/Waste Restrictions

Development and redevelopment that involves the use, treatment, generation, handling, storage, or disposal of Hazardous Materials and/or Hazardous Wastes, with the exception of Household Quantities or less, shall not be allowed within Wellhead Protection Areas and Potential Public Water Supply Areas, except as provided in WM1.2 and WM1.3.

Wellhead Protection Areas, as established by the CCC, consist of areas that contribute groundwater to existing public and community water supply wells and are recognized in conjunction with state standards for Zone II Aquifers (as defined in 310 CMR 22.02). Potential Public Water Supply Areas are areas identified by the CCC as potential future well sites and their associated recharge areas that have been identified by towns, water districts, or private water companies.

The Project passes through and/or adjacent to several Zone II and a Potential Public Water Supply Areas (see Figures 2-10 and 2-11 in Attachment A). A Zone II is an area identified by the MassDEP as that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation).

The Project will not result in any change in land use. Construction of the proposed replacement main will involve the use of equipment that requires fuel and lubricants; Table 3-1 (above) lists potential contaminants of ground or surface waters used in the construction process. The Company has developed and will maintain a detailed ECP to effectively manage these risks and avoid and minimize potential impacts to water resources (see Attachment F).

To minimize the possibility of spills or leaks of fuel and/or lubricants, nearly all vehicle fueling and all major equipment maintenance will be performed off-site at commercial service stations or a contractor's yard. A few pieces of large, less mobile equipment (e.g., excavators, paving equipment) will be refueled as necessary on-site. Any such field

refueling will not be performed within 100 feet of wetlands or waterways, or within 100 feet of known private or community potable wells. The fuel transfer operation shall be conducted by an operator knowledgeable about the equipment, the location, and with the use of the work zone spill kit. Proper spill containment gear and absorption materials will be maintained for immediate use in the event of any inadvertent spills or leaks. During construction, equipment will be inspected for incidental leaks (e.g., hydraulic fluid, diesel fuel, gasoline, anti-freeze) prior to site access and on a daily basis at the commencement of each work shift. Small pieces of powered equipment such as generators and pavement saws will be placed in containment bins or on absorbent blankets or pads to contain any accidental fuel spills or leaks.

WM1.4 – Pollution Prevention and Emergency Response Plan

Development and redevelopment in Wellhead Protection Areas and Potential Public Water Supply Areas shall prepare a pollution Prevention and Emergency Response plan for both the construction phase and normal operations that identifies potential contamination sources, threats of Hazardous Material and Hazardous Waste releases to the environment, describes material storage and handling details, containment and contingency plans for spill response, and documents regular inspection and employee education opportunities.

The ECP provided in Attachment F includes a Spill Prevention, Control, and Countermeasure ("SPCC") Plan that describes construction-period procedures to be followed in the event of a spill.

WM1.5 – Compliance with Massachusetts Hazardous Waste Regulations

Any development or redevelopment that uses, handles, generates, treats, or stores Hazardous Waste shall be in compliance with Massachusetts Hazardous Waste Regulations, 310 CMR 30.0 for the purposes of Cape Cod Commission review by providing the Commission with evidence of the following:

(a) Registration with or notification to the Massachusetts Department of Environmental Protection as a generator of Hazardous Waste;

(b) A written plan or protocol to manage the Hazardous Waste prior to disposal;

(c) A signed contract with a registered, licensed company to dispose of the Hazardous Waste.

The Project will not result in the generation of any hazardous waste within the work area of construction; therefore, it is not anticipated that 310 CMR 30.000 will apply.

Goal WM2 – Solid Waste

Goal WM2 is *"[t]o manage solid waste using an integrated solid waste management system that includes waste reduction, recycling, and composting and to divert 60 percent of municipal solid waste from incinerator and landfill facilities through recycling and composting programs by 2012."*

WM2.1 – Construction Waste

Development and redevelopment projects shall address the disposal of construction waste at both the construction and post-construction phases of development or redevelopment. To do so, a plan shall be provided to demonstrate how the applicant proposes to handle solid wastes, construction and demolition (C&D) wastes, and recyclable materials currently categorized by the Massachusetts Department of Environmental Protection (DEP) as a waste ban material.

National Grid's Environmental Policy commits the Company to taking steps to reduce and recycle wastes. Included among the many commitments contained within the Environmental Policy is the following statement regarding recycling of waste: *"National Grid has committed to looking for ways to use resources more efficiently through good design, use of sustainable materials, responsibly refurbishing existing assets, and reducing and recycling wastes."* The Company's recycling and reuse activities, by material, with which contractors must comply, are described in Table 3-2.

Table 3-2 Recycling and Reuse by Material.

Material	*Management Strategy*
Used steel pipe and associated components	Used gas pipe is cleaned and sent to Prolerized New England Co., LLC for recycling into new metal products.
Mixed Metals	Sent to Prolerized New England for recycling into new metal products.
Asphalt and Excavated Spoils	Recycled at Boston Gas Company d/b/a National Grid's Solid Waste Management Facility in Everett, Massachusetts. This material is sorted and crushed to a size that makes it useful as backfill for other National Grid construction projects.
Wood waste	Wood waste will be recycled at a Company-approved facility.
Cardboard	Cardboard will be recycled at a Company-approved facility.

Table 3-2 Recycling and Reuse by Material (Continued)

Material	*Management Strategy*
Office Recycling	Company and Contractor personnel working on this Project must adhere to National Grid's office recycling program. Program components include recycling all office paper, including but not limited to construction maps, photographs, and microfiche. Water/soda bottles and all other recyclable plastic containers must also be recycled.
Batteries	All batteries will be sorted by type and recycled by an approved vendor.

The Project will generate very limited waste, and will only generate waste during construction. Excavated soils will be maintained on-site, where possible, with planned reuse, and existing assets will be abandoned in place. The Contractor shall, at all times, keep the construction area free from accumulations of waste materials or rubbish caused by its employees or work, and shall remove from the Company's property, and from all public and private property at its own expense, all rubbish and waste materials resulting from construction operations. No burning of rubbish and/or waste materials shall be permitted on the Project site or upon any adjoining premises. Construction sites will be maintained daily (e.g., with sweeping), with minor debris and plastic bags disposed of accordingly and items such as cardboard boxes recycled. Any useful materials/equipment not used will be returned to inventory or returned to the supplier.

3.10 Energy

The Energy section of the RPP discusses ways to reduce greenhouse gas emission and control energy costs for Cape residents by: (1) reducing the consumption of energy or utilizing more efficient fuels; and (2) reducing the cost of energy from the provider. The MPS are designed for developments that will themselves generate energy demand, as well as Wind Energy Conversion Facilities.

As a local natural gas distribution company, the Company's core obligation is to provide safe, reliable, and least-cost gas service to its customers. It meets this core obligation through a sophisticated multi-disciplined planning process that is designed to quantify existing and future customer load and to ensure that sufficient has supply and gas-distribution resources are available to serve that load on a safe and reliable basis. The Company's gas-supply planning and procurement process is under the jurisdiction of the DPU, which reviews and approves the Company's Long-Range Resource and Requirements Plan pursuant to the authority set forth in M.G.L. c. 164, § 69I. In the Plan, the Company is required to present its methodology for forecasting customer load, substantiate its planning

standards, and demonstrate that it has sufficient gas-supply resources to meet existing and future customer requirements. For gas-distribution operations, the Company is required to maintain its system consistent with U.S. Department of Transportation regulations as set forth in the Code of Federal Regulations, Title 49, Parts 186-199 and operational and design standards set forth by the DPU pursuant to M.G.L. c. 164 and 220 CMR §§ 69, 100-113.

The primary driver of the Project need is the condition of the existing system and its effect on the Company's ability to provide safe and reliable service to existing and future customers on the Cape Cod gas distribution network during periods of peak demand (i.e., design weather conditions). The reduction of system pressure on the Mid-Cape 200-psig main to less than 125 psig has resulted in a moratorium on new and expanded gas services (including conversions) on portions of the mid-Cape and all of the lower Cape Cod regions. It has also resulted in increased reliance on portable LNG units to meet peak demand for existing customers.

Construction of the proposed Project will allow the Company to restore system pressures to 200 psig, thus strengthening downstream pressure and providing for adequate supply to reestablish new customer connections on the Cape and to lift restrictions on new services, expanded services, and conversions. By lifting the moratorium, the Project will provide customers with the option of choosing natural gas for their heating and cooking needs in place of oil, resulting in a reduction of GHG emissions. The Project will also once again reduce the Company's reliance on existing portable LNG, thus reducing trucking needs and improving reliability. Prior to the new customer demand restrictions, the most recent forecast (from 2014) of customer growth predicted that demand for natural gas on the Cape would increase by 15% over the next five years, with an average annual growth rate of 3%. This demand for natural gas service comes both from new development and the continuing demand from oil-to-gas conversions, primarily for heating. Because of the moratorium and deferral of new customer connections, pent-up demand is anticipated to be high when capacity becomes available again.

3.11 Affordable Housing

The Affordable Housing section of the RPP is intended to promote the *"provision of fair, decent, safe, affordable housing… that meets the needs of the present and future Cape Cod residents."* The Project does not involve the construction of new housing, and hence the MPS in this section of the RPP do not apply.

3.12 Heritage Preservation/Community Character

The Heritage Preservation/Community Character section of the RPP contains the goals and policies applicable to protecting the historic and cultural features of Cape Cod's landscape and built environment. Project consistency with the applicable goals and MPS related to heritage preservation and community character is addressed below.

Goal HPCC1 – Historic, Cultural, and Archaeological Resources

Goal HPCC1 is *"[t]o protect and preserve the important historic and cultural features of Cape Cod's landscape and built environment that are critical components of the region's heritage and economy."*

HPCC1.2 – Cultural Landscapes

The distinguishing original features of an historic or cultural landscape shall be preserved. New development adjacent to or within historic or cultural landscapes shall be located to retain the distinctive qualities of such landscapes and shall be designed to maintain the general scale and character-defining features of such landscapes. In particular, historic agricultural lands and other working agricultural lands shall be retained to prevent further loss of these dwindling resources that speak to the Cape's agricultural past.

The Project will not result in any change in land uses, is predominantly below grade, and along previously-disturbed roadways. Because the Project is proposed within existing roadway layout, it is not expected to encounter any previously-undisturbed areas, and as such no impacts to archaeological resources are expected.

The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves, two of which are proposed in the North Harwich Village. These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder in close proximity to the valves with circuitry connected to the valve actuators located in below-ground prefabricated concrete vaults. The Project will not affect properties listed on the State or National Register of Historic Places, nor will it affect historic districts or properties and areas listed in the Inventory of Historic and Archaeological Assets of the Commonwealth.

The Company's pipeline facilities must be constructed consistent with requirements of federal and state regulations, specifically 49 CFR 192.707 "Line Markers for Mains and Transmission Lines" and 220 CMR 109.07 "Pipeline Location Marking." However, line markers are not required for buried mains in class 3 or 4 locations where a damage prevention program is in effect or where placement of a marker is impractical. Therefore, for this Project, no line markers are required.

Goal HPCC2 – Community Character/Site and Building Design

Goal HPCC2 is *"[t]o encourage redevelopment of existing structures as an alternative to new construction, and to ensure that all development and redevelopment respects the traditions and distinctive character of historic village centers and outlying rural areas consistent with the Designing the Future to Honor the Past, Design Guidelines for Cape Cod, Technical Bulletin 96-001, as amended."*

HPCC2.2 – Protection of Existing Roadway Character

New development proposed on local and regional roadways shall be sized such that it can be accommodated without significant changes to the existing character of the roadway. Any necessary structural improvements shall be consistent with the existing character of the roadway, unless the Commission and the community deem alternatives appropriate.

The Project will not result in any change in land use, and hence will not have any permanent impacts on traffic or use of local or regional roadways. The replacement main will be installed underground, and no pipeline markers will be necessary. Following installation, any disturbance to pavement will be restored consistent with M.G.L. c. 164, § 70, which requires gas companies to "put all streets, lanes and highways in as good a repair as they were when opened." In consultation with municipal officials, the Company will comply with the standards required by the Massachusetts DPU in its *Standards to be Employed by Public Utility Operators when Restoring any of the Streets, Lanes and Highways in Municipalities*, D.T.E. 98-22/98-22-A (1999).

The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves, two of which are proposed in the North Harwich Village. These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder in close proximity to the valves with circuitry connected to the valve actuators located in below-ground prefabricated concrete vaults.

HPCC2.3 – Avoid Adverse Visual Impacts

New development shall be sited and designed to avoid adverse visual impacts to scenic resources. Visual Impact Assessments (VIA) shall be required for DRI review of any WECF in the Cape Cod Ocean Planning Area as defined in the Cape Cod Ocean Management Plan dated October 2011 and shall be conducted in accordance with the Technical Bulletin 12-001, as amended. VIA may be required as part of DRI review of other Development based upon staff recommendation and vote of the Regulatory Committee that a VIA is necessary to evaluate impacts from the development. Development proposed adjacent to scenic roads or vistas shall preserve distinctive features of the scenic resource including tree

canopy, wooded road edges, stone walls, winding road character, and scenic views. Development adjacent to or within scenic vistas shall be clustered and designed to limit the visibility of the new development.

Other than during the construction period, this Project will have minimal visual impact. Almost the entire Project will be underground, installed in existing roadway layouts either beneath pavement or within ten feet of pavement. The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves, two of which will be within the North Harwich Village Historic District. These control box enclosures are similar to those used to house equipment to manage traffic control signals and traffic lights, and will not cause a significant visual impact. The control box enclosures will be strategically located in the shoulder of the roadways.

No tree clearing will be needed to accommodate construction.

HPCC2.13 – Underground Utilities

All utilities for development including cable shall be placed underground except where the presence of natural features such as wetlands or archaeological resources prevent such placement.

The entire replacement main will be underground, installed in existing roadway layouts either beneath pavement or within ten feet of pavement. The only above-grade features associated with the Project are control box enclosures associated with the four remotely-controlled isolation valves (see Section 2.7.9 for additional details).

3.13 Conclusion

As described herein, the Project is consistent with the applicable goals and MPS contained within the Cape Cod RPP. Furthermore, the discussion contained within Sections 1 and 2 demonstrates that this Project is not only necessary to maintain the Company's core obligation to provide safe, reliable, and least-cost gas service to its customers, but that it is designed to do so while avoiding, minimizing, and mitigating potential impacts.

The Project will have no significant permanent impacts, and limited and temporary construction-related impacts have been avoided, minimized, and mitigated through route selection, installation methods, and construction BMPs. The Project will have no permanent impacts to land uses, will not change existing land uses, and will have no significant visual impacts. As such, the Project has no regional impacts and is eligible for a DRI Exemption related to the Cape Cod Commission's review.

Attachment A

Figures

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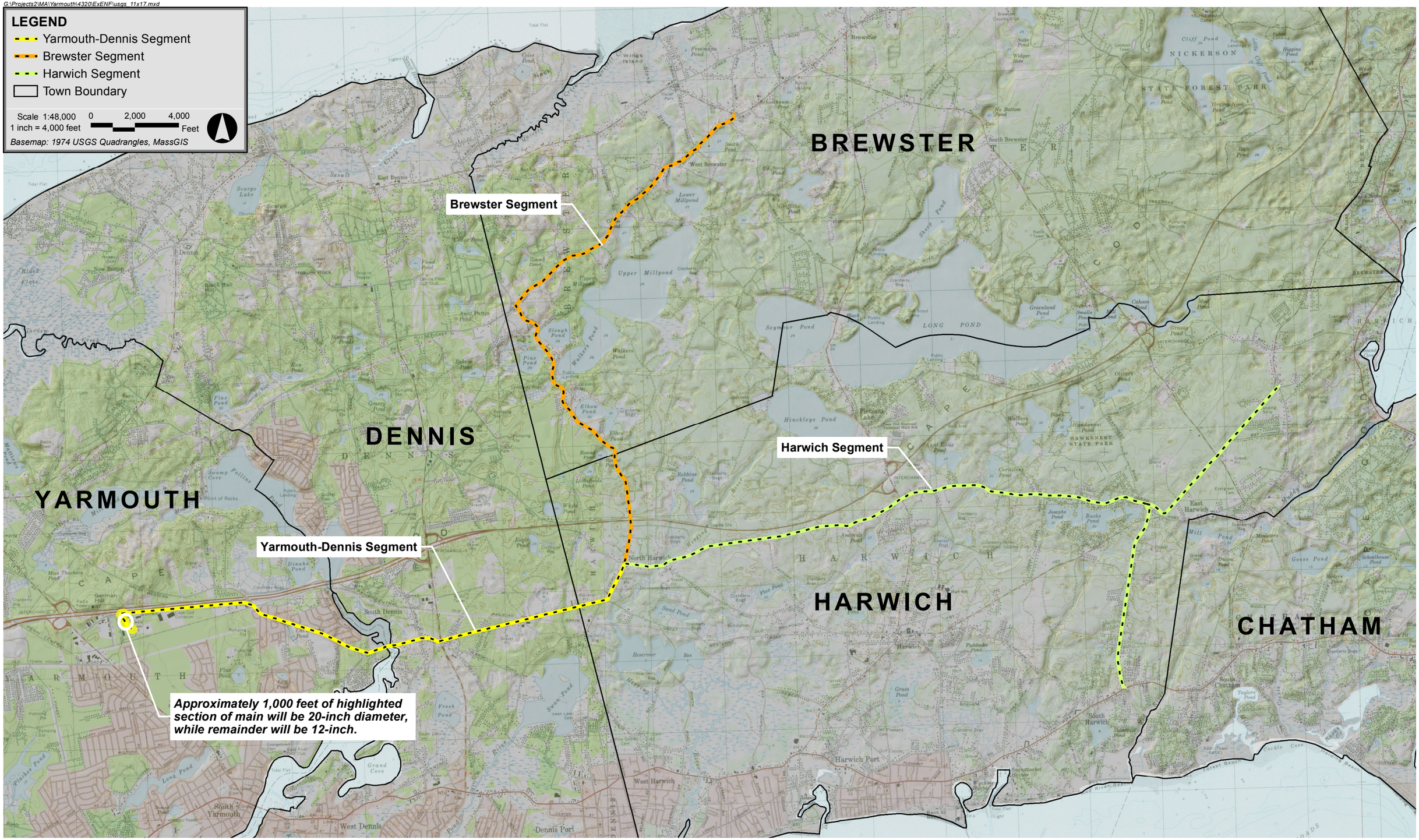

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-1

Proposed Project Route - USGS Locus Map

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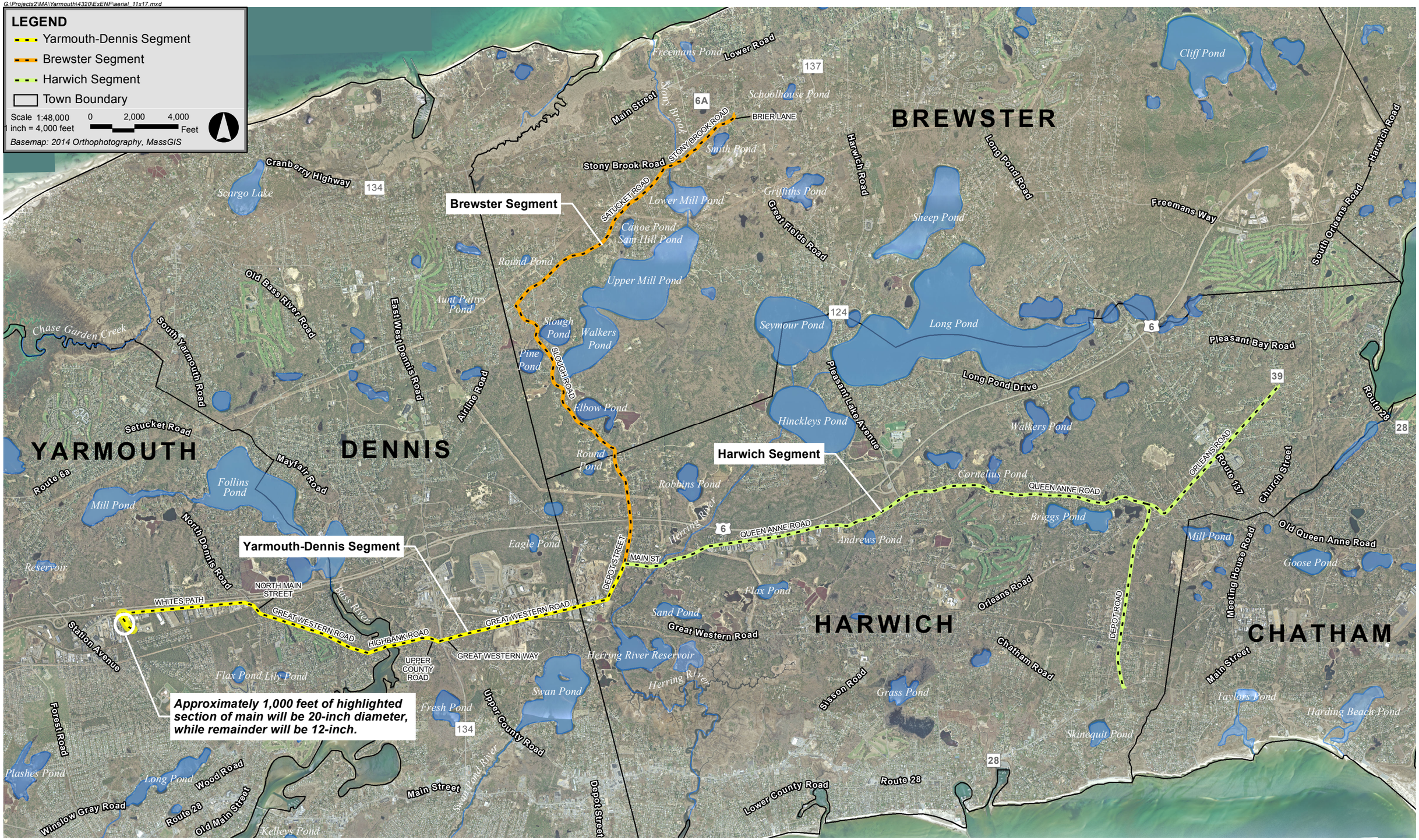

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-2

Proposed Project Route – Aerial Locus Map

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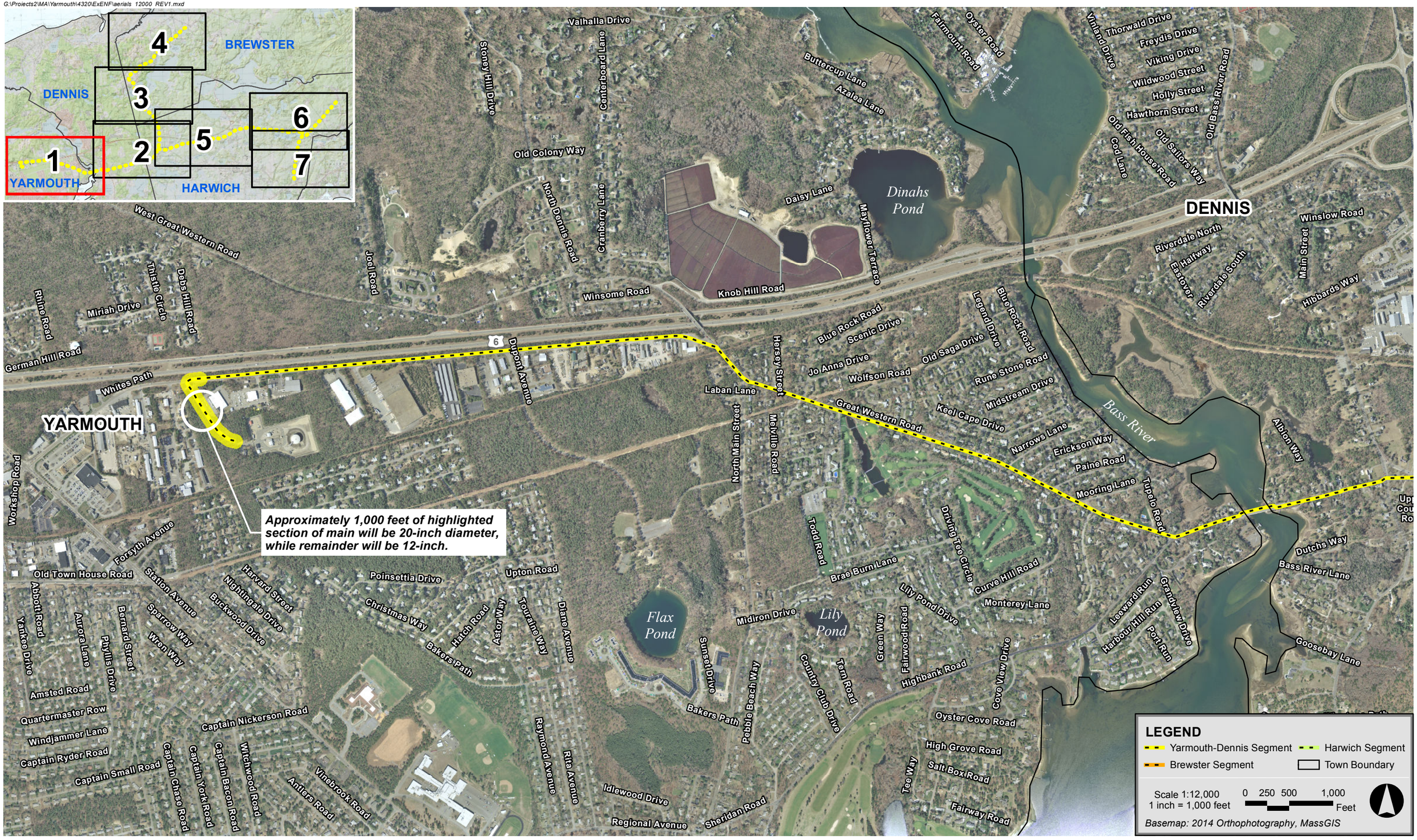

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 1 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 2 of 7

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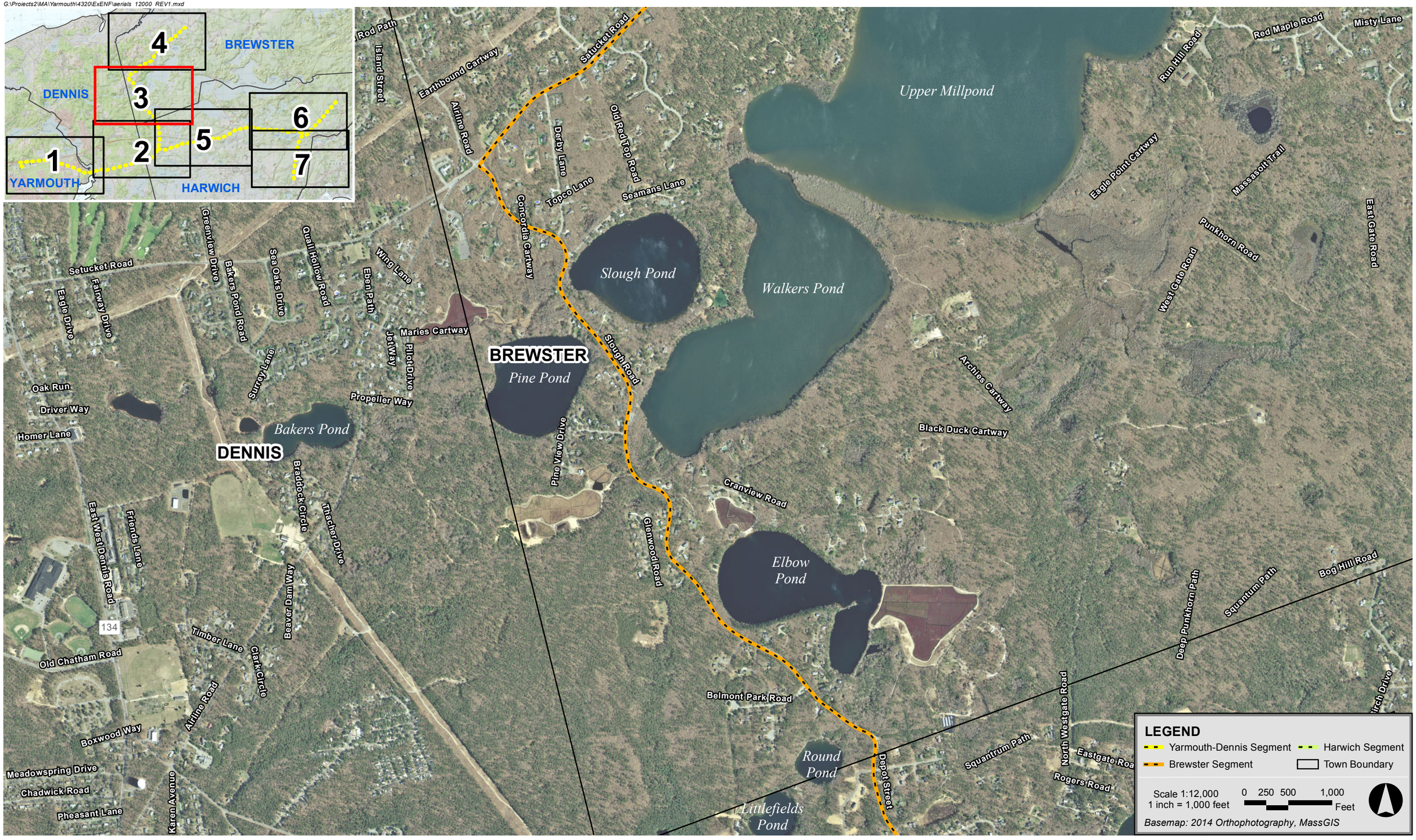

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 3 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 4 of 7

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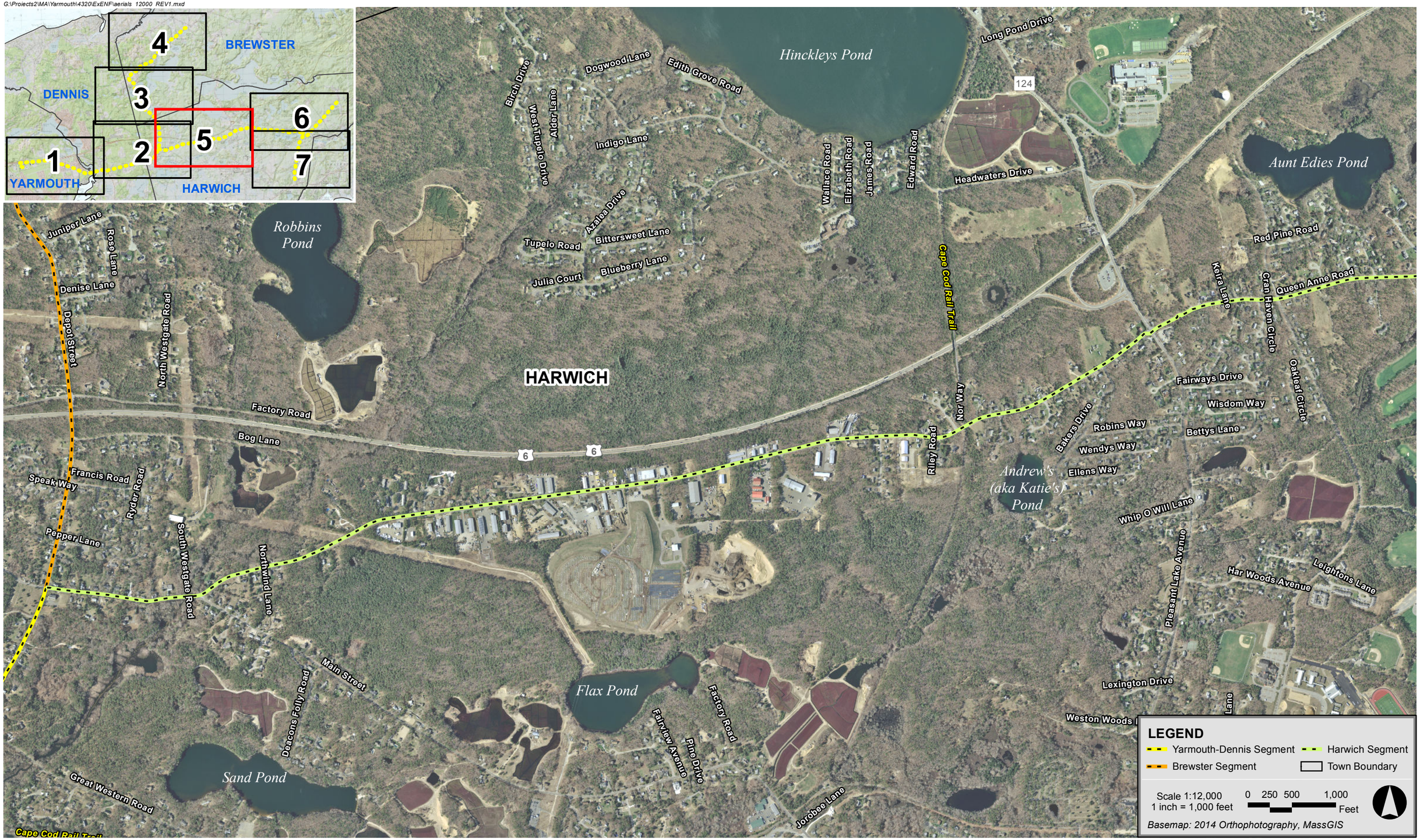

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 5 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 6 of 7

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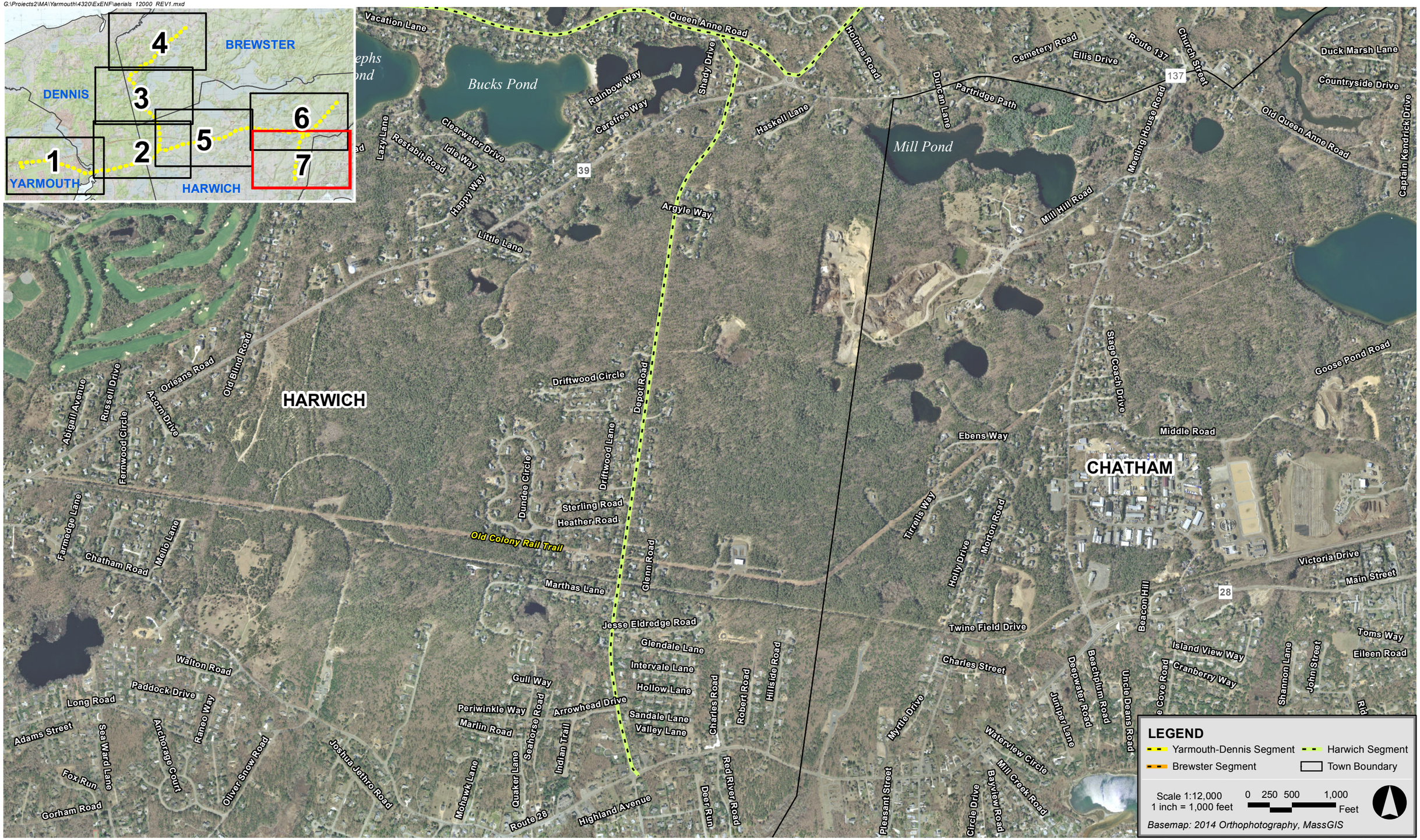

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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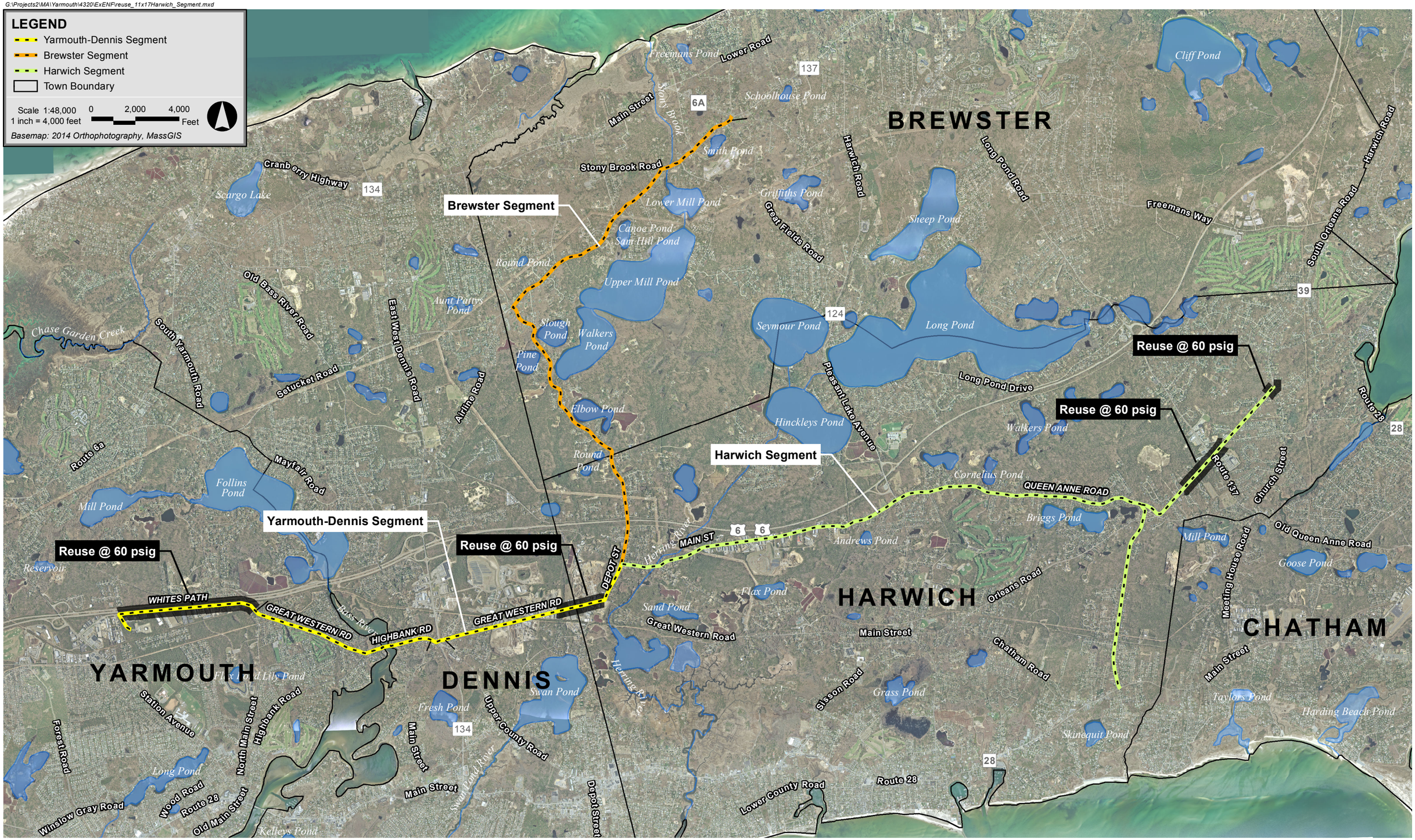
Figure 2-3

Proposed Project Route - Aerial Locus Map, Page 7 of 7

G:\Projects2\MA\Yarmouth\4320\ExENF\reuse_11x17Harwich_Segment.mxd



Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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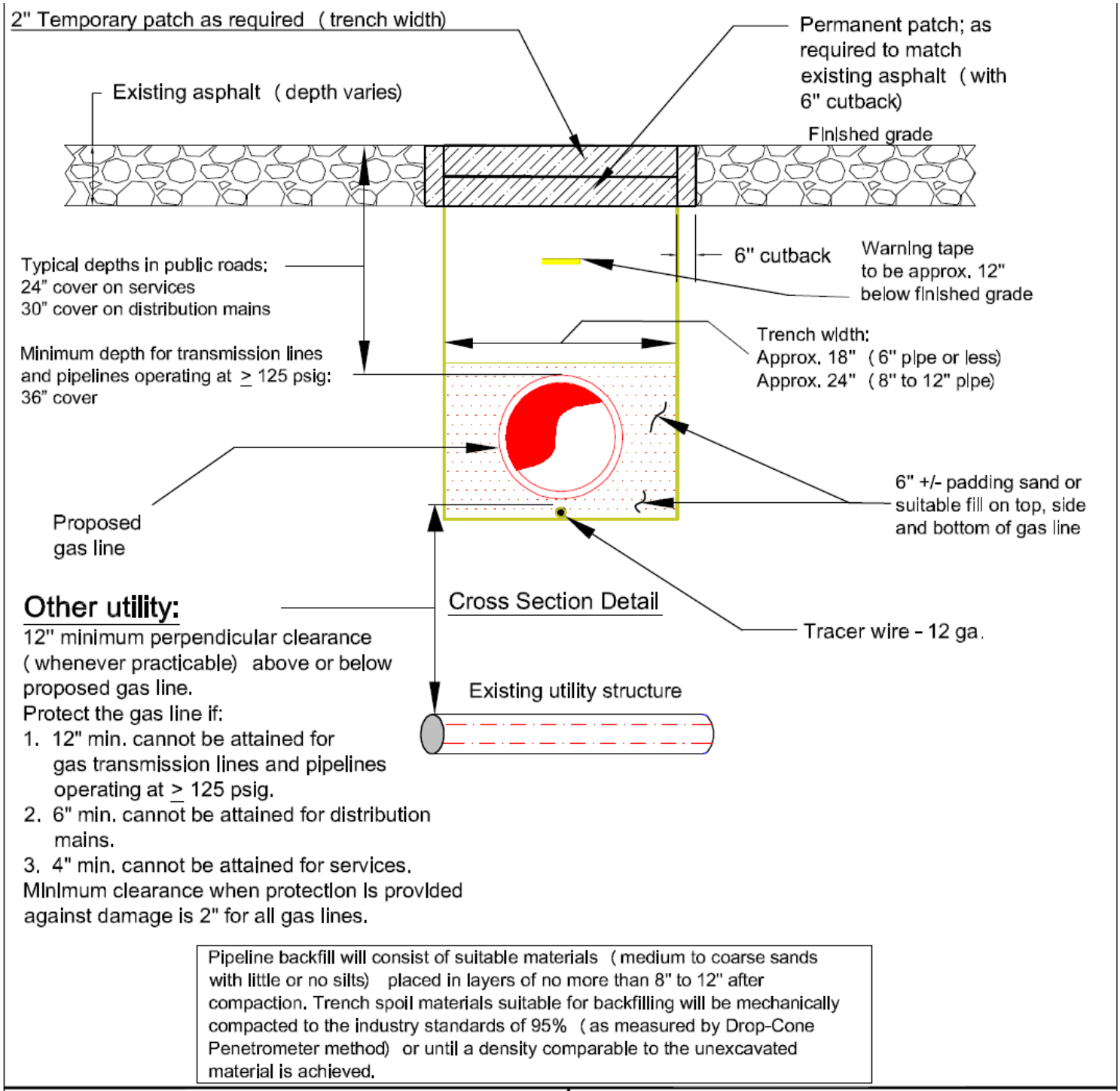
Figure 2-4

Sections of Existing 200-psig Main Proposed for Reuse at 60 psig



Other utility:

12" minimum perpendicular clearance (whenever practicable) above or below proposed gas line.

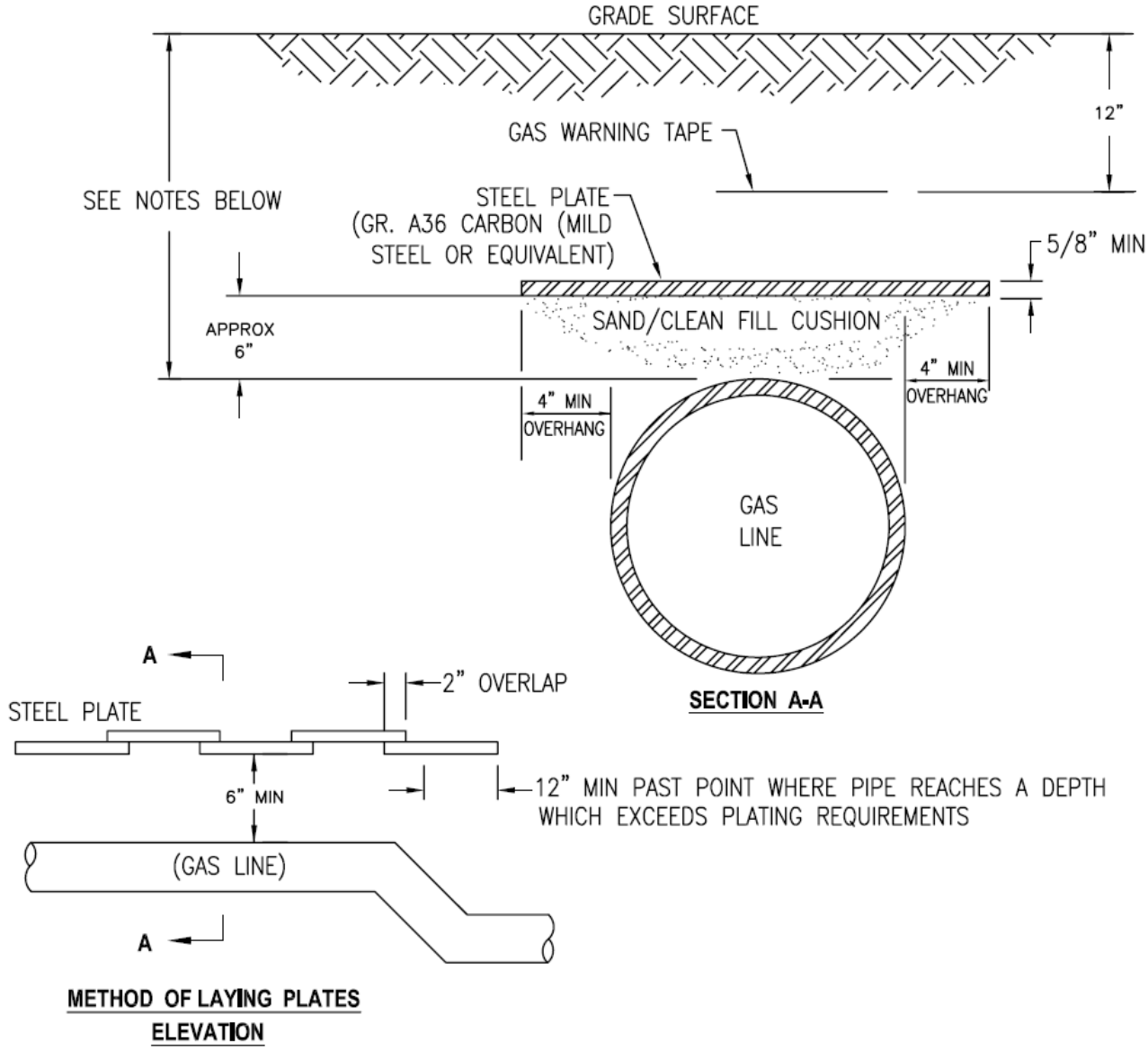
Protect the gas line if:

1. 12" min. cannot be attained for gas transmission lines and pipelines operating at ≥ 125 psig.
2. 6" min. cannot be attained for distribution mains.
3. 4" min. cannot be attained for services.

Minimum clearance when protection is provided against damage is 2" for all gas lines.

Pipeline backfill will consist of suitable materials (medium to coarse sands with little or no silts) placed in layers of no more than 8" to 12" after compaction. Trench spoil materials suitable for backfilling will be mechanically compacted to the industry standards of 95% (as measured by Drop-Cone Penetrometer method) or until a density comparable to the unexcavated material is achieved.

nationalgrid RI	**TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES**	
Key Changes:	DATE: 09/15/2014	EFFECTIVE DATE: 09/15/2014
	DESIGN: N. COSTANZO	STD. DWG. NO. **CS-CNST002**
	DRAWN: N. COSTANZO	



SECTION A-A

METHOD OF LAYING PLATES
ELEVATION

PROTECTIVE PLATES ARE REQUIRED:

1. FOR ANY GAS MAIN OR TRANSMISSION LINE OPERATING IN EXCESS OF 200 PSIG AND HAVING LESS THAN THREE FEET (3') OF COVER.
2. FOR ANY GAS MAINS OPERATING AT LESS THAN 200 PSIG HAVING LESS THAN TWO FEET (2') OF COVER.
3. FOR ANY SERVICE LOCATED IN THE PUBLIC RIGHT-OF-WAY HAVING LESS THAN EIGHTEEN INCHES (18") OF COVER.
4. FOR ANY SERVICE LOCATED IN PRIVATE PROPERTY HAVING LESS THAN TWELVE INCHES (12") OF COVER.

NOTES:

1. MAINS OR TRANSMISSION LINES INSTALLED WITH LESS THAN TWO FEET (2') OF COVER REQUIRE APPROVAL OF THE MASSACHUSETTS DPU.
2. MAINS OR TRANSMISSION LINES INSTALLED WITH LESS THAN THREE FEET (3') OF COVER IN MASSACHUSETTS STATE ROADWAYS/HIGHWAYS REQUIRE APPROVAL OF THE STATE AGENCY (E.G. MHD).
3. REFER TO NATIONAL GRID DOCUMENT CNST-5010 FOR REGULATORY COMPLIANCE REQUIREMENTS FOR SHALLOW MAIN AND SERVICE INSTALLATION (E.G. DTE WAIVER).
4. REFER TO STD. DWG. No. CNST-6025 FOR TYPICAL DETAILS FOR GAS MAIN AND SERVICE INSTALLATIONS.
5. FIELD SUPERVISOR TO PROVIDE SKETCH (WHICH INCLUDES ALL DIMENSIONS AND TIES) OF THE NEWLY INSTALLED STEEL PLATE OVER GAS MAINS, TRANSMISSION LINES AND SERVICES.

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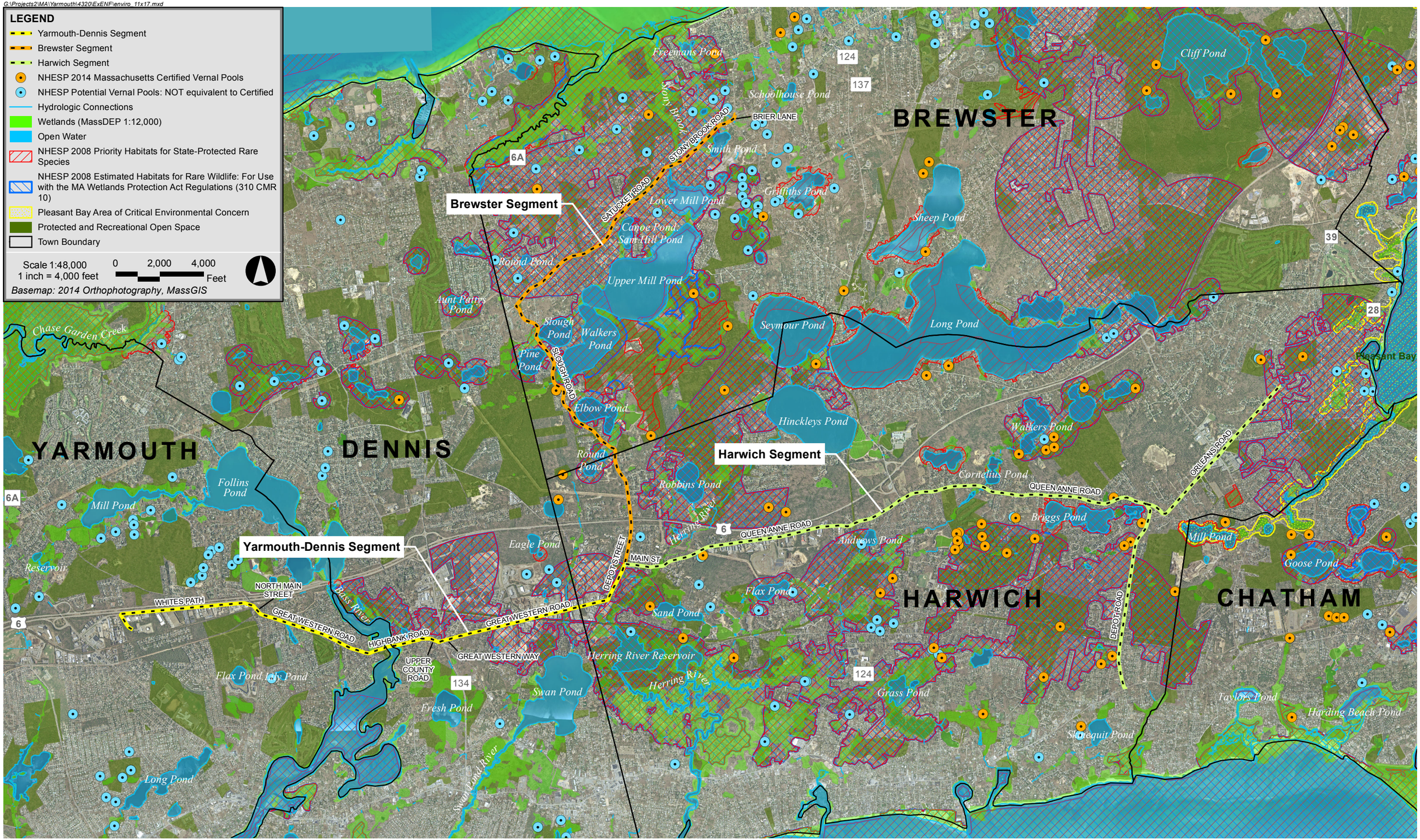

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-7

Project Route - Environmental Constraints Map

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-8

Project Route - Environmental Constraints Map, Page 1 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-8

Project Route - Environmental Constraints Map, Page 2 of 7

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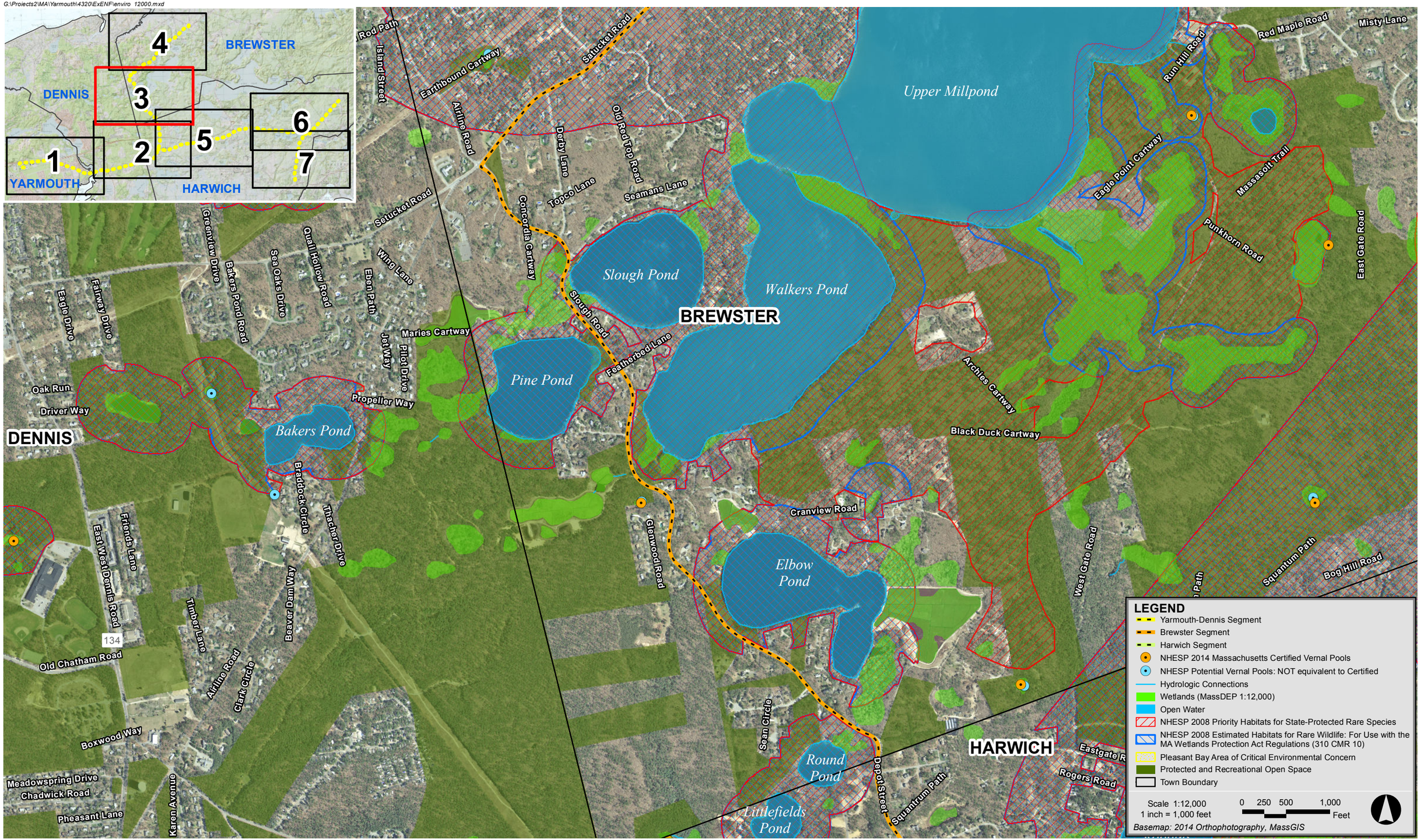

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-8

Project Route - Environmental Constraints Map, Page 3 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-8

Project Route - Environmental Constraints Map, Page 4 of 7

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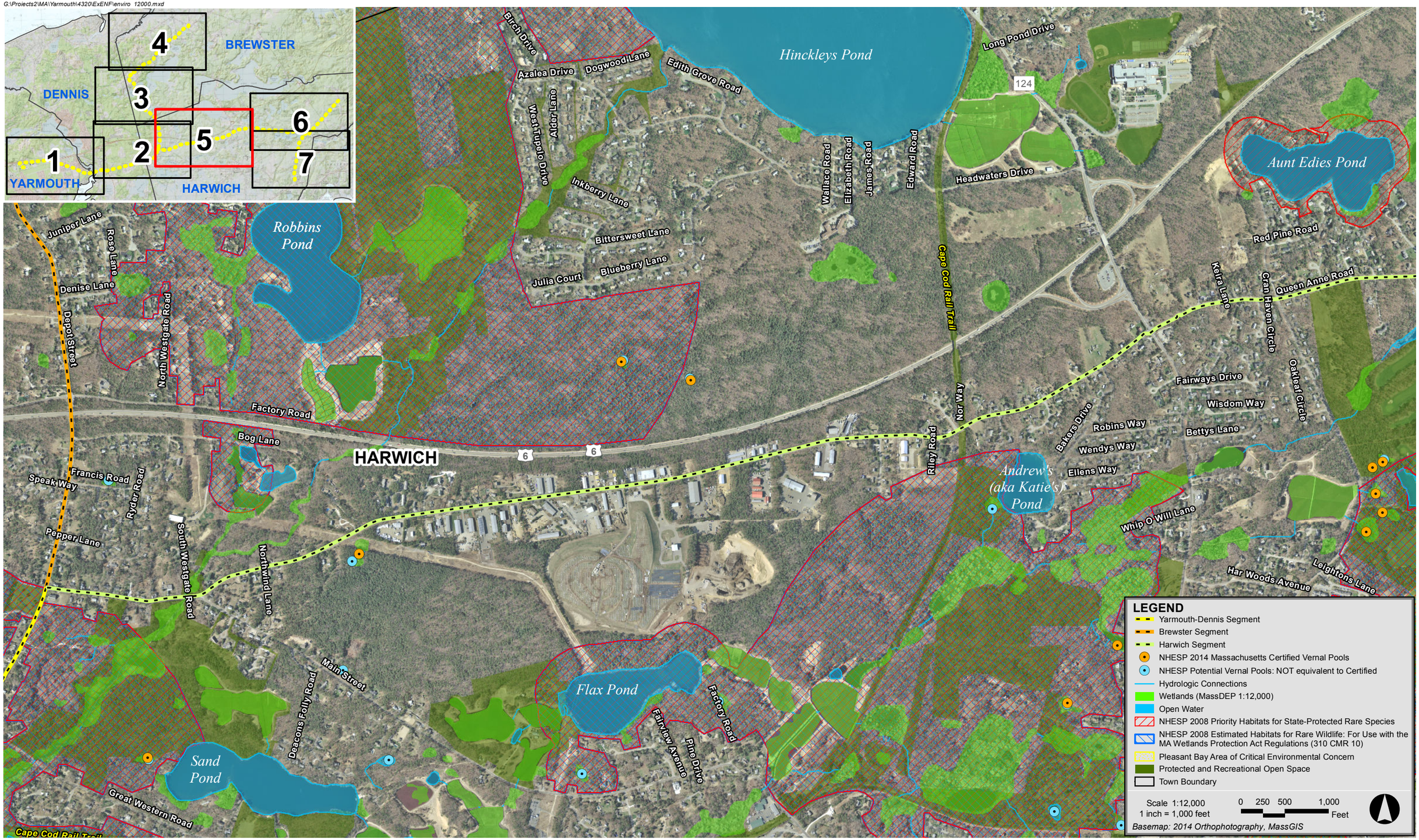

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

nationalgrid Epsilon ASSOCIATES INC.

Figure 2-8

Project Route - Environmental Constraints Map, Page 5 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-8

Project Route - Environmental Constraints Map, Page 6 of 7

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Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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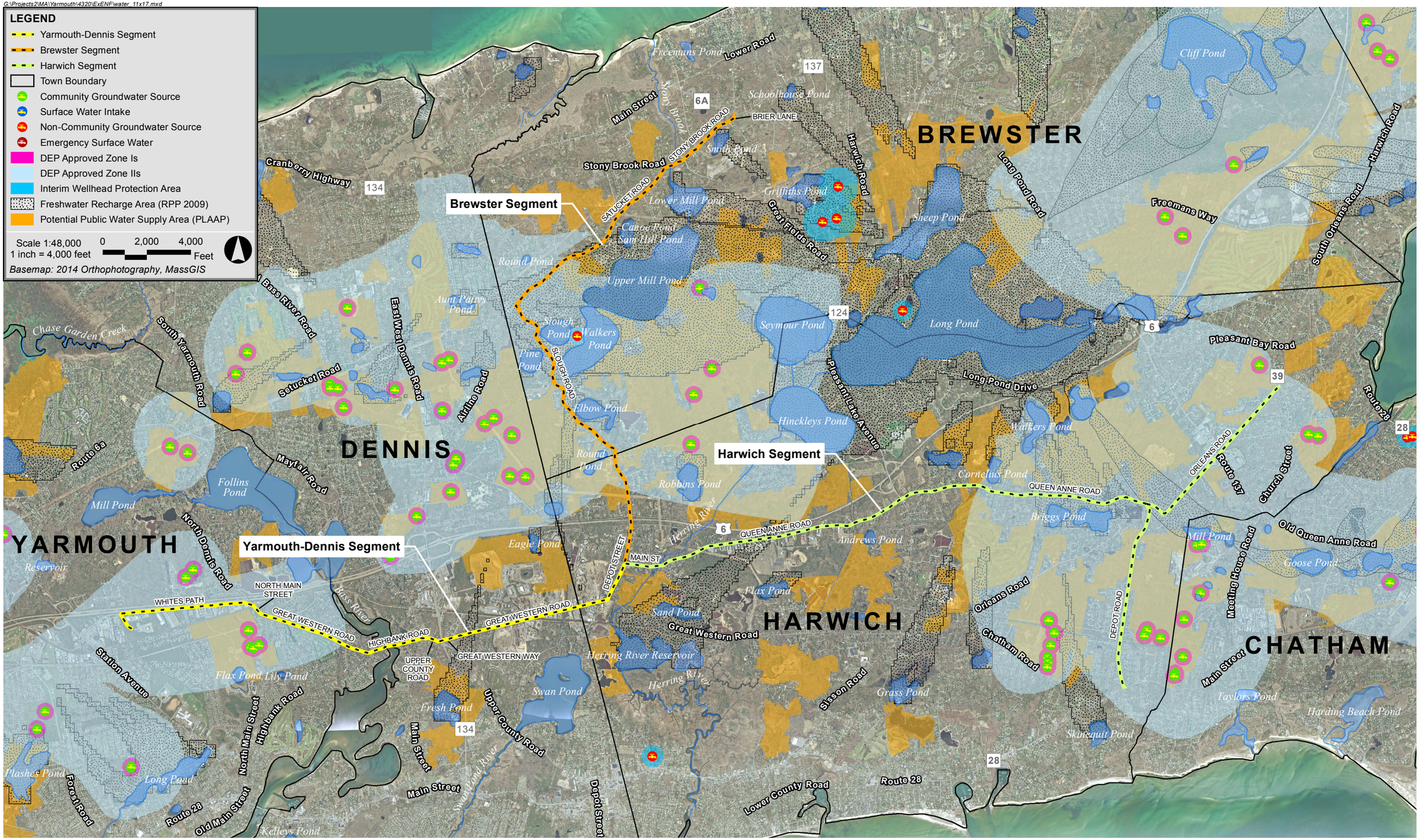
Figure 2-8

Project Route - Environmental Constraints Map, Page 7 of 7

Figure 2-9
Depiction of Culvert Crossing

G:\Projects2\MA\Yarmouth\4320\ExENF\water_11x17.mxd



Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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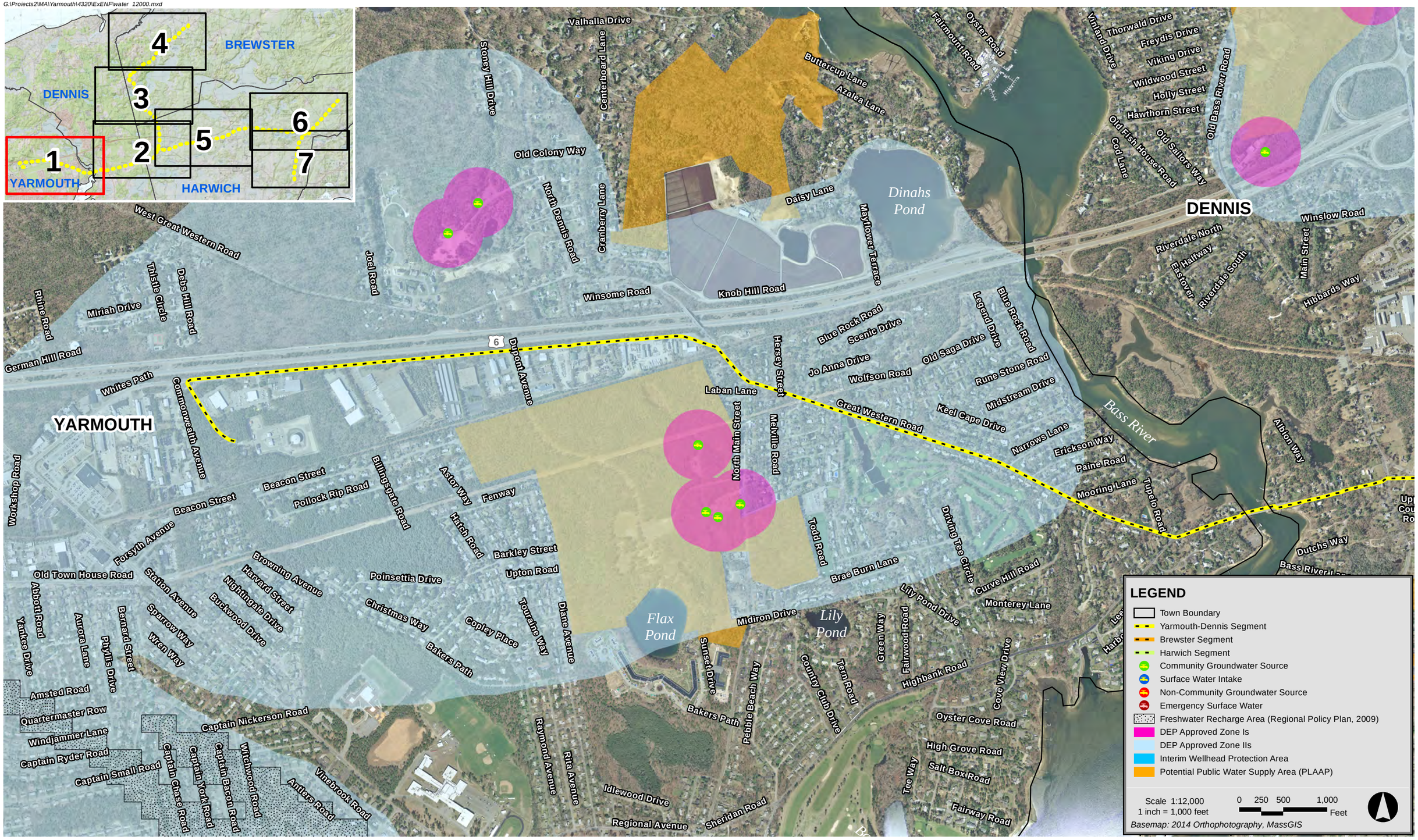
Figure 2-10

Project Route - Water Resources Map

G:\Proiects2\MA\Yarmouth\4320\ExENF\water 12000.mxd



Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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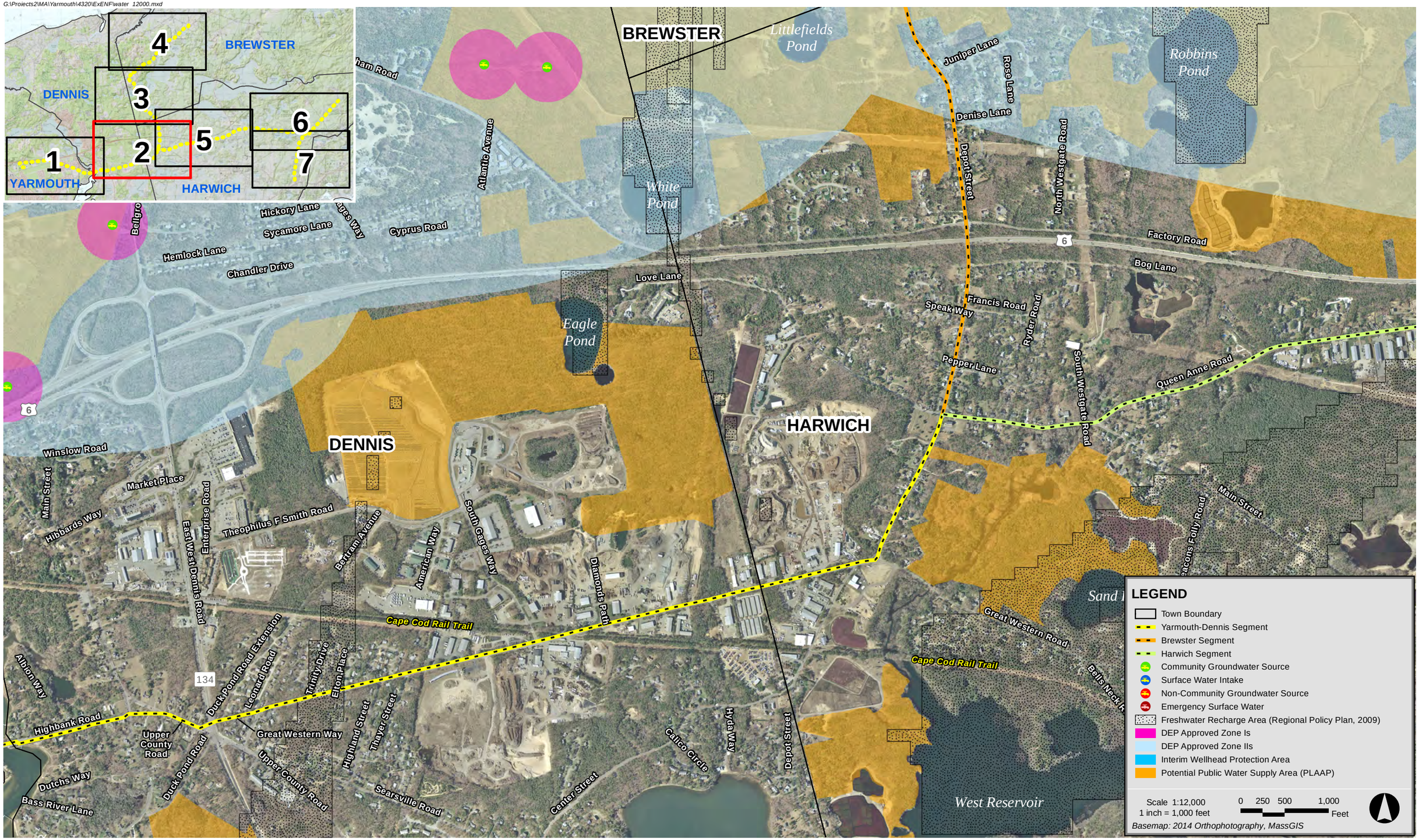
Figure 2-11

Project Route - Water Resources, Page 1 of 7

G:\Projects2\MA\Yarmouth\4320\ExENF\water 12000.mxd



Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 2 of 7

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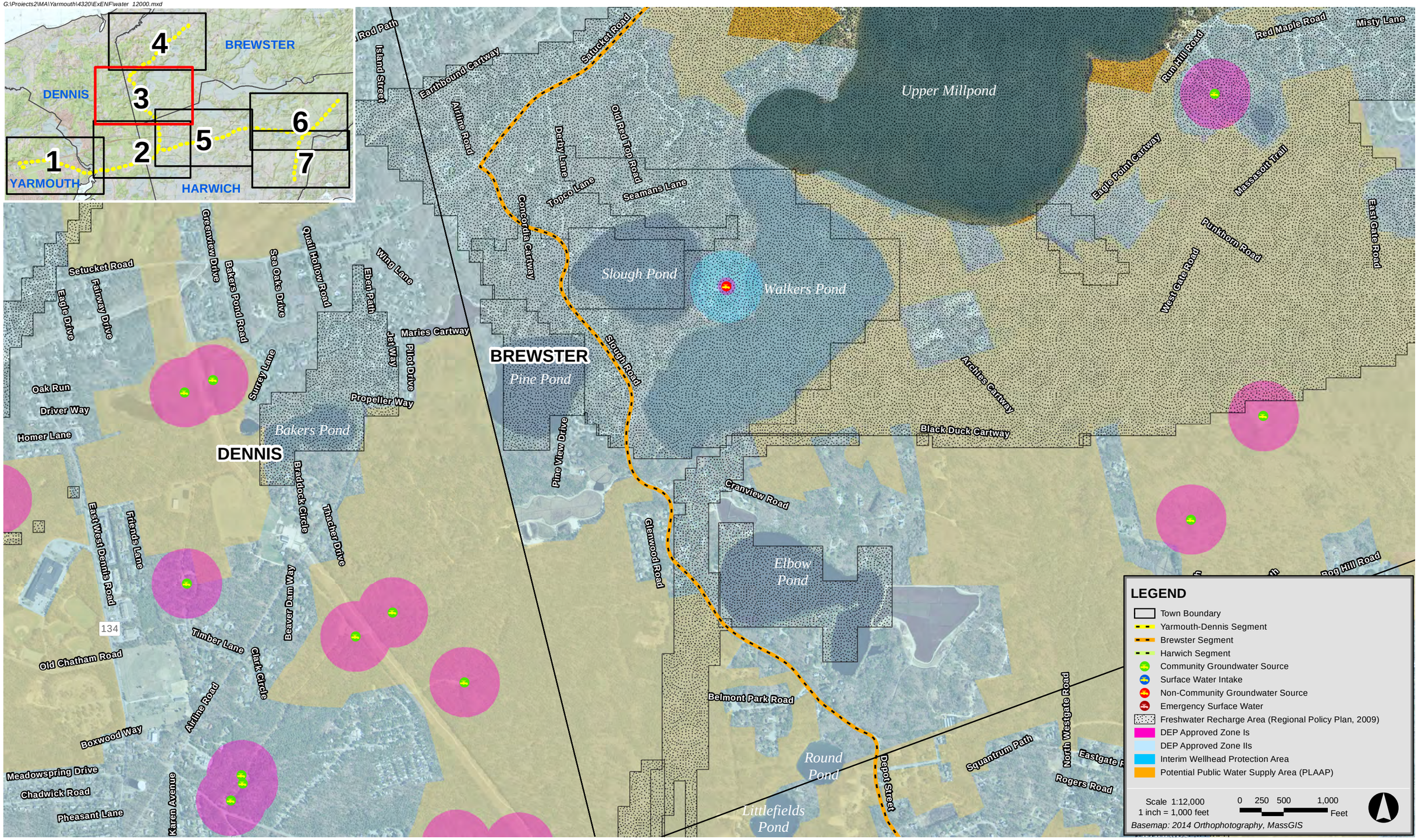

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 3 of 7

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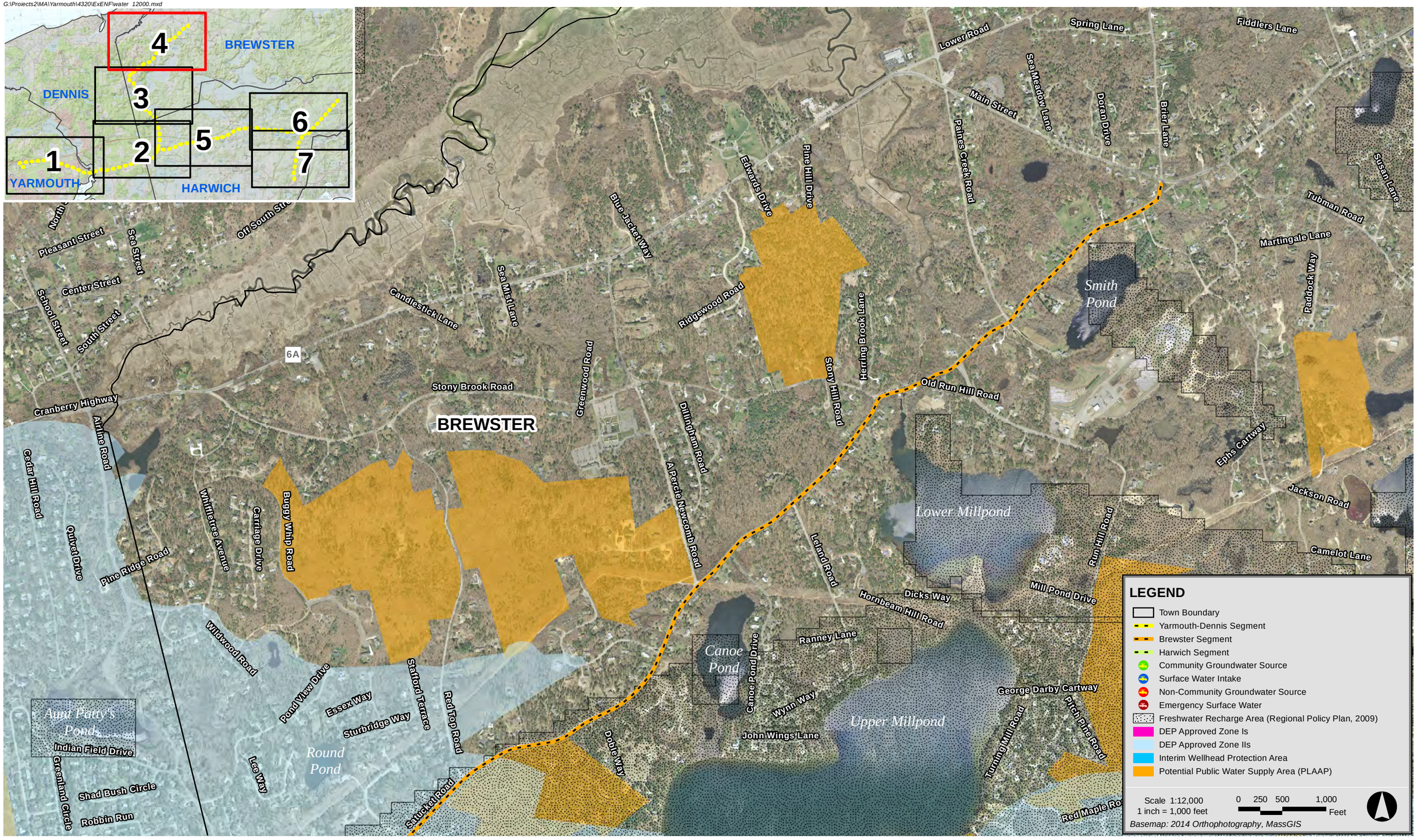

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 4 of 7

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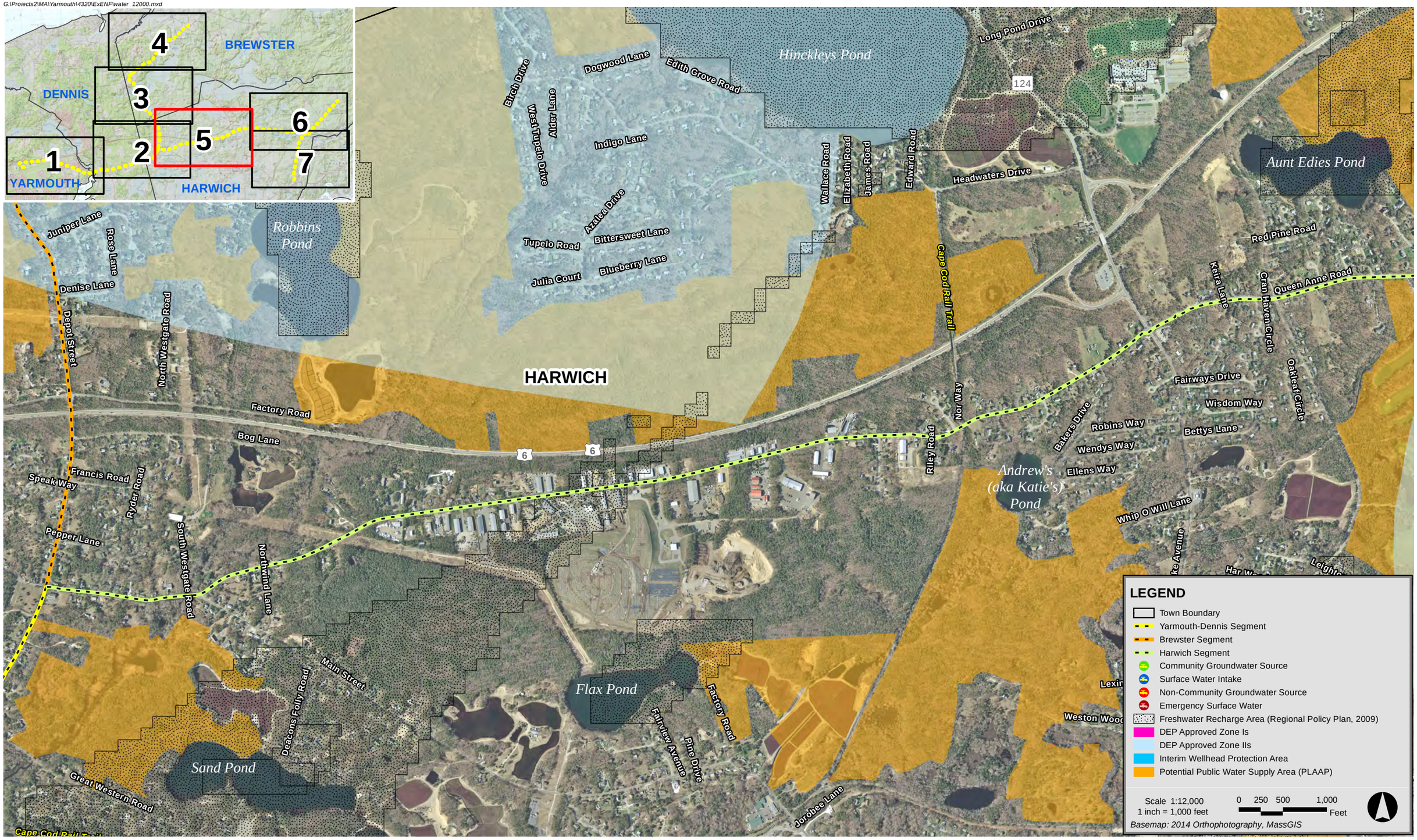

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 5 of 7

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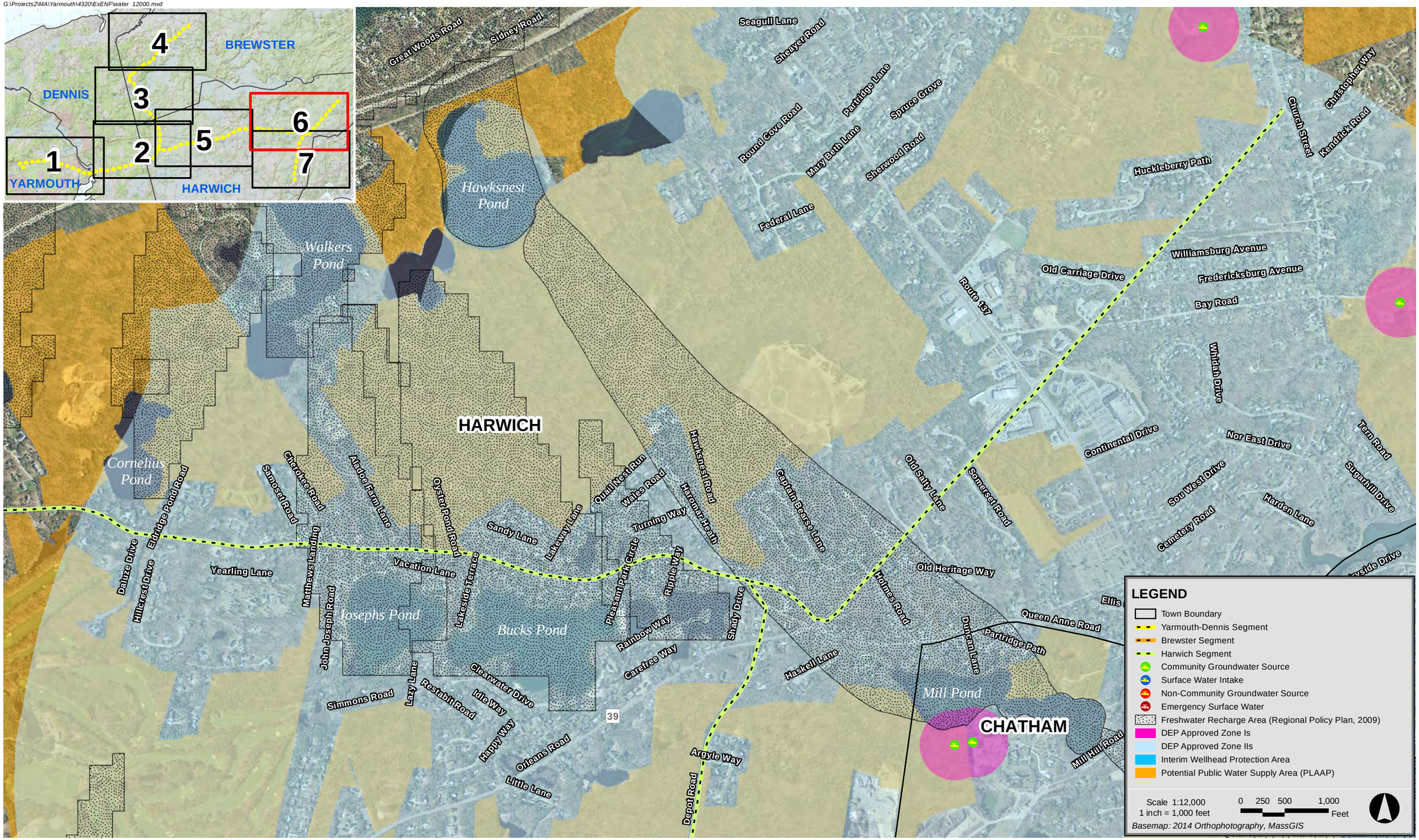

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 6 of 7

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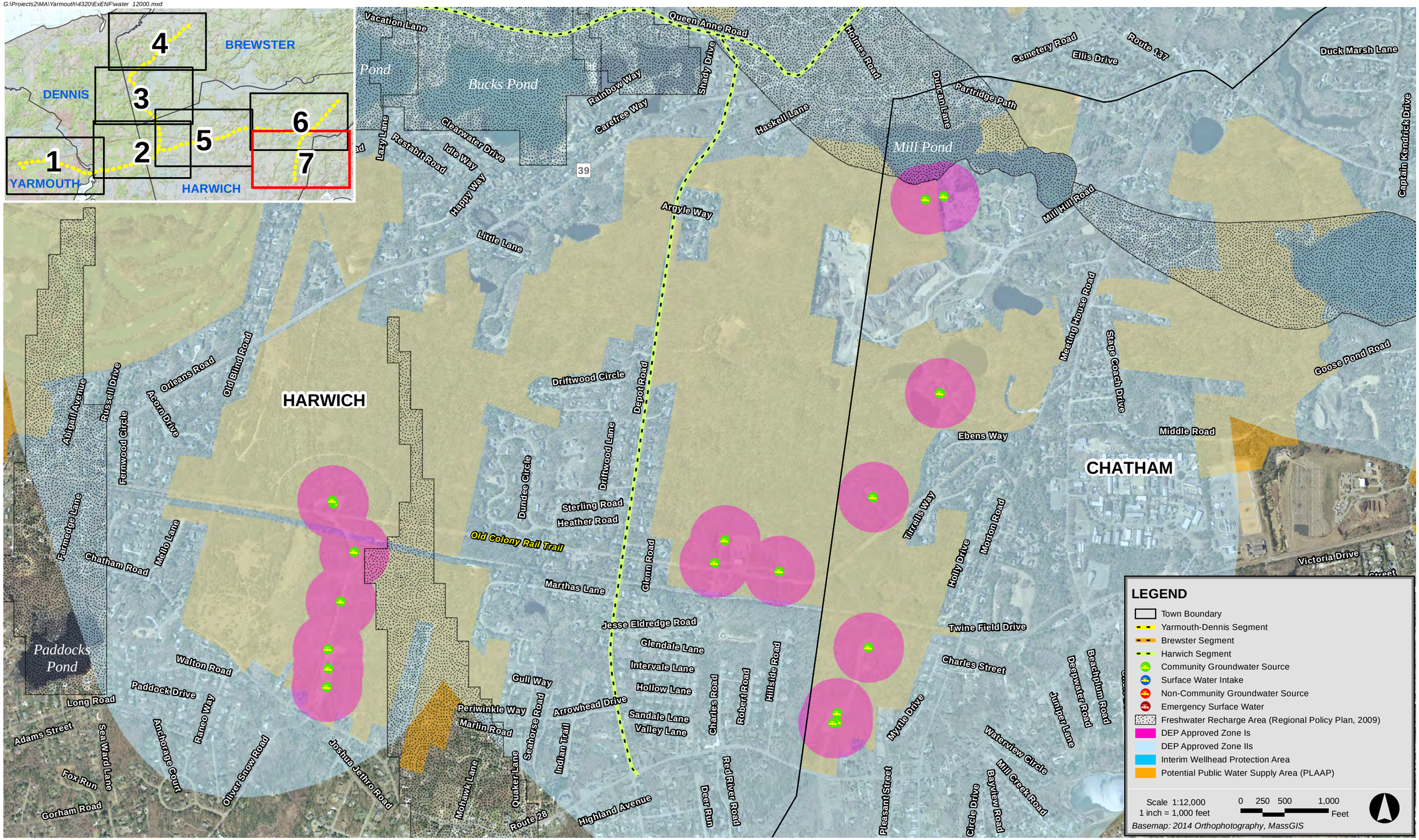

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 2-11

Project Route - Water Resources, Page 7 of 7

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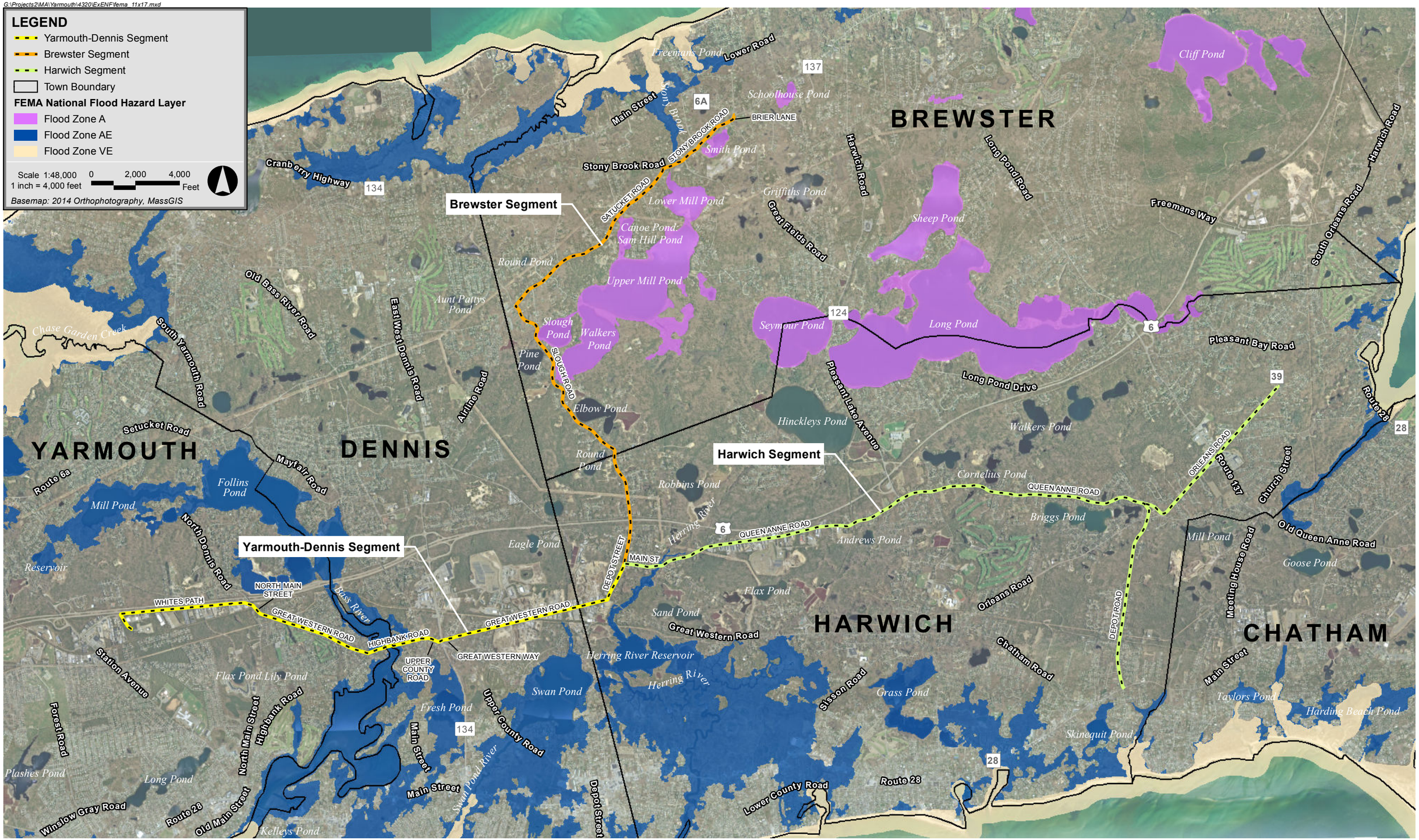

Mid-Cape Main Replacement Project

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Figure 2-12

FEMA National Flood Hazard Layer, Effective 7/16/2014

Figure 2-13
Control Box Rendering

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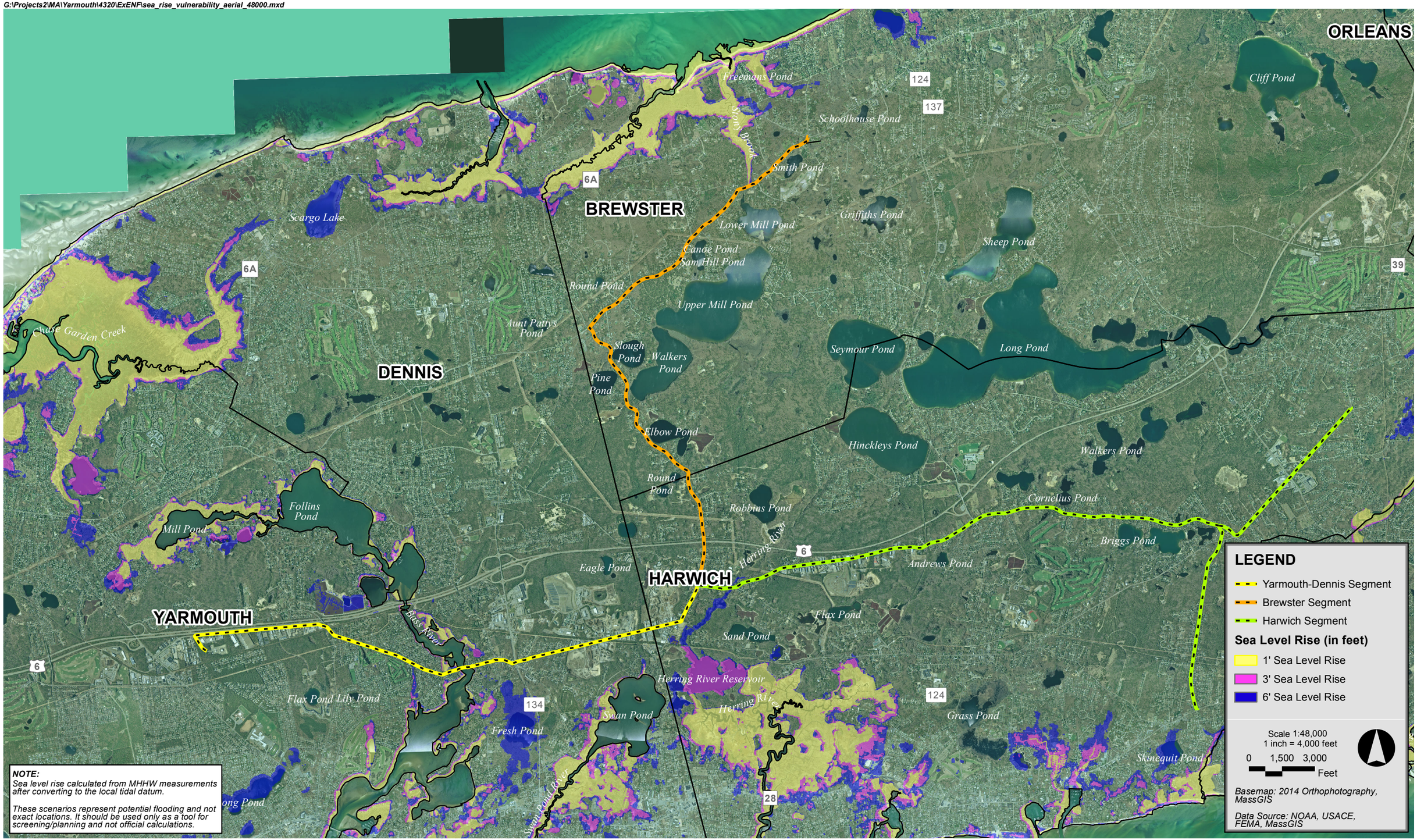

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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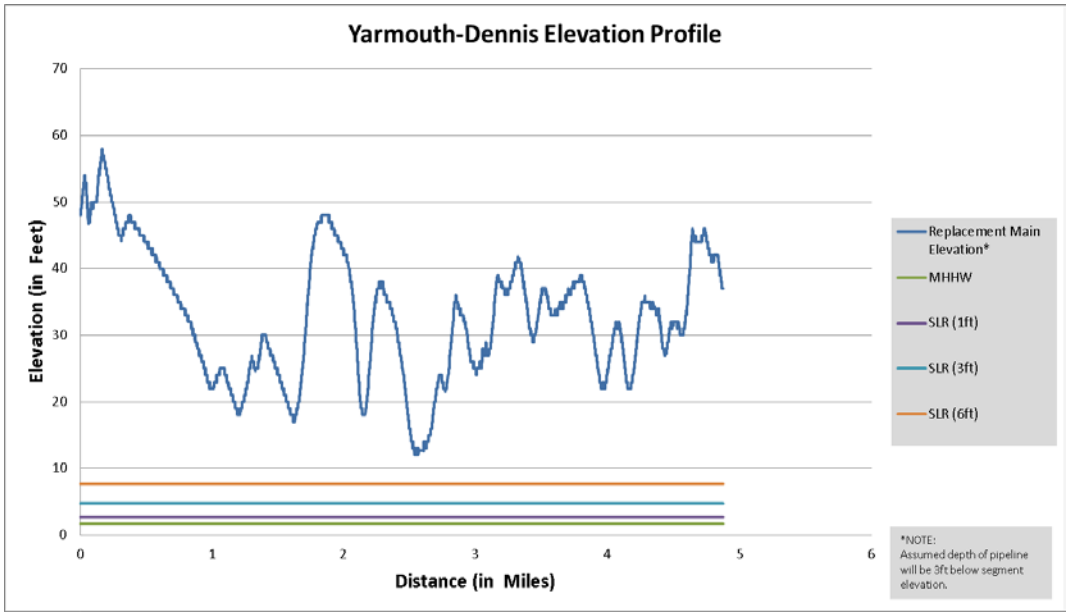
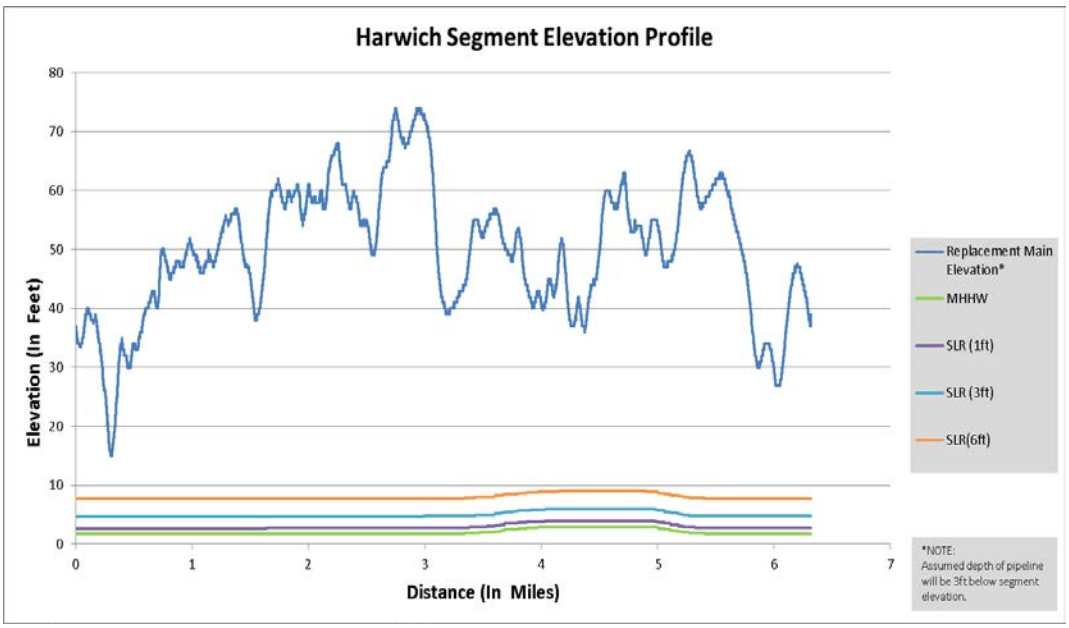
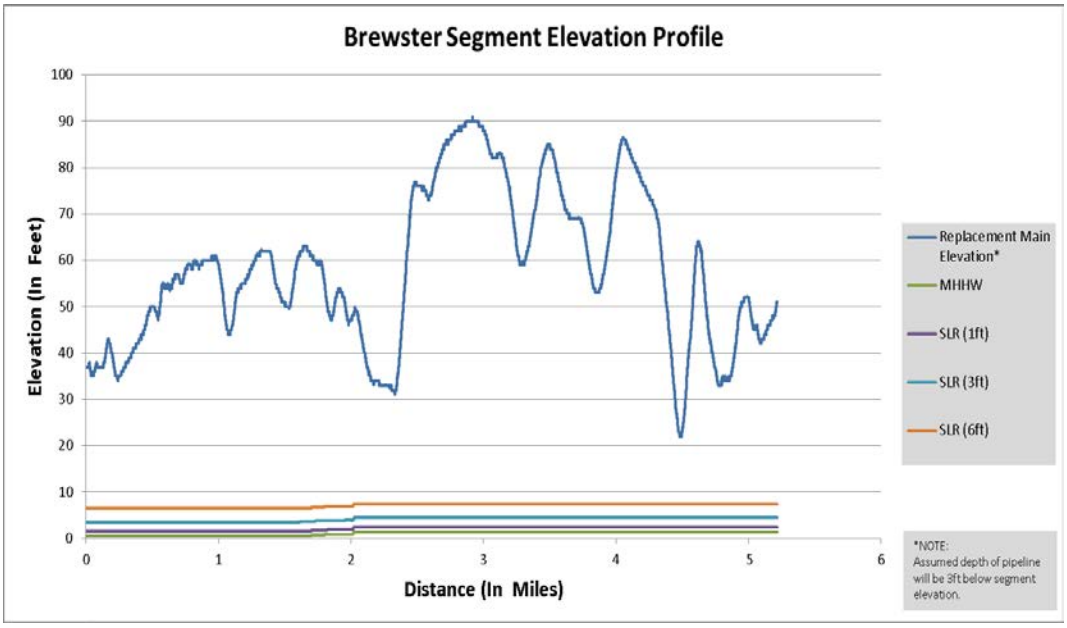
Figure 3-1
Vulnerability to Sea Level Rise Scenarios







Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, Massachusetts**

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Figure 3-2

Profiles Demonstrating Low Vulnerability to Sea Level Rise

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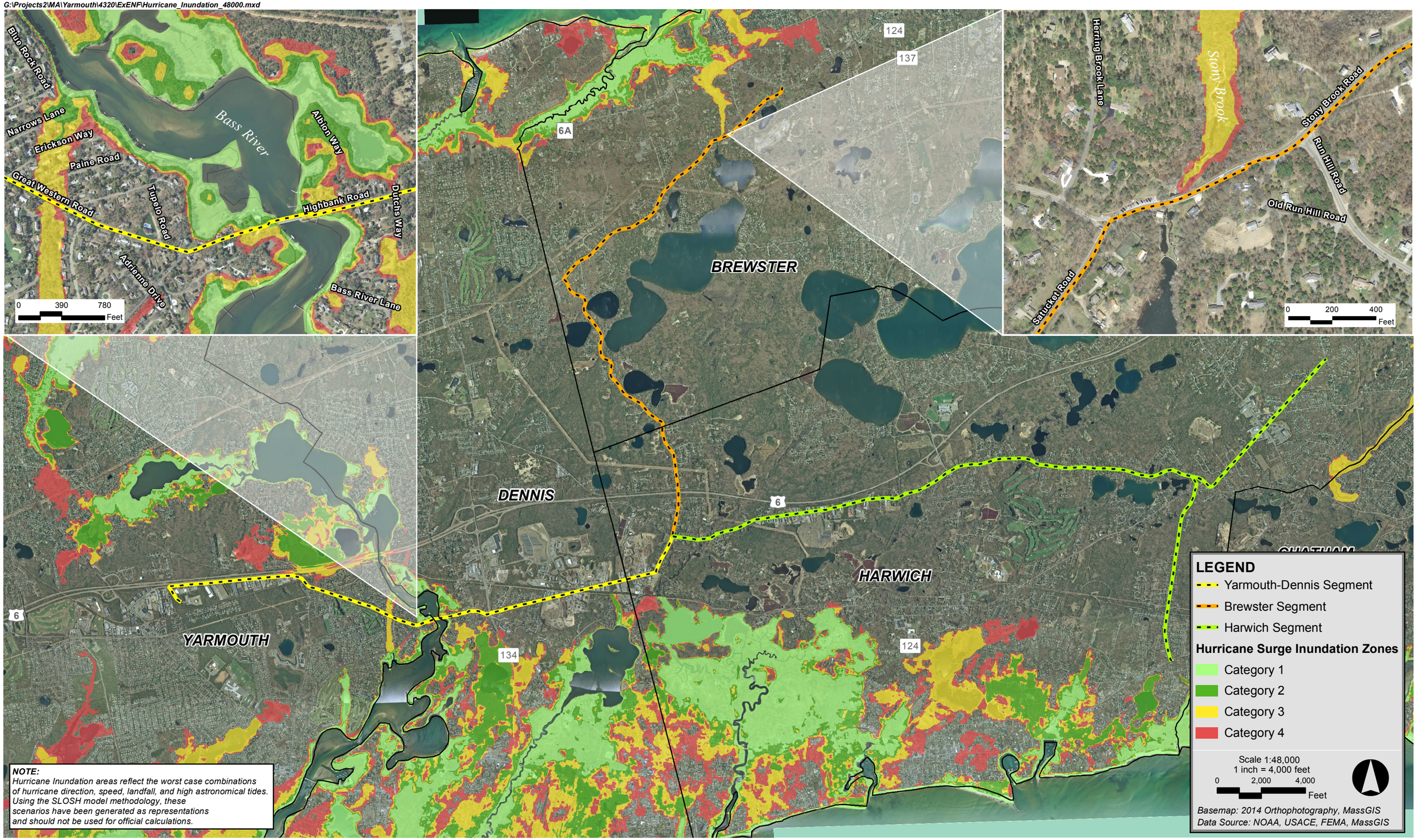

Mid-Cape Main Replacement Project **Yarmouth, Dennis, Harwich, Brewster, MA**

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Figure 3-3
Vulnerability to Hurricane Inundation