US Army Corps of Engineers

Hurricane and Storm Damage Reduction Project
Montauk Point, New York

Hurricane Sandy Limited Reevaluation Report
FINAL Environmental Assessment

FINAL – December 2016 (updated *March 2017*)

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Montauk Point, New York
Final Hurricane Sandy Limited Reevaluation Report (HSLRR)
Finding of No Significant Impact (FONSI)

The Montauk Point Lighthouse is located in the Township of East Hampton, Suffolk County, New York, approximately 125 mile east of New York City. The lighthouse was commissioned by President Washington and completed in 1796 and is included in the National Register of Historic Places and is a National Landmark. Since its construction, the Lighthouse has served as an important navigation aid for the first land encountered by ships heading for New York Harbor and Long Island Sound, as well as other eastern seaboard ports. Erosion of a coastal bluff at Montauk Point has been recognized as a problem for many decades.

The Montauk Point, New York Hurricane and Storm Damage Reduction Feasibility Report (FS) and Environmental Impact Statement (EIS) were prepared by the United States Army Corps of Engineers (USACE) New York District (NAN) (dated October 2005). The selected plan consisted of 840-feet of revetment protection (73-year storm design) to protect a historic lighthouse complex from damage due to bluff failure caused by erosion and storm events. The project also provided protection for the various cultural resources associated with the lighthouse complex and stability to the natural environment which would support the continued use of the area as a recreational destination. The project was authorized for construction in the Water Resources Development Act of 2007. However, the project was not constructed due to funding constraints. As a result of Hurricane Sandy (28-30 October, 2012), Congress passed Public Law (PL 113-2) that provided funding to implement measures to reduce coastal storm damage risk The Montauk Point revetment project was identified as a candidate for construction funding since the project was authorized but unconstructed.

The first step was to review any changes in site condition since the 2005 report. NAN completed a post-Hurricane Sandy assessment of the existing Montauk Point revetment in August 2013 and found that, despite continuous maintenance activity, the existing revetment is continuing to degrade and is inadequate to protect the bluff. Some of the deficiencies noted included partial collapse of the revetment due to overtopping, movement downslope of material, gradual loss of interlocking (separation) of armor stones, water seepage along the south shore and splitting of poor quality armor stone. Degradation of the revetment will continue and possibly accelerate in the future without the proposed project. These findings reinforced the urgent need for the construction of the proposed Montauk Point revetment to protect the historic lighthouse complex and other natural, cultural and recreational resources.

In order to expeditiously move forward to project construction, the USACE prepared the Hurricane Sandy Limited Reevaluation Report (HSLRR) and Environmental Assessment (EA). These reports update the revetment project information in the 2005 FS and EIS to current conditions. Work was performed by both the NAN and the USACE New England District (NED). The proposed project detailed in the HSLRR is consistent with the 2007 project authorization.

The selected plan, as described in the 2005 Montauk Point Storm Damage Reduction FS and EIS, consisted of 840-feet of revetment protection (73-year storm design) to protect the most vulnerable bluff area that would directly endanger the lighthouse complex due to bluff failure. The stone revetment currently proposed for construction in the HSLRR is the same length as the

authorized project (approximately 840 feet); however, there are some refinements to the revetment design cross-section to ensure the stability, constructability and cost effectiveness of the structure. Foremost, the adjusted design includes a revetment toe that is not buried, and also the incorporation of a bottom bench at 10 ft. NAVD88. The bottom bench will support equipment for construction and future maintenance and will also function to dissipate wave energy during storm events. These modifications to the revetment design slightly increased the size of the footprint of the revetment by approximately 0.08 acres in the intertidal area, but decreased the excavation that would have been required for the buried toe.

I find that based on the evaluation of environmental effects discussed in this document, the proposed action is not a major federal action significantly affecting the quality of the human environment. Under the Council on Environmental Quality ("CEQ") NEPA regulations, "NEPA significance" is a concept dependent upon context and intensity (40 C.F.R. § 1508.27.) When considering a site-specific action like the proposed project, significance is measured by the impacts felt at a local scale, as opposed to a regional or nationwide context. The CEQ regulations identify a number of factors to measure the intensity of impact. These factors are discussed below, and none are implicated here to warrant a finding of NEPA significance. A review of these NEPA "intensity" factors reveals that the proposed action will not result in a significant impact, neither beneficial nor detrimental, to the human environment.

Impacts on public health or safety: The project is expected to have no effect on public health and safety.

Unique characteristics: The unique characteristics of this property are multifaceted involving historic and cultural resources, unique habitat and highly valued recreational resources. No significant impacts will occur to unique characteristics of the project area as a result of the proposed project.

Controversy: The project was coordinated with federal, state, local agencies, and stakeholders with jurisdiction or interest in the project. All comments were addressed.

Impacts on cultural, environmental and recreational resources: The selected plan will protect a historic lighthouse complex from damage due to bluff failure caused by erosion and storm events. The project also provided protection for the various cultural resources associated with the lighthouse complex and stability to the natural environment which would support the continued use of the area as a recreational destination. The revetment footprint increased slightly, by 0.08 acres; however, this increase in impact to intertidal habitat was not considered to be significant.

The construction of the current revetment plan may require the removal or movement of the fire control bunker that has been sitting on the beach. It was once a part of the lighthouse complex but eroded out of its original location in 1951. If construction activities require the bunker to be moved or removed from its current location, the bunker may be offered to the Montauk Historical Society for its use within the lighthouse complex placement elsewhere on the beach.

Precedent for future actions: The proposed project will protect the most critical area of bluff erosion which will reduce maintenance of the existing structure.

Cumulative impact: Montauk Point has a long history of erosion control activities constructed by both governmental and non-governmental agencies starting in 1946, to the most recent efforts in 1992 due to on-going coastal erosion. To ensure the stability of this project over the 50-year life of the project, the footprint of the proposed revetment extends slightly further seaward than previous stabilization measures. This cumulative impact is localized and is not considered to be significant.

Historic resources: The project will have a beneficial impact on historic and cultural resources by protecting the Montauk Lighthouse which is included in the National Register of Historic Places and is designated as a National Historic Landmark.

Endangered species: The project will have no known positive or negative impacts on any state or federal threatened or endangered species.

Potential violation of state or federal law: This action will not violate federal law. The local sponsor will be responsible for obtaining necessary state and local permits.

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the Montauk Point, New York, Hurricane Storm Damage Reduction Project, in East Hampton, New York, is not a major federal action significantly affecting the quality of the human environment. Therefore, I have determined that this project is exempt from the requirement to prepare an Environmental Impact Statement.

5 APRIL 2017

Date

David A. Caldwell
Colonel, Corps of Engineers
District Engineer

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1.0 PURPOSE AND NEED OF ACTION

1.1 INTRODUCTION

The United States Army Corps of Engineers (USACE), New England District (NAE) is working in collaboration with the USACE, New York District (NAN) to prepare the Montauk Point Hurricane Sandy Limited Reevaluation Report (HSLRR) and Environmental Assessment (EA). The project area is located at Montauk Point, approximately 125 miles east of New York City, in the Township of East Hampton, Suffolk County, New York. Montauk Point is located on the extreme eastern tip of Long Island and separates the Atlantic Ocean to the south and Block Island Sound to the north (Figure 1 – General Location Map).

The Montauk Point Light Station was authorized for construction by President George Washington and construction was completed in November 1796. Since its construction, the lighthouse has served as an important navigation aid for the first land encountered by ships headed for New York Harbor and Long Island Sound, as well as other ports on the eastern seaboard. The Lighthouse is of national significance and is on the National Register of Historic Places and is designated as a National Historic Landmark.

When the lighthouse was completed it was located 300-feet from the edge of the coastal bluff. Continued erosion at Montauk Point has been recognized as a problem for many decades and various efforts have been made to stabilize the shoreline to protect the historic lighthouse and other buildings within the complex with limited success. Presently the lighthouse is less than about 120 feet from the edge of the bluff, and other major structures are now precariously situated less than 50 feet of the bluff edge.

Despite numerous previous protection projects implemented at Montauk Point (discussed further in Section 1.4 PROJECT AREA DESCRIPTION), the existing shoreline and bluff in the project area continued to erode. To evaluate storm damage protection measures to reduce the rate of erosion at Montauk Point, NAN prepared the Montauk Point Storm Damage Reduction Feasibility Study (FS) and Environmental Impact Statement (EIS) (dated October 2005). The selected plan consisted of 840-feet of revetment protection (73-year storm design) to protect the most vulnerable bluff area that would directly endanger the lighthouse complex due to bluff failure. The project also provided protection for the various cultural resources associated with the Lighthouse complex and stability to the natural environment which supports the continued use of the area as a recreational destination into the future. However, due to funding constraints, the project was not constructed.

NAN completed a post-Hurricane Sandy assessment in August of 2013 of the existing revetment at Montauk Point and found that, in spite of continuous maintenance activity, the existing structure is showing signs of degradation. Some of the deficiencies noted included partial collapse of the revetment due to overtopping, movement downslope of splash blanket

Figure 1 – General Location Map

material, gradual loss of interlocking (separation) of armor stones, water seepage along the south shore and splitting of poor quality armor stone. Degradation of the revetment will continue and possibly accelerate in the future unless the revetment protection is upgraded.

These findings reinforced the urgent need for the proposed revetment project at Montauk Point to protect the historic lighthouse complex and other natural, cultural and recreational resources from coastal storm damage. The USACE NAN and NAE, worked collaboratively to prepare the Hurricane Sandy Limited Reevaluation Report (HSLRR) and Environmental Assessment (EA) which updates the information in the 2005 Montauk Point FS and EIS. A review of the existing conditions and the constructability and stability of the revetment project proposed in 2005, in light of post-Hurricane Sandy conditions, has resulted in some design refinements. The HSLRR recommended project, while still an 840-foot long stone revetment, has a somewhat different profile. A description of the revised project and potential environmental impacts are described in this Environmental Assessment.

1.2 AUTHORIZATION

The 2005 Montauk Point Storm Damage Reduction FS and EIS were prepared under the authority of a resolution adopted by the Committee on Environment and Public Works of the U.S. Senate on May 15, 1991. A second resolution, also dated May 15, 1991 authorized the

study of interim emergency protection works until a comprehensive project was formulated, designed and constructed. The Final Report of the Chief of Engineers on the Montauk Point, New York, Hurricane & Storm Damage Reduction Project was provided to Congress on March 31, 2006 and the project was authorized in the Water Resources Development Act (WRDA) of 2007. USACE is the lead federal agency for the project, and the New York State Office of Park Recreation & Historic Preservation (State Parks) is the non-Federal Sponsor for the project.

In response to the 2012 Sandy event, PL 113-2, The Disaster Relief Appropriations Act of 2013, which was enacted by Congress "to improve and streamline disaster assistance for Hurricane Sandy, and for other purposes", will provide funds to complete the authorized but unconstructed project. The authorized project and existing site conditions have been reviewed under this HSLRR and EA to confirm that the proposed project is still the most suitable design to ensure that the lighthouse resource is adequately protected. The HSLRR and EA demonstrated that the proposed revetment project remains economically justified, technically feasible, and environmentally acceptable.

1.3 DESCRIPTION OF THE PROBLEM

Erosion of the coastal bluff at Montauk Point has been recognized as a problem for many decades. The historical long-term average rate of erosion of the shoreline, as cited by the 2005 Montauk Point Storm Damage Reduction FS, was estimate at 2 feet per year and the historical long-term average rate of erosion of the bluff face was estimated at 1 foot per year. Due to this continued erosion, Montauk Point has a long history of erosion control activities constructed by both governmental and non-governmental agencies starting in 1946, to the most recent efforts in 1992 (discussed further in Section 1.4 PROJECT AREA DESCRIPTION). At the present time, the Lighthouse's location is 120 feet from the bluff face and two other structures are also imminently threatened by erosion; a World War II era Fire Control Tower and concrete walkway for visitor access are less that about 50 feet from the edge of the bluff.

Further progression of erosion is expected as repeated storm damage and storms cause failure of the present revetment. As damage would continue, the revetment would no longer hold the base of the bluff and bluff erosion would accelerate. This accelerated erosion would lead to the continued loss of the plateau and the irrecoverable loss of the Lighthouse, its adjacent structures, and other historically important resources (e.g., archaeological features and artifacts).

1.4 PROJECT AREA DESCRIPTION

The project area includes the entire historic Montauk Point Lighthouse Complex situated on a high bluff, approximately 70-feet above Mean Sea Level (MSL) (-0.33 North American Vertical Datum [NAVD88]), which is underlain with glacial till. The lighthouse is the focal point of the historic complex and surrounding facilities, and acts as a junction marker for ships headed for New York Harbor or Long Island Sound. The lighthouse property includes a museum that serves to educate visitors about the history of lighthouses (with historic artifacts) as navigational aids for over 200 years of our nation's history.

The lighthouse complex is owned and operated by the Montauk Historical Society (nonprofit 501(c)(3)(referred to as the "Turtle Hill Plateau"). The lighthouse property, approximately 4 acres in size, includes a museum that serves to educate visitors about the history of lighthouses (with historic artifacts) and details over 200 years of history. The lighthouse complex is located adjacent to the Montauk Point State Park (New York). The ownership of the lighthouse property was transferred from the U.S. Coast Guard to the Montauk Historical Society (in accordance with HR 3675, Department of Transportation and Related Agencies Appropriations Act, 1997, Sec. 341, Conveyance of Light Station, Montauk, New York). The New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) own portions of the project area in which the existing stone revetment is located. A parcel to the southwest of the lighthouse (an area referred to a "Turtle Cove"), including the southern staging area, is owned by the Town of East Hampton. The areas to the south and north of the lighthouse property, including the northern staging area, are owned by the Long Island Park Commission and the area to the west is owned by the State of New York.

Figure 2 - Montauk Lighthouse, associated grounds, and revetment circa 1995

The cooperative effort of the U.S .Army Corps of Engineers, U.S. Coast Guard, New York State Department of Environmental Conservation, Long Island Office of Parks, Recreation and Historic Preservation and the Montauk Historical Society have improved the erosion control protection at Montauk Point. (c. 1995 Peter Paul Muller Jr.)

Due to the continuing erosion at the site, erosion control structures have been required to protect the bluff faces from the forces of oncoming waves. The bluff and beach along this entire area have been considered to be critical elements of the stability of the lighthouse. Since construction of the Lighthouse, numerous projects have been implemented to control the erosion problems at Montauk Point (see Table 1 – History of Erosion Control Activities at Montauk Point).

1.5 PLANNING OBJECTIVE

The planning objective of the Hurricane Sandy Limited Reevaluation Report was to review and refine as appropriate the 2005 Montauk Point Storm Damage Reduction proposed revetment project in consideration of existing conditions and the constructability and stability of the proposed revetment in a post-Hurricane Sandy environment. The reevaluation process included an appropriate level of detailed analysis to verify the feasibility and benefits of the project. Further, this project has been prepared in compliance with the National Environmental Policy Act of 1969 (NEPA) and other applicable laws and regulations.

Table 1 – History of Erosion Control Activities at Montauk Point

Year	Project
1796	Lighthouse construction begins; Lighthouse was built more than 300 feet from the edge of the bluff, presumably due to an awareness that the bluff would erode.
1946	USACE builds 700-foot-long stone seawall along the toe of the bluff.
1960's	United States Department of Transportation placed concrete rubble over the edge of the bluff just south of the Lighthouse.
1971	Ms. Georgina Reid constructed the first terracing project along the bluff slope; construction was on the United States Coast Guard (USCG) property just north of the Lighthouse.
1972	The USCG placed a series of gabions above the 1946 seawall project along the toe of the bluff.
1970s and 1980s	Terracing projects continued in various locations around the Lighthouse. Repairs were made to existing terraces, due to slippage.
1987	Mr. Greg Donohue of the Montauk Historical Society initiated the planting of American beach grass *(Ammophila breviligulata)* on the terraces to help maintain slope stability. Beach grass plantings were also initiated in areas to the north and south of the Lighthouse in places which had not been previously terraced.
1990	The Montauk Historical Society and the NYSOPRHP constructed a 225-footlong revetment along Turtle Cove, south of the Lighthouse.
1992	The USCG and Montauk Historical Society constructed a revetment on their property. The USCG built approximately 300 linear feet of revetment using a range of 5- to 10-ton stone. The Montauk Historical Society constructed the approximately 150-foot-long structure to the south of the USCG property.

Source: USACE. Feasibility Report -Montauk Point Storm Damage Reduction Project. New York District, New York, New York. 2005

1.6 PUBLIC REVIEW AND COMMENT

The 2005 Montauk Point Storm Damage Reduction FS and EIS included an extensive alternative analysis and a comprehensive description of the affected environment and environmental consequences evaluation. The EIS was coordinated with federal, state and local agencies and the general public pursuant to applicable federal laws and regulations. For detailed information about the project, a copy of the EIS can be downloaded from the NAN public website at:
http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx

Please Note: The vertical datum used in the 2005 Montauk Point Storm Damage Reduction FS and EIS was National Geodetic Vertical Datum (NGVD29). The datum was changed to North American Vertical Datum (NAVD88) in the HSLRR and EA. To compare design documents, subtract 0.94 feet from NGVD29 for the equivalent elevation in NAVD88.

Design refinements to the 2005 recommended revetment project (authorized in 2007), as documented in the HSLRR and this EA, were coordinated with jurisdictional federal, state and local agencies (see Appendix A, Pertinent Correspondence Received). A 30-day Public Notice period for the Draft EA was completed on June 3, 2016. Public comments received on the Draft EA and responses are included in Appendix F.

2.0 ALTERNATIVE ANALYSIS

In the 2005 Montauk Point Storm Damage Reduction FS and EIS six different alternatives were evaluated to determine the most appropriate solution to provide protection to historic structures from the impacts of wave attack and storm recession on the Turtle Hill Plateau. Alternatives evaluated in 2005 included the no-action alternative, a non-structural alternative, the relocation of the Lighthouse; and four structural alternatives; a stone revetment, offshore segmented breakwater with beach nourishment, t-groins with beach nourishment, and beach nourishment. An abbreviated discussion of each alternative evaluated in the 2005 Montauk Storm Damage Reduction FS and EIS is provided below in Sections 2.1 to 2.3. (A copy of 2005 FS and EIS can be downloaded from the NAN public website as provided in Section 1.6 PUBLIC REVIEW AND COMMENT for more detailed information.) The Stone Revetment was recommended in the 2005 Montauk Storm Damage Reduction FS/EIS and authorized in the Water Resources Development Act of 2007. Section 2.4 discusses design refinements to the 2005 revetment.

2.1 NO-ACTION ALTERNATIVE

The no-action alternative consists of a continuation of the without-project condition. As a result of the no-action alternative, progressive erosion of the bluff and bluff toe area would continue and eventually result in the irrecoverable loss of the Turtle Hill Plateau, the Lighthouse and its associated structures, along with historic and cultural resources. Although efforts by the Montauk Historical Society to control the erosion are expected to continue, in the absence of a comprehensive shore protection project, their efforts would not solve the problem of significant damage to the Lighthouse associated with threats from large storm events over an extended period of time (e.g., 50 years). The loss of the Lighthouse would have a negative impact on the socioeconomic, cultural, aesthetic and visual, and recreational resources in the project area. The no-action alternative fails to provide protection to the Turtle Hill Plateau, the Lighthouse and its adjacent structures, and other historically important resources.

2.2 NON-STRUCTURAL ALTERNATIVE

2.2.1 Relocation of the Lighthouse – This alternative would relocate the Lighthouse and its associated structures, features, and archaeological while simultaneously allowing the natural forces of erosion to continue to reshape the Turtle Hill Plateau. The relocation alternative would first consist of investigating and documenting all structures and cultural resources both the present Lighthouse site and at the new location for the Lighthouse and other structures. This alternative would also involve the removal of any buried archaeological

artifacts, constructing a new land surface, and moving the Lighthouse and its associated structures to this new location. The estimated cost for this alternative in the 2005 report was $27,000,000.

Aside from the high cost of this alternative, relocating the Lighthouse would require the construction of a large track or bridge to ensure a stable move across a level surface and a new platform onto which the Lighthouse would stand. Since relocating the Lighthouse would require the significant alteration of surrounding lands, impacts to vegetation and terrestrial wildlife habitat would be higher than other proposed alternatives. Relocating the Lighthouse would also exclude one of its uses as a navigational aid at Montauk Point and require the construction of a tower with a replacement beacon. In addition, this alternative had unacceptable impacts to historic and cultural resources and therefore, was eliminated from further consideration.

2.3 STRUCTURAL ALTERNATIVES

2.3.1 Stone Revetment - This alternative consisted of 840 linear feet of stone revetment protection which would provide reinforcement to the existing revetment structure. The proposed revetment would extend in length 200 feet to the south and would be 7 feet higher than the existing revetment, and extend 20-feet seaward from the existing revetment (73-year storm design). A heavily embedded toe would be employed to stand against breaking waves at the base of the revetment structure. The stone revetment features a 40-foot-wide crest at +25 feet NGVD29 (approximately +24 NAVD88), a 1 Vertical (V) to 2 Horizontal (H) slope, and 12.6-ton quarry stone armor units extending from the crest of the revetment down to the embedded toe. This alternative provides comprehensive protection to the Turtle Hill Plateau, the Lighthouse and its adjacent structures, and other historically important resources. The estimated construction cost, including interest, for this alternative in the 2005 report was $13,690,000.

The Stone Revetment alternative would utilize some of the stone already on site as part of the existing revetment structure, thus making use of existing resources. The reinforced revetment was not expected to negatively impact present surfing conditions and access for fishing would be only temporarily restricted. The revetment plan would have the least impact on intertidal, subtidal waters, and benthic substrate, therefore impacts to fish and other aquatic wildlife would be the least of the alternatives considered. Because the bluff face and Lighthouse are offered protection without having a negative effect on surfing, fishing, and tourism, this alternative is expected to have a beneficial effect on cultural resources and socioeconomics of the project area. The Stone Revetment was determined to be the preferred alternative.

2.3.2 Offshore Segmented Breakwater with Beach Nourishment - This alternative consisted of approximately 1,100 feet of breakwater protection (three separate segments, two would be 300 feet in length and one would be 500 feet in length), constructed parallel to, and approximately 200 feet offshore of the existing shoreline. The purpose of the breakwater would be to reduce the storm wave height offshore of the existing revetment toe, thus reducing the wave impact force on the bluff. Following construction of the offshore segmented breakwater, approximately 200,000 cubic yards of beach fill would be placed from about the mean high water level (MHWL) out to the breakwaters to provide additional toe scour protection to the existing revetment. Shoreline recession would be reduced with the construction of the offshore

segmented breakwater. The estimated construction cost for the offshore segmented breakwater with beach nourishment alternative in the 2005 report was $14,481,000.

Offshore breakwaters would be difficult to construct due to difficult site access and in-water construction. The gaps between the segments of the offshore breakwater could induce significant currents that could compromise the foundation of the breakwaters in the future and cause a safety hazard to surfers, fishermen, and other park users. The surfing activity in the area may be affected negatively by changed wave characteristics as a result of the offshore segmented breakwater. The protective beach fill for the breakwater system would hinder fishermen access to deeper waters and impact beach, intertidal and subtidal habitats (and would require periodic beach renourishment to maintain effectiveness). In addition, the abrupt transition of the bluff face into the ocean is unique to the area and would be replaced with a transition from bluff face to sloping beachfront which negatively impacts the visual and aesthetic appeal of the area. Cultural resources that are located within the bluff could also be impacted by beach nourishment. In consideration of the environmental and socioeconomic impacts, the Offshore Segmented Breakwater with Beach Nourishment alternative was not selected as the preferred alternative.

2.3.3 T-Groins with Beach Nourishment - The T-Groin system would consist of five separate shore-parallel structures, each being 150 feet in length. A groin would be extended from the center of each shore-parallel breakwater segment back to shore, creating individual littoral cells. T-groins were considered to reduce the storm wave height, thus reducing the wave impact force on the bluff, similar to the Offshore Segmented Breakwater with Beach Nourishment alternative. Following construction of the T-Groin system, a total of approximately 125,000 cubic yards of beach fill would be placed from shore out to the centerline of the shore-parallel breakwaters to provide erosion protection to the bluff toe. The consistent beach and shoreline recession would be reduced with the construction of T-Groins and beach nourishment. The estimated construction cost for the T-Groins with beach nourishment alternative in the 2005 report was $12,094,000.

The impacts associated with the T-Groins with Beach Nourishment alternative were similar to the Offshore Segmented Breakwater with Beach Nourishment as discussed in Section 2.3.2. In consideration of the environmental and socioeconomic impacts, the T-Groins with Beach Nourishment alternative was not selected as the preferred alternative.

2.3.4 Beach Nourishment – This alternative involves the construction of a 150-foot-wide sand berm along the existing shoreline. The purpose of beach nourishment would be to provide additional shoreline run-up area for incoming waves and tidal surges without the expense of constructing more robust or permanent shore protection structures. The consistent beach and shoreline recession would be reduced with Beach Nourishment and the existing revetment and terracing of the upper bluff would continue to provide existing levels of protection.

This alternative was eliminated from further consideration due to the high long-shore transport rates which would be expected to remove the beach fill rapidly, and thus would require periodic beach renourishment. During the first two to three years after construction, beach surveys would be necessary to refine the design of the beach fill cross section and to estimate

renourishment requirements. The impacts associated with Beach Nourishment were similar to the Offshore Segmented Breakwater with Beach Nourishment and T-Groins with Beach Nourishment as discussed in Sections 2.3.2 and 2.3.3, respectively. In addition, the sand berm would not prevent impacts to the bluff face during tidal or storm surges and therefore, would not provide adequate storm damage protection to historic and cultural resources over the long-term. In consideration of the environmental and socioeconomic impacts, the Beach Nourishment alternative was not selected as the preferred alternative.

In summary, after review and comparison of the Alternatives in the 2005 FS and EIS, the stone revetment was recommended project. The 2005 Montauk Point Storm Damage Reduction FS and EIS was coordinated with federal, state and local agencies and the general public pursuant to applicable federal laws and regulations. The Final Report of the Chief of Engineers on the Montauk Point, New York, Hurricane & Storm Damage Reduction Project was provided to Congress on March 31, 2006 and the project was authorized in Water Resources Development Act of 2007.

2.4 AUTHORIZED PROJECT DESCRIPTION (DESIGN REFINEMENTS)

The 2007 Montauk Point Storm Damage Reduction authorized project consists of the construction of 840-feet of revetment protection (73-year storm design) as described in Section 2.3.1. The authorized revetment project provided protection for the most vulnerable bluff area that would directly endanger the lighthouse complex should it fail and provided protection for the various cultural resources associated with the lighthouse complex and stability to the natural environment which would support the continued use of the area as a recreational destination. Although the project was authorized it was never constructed due to funding constraints.

In August of 2013, NAN completed a post-Hurricane Sandy assessment of the existing revetment at Montauk Point and found that, in spite of continuous maintenance activity, the existing structure is showing signs of degradation. Some of the deficiencies noted included partial collapse of the revetment due to overtopping, movement downslope of material, gradual loss of interlocking (separation) of armor stones, water seepage along the south shore and splitting of poor quality armor stone. Degradation of the revetment will continue and possibly accelerate in the future without the proposed project. These findings reinforced the urgent need for the construction of the authorized Montauk Point revetment project to protect the historic lighthouse complex and other natural, cultural and recreational resources.

The authorized project was re-assessed under this HSLRR/EA study to review the proposed project design and design refinement options. The construction of a buried toe, as proposed in the 2005 FS, was reviewed and deemed cost prohibitive as it would have necessitated the excavation of over 32,000 cubic yards of sediment material and about 60 feet from the existing shoreline. This approach would have required sheet piling and dewatering in order to construct the buried toe (which required excavation to a depth of approximately 16.5 feet below grade). In the adjusted design, the toe is not buried (only slightly embedded) which reduces the construction impacts to subtidal habitat. In addition, a lower bench was incorporated into the design at 10 feet NAVD88 to enable equipment access to facilitate construction and future maintenance to the lower portion of the revetment. The lower bench will also dissipate

wave energy during storm events which decreases the need for excavation and rock placement higher up the bluff face.

Several Options with varying slopes, bench elevations and bench widths were considered (see Figure 3 – Revetment Option Cross-Sections). The options with slopes of 1 Vertical (V) to 3 Horizontal (H) were eliminated from further consideration due to increased volume of stone required for construction (e.g., increased cost) and encroachment into subtidal habitats. The remaining options with a slope of 1V:2H were further evaluated for varying bench elevations to evaluate the cost effectiveness (see Table 2– Design Refinement Option Quantities). Option C, with a top bench elevation of 21 feet NAVD88, a lower bench elevation of 10 feet and a slope of 1V:2H, was determined to be the most practicable revetment option.

The stone revetment proposed for construction in the HSLRR/EA is the same length as the authorized project (approximately 840 feet) and provides the same level of protection as authorized. Option C takes advantage of an existing layer of stone near Mean Low Low Water (MLLW) that has eroded from the hillside. In addition, the 1V:2H revetment slope (the steepest stable seawall slope) is cost effective (e.g., required less stone than all other options) and minimizes impacts to intertidal habitat. See Figure 4 – Site Plan – HSLRR (Option C) for a plan view of the current revetment design; Figure 5 – Cross-Section Comparative - Site Plan vs. 2005 Feasibility Design; and Table 3 - Comparison of 2005 Revetment Design vs. 2015 Revetment Design for a comprehensive comparison of the 2005 and 2015 revetment design features.

It is anticipated that trucks would be used to bring the stone for the revetment to the site either directly from the source quarry via Route 27 or possibly delivered by barges to an off-load facility on the north fork of Long Island and then by truck to the site. (Air quality evaluation based on truck delivery.)

Two staging areas would be available at the site, at the north side of the revetment and on the south side (see Figure 6 – Access Roads and Staging Areas). The entire project would be built on top of the existing revetment to take advantage of the existing armor stone. Unsuitable stone in the existing revetment would be removed. For purpose of the cost estimate in the HSLRR the following construction sequencing was considered. However, at the time of construction, the contractor would be allowed to determine the best construction approach.

Construction would start with the toe berm at elevation 10 ft. NAVD88, and create a bench that the structure would be built from. The bench meets reasonable reach requirements for a crane. The lower bench initially would be built 24 ft. wide with 15 ton armor stone. It is anticipated that the toe berm would be built first and then the upper part of the revetment would be built on top of the toe berm, partially covering the construction platform. The existing toe would be excavated to remove all loose/soft material about three feet. Large boulders which have fallen from the revetment would be left in place. From the bench, two crews can work at the same a time. Starting from the center of the revetment, the crews can work backwards filling and narrowing the bench as the equipment backs up. As the crews back up, they would bury the bench with two layers of 15 ton stone. A 12 ft. bench would remain and be available for future maintenance access.

The toe berm elevation of 10 ft. NAVD88 would provide over 8 feet of freeboard between the construction (toe berm) platform and the MHHW tide level. This would provide

reasonable protection against waves during construction. For construction access, stone ramps would be built to transitioning between the new and old revetment. Furthermore, the ramps would act to support the ends of the new revetment and should remain in place following construction. A 38 ft. wide upper bench would be constructed at approximately elevation 21 ft. NAVD 88. The upper slope would be protected as needed to approximately elevation 25 ft. NAVD88. This is an area where cuttings from the slope may be utilized.

It is anticipated that the construction would be over an 18-month period. Access to the revetment during the construction period would not be allowed due to potential liability issues. Once construction begins, fishermen would still be able to fish from the adjacent beach areas. During construction, public access would be provided to Turtle Cove by the existing footpath leading down from Old Montauk Highway.

Table 2 – Design Refinement Options Quantities

OPTION DESCRIPTION (Elevation (EL) in NAVD88)	**TONS (With Contingency)**	
	1 Ton Stone Fill	15 Ton Stone
Option A Top Bench EL21 Lower Bench EL 8	6,800	54,000
Option B Top Bench EL25 Lower Bench EL 14	7,000	66,500
Option C Top Bench EL21 Lower Bench EL 10	4,500	49,000
Option 1 Top Bench EL27 Lower Bench EL 8	8,200	63,500
Option 2 Top Bench EL27 Lower Bench EL 14	8,300	76,000

Assumptions: Stone Density is 165lb/ft^3, Porosity is 30%, and construction contingency is 20%.
All Options listed have a slope of 1V:2H.

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Figure 3 – Revetment Option Cross-Sections

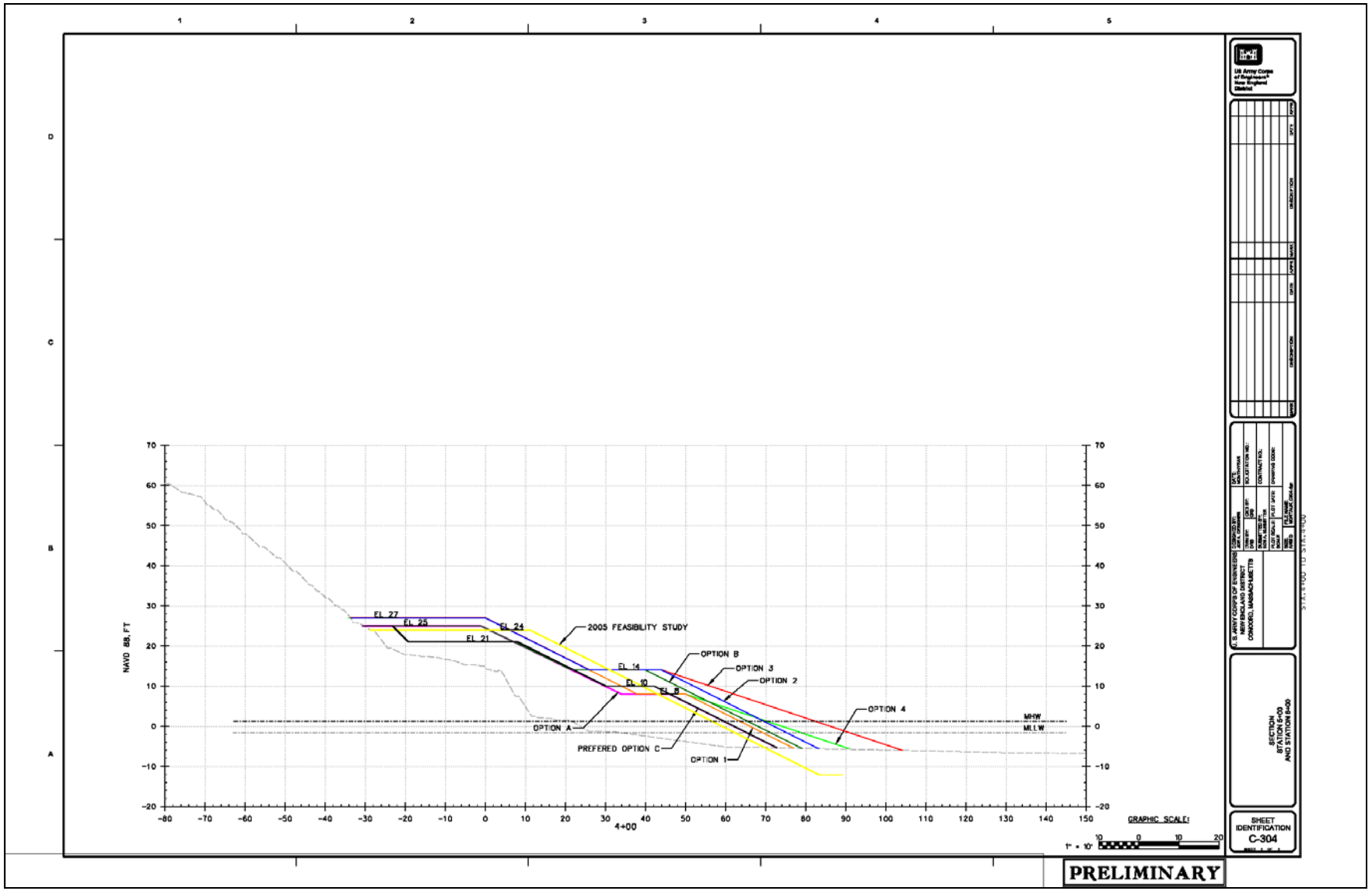


Figure 4 – Site Plan – HSLRR (Option C)

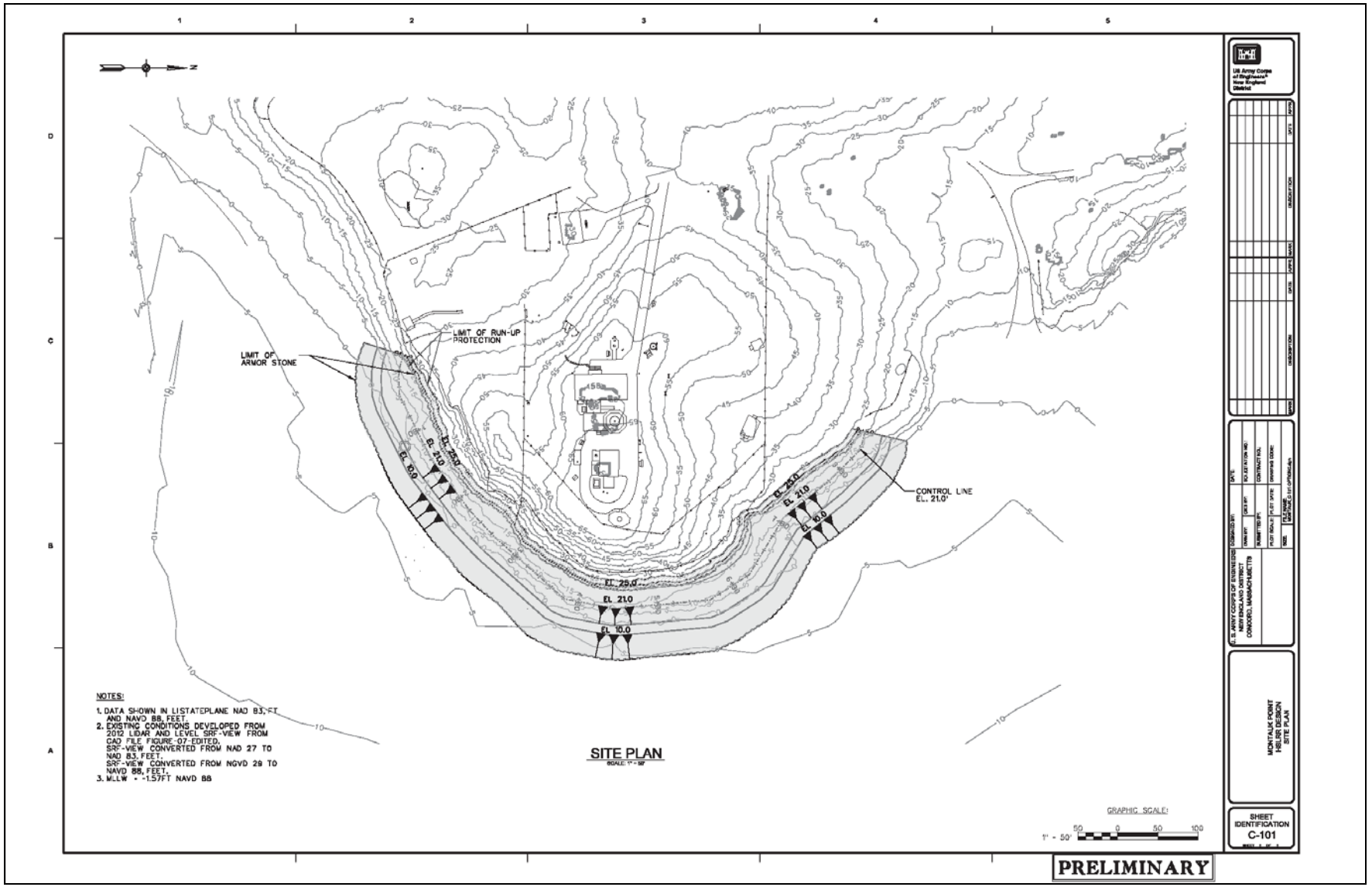


Figure 5 – Cross-Section Comparative - Site Plan vs. 2005 Feasibility Design

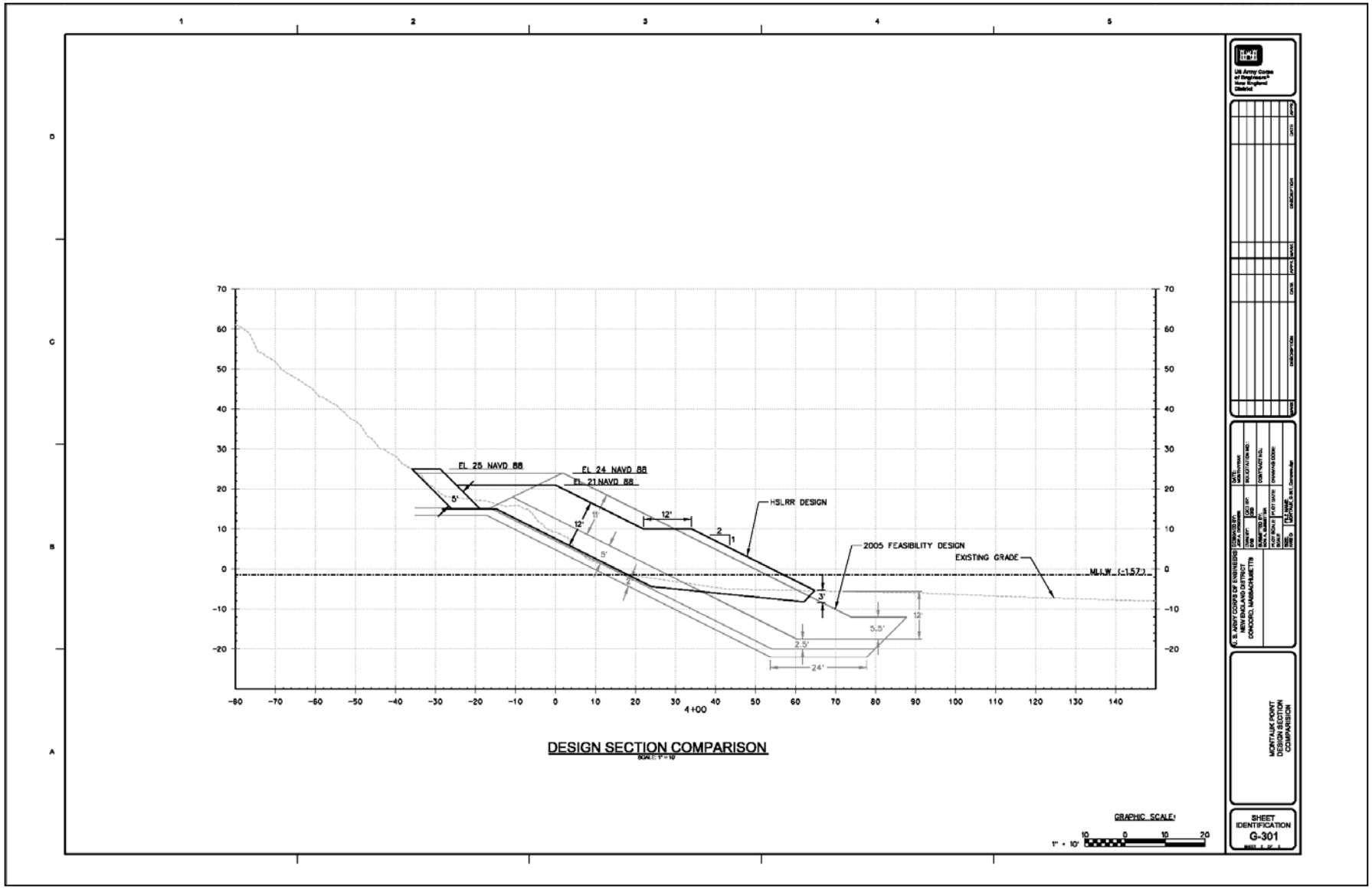
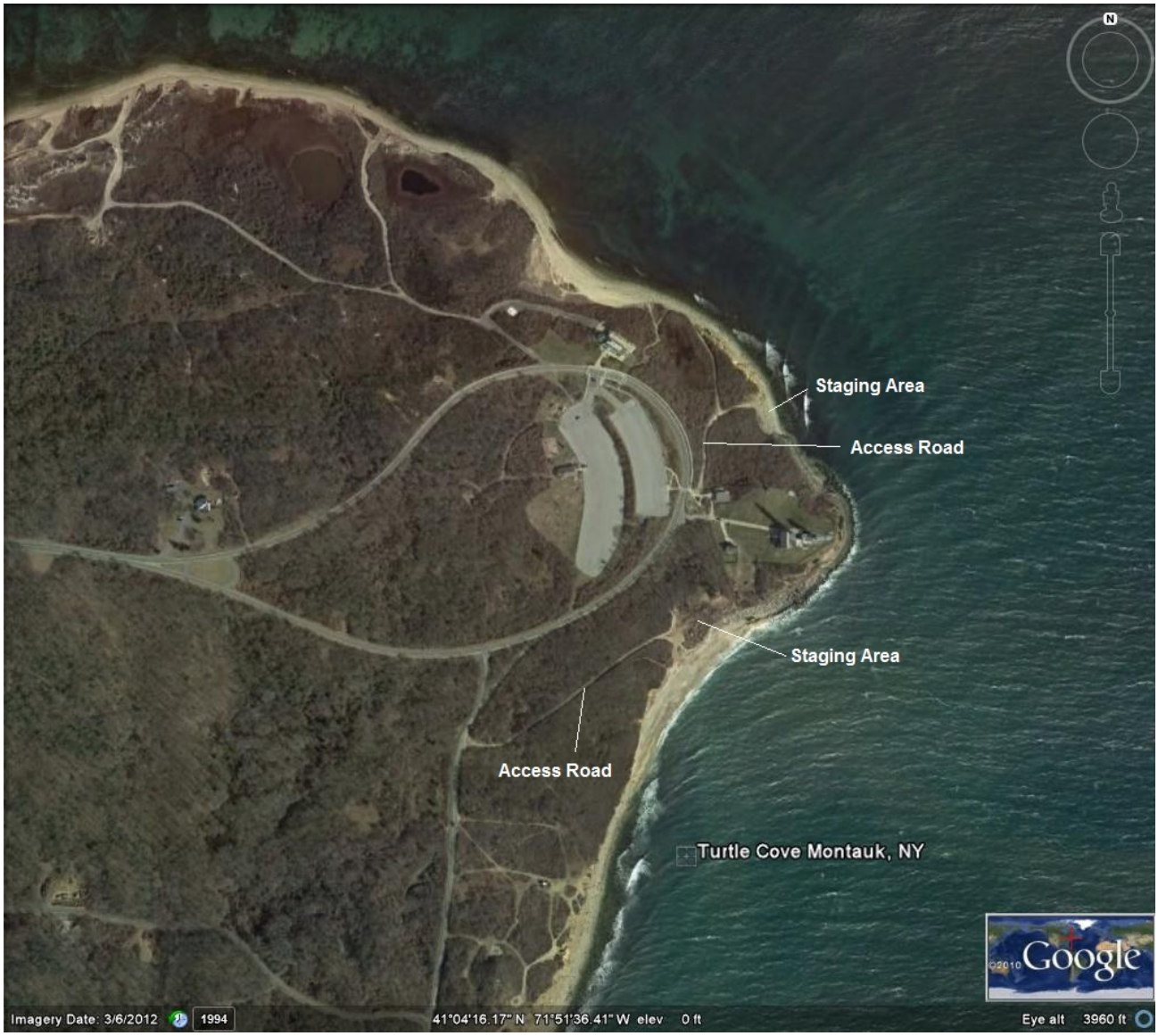


Table 3 – Comparison of 2005 Revetment Design vs. 2015 Revetment Design

	Montauk HSLRR Concept Design	Working Draft
Parameter	**2006 Feasibility Study, Authorized Project**	**Proposed Plan for HSLRR 2015**
Level of Protection	73-Year	No Change
Length	~840 Feet	No Change
Crest	40 ft. wide at +EL25 ft. NGVD29	38 ft. wide at +EL 21 ft. NAVD88
Side Slope	1V:2H	1V:2H
Construction Approach	Remove Existing Revetment, Reuse Quality Stone	Build Over Existing Revetment, Remove Poor Stone
Armor Stone Size	12.6 Ton Stone, 2 Layers (46,700 tons)	15 Ton Stone, 2 Layers (49,000 tons)
Middle Layer	1.3 Ton Quarry Stone (18,600 tons)	None
Under Layer	2 Layers, 100 lb Quarry Run (11,000 tons)	1-2 Ton Quarry Stone (4,500 tons)
Filter Fabric	Under Quarry Stone Layer	Under Splash Apron (EL 21 to 25 ft. NAVD88')
Splash Apron	4-5 Ton Stone, 3 layers	1-2 Ton Stone
Toe	Buried Toe (12.6 Ton Stone)	Partial Buried Toe (15 Ton Stone)
Bottom of Toe	Excavate 16.5 ft Below Grade (32,000 cu yds)	Excavate 2-3 ft. Below Grade (4,200 cu yds)
Toe "Bench" Elevation	None	10 ft. NAVD88
Toe "Bench" Width	None	25 ft During Construction (12 ft As Finished)
Seward Slope of Toe	Buried 1V:1H	Above Surface 1V:2H
Constructability	Difficult Construction. Significant Toe Excavation.	Minor Toe Excavation. Bench Provides Access.
Reuse Existing Materials	Some Reuse of Existing Stone	Build Over Existing Revetment
Environmental	Buried Toe is Considered Temporary Impact	Partial Buried Toe is Considered Permanent Impact
Revetment at -1.57 ft. NAVD88 (e.g. MLLW)	Moves Out 34 ft. From Current Revetment	Moves Out 38 ft. (Typical) From Current Revetment
Inter-Tidal Area Loss (MHHW to MLLW)	28560 ft^2 (.655 Acres)	31920 ft^2 (.733Acres)
Maintenance Considerations	No Bench for Future Maintenance	15 Ton Armor Stone Reduces Future Maintenance. Bench at 10' NAVD Supports Excavator Access.

Figure 6 – Access Roads and Staging Areas



3.0 AFFECTED ENVIRONMENT

3.1 TOPOGRAPHY, GEOLOGY, AND SOILS

The topography of the project area is characterized by a high bluff composed of glacial till, with steep slopes and abbreviated rocky shorelines surrounding the bluff. The South Fork of Long Island, including the Montauk Peninsula, was formed by the deposition of the terminal moraine of the most recent (Wisconsin) glaciations. Montauk Point is mostly composed of glacial till with a wide range of particle sizes. The soil series present at Montauk Point are part of the Montauk Series Sandy Variants. These soils are composed of well-drained, coarse-textured soils with a fragipan or compact layerover glacial till. The surface layer is usually very dark grayish-brown loamy sand. The subsoil is primarily a yellowish-brown to dark yellowish-brown loamy sand and the till substratum is a compact, dark yellowish-brown loamy sand.

The topography of the project area has undergone significant change over the last century. In the past 125 years of record, the seaward bluff at Montauk Point has retreated approximately 150 feet and the beach area has seen about 305 feet of erosion (USACE 2005). This erosion of the bluff is the result of the combined effect of storm waves, ground water flow and seepage, wind, and rain. Although erosion has slowed due to the numerous protection projects; the existing shoreline and bluff in the project area continue to erode (USACE 2005).

3.2 WATER RESOURCES

3.2.1 Regional Hydrology and Groundwater Resources - Long Island's groundwater reservoir consists of a sequence of unconsolidated glacial, lacustrine, deltaic, and marine deposits of clay, silt, sand, and gravel that range in age from Upper Cretaceous to Pleistocene (United States Geological Survey [USGS] 2002 in USACE 2005). Three principal aquifers underlie Long Island. They are unconsolidated deposits of Pleistocene age, referred to as the upper glacial aquifer, and unconsolidated deposits of Cretaceous age, that include the Magothy aquifer above and the Lloyd aquifer below (USGS 1995 in USACE 2005). The three aquifers are bounded above by the water table and below by the crystalline bedrock surface. Laterally, usable freshwater in the aquifers is bounded by a freshwater-saltwater transition zone that surrounds the island (USGS 1995 in USACE 2005).

3.2.2 Surface Water - The principal water bodies in the project area are the Atlantic Ocean to the south and the Block Island Sound to the north. In general, water quality improves eastward along the southern coast of Long Island away from New York City. The New York Department of Environmental Conservation (NYSDEC) has assigned a "Class SA" water quality classification to the waters surrounding the project area. Class SA surface waters are defined as saline surface waters best used for shell fishing for market purposes, and primary and secondary contact recreation and fishing, and are considered suitable for fish propagation and survival. The waters around the project area are part of the extreme eastern extent of the Peconic Bay Estuary, which is part of the US Environmental Protection Agency's (USEPA) National Estuary Program (NEP); a network of voluntary community-based programs that works cooperatively to safeguard the health of important coastal ecosystems (USEPA 2013). Overall

the Peconic Bay Estuary generally has "excellent" water quality with respect to nutrients and dissolved oxygen. Low dissolved oxygen conditions total approximately 3% of the estuary's surface waters and total nitrogen concentrations throughout the main stem of the estuary seem to be decreasing (Balla et al. 2005).

The work completed in the New District 2005 FS and EIS was referenced to National Geodetic Vertical Datum (NGVD29). The work done in this review effort was performed relative to the more recent NAVD88 datum. For this reason the conversion from NGVD29 to NAVD88 is included below in Table 4 for reference. (Note: The Montauk Fort Pond Bay National Oceanic and Atmospheric Administration (NOAA) Benchmark, the nearest NOAA tidal benchmark, is located 5.5 miles west of the project site.)

3.2.3 Tidal Influences - Tides in the project area are semi-diurnal with MSL of 1.2 feet above mean lower low water (MLLW) and the mean spring high tide of 2.4 feet above MLLW (USACE 2005). Tidal currents off of Montauk Point are generally strong and can reach nearly 3 knots (USACE 2005). These currents are strong enough to affect littoral processes. Normal waves reaching the project area include both the locally generated short period wind waves, and the long period sea swells generated in the deep ocean. Storm surge is the rise above normal water level on the open coast due to the action of wind stress, and in the case of hurricanes, due to atmospheric pressure reduction as well as wind stress. Hurricanes or large storms can result in a combined storm surge and wave crest level approximately 30 feet above MSL (USACE 2005).

Table 4 – Montauk Fort Pond Bay NOAA Benchmark and Tide Gage Location

MONTAUK, FORT POND BAY

	MLLW	MLW	MTL	MSL	NAVD88	NGVD29
	feet	feet	feet	feet	feet	feet
HIGHEST OBSERVED WATER LEVEL (08/31/1954)	8.44	8.27	7.23	7.20	6.87	7.81
MEAN HIGHER HIGH WATER (MHHW)	2.53	2.36	1.32	1.29	0.96	1.90
MEAN HIGH WATER (MHW)	2.24	2.07	1.03	1.00	0.67	1.62
NORTH AMERICAN VERTICAL DATUM-1988 (NAVD88)	1.57	1.40	0.36	0.33	0.00	0.94
MEAN SEA LEVEL (MSL)	1.24	1.07	0.03	0.00	-0.33	0.61
MEAN TIDE LEVEL (MTL)	1.21	1.04	0.00	-0.03	-0.36	0.58
NATIONAL GEODETIC VERTICAL DATAUM (NGVD29)	0.62	0.05	-0.58	-0.61	-0.94	0.00
MEAN LOW WATER (MLW)	0.17	0.00	-1.04	-1.07	-1.40	-0.45
MEAN LOWER LOW WATER (MLLW)	0.00	-0.17	-1.21	-1.24	-1.57	-0.62
LOWEST OBSERVED WATER LEVEL (02/02/1976)	-3.78	-3.95	-4.99	-5.02	-5.35	-4.41

LENGTH OF SERIES: 17 Years
TIME PERIOD: 1/1/1983-12/31/1992 ; 1/1/1994-12/31/2000
TIDAL EPOCH: 1983-2001

3.3 ECOLOGICAL COMMUNITIES

The Lighthouse is located on a glacial till plateau surrounded by marine intertidal rocky habitat, beaches, dunes, vegetated uplands, steep coastal bluffs, and wetlands. Much of the

evaluation of ecological communities for the 2005 FS and EIS was derived from the 2003 Fish and Wildlife Coordination Act Section 2(b) Report for the Montauk Point Storm Damage Reduction Project, Suffolk County, New York (USFWS 2003). This USFWS 2003 document is included in the 2005 FS and EIS Appendix E which may be downloaded from the NAN public website at:http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx.)

3.3.1 Marine Rocky Intertidal - The marine rocky intertidal habitat at Montauk Point is specifically classified as boulder beach as per the Fish and Wildlife Coordination Act Section 2(b) Report for the Montauk Point Storm Damage Reduction Project, Suffolk County, New York (USFWS 2003). Boulder beaches are partially exposed beaches primarily composed of round boulders between 10 inches and 10 feet in diameter. Underneath each boulder lies a thick layer of coarse and fine sediments that typically support infaunal communities. It is a unique habitat type because it is exposed to colder waters and higher wave action than other Long Island habitats and is unique because it includes both northern species, such as the rock weed (*Ascophyllum nodosum*) with lesser abundance, and southern species such as *Sargassum filidipendula,* not seen above Southern Connecticut (USFWS 2003 in USACE 2005).

The New York Natural Heritage Program (NYNHP) has designated an area of Marine Rocky Intertidal habitat at Montauk Point within the intertidal zone on the northern end of the revetment (see Figure 7 – New York Natural Heritage Program Natural Ecological Communities). This community type has a State Rarity Rank of S1 which is defined as "Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology makes it especially vulnerable in New York State" (NYNHP 20013a). Presently only 18 acres of marine rocky intertidal habitat exists at Montauk Point. The NYNHP describes this community type as having a substrate that ranges from natural to artificial rocks. At the eastern most tip of Montauk Point, large angular rocks at the base of the steep bluff were placed there for erosion control. The marine rocky intertidal ecological community has abundant and fairly diverse macroalgae and invertebrate assemblages. The organisms which typically inhabit this intertidal area (e.g., algae, sea stars, barnacles, mussels) are adapted to survive under particularly dynamic conditions such as moisture changes, temperature extremes, wave energy, and water salinity changes.

3.3.2 Maritime Beaches and Dunes - The beaches and dunes to the north and south of the Lighthouse are narrow and sparsely vegetated communities on substrates of unstable sand, gravel, or cobble. These communities occur above mean high tide and are often modified as a result of storm waves and wind erosion. The maritime dunes associated with these beaches are covered by American beachgrass *(Ammophila breviliqulata)* and wooly beachheather *(Hudsonia tomentosa).* Farther landward where there is a decrease in the amount of salt spray and sand burial where less specialized species such as seaside goldenrod *(Solidago sempervirens)* and beach pea *(Lathyrus japonicus)* accompany the American beachgrass (USACE 2005).

The NYNHP has designated an area of Maritime Beach habitat at Montauk Point at the southern end of the revetment (see Figure 7 – New York Natural Heritage Program Natural

Ecological Communities). Maritime beaches and dunes provide important nesting ground for shorebirds birds. There are an estimated 1000 miles of maritime beach on Long Island covering about 10,000 to 16,000 acres. This community type is in decline as a result of coastal development and recreational overuse (NYNHP 2013b).

3.3.3 Vegetated Uplands and Bluffs - A mosaic of upland plant communities are found interspersed with buildings, parking lots and other appurtenant infrastructure within the project area. Shrubs such as scrub oak *(Quercus ilicifolia),* beach plum (*Prunus maritima*), salt-spray rose *(Rosa rugosa),* bayberry (*Myrica pensylvanica*), blueberry (*Vaccinium* spp.), and catbriar (*Simlax rotundifolia*) are present adjacent to the maintained herbaceous lawn that surrounds the Lighthouse. The revetment surrounding Montauk Point is generally unvegetated. The steep coastal bluffs that surround Montauk Point to the north, east, and south have been vegetated through natural propagation and erosion control measures implemented by the Montauk Historical Society to stabilize the face of the bluff in front of the Lighthouse. These measures involved terracing of the bluff face with filter boxes, and planting species such as beach grass and salt-spray rose (Montauk Lighthouse Erosion Control Project 2002 in USACE 2005).

The NYNHP identifies Maritime Shrubland and Successional Maritime Forest communities within the general project area (see Figure 7 – New York Natural Heritage Program Natural Ecological Communities). Maritime Shrublands and Successional Maritime Forest communities are generally characterized by scattered stunted "salt pruned" shrubs and trees. These communities are concentrated on dry seaside bluffs and headlands that are exposed to offshore winds and salt spray. These community types are declining due primarily to threats from invasive species encroachment and coastal development that fragments maritime systems (NYNHP 2013c and NYNHP 2013d).

3.3.4 Wetlands – The U. S. Fish and Wildlife Service National Wetland Inventory indicates that there are nine wetland habitat classifications in the general project area (see Figure 8 – National Wetland Inventory). Wetlands are classified based on the Cowardin et al. (1979) system which divides wetlands into systems, subsystems, classes and subclasses with modifiers for water regime. There are two wetland systems represented in the general project vicinity; Marine and Palustrine (freshwater) wetland habitats. Of the three Marine wetland habitats; one is classified as subtidal (M1UBL) and two are classified as intertidal (M2US1P and M2US2P). These marine subsystems comprise the deepwater habitats seaward of Montauk Point and the cobble and sand shores in the general project vicinity.

There are also several Palustrine (freshwater) wetlands in the general project vicinity. A large Palustrine wetland complex, located north of the project area, is comprised of emergent, scrub-shrub vegetation and open water areas. Wetlands types included within this complex include emergent, seasonally flooded non-tidal wetlands (PEM1E); emergent, semi-permanently flooded, tidally influenced wetlands (PEM1T); broad-leaved deciduous shrub, tidally influenced wetlands (PSS1R); and open water, tidally influenced wetlands with unconsolidated bottoms (PUBV). There is also an isolated tidally flooded marsh, which is composed of primarily Common Reed (*Phragmites australis*), located north of the project area and a forested wetland (PFO1E) located south of the project area. In addition, there are two small colonies of Common Reed on the face of the bluff located above the existing revetment which are supported by

groundwater seeps. These small colonies appear to be limited by the extent of the supporting hydrology.

Of the Marine and Palustrine wetlands identified within the project vicinity, only the subtidal and intertidal marine wetlands (M1UBL and M2US2P, respectively) and the two Common Reed dominated groundwater seeps above the existing revetment are within the immediate project area.

3.4 WILDLIFE

The types and quality of habitats in the project area are suitable for a diverse group of migratory and resident wildlife species. These habitats include deepwater habitats, marine and maritime beaches, intertidal swales, coastal pond communities, natural dunes, and maritime shrublands that provide habitat for many species of fish and wildlife in and near Montauk Point. A comprehensive description of the wildlife community within the Montauk Point project area was included in the 2005 EIS for the Montauk Point Storm Damage Reduction Project. For additional information, a copy of the EIS can be downloaded from the NAN public website at http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx.)

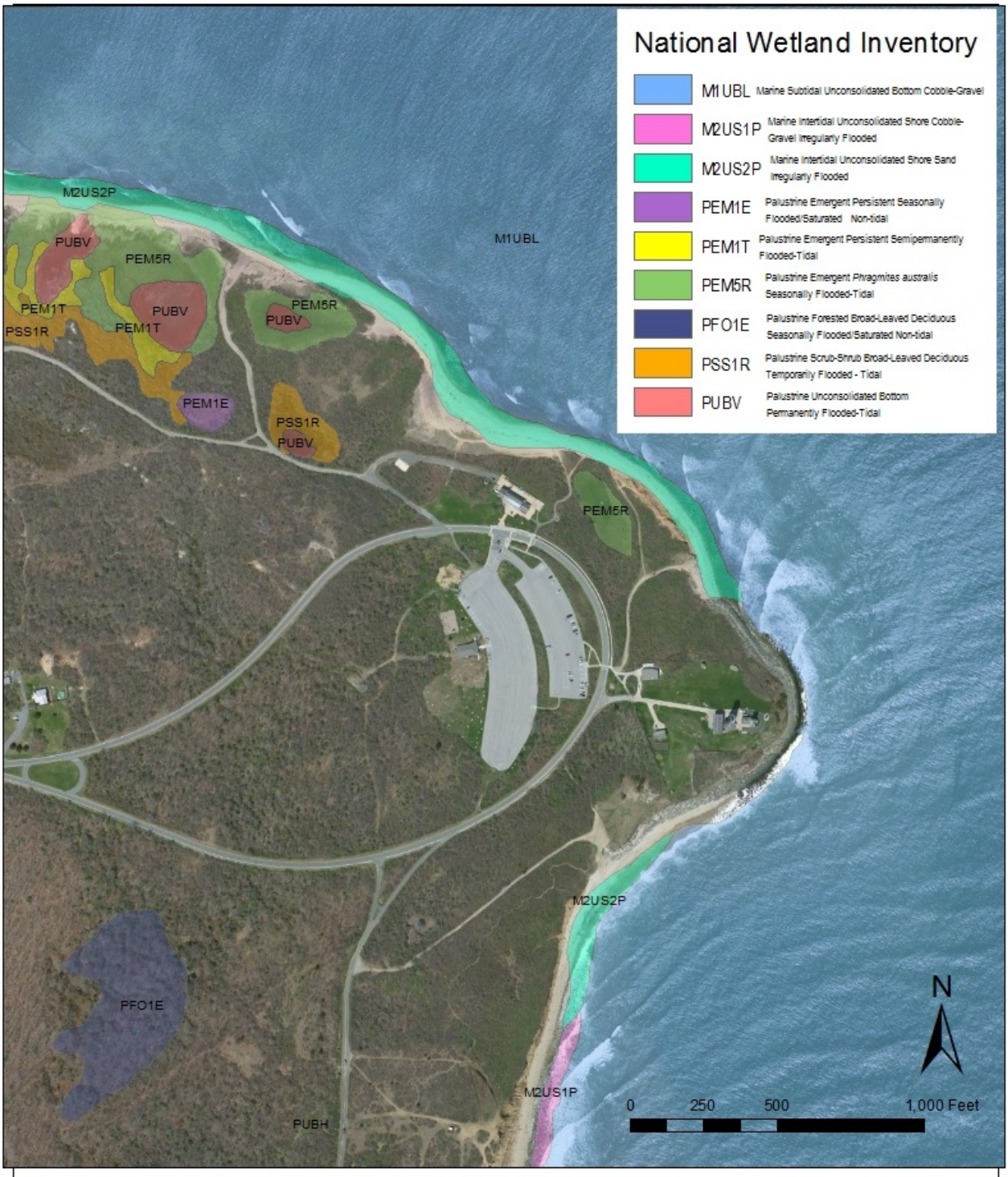
3.4.1 Benthic Communities – Site-specific studies and/or surveys describing the diversity and abundance of benthic organisms within the project area were not available.
In general, the benthos includes a complex community of plants and animals that live on or in the bottom sediments of oceans, streams, and wetlands. Both intertidal rocky habitat and beach habitat at the project area are exposed to rough, high-energy waves. The distribution and composition of benthic fauna within the project area is dependent on the organism's ability to withstand heavy wave action, exposure to the air, wide fluctuations in temperature and salinity, and the ability to exhibit diverse adaptations to harsh environments (Duxbury 1971, Lalli and Parsons 1993 in USACE 2005).

Southern kelp *(Laminaria saccharina)* and purple sea urchin *(Urbica pustulate)* are two species typically found in a northeastern rocky shore, low intertidal zone. Hydroids, bryozoans, sea slugs, worms, crabs, and tunicates are among the invertebrates that live on the seaweeds in the low intertidal zone (Lerman 1986 in USACE 2005). The mid-intertidal zone is briefly exposed to air once or twice a day at low tide. Sessile invertebrates such as barnacles *(Balanus* spp.), mussels *(Mytilus* spp.), and chitons *(Tonically* spp.), can be found throughout this zone, as well as mobile species such as green crab *(Cacicus menus)* and common sister starfish *(Asterias forbesi)*, which feed upon sessile invertebrates. Rockweed *(Fucus* spp.) is the dominant submerged aquatic vegetation and provides cover and substrate for many plants and animals (Lerman 1986 in USACE 2005). Snails of the genus *Littorina*, commonly called periwinkles,

Figure 7 – New York Natural Heritage Program Natural Ecological Communities

Source: New York GIS Clearinghouse. Natural Heritage Community Occurrences – NYNHP. Revised July 2013. http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1241

Figure 8 – National Wetland Inventory



Wetland Map
Montauk Point Hurricane Sandy Reevaluation Report

Source: US Fish and Wildlife Service National Wetland Inventory. October 2013.

and limpets *(Notoacmaea* spp.) are found grazing on microscopic blue-green algae *(Calothrix* spp.) and lichen *(Verrucaria* spp.) in the high or upper intertidal zone which is exposed to air for long periods twice a day (Lennan 1986 in USACE 2005). Common sandy habitat benthic species found within the project area in the intertidal zones of sandy beaches consists of air breathing amphipods (beach hoppers or beach fleas), Atlantic horseshoe crab *(Limulus polyphemus),* fast burrowing wedge-shaped clams *(Donax* spp. and *Tellina* spp.), ghost crab *(Ocypode quadrata),* isopods, and burrowing polychaete (segmented) worms such as the bamboo worm *(Clymenella torquata)* and trumpet worm *(Pectinaria gouldi)* (Lalli and Parsons 1993,USACE 1993 in USACE 2005).

3.4.2 Finfish and Shellfish - Important commercial and recreational finfish species found near the project area include the American sand lance *(Ammodytes americanus),* American shad *(Alosa sapidissima),* Atlantic croaker *(Micropogonias undulates),* Atlantic mackerel (*Scomber scombrus),* Atlantic menhaden *(Brevoortia tyrannus),* black sea bass *(Centropristis striata),* bluefish *(Pomatomus saltatrix),* northern kingfish *(Menticirrhus saxatilis),* scup *(Stenotomus chrysops),* spot *(Leiostomas xanthurus),* striped bass *(Morone saxatillis),* summer flounder *(Paralichthys dentatus),* weakfish *(Cynosion regalis),* and winter flounder (*Pseudopleuronectes americanus)* (USFWS 1997, Bortman and Niedowski 1998, USFWS 2003 in USACE 2005). Common migrant anadromous species found near the project area include the alewife *(Alosa pseudoharengus),* American shad, Atlantic menhaden, Atlantic silverside *(Menidia menidia),* blueback herring *(Alosa aestivalis),* and striped bass (USFWS 1997, Bortman and Niedowski1998, and PEP 2001 in USACE 2005). Shellfish species with important commercial or recreational value near the project area are American lobster *(Homarus americanus),* blue mussel *(Mytilus edulis),* common oyster *(Crassostrea virginica),* purple sea urchin (*Arbacia puncyulata),* Atlantic rock crab *(Cancer irroratus),* and Atlantic surf clam *(Spisula solidissima)* (USFWS 2003 in USACE 2005).

3.4.3 Essential Fish Habitat - Pursuant to Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the National Marine Fisheries Service (NMFS) regarding any action they authorize, fund, or undertake that may adversely affect Essential Fish Habitat (EFH). For assessment purposes, an adverse effect has been defined in the Act as follows: "Any impact which reduces the quality and/or quantity of EFH. Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions." EFH has been designated for species for which Federal management plans have been developed. A detailed EFH Assessment for the project is provided in Appendix B.

3.4.4 Reptiles and Amphibians - Species of frog and toad such as the green frog *(Rana clamitans melanota),* northern spring peeper *(Pseudacris crucifer*) and Fowler's toad *(Bufo fowleri)* are common to the area and can be found inhabiting brackish water wetlands and ponds (NYSDEC 2013). Common snakes such as the eastern ribbon snake *(Thamnophis sauritus),*

eastern garter snake *(Thamnophis sirtalis),* and northern black racer *(Coluber constrictor)* can be found inhabiting vegetated upland and wetland areas in the project area (NYSDEC 2013).

3.4.5 Birds - The nearshore open waters surrounding Montauk Point provide regionally significant and critical wintering waterfowl habitat and concentration areas (USFWS 1997 in USACE 2005). Common species of waterfowl likely to occur in the nearshore waters off Montauk Point are the American black duck *(Anas rubripes),* mallard *(Anas platyrhynchos),* scaup *(Aythya* spp.), and Canada goose *(Branta canadensis).* Species more common to bays and deeper water habitats of the Montauk Peninsula are the common loon *(Gavia immer),* common eider *(Somateria mollissima),* scoter (*Melanitta* spp.), oldsquaw *(Clangula hyemalis),* bufflehead *(Glaucionetta albeola),* common goldeneye (*Bucephala clangula),* great cormorant *(Phalacrocorax carbo),* and red-breasted merganser *(Mergus serrator)* (Turner 2001 in USACE 2005). The majority of these species do not breed in the project area and tend to concentrate during the mid-winter months using the shallow waters, to feed on benthic invertebrates, hard clams, blue mussels, fish, and submerged aquatic vegetation (Andrle and Carroll 1988, USFWS 1997 in USACE 2005).

The nearshore waters of the Montauk Peninsula provide forage for several species of shore and wading birds such as the spotted sandpiper *(Actitis macularia),* sanderling *(Crocethia alba),* semipalmated plover *(Charadruis semipalmatus),* lesser yellowlegs *(Totanus melanoleucas),* greater yellowlegs *(Tringa jlavipes)* and herring gull *(Larus argentatus),*snowy egret *(Egretta thula),* green heron *(Butorides virescens),* and black-crowned night heron *(Nycticorax nycticorax)* (Andrle and Carroll 1988, Pleuthner 1995 in USACE 2005).

The yellow warbler *(Dendroica petechia),* American robin *(Turdus migratorius),* gray catbird *(Dumetella carolinensis),* common yellowthroat *(Geothlypis trichas),* and song sparrow *(Melospiza melodia)* are common breeders within the scrub-shrub and wetland habitats surrounding the Lighthouse (Andrle and Carroll 1988 in USACE 2005). There are a variety of other common bird species known to utilize the wetland and grassland habitats within the project area.

3.4.6 Mammals - Terrestrial species most likely to occur in the project area are habitat generalists tolerant of development, including the white-tailed deer *(Odocoileus virginianus),* eastern gray squirrel *(Sciurus carolinensis),* eastern cottontail *(Sylvilagus jloridanus),* eastern chipmunk *(Tamias striatus),* raccoon *(Procyon lotor),* muskrat *(Ondatra zibethica),* house mouse *(Mus musculus),* and white-footed mouse *(Peromyscus leucopus)* (Connor 1971, USFWS 2003 in USACE 2005). The Riverhead Foundation reports that a seal haul out area is located approximately one mile north, northeast of the project area and is utilized by three species of seals, the harp seal *(Phoca groenlandica),* harbor seal (*Phoca vitulina),* and hooded seal *(Cystophora cristata)* (USFWS 2003 in USACE 2005). All of these seal species are protected under the Marine Mammal Protection Act of 1972, as amended in 1994.

3.5 THREATENED AND ENDANGERED SPECIES AND COMMUNITIES OF SPECIAL CONCERN

Section 7 of the Endangered Species Act (ESA) requires a Federal agency to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of Federally-listed endangered and threatened species, or result in the destruction or adverse modification of the designated critical habitat of Federally-listed species. The USACE New York District (NAN) consulted with the USFWS and NMFS regarding the presence of Federally-listed endangered and threatened species and their critical habitat in the vicinity of the proposed as part of the preparation of the 2005 Montauk Point Storm Damage Reduction Project EIS. In addition, the USFWS contacted the NYSDEC's Natural Heritage Program to review their database regarding Federally-listed and state-listed endangered and threatened species potentially occurring in the project area. Coordination was undertaken with the USFWS by e-mail dated July 11, 2014 and the NYSDEC by letter dated December 17, 2013 to reconfirm that information previously provided as part of the 2003 Fish and Wildlife Coordination Act (Section 2(b)) Report for the Montauk Point Storm Damage Reduction Project is currently relevant. Coordination was also undertaken with the Protected Resources Division of the NMFS by letter dated December 6, 2013 with regard to Federally protected species under the jurisdiction of the NMFS.

The following sections provide a general description of the Federal and state species of concern identified in the 2003 Fish and Wildlife Coordination Act (Section 2(b)) Report which is included in 2005 Montauk Storm Damage Reduction Project EIS, Appendix E. (For more detailed information, a copy of the EIS can be downloaded from the NAN public website at http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx.)

3.5.1 Federal Species of Concern - The Federally-listed endangered Atlantic ridley *(Lepidochelys kempii)* and leatherback *(Dermochelys coriacea)* sea turtles and threatened loggerhead *(Caretta caretta)* and green *(Chelonia mydas)* sea turtles have been identified as transient species through the project area (Beach 1992 in USACE 2005). Federally-listed endangered northern right whales *(Eubalaena glacialis)* (usually individuals) are regularly sighted migrating through the nearshore waters off Montauk Point, usually from March through June (USFWS 1997 in USACE 2005) and have been identified as a transient species by the NMFS (Beach 1992 in USACE 2005). Small aggregations of Federally-listed endangered finback whales *(Balaenoptera physalus)* feed close to shore from Shinnecock Inlet to Montauk Point from January to March, and Federally-listed endangered humpback whales *(Megaptera novaengliae)* feed all around Montauk Point, primarily between June and September (USFWS 1997 in USACE 2005).

The NMFS, in a letter dated December 19, 2013, confirmed that several species of sea turtles listed under the Endangered Species Act, as well as individual Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) originating from any of the five listed Distinct Population Segments (DPSs) (Gulf of Maine, New York Bight, Chesapeake Bay, Carolina and South Atlantic) may be seasonally present off Montauk Point in the Atlantic Ocean. Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (10-50 m

depth) nearshore areas dominated by gravel and sand substrates. Long distance migrations away from spawning rivers are common (NMFS 2014a).

One Federally-listed endangered plant, the sandplain gerardia *(Agalinis acuta),* has been historically known to have occurred at several locations within the project area (USACE 1993 in USACE 2005), and there are two extant areas containing this plant within two miles of the project area (USFWS 1992 in USACE 2005). According to the NYSDEC Wildlife Resources Center, this plant has not been identified in the project area since 1927 (USACE 1993 in USACE 2005). Several site visits by NAN personnel along with local naturalists and town biologists have concluded that the sandplain gerardia is not present in the project area (USACE 1993 in USACE 2005).

3.5.2 State Species of Concern - Several additional species that may occur in the vicinity of the project area are listed by New York State as species of concern, rare, threatened, or endangered. The threatened least bittern *(Ixobychus exilis)* and northern harrier *(Circus cyanus),* and three species of concern, the red-shouldered hawk *(Buteo lineatus),* whip-poor-will *(Caprimulgus vociferous),* and osprey *(Pandion haliatus),* may potentially nest in the vicinity of the project area (USFWS 2003 in USACE 2005). The state-listed rare seabeach knotweed *(Polygonum glaucum),* threatened saltmarsh spike rush *(Eleocharis halophile),* and endangered small's knotweed *(Polygonum buxiforme)* may be present in the project area (USACE 1993, USFWS 2003 in USACE 2005 and NYNHP 2014). In addition, Southern arrowwood *(Viburnum dentatum* var. *venosum),* a state-listed threatened species, is known to occur along the entrance loop road (NYSOPHP 2003 in USACE 2005 and NYNHP 2014). In addition, the Hairy–necked Tiger Beetle *(Cicindela hirticollis)* is listed as being **c**ritically imperiled in New York State. The habitat is maritime beach at the eastern end of Long Island (NYNHP 2014).

3.5.3 Areas or Communities of Special Concern and/or Management - The USFWS lists the Montauk Peninsula Complex as a Significant Habitat Complex of the New York Bight Watershed (USFWS 1997 in USACE 2005). The complex consists of undeveloped habitat communities that support an unusual diversity of rare plants and animals, and the nearshore waters support important concentrations of marine species. In 1993, the Peconic Estuary, which encompasses Montauk Point, was designated as an estuary of national significance and included in the USEPA's National Estuary Program. As well, the National Audubon Society of New York State recognizes Montauk Point (the area east of Montauk Lake to Montauk Point including offshore waters) as an Important Bird Area (IDA). Specifically, Montauk Point was recognized due to its importance to wintering waterfowl, and the site's importance to pelagic seabirds, migrant songbirds, and state threatened and special concern species.

3.6 SOCIOECONOMICS

Socioeconomic conditions in the project area in the Township of East Hampton, Suffolk County, New York, are affected by the area's development and zoning regulations. Much of the eastern portion of Long Island has been preserved primarily as recreational and open space according to land use planning and zoning ordinances. This area is relatively sparsely developed for residential, commercial or industrial purposes, and is considered to have no land available for

significant development of these land uses (Suffolk County Planning Department [SCPD] 2009). In particular, development in the project area is dominated by Montauk Point State Park, which includes the Lighthouse and its associated historic structures. These two recreational areas (the state park and the Lighthouse) influence the specific socioeconomic conditions of the project area, which are associated with use of the area for tourism or recreational purposes by both seasonal and year-round residents and visitors.

3.6.1 Demographic Characterization –The population of Suffolk County was estimated to be 1,504,947 in 2007 which represents an increase of 6% since 2000. Suffolk County's population density was 1,652 persons per square mile; however, the western portion of the county has a higher population density than the eastern portion of the county. This increase in population is expected to continue slowly for the next 25 years. The median age of the county's population was 38.3 years. Minorities represent 25% of the Suffolk County population. Hispanics represent the largest minority at 13% of the population; 8% were black; 3% were Asian, and an additional 1% were of two or more races (SCPD 2009).

3.6.2 Economy and Income – Suffolk County continues to experience stable economic conditions. In October 2008, Suffolk County had 756,400 employed residents (a slight decrease of 0.2% from 2007). The unemployment rate for Suffolk County was 5.0% in October of 2008, which is below that national average but higher than it was a year earlier (3.6%). Suffolk County's 2006 per capita personal income was $46,830 which ranks 6th in New York State and higher than the national average of $36,714. Suffolk County's median household income was $76,847 which was 59% higher than the median household income in the nation as a whole. In 2007, 5% of the population in Suffolk County (71,000 people) were living in poverty according to the U.S. Census Bureau. This figure is based on a poverty income threshold of $20,650 for a family of four in 2007 and $10,210 for an individual (SCPD 2009).

Suffolk County's local economy is closely associated with the hotel and motel industry (including bed-and-breakfast lodging), particularly in eastern Suffolk County, where occupancy is primarily seasonal and associated with the tourism in this area. Tourism is a particularly important part of the Suffolk County economy, and is focused on the eastern part of Suffolk County. The population of Suffolk County increases by 200,000 persons during summer times due to tourism, more than doubling the year-round population (SCPD 2009). Montauk Point State Park is used by an average of 904,185 visitors annually; the Lighthouse is used by an average of 106,723 visitors annually (USACE 2005). These two areas contribute significantly to the local economy of Suffolk County, by attracting vacationers, as well as local residents to enjoy the recreational opportunities at Montauk Point.

3.6.3. Housing - Suffolk County has both year-round and seasonal housing with a rate of 82% owner-occupied housing. Suffolk county housing prices began to decrease in 2007. In September 2008, the median selling price of a home in Suffolk County was $376.000. Rental income remains high; in early 2008, the average rent for a one-bedroom apartment was $1,107 and $1,469 for a two bedroom apartment. Suffolk County ranked 11th highest among all counties in the nation in the 2000 U.S. Census for median gross rent paid (SCPD 2009).

3.7 CULTURAL RESOURCES

The Lighthouse is a National Historic Landmark. As an agency of the federal government, the District has certain responsibilities for ensuring that the plans of the proposed Project are in compliance with all relevant cultural resources laws. The federal statues regarding these responsibilities include Sections 106 of the National Historic Preservation Act (NHPA) of 1966, as amended; Executive Order 11593, and the Advisory Council on Historic Preservation "*Protection of Historic Properties"*, as amended (36 CFR Part 800). In accordance with the NHPA, the State Historic Preservation Office (SHPO) advises and assists Federal agencies in carrying out their historic preservation responsibilities. In New York State, the SHPO is the Commissioner of New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP). It is these preservation laws and directives that guide the District in the implementation of the study authority to project this site and its associated features.

The Lighthouse complex consists of the Lighthouse Tower and Keeper's House, the Fire Control Tower, and Garage, which was an earlier Keeper's House. Also part of the complex are the archaeological sites associated with the Lighthouse and the use of Montauk Point and the bluff, which provides the setting that prompted the construction of the Lighthouse in this location. The bluff and natural setting of Montauk Point are contributing elements to the Lighthouse's historic significance. Continued erosion of the bluff would be an adverse effect on the Lighthouse's historic significance.

The Area of Potential Effect (APE) consists of the Lighthouse complex, including the base of the bluff and existing storm damage reduction features. The APE also consists of the proposed access roads and staging areas. The access roads are current access points to the base of the bluff and existing revetment. The staging areas are previously used areas located along these roads to the north and south of the existing revetment.

3.7.1 Overview of the Cultural History of Montauk Point - The eastern portion of Long Island contains evidence for prehistoric occupation dating back to the Paleo-Indian period, as indicated by the recovery of 14 fluted points and biface blades across Long Island. However, permanent prehistoric occupation of the study area by prehistoric peoples is not clearly represented until the Archaic Period, with eastern portions of Long Island occupied during the Middle Archaic Period by groups who would eventually become the historic-period Montauket, and by Terminal Archaic or Transitional Period groups, represented on the island by sites dating to the Orient Complex. A variety of unprovenienced, diagnostic projectile point types from a collection of prehistoric artifacts of Montauk Point are indicative of Late Archaic to Late Woodland occupations.

The structures of the Montauk Point Lighthouse Complex, including the Lighthouse, keeper's dwelling, and other associated buildings, have remained the only evidence for historic period settlement of the eastern tip of Long Island. The Lighthouse is the oldest lighthouse in the State of New York, President George Washington authorized construction of the Lighthouse in 1796, and John McCombe, Jr., constructed the tower and surrounding structures later that year. From the 17th century until 1873, the greater part of the surrounding Montauk peninsula was pastureland. In 1873, Frank and Mary Benson purchased the land surrounding the Lighthouse

property for use as a hunting and fishing resort. However, for the most part, the peninsula remained an undeveloped area into the mid 20th century (Brighton 1992, McLean 1999).

The structures associated with the Lighthouse property underwent periodic repairs and renovations throughout the 19th century. After 1900, a number of additions and renovations were made to the Lighthouse property, including the construction of buildings related to safety and rescue, as well as defense, during World War II. Early to mid-20th century buildings at the Lighthouse property included an oil house (1904), and World War II and post-war period structures such as the fire control tower (1942), a fire control station/bunker, and a troop barracks, although the barracks were demolished by 1951, and erosion of the bluff has caused the control station/bunker to slide off of the bluff. In 1987, the Lighthouse was fully automated, with a new automated optic revolving beacon (Brighton 1992, Montauk Point Lighthouse Museum 1996, McLean 1999; see also Heffner 1988, 1989 and 1994 for further information related to the historical and structural aspects of the Lighthouse).

3.7.2 Previous Investigations - Three previous cultural resources investigations have been conducted at the Lighthouse. These investigations included documentary research, field survey, and limited subsurface testing. Coordination with the NYSOPRHP, the New York State Museum, the Suffolk County Historical Society, and local historian were undertaken to help building the documentary history/record of the area. All projects resulted in the identification of historic sites at the Lighthouse property and recommended further testing where appropriate.

In 1992, the District conducted a limited Phase I cultural resources survey (Brighton 1992). The objective of these investigations was to assess the impact erosion control measures might have on NRHP-eligible historic properties or archaeological resources. The Phase I survey was conducted on the bluff to the south of the Lighthouse and museum, in areas west and south of the garage, and on the bluff north of the guardhouse (Brighton 1992).

Between 1999 and 2000, a private consultant, Jo-Ann Mclean Archaeological Consultants performed additional Phase I investigations at the Lighthouse (McLean 1999, McLean 2000). These Phase I surveys, which were conducted under contract to the Montauk Point Historical Society, were designed to assess the impact of the proposed construction of a gift shop west of the garage, based on the high sensitivity of the Lighthouse grounds for cultural resources (McLean 1999, McLean 2000).

In 2002, building upon the earlier Phase I cultural resources investigations, the District contracted with Panamerican Consultants, Inc., to conduct Phase II cultural resources investigations at the Lighthouse, including subsurface testing along the edge of the bluff area (Panamerican Consultants, Inc. 2002). Results of the Phase II investigations indicated several sites within the Project area may be eligible for the NRHP, including a stone walkway or floor, a trash pit, a well and barn foundations. Aside from the recovered historic materials, there is a high potential for the recovery of Native American remains (Panamerican Consultants, Inc. 2002).

3.7.3 Historic Properties- All cultural resource investigations conducted within the Lighthouse Project area were performed in accordance with the *Secretary of the Interior's*

Standards and Guidelines for Archaeological Documentation (48 FR 44734-37) and the *Treatment of Archaeological Properties* (ACHP 1980). These investigations focused on the potential culturally recovered sites and remains relating to both Native Americans and the historic period of the Lighthouse's operation.

The Lighthouse property is archaeologically sensitive for prehistoric remains. Diagnostic prehistoric artifacts found at Montauk Point, including projectile points, groundstone tools and a pestle, are displayed in a glass-covered wooden case within the Montauk Lighthouse Museum. A variety of projectile point types are present in the collection, although unfortunately, these artifacts have no recorded provenience. Although close analysis of these points was not conducted, some have shape characteristics of Squibnocket Triangle, Bare Island, Levanna and Madison, which are indicative of Late Archaic to Late Woodland occupations. Cultural resource investigations conducted by Brighton in 1992 recovered the tip of a quartz projectile point on the slope southwest of the Lighthouse (Brighton 1992).

The Lighthouse property is also archaeologically sensitive for historic remains. In particular, the historical archaeological record at this property has the potential to contribute information relating to the keepers' lifestyles and households, including "the day-to-day operation", the "types of good that they used, the types of foods that they ate and how they ordered and landscaped the lighthouse grounds to suit their needs (Brighton 1992). The continued investigation of the historic archaeological sites at the Lighthouse Complex will add to the growing information that exists on the daily function and activity of this area.

The Lighthouse, built in 1796, is the oldest lighthouse in the State of New York. The Lighthouse was constructed of "brown Chatham stone" between June and November of 1796 on the bluff, known as Turtle Hill, 390 feet (119 m) from the water's edge (Britten 2000). A keeper's dwelling was built 200 feet (61 m) west of the Lighthouse tower to facilitate well water access. The original keeper's dwelling was a two-story frame house. By 1838, the keeper's dwelling was in such poor condition that a new house was built, under contract, by Henry B. Havens. Instead of replacing the old keeper's dwelling, the new 1 ½ -story brick and frame structure was built against the south wall of the old building. By 1857, further work was needed on this new house as well as the Lighthouse itself. The tower renovations were completed in 1860. During this period of renovation, the first keeper's dwelling was demolished, along with an 1806 kitchen addition attached to its north side. A new keeper's house was built on the hill next to the Lighthouse tower, along with an oil house and well. A fog signal was built east of the tower in 1873. The brick-and-frame 1838 keeper's dwelling was converted into a barn after the original barn was destroyed by a hurricane (McLean 1999). It was again renovated between 1937 and 1939 to serve as a garage.

After 1900, additions and renovations to the Lighthouse property included the construction of buildings related to safety and recue, as well as defense during World War II. A new oil house was built in 1904. Was and post-war period structures include the fire control tower (1942), a fire control station/bunker, and a troop barracks. The barracks demolished by 1951, and erosion of the bluff has caused the control station/bunker to slide off the bluff. In 1987, the lighthouse was fully automated, with a new automated optic revolving beacon (Brighton 1992, Montauk Point Lighthouse Museum 1996, McLean 1999; see also Heffner 1988,

1989 and 1994, for further information related to the historical and structural aspects of the Lighthouse).

On March 2, 2012 Secretary of the Interior Ken Salazar designated the Montauk Lighthouse as a National Historic Landmark in recognition of the significant role played by the lighthouse in American maritime history.

The designation entitles the Montauk Historical Society to technical advice provided by the National Park Service and protects the lighthouse in case of a natural disaster.

3.8 AESTHETIC RESOURCES AND RECREATION

Aesthetic and scenic resources in the project area are derived from the open coastal vistas of Montauk Point, and have been enhanced through the area's use for recreation and open space as part of Montauk Point State Park. The facilities of the approximately 862-acre Montauk Point State Park support a variety of year round recreational activities, including sightseeing, seashell collecting, picnicking, wildlife observation, recreational fishing, hunting, and the multiple uses of trails for hiking, cross country skiing, and horseback riding. The Lighthouse and its associated historic structures provide a museum that interprets the history of the Lighthouse, and access to an enclosed deck at the top of the Lighthouse for sightseeing. Offshore and shore front areas along Montauk Point are particularly popular for recreational activities such as surfing and fishing.

Montauk Point is considered to be one of the best surfing locations along the East Coast, primarily due the physical characteristics of the shoreline at Montauk Point. The particular projection of the land surface into the currents of the Atlantic Ocean at Montauk Point suggests that wave conditions at Montauk Point are transformed and enhanced by diffraction, a "wrap around" effect of the waves caused when they pass the end of Montauk Point. This diffraction, or "wrap around" effect, results in "clean surfable waves" off of the shoreline (Nelsen 1996 in USACE 2005). Surfers or "surfriders" are attracted from all over the country to enjoy the specific waves and scenic setting that Montauk Point offers. The Surfrider Foundation represents the locally and nationally organized group dedicated to the protection and enjoyment of the world's oceans, waves, and beaches (Surfrider Foundation 2013). The Surfrider Foundation, Eastern Long Island Chapter, has an interest in the study of erosion control and storm protection at Montauk Point.

Montauk Point is considered to be one of the great fishing areas for migratory game fish in the Northeast, and the premier east coast striped bass fishery spot. Recreational fishing is an important part of the local economy, attracting "surfcasters" from across the nation. The stone walkway that surrounds the entire point is used by surfcasters to access the near shore waters surrounding the point. The Montauk Surfcasters Association and the New York Sport Fishing Federation, locally organized fishing groups, are interested in the study of erosion control and storm protection at Montauk Point.

3.9 AIR QUALITY: GENERAL CONFORMITY & GREENHOUSE GASES

Montauk Point is located on the eastern end of Long Island in Suffolk County, New York, and is part of the New York, Northern New Jersey, Long Island, and Connecticut nonattainment area. Suffolk County has been designated with the following attainment status with respect to the National Ambient Air Quality Standards (NAAQS) for criteria pollutants: marginal nonattainment area for the 2008 8-hour ozone standard and a maintenance area for the 2006 particulate matter less than 2.5 microns ($PM_{2.5}$) standard (40 CFR §81.333). Oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) are precursors for ozone and sulfur dioxide (SO_2) is a precursor pollutant for $PM_{2.5}$. Suffolk County is in attainment of the NAAQS for all other criteria pollutants.

Emissions from the Project are associated with non-road construction equipment working on the site and on-road trucks moving on public roads to and from the Project site. Emissions from these two source categories are primarily generated from their diesel engines, with emissions that include NO_x, VOCs, SO_2, and $PM_{2.5}$. Emissions from Federal Actions, such as the Proposed Project, are regulated under 40 CFR §93 Subpart B General Conformity. Fugitive dust on the worksite can potentially be generated due to trucks and equipment moving on unpaved surfaces, but can be significantly reduced through the use of best management practices relating to site work dust mitigation. Fugitive dust is made up of PM and can contain $PM_{2.5}$.

In addition to the applicable regulated pollutants, each Federal Agency project's NEPA assessments will consider and evaluate GHGs consistent with the final guidance on the consideration of GHGs emissions and the effects of climate change[1] issued by the former administration's Council on Environmental Quality (CEQ). It is noted that this final guidance is no longer available on the current "whitehouse.gov" website (nor is anything related to the CEQ) but is posted on an archive website as footnoted below. The extent to which this guidance will be adopted by the current administration, if at all, is not known at this time.

4.0 ENVIRONMENTAL CONSEQUENCES

Based upon the information gathered during the preparation of the 2005 Montauk Point Storm Damage Reduction FS and EIS, a determination was made that the Stone Revetment was the best alternative for the overall project and would not adversely affect either the natural or cultural environments. The conclusion of the EIS was that the Stone Revetment would cause only temporary, minimal impacts to the natural and cultural environment during the construction phase of the project only. No long term significant impacts to either the natural or cultural environment were identified. The Final Report of the Chief of Engineers on the Montauk Point, New York, Hurricane & Storm Damage Reduction Project was provided to Congress on March 31, 2006 and the project was authorized in Water Resources Development Act of 2007.

In response to the 2012 Sandy Hurricane event, funds to complete the authorized but unconstructed project would be provided by The Disaster Relief Appropriations Act of 2013. The authorized Stone Revetment was re-assessed under this HSLRR and EA to confirm that the proposed plan was still the most suitable design to ensure that the lighthouse resource was

[1] See *https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance*

adequately protected. Some design refinements, as described in Section 2.4 PROJECT DESCRIPTION (DESIGN REFINEMENTS), include a slightly embedded toe rather than a buried toe and a lower bench or toe berm was incorporated into the design at 10 feet NAVD88 to enable equipment access to facilitate construction and future maintenance to the lower portion of the revetment. Since a determination was made that the previous project would not adversely affect either the natural or cultural environments and that existing conditions, as described in Section 3.0 AFFECTED ENVIRONMENT, have not changed significantly, the following section will primarily address the environmental effects of the Stone Revetment design refinements. This conclusion was confirmed in the Planning Aid Letter (PAL) from the USFWS dated August 21, 2014 (see Appendix A - Pertinent Correspondence Received). (More detailed information on the overall environmental effects of the proposed Stone Revetment can be found in the 2005 EIS; a copy of which can be downloaded from the NAN public website at http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx.)

4.1 TOPOGRAPHY, GEOLOGY, AND SOILS

The expected lifespan of the revetment is at least 50 years, which is considered a permanent impact to the local topography. However, the revetment would be constructed over an existing revetment and implementation of the revetment would be expected to result in significant benefits to the existing topography by stabilizing the bluff and shoreline. The differences between the current revetment design and the 2005 revetment design, as depicted in Figure 5 – Cross-Section Comparative - Site Plan vs. 2005 Feasibility Design, would not substantially increase impacts to topography, geology or soils. The current design has the same slope as the previous design, is one foot higher than the previous design and extends approximately 4 feet seaward (typical cross-section) of the previous design which would have a negligible direct impact to the bluff and other natural resources. Modifications to the revetment profile would not change wave refraction patterns around Montauk Point, change erosion or accretion rates of the adjacent shoreline, or alter the near shore bathymetry.

4.2 WATER RESOURCES

4.2.1 Regional Hydrogeology and Groundwater Resources – It was determined in the 2005 FS and EIS that the construction of the revetment would not impact regional hydrology or groundwater resources because the revetment construction would occur at the surface of the bluff and along the Montauk Point shoreline. Implementation of the proposed revetment would be expected to result in significant long-term benefits by stabilizing the bluff and shoreline. Design refinements, as depicted in Figure 5 – Cross-Section Comparative - Site Plan vs. 2005 Feasibility Design, would have no effect regional hydrology or groundwater resources.

4.2.2 Tidal Influences – It was determined in the 2005 FS and EIS that the revetment would not have any significant impact on the existing wave refraction or tidal patterns around Montauk Point. During the preparation of the New York District Feasibility Study (USACE 2002), the Surfrider Foundation, Eastern Long Island Chapter, raised concerns regarding the impact of the proposed project on recreational surfing. In response to the Surfrider

Foundation's concerns, the Corps performed an analysis to determine the potential effect of the proposed project in the Feasibility Study on near shore breaking waves. The results of this analysis determined that the reflection coefficient for the existing revetment ranged from 0.30 to 0.33, whereas the reflection coefficient for the proposed revetment would range from 0.25 to 0.28; an approximate 15 percent reduction from that of the existing revetment. This reduction was due to the milder front slope and the greater porosity of the thick layers of randomly placed stone of the proposed revetment. Based upon the modeling results, the Corps concluded that implementation of the proposed revetment project would have little to no impact on the quality or surfability of the waves in the offshore waters of Montauk Point, and may, in fact, have less impact than the existing structure. The currently proposed structure has the same slope and a similar footprint as the 2005 FS and EIS structure, thus no impact is anticipated to surfing

4.2.3 Surface Water - During construction of the revetment, a temporary increase in turbidity of nearby surface water is expected. However, the suspended materials (i.e., unconsolidated organic and inorganic particles) would be expected to settle out quickly or would be rapidly transported away by the strong tidal currents. Following completion of in-water construction activities, water quality would be expected to quickly return to pre-construction conditions. No significant long-term impacts on surface water quality are expected. A Clean Water Act Section 404(b)(1)Guidelines Evaluation has been completed and is included in Appendix C.

The volume of water that would be displaced by the 2005 revetment design was calculated to be 302,400 cubic feet (from MLLW -1.57 NAVD88 to MHHW 0.96 NAVD88). The incremental increase in the volume of water displaced by the 2015 revetment design was calculated to be an additional 30,240 cubic feet for a total of 332,640 cubic feet. The loss of the water column was not considered to be significant when compared to the availability of open water in the project vicinity. Finfish species that feed in the nearshore waters of Montauk Point, such as black sea bass and striped bass, would be expected to use open water areas adjacent to the project area and the open ocean.

4.2.4 Erosion and Downdrift Sand Movement – A comprehensive evaluation of Coastal Processes was provided in the 2005 Montauk Point Storm Reduction EIS. Effects of both the existing structure at Montauk Point and the proposed structure on the littoral sand transport were determined to be small. Any adverse impacts from the proposed revetment alternative are not considered to be significant. The 2013 design refinements are minor and therefore, would not change the conclusion of the coastal processes evaluation.

4.3 ECOLOGICAL COMMUNITIES

For the most part, no direct or indirect impacts to vegetation would occur because areas that would be impacted beyond the footprint of the existing revetment are unvegetated. There is one minor exception; the current revetment would be approximately one foot higher than the previous design which would impact bluff vegetation along the revetment upper boundary to a minor degree. Existing roads and parking areas would be used for construction equipment and material access and staging and therefore, no direct or indirect impacts to vegetated habitats as a

result of the movement or staging of equipment and materials are expected. Individual community type impacts are address in the following sections.

4.3.1 Marine Rocky Intertidal Habitat – The 2005 stone revetment project would impact approximately 2.4 acres of land and ocean bottom along the shoreline. Of these 2.4 acres, 0.7 acres would be beyond the footprint of the existing revetment and would impact marine intertidal gravel/sand beach, maritime beach and marine rocky intertidal habitat located to the south the existing revetment. Although the 200-foot extension of the revetment southward would impact some marine intertidal rocky habitat, the majority and richest portion of the habitat type occurs north of the revetment (USFWS 2003 in USACE 2005). The conclusion of the 2005 EIS was that construction of the project would result in the creation of new rocky intertidal habitat at the toe of the new revetment and that the habitat developed would be approximately the same quantity and quality as the habitat lost due to construction. Thus, no net loss of in-kind habitat value would be experienced as a result of the project (USFWS 2003 in USACE 2005 and USFWS 2014).

Although the 2015 revetment design increases the revetment footprint approximately 4 feet seaward on a typical cross-section (ranging from 10 feet to -4 feet as the toe meanders with topography), the direct increase impact to intertidal habitat, approximately 0.08 acres, was not considered to be significant. As well, the construction of a buried toe, as proposed in the 2005 revetment design, would have necessitated the excavation of over 32,000 cubic yards of sediment material and approximately 60 feet from the existing shoreline. This approach would have required sheet piling and dewatering in order to construct the buried toe to a depth of approximately 16.5 feet below grade.

The construction of a slightly imbedded toe versus a buried toe significantly reduces temporary construction impacts within an area approximately 25 feet wide seaward of the revetment (the area located directly above the buried toe) and reduces the amount of excavation to 4,200 cubic yards. (See Table 5 – Comparison of Impacts to Ecological Communities of the 2005 Revetment Design versus the 2015 Revetment Design.)

The New York Natural Heritage Program (NYNHP) has designated an area of Marine Rocky Intertidal Habitat at Montauk Point within the intertidal zone on the northern end of the revetment (see Figure 7 – New York Natural Heritage Program Natural Ecological Communities). This community type is described as having substrate composed of natural to artificial rock including large angular rocks placed at the base of the sandy bluff for erosion control. The impacts to this habitat type slightly increased, from approximately 0.10 acres in the 2005 revetment design, to 0.13 acres in the 2015 revetment design (see Figure 9 - Impacts to Marine Rocky Intertidal Habitat and Maritime Beach Habitat). This increase of 0.03 acres is not considered to be significant.

The August 21, 2014 Planning Aid Letter (PAL) from the USFWS reconfirmed the conclusion of the 2005 EIS that construction of the project would result in the creation of new rocky intertidal habitat at the toe of the new revetment and that the habitat developed would be approximately the same quantity and quality as the habitat lost due to construction. Thus, no net loss of in-kind habitat value would be experienced as a result of the project (see Table 5 –

Comparison of Impacts to Ecological Communities of the 2005 Revetment Design vs. the 2015 Revetment Design) and Appendix A – Pertinent Correspondence Received for the Planning Aid Letter (PAL) from the USFWS dated August 21, 2014.)

The conclusion of this evaluation is that the 0.08-acre increase in impact to intertidal habitat as a result of the 2015 revetment design modifications would not significantly impact the value of the habitat. Similar to the conclusion of the 2005 EIS, the construction of the project would result in the creation of new rocky intertidal habitat at the toe of the new revetment and that the habitat developed would be approximately the same quantity and quality as the habitat lost due to construction. The minor, temporary and localized suspended sediment generated by revetment construction would quickly settle out of the water column, and would not result in significant sedimentation in the project area.

A letter received from the USFWS August 21, 2014 had the following recommendation:

> 1) The Corps shall use Access Road 1 and Alternative Access Road 2 (as referred to in the 2005 Draft Environmental Impact Statement [U.S. Army Corps of Engineers 2005]) for construction access and avoid using Access Road 2 to minimize impacts associated with off-road vehicle and equipment traffic on the beach (Corps agreed to this recommendation in their Draft Environmental Impact Statement [U.S. Army Corps of Engineers 2005]); and
>
> 2) Coordinate with the New York State Department of Environmental Conservation (NYSDEC) regarding survey protocols for state-listed plant and bird species and measures to avoid/minimize project impacts. Conduct surveys to identify and locate species presence and obtain NYSDEC permits (if needed).

Coordination is on-going with NY State and any agreed to surveys would be done during the design phase of project.

4.3.2 Beaches and Dunes – The same access roads and staging areas proposed in the 2005 FS and EIS would be used during construction of the current revetment (see Figure 6 - Access Roads and Staging Areas). A natural community designated by the New York Natural Heritage Program (NYNHP), referred to as Maritime Beach, is located in the southern end of the project area (see Figure 7 – New York Natural Heritage Program Natural Ecological Communities). The permanent impact to Maritime Beach habitat was reduced from 0.23 acres, associated with the 2005 revetment design, to 0.18 acres with the current revetment design (minus 0.05 acres of impact). (See Figure 9 - Impacts to Marine Rocky Intertidal Habitat and Maritime Beach Habitat and Table 5 – Comparison of Impacts to Ecological Communities of the 2005 Revetment Design vs. the 2015 Revetment Design.)

There will also be approximately 0.46 acres of temporary impacts to Maritime Beach habitat as this area will be used by construction vehicles to access the revetment during construction. This area was proposed for construction access in the 2005 revetment plan and has been used previously for revetment maintenance and therefore, no additional impacts would be expected.

Figure 9 – Impacts to Marine Rocky Intertidal Habitat and Maritime Beach Habitat

4.3.3 Vegetated Uplands and Bluffs – The same access roads and staging areas proposed in the 2005 FS and EIS would be used during construction of the current revetment (see Figure 6 - Access Roads and Staging Areas). The use of construction equipment in these areas has the potential to directly and indirectly impact these community types. As a result of this potential impact to these communities, access roads and staging areas limits would be clearly marked with stakes and flagging. These areas would also be monitored during construction to ensure road widths and designated staging areas are not widened or extended beyond the designated area or the existing condition.

In addition, soil and water protection measures along access roads and at staging areas to protect adjacent vegetated habitats from excess erosion caused by construction equipment use. In addition, the 2015 revetment is one foot higher on the bluff face than the 2005 revetment design. Therefore, there would be some minor impact to the vegetation on the bluff (an estimated 200 square feet); however, this is not expected to significantly impact the value of the bluff habitat (see Table 5 – Comparison of Impacts to Ecological Communities of the 2005 Revetment Design vs. the 2015 Revetment Design). No additional impacts to vegetated uplands would be expected. The coastal bluffs surrounding the Lighthouse would receive protection from erosion through implementation of the selected alternative.

4.3.4 Wetlands - No direct or indirect impacts to freshwater wetlands, coastal ponds, or interdunal swales are expected due to construction of the stone revetment. The new revetment would essentially replace and stabilize the existing revetment within the existing revetment footprint and construction access and staging would be confined to existing roads and designated staging areas.

There are two small colonies of Common Reed on the face of the bluff located above the existing revetment which are supported by groundwater seeps. Since the 2015 revetment is one foot higher on the bluff face than the 2005 revetment design, there would be some minor impact to these wetland areas. Common Reed is an invasive plant species of low habitat value and therefore, this is not considered to be a significant impact to project area wetland resources.

Impacts to the marine wetlands (M2US2P, M2AB1N, and M2USIP), that comprise the sand and cobble shores and intertidal habitat in the project area, have been previously described in Section 4.3.1 Marine Rocky Intertidal Habitat.

Table 5 – Comparison of Impacts to Ecological Communities of the 2005 Revetment Design vs. the 2015 Revetment Design

	Ecological Community	**2005 Revetment Design (impact area beyond the footprint of the existing revetment)**	**2015 Revetment Design (impact area of the footprint of the 2015 revetment)**	**Incremental difference in impact area for 2015 Revetment Design**
Permanent Impacts	Total Intertidal Habitat[1]	0.7 acres	0.78 acres	+0.08 acres
	Note: Rocky Intertidal Habitat and Maritime Beach acreages are included in the acreage for Total Intertidal Habitat (above)			
	Rocky Intertidal Habitat[2]	0.10 acres	0.13 acres	+0.03 acres
	Maritime Beach[3]	0.23 acres	0.18 acres	- 0.05 acres
	Vegetated Upland Bluff	-	200 square feet	+200 square feet
Temporary Impacts	Intertidal and Subtidal Habitat	Construction of buried toe impacts 60 feet seaward of the revetment 32,000 cubic yards	Construction of imbedded toe impacts 25 feet seaward of the revetment 4,200 cubic yards	-35 feet of impact seaward of the revetment -27,800 cubic yards
	Maritime Beach	0.46 acres	0.46 acres	0

[1] The toe of the 2015 revetment design meanders with topography along the toe the previous 2003 design (ranging from 10 feet seaward to -4 feet landward),

[2] Designated by the New York Natural Heritage Program (see Figure 7 – New York Natural Heritage Program Natural Ecological Communities and Figure 9 – Impacts to Marine Rocky Intertidal Habitat and Maritime Beach Habitat)

[3] Due to 1 feet increase in elevation of the 2015 revetment design (includes minor impacts to an area of *Phragmites* for which hydrology is supported by a groundwater seep).

4.4 WILDLIFE

A Fish and Wildlife Coordination Act Report (FWCAR) was submitted to the USACE by the USFWS on July 31, 2003. The FWCAR incorporates consultations with the NYSDEC and NMFS, regarding existing fish and wildlife resources, anticipated impacts, and recommendations for avoidance and minimization of impacts. Overall, the USFWS concluded the impacts to fish and wildlife resources occurring within the footprint of the proposed construction area would be minimal. Coordination with the USFWS confirmed the conclusions of the 2003 FWCAR in light of existing conditions and design refinements. (See Appendix A – Pertinent Correspondence

Received for the Planning Aid Letter (PAL) from the USFWS dated August 21, 2014 and confirmation by the USFWS dated January 14, 2015 that no further coordination is required under the Endangered Species Act.)

4.4.1 Benthic Communities - The conclusion of the 2005 EIS was that construction of the revetment would impose a one-time, temporary impact on existing benthic communities. Varying degrees of mortality of less motile benthic organisms (e.g., polychaetes, isopods, amphipods, clams, periwinkles) would be expected within the footprint of the revetment. More motile species such as the American lobster and crab species would be expected to suffer the least mortality of the benthic communities.

The minor, temporary and localized suspended sediment generated by revetment construction would quickly settle out of the water column, and would not result in significant sedimentation in the project area. The sedimentation that settles may have the potential to cover the openings of dwellings of adjacent benthic organisms (e.g., polychaetes, clams, and crabs). However, these organisms are typically adapted to living in the naturally harsh conditions of the project area (i.e., exposure to high energy waves and potential for desiccation), and therefore would not be significantly impacted by the minor, temporary increase in sedimentation of adjacent waters during construction of the project.

Some changes to species composition and density will occur from a shift in low intertidal and subtidal habitat to rock revetment in the low intertidal and mid intertidal area. Kelp and sea urchin, typical of the low intertidal area, are expected to recolonize the rock revetment in the low intertidal area. Species such as polychaetes, isopods, amphipods, clams, and periwinkles in the subtidal area, are expected to be replaced with species more typical of the mid-intertidal zone, such as sessile barnacles, mussels, chitons and aquatic vegetation such as rockweed which provides cover and substrate for many plants and animals. There is a gap in available scientific data that focuses specifically on the timeframe for the recovery of macrofauna following the installation of riprap. However, once recovery occurs, which would be expected within several years, research shows that boulder habitat provides similar habitat value to more dispersed boulder and cobble substrates. For example, Auster, 1998 cites "dispersed boulder-cobbles" as "less complex habitat" than "piled boulders" and Auster and Langton, 1999 cites that “piled boulders” habitat provide more complexity than “partially buried or dispersed boulders” and “pebble-cobble” habitats. Davis et al., 2002 examined marine community composition (fish, invertebrates and algae) at shorelines stabilized with riprap compared to natural rocky intertidal areas and Davis et al., 2006 compared macrofauna at five habitat types (riprap, oyster shell, woody debris, vegetation and bare sediment). The Davis et al., 2002 and 2006 studies found the density and diversity of macrofauna in riprap to be comparable to the other natural environments studied.

With regard to the temporary impacts to benthic resources associated with the installation of the imbedded toe, based upon research of dredging operations, recolonization of the dredged areas should take place within a short period of time by organisms in the surrounding areas and from seasonal recruitment. The post-dredging community should closely resemble the existing community since there will be no change in sediment structure. Newell et al., 2004 provided a time sequence of recovery of macrofauna in coastal marine deposits in an area of high energy

after cessation of dredging activities. Initial colonization of small mobile species and larval recolonization was seen in as little as 7 days, but it took about 100 days for species diversity to be restored within 70-80% of that occurring in surrounding areas. At about 175 days, population density is restored to 60-80% of that in surrounding area. Restoration by growth of individuals or biomass takes about 2 to 3 years.

Recolonization by higher trophic level organisms would be expected to occur soon after early successional species colonization. Studies have demonstrated relatively rapid recolonization and recovery of the benthic community (USFWS 2003), especially in areas of high sediment mobility (Hall et al. 1991 in USACE 2015) such as the conditions present at the project area. The USFWS's 2003 FWCAR concluded that, due to the amount of data supporting the rapid recovery of benthic organisms, there will be limited impacts to the subtidal benthic community as a result of project implementation except in areas of direct stone placement where infaunal communities would be replaced with epifaunal communities. The minor design refinements to the 2005 revetment profile are not expected to significantly increase impacts to benthic communities in the project area. As well, the construction of a slightly imbedded toe versus a buried toe significantly reduces temporary construction impacts within an area approximately 25 feet wide seaward of the revetment (the area located directly above the buried toe). Coordination with the USFWS confirmed the conclusions of the 2003 FWCAR in light of existing conditions and design refinements. (See Appendix A – Pertinent Correspondence Received for the Planning Aid Letter (PAL) from the USFWS dated August 21, 2014.)

4.4.2 Finfish and Shellfish - The conclusion of the 2005 EIS was that construction of the stone revetment would impose a one-time, temporary impact on the existing finfish and shellfish species at the nearshore area of the project area. During construction, finfish species that feed in the nearshore waters of Montauk Point, such as black sea bass and striped bass, would experience a short-term displacement and/or removal of food sources that live on and/or nearby the existing revetment. As such, motile finfish species are expected to leave the area to avoid construction related disturbances and/or seek out appropriate food sources in areas adjacent to the project area. Temporarily displaced finfish are expected to return to the project area and recruitment from adjacent habitats is expected to occur after completion of construction. This recolonization would likely follow the recovery of the benthic communities which is expected to be rapid (see Section 4.4.1).

Similar to other benthic organisms, sessile shellfish species that are attached to hard surfaces of the existing revetment, such as blue mussel and common oyster, would experience a one-time, short-term impact from construction of the revetment. Motile shellfish species such as American lobster and Atlantic rock crab would also experience a onetime, short-term impact resulting from the temporary removal or disturbance of potential shelters and food sources. However, similar to the finfish species in the project area, recolonization of the project area by shellfish species is expected to occur after completion of the project construction.

Construction of the revetment in the nearshore area of Montauk Point would cause a slight temporary increase in turbidity to the adjacent waters of the project area. Increases in turbidity could affect the settling rate of shellfish ova and larva, and can clog and damage the gills of fish species (Uncles et al. 1998 in USACE 2005). However, the majority of finfish and

shellfish occurring in the project area are adapted to wide fluctuations in turbidity such that these indirect impacts to finfish and shellfish area expected to be minimal.

The minor design refinements to the 2005 revetment profile are not expected to significantly increase impacts to finfish and shellfish in the project area. As well, the construction of a slightly imbedded toe versus a buried toe significantly reduces temporary construction impacts within an area approximately 25 feet wide seaward of the revetment (the area located directly above the buried toe). Coordination with the USFWS confirmed the conclusions of the 2003 FWCAR in light of existing conditions and design refinements. (See Appendix A – Pertinent Correspondence Received for the Planning Aid Letter (PAL) from the USFWS dated August 21, 2014.).

4.4.3 Essential Fish Habitat - Temporary impacts on Essential Fish Habitat (EFH) are predicted during periods of active construction of the revetment and in the short-term. Habitat would be temporarily degraded as a result of elevated suspended sediment levels, temporarily lowering visual feeding efficiency, and irritating gill tissue. However, the suspended sediments are expected to settle quickly out of the water column. Therefore, no long-term adverse impacts on the water quality aspects of EFH are expected.

Although sessile benthic invertebrates within and immediately adjacent to the permanently impacted intertidal zone would likely be destroyed or smothered during construction, benthic communities would naturally begin to re-establish nearby areas shortly after construction is completed. (See Section 4.4.1. Benthic Communities for additional information on species composition and density for the recovery of habitats associated with a shift from subtidal habitat to rock revetment.) Of the EFH species that have designated habitat in the project area, the species that are most likely to utilize areas in close proximity to the selected project plan footprint are those that occur in shallow-depth coastal waters with sandy substrates. Certain bottom dwelling species known to occur in areas of shallow-depth and sandy substrates, such as the flounder species, will lose a small amount of habitat as a result of the permanent placement of materials for the revetment. However, the total area that will be lost is minor in comparison to the remaining areas of this type of habitat available in the project vicinity. Further coordination would be conducted with the NMFS and USFWS should issues of seal haul out arise during the construction phase of the project.

The NMFS evaluated the existing resources and anticipated impacts of implementation of the 2005 revetment project in conjunction with the public and agency review period for the 2005 Draft EIS (an EFH Assessment was provided in Appendix D of the 2005 Draft EIS). The NMFS determined at that time that there are no anticipated impacts based on the proposed project. At the present time, the list of managed species and life stages for the project area remains the same as those identified in the EFH Assessment prepared for the 2005 EIS (NMFS 2014b). Although the 2015 revetment design increases the revetment footprint approximately 0.08 acres, this increase was not expected to significantly impact EFH listed species in the project area. As well, the construction of a buried toe, as proposed in the 2005 revetment design, would have necessitated the excavation of over 32,000 cubic yards of sediment material from an area approximately 25 feet wide seaward of the revetment (the area located directly above the buried toe). The construction of a slightly imbedded toe versus a buried toe reduces the amount

of excavation to 4,200 cubic yards which significantly reduces temporary construction impacts. Therefore, the EFH Assessment that was prepared for the 2005 EIS is considered to be relevant to the currently proposed project and a copy provided in Appendix B of this EA. Furthermore, in a letter dated December 19, 2014, the NMFS determined that because of the dynamic nature of the area of the proposed revetment and the minor change in the scope of the project, the NMFS has no further comment or conservation recommendations to provide for the proposed activity (see Appendix A – Pertinent Correspondence Received).

4.4.4 Reptiles and Amphibians – The primary construction impacts would be concentrated in and around the intertidal, subtidal, and beach areas where reptile and amphibians would not likely occur. In addition, existing parking lot and access roads would be used for construction equipment and material staging and access, such that no direct or indirect impacts to vegetated reptile and amphibian habitats are expected.

4.4.5 Birds – The 2005 FS and EIS concluded that construction activities would result in the temporary and permanent loss of marine intertidal gravel sand beaches, maritime beaches, and maritime rocky intertidal habitats. Temporary impacts would be those associated with the construction of the revetment, as the presence of construction machinery and human disturbance may deter some species from utilizing the project area during construction. The loss of beach habitat could negatively impact several species of shorebirds that utilize the beaches for feeding and resting, such as the spotted sandpiper and sanderling during construction. However, this temporary disturbance was not expected to significantly impact bird species. Birds utilizing the project area are expected to resume their normal habits upon cessation of construction activities. As well, the loss of Maritime Beach habitat (as designated by the NYNHESP), located in the southern portion of the project area, was reduced from 0.23 acres to 0.18 acres with the current revetment design because the current revetment design does not extend as far south as the previous design.

4.4.6 Mammals – Construction equipment traveling over terrestrial habitat could result in the temporary disturbance of habitat and possible mortality of less mobile, burrowing, and/or denning species of mammals during construction activities. The potential impacts are expected to be of minimal significance because vegetated environments would not be impacted by the project. In addition, the roads and access areas have been used previously have been subject to compaction and are generally devoid of vegetation and therefore, avoided by wildlife. Following construction, wildlife species are expected to resume their normal habits consistent with post-construction habitat availability in and within the vicinity of the project area.

Although there is a seal haul out area located one mile to the north, northeast of the project area, seals do not appear to utilize the Lighthouse revetment or the beach proximal area (USFWS 2003 in USACE 2005 and USFWS 2014). It appears that the human presence, local topography, hydrodynamics, and food availability at the Lighthouse limit the desirability of the area for seal activities. Further coordination with the NMFS and the USFWS would be conducted should issue of seal haul out arise during the construction phase of the project.

4.5 THREATENED AND ENDANGERED SPECIES AND COMMUNITIES OF SPECIAL CONCERN

The evaluation of impacts on threatened and endangered species and communities of special concern is based on the information provided in the 2003 Fish and Wildlife Coordination Act (Section 2(b)) Report which is included in Appendix E of the 2005 Montauk Storm Damage Reduction Project EIS.

4.5.1 Federal Species of Concern – Although several species of Federally-listed endangered and threatened species of animals and plants (discussed in Section 3.5.1) can be expected to occur in the general vicinity of the project area at any time (USFWS 1992, Beach 1992 in 2005 USACE), no impacts to these species are expected to occur as a result of construction of the stone revetment alternative (USFWS 2003 in USACE 2005 and USFWS 2014).

The sea turtle and marine mammal species listed in Section 3.5 are highly mobile and are considered transient species in the project area (Beach 1992 in USACE 2005). Therefore, these species are unlikely to be present or would avoid the project area during construction. Furthermore, the construction of the revetment is not expected to negatively impact the preferred habitat of these species because they do not breed in the region and are considered pelagic.

Although the Federally and state-listed endangered sandplain gerardia *(Agalinis acuta)* has been historically known to occur at several locations within the project area, this species has not been recorded in the area since 1927. NAN personnel, along with local naturalists and biologists, concluded following several site visits that the sandplain gerardia is no longer present in the project area and therefore, would not be impacted by the project.

The 2003 FWCAR concluded that no Federally-listed or proposed endangered or threatened species under the jurisdiction of the USFWS are known to exist within the project impact area and that no habitat in the project area is currently designated or proposed critical habitat in accordance with the provisions of the Endangered Species Act (ESA) (2005 Montauk Storm Damage Reduction EIS, Appendix E). Coordination was undertaken with the USFWS by e-mail dated July 11, 2014 and also to the NYSDEC by letter dated December 17, 2013 to reconfirm that information previously provided is currently relevant. Additionally, a letter received from the NMFS, dated 19 December 2013, concluded that no species listed under the jurisdiction of the NMFS will be exposed to any direct or indirect effects of the proposed project and no further coordination under the ESA is required.

4.5.2 State Species of Concern – Impacts to the state-listed rare Seabeach knotweed, endangered Small's knotweed, and threatened saltmarsh spike rush and southern arrowwood, which may be present within the project area (USFWS 2003, NYSOPRHP 2003 in USACE 2005 and NYNHP 2014), are not expected because construction activities would not impact vegetated areas. In addition, NAN would implement soil and water protection measures and monitoring along access roads and staging areas to protect adjacent vegetated habitats from excess erosion caused by equipment use.

The state-listed threatened northern harrier may breed in the general vicinity of the project area. The northern harrier is commonly associated with vegetated tidal wetlands and marshes. It nests on the ground, usually in dense vegetation. The state-listed threatened least bittern usually breeds in freshwater marshes. Three species of special concern; the red-shouldered hawk, osprey and whip-poor-will may also breed in the general vicinity of the project area. The red-shouldered hawk nest in large trees, the osprey similarly builds a large nest in large trees or on artificial nest structures, and the whip-poor-will prefers open hardwood or mixed woodlands of pine, oak, and beech, particularly younger stands in fairly dry habitats (USFWS 2003 in USACE 2005). Because the project would not impact vegetated habitats, impacts to these species or their habitats are unlikely.

The Hairy–necked Tiger Beetle is listed as being **c**ritically imperiled in New York State. The habitat is maritime beach at the eastern end of Long Island (NYNHP 2014). Due to the rarity of the species, it would be unlikely to be found in the project area. In addition, the proposed project would use a portion of the maritime beach has been used previously for the construction in repair of the existing revetment. Impacts to the Hairy-necked Tiger Beetle would not be expected as a result of the proposed project.

Although impacts to the plant and animal species discussed above would be unlikely, NAN would conduct pre-construction surveys for state-listed plants and birds and would coordinate with the NYSDEC regarding proper survey protocols as recommended in the USFWS's 2003 FWCAR (2005 Montauk Storm Reduction Project EIS, Appendix E). Further coordination with the NYSDEC would be initiated regarding recommendations to minimize and avoid disturbance if listed species are encountered.

4.5.3 Areas or Communities of Special Concern and/or Management – Because the project is, for the most-part, an in-kind replacement of the existing structure the stone revetment alternative would have no effect on the ability of the project area to continue to play an important role as part of the USFWS's Montauk Peninsula Significant Habitat Complex, the USEPA's Peconic Estuary, and the National Audubon Society's IBA. Montauk Point would continue to function as an important area for waterfowl, seabirds, and shorebirds.

4.6 SOCIOECONOMICS

4.6.1 Demographic Characterization – The stone revetment alternative is expected to have no effect on the demographic characteristics associated with the project area vicinity.

4.6.2 Economy and Income - The stone revetment alternative is expected to have a beneficial, long-term effect on the economic characteristics of the project vicinity. The protection of Montauk Point future erosion and storm damage preserves the bluff top and the Lighthouse for continued use by seasonal and permanent residents. This would enable a continuing contribution to various aspects of the local economy in support of the recreational uses of the project area.

The stone revetment alternative is expected to have limited short-term impacts on the local economy during the 18 month construction period. However, this short-term impact to the

local economy would be limited because areas adjacent to the project area, including Turtle Cove and Camp Hero State Park, would remain open and usable to the public. In addition, the construction schedule would not have an effect on access to the Montauk Point Lighthouse or its regularly scheduled hours of operation.

To mitigate any potential short-term impacts on the local economy, as part of the preparation of the 2005 FS and EIS, NAN coordinated with the Montauk Historical Society and NYSOPRHP to develop a plan that would minimize impacts on access as well as the aesthetic setting during construction. The plan included limiting the time of day when equipment and heavy-duty trucks access the area to off-peak visitation hours to reduce the negative impact that these vehicles may have on traffic and the relatively quiet, peaceful setting provided by the Montauk Point State Park. In addition, reduced access to the revetment and portions of the beach would be ameliorated by allowing limited access to the current revetment for fishing during the construction period to the maximum extent practicable without causing a safety hazard. This was proposed to be accomplished by initiating construction on the south end of the revetment while having a delayed construction start date on the north end of the revetment. This delay could allow a few additional months of access to the revetment by fisherman and could be scheduled to encompass peak use times for fishing (September to November). However, eventually the entire revetment and staging areas immediately adjacent to the northern and southern ends of the revetment would need to be closed to the public. At that time, fisherman would still be able to fish from the adjacent beach areas. In addition, a plan for notice and signage to the shorefront for sightseers, trail walkers, and fisherman would also be developed as needed during construction. The implementation of the above measures would reduce the impacts to access and aesthetic setting at Montauk Point.

The current revetment plan construction sequencing has been modified such that the entire revetment would be constructed simultaneously. The overall construction timeframe has been reduced from 2 years, as estimated in the 2005 FS and EIS, to the currently estimated construction period of 18 months. Access to the revetment during the construction period would not be allowed due to potential liability. Once construction begins, fishermen would still be able to fish from the adjacent beach areas. Further coordination with the Montauk Historical Society, NYSOPRHP, Montauk Surfcasters Association and the New York Sport Fishing Federation will be undertaken to discuss the revetment construction plan during the design phase. Project, truck traffic during, normal weekday working hours 7am to 5 pm would occur to support project completion in 18 months.

4.6.3 Housing –The stone revetment alternative is expected to have no effect on the housing characteristics associated with the project area vicinity at the present time or in the future. The project area and vicinity is currently developed as recreational or open land.

4.7 CULTURAL RESOURCES

As previously described, all cultural resources investigations conducted at the Lighthouse were conducted in accordance with the *Secretary of the Interior's Standards and Guidelines for Archaeological Documentation* (48 FR 44734-37) and the *Treatment of Archaeological Properties: A Handbook* (ACHP 1980). Information provided by the documentary record for

the Project area, as well as data from the archaeological investigations, have identified the potential effects of the proposed actions on cultural resources at the Lighthouse and recommendations for avoiding, reducing or mitigating these potential effects.

The Lighthouse tower and keeper's house are a National Historic Landmark. Based on the results of previous cultural resources investigations, several of the archaeological sites uncovered around the Lighthouse are contributing elements to the National Historic Landmark under several of the prescribed criteria. Furthermore, the other extant structures are also key and contributing elements to the National Historic Landmark, possessing integrity and significance based upon the characteristics of location, setting, feeling, association and design, including "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects, united historically or aesthetically by plan or physical development (US Department of the Interior n.d.).

The current revetment plan would place the new revetment on top of the existing revetment on the slope of the bluff to the toe. The prior construction of the revetment and storm damage reduction elements along the bluff would have disturbed any archaeological resources located in this area. The installation of the new revetment would only extend the toe of the revetment below the water. The access areas were previously used in the construction of the existing revetment. The current revetment plan would not have an adverse effect on the National Historic Landmark or any key or contributing elements within the APE.

The construction of the current revetment plan may require the removal or movement of the fire control bunker that has been sitting on the beach (see Figure 2, left of center). The fire control bunker eroded out of its original location in 1951. If construction activities require the bunker to be moved or removed from its current location, the bunker may be offered to the Montauk Historical Society for its use on the site or placement elsewhere on the beach.

Consultation with the ACHP, the NYSOPRHP, the Montauk Historical Society and other interested parties is ongoing. Consultation with the Shinnecock Indian Nation regarding the effect of this project on resources of interest to the Shinnecock Indian Nation as well as regarding elements of the overall project are also ongoing (Appendix A).

4.8 AESTHETIC RESOURCES AND RECREATION

The Surfrider Foundation, Eastern Long Island Chapter, raised concerns regarding the impact of the proposed project on recreational surfing. In response to the Surfrider Foundation's concerns, the Corps performed an analysis to determine the potential effect of the proposed project in the 2005 FS on near shore breaking waves. The results of this analysis determined that the reflection coefficient for the existing revetment ranged from 0.30 to 0.33, whereas the reflection coefficient for the proposed revetment would range from 0.25 to 0.28, an approximate 15 percent reduction from that of the existing revetment.

This reduction was due to the milder front slope and the greater porosity of the thick layers of randomly placed stone of the proposed revetment. Based upon the modeling results, the Corps concluded that implementation of the 2005 proposed project would have little to no impact on the quality or surfability of the waves in the offshore waters of Montauk Point, and

may, in fact, have less impact than the existing structure. The currently proposed structure has the same slope and a similar foot print to the 2005 FS structure, thus no impact is anticipated to surfing.

During the preparation of the 2005 FS and EIS, a meeting was held between NAN, the Montauk Surfcasters Association and the New York Sport Fishing Federation to discuss the proposed project on May 8, 2003. Representatives were primarily concerned about access to the revetment for fishing. NAN informed the Montauk Surfcasters Association and New York Sport Fishing Federation that access to the revetment for recreation fishing would be restricted, and at times prohibited during construction. In coordination with these organizations, NAN developed a construction schedule that would allow fishermen limited access to the revetment area during the initial stages of construction. Under the current revetment plan, construction sequencing has been modified such that the entire revetment would be constructed simultaneously. The overall construction timeframe has been reduced from 2 years, as estimated in the 2005 FS and EIS, to the currently estimated construction period of 18 months. Access to the revetment during the construction period would not be allowed due to potential liability issues. Once construction begins, fishermen would still be able to fish from the adjacent beach areas. Public access would be provided to Turtle Cove through the existing footpath leading down from Old Montauk Highway. During design NAN will coordinate with the Montauk Surfcasters Association and the New York Sport Fishing Federation to discuss the construction plan.

4.9 CLEAN AIR ACT CONFORMITY REVIEW (GENERAL & GREENHOUSE GASES)

The recommended Plan will produce temporarily localized emission increases from the diesel powered construction equipment working onsite. The localized emission increases from the diesel powered equipment will last only during the project's construction period and then end when the project is over, thus any potential impacts will be temporary in nature.

As stated in Section 3.9, Suffolk County has been designated with the following attainment status with respect to the National Ambient Air Quality Standards (NAAQS) for criteria pollutants: marginal nonattainment area for the 2008 8-hour ozone standard and a maintenance area for the 2006 particulate matter less than 2.5 microns (PM2.5) standard. The county is part of the Ozone Transport Region. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NOx) and volatile organic compounds (VOCs). Sulfur dioxide (SO2) is a precursor for PM2.5. Because of these designations and since the project is a Federal Action taken by the USACE, this project triggers a General Conformity Review under 40 CFR §93.154. General Conformity ensures that Federal Actions do not have a negative impact on State Implementation Plans (SIPs).

The emissions associated with the project are estimated as part of the General Conformity Review and are summarized below, by calendar year. The following emission estimates were made utilizing the project-related equipment list for the entire project: 21.2 tons NOx, 0.4 tons VOC, 0.01 tons SO2, and 0.4 tons PM2.5 (see EA Appendix D).

As per the annual de minimis trigger levels for General Conformity review (40 CFR §93.153 (b)) the Montauk Point's General Conformity-related emissions are significantly below

the de minimis levels for NOx (100 tons in any year), VOC (50 tons in any year), PM2.5 (100 tons in any year), and SO2 (100 tons in any year). Therefore by rule, Montauk Point is considered de minimis and will have only a temporary impact around the construction activities with no significant impacts.

The primary GHG emitted by diesel-fueled engines is CO2. The project is estimated to generate a total of 1,158 metric tons of CO2, which is equivalent to 245 passenger vehicles' annual CO2 emissions[2]. The GHG emissions associated with the project will be temporary and insignificant compared to over 1.1 million registered passenger vehicles in Suffolk County.[3] The project is significantly below the evaluation level of 25,000 metric tons per calendar year that was included in the final draft of the CEQ guidance before it was finalized. Documentation of the GHG calculations is included in EA Appendix D.

4.10 PROTECTION OF CHILDREN

Executive Order 13045 "Protection of Children From Environmental Health Risks and Safety Risks" requires federal agencies to examine proposed actions to determine whether they will have disproportionately high human health or safety risks on children. During the construction phase of the proposed project, heavy construction equipment and vehicles will be transported to the site. In addition, there will be a temporary increase in truck traffic transporting materials to and from the site. These trucks will be limited to public roadways and the existing project access road and increased traffic will be temporary (an estimated duration of 18 months). Therefore, the proposed project is not expected to cause any disproportionate direct, or indirect or cumulative environmental health or safety risks to children.

4.11 ENVIRONMENTAL JUSTICE

In accordance with Executive Order 12898 (dated February 11, 1994), Federal agencies are required to identify and address the potential for disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations. Racial minorities comprise 25% of the Suffolk County population (SCPD 2009). However, the proposed project area is not located within a residential setting and therefore, construction of the stone revetment would not disproportionately affect minority populations. In 2007, there were 71,000 people in Suffolk County living in poverty, 5% of the population according to the U.S. Census Bureau (SCPD 2009). Again, because the proposed project area is not located within a residential setting, no impacts are expected on the county's low-income community. No adverse human health impacts are anticipated to result from the increased level of erosion and storm protection that the project would provide.

[2] EPA Greenhouse Gas Equivalent Calculator, *www2.epa.gov/energy/greenhouse-gas-equivalencies-calculator*, accessed 8 February 2017

[3] NYS Department of Motor Vehicles, NYS Vehicle Registrations on File – 2015, *dmv.ny.gov/statistic/2015ReginForce-Web.pdf*, accessed 8 February 2017

4.12 SUSTAINABLE DESIGN AND DEVELOPMENT

The concept of sustainable development has surfaced recently as an important consideration in the implementation of Corps water resources development projects. Economic prosperity, social well being and environmental quality, the three fundamental sustainable development principles, are integrated into the planning process to foster the "smart growth" vision of the future. The U.S. Army Corps of Engineers (USACE) Districts are required to begin incorporating sustainable design and development (SDD) principles into the design, development, and construction of Corps projects in accordance with Executive Order 13123 and other applicable laws and Executive Orders.

The Sustainable Design and Development Principals are as follows:

- Meets the needs of the present without compromising the quality of life of future generations.
- Maintains economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to life in a pleasant and healthy environment.
- Meets human needs by maintaining a balance between development, social equality, ecology, and economics.
- Demands systematic considerations of environmental impact, energy use, natural resources, economy, and quality of life.
- Has optimal benefit only when addressed at the inception of a project, and throughout the entire life cycle of a project -- from concept to planning, to programming, design, construction, and ownership.

The 2005 Montauk Point Storm Damage Reduction FS and EIS were prepared under the authority of a resolution adopted by the Committee on Environment and Public Works of the U.S. Senate on May 15, 1991. A second resolution, also dated May 15, 1991 authorized the study of interim emergency protection works until a comprehensive project was formulated, designed and constructed. The Final Report of the Chief of Engineers on the Montauk Point, New York, Hurricane & Storm Damage Reduction Project was provided to Congress on March 31, 2006 and the project was authorized in the Water Resources Development Act (WRDA) of 2007. The proposed stone revetment would provide protection to the nationally recognized historic Montauk Point Lighthouse and other cultural and natural resources in the project area. Much of the stone already on site as part of the existing revetment structure would be used to construct the new revetment, thus making good use of existing resources. The project is not expected to negatively impact present surfing conditions and access for fishing would be only temporarily restricted. The stone revetment would have the least impact on intertidal, subtidal waters, and benthic substrate of all the alternatives considered. Because the bluff face and Lighthouse provide protection without having a negative effect on surfing, fishing, and tourism, this alternative is expected to have a beneficial effect on cultural resources and socioeconomics of the project area. The proposed plan to protect the Lighthouse for future generations is consistent with the Sustainable Development Principles.

This Environmental Assessment (EA) was prepared to comply with Council of Environmental Quality and USACE regulations for implementing the National Environmental Policy Act of 1969 (NEPA). NEPA requires the federal government to consider the

environmental effects of a proposed action and solicit comment during the planning process from interested agencies, groups and the general public. These processes assure that the environmental effect of a proposed action, with regard to the balance of development, social equality, ecology and economics, consistent with the established Sustainable Design and Development Principals, were considered in the development of this project and will be realized throughout the entire life cycle of the project.

4.13 ACTIONS TO MINIMIZE ENVIRONMENTAL IMPACTS

The construction of the stone revetment alternative would result in certain unavoidable adverse impacts on the environmental resources located within the project area. These impacts include an increase in traffic, an increase in noise levels due to construction equipment, an increase of turbidity and sedimentation into water resources during construction, loss of less mobile wildlife including shellfish and other benthic organisms, and disruption of aesthetic, visual, and recreational resources. However, implementation of the stone revetment alternative is expected to generate numerous long-term beneficial impacts that would offset temporary adverse environmental impacts. These long-term beneficial impacts include the protection of the most vulnerable portion of the bluff area from failure, offering protection to the Turtle Hill Plateau, the Lighthouse and associated structures, and other historically important resources. This protection would provide long-term protection to the socioeconomics of the area through the preservation the aesthetic, visual, historic, and recreational appeal that the project area currently offers.

To minimize adverse impacts during the construction of the revetment, NAN would implement standard protection measures for soil and water (i.e., erosion and sedimentation controls) and other resources during and after implementation of all activities associated with construction. In addition, during the design phase of the project, NAN would coordinate with the NYSDEC to determine proper protocol for conducting pre-construction surveys for state-listed plants and birds. Further coordination with the NYSDEC would be initiated regarding recommendations to minimize and avoid disturbance if listed species are encountered. Also, coordination would be conducted with the NMFS and USFWS, if necessary, regarding changes to anticipated seal haul out areas within the project vicinity. In addition, during design NAN will coordinate with the Montauk Historical Society, NYSOPRHP, Montauk Surfcasters Association and the New York Sport Fishing Federation to discuss the revetment construction plan and fishing accessibility. The cost of these additional environmental tasks is included in the pre-construction engineering and design (PED) project cost estimate.

4.14 CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) definition of cumulative impacts as found in 40 Code of Federal Regulation (CFR) Section 1508.7 is as follows: "Cumulative Impact is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or persons undertakes such other acts." The continued erosion of the coastal bluff at Montauk Point has been recognized as a problem for many years. Erosion control measures have been constructed by both governmental and non-governmental agencies starting in 1946, to the most recent efforts in 1992 to protect the historic lighthouse, cultural and

natural resources and recreational benefits of the project area. The 2005 Montauk Point Storm Damage Reduction project included primarily the in-kind replacement of the existing stone revetment to reduce the further progression of erosion from repeated storm damage and storms that exceed the current level of protection. A comprehensive cumulative impacts assessment for the proposed revetment project was included in the 2005 Montauk Point Storm Damage Reduction EIS. The analysis identified baseline conditions upon which cumulative impacts were assessed, identified the area of potential effect that would be considered, identified and briefly described reasonably foreseeable future actions within the cumulative impact zone, and evaluated subsequent cumulative impacts by resource area. The conclusion of this analysis was that no significant negative cumulative effects would be expected on project area resources (e.g., topography/geology/soils, water resources, ecological communities, threatened and endangered species, socioeconomics, cultural resources, etc.). (For detailed information about the cumulative impacts assessment for the revetment project, a copy of the EIS can be downloaded from the NAN public website at http://www.nan.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/11241/Article/11324/fact-sheet-montauk-point.aspx.)

Minor design refinements evaluated in the Montauk Point Hurricane Sandy Limited Reevaluation Report (HSLRR) included primarily the construction of an embedded toe rather than a buried toe, and incorporation of a lower bench or toe berm into the revetment design at 10 feet NAVD88 to enable equipment access to facilitate construction and future maintenance. These refinements increased the revetment footprint by 0.08 acres. However, this increase in impact to intertidal habitat was not considered to be significant as it is considered an in-kind replacement. Future related activities may involve maintenance to the revetment to maintain the revetment stability and assure the authorized level of protection. This minor change in the revetment footprint and future maintenance of the revetment are not expected to cause adverse cumulative impacts on project area resources (e.g., topography/geology/soils, water resources, ecological communities, threatened and endangered species, socioeconomics, cultural resources, etc.) currently or in the foreseeable future.

Since the preparation of the 2005 Montauk Point Storm Damage Reduction EIS, two projects in the vicinity of the Montauk project are being proposed; the Downtown Montauk Stabilization Plan and the Lake Montauk Harbor project in the town of East Hampton, New York. The first project, the Downtown Stabilization Plan, consists of vegetated dune reinforcement (sand filled geotextile bags with a sand cover) along 3,100 ft of the shoreline in downtown Montauk. The project will require 51,000 cubic yards (cy) of sand; dune grass will be planted on the dune crest and face. The second project, the Lake Montauk Harbor project, involves dredging approximately 140,000 cy of sand initially, placed within 2500 feet (ft); and dredging of an estimated 50,000 cy on a 5-year cycle to maintain navigable depth, placed within 1200 ft. These projects are proposed to address threatened infrastructure and navigation, respectively, as a result of erosion and deposition associated with the dynamic coastal erosion and sediment transport process. Stabilization of the dune in downtown Montauk and dredging in Lake Montauk are not expected to cause adverse cumulative impacts on environmental and cultural resources in the vicinity when added to the Montauk lighthouse project currently or in the foreseeable future.

4.15 CONCLUSIONS

The Stone Revetment was determined to be the best alternative in the 2005 Montauk Storm Damage Reduction FS/EIS. Only temporary, minimal impacts to the natural and cultural environment during the construction of 840-feet of revetment protection (73-year storm design) would be expected to occur. No long term significant impacts to either the natural or cultural environment were identified.

The authorized project was re-assessed under this HSLRR/EA study to confirm that the proposed project is still the most suitable design to ensure that the lighthouse resource is adequately protected. Minor design refinements were incorporated into the 2005 revetment design which included primarily the construction of an embedded toe rather than a buried toe, and a lower bench or toe berm at 10 feet NAVD88 to enable equipment access to facilitate construction and future maintenance. The revetment footprint increased slightly, by 0.08 acres, as a result of these changes to the revetment profile. However, this increase in impact to intertidal habitat was not considered to be significant. As well, there was a reduction in temporary intertidal habitat impact and water quality impacts through the construction of an embedded toe rather than a buried toe. No long term significant impacts to either the natural or cultural environment were identified in the evaluation of design refinements as presented in this HSLRR/EA report.

5.0 COMPLIANCE WITH ENVIRONMENTAL FEDERAL STATUTES AND EXECUTIVE ORDERS

Federal Statutes

1. Archaeological Resources Protection Act of 1979, as amended, 16 USC 470 et seq.

Compliance: Not applicable; Act applies to Federal lands.

2. Preservation of Historic and Archeological Data Act of 1974, as amended, 16 U.S.C. 469 et seq.

Compliance: Project has been coordinated with the State Historic Preservation officer.

3. American Indian Religious Freedom Act of 1978, 42 U.S.C. 1996.

Compliance: Must ensure access by Native Americans to sacred sites, possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

4. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: Public notice of the availability of this report to the Environmental Protection Agency is required for compliance pursuant to Sections 176c and 309 of the Clean Air Act. General Conformity under the Clean Air Act, Section 176c has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project/action because the total direct and indirect emission from this project/action have been

estimated at less than 50 tons per year (tons/year) of VOC (volatile organic compounds) and 100 tons/year NOx (nitrogen oxides) (40 CFR 93.153(b(1) & (2)) and the project/action is not considered regionally significant under 40 CFR 93.153(i).

5. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review is incorporated into the project report. An application shall be filed for State Water Quality Certification pursuant to Section 401 of the Clean Water Act.

6. Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 et seq.

Compliance: A CZM consistency determination wasprovided to the State for review and concurrence that the proposed project is consistent with the approved State CZM program.

7. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Coordination with the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) determined no formal consultation requirements pursuant to Section 7 of the Endangered Species Act were required.

8. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

Compliance: Not applicable; report is not being submitted to Congress.

9. Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 et seq.

Compliance: Public notice of availability to the project report to the National Park Service (NPS) and Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

10. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: Coordination with the FWS, NMFS and state fish and wildlife agencies signifies compliance with the Fish and Wildlife Coordination Act.

11. Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-4 et seq.

Compliance: Public notice of the availability of this report to the National Park Service (NPS) and the Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

12. Marine Protection, Research, and Sanctuaries Act of 1971, as amended, 33 U.S.C. 1401 et seq.

Compliance: Not applicable; the project does not involve the transportation or disposal of dredged material in ocean waters pursuant to Sections 102 and 103 of the Act, respectively.

13. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Compliance: Coordination with the State Historic Preservation Office signifies compliance.

14. Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. 3000-3013, 18 U.S.C. 1170

Compliance: Regulations implementing NAGPRA will be followed if discovery of human remains and/or funerary items occur during implementation of this project.

15. National Environmental Policy Act of 1969, as amended, 42 U.S.C 4321 et seq.

Compliance: Preparation of an Environmental Assessment signifies partial compliance with NEPA. Full compliance shall be noted at the time the Finding of No Significant Impact is issued.

16. Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance: No requirements for projects or programs authorized by Congress.

17. Watershed Protection and Flood Prevention Act as amended, 16 U.S.C 1001 et seq.

Compliance: Floodplain impacts were considered in project planning.

18. Wild and Scenic Rivers Act, as amended, 16 U.S.C 1271 et seq.

Compliance: Not applicable.

19. Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 et seq.

Compliance: Coordination with the National Marine Fisheries Service and preparation of an Essential Fish Habitat (EFH) Assessment signifies compliance with the EFH provisions of the Magnuson-Stevens Act.

20. Coastal Barrier Resources Act of 1982, 16 U.S.C. 3501 et seq.

Compliance: Coordination with the FWS signifies compliance with the provision of the Coastal Barrier Resources Act.

Executive Orders

1. Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971

Compliance: Coordination with the State Historic Preservation Officer signifies compliance.

2. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: 11988 Compliance Table Provided Below.

3. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Public notice of the availability if this report for public review fulfills the requirements of Executive Order 11990, Section 2 (b).

4. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not applicable to projects located within the United States.

5. Executive Order 12898, Environmental Justice, 11 February 1994.

Compliance: Not applicable; the project is not expected to have a significant impact on minority or low-income population, or any other population in the United States.

6. Executive 13007, Accommodation of Sacred Sites, 24 May 1996

Compliance: Not applicable unless on Federal lands, then agencies must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of such sacred sites.

7. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. 21 April, 1997.

Compliance: Not applicable if the project would not create a disproportionate environmental health or safety risk for children.

8. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000.

Compliance: Consultation with Indian Tribal Governments, where applicable, and consistent with executive memoranda, DoD Indian policy, and USACE Tribal Policy Principles signifies compliance.

Executive Memorandum

Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not applicable if the project does not involve or impact agricultural lands.

White House Memorandum, Government-to-Government Relations with Indian Tribes, 29 April 1994.

Compliance: Consultation with Federally Recognized Indian Tribes, where appropriate, signifies compliance.

Executive Order 11988 requires that Federal agencies avoid, to the extent possible, adverse impacts associated with the occupancy and modification of flood plains and to avoid support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities." The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988, as referenced in ER 1165-2-26, requires an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to, or are within the floodplain. The eight steps and project-specific responses to them are summarized below.		
1, 2	Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year). If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or to location of the action in the base flood plain.	The proposed action is within the base floodplain. However, the project is designed to reduce damages to existing infrastructure located landward of the proposed project.
3	If the action must be in the flood plain, advise the general public in the affected area and obtain their views and comments.	The Draft Feasibility Report and Environmental Assessment were released for public review and comment in 2016.
4	Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain will affect the base flood plain, impacts resulting from these actions should also be identified.	The project will not encourage development in the floodplain because the project area is already developed. The project provides benefits for existing development.
5	If the action is likely to induce development in the base flood plain, determine if a practicable non-flood plain alternative for the development exists.	Not Applicable
6	As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative.	The project will not alter or impact the natural or beneficial flood plain values.

7	If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.	The Draft Feasibility Report and Environmental Assessment were released for public review and comment in 2016.
8	Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order.	The Recommended Plan is responsive the study objectives and the most consistent with the executive order.

6.0 LIST OF PREPARERS

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Name	Title	Education/Responsibility	Experience
Judith L. Johnson	Biologist	B.S. Wildlife Biology. Responsible for the NEPA document preparation	35 years
U.S. Army Corps of Engineers, New York District (NAN)			
Nancy Brighton	Supervisory Archeologist	M.A. Anthropology. Responsible for Section 106 compliance	23 years

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