



National Grid
40 Sylvan Road
Waltham, Massachusetts 02451

Former Gloucester Gas Light
Company
Manufactured Gas Plant
Harbor Loop
Gloucester, Massachusetts
RTN 3-25126

File No. 25623.00
July 12, 2013

Expanded Environmental Notification Form



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SECTION 1

INTRODUCTION AND PROJECT DESCRIPTION



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LIST OF ACRONYMS AND ABBREVIATIONS

AUL	Activity and Use Limitation
AQ	Anchor QEA, LLC
bgs	below ground surface
CSA	Comprehensive Site Assessment
DMF	Division of Marine Fisheries
DNAPL	dense non-aqueous phase liquid
EECS	EECS, Inc.
ERC	Ecological Risk Characterization
GGLC	Gloucester Gas Light Company
GZA	GZA GeoEnvironmental, Inc.
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
mg/kg	milligrams per kilogram
MGP	Manufactured Gas Plant
National Grid	Massachusetts Electric Company d/b/a National Grid
NGVD 29	National Geodetic Vertical Datum of 1929
OHM	Oil and/or Hazardous Material
PAH	polycyclic aromatic hydrocarbon
Phase I Project	Phase I – Initial Site Investigation Report Gloucester Gas Light Company Manufactured Gas Plant Remediation Project
RAP Site	Remedial Action Plan Former Gloucester Gas Light Company Manufactured Gas Plant site located at Harbor Loop in Gloucester, Massachusetts
TOY	Time of Year
TPAH16	total United States Environmental Protection Agency 16 priority polycyclic aromatic hydrocarbons (i.e., PAHs with no alkyl substitutions, excluding 1-methylnaphthalene and 2-methylnaphthalene)
TRV	threshold reference value
UCL	Upper Concentration Limit
USCG	United States Coast Guard
VOT	visible oil and/or tar



SECTION 1-INTRODUCTION AND PROJECT DESCRIPTION

1. INTRODUCTION

The former Gloucester Gas Light Company (GGLC) Manufactured Gas Plant (MGP) Remediation Project (Project) consists of remediation activities proposed by the Massachusetts Electric Company d/b/a National Grid (National Grid) for the former GGLC MGP site located at Harbor Loop in Gloucester, Massachusetts (the Site - see Figure 1). The former MGP Site has been assigned Release Tracking Number (RTN) 3-25126 by the Massachusetts Department of Environmental Protection (MassDEP). As defined in greater detail in subsection 4 below, the Project Area consists of several properties within and adjacent to the former GGLC including portions of:

- The United States Coast Guard (USCG) station;
- Solomon Jacobs Park;
- areas owned by the City of Gloucester;
- property owned by Maritime Gloucester;
- a commercial property owned by National Grid; and
- portions of Gloucester Inner Harbor.

See Figure 2: Annotated Aerial Photograph of Proposed Work Area for locations and assessor’s parcel identification. The regulatory driver for this project is the Massachusetts Contingency Plan (MCP 310 CMR 40.0000), which requires that Response Actions be conducted until a Permanent or Temporary Solution is achieved at sites within the Commonwealth. Comprehensive Response Actions, which include assessment and remediation, are being performed by National Grid under the MCP and in accordance with a Tier IA Permit (permit number W092029). The remediation design proposed for this Site was selected as a feasible remedial alternative, as presented in the Phase III Remedial Action Plan, to achieve a Permanent Solution under the MCP.

2. PROJECT PURPOSE

The purpose of the proposed Project is to remediate historic contamination at both upland and marine areas of the Site. The proposed remedial actions are designed to eliminate or control ongoing sources; to remove the condition of Readily Apparent Harm (as defined in the MCP) and reduce risk to ecological receptors in the harbor; and to remediate the hot spots with regulatory defined exceedances (i.e., Upper Concentration Limit [UCL]) in the upland that the MCP considers a potential future risk to public welfare and the environment. This will be accomplished through excavation and capping of impacted soils, removal of coal tar in the form of dense non-aqueous phase liquid (DNAPL)¹, dredging of impacted sediment, and post dredging placement of a subaqueous cap. The Remediation Waste generated during these activities will be transported to licensed disposal facilities. The remedial approach has been designed to retain or replace historic and cultural features at the Site to the extent practical, and limit potential environmental impact associated with the construction of the remedial actions.

¹ To simplify the text, the terms coal tar, DNAPL, oil/tar, and VOT are used interchangeably in this document.



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In addition to the ecological and human health benefits of the environmental remediation activities, the Project has many additional benefits. For example, when the Project is complete, Solomon Jacobs Park will be improved through improved seawall stability and reliability and a more functional floating dock for the Harbormaster and the City.

3. REQUIRED PERMITS AND AUTHORIZATIONS

Due to the proposed remediation work taking place in wetlands and other jurisdictional resources, several environmental permits and reviews will be required to conduct this project, as listed below (see Section 6 for an annotated list of permits and description of how the project complies with permit requirements):

Federal

- Section 404 Clean Water Act and Section 10 Rivers and Harbor Act approval - Army Corps of Engineers (ACOE)
- Section 106 Consultation (both Federal and State) – Project Notification Form (PNF) to Massachusetts Historical Commission (MHC)

State

- Massachusetts Contingency Plan Compliance
- Massachusetts Environmental Policy Act – Executive Office of Energy & Environmental Affairs
- Section 401 Water Quality Certification – MassDEP
- Environmental Notification Form (ENF) – MEPA
- Federal Consistency Review – As administered by the MA Office of Coastal Zone Management (CZM)
- Chapter 91 Permit and Licenses – MassDEP

Local

- MA Wetlands Protection Act – Notice of Intent Application (as administered by Gloucester Conservation Commission)
- Gloucester Wetlands Ordinance – Notice of Intent Application (Gloucester Conservation Commission combined application with MA Wetlands Protection Act)
- Lowland Permit – City of Gloucester Special Permit



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4. EXISTING CONDITIONS AND USE

The former MGP Site is located along a heavily used, industrial and commercial waterfront area of Gloucester Inner Harbor (Figure 2). The properties within the Site and its surroundings are zoned by the City of Gloucester for marine industrial use, and are located within a Designated Port Area (DPA) per 301 CMR 25.00: Designation of Port Areas. The remedial activities described in this submittal will impact only a portion of the Site. This portion, which has been designated as “Project Area” to distinguish it from the larger “Site”, includes both upland and marine areas. The upland Project Area includes a portion of a United States Coast Guard (USCG) station located at 17 Harbor Loop; Solomon Jacobs Park and associated parking areas owned by the City of Gloucester located at 19A and 19R Harbor Loop; a portion of the property owned by Maritime Gloucester located at 23 Harbor Loop; and a commercial property at 19 Harbor Loop that is owned by National Grid (Figure 2). The marine Project Area includes portions of Gloucester Inner Harbor adjacent to the above listed upland properties, as well as a portion of the Federal Navigation Channel.

Additional information pertinent to each of these properties and the marine area, including current use and relevant features, is presented in the following sections.

4.1 United States Coast Guard Station (17 Harbor Loop)

The property located at 17 Harbor Loop (Lots 9-11 and 9-13) is owned by the U.S. Government and occupied by an active USCG station including a three-story brick building used for operations. The USCG has access to Gloucester Inner Harbor adjacent to their property via a concrete wharf and two floats, which are used to dock emergency response and support vessels. A granite block seawall separates the USCG property from the harbor. A portion of this property will be used as a materials support and staging area during remediation.

4.2 Solomon Jacobs Park (19R Harbor Loop)

The property at 19R Harbor Loop (Lot 9-14) is owned by the City of Gloucester and is the location of Solomon Jacobs Park and Public Boat Landing. The park is restricted to day-use for activities such as dog walking and harbor viewing. In addition, public access to the waterfront is provided via the Public Boat Landing, which consists of a metal gangway and floating docks. A granite block seawall separates the City of Gloucester property from the harbor.

The adjacent Lot 9-12, also owned by the City of Gloucester, is located along Harbor Loop and slopes steadily downward from Harbor Loop toward Solomon Jacobs Park (Lot 9-14). The ground surface is primarily covered with bituminous pavement that serves as parking for Solomon Jacobs Park.

4.3 National Grid Property (19 Harbor Loop)

The property located at 19 Harbor Loop (Lot 9-16) is owned by National Grid and contains a two-story building. The building, partly supported on a granite block seawall, is currently leased as commercial and office space. Tenants include an art gallery, a publishing company, a





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financial consultant, and the Gloucester Harbormaster. Property access to the water is provided via an access ramp and landing attached to a wooden pier, a portion of which is located adjacent to the Solomon Jacobs Park property. The seaward edge of the access ramp and landing are marked by a granite block seawall separating the National Grid property from the harbor. National Grid currently leases the pier to the Gloucester Harbormaster, who uses the pier and adjacent floating docks owned by the City of Gloucester as a base of operations.

4.4 Maritime Gloucester Property (23 Harbor Loop)

23 Harbor Loop is owned by Maritime Gloucester, a nonprofit entity operating an educational facility on the property. The property includes access to Gloucester Inner Harbor via a main pier, floating docks, and two smaller hauling piers. A granite block seawall is located at the landward edge of the Maritime Gloucester main pier where the pier decking meets the upland property. An active marine railway is also located on the property.

A portion of this property will be used as a materials support and staging area during remediation.

4.5 Marine Area

The marine area includes portions of Gloucester Inner Harbor adjacent to the following properties: the USCG station, Solomon Jacobs Park, the National Grid property, and the Maritime Gloucester property. The marine area also includes portions of the entrance channel (i.e., Federal Navigation Channel). Property owners have rights to the portion of the marine area adjacent to their upland property, extending out to the Harbor Line, to support their operations. For discussion purposes, the marine area is split into two areas—the nearshore area and the offshore area. The nearshore area extends from the seawall out to the Harbor Line established in 2004, and encompasses the various piers, docks and structures associated with these properties, including: the USCG floating docks; the City of Gloucester floating docks; the National Grid pier and associated floating docks; the Maritime Gloucester main pier and associated floating docks; the Maritime Gloucester marine railway and hauling piers; and the existing granite block seawalls located on the properties.

The offshore area begins at the Harbor Line and extends seaward to the limit of the Project Area. The marine area is currently used for various recreational and industrial activities both by upland property owners and the public.

4.6 Remediation Support Area

Although not located within the Project Area, project support activities will occur on the 109 Rogers Street property (Lot 10-5) owned by National Grid. This property is currently used as an electrical substation. The property is occupied by a two-story building, a detached multi-bay, single-story garage building, a storage shed, and electrical substation transformers and associated equipment. This property abuts Gloucester Inner Harbor along a riprap slope.



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5. SUMMARY OF MCP RESPONSE ACTIONS AND FINDINGS

The Site has been investigated since 2005 in accordance with the MCP. In August 2006, a Phase I – Initial Site Investigation Report (Phase I Report) was prepared by EECS, Inc. (EECS 2006) pursuant to the requirements of the MCP, 310 CMR 40.0480. The results of the Phase I Report indicated that a release of MGP residuals, in particular oil/tar, had historically occurred at the Site. This release of an unknown volume of waste material has directly impacted or migrated to various Site media including soil, groundwater, sediments, and possibly surface water. Based on the findings of the Phase I Report, EECS concluded that a Response Action Outcome Statement could not be prepared at that time and determined that the Site should be Tier Classified as a Tier IC Disposal Site pursuant to the MCP.

Between 2007 and 2011, a Phase II Comprehensive Site Assessment (CSA) was conducted in the upland and marine areas of the Site, culminating in the submittal of a Phase II CSA report in July 2011 (GZA GeoEnvironmental, Inc. [GZA] 2011). As a result of the data collected during Phase II, the Site was re-classified as a Tier IA Disposal Site effective January 29, 2011. A Stage II Ecological Risk Characterization (ERC) was conducted as part of Phase II activities. The ERC identified a risk-based Threshold Reference Value (TRV) of 135 milligrams per kilogram (mg/kg) for total polycyclic aromatic hydrocarbons (TPAH16) in sediment; thus, sediments with TPAH16 concentrations higher than this TRV do not meet the MCP condition of No Significant Risk to ecological receptors.

The Phase II CSA identified the following ongoing sources of impact within the Project Area:

- Coal tar-saturated soil in and adjacent to the seawall at the Solomon Jacobs Park and National Grid properties, which may be resulting in coal tar migration beneath the mudline into the harbor.
- Coal tar-impacted sediments in the slip adjacent to the National Grid property, which result in intermittent sheens on the surface water.

The Phase II CSA also identified the following potential risks in the Project Area:

- Concentrations of petroleum hydrocarbons in soil at Solomon Jacobs Park and the National Grid property exceeding Upper Concentrations Limits (UCLs) established by the MCP, which is a condition defined as future risk to public welfare and the environment.
- Dense non-aqueous phase liquid (DNAPL) present at thicknesses greater than ½ inch, which is also defined as a UCL, on the Solomon Jacobs Park, National Grid, and USCG properties and at two locations in the marine area sediments. The MCP defines the condition as a future risk to public welfare and the environment.
- Visible oil and/or tar (VOT) present in the upper foot of harbor sediments over an area of approximately 5 acres, exceeding the 1,000-square-foot area that the MCP defines as a condition of Readily Apparent Harm.



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- Concentrations of PAHs in the harbor sediment exceeding the applicable risk-based threshold value of 135 mg/kg, which pose a potential risk to ecological receptors.
- Concentrations of some constituents detected in porewater samples from beneath the harbor, which may pose a potential future risk to the environment.

In February 2012, a Phase III Remedial Action Plan (RAP) was submitted to MassDEP (GZA and Anchor QEA 2012). The Phase III RAP outlined the Remedial Action alternatives considered under the MCP, the selection criteria, and the selected Remedial Alternative chosen to address the sources and risks described above.

6. PROJECT DESCRIPTION

Several Remedial Actions are proposed for the upland and marine Project Areas to address historical MGP contamination, as required by the MCP. As shown on Figures 5A and 5B, proposed remedial actions within the Project Area include the following:

- Sediment dredging in the nearshore and offshore marine areas.
- Porewater cap placement in a portion of the nearshore marine area.
- Engineered barrier construction at Solomon Jacobs Park.
- DNAPL recovery at Solomon Jacobs Park, the National Grid property, and the USCG property.
- Excavation of impacted source soils behind and within the seawalls at Solomon Jacobs Park and the National Grid property, followed by reconstruction of the seawalls with some associated loss of land.
- Construction of a vertical contaminant barrier, including a new seawall and associated new land, adjacent to the existing building on the National Grid property and extending onto a portion of the Maritime Gloucester property.

These remedial actions and the remediation support area are more fully described below. Moreover, the project includes Best Management Practices, Environmental Controls, and Mitigating Measures will be implemented in combination with remedial actions to comply with regulatory performance standards for resource areas and to protect the environment. These detailed design attributes of these BMPs, Environmental Controls and Mitigation Measures are described in the individual permit applications.

6.1 Remediation Support Area

The remediation support area will be established at the National Grid substation located at 109 Rogers Street (Figure 5C). This area is outside the Site boundary and does not require remedial actions. However, this property will be used for staging material and equipment, with a





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portion of the property dedicated to processing and stockpiling of Project sediments and soils prior to transport to the disposal facility.

The remediation support area will contain the following elements:

- Area for equipment and clean material staging;
- Temporary field office and support facilities;
- Sediment/soil processing and stockpile area;
- Water processing and storage area.

The sediment/soil processing area (covering approximately 10,000 square feet) will be constructed to limit surface infiltration by installing a low permeability surface consisting of an asphalt pad and overlying liner system (Figure 5C). Stormwater and water generated from gravity dewatering of excavated or dredged material will be directed to a sump and subsequently pumped to temporary storage tanks prior to disposal. Jersey barriers or bin blocks will be placed around the processing area and the liner system will be installed between the sediment/soil and these structures to limit leakage. Erosion controls (geotextile fencing, staked wattles, and/or silt socks) will be used to surround the processing area for additional spillage protection. Following completion of remediation activities, the processing area will be returned to preexisting conditions.

The cove adjacent to the remediation support area will also contain several elements. A temporary docking facility (Figure 5C) will be constructed and/or installed adjacent to the property shoreline and may be composed of the following (or similar) components:

- a crane working on a spud anchored barge;
- up to four temporary timber-pile dolphin structures to assist in anchoring the crane barge and/or sediment barge or scow. The temporary dolphins consist of a group of up to four timber piles individually driven into the sediment bed and connected above the waterline to provide anchoring for vessels. The dolphins will be installed at the start and removed at the completion of construction. It is not anticipated that the dolphins will be removed between construction seasons;
- a float-supported spill apron extending from the sediment barge or scow up to the remediation support area. The spill apron is a best management practice that will capture potential spillage of material during the offloading process. It is likely that this spill apron system will be removed after and re-installed at the start of the next construction season.

Portions of the cove will be dredged to an elevation of -13 feet NGVD 29 to support the remediation activities, specifically to accommodate barge and tug access to the Remediation Support Area (Figure 5C).



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6.2 Remedial Dredging

The objective of the remedial dredging is to remove impacted sediments so the marine portion of the Site will present No Significant Risk to ecological receptors. The dredging will also remove coal tar residuals from the two locations in the harbor where UCL exceedances were identified in sediments, eliminating the potential of future harm to the environment posed by the UCL exceedances.

This remediation activity will include removal of debris, removal of structures, dredging of impacted sediment, subsequent placement of backfill, management and disposal of dredged material, and replacement of structures.

6.2.1 Debris Removal

Prior to the start of dredging activities, a visual debris survey will be performed and the debris will be removed to facilitate dredging activities. Industrial debris related to marine activities has been identified in the nearshore area, including old piles, tires, bricks, cables, lines, a former marine railway, and potential shipwreck debris in the vicinity of the National Grid Pier. Debris will be removed and transported to the sediment processing and staging area for stockpiling prior to being transported off Site for disposal at an approved facility.

6.2.2 Structure Removal and Replacement

To accommodate remedial activities, including the dredging described in Section 6.2.3 below, the following structures in the nearshore marine area must be temporarily removed:

- **USCG floating docks.** The two floating docks and associated gangway identified on Figure 5B will be removed from their support piles and stored. The piles will remain in place with remediation activities proceeding around them. After dredging, the floats will be reattached to the support piles.
- **National Grid pier and adjacent floating docks.** The floating docks will be removed from their supports and stored. The National Grid pier and the wooden piles used to support the pier and floating docks will be removed to accommodate the dredging described in Subsection 6.2.3 below. National Grid will work with the City of Gloucester to install a new floating dock system with a somewhat different footprint and associated piles will be installed in lieu of the existing combination pile-supported structure and floating dock system. See Subsection 6.6 of this document (Section 1: Introduction and Project Description) for a description of the proposed docking system.
- **Maritime Gloucester main pier and adjacent floating docks.** The floating docks will be removed from their supports and stored. The Maritime Gloucester main pier will be removed in its entirety. Timber piles and decking will be salvaged and reused where possible. Following dredging, the pier will be reconstructed within the same or potentially more limited footprint.



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- **Maritime Gloucester marine railway.** All or a select portion of the marine railway will be removed. Where possible, the existing timber pile supports will be left in place to limit impacts to the structure. Sediment will be removed around the piles during dredging. Once the area has been returned to grade, portions of the marine railway that were removed will be reconstructed using similar materials within the same footprint.

National Grid will endeavor to minimize disruption to the USCG, the City and Maritime Gloucester. National Grid will also coordinate with each property owner and make arrangements to provide alternative temporary docking facilities, utilities, and security, as required, for the duration of work on each respective property. Replacement locations may include, but are not limited to, the Maritime Gloucester docks or other similarly identified locations within the Inner Harbor.

Due to their narrow width and pile spacing, removal of the two Maritime Gloucester hauling piers that flank the marine railway is not anticipated to be required for dredging; however, if a portion of either of the hauling piers is removed for sediment access, it will be replaced using similar materials.

6.2.3 Dredging and Backfilling

Mechanical dredging is proposed over approximately 7 acres of the marine area (Figure 5A). Proposed dredge depths range from approximately 1.0 feet to 6.5 feet below the existing mudline including an anticipated overdraft allowance of 6 inches. The deeper dredge depths are located in the nearshore area. Approximately 25,000 – 30, 000 cubic yards (cy) of sediment will be removed. Additional sediment volume may need to be removed based on visual observation of nature and extent of OHM during dredging implementation.

Similar dredging techniques will generally be used in both the nearshore and offshore areas. Sediment will be dredged using an excavator equipped with an environmental clam shell bucket and transferred into a barge or scow prior to being transported via water to the remediation support area on the National Grid property at 109 Rogers Street. A crane or excavator will then transfer the dredged material from the barge to the sediment/soil processing area, where these materials will be mixed with a stabilizing agent (e.g., Portland cement, fly ash, sawdust). One potential variant of this procedure would be to accomplish the stabilizer addition and mixing in the barge prior to off-loading into the remediation support area. The stabilized dredged material will then be stockpiled and subsequently loaded into trucks for transport to an off-Site disposal facility. Water collected from the barge and sediment processing area sumps will be pumped to temporary storage tanks located within the processing area. These liquids will also be transported to an off-Site disposal facility.

Within the nearshore area at the United States Coast Guard and Maritime Gloucester properties, dredging adjacent to the seawalls will be limited to excavation in narrow slots to limit the associated reduction in wall stability. Slot excavation entails sequential pit excavation with backfilling back to existing grade before excavation of the adjacent pit. Temporary earth support, such as trench box or guide pile and plate techniques, will be used to retain sediment



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and soil adjacent to the individual pits and beneath the wall foundation during excavation and backfilling. The pits will extend no more than 3 feet beneath the existing mudline, consistent with the proposed dredge prism for these areas.

The existing row of wooden piles closest to the Maritime Gloucester wall will be left in place when the pier and floating docks are removed to maintain (and somewhat increase) the current limited seawall stability and to facilitate dredging. These piles will be augmented with a row of steel piles driven along the toe of the wall in front of the boat house, with timber blocking installed between the piles and the seawall, to provide additional stability specific to the boathouse area. The piles will be installed along a distance of approximately 26 feet at a spacing of approximately 4 foot on center. Note that the steel piles will remain in place but will be cut flush with the mudline at the completion of the dredging project. In addition, the top four feet of soil and granite block wall in front of the boat house will also be temporarily removed. This will reduce the effective surcharge load on the wall and thus increase the overturning factor of safety during dredging in front of the boathouse (Figure 5B). The removed seawall blocks and excavated soil will be properly stockpiled on the Maritime Gloucester property or at the Remediation Support Area and will be utilized for restoration when the dredging activities along the Maritime Gloucester seawall are complete.

A 6-inch-thick layer of tested and certified clean backfill will be placed within the nearshore area to reestablish benthic habitat, and/or to manage dredge residuals. Other than for specific seawall stability concerns and the pore water cap (see below), the grain size characteristics of the backfill will generally be similar to existing materials.

Backfill will be placed to grade beneath the following structures to re-establish the previously existing level of stability (Figure 8B):

- Maritime Gloucester dock;
- Maritime Gloucester hauling piers;
- Maritime Gloucester marine railway.

If further analysis suggests backfill to grade is not required for structural stability, a 6-inch backfill layer will be placed above the post-dredge surface (below existing grade), as described above.

Backfill will also be placed adjacent to the following seawalls to provide additional structural stability (Figure 5B).

- **USCG Seawall.** A stability wedge of concrete overlain by graded gravel will be placed at the bottom of the dredge footprint extending approximately 10 feet seaward from the seawall. The wedge will provide structural stability along the seawall following remediation, and will create additional tidal resource area as shown on the typical cross-section on Figure 6C.



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- **Maritime Gloucester Seawall.** Backfill will be placed along the existing seawall to return the mudline to grade.

The majority of the offshore area is located within a Federal Navigation Channel, which has a required elevation. The proposed dredging will extend below that required elevation. Adding backfill material after dredging poses the potential risk of overfilling to an elevation at or above the required channel elevation. To minimize the need for backfilling after dredging, confirmatory sediment samples will be collected from a representative “test” area and analyzed for OHM concentrations. If OHM concentrations are consistent with remedial objectives, backfilling will not be placed within the area tested and backfill placement will not be recommended for the offshore dredge area. If OHM concentrations are not consistent with remedial objectives, the area will be re-dredged, and backfilling placed to an elevation below the channel elevation. Then, confirmatory sediment samples will be collected from another “test” area and the process mentioned above repeated.

6.3 Porewater Cap Placement

The objective of the porewater cap to be constructed in the nearshore area adjacent to the USCG property, Solomon Jacobs Park, and the National Grid property is to address impacted sediment porewater that has the potential to present a future risk to ecological receptors.

The porewater cap will be placed following dredging activities. The cap footprint is approximately 10,000 square feet (0.23 acres) as shown on Figure 5B. The cap will consist of three layers (described from post-dredge mudline upward): a sorptive layer (e.g., organoclay) to sequester constituents in porewater; a sand/gravel filter layer; and a graded gravel or cobble-size material erosion protection layer. A typical cross-section of the cap is shown on Figure 7. The top of cap elevation will be no higher than the existing mudline.

Following the completion of remediation activities, the integrity of the cap will be monitored over time and maintenance will be conducted as needed, in accordance with the Activity and Use Limitation (AUL), or AUL-like instrument, required to reach a Permanent Solution under the MCP. An AUL is a deed restriction that defines permissible and prohibited activities within the footprint of the area defined by the AUL and also defines obligations necessary to maintain a condition of No Significant Risk.

6.4 Engineered Barrier Construction At Solomon Jacobs Park

The objective of the engineered barrier to be constructed at Solomon Jacobs Park is to limit access to, and thus reduce the potential risk from the subsurface soil that contains MGP-related petroleum hydrocarbons at concentrations that exceed MCP-published UCLs. To provide for cap longevity and reduce exposure risk, an AUL will subsequently be implemented in accordance with the MCP.

Soils with petroleum hydrocarbon concentrations exceeding UCLs extend over an approximately 3,600-square-foot area. The engineered barrier will be constructed by excavating the soil in the footprint shown on Figure 5B to between 4 and 6 feet below ground surface (bgs). The depth to





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groundwater is tidally influenced, and ranges between 5 and 8 feet bgs; therefore, the excavation will be coordinated with tidal cycles to limit the volume of water that is generated. Water that might be generated will be containerized and properly managed for off-Site disposal. Given the absence of surface structures at the park and the limited depth of excavation, no shoring or support of excavation is anticipated.

Approximately 800 cy of soil will be removed from the excavation. At the end of each day, excavated soil will either be transported to the Remediation Support Area at the National Grid property at 109 Rogers Street for temporary storage, or will be transported directly to an approved off-Site facility for disposal.

Following soil removal, a defining layer (consisting of orange snow fence material or similar) will be placed at a minimum of 4 feet below grade and will be overlain with clean fill. The finished grade of the engineered barrier will match existing grade, therefore there will be no change in the elevation of the park. Following the completion of activities, the park will be landscaped and restored to its current use, and the engineered barrier will be maintained in accordance with the AUL. See Section 5: Mitigation of Impacts for additional information regarding restoration of the park.

The Park and an adjacent City-owned public parking lot will serve as a temporary staging area for materials, and a construction vehicle access route to the seawalls. Thus, the entire Park and adjacent parking lot must be closed to the public through measures such as fencing and placarding to ensure safety during work operations. National Grid will coordinate its efforts with the City to limit the Project's impact on park users. In accordance with past and anticipated future agreements, work will not be initiated until after Labor Day and conclude by Memorial Day. During this eight-month period, there are fewer visitors to the Park and less use of the public landing compared to the summer. National Grid anticipates that the Park will be closed for at least one and not more than two eight-month periods.

6.5 DNAPL Recovery At Solomon Jacobs Park, National Grid Property, and USCG Property

The objective of DNAPL recovery is to address the presence of measured DNAPL thicknesses greater than ½-inch in environmental media, constituting a UCL. Under the MCP, a UCL represents a categorical future risk to public welfare and the environment. To achieve a permanent solution in the upland areas, these UCLs must be removed.

At the Site, DNAPL at thicknesses persistently exceeding ½ inch have been detected in three groundwater monitoring wells—GZ-2C at the National Grid property, GZ-8B at Solomon Jacobs Park, and GZ-4C at the USCG property (Figure 5B). National Grid has been routinely removing DNAPL from each of these wells in accordance with the Immediate Response Action (IRA) provisions of the MCP, and with the approval of the City of Gloucester Conservation Commission.

DNAPL removal has been achieved through manual bailing and/or automated pumping via a pilot-scale, mobile DNAPL recovery system. This automated system has been used sequentially





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at GZ-2C and GZ-4C over the last two years. Approximately 334 gallons of DNAPL has been removed from the Site as of January 18, 2013 and has been disposed off-Site at an approved facility.

It is anticipated that, following seawall reconstruction activities, the DNAPL recovery system will be expanded via the addition of automated recovery pumps to all wells still containing accessible DNAPL at that time. This will permit the concurrent removal of DNAPL from these wells, with the potential for expansion to additional wells if required. It is anticipated that the power and DNAPL storage portions of the expanded recovery system will be located on the National Grid property either outside the 100-ft buffer zone to the various resource areas or within the existing National Grid building. These systems will be connected to the individual wells via underground piping. It is anticipated that the pilot-scale DNAPL recovery system will continue to be used at the USCG property for at least the next year given its current level of effectiveness and USCG preliminary concurrence.

6.6 Source Removal and Seawall Rehabilitation at Solomon Jacobs Park and National Grid Property

The objective of the soil excavation behind the seawalls at Solomon Jacobs Park and the National Grid property is to address subsurface soil that contains MGP-related petroleum hydrocarbons, which could potentially migrate beneath the mudline and potentially re-contaminate harbor sediments.

An assessment of the structural stability of the seawalls has indicated that the required source soil excavation (and dredging within the harbor) will likely compromise the integrity of the seawalls at both the park and National Grid properties. In addition, the in-fill material between the seawall blocks is also a potential source of coal tar contamination. Therefore, the Solomon Jacobs Park Seawall and the National Grid Access Ramp Seawall (Figure 5B) will be removed to facilitate access to the soil impacted by coal tar, and will be re-built following removal of the soil containing coal tar. Additionally, a 1,150 square foot area of previously built land and enclosed seawall (National Grid Pier Seawall) will be permanently removed, thus increasing the amount of water sheet (Land Under the Ocean) available to the Gloucester Harbormaster and public.

To provide access to the remediation areas along the seawall, the timber-pile-supported National Grid Pier will be removed at the start of the work, likely using a crane with a clamshell apparatus. Prior to pier removal, the attached floating dock system owned by the City of Gloucester will be disconnected. The materials from the National Grid Pier and the City of Gloucester floating dock system will be transported to the remediation support area on the National Grid property at 109 Rogers Street where, if needed, the materials will be steam-cleaned to remove coal tar residuals. The cleaning water will be containerized for disposal at an off-Site facility. If necessary, the City of Gloucester floating dock system will be stored for possible re-installation at the completion of the work. The materials for disposal will be segregated and transported to a licensed facility that accepts creosote-treated wood and/or to a solid waste landfill if the material is not impacted with coal tar or is not creosote-treated wood.



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After the pier and floating docks have been removed, a temporary king pile wall system (king piles with intermediary sheetpiles) will be installed landward of the existing seawalls to support upland excavation (see Figure 6C showing cross sectional details). Once the king pile wall system is installed, the National Grid Pier Seawall and the approximately 1,150-square-foot piece of land enclosed by the seawall (approximately 1,000 cy of fill) will be removed (Figure 5B). Additional soil volume may need to be removed based on visual observation of the nature and extent of OHM at depth during removal of the land enclosed by the seawall. These materials will be transported to the sediment stabilization and stockpiling area at the Remediation Support Area, where they will be stabilized, if needed, and transported off Site for disposal at an approved facility. To the extent feasible, the granite blocks will be reused to face the new seawalls.

Following the removal of the National Grid Pier Seawall and enclosed land, the Solomon Jacobs Park Seawall and National Grid Pier Access Ramp Seawall will be removed in sequence with the excavation of coal tar-containing soil behind the seawalls. The excavation area will cover approximately 1,500 square feet, as shown on Figure 5B, resulting in removal of approximately 1,600 cy of soil and other material containing coal tar from behind the Solomon Jacobs Seawall and National Grid Access Ramp Seawall (Figure 5B). Additional soil volume may need to be removed based on visual observation of nature and extent of OHM at depth during removal of the land enclosed by the seawall. Removed material will be transported to the sediment stabilization and stockpiling area, where it will be stabilized, if needed, and subsequently transported off Site for disposal at an approved facility. As above, the excavated granite blocks will be reused to face the new seawalls, to the extent feasible.

Once the soil and seawalls have been removed, a concrete tremie plug will be poured at the base of the excavation (typical cross-section shown on Figure 6C). The excavation and seawall construction will be conducted in the wet in conjunction with the tidal cycles at this location. Reinforced concrete seawalls, with a granite façade to maintain the historic appearance of the harborfront, will be constructed along the alignment as shown on Figure 6C. To address the potential mounding of groundwater on the landward side of the seawalls, a drainage board will be placed behind the seawalls, allowing groundwater to drain from the backfill toward drainage pipes in the wall and out to the harbor. Absorbent material, such as organoclay, will be placed landward of the drainage board to adsorb residual hydrocarbons if present, thus limiting potential future impact associated with groundwater drainage to the harbor. Backfill material consisting of free draining sand and gravel will be placed and compacted to existing grade in the remaining portion of the excavation.

Following backfilling, the sheetpiles between the king piles will be removed and the tops of the king piles will be cut off at 3 feet below finished grade. The sheetpiles will be cleaned and transported off Site. Wash water will be collected and transported off Site for disposal.

A granite block façade will be installed on the reconstructed concrete seawalls to maintain an appearance similar to that previously existing as well as other walls in the area. It is anticipated that the granite blocks obtained during removal of the existing seawalls will be cleaned as necessary (to remove coal tar staining) and re-used to construct the façade. Granite blocks



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reclaimed from the seawall demolition will be placed at the toe of the rebuilt seawall for aesthetics to the extent feasible.

6.6.1 Floating Dock Construction After Source Removal

When the remediation work is complete, National Grid will work with the City to install a new floating dock system to restore waterfront access from the National Grid property and Solomon Jacobs Park and Public Landing. The existing pile-supported pier on National Grid and City of Gloucester property will be removed during the remediation efforts and will be replaced by the City with a 3600± square foot floating dock, as currently proposed (please note that the City is in the design process). The original main pier was 3,325 square feet with an additional 1,600 square feet of adjoining floating docks (for a total of 4,925 square feet), but in July 2012 a 1,300 square foot section of the existing main pier was removed for safety reasons. When the new floating dock is constructed, there will be a net decrease of at least 1,325± square feet of structure (actual decrease depends of final design of the City floating dock system). Up to fifteen piles will secure the floating docks. It is anticipated that two gangways will provide access to the floating docks; one for access from Solomon Jacobs Park and the other from the new land proposed on the National Grid property. In addition, a telescoping davit will be installed for operation by the Harbormaster to facilitate moving materials to and from boats and a land-based sewage pump-out station will be installed to service transient boaters.

6.7 Vertical Barrier Construction at National Grid and Maritime Gloucester

The objective of the vertical barrier adjacent to the National Grid building is to limit the potential migration of source material, presumed to be located under the building, into the harbor and sediment through the Existing National Grid Seawall. The shoreline-wall of the building is located on, and supported by the Existing National Grid Seawall (Figure 4B). Given the building location, it is not feasible to excavate the presumed source soils without significantly impacting the building. As such, National Grid is proposing to construct a low-permeable barrier (i.e. seawall) approximately 10 feet seaward of the current seawall (Figure 5B) to limit the potential migration of coal tar toward the harbor. The barrier will extend approximately 5 feet onto the Maritime Gloucester property to provide additional control of presumed source and to provide additional stability to the existing Maritime Gloucester seawall at this location. This work will consequently create approximately 450 sf of new land at the northern end of the Harbormaster slip.

This portion of the work will include dredging in front of the Existing National Grid Seawall to remove unsuitable sediments, constructing an undrained reinforced concrete seawall, and backfilling behind the new seawall with clean material (Figure 6C). Due to anticipated soil conditions, the new seawall will be supported by steel piles driven to refusal. Steel plates will be placed between the piles closest to the seawall to limit undermining of existing seawall during excavation. Sediment adjacent to the seawall will then be excavated in alternating slots perpendicular to the existing seawall, as described above in Subsection 6.2.3. Impacted sediments within the slots will be removed in the wet. As shown on Figure 6C, two additional



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rows of piles will be installed to the top of competent soil/bedrock, seaward of the proposed new wall, with steel plates installed between the outermost row of piles.

An undrained reinforced concrete seawall (i.e., vertical barrier) will then be constructed in the wet approximately 10 feet seaward of the existing wall. Clean backfill material will be placed and compacted behind the new seawall. In accordance with the drainage design for this area, the backfill will consist of low-permeability fill on the Maritime Gloucester property and permeable granular fill on the National Grid property. Groundwater will thus flow through the clean backfill toward the fill material behind the National Grid Access Ramp Seawall, including its integral absorbent permeable barrier material as described above in Section 6.6.

The surface of the new land constructed behind the vertical barrier will be capped with a concrete slab, and a granite block façade will be installed on the face of the seawall so that its appearance is similar to the existing seawalls in the area.

6.8 Post-Remedial Activities

Following the completion of remedial activities in the upland area, conditions will be restored at each of the properties within the Project Area. Restoration in the Marine Area has been discussed in previous sections of this document.

Within the upland area, paved areas (e.g., present-day parking or driveways) that may be disturbed by remedial activities will be re-paved following remediation. New landscaping, benches, and planters will be installed at Solomon Jacobs Park to restore the park to existing conditions. Existing monuments (e.g., the Harbor Walk granite monument and the Captain Solomon Jacobs plaque) that may be temporarily removed to facilitate remedial activities will be replaced. In addition, a sculpture designated by the City of Gloucester for the waterfront area may also be installed within the park.

Post-remedial restoration activities at the park and National Grid properties will also include the installation of utilities (e.g., electrical, water, and sewer) for the floating dock system including a sewage pump-out station. In addition, a davit (winch) will be installed at the head of the Harbormaster slip to facilitate the removal of large materials and/or debris by the Harbormaster.

The area in front of the Maritime Gloucester boathouse, as well as the temporary staging and material storage areas at this property and on the USCG property, will be restored to existing conditions. As noted earlier, conditions at the Remediation Support Area at the National Grid-owned substation will also be restored following the completion of upland and marine remedial activities.

7. CONSTRUCTION SCHEDULE

Construction is planned to occur over two to three construction seasons between 2014 and 2016 or 2017. In-water work will be subject to Time of Year (TOY) restrictions established by the Division of Marine Fisheries (DMF) through a published Technical Report, TR-47, that outlines



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recommendations for TOY restrictions in coastal areas. The following TOY restrictions are anticipated based on a review of TR-47 and pre-filing meetings with representatives from DMF:

- February 15 to June 30 Winter Flounder (*Pseudopleuronectes americanus*) spawning activities;
- May 31 through July 31 for American Lobster (*Homarus americanus*) migration.

In addition, remediation activities (both upland and in the marine area) may be restricted at the request of the City of Gloucester and Maritime Gloucester between Memorial Day and Labor Day to avoid limiting public access to Solomon Jacobs Park, the public landing, and the Maritime Gloucester facility.

Work at 109 Rogers Street is only subject to the TOY restriction as established by the DMF, and in-water work could potentially commence as early as August 1, 2014. Upland remediation activities are only subject to the City of Gloucester requirements; thus the construction of the engineered barrier and DNAPL recovery system can be conducted after February 15 as long as they are completed before Memorial Day.

The following general construction sequence is anticipated:

- **Season 1 (Year 1, currently anticipated during August 2014 - May 2015) :**
 - Preparation of Remediation Support Area at National Grid substation.
 - Remedial activities in upland and marine areas of the City of Gloucester property and a portion of the National Grid property.
 - Remedial activities in the marine area of the USCG property.
 - Remedial activities in the offshore portion of the marine area.
- **Season 2 (Year 2, currently anticipated during August 2015 - May 2016):**
 - Remedial activities in the remaining marine portion of the National Grid property.
 - Remedial activities in the offshore portion of the marine area.
 - Removal and rebuild of the Maritime Gloucester main pier.
 - Removal and rebuild of marine railway (to the extent required).
 - Remedial activities in the marine area of the Maritime Gloucester property.
 - Remedial activities in the offshore portion of the marine area.
 - Return Remediation Support Area to pre-construction conditions.
- **Season 3 (Year 3, currently anticipated during August 2016 - May 2017):**
 - Completion of remedial activities on the Maritime Gloucester property, as necessary.
 - Return Remediation Support Area to pre-construction conditions, as necessary.



EXPANDED ENVIRONMENTAL NOTIFICATION FORM

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The construction schedule and sequence is designed to limit impacts to neighboring property owners and their operations, and the environment. Moreover, as described in Section 5, National Grid will undertake a number of mitigation measures to minimize impacts to neighboring property owners. Where possible, work will be limited to one season per property. However, this construction sequence is subject to change based on the complexity in implementing this project. Once the project is contracted, a final construction sequence will be developed and available.