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

PREPARED BY:

Anchor QEA, LLC
500 Cummings Center, Suite 3470
Beverly, Massachusetts 01915

GZA GeoEnvironmental, Inc.
249 Vanderbilt Avenue
Norwood, Massachusetts 02062

SECTION 2

ALTERNATIVES ANALYSIS

SECTION 2 - TABLE OF CONTENTS

1. ALTERNATIVES ANALYSIS: MCP REMEDIATION FRAMEWORK

As detailed in this section, National Grid has thoroughly evaluated Project alternatives in order to comply with the MCP and the alternatives analysis required for Section 401 Water Quality Certification (314 CMR 9.00) and coverage under Category II of the Section 404 Massachusetts General Permit. Much of this prior analysis is directly relevant to the alternatives analysis requirements in the MEPA regulations.

As a remediation project, the Project's primary goals and purposes are established by the MCP objectives. As described earlier in this project narrative, the project's general objectives are to:

1. eliminate or control ongoing sources, as defined by the MCP;

2. eliminate the Substantial Hazard and reduce risk to ecological receptors in the harbor; and

3. remediate the hot spots with UCL exceedances in the upland that pose a potential future risk to public welfare and the environment.

As previously presented, the project has several more specific objectives and alternatives have been considered for each, including the "No Further Action" alternative:

1. Addressing impacted source soils behind and within the seawalls at Solomon Jacobs Park and the National Grid property, and addressing secondary impacts on the seawalls;

2. Addressing impacted soils in Solomon Jacobs Park upland of the seawalls;

3. Addressing DNAPL recovery at Solomon Jacobs Park, the National Grid property, and the USCG property;

4. Addressing the impacted harbor sediments through dredging and/or capping; and

5. Addressing oil and/or hazardous materials (OHMs) that migrate with groundwater into sediment porewater in shallow, biologically active zones in sediment and pose a potential ecological risk.

As described below the selected remedial actions and planned implementation are the product of an extensive evaluation of alternatives and represent the most feasible approach to meet the human and ecological health clean-up goals required by the MCP, which also retain historic or cultural features at the Site, and minimize the environmental impact associated with remediation activities. The selected remedial alternative accomplishes the needed remediation in a manner that supports the long term solution while also minimizing potential adverse impacts to the environment, including ecological receptors.

2. REGULATORY REQUIREMENTS FOR ALTERNATIVES EVALUATION

The MEPA regulations require an analysis of feasible alternatives to the Project in light of the Project goals and the no action alternative (301 CMR § 1.07(f)). The initial identification, evaluation and selection of Comprehensive Remedial Action Alternatives, was completed and described in the February 2012 Phase III Remedial Action Plan (RAP) submitted to MassDEP. For this proposed project, the analysis was conducted in order to assess whether alternative forms or methods of remediation would satisfy the MCP objectives with less activity or impact within applicable jurisdictional resource areas including U.S. Waters and Waters of the Commonwealth. The Phase III RAP alternatives assessment was also used as a framework to thoroughly evaluate the feasible alternatives and to demonstrate that there are no practicable alternatives that have less impact to the resource areas, thus meeting the need for alternatives analyses that are a necessary part of the environmental permitting processes for the work.

The MCP focus on practicable alternatives also addresses the analysis required under Section 401 and 404 of the Federal Clean Water Act and related regulatory standards under the Massachusetts Clean Water Act. These provide that the project must *avoid and minimize to the maximum extent practicable* discharges of dredged or fill material to U.S. waters (General Condition 15(a) of the Section 404 Massachusetts General Permit for Category 2 permits) and demonstrate that there is *no practicable alternative to the discharge that would have less impact on the aquatic ecosystem (314 CMR 9.07 (1))*. The latter regulation limits the consideration of alternatives to those that are available and capable of being done after taking into consideration costs, existing technology and logistics in light of the overall project purpose and are permittable under existing federal and state statutes and regulations. As detailed below, the Project meets the 401/404 alternative analysis requirements.

The Project also meets the alternatives analysis requirement in the Wetlands Project Act because the Project is eligible for Limited Project designation. A "Comprehensive Remedial Action Alternative" that is selected in accordance with the provisions of 310 CMR 40.0851 through 40.0869 shall be deemed to have met the requirements of the alternatives analysis standards listed in 310 CMR 10.24(7)(c)6.a. The proposed Project is a Comprehensive Remedial Action Alternative that was selected in accordance with the aforementioned requirements of the MCP and therefore is presumed to meet the performance standards for an alternatives analysis.

3. NO FURTHER ACTION ALTERNATIVE

The initial screening of alternatives evaluated for this project considered "No Further Action". For the purposes of this project, "No Further Action" would mean that no additional efforts would be conducted to mitigate the existing conditions or to further monitor impacts. "No Further Action" does not meet the requirements of the MCP where there are uncontrolled sources or where significant risk to current or future human or ecological receptors exists. As previously described, the project's purpose is to eliminate or mitigate these risks so that a condition of No Significant Risk is reached and a Permanent Solution as defined by the MCP is achieved. Therefore, "No Further Action" alternative would fail to achieve the stated purpose of this project.

4. ALTERNATIVES FOR SOURCE TREATMENT, REMOVAL & ISOLATION

The initial Phase III RAP screening process considered alternatives such as Institutional Controls and Natural Attenuation, which would have no additional detrimental short-term impact on natural resources. It was determined in this process that the long-term risks to ecological receptors and public welfare and the environment could not be adequately addressed by either Institutional Controls or Natural Attenuation, and therefore these alternatives were not retained for further evaluation in the Phase III evaluation.

The Phase III RAP screened three major categories of technologies to address the contamination:

1. Containment of the contaminants of concern via construction of a horizontal engineered barrier, sub-aqueous cap, or vertical barrier;

2. *in situ* technologies to degrade, immobilize, or reduce the toxicity of the contaminants of concern (i.e., soil vapor extraction, soil flushing, chemical oxidation, solidification and/or stabilization, bioremediation, thermal treatment, and multi-phase extraction); and

3. *ex-situ* technologies (i.e., excavation and/or dredging of soil/sediment, followed by either on-site or off-site treatment or disposal). Treatment methodologies that were evaluated included biological (e.g., bio-piles), physical and chemical (e.g., stabilization/solidification), and thermal treatment (e.g., thermal oxidation).

In addition, NAPL recovery was evaluated as a means of reducing NAPL thicknesses to below UCLs.

These technical approaches were evaluated for their applicability at four different areas within the Project Area:

1. The upland portions of the National Grid property;

2. The upland portions of Solomon Jacobs Park;

3. The upland portions of the USCG property; and

4. Within the affected areas of the Harbor.

For the affected harbor area, only physical removal (dredging) and capping is a feasible alternative because most of the proposed remedial area is navigable and water depth therefore must be maintained. This requirement eliminates capping as a stand-alone alternative. Capping can be combined with dredging, with cap placement following dredging to a depth that accommodates the cap without decreasing water depth. *In situ* procedures were considered, but are not feasible. *In-situ* approaches have generally not been implemented on a full scale. Additionally, impacts to resource areas are typically significant due to mixing of sediment and additives, or addition of chemical agents that are incompatible with harbor ecology. Therefore, harbor remediation is limited to dredging/capping alternatives (see analysis below).

However, for the developed upland environment associated with the USCG, National Grid and Solomon Jacobs Park properties, the *in situ* and *ex situ* alternatives required a further evaluation. In accordance with Section 310 CMR 40.0858 of the MCP, the potential feasibility of remedial action alternatives was evaluated in terms of effectiveness, reliability, difficulty of implementation, relative cost, short-term and long-term risks, timeliness, and comparative benefits.

As documented in the February 2012 Phase III RAP submitted to MassDEP, the *in situ* technologies were deemed unsuitable for remediation of coal tar saturated soil in the upland areas primarily due to site conditions including the presence of buildings in close proximity to the remediation area, the existence of large boulders in the subsurface and porous nature of the seawalls adjacent to the harbor. An *ex situ* approach (i.e., excavation) was deemed feasible, but treatment of the removed material within the Site boundary is not feasible due to limited undeveloped space and proximity to existing commercial properties. Moreover, the quantities of sediment to be remediated are significantly greater than upland soil and there is no need for reuse of the treated sediment for backfilling the dredged area; as a result, there will be significant excess material requiring off-site disposal. Therefore, on-site treatment of excavated soils is not a cost effective alternative. However, ex-situ treatment facilities exist within a reasonable distance from the Site, and are available for treatment and disposal of excavated materials.

As a result of the alternatives analysis, the selected alternative focused upon physical removal of impacted soil and rehabilitation of the seawalls as a means of isolation of the contaminant from the receiving environment. The selected remediation approach for the project, as described in Section 1: Introduction and Project Description, meets the necessary environmental standards for avoiding, minimizing impacts (while addressing the contamination) by limiting work within the water, maximizing productivity during dredging windows, employing Best Management Practices throughout the project, and avoids and minimizes impacts to aquatic resources to the maximum extent practicable. As described below, there are no practicable alternatives for accomplishing the needed environmental remediation goals that would involve less impact in waters of the U.S. and resources jurisdictional under the above-mentioned regulations. No work is proposed in an Outstanding Resource Water, as defined in 314 CMR 9.00 and 310 CMR 10.00.

Additional information about the alternatives considered for each of the proposed remedial approaches is provided below.

5. SOURCE REMOVAL & ISOLATION ALTERNATIVES

During the Phase III process, it was recognized that excavation of source soil and rehabilitation of the seawalls on the City of Gloucester-owned Solomon Jacobs Park and adjacent National Grid owned property would be technically complex, and would result in some short-term disruption to park operations, Harbormaster operations, and conditions within the harbor. However, remediation of source material behind and within the spaces between granite seawall blocks which contribute to VOT-impacted sediments, and limiting the potential for future recontamination following harbor remediation, are essential to reducing long-term risks to ecological receptors and achieving a condition of No Significant Risk under the MCP. Due to the physical properties of coal tar (dense and low viscosity liquid with low vapor pressure that is not amenable to vapor extraction or other similar in-situ technologies), the tide impacts, and the extent of impacted soil and its proximity to the harbor, no suitable alternative to excavation was identified for remediation of the source soil behind and within the seawall.

Once excavation was selected as the preferred remedial action alternative, pre-design studies were conducted to evaluate whether the excavation could be conducted without removal of the seawall. However, a study of the structural stability of the existing seawalls indicated that their integrity could be significantly compromised by excavation in the upland areas adjacent to the wall and/or dredging of sediments in the harbor to the base of the wall. Therefore, reconstruction of the seawall in these areas of the Site was deemed to be an essential component of the remedial action.

During the detailed MCP Phase III evaluation, the benefits and risks associated with various remedial approaches were assessed using the criteria listed earlier. A significant benefit identified for the selected remedial approach was that source material would be removed (as required by the MCP), and that residual OHM would be reduced to levels that achieve a Class A RAO (a Permanent Solution under the MCP). Experienced personnel and equipment are readily available to implement the remedial approach, and arrangements exist between National Grid and disposal facilities for the treatment or recycling of remediation waste, resulting in the destruction or recycling of OHM. Wastes and emissions generated during the remedial process can be managed to satisfy requirements of the MCP and in accordance with standard practice at MGP remediation projects.

Some short-term risks were identified, including the need for soil management, odor control, water management, potential for sheens to the harbor, traffic issues, and transportation of remediation wastes. Based on experience at other remediation projects, it was concluded that these short-term risks can be readily managed by the use of BMPs and site controls. There is also a moderate short-term risk associated with seawall reconstruction, and a potential risk of mobilizing NAPL, which can be addressed during design. However, these risks are off-set not only by the overall long-term benefit of reducing risks to ecological receptors, but also by the aesthetic and safety benefits of reconstructed seawalls. The work can be conducted in a timely manner, within the fisheries window (August 1-February 15) to limit impact to environmental receptors in the harbor, and during the off-season (mid-September to mid-May) to limit impact to tourism in Gloucester's waterfront area. Please see Appendix E for a detailed discussion of Best Management Practices.

Although public use of the waterfront and park would be temporarily limited during the remediation, no permanent relocation would be required, and since no change in the use of the property is anticipated, there is no lost value associated with implementation of this proposed remedial action alternative.

In summary, based on experience at similar sites, it was concluded that the short-term risks associated with excavation for source removal and seawall reconstruction (see section below) could be adequately managed by the use of best management practices and site controls, and that the long-term benefits, including removal of a source of recontamination of harbor sediments and the associated reduction of risk to ecological receptors, outweighed the short-term impacts of the remedial process.

6. DNAPL REMEDIATION ALTERNATIVES

During the Phase III process, both passive and active NAPL recovery systems were considered to reduce NAPL thicknesses in the groundwater monitoring wells at the Site, specifically on the National Grid, Solomon Jacobs Park, and USCG parcels. Active removal systems are differentiated from passive systems by the addition of continuous groundwater extraction to enhance the gradients used to induce the NAPL to flow toward the removal location. The addition of groundwater extraction can be beneficial for light non-aqueous phase liquid (LNAPL) recovery, but typically has limited to no impact on DNAPL recovery rates. Examples of passive removal technologies include the use of adsorbent materials within recovery wells systems that skim LNAPL from the water surface within a well, total fluid pumps specifically positioned to extract DNAPL (and collaterally, often groundwater) from the bottom of a well, and manual bailing of LNAPL and/or DNAPL from wells. A passive DNAPL removal system (automatic, periodic pumping to remove DNAPL accumulated in the bottom of the well) is currently being employed under an IRA at the Site. In addition, manual bailing has also been historically employed to remove NAPL from some of the Site wells.

Active NAPL removal systems are designed to control the migration of NAPL (typically only effective for LNAPL) by imposing an additional groundwater gradient toward one or more collection locations. This process results in the capture of LNAPL within the resulting groundwater “drawdown cone” which extends some distance from the removal location.

An advantage of active removal technologies, as opposed to the passive technologies described above, is that the mass of contaminants in the subsurface is also reduced via the removal, collection, and/or treatment of contaminated groundwater. However, although LNAPL product recovery technologies have been used extensively for light fuel oils, and their successes are well documented, active DNAPL removal is generally considered difficult, if not infeasible, at MGP sites. This is because, as demonstrated consistently at other sites, MGP contaminants are not easily induced to flow through the subsurface along groundwater gradients due to their viscous, tar-like consistency. In addition, groundwater extraction is typically ineffective at inducing DNAPL flow towards collection points, and in fact, can cause unintended DNAPL migration to points deeper into the subsurface. As a result, active DNAPL removal was not deemed suitable for remediation at this Site. Therefore, the preferred alternative for management of DNAPL was passive NAPL recovery.

7. CONTAMINANT BARRIER ALTERNATIVES

Contaminant barriers considered for the upland properties included the creation of a vertical barrier at the National Grid property and extending onto a portion of the Maritime Gloucester property, and the construction of an engineered barrier at Solomon Jacobs Park. These barriers and the alternatives considered are discussed below.

Vertical Barrier (Seawall) Construction: Construction of a new seawall at the National Grid property (extending onto the Maritime Gloucester property) was recommended only after a detailed evaluation of other alternatives, including demolition of the existing building at the property. It was concluded that demolition would carry significant risks during implementation, including risks associated with shoring, management of remediation waste, and potential damage to the adjacent Maritime Gloucester building. Therefore, an alternative was developed that would retain the current building but would provide source removal along some areas of the seawall and source control at the headwall of the Harbormaster slip.

As in the case of the seawall rehabilitation, a significant benefit identified for the selected remedial approach was that on-going sources of contaminants to the environment would be controlled (as required by the MCP), and that residual OHM would be reduced to levels that a condition of No Significant Risk reached and a Class A RAO (Permanent Solution) could be achieved. Experienced personnel and equipment are readily available to implement the remedial approach, and arrangements exist between National Grid and disposal facilities for the treatment or recycling of remediation waste, resulting in the destruction or recycling of OHM. Wastes and emissions generated during the remedial process can be managed to satisfy requirements of the MCP and in accordance with standard practice at MGP remediation projects.

Similar short-term risks to those listed for source excavation and seawall rehabilitation were identified for the work at the National Grid property, and it was concluded that these short-term risks can be readily managed by the use of BMPs and site controls. Furthermore, in the case of the National Grid property, these risks are off-set not only by the overall long-term benefit of reducing risks to ecological receptors, but has the secondary benefit of creating new land along the waterfront, which would provide for enhanced waterfront access. Given the potential for future recontamination of the sediments within the intertidal zone, the source material behind the seawall must be controlled; therefore, the long-term benefits of creating the new land in the intertidal zone outweigh the risks.

As in the case of the park, although use of the National Grid property would be temporarily limited during the remediation, no permanent relocation or change in the use of the property is anticipated. Thus, there is no long-term reduction in value associated with implementation of this proposed remedial action alternative. Moreover, the work will be conducted within the fisheries windows to limit impact to environmental receptors in the harbor and will also minimize impacts to neighboring properties and to tourism in Gloucester's waterfront area to the extent feasible.

In summary, it was concluded that the short-term risks associated with construction of a new seawall and land could be adequately managed by the use of best management practices and site controls, and that the long-term benefits, including control of a source of recontamination of harbor sediments and the associated reduction of risk to ecological receptors, outweighed the short-term impacts of the remedial process.

Engineered Barrier at Solomon Jacobs Park: The installation of an engineered barrier to isolate soil with concentrations that exceed UCLs was selected as a remedial action to obtain a Permanent Solution under the MCP after other temporary and permanent alternatives were considered. This selected remedial action achieves a Class A-4 RAO under the MCP.

The objective of the engineered barrier would be to remove the exposure pathway to human receptors, resulting in a condition of NSR. As discussed previously, to install the engineered barrier, approximately 800 cy of vadose zone soils would be excavated to a depth of up to 6 feet below grade and transported off the Site for treatment or recycling, resulting in the removal of material exceeding UCLs. Approximately 3,600 square feet of engineered barrier would then be constructed within the excavation footprint.

Each of the alternatives considered for addressing UCL soil within Solomon Jacobs Park would require the disruption of the park to the public for approximately 3 months. Each of the alternatives considered require work in the Buffer Zone, relevant under the Wetlands Protection Act, and will require air monitoring and soil management. The alternative of excavating the UCL area was considered but eliminated as a feasible option due to the complexities associated with bracing or shoring of a deep excavation, associated dewatering, and management of larger volumes of impacted remediation waste. This option would not have avoided or minimized work near the resource areas but would have increased the potential for adverse effects to resource areas due to the additional excavation infrastructure required.

8. HARBOR REMEDIATION ALTERNATIVES

There are only two feasible alternatives to remediate contaminated harbor sediments given that *in situ* treatment is not feasible:

1. Dredging;

2. Combined dredging and capping (selected alternative).

The overall project objective for Site sediments is to eliminate: the Substantial Hazard, conditions of Significant Risk, and UCL-exceedances.

Eliminating the Substantial Hazard requires remediating sediment containing visible oil and tar (VOT) in the top 12 inches of sediment. VOT is also referred to as NAPL. Eliminating the conditions of Significant Risk requires addressing the Substantial Hazard due to short-term exposure and current concentrations of sediment OHM, specifically polycyclic aromatic hydrocarbons (PAHs). To reach a condition of No Significant Risk the migration of OHM in nearshore groundwater to sediment porewater must be controlled to protect the upper biologically active zone of sediment, where the benthic receptors could be exposed for future (i.e., post-remediation) environmental conditions.

8.1 Sediment NAPL Remediation Alternatives

Sediment containing NAPL requires remediation to eliminate the Substantial Hazard.

Readily Apparent Harm is as defined in Section 40.0995 (3)(b)1.(c) of the MCP as "Visible presence of oil, tar, or other non-aqueous phase hazardous material in soil within three feet of the ground surface over an area equal to or greater than two acres, or over an area equal to or greater than 1,000 square feet in sediment within one foot of the sediment surface."

RAH represents a Substantial Hazard, which is defined in Section 40.0956 of the MCP as "a hazard…that would pose a significant risk of harm to health, safety, public welfare, or the environment if it continued to be present for several years."

The sediment containing NAPL which meets the MCP definition of a Substantial Hazard covers an area of approximately 5-acres in Gloucester Inner Harbor. Achieving a Permanent Solution (or a Temporary Solution) requires eliminating the Substantial Hazard. Eliminating the Substantial Hazard can be achieved by removing the sediment containing NAPL, treating the sediment *in-situ* to remove the NAPL, or by capping the sediment with a minimum of 1 foot of clean material.

The only feasible alternative for remediating the Substantial Hazard is removing the sediment by dredging. Technologies are not available for effectively removing NAPL from sediment via in-situ treatment. In addition, general capping of the Substantial Hazard area is not feasible because the majority of the 5-acre area is used for navigation, and placement of a cap would reduce navigation draft and in shallow areas, an armor layer would be required on the cap to limit potential erosion of cap layers, and this would require placement of a thick cap, and further reduction in navigable areas. A cap would also be required to be a multi-layer cap that would not only include the above-mentioned armor layer but also a sorptive layer with adequate sorptive capacity to prevent the upward migration of NAPL and associated OHM so that ecological receptors are not exposed. Therefore, capping of the Substantial Hazard area was deemed to be infeasible.

Dredging is therefore the recommended alternative for remediating sediment NAPL. Mechanical dredging of sediment containing NAPL is proposed. The objective of the dredging is to remove continuous NAPL in sediment, regardless of depth. Sediment containing NAPL and deeper than 1 foot below the harbor bottom requires removal to avoid re-creating the Substantial Hazard by exposing and leaving behind deeper sediment containing NAPL after dredging, and allowing this residual sediment/NAPL to form the new harbor bottom.

Mechanical dredging is proposed because it is more effective when dredging in areas where debris is present, and entrains less water requiring subsequent management and treatment when compared to other dredging methods, e.g., hydraulic dredging. Mechanical dredging is discussed further below in the summary of alternative evaluation for eliminating significant risk.

8.2 Sediment $TPAH_{16}$ Alternatives

Sediment OHM requires remediation to eliminate Significant Risk. The Ecological Risk Characterization (ERC) indicated a condition of No Significant Risk was not achieved for ecological receptors, based primarily on the sediment concentrations of the sixteen U.S. Environmental Protection Agency (USEPA) Hazardous Substance List (HSL) polycyclic aromatic hydrocarbons ($TPAH_{16}$). The ERC concluded that the area with $TPAH_{16}$ concentrations above 135 mg/kg within the upper 6 inches of sediment poses an ecological risk. The ERC-based risk area is approximately 5.3 acres in size and overlaps with much of the Substantial Hazard Area.

The coincidence of most of the Substantial Hazard and Sediment $TPAH_{16}$ areas was a primary factor in evaluating alternatives to remediate sediment OHM. Capping was not considered viable for sediment $TPAH_{16}$ because of the potential impacts on navigation, as discussed above in the Substantial Hazard discussion. In-situ treatment is more feasible for $TPAH_{16}$ than for sediment NAPL, and has been attempted at several sites on a pilot-scale, but has not been implemented on a full scale for sediment $TPAH_{16}$ concentrations that are similar to the Site. The presence of NAPL would also likely render the in-situ remedial approaches less effective.

Mechanical dredging was selected for sediment OHM remediation for the reasons described above for Substantial Hazard remediation, and because it was the alternative that best addressed both sediment $TPAH_{16}$ and NAPL. The approach for dredging sediment containing $TPAH_{16}$ is similar to the conservative approach for removing sediment NAPL. Deeper sediment containing $TPAH_{16}$ will be removed to limit residual sediment $TPAH_{16.}$ A layer of clean native sediment underlies the sediment containing both NAPL and $TPAH_{16}$. In general, the targeted depth for dredging will be the top of this clean native sediment layer.

8.3 Porewater Remediation Alternatives

Field and laboratory investigation activities during MCP response actions indicated OHM was present in sediment porewater in an area near the Site shoreline. Porewater OHM included $TPAH_{16}$ compounds and volatile organic compounds (VOCs). The porewater OHM is associated with nearshore groundwater OHM that migrates to sediment and transitions to sediment porewater. Porewater OHM concentrations exceeded risk-based water quality criteria. Because OHM in porewater is similarly bioavailable to OHM in surface water, the surface water risk-based criteria were protectively applied to porewater. This approach resulted in a need to address porewater OHM to eliminate potential future Significant Risk, for post-remediation scenarios where porewater OHM would continue to discharge to the biologically active zone in sediment. The area where porewater OHM was present in porewater samples covered approximately 10,000 square feet of the harbor bottom and is located beside the Site shoreline.

Alternatives considered for porewater remediation included barriers and caps for containing or intercepting the porewater OHM prior to migration to shallow sediment. Dredging was not considered because it will not eliminate porewater OHM migration – dredging does not access, contain, or otherwise address migrating nearshore groundwater. In-situ treatment was considered, but was not considered feasible because of the difficulty in implementing due to the presence of rocky material, foundations, and other obstructions in the nearshore area. Barriers (e.g., low permeability caps) were not considered because of the potential for nearshore groundwater to bypass the low permeability caps.

Reactive capping was selected as the alternative for porewater remediation. A reactive cap is a multi-layer cap that includes a layer of cap material that interacts with porewater OHM and significantly reduces porewater OHM concentrations prior to migration to cap layers that overlie the reactive layer. The reactive material is maintained in place by installation over the reactive layer of an armor layer consisting of armor stone. The porewater cap area will be dredged prior to placement of the cap to limit minimizing loss of water depth in navigational areas that coincide with the porewater cap area. The proposed source removal and isolation, including seawall rehabilitation, is expected to reduce nearshore groundwater migration, and is therefore compatible with porewater remediation.

Under the MCP, Substantial Hazard and a condition of Significant Risk must be eliminated to achieve a Permanent Solution. The selected remedial alternative for this portion of the remediation project is expected to achieve a Permanent Solution, as defined by the MCP.

The marine portion of the work including dredging and porewater capping will, by necessity, take place in Waters of the U.S. and jurisdictional surface waters. Activities will be conducted in a manner which minimizes potential adverse impacts to surface waters and waters of the U.S. and mitigates unavoidable adverse impacts. Potential adverse impacts include releases of OHM and suspended sediment during dredging, and to a lesser extent, during the early stages of capping. BMPs will be implemented to protect water quality, including installation of turbidity barriers and floating oil booms during dredging and capping, and water quality monitoring. Monitoring will be conducted during remediation to evaluate potential environmental impacts and allow for early intervention and mitigation. If water quality monitoring indicates the potential for adverse impacts, mitigating measures will be implemented, including adjusting turbidity barriers and oil booms, and modifying construction methods and equipment as needed to minimize potential impacts. Additionally, a cleanup crew and boat with oil spill kits will be available on the Site during the in-water work, and can be rapidly deployed if needed. Engineering and construction BMPs will be used during dredged material transport and management.

Unavoidable impacts include temporary loss of habitat during and after dredging. The temporary habitat loss would be mitigated by removal of OHM and backfilling of dredged areas with clean sand, which in combination are expected to accelerate restoration of improved habitat in the dredged area. Similarly, capping is expected to result in a temporary loss of habitat that will be mitigated by preventing porewater OHM from migrating to the shallow sediment, thereby restoring and improving habitat. The in-water work will be scheduled to occur between September and February to avoid seasonal impacts to Winter Flounder and American Lobster during spawning and/or migration periods.

In summary, there is no acceptable remedial alternative that would have less impact on the aquatic ecosystem or that avoids temporary alteration of wetland resource areas than the selected alternative that combines dredging and capping.

The project will be phased to avoid sensitive migration and spawning periods and will result in an improved condition to ecological receptors and the overall environment. In compliance with provisions of the Water Quality Certification regulations 314 CMR 9.07, and similar provisions in Section 401 and Section 404 of the Federal Clean Water Act as cited in the Alternatives Analysis, the dredging and dredged material management will be conducted in a manner that provides protection of human health, public safety, public welfare, and the environment.

9. NATIONAL GRID PIER & CITY FLOATING DOCK ALTERNATIVES

The pier is primarily located on National Grid property but also lies within a portion of the City of Gloucester water sheet associated with Solomon Jacobs Park. National Grid 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. The pier is in overall poor condition. Therefore, in August 2012, approximately 60 feet of the outermost portion of the pier was removed as it was deemed a hazard to city employees that use the facility and members of the public using the adjacent city owned floating docks associated with the public landing.

During the evaluation of remedial alternatives, it was concluded that removal of the pier was necessary, based on the nearshore work associated with the porewater cap, necessary source removal, and condition of the pier. The option of reconstructing the pier in a similar configuration was considered. However, in consultation with the City, it was determined that the existing design of the pier is no longer suitable to its function. The current function of the pier is limited to providing support to floating docks utilized by the City of Gloucester Harbormaster and the public boat landing. National Grid has been working with the City of Gloucester to negotiate a lease of their property, including the water sheet, so the City can replace the existing floating docks with a configuration that will better serve its needs.