APPENDIX K - CLEAN WATER ACT SECTION 404(b)(1)

GENERAL REEVALUATION REPORT (GRR) AND
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS)
FOR THE
POPLAR ISLAND ENVIRONMENTAL RESTORATION PROJECT

CHESAPEAKE BAY, TALBOT COUNTY, MARYLAND

September 2005

I. PROJECT DESCRIPTION

a. Location – The Poplar Island Environmental Restoration Project (PIERP) is an environmental restoration project located in the waters of the Chesapeake Bay, Talbot County, Maryland, 34 nautical miles south-southeast of Baltimore Harbor, and two miles northwest of Tilghman Island (Figure 1). Dredged material from the upper Chesapeake Bay approach channels to the Port of Baltimore is currently being used to restore over 1,140 acres of wetland and upland habitat, which, as of 1996, had eroded to three separate islands with an area of less than three acres.

b. General Description – The Poplar Island GRR/SEIS has five recommendations: 1) construction of a northern lateral expansion of approximately 575 acres of remote island habitat that incorporates an open-water embayment and includes approximately 29 percent wetland, 47 percent upland, and 24 percent open-water embayment habitat; 2) construction of a 5-ft vertical raising of the existing upland cells (Cells 2 and 6) on the western side of the PIERP; 3) amending the existing project authorization to include the placement of dredged material from the southern approach channels to the Chesapeake and Delaware (C&D) Canal and other Federal navigation projects; 4) incorporation of design modifications required for the completion of the existing project; and 5) development of recreational and educational enhancements for the PIERP.

This 404(b)(1) evaluation applies to the following components for the construction of the lateral and vertical expansion of the PIERP that may result in discharge into the Chesapeake Bay, a Water of the United States: perimeter dike construction, discharge of water through spillways, and construction of artificial reefs/breakwaters. For both the lateral and the vertical expansion, dredged material will be placed within the wetland/upland cells and dewatered to accelerated consolidation of the dredged material. As a result of this process, water will be discharged through project spillways into the Chesapeake Bay.

Containment (perimeter) dikes similar to those used for the existing project will be used to construct the lateral expansion alignment. The perimeter dikes will consist of a fine sand core with exterior slopes faced with various thickness of armor stone. Based on past experience and the close proximity of the oyster bars, it is anticipated that the sand used to build the perimeter dikes will be dredged from the Bay bottom deposit, stockpiled at a location immediately north of the existing project, and mechanically placed into the perimeter dike section using trucks, excavators, and bulldozers to compact the fill into the dike section.

To create the open-water embayment, segmented breakwaters will be constructed along approximately 3,400 feet of the western leg of the perimeter dike, and submerged breakwater/reef structures will be constructed within the open-water embayment. It is anticipated that the submerged breakwater/reefs will be constructed either entirely of rock with a cross section similar to the breakwater structures or may consist of a sand core with external armor, depending on the size of the submerged breakwater/reef. Additional artificial reef habitat will also be constructed outside the footprint of the proposed expansion. As currently designed, this rock reef habitat is proposed to be adjacent to the northeast corner of the expansion (Figure 2), however, the final location of the rock reefs will be determined through agency coordination. It is anticipated that the open-water embayment will provide approximately 435-acres of dredged material placement area, as calculated from the centerline of the exterior dike, plus a 10-acre tidal gut. The area from the centerline of the exterior dike outward to the end of the toe dike encompasses approximately 25 acres of additional bottom. Therefore, the total area of impact analyzed for the open-water embayment is a footprint of approximately 470 acres in size.

Hydraulic dredging will be required for sand borrow to support the recommendations of the GRR/SEIS. The recommended plan for the lateral and vertical expansion of the PIERP will require approximately 19 acres of sand borrow outside the footprint of the lateral expansion, and dredging the northern access channel and turning basin will require dredging over approximately 30 acres. The actions required to complete the existing project will require sand borrow from approximately 119 acres of the southwestern sand borrow area, previously disturbed areas in Borrow Area F (approximately 60 acres) and Borrow Area G (approximately 35 acres), and the relocation of the southern access channel and basin, which will disturb approximately 28 acres. Therefore, a total of approximately 519 acres [470 (alignment footprint) + 19 + 30 acres] of bottom habitat will be disturbed by the lateral and vertical expansion, and approximately 242 acres (119 + 60 + 35 + 28 acres) of bottom habitat will be disturbed by actions required to complete the existing PIERP.

c. **Authority and Purpose** – The GRR/SEIS for PIERP was conducted under the authority for the existing project, Section 537 of the Water Resources Development Act (WRDA) of 1996. The project cooperation agreement (PCA) for the construction of Poplar Island between the Department of the Army, represented by the Assistant Secretary of the Army Civil Works, and the State of Maryland ('the Non-Federal sponsor'), represented by the Secretary of the Maryland Department of

Transportation (MDOT), was signed on April 4, 1997 and has been amended twice - on July 11, 1997 and April 9, 2002. The expansion of the PIERP was one of seven alternatives recommended in the *Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement* (USACE, 2005) to address the predicted regional dredged material placement capacity shortfall.

The purpose of the proposed project is to investigate alternatives to expand the existing dredged material capacity at Poplar Island and investigate potential environmental and recreational improvement. This project will recreate and restore important regional habitat that has been lost through erosion of islands in the Chesapeake Bay and, at the same time, to provide for a beneficial use of sediments that must be dredged from Bay channels. Dredging the access channel would provide ready access to the site for placement of dredged material. The open-water embayment was incorporated into the recommended plan to provide additional protected habitats including open water varying in depths from 12 feet to intertidal elevations, and to include mudflats, tidal guts, tributaries, and fish habitat structures with the proposed northern lateral expansion. Artificial reefs would enhance habitat for fish.

d. General Description of Dredged Material – The sand used to construct the dikes for the expansion project will be dredged from borrow areas located within the footprint of the lateral expansion alignment, a borrow area located to the southwest of the existing project, or dredged from the proposed northern access channel. These sediments are expected to consist of fine sand with some silt and clay lenses.

The sediment used to construct the wetland and upland habitats at the PIERP will be dredged from the Federal navigation channels and channel reaches that make up the upper Chesapeake Bay approach channels to the Port of Baltimore. Most project sediments will be dredged during periodic episodes of maintenance dredging. The sediment is expected to consist of relatively low cohesion silts and clays with some fine sands. Because the channels are removed from known point sources, anthropogenic contaminant concentrations are likely to be consistent with background levels in the Chesapeake Bay sediments.

e. Description of Proposed Discharge Site – The PIERP, as currently authorized, is planned to be approximately 570 acres of wetland and 570 acres of upland habitat, and it is estimated that by 2014 the PIERP will provide up to 40 million cubic yards (mcy) of dredged material placement capacity. Water depths in the vicinity of the PIERP are generally less than 20 ft deep. Two privately-owned islands, Coaches Island and Jefferson Island are located adjacent to the PIERP and Poplar Harbor (Figure 1). The PIERP is separated from Coaches Island by a narrow tidal gut, and Jefferson Island is located within Poplar Harbor. Poplar Harbor is a 282-acre quiescent area located within waters protected by the shorelines of Poplar, Jefferson, and Coaches Island (Figure 1).

f. Description of Discharge Method – Stones used to construct the perimeter dikes, breakwaters, and artificial reefs will be placed using mechanical (heavy equipment) methods. It is expected that fine-grained sand to be used in constructing the proposed perimeter dikes and breakwaters will be dredged hydraulically and pumped to a location within the existing PIERP to be stockpiled. The construction of the sand perimeter dikes will be completed by mechanical placement of sand using trucks to transport the sand from the stockpile. Some mechanical shaping of the sand will be required before armor stone can be placed on the exterior slopes. Some small amount of fine-grained sediment unsuitable for dike construction may be sidecast near the borrow site within the proposed dike alignment.

The material from the Federal channels will most likely be dredged mechanically using a clamshell dredge and placed in barges. The filled barges will be towed or pushed to the proposed placement sites where the sediments will be pumped into the containment cells. During placement of dredged material into the wetland cells, water will be discharged in accordance with water quality standards into the open-water embayment through approximately three spillway structures (two associated with the northern wetland area, and one associated with the separate southern area). After placement of dredged material in wetland cells is complete, temporary interior dikes will be removed and channel systems will be established to assure hydraulic interconnection throughout the wetland areas and with the embayment. As part of the of the final wetland construction, the spillways will be replaced with temporary outlet control structures that will connect the wetland cells to the embayment to allow full tidal exchange while wetland plants are established and while the dredged material is stabilized to minimize erosion. After full stabilization has been achieved, the wetland control structures will be replaced with open breaches connecting to the embayment.

II. FACTUAL DETERMINATION

a. Physical Substrate Determination

i. Substrate Elevation and Slope – The water depth within the proposed expansion area varies from 1 to 14 ft. The proposed containment dikes would be constructed in depths ranging from 5 to 11 ft. The southwestern borrow area currently has depths ranging from –8 to –15 ft MLLW. After the sand borrow is complete, the depths will increase by approximately 10 ft on average, will have grades similar to the existing bottom contours, and the side slopes will be no steeper than 5 horizontal to 1 vertical (5H:1V) to ensure stability.

ii. Sediment Types – The surface sediments in the vicinity of the proposed lateral expansion are typical of lowland sedimentary deposits and consist mainly of silts clays, and sands, with some gravel. The sediment that will be used to construct the containment dikes is fine-grained sand with some silt and clay lenses. The dredged materials proposed for placement in the

proposed expansion project are likely to be silt, with some clay and fine sand.

iii. **Discharged Material Movement** – The fine-grained sand used to construct the perimeter dikes for the expansion will be dredged and placed to avoid unnecessary loss of materials. When completed, the perimeter dikes will contain the movement of the dredged material, and the discharge spillways will be managed to restrict movement of dredged material beyond the containment dikes.

iv. **Physical Effects on Benthos** – Non-mobile benthos within the sand borrow areas will be destroyed during dredging, but benthos are expected to recolonize from adjacent undisturbed areas once dredging has ended. Increased water depths resulting from the sand borrow excavation may impact the benthic community that recolonizes once construction has been completed. Benthos located within the 470 acres of proposed wetland and upland habitats within the lateral expansion will be buried and destroyed as the placement cells are filled. No dredged material will be placed within the open-water embayment, therefore, the existing substrate and benthic community inside the open-water embayment will be conserved and not be adversely impacted. Epibenthic communities are also expected to colonize the exterior perimeter dike face, the segmented breakwater structures, and the submerged rock reef habitats within the open-water embayment once construction is completed.

v. **Other Effects** – Construction of the northern lateral alignment has the potential to increase fine-grained sediment deposition in Poplar Harbor, since it will increase the protection of Poplar Harbor from wind driven waves and currents. Additionally, the construction of a northern lateral alignment will create intertidal substrates such as tidal flats and vegetated wetlands.

vi. **Actions Taken to Minimize Impacts** – No dredged material would be placed in the open-water embayment, thus conserving the existing substrate, benthic community, and natural bathymetry. Sand borrow areas within the footprint of the lateral expansion alignment and previously disturbed borrow areas south of the existing project will be exhausted prior to sand dredging in the southwestern borrow area.

b. Water Circulation, Fluctuation, and Salinity Determination

i. Water Quality – Temporary, localized changes are expected in clarity, color, and quality of Bay waters in the immediate vicinity during perimeter dike construction, dredging in the sand borrow areas, and discharge through the spillways. Turbidity monitoring during both Phase I and Phase II construction of PIERP indicated the turbidity levels quickly

diminished to background levels, and the same conditions are anticipated during the construction of the lateral expansion.

During placement of dredged material into the wetland cells, water will be discharged in accordance with water quality standards into the open-water embayment and through spillway structures constructed in the lateral expansion. After placement of dredged material in wetland cells is complete, temporary interior dikes will be removed and channel systems will be established to assure hydraulic interconnection throughout the wetland areas and with the embayment. As part of the of the final wetland construction, the spillways will be replaced with temporary outlet control structures that will connect the wetland cells to the open-water embayment to allow full tidal exchange. After full stabilization of the wetland habitat has been achieved, the control structures will be replaced with open breaches connecting the wetlands to the open-water embayment.

a. Salinity – No change is expected because water discharge would be of similar salinity to those surrounding placement areas.

b. Chemistry – Minor and temporary fluctuations in nutrient, pH, and some metal concentrations are possible in the immediate vicinity of the placement site spillways during dewatering operations. Discharges from the existing PIERP have been monitored, and no significant changes to the water quality have been identified (EA, 2004a; 2002d). Since similar conditions are anticipated for discharges from the lateral expansion, no substantial changes to the water chemistry are anticipated. However, the water chemistry of discharges from the lateral expansion will be monitored according to the existing monitoring framework and guidelines (MES, 2003).

c. Clarity – Minor and temporary changes are expected in the immediate vicinity of the project during perimeter dike construction, dredging in the sand borrow areas, and at the placement site spillways because of elevated turbidity.

d. Color – Minor and temporary changes are expected in the immediate vicinity of during perimeter dike construction, dredging in the sand borrow areas, and at the placement site spillways because of elevated turbidity.

e. Odor – No change is expected.

f. Taste – Not applicable.

g. Dissolved Gas Levels – Localized reductions in dissolved oxygen may occur in the immediate vicinity of perimeter dike construction and dredging in the sand borrow areas, but the study area for the dredging and construction activities is well-mixed, and the impact is not expected to be significant.

h. Nutrients – The release of nutrients from the sediments during dredging is expected to be short term, temporary, and localized during the construction of the northern lateral expansion and dredging of the northern access channel. Minimal releases of phosphorus and nitrogen (ammonium) are expected during construction and dredging, but are not expected to be significant. The sandy sediments that are proposed for dredging from the sand borrow area and northern access channel do not have elevated concentrations of nutrients (EA, 2004d; 2002c). Discharges as from the existing PIERP, including nutrient concentrations, have been monitored, and no significant changes to the water quality have been identified (MES, 2005; 2003; 2002). The same conditions are anticipated for discharges from the lateral expansion, and therefore, no significant changes to water quality are anticipated. However, nutrient concentrations in the discharges from the lateral expansion will be monitored according to the existing monitoring framework and guidelines (MES, 2003).

i. Eutrophication – Eutrophication is not expected because nutrient releases will be short-lived and will dissipate quickly to background concentrations. Based on the results of the discharge monitoring conducted for PIERP, ammonia concentrations are not anticipated to be high enough to significantly increase algal growth in the surrounding water or cause toxicity to benthic/sessile organisms.

j. Others as Appropriate – None.

ii. Current Patterns and Circulation

a. Current Patterns and Flow – Based on the hydrodynamic modeling conducted for the GRR/SEIS, minor changes to current speeds were predicted (USACE-ERDC, 2005b). Water surface elevations would be unaffected by construction of the northern lateral alignment (M&N, 2003). Following construction of the proposed northern lateral alignment, water flow would be displaced northward, and current velocity would increase north of the proposed alignment (M&N, 2003). Current velocity decreases where flow is blocked by the existing PIERP will create an area of

increased quiescence to the east, west and immediately south of the northern alignment area (M&N, 2003).

Residence time for particles within Poplar Harbor was predicted to increase slightly (by approximately 8 to 15 hours) as a result of the construction of the proposed lateral expansion (USACE-ERDC, 2005b). The residence time for particles within the open-water embayment is predicted to be approximately 3.8 days (91 hours) (USACE-ERDC, 2005b).

b. Velocity – During high and low water, the largest tidal velocities were observed over shallow water areas on the western side of PIERP and the channel located on the east side of the island (M&N, 2004). Currents near the PIERP are on the order of 0.1 to 1.2 ft/sec, and construction of the northern lateral alignment is not expected to significantly change current velocities in the surrounding vicinity (M&N, 2003). No increases in wave height along the Eastern shore mainland were predicted based on the hydrodynamic modeling (USACE-ERDC, 2005a).

c. Stratification – The area in the vicinity of PIERP is well-mixed and no change is expected.

d. Hydrologic Regime – No significant changes are expected.

e. Alteration to Bottom Contours – Dredging of sand for construction of the lateral and vertical expansion and the actions required to complete the existing project will change the water depth over approximately 138 acres in the southwestern borrow area. Water depths in the proposed southwestern borrow area currently range from about -16 ft MLLW at its western boundary to about -8 ft MLLW immediately adjacent to the PIERP. Following dredging activities, the borrow area would have a surface grade similar to existing conditions, but water depths may increase by a maximum average of approximately 10 ft across the bottom. The depth of dredging for sand in the southwestern borrow area is proposed to a maximum of –25 ft MLLW, although this depth may change once the final dredging plan is submitted for approval.

During construction, a 400-ft wide northern access channel with side slopes of 3H:1V will be dredged to a depth of approximately –25 MLLW ft (with up to 2-ft overdepth). This channel will extend from the existing Bay bottom the elevation –25 ft MLLW contour northwest of the site, to the northern end of the placement

site. The total area disturbed by the northern access channel and turning basin excavation is approximately 30 acres.

To complete the existing project, dredging will be required in Borrow Areas F and G, and the southern access channel will be relocated (Figure 3). Approximately 60 acres in Borrow Area F and 35 acres in Borrow Area G, plus 28 acres for the southern access channel will be dredged. The southern access channel will be 400 ft wide, have side slopes of 3H:1V, and will be dredged to a depth of approximately –25 MLLW ft.

iii. **Normal Water Fluctuation** – No significant changes are expected.

iv. **Salinity Gradients** – No changes are expected.

v. **Actions to Minimize Impacts** – During perimeter dike construction, the toe dike will be constructed first to minimize turbidity plumes resulting from dredging associated with the sand borrow activities and placement of sand to construct the dikes. Dredged material transported to the site for placement will be contained behind armored dikes, and the overflow of dredged material from barges and scows will be prohibited. Discharges through the spillways will be monitored, and must meet State water quality standards, and the turbidity and TSS limits prescribed in the Water Quality Certification and Wetlands License. Additionally, the shoreline of the southern end of the open-water embayment was adjusted to provide a smoother alignment to minimize the potential for areas of poor circulation. The southwestern borrow area will be connected to waters of equal depth through existing Borrow Area G and the existing access channel to provide circulation with deeper waters of the borrow area.

c. Suspended Particulate/Turbidity Determination

i. **Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Project Site** – Minor, temporary and localized increases in turbidity are expected during perimeter dike construction and dredging in the sand borrow areas. However, turbidity monitoring during both Phase I and Phase II construction of PIERP indicated the turbidity levels quickly diminished to background levels. Water discharged through the spillways during dredged material placement may have slightly elevated turbidity, but will be monitored to ensure compliance with the turbidity and TSS limits prescribed in the Water Quality Certification and Wetlands License. Construction of the lateral expansion will protect Jefferson Island from continued erosion, decreasing water column turbidity and improving overall water clarity.

ii. Effects on Chemical and Physical Properties of the Water Column – Minor, temporary and localized increases in turbidity are expected during perimeter dike construction, artificial reef construction, dredging in the sand borrow areas, and discharge from the spillways.

a. Light Penetration – A minor, temporary decrease in light penetration is anticipated in the sediment plumes that result from the perimeter dike construction and dredging in the sand borrow areas. No changes in light penetration are expected from the spillway discharges because turbidity is monitored during discharge through the spillways, and must meet the limits set in the Water Quality Certification and Wetland License.

b. Dissolved Oxygen – Localized reductions in dissolved oxygen may occur in the immediate vicinity of perimeter dike construction and dredging in the sand borrow areas, but the study area for the dredging and construction activities is well-mixed, and the impact is not expected to be significant. Dredging within the southwestern sand borrow area may create an area of deeper water that may be prone to seasonal hypoxia.

c. Toxic Metals and Organics – Perimeter dike construction, artificial reef construction, dredging in the sand borrow areas, and discharge from the spillways are not expected to result in the release of any measurable amounts of contaminants into the water column. During dredged material dewatering, the pH significantly decreases and metals become soluble potentially altering the water quality of effluent discharged through the spillways. However, exterior water quality monitoring in the vicinity of PIERP has not identified any significant changes to concentrations of toxic metals or organics as a result of dredged material placement (EA, 2004a; 2002d).

d. Pathogens – Perimeter dike construction, artificial reef construction, dredging in the sand borrow areas, and discharges from the spillways are not expected to result in the release of any measurable amounts of pathogens into the water column.

e. Aesthetics – Temporary increases in water column turbidity during perimeter dike construction, artificial reef construction, dredging in the sand borrow areas, and discharges from the spillways may constitute a short-term decrease in aesthetic values.

f. Others as Appropriate – None.

iii. **Actions to Minimize Impacts** – The stone toe of the armored section of the dike will be constructed before the sand dike section to minimize turbidity impacts during construction and dredging. Turbidity monitoring will be conducted during construction of the lateral expansion for PIERP. Dredged material that will be placed in the cells is limited to material from the upper Chesapeake Bay approach channels to the Port of Baltimore, which does not contain high concentrations of chemical analytes (EA, 2003; 2000a; 2000b), minimizing the potential impact to the water quality. Discharges through the spillways will be monitored, and must meet State water quality standards, and the turbidity and TSS limits prescribed in the Water Quality Certification and Wetlands License. The southwestern borrow area will be connected to adjacent deep-water regions to promote water circulation and minimize the tendency for hypoxic/anoxic conditions to develop. Dissolved oxygen levels will continue to be monitored in spillway discharges from the lateral expansion to ensure that hypoxic waters are not released into the Bay. The shoreline of the southern end of the open-water embayment was adjusted to provide a smoother alignment to minimize the development of areas of poor circulation.

d. Contaminant Determination – Fine-grained sand used to construct the proposed containment dikes will be dredged primarily from within the footprint of the lateral expansion. Some additional sand borrow from the southwestern sand borrow area may be required to complete the construction of the perimeter dikes. The PIERP is far removed from known sources of anthropogenic contamination, and it is unlikely that the sands have a higher level of contaminants than the surface sediment on which it will be placed. Therefore, the fine-grained sand satisfies the contaminant determination requirements of 40 CFR 230.11.

Similarly, the sediments likely to be dredged from the upper Chesapeake Bay approach channels to the Port of Baltimore are removed from known sources of anthropogenic contaminants, and do not contain high concentrations of chemical analytes (EA, 2003; 2000a; 2000b). Sediments from the Federal navigation channels are currently tested for priority pollutant concentrations every three years according to Inland Testing Manual (USEPA/USACE, 1998) methods and guidance. Overall, tested analytes were detected at low concentrations. Because the material will be contained in a placement site, and the spillways are monitored and managed, the release of significant contaminants is unlikely. Testing of the sediments from the upper Chesapeake Bay approach channels to the Port of Baltimore will continue at intervals not exceeding three years during the life of the project.

e. Aquatic Ecosystem and Organism Determination

i. **Effects on Plankton** – Short-term increases in turbidity associated with perimeter dike construction, artificial reef construction, dredging in the sand borrow areas, and discharges from the spillways could temporarily

and locally depress phytoplankton communities. Long-term effects are expected to be negligible. Minor, localized, and temporary increases in nutrient concentrations could potentially stimulate phytoplankton growth, but are not expected to be significant because of the low concentrations of nutrients released (MES, 2005; 2004; 2002). The open-water embayment will provide a trophic connection between the open water and the wetlands. This connection will increase detrital concentrations in the open-water embayment, providing a food source for zooplankton.

ii. **Effects on Benthos** – Nonmobile benthos within the sand borrow areas will be destroyed during excavation, but benthos are expected to recolonize from adjacent areas once construction has stopped. Where bottom substrate as a result from sand excavation is changed from sand to silts/clays, the composition of the benthic community that recolonizes once construction has been completed may differ from that of the pre-project community. In years when anoxia is pervasive in the Bay, deeper areas created in the borrow area might experience depressed oxygen which could further limit benthic utilization.

Non-mobile benthos located within the lateral expansion will be buried as the placement cells are filled. However, habitat created within the lateral expansion, including intertidal flats and wetlands, will be colonized by benthos that utilize these habitat types. The habitat in the created wetland cells will export both detritus and micronutrients into the open-water embayment, thus enhancing the existing benthic community within the open-water embayment. Because of this increased interaction with the adjacent wetland cells, it is anticipated that the existing benthic community within the embayment (which is currently dominated by a single species of suspension feeder) may eventually become more stable.

Epibenthic communities are also expected to colonize the exterior perimeter dike face, the segmented breakwater structures, and the submerged rock reef habitats within the open-water embayment once construction is completed. Monitoring of the benthic and epibenthic communities in the vicinity of PIERP have not indicated any significant effects (EA, 2004b,c; 2002a,b). The long term, overall impact on benthic populations in the region is expected to be insignificant because of the regional abundance of these species and the comparatively small area of bottom impacted.

iii. **Effects on Filter-Feeders** – Short-term effects on filter-feeders, particularly oysters, are expected as a result of the increased turbidity associated with perimeter dike construction and dredging in the sand borrow areas. The four natural oyster bars (NOBs) in the vicinity of the PIERP (NOBs 8-10, 8-7, 8-11, and 11-3) (Figure 2) are outside of the proposed lateral expansion and southwestern borrow area. Increased

levels of turbidity associated with project construction have the potential to disrupt the oyster beds; the proposed lateral expansion has been designed to minimize impacts to nearby oyster beds.

Dredging activities and perimeter dike construction for the proposed lateral expansion have the potential to physically entrain oyster larvae, but because dredging operations entrain a very small portion of the total water volume flowing past the dredge, the long term, overall impact on oyster populations is not expected to be significant. All time of year restrictions for oysters will be honored to minimize impacts on the NOBs, including the entrainment of oyster larvae. Agency consultation with MDNR will be ongoing. Monitoring of the potential sedimentation on the NOBs is included in the monitoring framework (MES, 2003).

iv. **Effects on Nekton** – Short-term and indirect effects on the early life stages of some species, specifically during egg and larval stages, are expected as a result of the increased turbidity associated with perimeter dike construction and dredging in the sand borrow areas. Suspended particles readily adhere to many of the fish eggs, making them less buoyant (in the case of pelagic eggs) or smothering them (in the case of demersal eggs). Short-term, localized impacts could also result from the entrainment of fish eggs and larvae during hydraulic dredging. Suspended sediments could also indirectly affect finfish by impairing the ability to feed (by limiting sight and ability to detect prey) of some larval and juvenile fish, including striped bass that are dependent on vision to detect prey. Short-term increases in turbidity are expected to have a negligible effect on larger, more mobile members of the fish community that will likely avoid the areas of highest turbidity.

Habitat conditions for nekton in the open-water embayment would be enhanced compared to pre-project conditions. The exchange and interaction between wetland cells and open water could particularly benefit a variety of juvenile finfish species as well as juvenile blue crabs. Both the submerged rock reefs within the open-water embayment and the segmented stone breakwater structures will provide predatory habitat for finfish species and will diversify the habitat of the existing, relatively flat and even bathymetry in the vicinity. The preservation of the original sand bottom substrate within the embayment would also provide foraging habitat for bottom-feeding finfish species. In addition, the open-water embayment will provide more diverse habitat types for finfish species within the lateral expansion, including deep and shallow subtidal zones, an open water pelagic zone, mudflat habitat, tidal guts throughout the wetland cells, submerged reef habitat, and rock reef habitat.

The long term, overall impact on nekton populations in the region is expected to be insignificant because of the regional abundance of these

species and comparatively small area of bottom impacted. The project area has not been identified as providing unique habitat for any particular species.

v. **Effects on Aquatic Food Web** – The long-term project effects are expected to be positive since the project would provide habitat for a wider variety of organisms than is currently available at the site. The exchange and interaction between wetland cells and the open-water embayment is anticipated to provide a food source for benthic, finfish, and avian species.

vi. **Effects on SAV –** SAV does not occur in the areas proposed for perimeter dike construction, artificial reef construction, and sand borrow dredging (EA, 2005a). The long-term project effect to SAV is anticipated to be positive because the protection of Jefferson Island will reduce erosion and improve overall water clarity, which will increase the potential for SAV reestablishment within Poplar Harbor. In addition, created quiescent habitat along the shorelines of the open-water embayment could potentially support additional SAV beds where depths are reduced to 2 m or less.

vii. **Effects on Special Aquatic Sites** – The placement of dredged material at PIERP will restore wetland and intertidal flat habitats comparable to those that formerly existed at Poplar Island. The project may indirectly impact special aquatic species by creating additional wetland habitat and potentially promoting SAV growth.

   a. **Sanctuaries and Refuges** – Not applicable.

   b. **Wetlands** – The placement of dredged material at PIERP would have a positive impact on wetlands because the lateral expansion would create approximately 165 acres of wetland.

   c. **Mud Flats** – The placement of dredged material at PIERP would create interim intertidal flat habitats during dredged material placement.

   d. **Vegetated Shallows** – The placement of dredged material at PIERP will is anticipated to have an overall positive impact on vegetated shallows [see section (e)(iv) above].

   e. **Coral Reefs** – Not applicable.

   f. **Riffle and Pool Complexes** – Not applicable.

viii. **Threatened and Endangered Species** – The applicable Federally-listed species of importance for this project include the Federally threatened bald

eagle, the federally endangered shortnose sturgeon, and several Federally-listed sea turtles. Because no shortnose sturgeon have been caught near the PIERP and the species is only transient to the project area, no impacts are expected. Leatherback sea turtles, loggerhead, Kemp's ridley, and green sea turtles are migratory individuals that are seasonal transients to Poplar Island and the project area; therefore, no impacts are expected. An active bald eagle nest is located on Coaches Island (adjacent to Poplar Island). The USACE continues to comply with USFWS recommendations for protecting the bald eagle and its nesting sites, and time-of-year restrictions on construction and site operation activities are in place.

ix. **Other Wildlife** – Impacts to wildlife are not expected to be significant during perimeter dike construction, artificial reef construction, and dredging in the sand borrow areas, although temporary displacement of some wildlife will occur. No significant adverse effects to the avian resources are anticipated because the avian species are currently utilizing the PIERP during on-going construction activities. Once completed, the lateral expansion of PIERP will result in additional remote island wetland, upland, and beach/shoreline habitats that will be beneficial to a wide range of wildlife species, particularly diamondback terrapin and colonial nesting waterbirds.

x. **Actions to Minimize Impacts** – The project is an aquatic and island habitat restoration project, and is therefore by design inherently beneficial a wide variety of aquatic and island organisms. The stone toe of the armored section of the dike will be constructed before the sand dike section to minimize turbidity impacts and turbidity monitoring will be conducted during construction. Discharges through the spillways will be monitored, and must meet State water quality standards, and the turbidity and TSS limits prescribed in the Water Quality Certification and Wetlands License. Time-of-year restrictions are in place for the bald eagle and the oyster bars located in the vicinity of PIERP. Best management practices will be employed to manage the site, to maximize environmental benefits, and to minimize potential adverse impacts.

f. Proposed Placement Site Determination

i. **Mixing Zone Determinations** – None.

ii. **Determination of Compliance with Applicable Water Quality Standards** – Discharges through the spillways will be monitored, and must meet State water quality standards, and the turbidity and TSS limits prescribed in the Water Quality Certification and Wetlands License.

iii. Potential Effects on Human Use Characteristics

a. Municipal and Private Water Supply – No effect is expected.

b. Recreational and Commercial Fisheries – A minimal effect on commercial fisheries is expected. The lateral expansion is not expected to have a significant effect on the abundance or catch of clams, oysters, crabs, or finfish. The project is also not expected to effect spawning or significant habitat areas [i.e. SAV beds, habitat of particular concern (HAPC), unique forage areas, or overwintering areas] in the vicinity of PIERP (EA, 2005b). PIERP lies in shallow water and does not affect any typical commercial boat navigation routes.

Some shallow-water recreational fishing areas will be lost, but because the number of recreational fishermen who seek out these soft-bottom areas is small, they should be able to shift to the abundant shallow areas adjacent to or near the site with no significant effect on congestion levels or catch rates. The open-water embayment feature, including the segmented breakwaters and rock reefs, will provide a diversity of fish habitat that may attract fish that orient to structures that are a target of recreational fishermen. For fishermen targeting areas with hard bottom, perimeter dike construction has the potential to increase local fish abundance and catch rates of some recreational species in nearby fishing areas.

c. Water Related Recreation – During and after project construction, the proposed lateral expansion should not interfere with typical travel routes used by recreational fishermen. During project construction and site operations, barge traffic will increase, but boaters who wish to avoid the areas immediately around the project have many alternative boating areas and will not be prevented from reaching common boating destinations in Eastern Bay and the Miles River.

Depending on the final design, water depths within open-water embayment will be 8 to 12 feet, thereby making the area accessible to recreational boaters. However, the level of allowable access to the embayment has yet to be determined, and will be a function of safety and environmental concerns.

d. Aesthetics – The lateral expansion has the potential to be a significant element in the landscape for some sensitive viewpoints, such as Jefferson Island, but from the majority of vantage points, it is anticipated that the island, once completed, will blend into the

existing landscape. The lateral expansion will occupy a larger portion of the view of the currently unimpeded view of the Bay from Jefferson Island.

e. Parks, National and Historic Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves – These resources do not exist within three miles of the project site, therefore impacts are anticipated.

g. Determination of Cumulative Impacts on the Aquatic Ecosystem – Activities warranting greatest attention from the cumulative impacts perspectives are those activities that in combination with the proposed expansion at Poplar Island would potentially magnify what are perceived by resource agency personnel and the public as the most significant impacts of the proposed work in the Mid-Bay Region of the Chesapeake Bay. These activities include: 1) conversion of significant areas of open water and Chesapeake Bay bottom habitat, including shallow water habitat, to island habitat, 2) creation and/or restoration of Chesapeake Bay tidal wetlands, and 3) alterations to aesthetics and visual qualities of existing viewshed conditions.

Recent and reasonably foreseeable human actions in the Mid-Bay Region of the Chesapeake Bay include the existing 1,140 acre PIERP and the proposed expansion, and the proposed projects at James Island (island restoration project), Barren Island (wetland protection), Dorchester County (wetland restoration), and Smith and Tangier Islands (SAV and wetlands protection and restoration measures). The cumulative areal impact of these USACE projects would be the loss of approximately 3,803 acres of open water habitat lost, approximately 400 acres of shallow water habitat, and approximately 4,168 acres of bottom habitat disturbed or lost. However, these same projects would also create/restore approximately 3,571 acres of wetland habitat and approximately 1,770 acres of upland habitat.

No cumulative impacts to regional water quality are anticipated from the cumulative discharge of water through the spillways at the existing PIERP, the lateral expansion of the PIERP, and the proposed island restoration project at James Island. Results of recent studies (EA, 2004a; 2002d) have indicated no significant changes to water quality in the vicinity of the PIEPR as a result of dredged material placement and subsequent dewatering. It is not expected that expansion of the facility will influence the overall water quality in the immediate vicinity of the island. Restoration of James Island would introduce a second source of discharge points into the Chesapeake Bay, however, yearly placement at the PIERP is expected to be completed prior to initiation of placement at James Island, thus minimizing discharges from two facilities concurrently.

The loss of approximately 3,800 acres of open water habitat is not anticipated to have major cumulative impacts on fisheries of the region because this type of habitat being affected is common throughout the Bay. The island restoration areas near Poplar and James islands have been sited to minimize fisheries impacts by avoiding oyster bars

and prime fish habitat. It is expected that fish and fishermen will be able to shift to new regions outside the footprints of the island restoration projects. Given the distance between the two island restoration projects, it appears unlikely that any single fisherman would be negatively impacted by both projects. Increased fishing pressure in adjacent areas (to compensate for lost harvest areas) is also expected for more mobile resources (finfish and blue crabs) adjacent to both the PIERP and James Island if both projects are developed. However, since the resources that utilized those fishing areas will also be displaced, no cumulative impact is expected on the populations.

h. Determination of the Secondary Impacts on the Aquatic Ecosystem – Secondary impacts to the aquatic ecosystem will be largely beneficial. Wetlands creation in the area will have secondary positive impacts by providing foodweb support to the immediate adjacent area of the Bay. This is anticipated to have positive impacts throughout the food chain by providing a food source to zooplankton, benthics, finfish, blue crabs, and avian species. Increased productivity in and around the lateral expansion to recreational and commercial landings. The protection of Jefferson Island will reduce erosion and improve overall water clarity, which will increase the potential for SAV reestablishment within Poplar Harbor.

The only secondary negative impacts identified would be associated with displacing harvesting pressure to adjacent areas. Because most of the associated resources (crabs, finfish, etc.) will also be displaced, these secondary impacts are not expected to be significant on a population level.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made for this evaluation.

b. Evaluation of Alternatives:

The lateral and vertical expansion of the existing PIERP to form wetland and upland habitats has been selected as a result of the alternatives analysis undertaken in accordance with the Guideline given in 40 CFR 230.10(a). The expansion of the PIERP is a specific recommendation of the *Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement* (USACE, 2005a). The plan formulation and alternatives analysis for the lateral and vertical expansion of the PIERP are included in the *General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) for Poplar Island Restoration Project (PIERP), Chesapeake Bay, Talbot County, Maryland* (USACE, 2005b).

The island habitats to be created by the expansion of PIERP are water-dependent. Large island habitat restoration projects require locations in the aquatic realm because they are dependent on their isolation in open Bay waters. The location of the alignment for the lateral expansion of the PIERP was carefully selected, and the project was configured to

minimize detrimental environmental impacts and maximize benefits to the aquatic ecosystem.

The plan formulation process for the expansion study included analysis of numerous lateral alignments, wetland/upland proportions, and combinations of lateral expansion and vertical dike raising scenarios. Three initial options for expansion were considered: 1) vertical expansion only, 2) lateral expansion only, and 3) lateral expansion plus vertical expansion. Vertical expansion alone was determined not to be a viable option, however, vertical expansion was considered in combination with a lateral expansion to provide sufficient dredged material placement quantity to support proper wetland cell development.

For the lateral expansion, six alignments were initially developed and studied as part of a reconnaissance-level assessment (GBA, 2003), and a seventh alignment was added during the early stages of the USACE-Baltimore's plan formulation process. An initial screening process that considered cost, site capacity and life, engineering suitability, environmental resources, and agency and public concerns, indicated that a northern lateral alignment provided the optimal geographical location. A conceptual northern alignment consisting of approximately 575 acres was evaluated within a Study Area located to the north of the existing PIERP. Then, a total of six combinations of vertical and/or lateral expansion for the 575-acre northern lateral alignment were evaluated using dredged material placement analysis, environmental benefits determination, and cost effectiveness/incremental cost analysis.

Following the completion of the plan formulation process, a proposal from NMFS and subsequent discussions with USEPA, USFWS, MDNR, and MDE led to the development and evaluation of an open-water embayment that was incorporated into an alternative for the northern lateral alignment (USACE, 2005b). Therefore, based on the results of the analyses and agency coordination, three alternatives, in addition to the no-action alternative were carried forward in the impacts analysis:

i. **Alternative 1** (Figure 4)
   - 60 percent wetlands, 40 percent uplands, plus 5-ft vertical expansion
   - Approximately 29 mcy of placement capacity

ii. **Alternative 2** (Figure 5)
   - 50 percent wetlands, 50 percent uplands, plus 5-ft vertical expansion
   - Approximately 30 mcy of placement capacity

iii. **Alternative 3 - Environmentally Preferred Alternative** (Figure 2)
   - 29 percent wetland habitat, 47 percent upland habitat, and 24 percent open-water embayment habitat, plus 5-ft vertical expansion
   - Approximately 28 mcy of placement capacity

iv. <u>No-Action Alternative</u> (existing project at its authorized configuration)
- 1,140 acres at 50 percent wetlands, 50 percent uplands
- Approximately 40 mcy of placement capacity

Alternative 3 is the recommended plan for the lateral and vertical expansion of the Poplar Island Environmental Restoration Project. Alternative 3 has been identified as the least-cost alternative, and the alternative with the fewest environmental impacts that can accommodate the volume of dredged material needed to maintain the navigability of the approach channels to the Port of Baltimore. Thus the proposed construction, dredging, and placement of dredged material satisfies the requirements test of 40 CFR 230.10(a).

c. The proposed construction and fill with dredged material is not contrary to other State and Federal laws for the protection of water quality, aquatic species, or habitat; as follows:

i. The proposed construction, dredging, and placement of dredged material will be in compliance with State water quality standards.

ii. The proposed construction, dredging, and placement of dredged material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act. No contaminants will be discharged in toxic concentration in violation of Section 307 of the Clean Water Act.

iii. The proposed project will not negatively affect any endangered species.

iv. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

v. The proposed construction, dredging, and placement of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected.

vi. The proposed construction, dredging, and placement of dredged material will not result in significant adverse effects to aquatic diversity, productivity, or stability.

vii. The proposed construction, dredging, and placement of dredged material will not result in significant adverse effects to recreational, aesthetic, or economic values.

Thus the proposed construction, dredging, and placement of dredged material satisfies the requirements test of 40 CFR 230.10(b).

d. The proposed construction, dredging, and placement of dredged material during the expansion of PIERP do not contribute to the degradation of waters of the United States and as such, the proposed project and proposed use of the placement sites does comply with the requirements of 40 CFR 230.10(c).

e. Appropriate steps to minimize potential impacts of the placement of the material to aquatic systems, as discussed in the relevant sections above, will be followed. Thus the

proposed construction, dredging, and placement of dredged material satisfies the requirements test of 40 CFR 230.10(d).

On the basis of the Guidelines, the proposed placement site for the discharge of dredged material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

REFERENCES

EA Engineering, Science, and Technology. 2005a. *Poplar Island Expansion Study – Final Supplemental Studies to Evaluate Existing Conditions of Aquatic Resources, Spring 2004 through Fall 2004. Chesapeake Bay, Maryland.* Prepared for USACE-Baltimore District. May.

EA Engineering, Science and Technology (EA). 2004a. *Poplar Island Environmental Restoration Project Exterior Monitoring. Post-Placement (2002) Water Quality Evaluation.* Prepared for Maryland Environmental Service. March.

EA Engineering, Science and Technology (EA). 2004b. *Poplar Island Environmental Restoration Project, Exterior Monitoring: Post-Placement (2002), Benthic and Epibenthic Community Report.* Prepared for Maryland Environmental Service. March.

EA Engineering, Science and Technology (EA). 2004c. *Poplar Island Environmental Restoration Project Exterior Monitoring. Post-Placement (2002) Tissue Analysis.* Prepared for Maryland Environmental Service. March.

EA Engineering, Science and Technology (EA). 2004d. *Poplar Island Environmental Restoration Project Exterior Monitoring. Post-Placement (2003) Sediment Quality Characterization.* Prepared for Maryland Environmental Service. December.

EA Engineering, Science, and Technology (EA). 2003. *FY02 Evaluation of Dredged Material: Upper Chesapeake Bay Approach Channels to the Port of Baltimore and Baltimore Harbor Channels.* Prepared for USACE-Baltimore. May. Draft.

EA Engineering, Science and Technology (EA). 2002a. *Poplar Island Environmental Restoration Project, Phase I Exterior Monitoring: Pre-Placement Benthic Community Report*. Prepared for USACE-Baltimore. October.

EA Engineering, Science, and Technology. 2002b. *Poplar Island Environmental Restoration Project: Phase I Exterior Monitoring Pre-Placement Benthic Tissue Analysis*. Prepared for USACE-Baltimore. October.

EA Engineering, Science and Technology (EA). 2002c. *Poplar Island Environmental Restoration Project. Phase I Exterior Monitoring Pre-Placement Sediment Quality Analysis*. Prepared for USACE-Baltimore. October.

EA Engineering, Science, and Technology (EA). 2002d. *Poplar Island Environmental Restoration Project: Phase I Exterior Monitoring Pre-Placement Exterior Water Quality Analysis*. Prepared for USACE-Baltimore. October.

EA Engineering, Science, and Technology (EA). 2000a. *FY1998 Sediment Sampling and Chemical Analysis for Baltimore Harbor and Chesapeake Bay, Maryland*. Prepared for USACE-Baltimore. Final. April.

EA Engineering, Science, and Technology (EA). 2000b. *Evaluation of Dredged Material: Upper Chesapeake Bay Approach Channels to the Port of Baltimore*. Prepared for USACE-Baltimore. December. Draft.

Gahagan and Bryant Associates, Inc (GBA). 2003. *Poplar Island Habitat Restoration Project: Poplar Island Modification Reconnaissance Study*. January.

Maryland Environmental Service (MES). 2005. Poplar Island Environmental Restoration Project. *2003 Discharge and Exterior Monitoring Annual Draft Report*. Prepared for Maryland Port Administration. January.

Maryland Environmental Service (MES). 2004. *Poplar Island Environmental Restoration Project. 2002 Discharge and Exterior Monitoring Annual Draft Report*. Prepared for Maryland Port Administration. April.

Maryland Environmental Service (MES). 2003. *Poplar Island Environmental Restoration Project, Exterior and Operations Monitoring Plan 2003/2004*. September.

Maryland Environmental Service (MES). 2002. *Poplar Island Environmental Restoration Project. 2000/2001 Discharge and Exterior Monitoring Annual Draft Report*. Prepared for Maryland Port Administration. January.

Moffatt & Nichol Engineers (M&N). 2004. *Poplar Island Environmental Restoration Project, Morphological Modeling*. Prepared for Maryland Port Administration. December.

Moffatt & Nichol Engineers (M&N). 2003. *Poplar Island Modifications, Hydrodynamics, and Sedimentation Modeling. Final Report January 22, 2003*. Report submitted to Maryland Port Administration and Maryland Environmental Services.

Reine, K. and Clarke, D. 1998. *Entrainment by Hydraulic Dredges – A Review of Potential Impacts*. Technical Note DOER-E1. U.S. Army Corps of Engineer Research and Development Center. Vicksburg, MS.

U.S. Army Corps of Engineers (USACE). 2005a. *Baltimore Harbor and Channels Dredged Material Management Plan and Tiered Environmental Impact Statement.* Prepared by Weston Solutions, Inc. July.

U.S. Army Corps of Engineers (USACE). 2005b. *General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) for Poplar Island Restoration Project (PIERP), Chesapeake Bay, Maryland*. Prepared by EA Engineering, Science, and Technology, Inc. September.

U.S. Army Corps of Engineers, Engineer Research and Development Center (USACE-ERDC), Coastal and Hydraulics Laboratory (CHL). 2005a. *Life Cycle Analysis of Mid Bay and Poplar Island Projects, Chesapeake Bay, Maryland. Prepared for U.S. Army Engineer District, Baltimore (NAB).* July.

U.S. Army Corps of Engineers, Engineer Research and Development Center (USACE-ERDC), Coastal and Hydraulics Laboratory (CHL). 2005b. *Poplar Island Expansion Flushing Study*. Memorandum for the Record. Prepared for U.S. Army Engineer District, Baltimore (NAB). 26 August 2005.

U.S. Environmental Protection Agency (USEPA) / U.S. Army Corps of Engineers (USACE). 1998. *Evaluation of Dredged Material for Discharge in Waters of the U.S.–Testing Manual (Inland Testing Manual–ITM).* EPA-823-B-98-004.

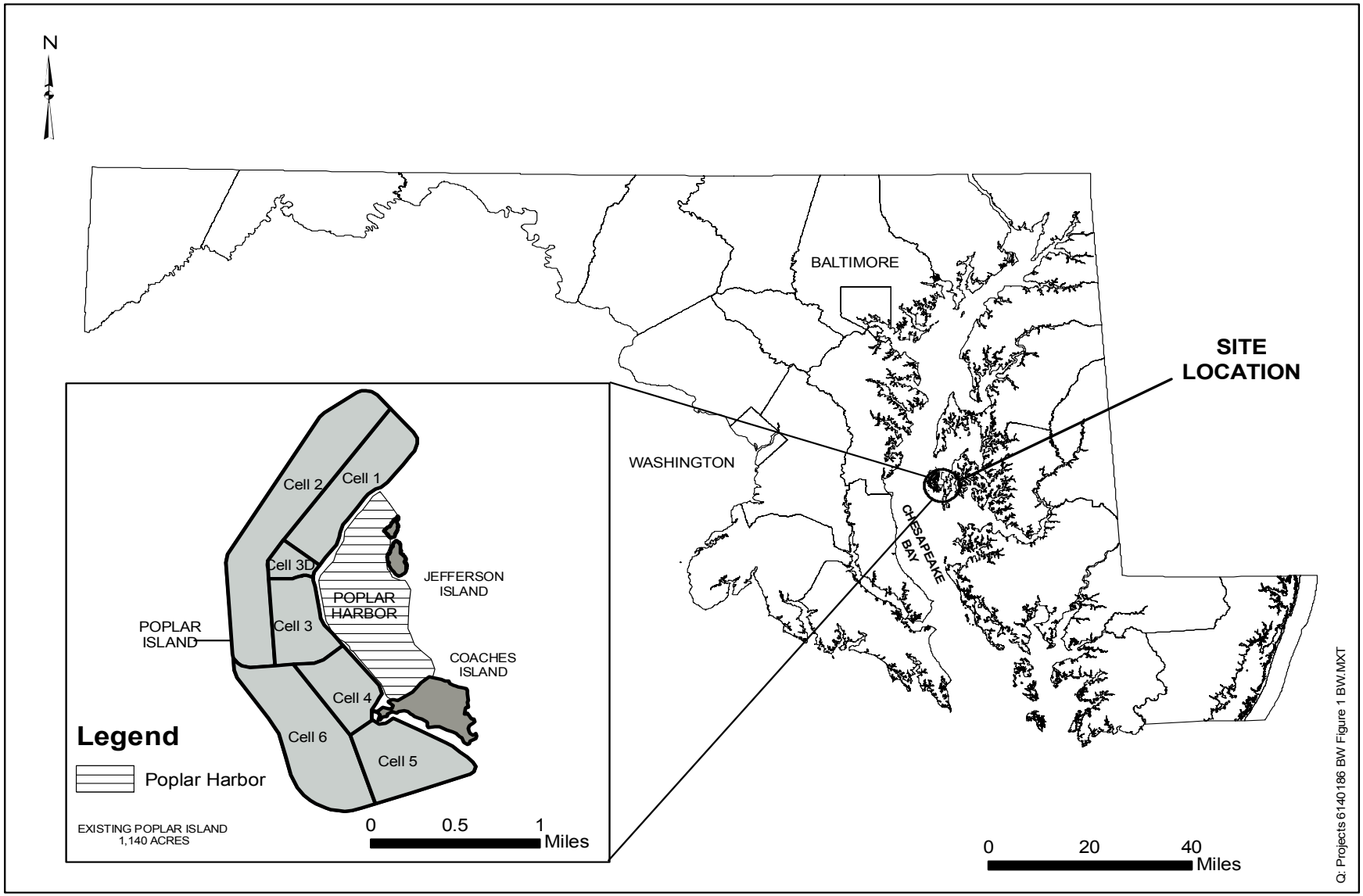

Figure 1. Poplar Island Environmental Restoration Project (PIERP) Site Location Map

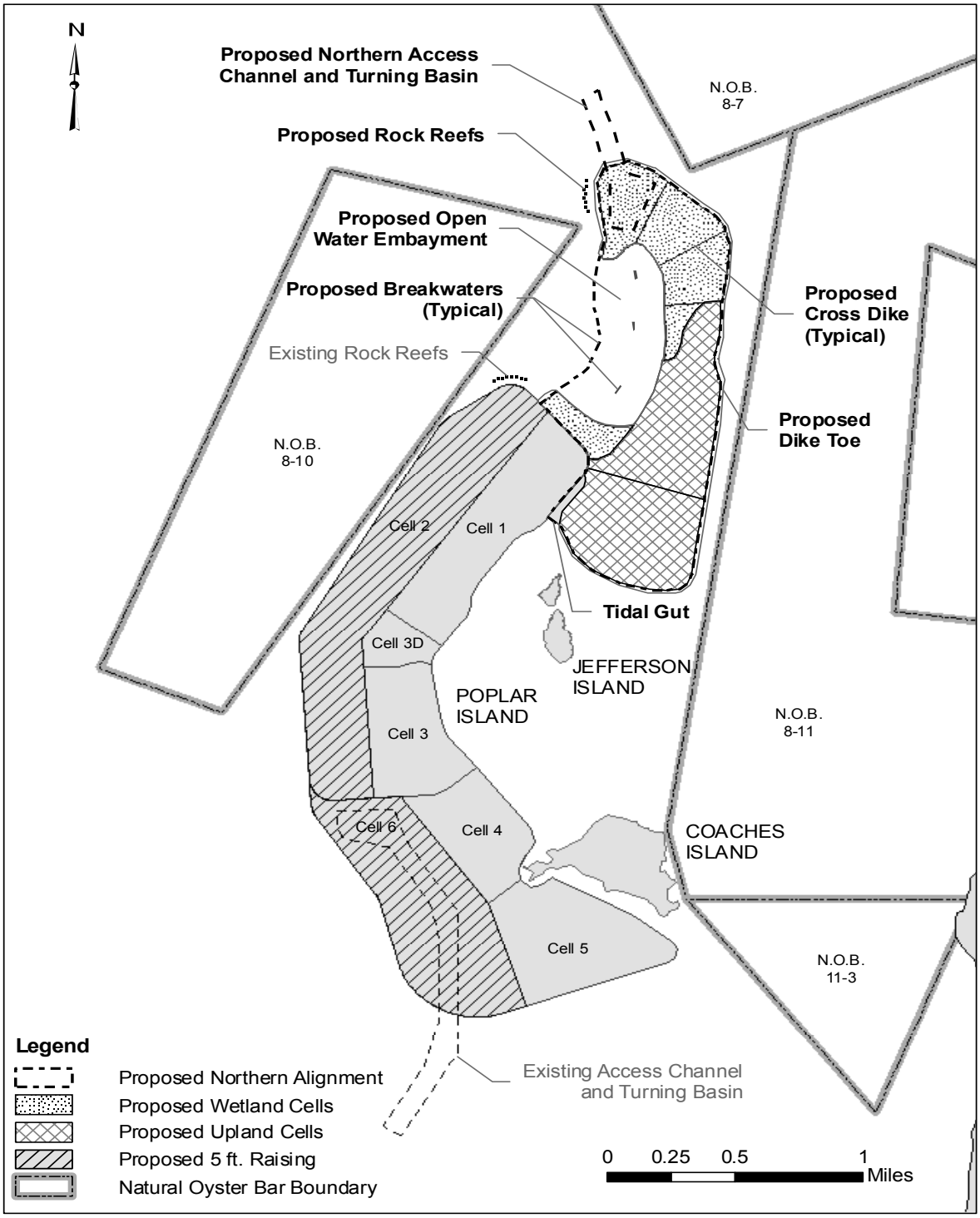

Figure 2. Recommended Plan for the Poplar Island Environmental Restoration Project Expansion (29% Wetland, 47% Upland, and 24% Open-Water Embayment and 5-ft Raising of PIERP Upland Cells).

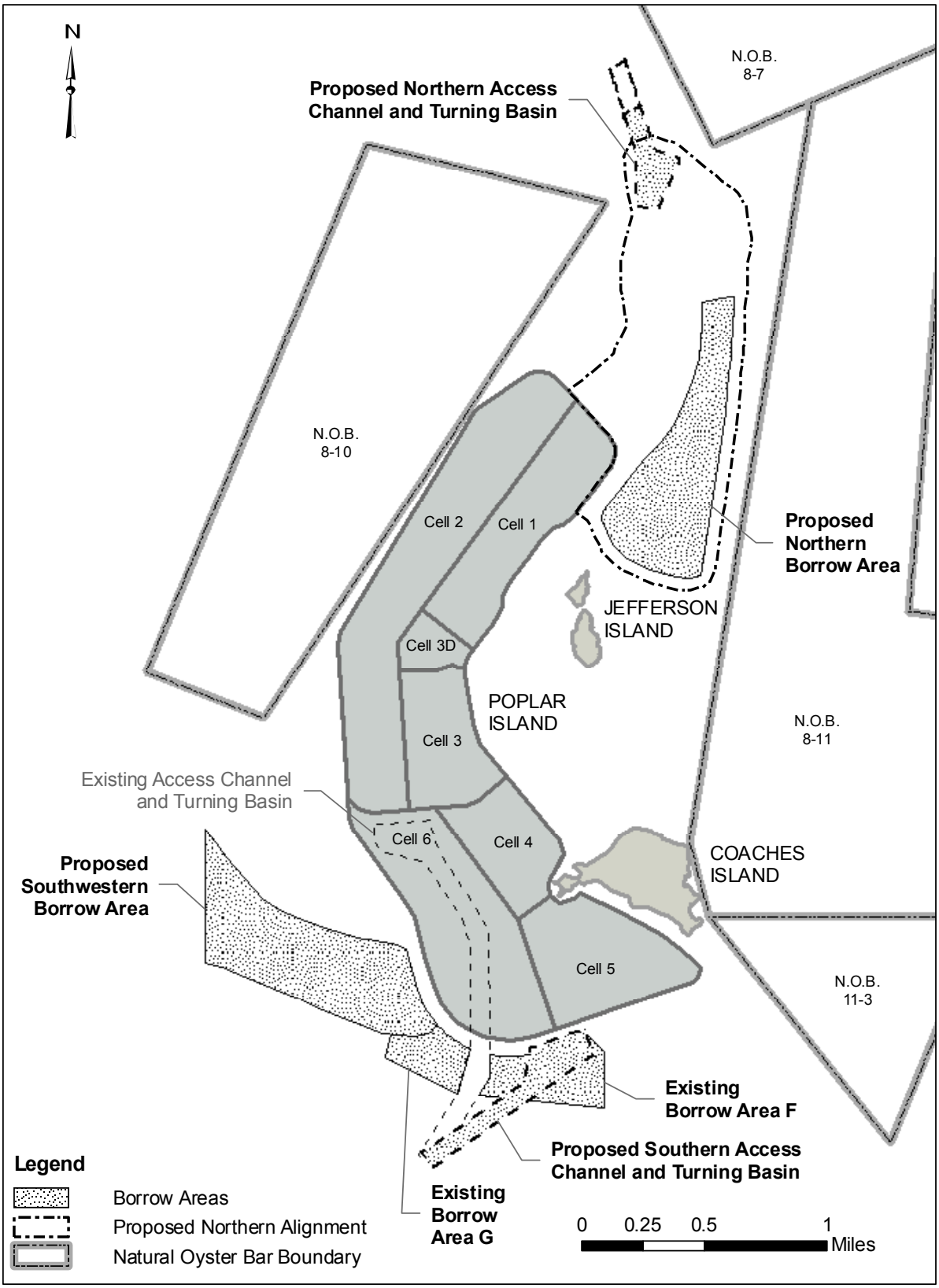

Figure 3. Potential Sand Borrow Areas

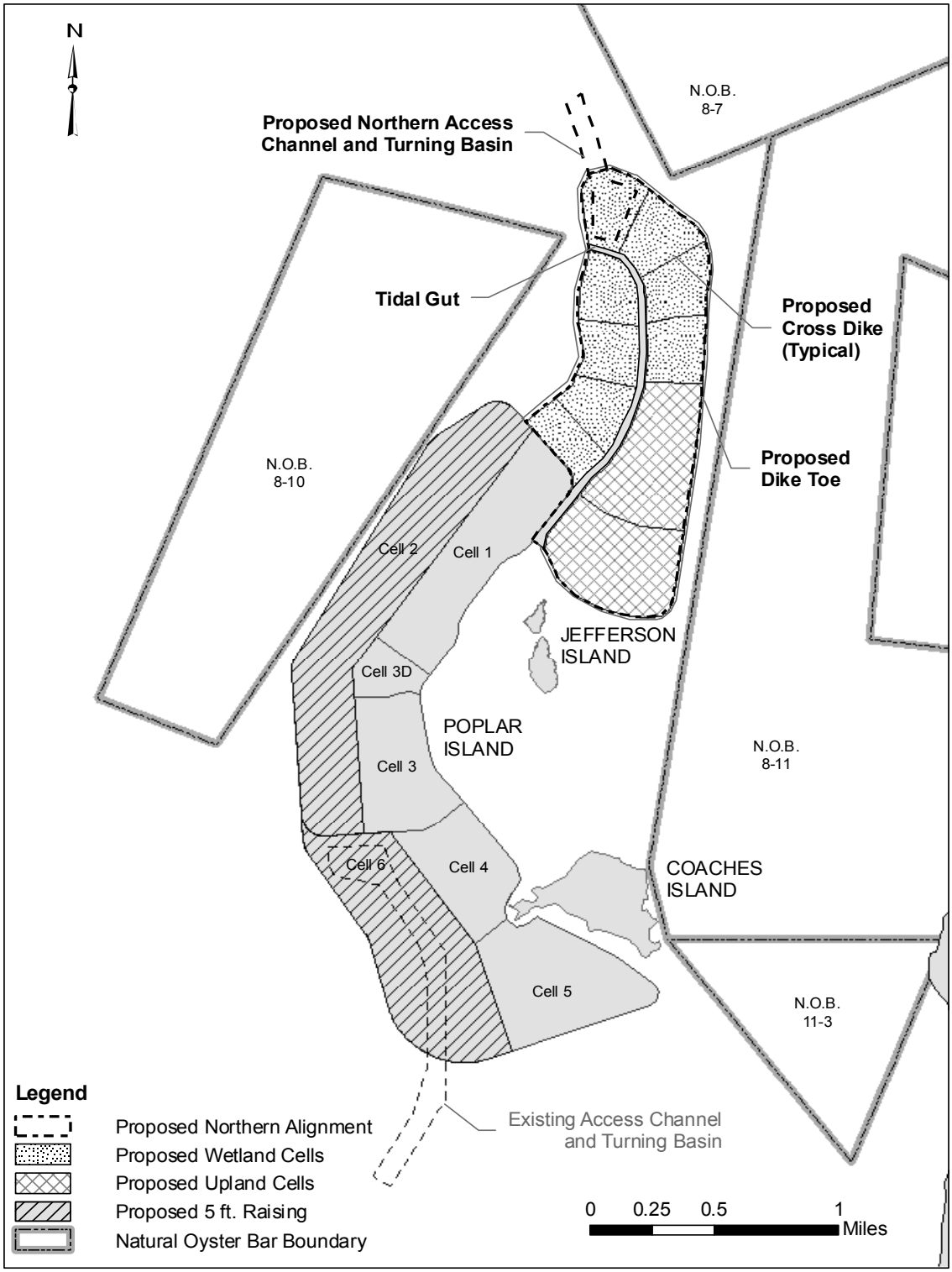

Figure 4. Alternative 1 (60% Wetland to 40% Upland Ratio and 5 ft. Raising of PIERP Upland Cells).

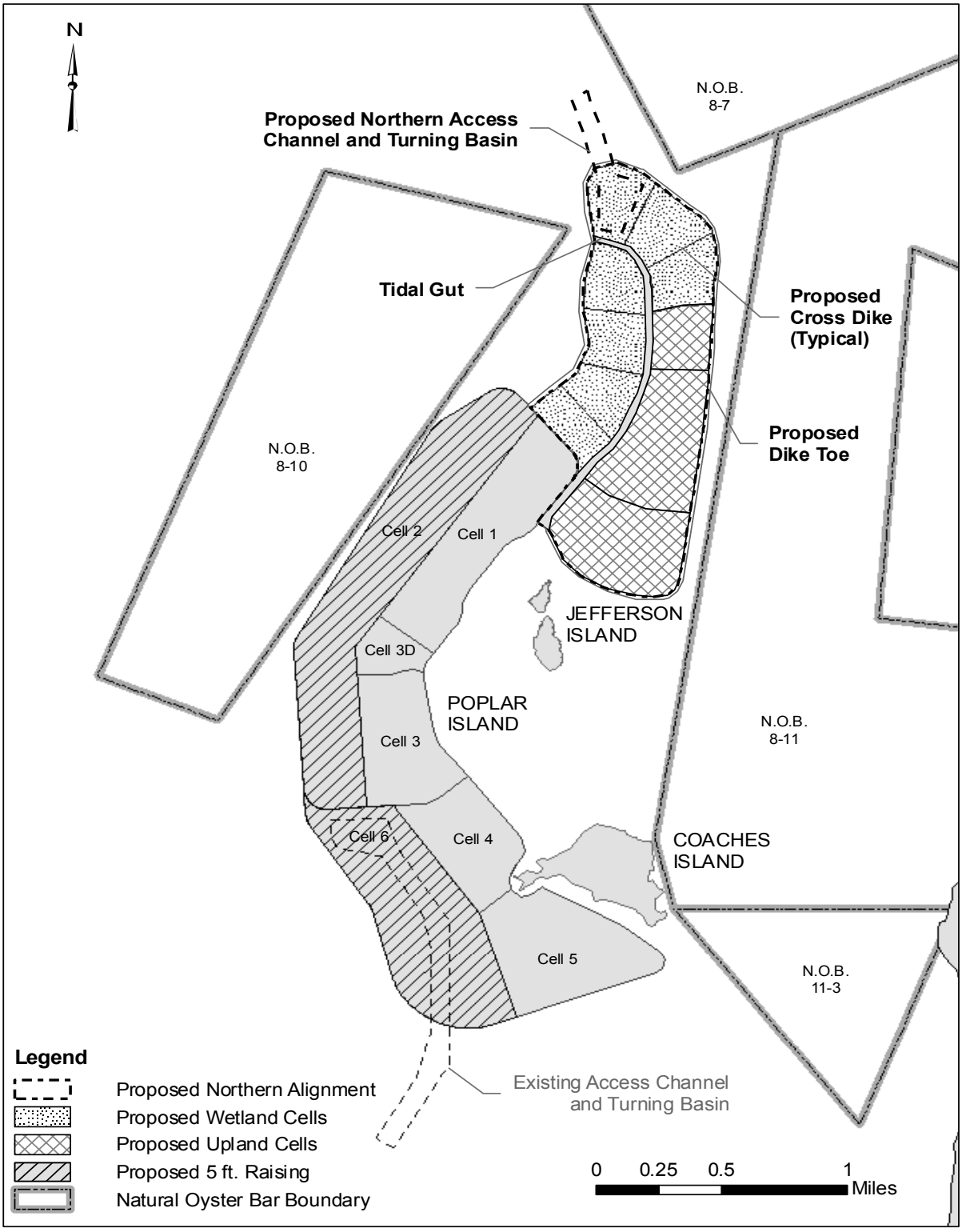

Figure 5. Alternative 2 (50% Wetland to 50% Upland Ratio and 5 ft. Raising of PIERP Upland Cells).