U.S. Army Corps of Engineers
New York District

FINAL
ENVIRONMENTAL ASSESSMENT

Phase II - Port Monmouth Flood Risk Management Project

Raritan Bay and Sandy Hook Bay

Middletown Township, Monmouth County, New Jersey

U.S. Army Corps of Engineers - New York District
Jacob K. Javits Federal Building
New York, New York 10278-0090

June 2016

Finding of No Significant Impact

Environmental Assessment for the Port Monmouth Flood Risk Management Project, Phase II
Raritan Bay and Sandy Hook Bay
Middletown Township, Monmouth County, New Jersey

The U.S. Army Corps of Engineers (USACE), New York District (District) and the New Jersey Department of Environmental Protection (NJDEP) Bureau of Coastal Engineering propose to construct a Flood Damage Reduction Project in Port Monmouth, New Jersey (NJ). This flood damage reduction project represents the second phase of an overall Hurricane and Storm Damage Reduction Project and would include levees, floodwalls, the splicing of sheet pile onto an existing bulkhead, road closure structures, a vertical lift tide gate, pump stations, road raising and re-grading interior drainage facilities, and wetland mitigation.

The first phase of the project included beach nourishment, construction of a groin and walkovers for beach access, and extension of a pier along the waterfront in Port Monmouth. Two National Environmental Policy Act (NEPA) documents for the entire project have been completed to date.

In 2000, the District evaluated potential environmental impacts of the project in the Draft Feasibility Report [FR] and Environmental Impact Statement [EIS] for Hurricane and Storm Damage Reduction, Port Monmouth, NJ. A Record of Decision (ROD) was signed in 2008, finalizing the EIS. The EIS covered Phases I and II.

In 2008, an Environmental Assessment (EA) was developed to address a change to the project design for Phase I; Phase II was not re-evaluated in this document. A Finding of No Significant Impact (FNSI) was released in February 2009. Construction of Phase I was completed in July 2015; therefore, this EA (EA) will address the changes in the environment, regulations or the design alternatives that are being considered for Phase II only.

This EA was prepared pursuant to the NEPA Council on Environmental Quality's (CEQ) *Guidance Regarding NEPA Regulations,* and the USACE's *Procedures for Implementing NEPA* (Engineering Regulation 200-2-2) and serves to update the project's 2000 EIS and 2008 ROD for Phase II. This EA is being prepared to address changes to environmental and cultural resource conditions and potential impacts from changes in project design, and to comply with USACE guidance to update NEPA documentation if a decision document is greater than 5 years. This EA also evaluates the significance of potential environmental impacts of the proposed action to determine if the proposed project changes warrant the preparation of a supplemental environmental impact statement to the Final EIS.

Impacts, resulting from Phase II changes analyzed in this EA, to coastal and freshwater wetlands, and riparian habitat, would be fully mitigated on two sites adjacent to the project alignment.

In response to concerns by the United States Fish and Wildlife Service (USFWS) that placement of the tide gate across Pews Creek would alter the adjacent vegetation community and wetland habitat, and adversely impact fish and wildlife, tidal monitoring of Pews Creek would occur for water level and salinity pre and post construction of the gate.

To protect nesting migratory birds from potential impacts, USFWS has recommended that if any tree or shrub removal is necessary that it be seasonally restricted from March 15 to July 31. The District has concurred with this recommendation.

Monitoring for state and federally listed threatened and endangered species, including the piping plover, seabeach amaranth, seabeach knotweed, and ospreys would occur prior to construction if planned before/during the nesting and growing seasons to ensure these species are not disturbed by construction; surveys for bald eagles would occur as well.

Best management practices, such as the use of silt fences and straw bales, would be utilized during construction to prevent soil erosion and sedimentation.

Based on my review and evaluation of the environmental effects as presented in the EA, I have determined that the changes evaluated in this EA regarding Phase II of the proposed project are not a major Federal action significantly affecting the quality of the human or natural environment and do not warrant the preparation of a supplemental Environmental Impact Statement.

27 Jul 16
Date

David A. Caldwell
Colonel, U.S. Army
District Commander

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1.0 Introduction

The U.S. Army Corps of Engineers (USACE), New York District (District) and the New Jersey Department of Environmental Protection (NJDEP) Bureau of Coastal Engineering propose to construct a Flood Damage Reduction Project in Port Monmouth, New Jersey (NJ). This flood damage reduction project represents the second phase of an overall Hurricane and Storm Damage Reduction Project and would include levees, floodwalls, the splicing of sheet pile onto an existing bulkhead, road closure structures, a vertical lift tide gate, pump stations, road raising and re-grading interior drainage facilities, and wetland mitigation.

The first phase of the project included beach nourishment, construction of a groin and walkovers for beach access, and extension of a pier along the waterfront in Port Monmouth. Two National Environmental Policy Act (NEPA) documents for the project have been completed to date. In 2000, the District evaluated potential environmental impacts of the project in the *Draft Feasibility Report [FR] and Environmental Impact Statement [EIS] for Hurricane and Storm Damage Reduction, Port Monmouth, NJ*. A Record of Decision (ROD) was signed in 2008, finalizing the EIS. The EIS covered Phases I and II.

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This EA was prepared pursuant to the NEPA Council on Environmental Quality's (CEQ) *Guidance Regarding NEPA Regulations,* and the USACE's *Procedures for Implementing NEPA* (Engineering Regulation 200-2-2) and serves to update the project's 2000 EIS and 2008 ROD for Phase II. This EA is being prepared to address changes to environmental and cultural resource conditions and potential impacts from changes in project design, and to comply with USACE guidance to update NEPA documentation if a decision document is greater than 5 years old. This EA also evaluates the significance of potential environmental impacts of the proposed action to determine if the proposed project changes warrant the preparation of a supplemental environmental impact statement to the Final EIS.

2.0 Project History and Authorization

Flooding and shore erosion are historical problems in the Raritan Bay and Sandy Hook Bay area, particularly in the community of Port Monmouth which is surrounded on three sides by water (Figure 1). A description of the project history and authorization, before and after Hurricane Sandy, are described in the project's 2000 FR/EIS and 2014 USACE Hurricane Sandy Limited Reevaluation Report (USACE 2013b) and are incorporated by reference. The Port Monmouth project was identified for 100% Federal funding under the Disaster Relief Appropriations Act of 2013 under Public Law (P.L.) 113-2, which was implemented in response to Hurricane Sandy.

3.0 Purpose and Need

The purpose and need for the Port Monmouth project remains largely unchanged from the project's 2000 EIS and is incorporated by reference. A short summary and update is provided.

Hurricanes, nor'easters, and extratropical storms have historically resulted in two major issues in Port Monmouth: shoreline erosion and extensive flooding. These issues have caused damage or destruction to structures within the community and increased the susceptibility of remaining development and infrastructure to storm events.

Historically, significant erosion removed much of the natural beachfront and dune complexes that provided coastal protection to the community from storm surge; Hurricane Sandy further exacerbated these conditions and increased community vulnerability to future storm events.

The purpose of the project is to reduce storm and induced tidal flooding within the Port Monmouth community. Construction of Phase I was completed in July 2015 and has widened the beach through sand nourishment and a vegetated dune complex. Phase II of the project is designed to reduce flooding due to tidal surges in Pews and Compton Creeks through the construction of a series of levees, floodwalls, a storm gate, pump stations, road closure gates and interior drainage structures. Tidal surges in the Creeks have caused flooding on both the east and west sides of the community. Tidal surges have also blocked existing municipal storm drainage systems that outlet into Pews Creek and Compton Creek channels and their associated wetlands. Extensive flooding from both issues has resulted in significant damage/destruction of homes, commercial properties, building contents, and community infrastructure such as roads, bridges, utility lines, and storm sewers. This damage has resulted in extensive financial losses and is considered a significant constraint to commerce and regional economic development. Construction of Phase II would reduce the risk of flooding and damages to development and infrastructure from coastal storm events.

The purpose and need of this EA is to:1. evaluate the potential adverse effects of design changes, since the 2000EIS/2008 ROD, to Phase II of the project, 2. evaluate any changes to the environment that may be affected by the proposed project, incorporate all new regulations that have been promulgated since the EIS/ROD.

4.0 Alternatives

4.1 Phase II Project Description/Proposed Action

Port Monmouth is located in Middletown Township, NJ just south of the Raritan and Sandy Hook Bays (Figure 1). The boundaries of the Port Monmouth Phase II project area are roughly Pews Creek to the west, Compton Creek to the east, Route 36 to the south, and landward of the beach/dune system on the north side (Figure 2).

Figure 1: Location of Port Monmouth, NJ

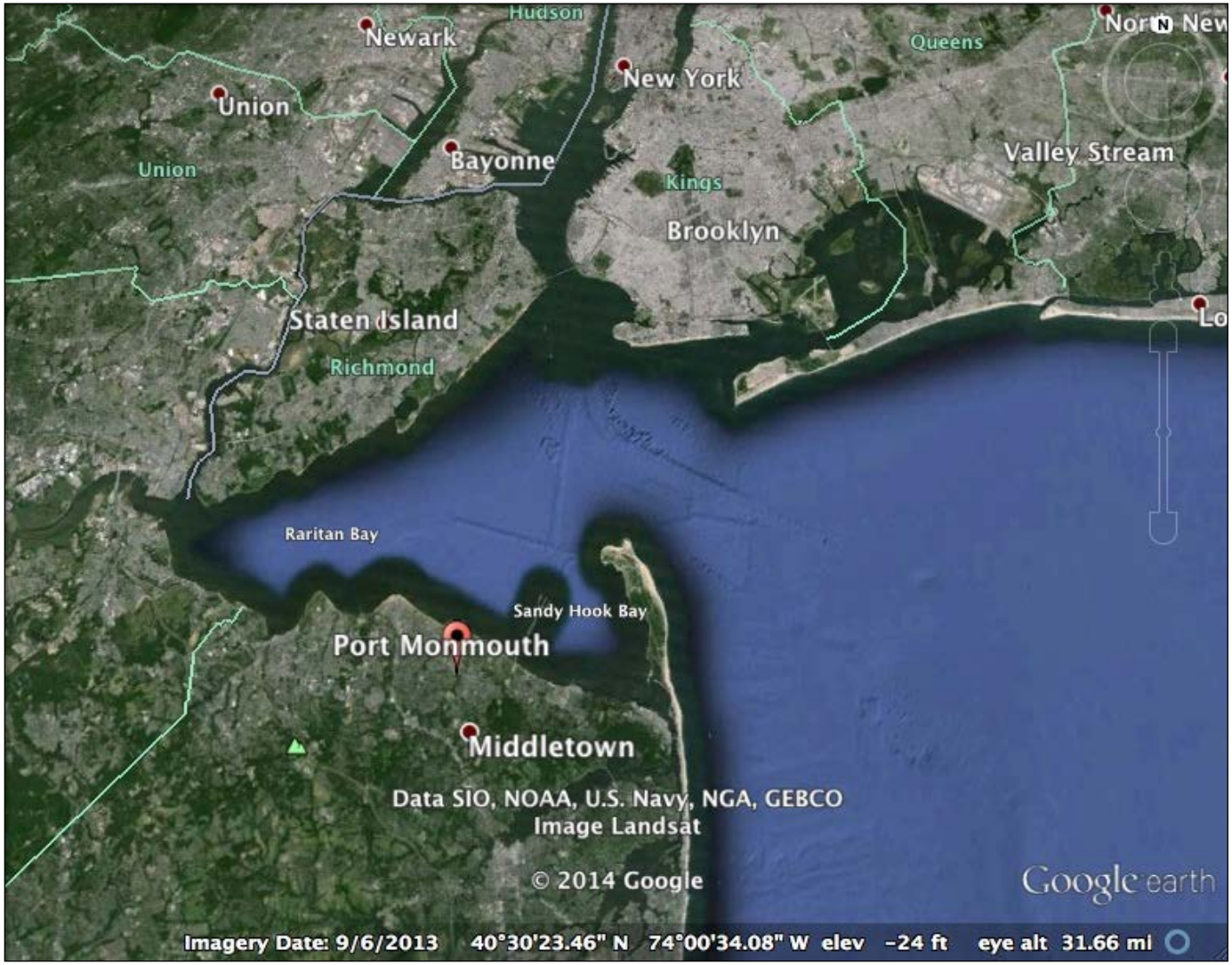
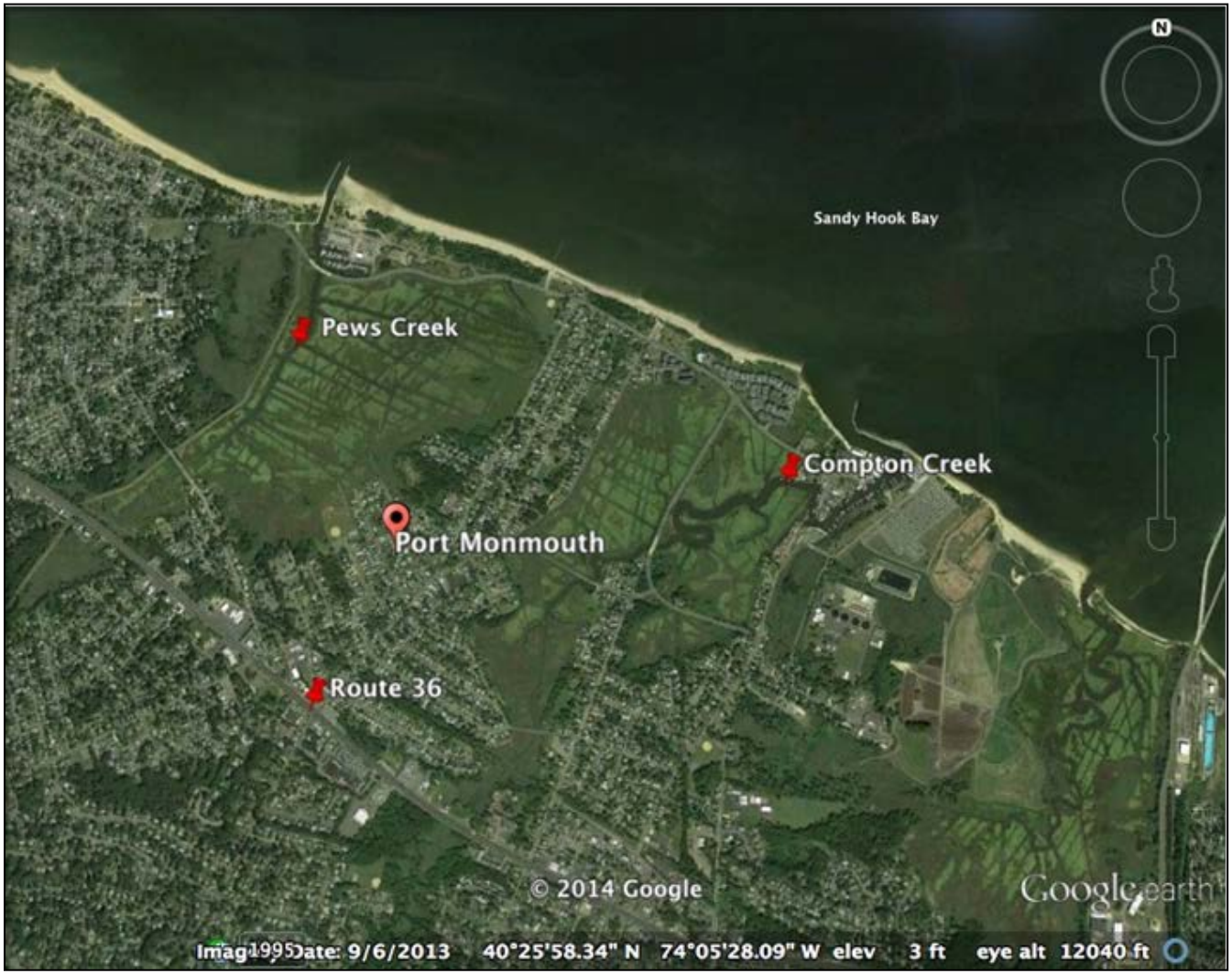


Figure 2: Project area limits: the Bay to the North; Pews Creek to the west; Compton Creek to the east; and Route 36 to the south.



Alternative plans were analyzed in the project's 2000 EIS and will not be re-visited in this document. The selected plan, which was also the environmentally preferred plan, identified a combination of flood risk management features for Phase II (Tables 1-3) and a preliminary plan was developed. Availability of funding under P.L. 113-2 following Hurricane Sandy has allowed for the preliminary plan to progress to more detailed engineering design and construction; this revised plan represents the proposed action described in this section.

Refinement of the alignment of the project features is based on physical (including geotechnical data), environmental, and economic criteria, including: avoiding and minimizing adverse effects on wetlands; following high ground to the extent possible to minimize construction costs; protecting high-density concentrations of flood-prone structures; and considering changes in development of the community since the preliminary plan, as well as regulation changes. Refinement of the plan has resulted in a variety of changes to the project alignment and features (see Figure 3 for map of current alignment and Tables 1-3 for a written comparison of changes to the alignment since the project's 2000 FR/EIS)..

Figure 3: Outline of project alignment and contract areas.
* The second wetland mitigation site is not identified since the real estate acquisition has not been confirmed.

Phase II has been divided into 5 contract areas for design and construction (Figure 3). Contracts 2-5 contain connecting structures that would be integrated to form a single line of protection to reduce flooding from storm events in the Port Monmouth community. The total length of the project is approximately 4,500 linear feet of levees and 7,000 linear feet of floodwalls, which make up the majority of the structures. The structures would provide protection to an elevation of +13 feet as referenced to the North American Vertical Datum of 1988 (NAVD). Construction of the contracts is anticipated to occur between the years 2016 to 2020; however, not all contracts would be constructed simultaneously.

Earthen/clay levees would be constructed along segments of the project alignment, with a top elevation of +13 ft. NAVD 88 in most areas, except near the Compton Creek area pump station (Contract 5) which would be overbuilt by 0.05 feet to account for projected settlement. The top of levee would be grass and would be maintained for vehicular access during flood events and for maintenance activities. Side slopes of the levee would be vegetated and maintained through periodic mowing. On the protected side of the levee, which is the side facing the developed area of the community, a 10 foot wide (approximate) earthen drainage ditch would be constructed along the entire length of the levee, in which water would be diverted towards pump stations. In addition, drainage structures, such as flap valves and sluice gates, would be constructed through the base of the levee to divert water to the unprotected side; where possible, water would spill out into existing, natural drainage features of the wetland. Beyond the ditch, and on the unprotected side of the levee, a 15 foot wide (approximate) “vegetation free” buffer is required; USACE restrictions dictate that only perennial grasses are permitted in this area and that they must tolerate mowing to heights as low as 3" at least once per year.

Floodwalls would be constructed along segments of the project alignment with a maximum top elevation of +13 ft. NAVD 88. The floodwalls would be reinforced concrete walls supported on steel pile foundations. Drainage ditches and 15 foot buffers would mirror that described in the previous paragraph for levees; however, portions of the floodwall would require drainage structures on both sides of the wall.

Sheet pile would also be constructed adjacent to the lift gate (23 linear ft.) and would be placed on existing bulkhead on Port Monmouth Road (415 linear ft.).

A vertical lift tide gate of approximately 19 ft. x 24 ft. would be placed across the entire width of Pews Creek just south of the bridge on Port Monmouth Road. One pump station would be placed adjacent to the gate in Contract 2; a second pump station would be placed on top of the levee along Main Street in Contract 5. The pump stations would serve to channel excess water back into Raritan Bay, limiting flooding on the protected side during periods of gate closure. Under normal conditions, the gate would remain fully opened, with the pump stations off. Examples of conditions that would trigger closing of the gate and/or operation of the pumps include: a rain event occurs over the drainage basin at the same time as spring tide; during storms in which a major tidal event is predicted; during storms in which a major tidal event and rain event occurs over the drainage basin at the same time.

A total of three road closure gates would be placed on Old Port Monmouth Road, on Campbell Avenue near Creek Road, and on Broadway near Main Street; approximate dimensions of the

gates would be 40 ft. x 9 ft. and 40 ft. x 8 ft., respectively. Rolling gates would be constructed and would remain open under normal weather conditions to maintain access in and out of the community.

Road raising would occur in the project area along a portion of Port Monmouth Road and Route 36. Regrading of property would also occur on Wilson Ave. This road raising/regrading construction would elevate areas along the line of protection to maintain the required +13 ft. NAVD elevation throughout the project.

Table 1: Description of Changes to Phase II Levees From the 2000 FR/EIS

2000 FR/EIS	2016 EA	Description of Change
Length: approximately 7,070 linear feet.	Length: Approximately 4,500 linear feet (potential to change as design is refined).	Contract 2 (Pews Creek): *Levee from east side of Pews Creek to Port Monmouth Road removed and replaced with sheetpile wall connected to lift gate. Wall tie into Port Monmouth Road.
		Contract 3 (Pews Creek): *Levee from Port Monmouth Road north changed to a floodwall and extended to tie into high ground at the dune.
		Contract 4 (Compton Creek): *Realignment of levee shifted slightly west due to new housing development on Willow Street. *Section of levee north of Route 36 to Campbell Avenue. changed to floodwall due to space constraints, to maintain access to Henry Hudson trail, and to avoid overbuilding levee to maintain height due to soil type in this area. *Section of levee from Campbell Avenue to Broad Street (approximate) changed to floodwall to avoid overbuilding levee to maintain height due to soil type in this area.
		Contract 5 (Compton Creek): *Levee changed to floodwall from Broadway to Lydia Place (approximate). *Levee extended north of Port Monmouth Road to tie into high ground at dune.
Vegetation Free Zone: 10 feet on both sides.	Vegetation Free Zone: 15 feet on both sides.	USACE ETL 1110-2-583, Guidelines for Landscape Planting and Vegetation management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, dated 30 April 2014, implemented a requirement for a vegetation free buffer of a minimum of 15 feet from levee toes, drains, critical appurtenant structures or structural features and a minimum of 15 feet from the faces of floodwalls. Guidelines were initially released 10 April 2009, after the project's EIS was finalized.

Table 2: Description of Changes to Phase II Floodwalls Since 2000 FR/EIS

2000 FR/EIS	2016 EA	Description of Change
Length: approximately 3,585 feet Height: + 8feet NGVD.	Length: approximately 7,000 feet (potential for update as design is refined).	(See "Levees" Section in Table 1 for additional changes) Contract 2 (Pews Creek): *Floodwall changed to levee on west side of Pews Creek to tie into existing Keansburg levee.
		Contract 3 (Pews Creek): *Realignment of floodwall across undeveloped land from Port Monmouth Road to Old Port Monmouth Road to minimize the interior drainage requirements and to simplify access for construction. Floodwall shifted west from Port Monmouth Road to dune. *Segments of the flood wall near the Monmouth County Marina were changed to sheetpile and sheetpile spliced onto existing bulkhead instead of T-walls.
		Contract 4 (Compton Creek): *Floodwall near Route 36 was realigned to accommodate expansion of the commuter parking lot that has occurred. *Section of floodwall parallel to Route 36 shifted south slightly.
		Contract 5 (Compton Creek): *Floodwall added to north side of Port Monmouth Road. *Retaining walls added to north and south sides of Port Monmouth Road.
Vegetation Free Zone: 10 feet both sides.	Vegetation Free Zone: 15 feet both sides.	Change in USACE regulation, as described above under "levees".
Wall Type: Predominately I-walls with approximately 200 feet. of T-walls.	Wall Type:	Engineering refinement.

2000 FR/EIS	2016 EA	Description of Change
	Predominately T-wall with small section of I-wall, along with sheetpile wall, on Contract 2 and bulkhead splicing on Contract 3.	

Table 3: Description of Changes to Other Phase II Project Features and Mitigation Since 2000 FR/EIS

Project Feature	2000 FR/EIS	2016 EA	Description of Change
Tide Gate	Sector Gate	Lift Gate	Contract 2 (Pews Creek): *Sector gate more appropriate for a large water body. *Lift gate provides a smaller footprint, and less impacts. *Lift gate remains out of the water when non-operational, therefore facilitating operations and maintenance.
Road Closure Gates	Mitre Gate: Intersectionof Old Port Monmouth Road & Port Monmouth Road (40 ft x 4 feet).	Roller Gate: Old Port Monmouth Road (32 ft. x 7.9 feet.).	Contract 3 (Pews Creek): *Due to line-of-sight and Department of Transportation traffic safety rules at the intersection of Old Port Monmouth Road and Port Monmouth Road, the gate was shifted west along Old Port Monmouth Road and its dimensions were changed to reflect the revised location. * Mitre gate changed to rolling gate.
	Mitre Gate: Broadway & Main Street (40.5 x 8 feet).	Roller Gate: Broadway & Main Street (40 feet x 8 feet).	Contract 4 (Compton Creek): Mitre gate changed to roller gate during engineering design refinement.

Project Feature	2000 FR/EIS	2016 EA	Description of Change
	Mitre Gate: Campbell Avenue & Creek Road (40 feet x 8 feet).	Roller Gate: Campbell Avenue & Creek Road (62 feet x 8.5 feet).	Contract 4 (Compton Creek): *Mitre gate changed to roller gate; engineering design refinement. *The clear opening width of the Campbell Road closure gate was increased from 40 feet to 57 feet to accommodate the rerouted Henry Hudson Trail.
Road Raising	Port Monmouth Road (east side).	Port Monmouth Road (east side).	N/A (Contract 5) *It was determined that the road would be raised to a maximum height of 6.5 feet.
	None	Route 36 Road Regrading; Regrading property on Wilson Avenue.	Contract 4 (Compton Creek) ***** Additional data collected during design revealed low spots/areas of vulnerability within the project.
Interior Drainage	4 primary outlets, 11 secondary outlets.	15 drainage structures with flap valve & sluice gate.	N/A
	2 diversion & drainage pipes.	Swale	Diversion pipe to redirect water from low lying areas was changed to a swale.
Mitigation	Restoration of approximately 12.80 acres of wetland *Phragmites*-dominated habitat to salt marsh habitat, east side of Pews Creek.	Worse-case scenario, likely to be reduced based on design changes: 29.5 acres of coastal wetland mitigation, 1.83 acres of freshwater wetland mitigation, and 2.18 acres of riparian mitigation.	It was determined that the proposed mitigation site from the 2000 FR/EIS was already quality wetland habitat. Therefore, new sites are being evaluated. Pending final EPW, HTRW, and Real Estate, current sites would include: west of Pews Creek to mitigate for coastal wetland impacts (Pews 4); and west of Compton Creek (Compton 6) to mitigate for coastal and riparian

Project Feature	2000 FR/EIS	2016 EA	Description of Change
			impacts. Freshwater wetland impacts would be mitigated through the purchase of credits.

4.3 No Action Alternative

The No Action Alternative reflects the continuation of existing economic, social, and environmental conditions and trends within the Port Monmouth community. With the No Action Alternative, the implementation of Phase II project features associated with the Flood Risk Management project would not occur.

5.0 Affected/Existing Environment and Environmental Impacts

A detailed description of the affected/existing environment and environmental impacts was provided in the project's 2000 EIS. Upon review of the EIS, it was found that the potential impacts on many of the resources remain unchanged due to the changes in the project alignment; these assessments are incorporated by reference. ***Only those resource areas with changes to the following will be discussed and analyzed for potential adverse or beneficial effects for the No Action Alternative and Proposed Action: the existing conditions in the project area, such as physical setting and resource areas; and/or changes resulting from engineering alignment changes; and/or changes resulting from recent agency coordination.*** The Proposed Action would avoid adverse project impacts (during project construction and operations and maintenance [O&M]) to the fullest extent possible. When practicable, the proposed action will incorporate recycling, reuse and disposal options for construction and demolition materials in accordance with Environmental Protection Agency guidelines. Mitigation measures would be implemented; as described in Section 7.16 , to avoid, minimize and fully offset unavoidable impacts. Compensatory mitigation measures are included in the design elements of this project and will be constructed prior to the impacts being incurred so as to avoid the irretrievable and irreplaceable commitment of resources with implementation of Phase II of this project, thereby supporting the FNSI for this project.

5.1 Topography, Geology and Soils

No Action Alternative

The No Action Alternative remains unchanged from the project's EIS.

Proposed Action

The description provided for the existing environment in the project's EIS remains the same. The construction and maintenance of Contracts 2-5 would have minimal impacts on the topography, geology and soils, as described in the EIS.

Based on the NJ Geological Survey files on the geologic formations in the area of construction, the potential for exposing acid producing soils is low. The acid producing soils in the area are covered by upwards of 100 feet of Estuarine deposits and/or upwards of 50 feet of Lower Terrace deposits. Excavation for this project is not anticipated to exceed more than 15 feet; therefore, it is unlikely that acid producing soils would be exposed during construction.
The wetland mitigation site identified in the project's 2000 EIS concluded that minor changes to the topography would occur by lowering the surface elevation of approximately 12.80 acres one-to-two feet to establish a salt marsh community; this site is no longer being used, however, a similar and permanent impact would apply to the Compton 6 and Pews 4 proposed mitigation sites for those areas excavated to remove dense stands of *Phragmites,* if leveling of disturbed

areas is required. Soil erosion and sedimentation issues and minimization would be similar to that described in the project's EIS.

Additionally, the vegetation cover type at Pews 4 would shift from dense stands of *Phragmites* to more diverse species of varying cover heights, which would represent a permanent and minor impact for the visual topography in Port Monmouth in which approximately 10% of shorter, more uniform topography would be replaced. As the visual landscape is subjective, this impact could be considered beneficial or adverse.

5.2 Water Resources

Regional Hydrogeology and Groundwater; and Surface Water.

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The description provided for the existing environment in the project's EIS remains the same. The construction and maintenance of Contracts 2-5 would have no direct impacts on regional hydrogeology and groundwater resources, as described in the EIS.

During coordination for the EIS and more recently, the United States Fish and Wildlife Service (USFWS) expressed concerns that placement of the tide gate across Pews Creek would alter the adjacent vegetation community and wetland habitat, and adversely impact fish and wildlife. It was determined that tidal monitoring of Pews Creek for water level and salinity pre and post construction of the storm gate would occur. Due to typical cold and icy weather conditions throughout the winter in Port Monmouth, the District and the USACE Engineering, Research and Development Center experts determined that placing gauges in the wetland/creek area during this time would not be effective. Therefore, for pre-construction monitoring, the gauges would be placed when the weather consistently rises above freezing towards the beginning of spring and would continue through the fall, pending weather conditions. This pattern would continue for post-construction monitoring. A total of three years of data would be collected.

5.3 Vegetation

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The existing environment and the environmental impact description remains similar to the project's EIS. The general impact conclusion remains unchanged, however it is acknowledged that the approximate acreage of direct and indirect impacts to vegetation and associated mitigation changed due to several proposed project changes, such as: shifts in the outline of the project alignment of Contract 3; changes of alignment segments from levees to floodwalls and vice-versa; and an increase in the vegetation free zone (see Table 1 for additional information).

The EIS documented a total of approximately 12.76 acres of direct impacts to wetland habitat, 5.63 acres of indirect impacts to wetland habitat and 2.13 acres of impacts to upland vegetation.

Indirect impacts to wetlands would result from the isolation of wetlands from the construction of levees and floodwalls; however, since the areas are low lying depressions that are expected to collect surface water runoff from adjacent upland areas, a conclusion was made that the vegetative cover type would change but not the wetland function. Beneficial impacts anticipated would include the creation of upland habitat from the construction of the levee; removal of *Phragmites*-dominated areas along the edge of the wetland; and prevention of encroachment of *Phragmites* located on the landward side of the wetland.

A recalculation of impacts based on a worse case scenario of all contract areas was developed. Approximately 17 acres of vegetation would be permanently removed in order to construct the project features. The majority of impacts would occur in wetlands; the approximate and maximum acreage of temporary and permanent impacts are identified in Tables 3.
It is anticipated that permanent coastal and riparian impacts would be mitigated on the Pews 4 and Compton 6 sites, pending acquisition of real estate conservation easements (see Section 8.0 Project Mitigation). For the worse case scenario, it is anticipated that 29.5 acres of mitigation is required for the coastal wetland impacts and 2.18 acres of mitigation is required for riparian impacts. Temporary impacts would be mitigated onsite. Levees, ditches, and the vegetation free buffers would be seeded with turf grass for maintenance and inspection requirements. The District initiated coordination with the NRCS, USFWS, NJDEP and the NJ Soil Conservation District to find a native coastal seed mixture, however, the recommendations did not meet the USACE Engineering Technical Letter 1110-2-583 for these project features. Therefore, the seed mix used for the neighboring Keansburg levee would be used. Areas of temporary disturbance outside these zones would be seeded with a mix of native shrubs and trees.

5.4 Fish and Wildlife

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
In 1999, the USFWS issued a Fish and Wildlife Coordination Act (FWCA) Section 2(b) report for the project. As part of the NEPA process and due to changes in the project design, the District requested an update to the FWCA report in 2014. The USFWS issued a Planning Aid Letter (PAL) to the District in April 2015 as a supplement to the 2(b) report. The PAL and the District's response letter are included in Appendix B.

5.4.1 Fish and Shellfish; and Reptiles and Amphibians

The existing environment and the environmental impact descriptions (e.g., No Action and Proposed Action) remain unchanged from the project's EIS. Minor adverse permanent and temporary impacts, as well as permanent beneficial impacts, are anticipated for fish, reptiles and amphibians. Negligible impacts to shellfish are anticipated.

5.4.2 Benthos

The existing environment and the environmental impact descriptions (e.g., No Action and Proposed Action) remain unchanged from the project's EIS for Contracts 2-5; impacts would be temporary, direct adverse.

As the original mitigation site for Contract 1 is no longer being considered, the benefits of restoration to the benthos described in the project's EIS for the Pews Creek wetland area would shift to the Compton 6 site.

5.4.3 Mammals and Birds

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The loss of habitat for species utilizing *Phragmites* and gain of habitat for species using salt marsh as described in the project's EIS would not occur in Pews Creek; however, these benefits would apply to the Compton 6 mitigation site. In the Pews 4 mitigation site, a loss of habitat for species utilizing *Phragmites* and a gain of habitat for species using forested wetlands would occur.

As described in the project's EIS, within the project alignment footprint, impacts would be permanent, minor adverse for those areas with permanent structures (e.g., floodwalls, road closure gates, pump station, etc.); the levees could still provide habitat for some mammals. Temporary, minor adverse impacts would occur in the areas of the project footprint that would be restored once construction is completed. It is anticipated that mammals and birds would return to the contract area post construction. The mitigation sites would provide permanent, moderate beneficial impacts due to the lift in habitat quality.

5.4.4 Migratory Birds

According to the USFWS PAL (Appendix B), and as cited in Niles *et al. 2001*, there are approximately 80 species of nesting migratory birds in the general area of the project site. As the PAL explains, "The Migratory Bird Treaty Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior." There is no permitting for incidental take under the Act. Therefore, the USFWS has recommended that should any tree or shrub removal be necessary, it should be seasonally restricted from March 15 to July 31 to protect nesting migratory birds.

5.5 Federal and State Endangered, Threatened and Species of Concern

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
Several changes to the status of species, and additional agency coordination, have occurred since the EIS was developed. Most of the species in this section were not addressed in the EIS, therefore new analyses were conducted.

5.5.1 Marine Species

Formal consultation for Federally-listed marine species was combined for Phases I and II of the project. In 2013, a Biological Assessment (USACE 2013a) was submitted to the National Oceanic and Atmospheric Administration's NMFS by the District as part of the formal

consultation process under Section 7 of the Endangered Species Act (ESA), as amended November 10, 1978. Species covered under the BA included: the endangered Northwest Atlantic Ocean Distinct Population Segment (DPS) of the loggerhead turtle (*Caretta caretta*); the endangered Kemp's ridley turtle (*Lepidochelys kempi*); the endangered green turtle (*Chelonia mydas*); the endangered leatherback turtle (*Dermochelys coriacea*); the endangered North Atlantic right whale (*Eubalaena glacialis*); the endangered humpback whale (*Megaptera novaeangliae*); the endangered fin whale (*Balaenoptera physalus*); the endangered New York Bight (NYB) DPS of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*); and the endangered shortnose sturgeon (*Acipenser brevirostrum*). At the time the EIS was developed, loggerheads were not grouped into DPSs and the status was listed as threatened; also, the Atlantic sturgeon was not listed (Federal Register Vol 77, No. 24, Monday February 6, 2012; 50 CFR Part 224).

A Biological Opinion was issued in 2014 (Appendix C) and it was determined that no Federally-listed marine species would be present in Pews Creek, which is where the lift gate structure would be constructed under Contract 2. If pile driving is used to construct the lift gate across Pews Creek, it was determined that indirect effects to Atlantic sturgeon would be insignificant and discountable. Also, there would be no disruption of essential behaviors of Atlantic sturgeon or sea turtles, such as migrating and foraging, from pile driving activities.

5.5.2 Terrestrial Species

Several Federal and State listed terrestrial species are known to occur in the project area or may be within the species‘ range, or were addressed in the project’s EIS: the Federally listed threatened/NJ state listed endangered piping plover (*Charadrius melodus*); the Federally de-listed endangered peregrine falcon (*Falco peregrinus*) and the Federally de-listed endangered bald eagle (*Haliaeetus leucocephalus*); the Federally listed endangered roseate tern (*Sterna* dougallii)*;* the Federally listed threatened rufa red knot (*Calidris canutus rufa*)*;* the Federally listed threatened seabeach amaranth (*Amaranthus* pumilus)*;* the NJ state listed endangered pied-billed grebe (*Podilymbus podiceps*);the NJ state listed threatened osprey (*Pandion haliaetus*); the NJ state listed endangered Cooper's hawk (*Accipiter cooperii*), the NJ state listed endangered black skimmer (*Rynchops niger*); the NJ state listed endangered least tern (*Sterna antillarum*); the NJ state listed endangered seabeach knotweed (*Polygonum glaucum*), the NJ State listed threatened Black-crowned night-heron (*Nycticorax nycticorax*); the NJ state listed threatened Silver-bordered fritillary (*Boloria selene myrina*); the NJ state listed species of special concern snowy egret (*Egretta thula*); and the NJ State listed species of special concern beach wormwood (*Artemisia campestris*).

The USFWS PAL (Appendix B) identified the following NJ State listed endangered species as documented in the project area. However, these species were not mapped on the NJDEP Landscape Maps in the area of the proposed activities, are considered rare in NJ, and it is therefore unlikely that the proposed project would have any impact on these species:
American bittern (*Botaurus lentiginosus*): The New Jersey Natural Heritage Program considers the American bittern to be “apparently secure globally,” yet “rare in New Jersey” (http://www.nj.gov/dep/fgw/ensp/pdf/end-thrtened/ambittern.pdf, accessed 12/17/15);
short eared owl (*Asio flammeus*): The New Jersey Natural Heritage Program considers the short-eared owl to be, “demonstrably secure globally,” yet, “no extant occurrences are known in New

Jersey" (http://www.nj.gov/dep/fgw/ensp/pdf/end-thrtened/shrtearedowl.pdf, accessed 12/17/15); and
upland sandpiper (*Bartramia longicauda*): The New Jersey Natural Heritage Program considers the upland sandpiper to be "demonstrably secure globally," yet "critically imperiled in New Jersey because of extreme rarity" (http://www.nj.gov/dep/fgw/ensp/pdf/end-thrtened/uplndsandpiper.pdf, accessed 12/17/15).

5.5.2.1 Piping Plover

The District has been monitoring for endangered species, including plovers, since 2011 as part of pre, during, and post construction requirements of Phase I as committed to in the EIS; no plovers were observed in/around the project site or nesting. According to USFWS (Appendix B), there are known occurrences of piping plovers within ten miles of the project area, in Sandy Hook and the Sea Bright Borough. Prior to the beach nourishment associated with Phase I of the project, the beach along Port Monmouth was not deemed suitable for piping plover nesting. With the reconstructed beach, the USFWS believes the plover may occur within or near the project area (Appendix B).

The USFWS recommends not conducting any proposed construction activities within 100 meters (333 feet) of occupied plover habitat during the nesting season of March 15 through August 15. Contracts 3 and 5 are the only contracts with anticipated construction on/around 300 feet of the beach/potential plover habitat. Prior to the start of construction between March 15 through August 31, the District would monitor for piping plovers and their nests and would continue to coordinate with USFWS if any plovers are observed. With the monitoring program and restrictions in place and historical lack of presence in the area, impacts to plovers are not anticipated.

5.5.2.2 Seabeach Amaranth, Seabeach Knotweed and Beach Wormwood

Seabeach amaranth were first recorded on the beach at Port Monmouth in August 2014 during District monitoring for endangered species required for Phase I construction, as committed to in the EIS; the plants were found after sand nourishment occurred on the Port Monmouth and Keansburg beaches, although the area in which the plants were found were not nourished with sand. Multiple plants were found on the beach in the area between the Monmouth Cove Marina and the fishing pier. Additional plants were observed in August 2015. In both years, the USFWS were notified and a buffer of 3 meters around the plant was maintained with post-and-string fencing and "Restricted Area" signs were placed on the fencing.

Seabeach knotweed can also be found growing on beaches; it was observed for the first time by the District in September 2015 on the west side of the fishing pier on the Port Monmouth beach. The plants were observed following the completion of Phase I construction.

Beach wormwood is rare in NJ, it can be found in dunes and sandy areas generally along the coast but also irregularly inland. Plants have been observed by NJDEP within the project vicinity but not within the proposed project footprint.

For the construction of Phase II, Contracts 3 and 5 only have the potential to overlap with areas in which the amaranth, knotweed, and wormwood may grow during construction of the

floodwalls north of Port Monmouth Road and adjacent to the beach/dune. Although it is unlikely that construction would take place in areas the plants may grow, equipment and personnel may utilize the beach to transport material. To prevent direct impacts to potential plants, the District would survey for seabeach amaranth, seabeach knotweed, and beach wormwood no more than one week prior to the start of Contracts 3 and 5 construction, if it occurs between May 15 through November 30. If the plants are found, fencing and signage would be placed as described in the preceding paragraph for seabeach amaranth and USFWS and the DLUR would be alerted. Overall, impacts are anticipated to be temporary and minor.

Post construction monitoring for Phase I would continue as committed in the 2008 project's EA, with the addition of beachworm wood.

5.5.2.3 Peregrine Falcon

Surveys for peregrine falcons were conducted during the development of the project's EIS; however, no observations were reported. The falcon was delisted from the ESA in August 1999.

5.5.2.4 Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was delisted as an endangered species under the ESA in June 2007; however the eagle is still protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and remains a state-listed species under the New Jersey Endangered and Non-Game Species Conservation Act. The project's EIS reported the occasional migrating bald eagle as known to occur in the project vicinity and none were observed during surveys between October and November 1997. More recently, a bald eagle's nest is known to occur within seven miles of the project area; potential nesting and foraging habitat may occur in the project area (Appendix B). An adult bald eagle was observed in September 2015 on/around an avian nesting platform used by osprey in the Pews Creek wetland; the eagle was chased off the platform by an osprey and harassed in the air (observed by Ann Marie DiLorenzo, USACE Ecologist).

Given that the eagle is highly mobile, direct adverse impacts from construction activities are unlikely. Surveys for bald eagles and nesting activity are proposed if construction would occur during the nesting season. In addition, the District would comply with the National Bald Eagle Management Guidelines Recommendations as much as possible to minimize adverse impacts to the eagle during nesting, foraging and communal roosting. If during construction activities a bald eagle is observed in the project area and the recommendations cannot be adhered to, the District would contact the USFWS.

5.5.3.5 Northern Long-Eared Bat

Under Section 4(d) of the ESA, the USFWS proposed a rule to list the northern long-eared bat (NLEB) (*Myotis septentrionalis)* as a threatened species. A final listing and interim rule were published in the *Federal Register* on April 2, 2015, and the rule went into effect on May 4, 2015. This species was not addressed under the EIS.

In the USFWS PAL (Appendix B), the USFWS recommended a seasonal restriction which would prevent tree removal from April 1 through September 30 in areas of potential northern long-eared bat habitat. Upon additional coordination with the USFWS via an email between the

District Ecologist (Ann Marie DiLorenzo) and the NLEB expert at the USFWS (Jeremy Markuson) on November 23, 2015, it was determined that "...it's unlikely the project would result in adverse effects. For northern long-eared bats a time-of-year restriction on tree clearing activities is not warranted". This determination was based on additional assessments of the project's landscape and an approximate acreage of proposed tree cutting activities.
Per Mr. Markuson: "...I find it unlikely that a northern long-eared bat would use the patches of forested habitat in the project area for roosting.

However, northern long-eared bats may forage within or near the action area. Additionally, to address small scaled forest clearing activities we have conducted a spatial probability analysis using a simulation model to determine exposure risk to roosting northern long-eared bats. Based on the model results and the estimated occupancy of northern long-eared bats in New Jersey, tree clearing activities under 5 acres during the active season (April 1 - September 30) is discountable provided the activities do not occur within known occupied habitat (beyond 3 mi. of any netting or acoustic detection, 1.5 mi. of any known roost, and 5 mi. of any known hibernaculum). Discountable effects are those extremely unlikely to occur. The tree clearing activities do not occur with any known occupied habitat."

Therefore, impacts to NLEB are not anticipated.

5.5.3.6 Osprey

At the time the EIS was developed, osprey were not observed in the project area during Fall surveys and it was concluded that the project would not have an impact on the species. Since then, five man-made avian nesting platforms were installed by other organizations within the Pews and Compton Creek wetlands. Osprey were observed on four of the platforms, with successful chicks observed on one of the structures (Ann Marie DiLorenzo, USACE Ecologist). DLUR prohibits construction/disturbance within 300 meters (m) of listed species' avian nesting from March 15-August 15. Two of the nesting platforms fall within 300 m of Contract Areas 2, 3, 5 and the Pews Creek 4 proposed mitigation site.

A Federal Consistency Determination was received from DLUR in December 2015 to allow for the relocation of affected structures outside of the osprey nesting season between September and February. Relocating the structures outside the nesting season would avoid disturbance to active nests, and would minimize, to the maximum extent practicable, disturbance associated with construction activities by maintaining the minimum 300 m buffer. Mitigation for the relocation includes the installation of new, superior nesting platforms. A total of three new platforms would be installed.

Although the project's EIS committed to the installation of three avian nesting platforms aimed to encourage osprey nesting, given the number of existing platforms, constraints and new platform installations required for mitigation, the District has replaced this commitment with the new platforms for relocation. Coordination on this decision occurred on December 2, 2015 with DLUR and NJ Division of Fish & Wildlife, Endangered & Nongame Species Program during discussions on the Federal Consistency determination for the osprey relocation.

5.5.3.7 Pied-billed Grebe and Cooper's Hawk

The pied-billed grebe and Cooper's hawk were observed during field surveys conducted for the EIS. Impacts were not reported for either species in the EIS, however, these species would experience a change in some of the habitat in the project area. A permanent reduction in wetlands and forested habitat would occur along the footprint of the levees, floodwalls, road closure gates and the lift gate; however, the majority of these impacts would occur on the edge of the available habitat and the remaining areas in/around the Pews and Compton Creek wetlands would remain intact. These impacts would be considered permanent, minor adverse. Construction of the mitigation sites would provide a lift in habitat quality and availability for these species and would be considered a permanent and moderate beneficial impact.

5.5.3.8 Snowy Egret, Black Skimmer, Least Tern, Silver-bordered Fritillary, Black Crowned Night Heron, Roseate Tern and Rufa Red Knot

According to the USFWS (Appendix B), few rufa red knots have been observed in beaches near the project area and those sightings have primarily occurred during the fall migration season. The USFWS has also advised that Roseate terns were last recorded breeding in NJ in the 1970's, however individuals are occasionally sighted along the NJ coast during spring and fall migration. Black skimmers and least terns nest in colonies on beaches. As part of Phase I endangered species monitoring, the District has surveyed for skimmers and terns; however, none were observed nesting on the Port Monmouth beach from 2011 to 2015. It is possible that they forage in the project area (NJDEP Landscape Data, http://www.nj.gov/dep/gis/geowebsplash.htm, accessed 12/17/15).

The project area may be utilized for foraging of snowy egret and black crowned night heron (NJDEP Landscape Data, http://www.nj.gov/dep/gis/geowebsplash.htm, accessed 12/17/15). The range of the Silver-bordered fritillary identified by Conserve Wildlife (http://www.conservewildlifenj.org/species/fieldguide/view/Bolaria%20selene%20myrina/, accessed 12/7/15) does not overlap with the project area, although the NJDEP Landscape data calls out the area for potential breeding and courtship. A reduction in wetland habitat at the site of construction may reduce the plant species available for caterpillar and adult foraging, resulting in an indirect adverse impact; however, the wetland mitigation sites may provide additional habitat for the species. Also, a direct, adverse and minor impact could occur to caterpillars during the removal of vegetation.

Although there is some potential for all of these species to be present in the project area, they are all highly mobile and capable of avoiding construction activities, except for the larval (caterpillar) stage of the fritillary. Disturbance from construction activities would be temporary and localized. Impacts to habitat were minimized as much as possible to limit disturbance to the edge of wetlands. Given the availability of habitat in/around the Pews and Compton Creek wetlands, and with the restoration of mitigation sites to higher quality habitat, the impacts to all species is anticipated to be minor and adverse.

5.6 Essential Fish Habitat

An assessment of impacts on essential fish habitat (EFH) was not developed for the project's EIS. A detailed assessment is provided in Appendix D and a summary is provided in this section.

Based on EFH designations compiled by the NOAA, relevant life history stages for project study area EFH species are summarized in Tables 4 and 5. Tables 4 and 5 also identify those species and life history stages that have been either confirmed or are likely to occur nearshore of the project site based on nearshore sampling in the Raritan Bay and Sandy Hook Bay (RBSHB) area conducted in the 80's and 90's, and published information on the life history and habitat requirements of EFH.

Table 4: EFH-Designated Bony Fish, Port Monmouth Quadrant. Source: NOAA (1999a)

Species	Port Monmouth QUAD				Confirmed*	Probable**
	Eggs	Larvae	Juveniles	Adults		
Red hake (Urophycis chuss)		x	x	x		
Winter flounder (Pseudopleuronectes americanus)	x	x	x	x	Juveniles, Adults	
Windowpane flounder (*Scopthalmus aquosus*)	x	x	x	x	Juveniles	Adults
Atlantic sea herring (*Clupea harengus*)		x	x	x	Juveniles	
Bluefish (Pomatomus saltatrix)			x	x	Juveniles	Adults
Atlantic butterfish (*Peprilus triacanthus*)		x	x	x		Juveniles, Adults
Atlantic mackerel (*Scomber scombrus*)			x	x		Juveniles
Summer flounder (Paralichthys dentatus)		x	x	x	Juveniles, Adults	
Scup (Stenotomus chrysops)			x	x		Juveniles
Black sea bass (Centropristis striata)			x	x	Juveniles	
King mackerel (Scomberomorus cavalla)	x	x	x	x		
Spanish mackerel (Scomberomorus maculatus)	x	x	x	x	Juveniles	
Cobia (Rachycentron canadum)	x	x	x	x	Juveniles	
Winter Skate (Leucoraja ocellatus)			x	x		
Clear nose Skate (*Raja eglanteria*)	x	x	x	x		
Little Skate (Leucoraja erinacea)	x	x	x	x		

Captured during 1999 beach seine surveys at Cliffwood/Union Beach.
** Based on life history characteristics and habitat requirements.

Table 5: EFH-Designated Shark Species, Port Monmouth Quadrant. Source: NOAA (1999b)

Species	Zone 1			Confirmed*	Probable**
	Early Juveniles	Late Juveniles/Subadults	Adults		
Dusky shark (Charcharinus obscurus)	x				
Sandbar shark (Charcharinus plumbeus)	x	x	x		Early Juveniles, Adults

* Captured during 1999 beach seine surveys at Cliffwood/Union Beach.
** Based on life history characteristics and habitat requirements.

No Action Alternative
Under the No Action alternative, EFH species would continue to use Pews and Compton Creeks undisturbed by temporary construction that would be associated with the project under the proposed action. During storm events, the wetlands could experience increases in turbidity and sedimentation, potentially impacting larval and egg life stages, if present, with some mortality possible to prey species (e.g., benthic organisms).

Proposed Action
Overall, flood control measures are not expected to have any significant or long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the designated EFH species that occupy the project area waters, which include Pews and Compton Creeks, associated wetlands and near-shore zones of Raritan Bay adjacent to the creek mouths. However, proposed activities would result in some permanent changes of land use and construction of project features would have immediate, short-term, minor direct and indirect impacts on EFH for some of the designated fish species and life history stages that occur in the immediate vicinity of the project's construction. The vertical lift tide gate and pump stations would only operate during the occasional and infrequent storm and for maintenance, and would therefore not cause any significant impacts to EFH or designated species.

A permanent loss/modification of open bottom for the footprint of the tide gate would occur in Pews Creek; however, the footprint represents a small area compared to the main channel of Pews Creek. Any loss of benthic prey species for EFH species occurring in the area would be temporary and minor.

Temporary, localized disturbance to bottom substrate would occur during construction. Impacts during construction may include increased turbidity, and disturbance; however use of best management practices through a sediment and erosion control plan would minimize this temporary adverse impact.

The tide gate would typically be closed only during storm events and for maintenance. During spring tide events, flooding has occurred on Wilson Avenue, adjacent to the Pews Creek wetland; to minimize this flooding, the pump station would operate instead of closing the tide gate to maintain tidal flow to the wetland. During events, tidal flow would be interrupted at the surge barrier in Pews Creek to prevent upstream flooding. No long term change in currents or wave patterns are anticipated. There is the likelihood for increases in turbidity and sedimentation at the downstream side of the barrier when the gate is closed. Conversely there may be a temporary increased flow of sediment downstream after the barrier is removed. Increases in turbidity and sedimentation would be temporary, minor and adverse.

Although it is possible that any of the species listed in the Port Monmouth EFH quadrant could be present within the bay water in the vicinity of the project, it is likely that only a few species and life stages would be found regularly within the waters of the project site (Pews and Compton Creeks). Analysis of the available EFH resources along with recent RBSHB monitoring studies show that the species most likely to be affected by construction and future existence and utilization of the Port Monmouth project include: adult and juvenile winter, summer and windowpane flounder; juvenile scup; butter fish; and black sea bass. Other juvenile species may be found on occasion but are not likely to be common. The remaining quadrant species, especially the adults, are not expected to frequent the immediate near shore and the tidal creeks. Although no specific data for Pews and Compton Creeks is available for very early life stages, larvae of any of the EFH species that can be found in RBSHB could be within the project site estuarine waters during the appropriate season. Thus larvae would be susceptible to certain impacts described above.

Most EFH species adults have little potential for significant or long term direct impacts from any of the project components. Although small forage fish might be temporarily displaced during construction, this would not affect the feeding success of piscivorous EFH-designated species, since they would simply re-locate to nearby shallow water areas where they could continue to feed successfully. Early life stages (eggs, larvae, early stage juveniles) are more likely to be directly impacted from construction and implementation of the project, as discussed below.

Construction and implementation of the levee, sheet pile and tide gate would create temporary, localized disturbance to bottom substrate which would include the short-term increase in suspended sediments (turbidity), with possible mortality of some benthic organisms, fish eggs and larval forms, if present. Early juvenile stages of flat fish or skates may be at higher risk of respiratory effects from increased turbidity or possible mortality from burial. Other impacts include reduced salinity on the up-stream side of the surge barrier, infrequent interrupted current flow, some permanent loss of bottom habitat as a result of construction (footprint of the surge barrier and levee below the top of bank).

Adults of EFH species are expected to move away from construction disturbance without experiencing significant effects. Tidal flow between the Bay and Pews Creek would be maintained during construction through the construction of a coffer dam; therefore access for EFH species would be maintained. For the long term, the tide gate would typically be closed only during extreme storm surges when water level reaches +5 ft. NGVD to prevent flooding

above the Port Monmouth bridge; water would be pumped from upstream to the downstream side of the surge barrier when the tide gate is closed in Pews Creek. There is no anticipated (long term) change in currents or wave patterns. Fish moving within the creek would be temporarily prevented from passing. Any planktonic life stages of EFH species may be susceptible to entrainment through the pump system. A permanent loss of wetlands and a change to a portion of the riparian corridor would occur through placement of levees and floodwalls in the Pews and Compton Creek areas. Impacts to wetlands and riparian areas were minimized by designing project features at the edge of these habitats; unavoidable impacts would be mitigated for through the NJDEP permitting process.

Under normal flow of tidal water in the creeks, there would be no decrease in salinity to surrounding receiving waters. During flood conditions diverted water would likely lower salinity within the wetlands during a rain event. Juvenile and adult EFH species within the receiving waters are not expected to be significantly impacted by this activity. Spawning winter flounder may occupy the project area near the tide gate. Conditions that lowered the salinity by influx of storm runoff could adversely affect eggs if salinity decreased to below 5 ppt. However because spawning conditions in Pews Creek are already very poor, tide gate construction and operation is not expected to adversely affect spawning habitat.

Adverse indirect project impacts to EFH species and habitat are anticipated for the loss of approximately 0.94 acres of wetlands from the construction of levees, floodwalls, tide gate and related measures. The wetlands provide nursery, refuge and forage areas for multiple life history stages of designated project site EFH species. Wetlands are highly productive habitats especially in regard to providing prey species for both adult and juvenile fish. Loss of low emergent marsh would cause a proportional loss of these ecological functions relating to juveniles of EFH species including, winter flounder, windowpane, bluefish, butterfish, and summer flounder. These potential impacts would remain highly localized within the project area and would be mitigated as described in Section 8.0 Project Mitigation.

Impacts to the entire Pews Creek wetland is not anticipated based on the District's hydrodynamic model of Pews Creek, which determined that the placement of a tide gate in Pews Creek would have minimal effect on the daily tidal cycle. However, pre and post-construction monitoring of the tidal range and salinity in the Pews Creek marsh is proposed to identify what if any impacts occur due to the tide gate. The District will coordinate with the NMFS and other resource agencies regarding the results of the monitoring. The District proposes to record data in the spring of 2016 through the start of construction in late 2016 in order to establish a baseline, and then for two years following construction.

5.7 Socioeconomics

No Action Alternative

The No Action Alternative remains unchanged from the project's EIS.

Proposed Action

The data provided for demographics, race, economy and income, and housing in the project's EIS has become outdated over time. An update of pertinent data is provided below. The project area is located in the Township of Middletown in Monmouth County, NJ.

The total population in Port Monmouth is 3,818. The population is comprised of 93.0% White, 2.1% Black or African American, 2.0% Asian, 1.5% some other race, 1.2% two or more races, and 0.2% American Indian and Alaska native. The median age is 40.7 and the median household income is $88,513. Approximately 3.5% of individuals live below the poverty line. 87.7% are high school graduates or higher. There are a total of approximately 1,595 housing units (data retrieved from US Census Bureau, 2009-2013 data; http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml).

The total population in Middletown Township 66,509. The population is comprised of approximately 93.9% White, 1.3% Black or African American, 2.6% Asian, 0.8% some other race, 1.3% two or more races, and 0.1% American Indian and Alaska native. The median age is 43.2 and the median household income is $102,088. Approximately 4.0% of individuals live below the poverty line. 95.1% are high school graduates or higher. There are a total of approximately 25,095 housing units (data retrieved from US Census Bureau, 2009-2013 data; http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#none).

The total population in Monmouth County is 630,380. The population is comprised of approximately 82.6% White, 7.3% Black or African American, 5.0% Asian, 2.9% some other race, 2.0% two or more races, and 0.2% American Indian and Alaska native. The median age is 41.7 and the median household income is $84,526. Approximately 7.0% of individuals live below the poverty line. 92.2% are high school graduates or higher. There are a total of approximately 258,988 housing units (data retrieved from US Census Bureau, 2009-2013 data; http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml).
In terms of demographic characterization, the proposed project would neither induce growth nor inhibit growth of existing or future populations in Port Monmouth since the area is almost completely developed, with no real potential for expansion. Further, the proposed project would have little impact on the number, density, or racial composition of the residents living within the project area.

In terms of economy and income, the proposed project would have a positive direct economic impact on existing business in the protected area due to the reduced potential for future flood damages and potential improved accessibility to business during storm events. There would also be minor, indirect beneficial economic impacts on the local economy during construction from the introduction of construction workers and resulting purchase of supplies and food.

In terms of housing, the proposed project would have a direct positive impact on housing and structures in the project area due to a reduction in potential flood damage to existing properties, and the subsequent reduction in associated costs to repair such damages. The proposed project may have an indirect positive impact on residential property values due to an increase in flood protection and from the enhanced beach and recreational opportunities from Phase I of the project.

5.8 Environmental Justice

No Action Alternative

The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
As described in the project's EIS, there are no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Beneficial impacts to human health are anticipated in terms of the increased potential for protection of property and life during future storm events. Beneficial impacts to low-income persons and the community in general is anticipated by reducing future storm damages, subsequent repair costs, and could potentially increase property values. This conclusion remains the same given the updated data for race and low-income populations provided in Section 5.7 has not changed significantly from the EIS.

5.9 Land Use and Zoning

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
Since the project's EIS was developed, two changes to land use have occurred: a condominium was developed near the intersection of Port Monmouth Road and Church Street; and a housing development was constructed along Willow Avenue. In the initial project alignment, the southern-most section of levee in Contract 4 crossed what is now the edge of the housing development. As a result, the levee was shifted east to avoid the community.

Impacts described in the EIS remain the same in terms of project implementation having a direct and positive permanent impact on existing residential areas by reducing the potential for future flood damages. The project would have no impact on future development in a majority of the alignment since existing wetlands already restrict development.

It is anticipated that the construction of Phase II would not displace or remove any residences. However, acquisition of temporary and permanent easements would be required for the project features (e.g., levees, floodwalls, road closure gates, vertical lift tide gate, etc.) and construction workspace.

5.10 Floodplain

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
Minor, temporary and permanent direct adverse impacts would occur to flooding events and floodplain values, as described in the project's EIS.

5.11 Coastal Zone Management

The authorized project was reviewed and analyzed to determine consistency with the New Jersey Coastal Zone Management Rules (NJAC 7:7E). An evaluation of the project's consistency with applicable policies is provided in Appendix E.

5.12 Navigation

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
Impacts to navigation from construction of the tide gate and associated features around Pews Creek are not anticipated, as described in the project's EIS.

5.13 Aesthetics and Scenic Resources

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The existing environment and the environmental impact descriptions remain largely unchanged from the project's EIS. Minimal impacts are anticipated.

After the project's EIS was developed, it was determined that the floodwalls would have a fluted appearance, making the structure more visually pleasing.

In addition, during refinement of the road raising design along Port Monmouth Road, it was determined that the height would be a maximum of 6.5 feet. The road would be raised in front of the condominium complex and may block the viewshed of the beach and Raritan Bay on the south side of Port Monmouth Road. This impact would be permanent and minor adverse.

5.14 Recreation

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The existing environment and the environmental impact descriptions remain largely unchanged from the project's EIS, with temporary, minor, direct and indirect impacts described.
During design, to maintain level-ground access to the Henry Hudson Trail in Contract 4, it was determined that a walk-around trail around the floodwall was the best alternative to maintain access. This impact would be permanent and minor from current access. Since the impact from changing a straight line path to a curved, extended path is subjective, it could be considered beneficial or adverse.

The project is not anticipated to have a major impact on recreation in Pews and Compton Creeks. Small boats (e.g., kayaks) may be used in Pews Creek, however access would be limited for a short time during construction of Contract 2. Impacts would be temporary and minor adverse. Access to the Port Monmouth Bayshore Waterfront Park (e.g., beachfront) would be maintained during construction of Contracts 3 and 5.

5.15 Transportation

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The existing environment and the environmental impact descriptions remain largely unchanged from the project's EIS, with temporary minor, direct adverse and permanent, minor, direct beneficial impacts described.

Since the project's EIS was developed, it was determined that the elevation of a portion of the road along Route 36 was too low and would represent a weak point in the project's alignment during flood events. Therefore, up to 500 ft. in length of the road would be regraded to become 13 ft. NAVD. Since Route 36 is a major roadway through the Raritan Bay communities, minor, temporary adverse impacts to traffic flow and volume would occur during construction. Upon completion of the re-grading, no permanent adverse impacts to local transportation systems would occur.

5.16 Noise

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
The existing environment and the environmental impact descriptions remain unchanged from the project's EIS, with temporary, minor adverse impacts anticipated during construction.

5.17 Air Quality

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action

Clean Air Act

Although the District developed a Statement of Conformity to support the EIS, due to the passage of time and to ensure the most up to date information is provided, a new analysis was performed..

The project is located in Monmouth County, which 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 $PM_{2.5}$. Monmouth 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, $PM_{2.5}$, and CO. Emissions of these pollutants resulting 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. Fugitive dust is made up of PM and can contain $PM_{2.5}$.

The project would produce temporarily localized emission increases from the diesel powered construction equipment working on site. The localized emission increases from the diesel powered equipment would last only during the project's construction period and then end when the project is over, thus any potential impacts would be temporary in nature.
Monmouth County is part of the Ozone Transport Region. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). Sulfur dioxide (SO_2) is a precursor for $PM_{2.5}$. 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 (see Appendix F). General Conformity ensures that Federal Actions do not have a negative impact on State Implementation Plans (SIPs).

As per the annual de minimis trigger levels for General Conformity review (40 CFR §93.153 (b)) the project's General Conformity-related emissions are significantly below the de minimis levels for NO_x (100 tons in any year), VOC (50 tons in any year), $PM_{2.5}$ (100 tons in any year), and SO_2 (100 tons in any year). Therefore, by rule, the project is not a significant Federal action and would have only a temporary impact around the construction activities with no significant impacts.

Greenhouse Gases
As per the CEQ December 2014 revised draft guidance for Federal agencies' consideration of GHG emissions and climate impact in NEPA documents the greenhouse gas CO_2 would also be emitted from the non-road and on-road engines associated with the project. GHG emissions from the project are estimated to be less than 3,000 metric tons in the highest year. .

The CEQ has a reference point of 25,000 metric tons of GHGs (in units of CO_2 equivalents or CO_2e) annually as a threshold for quantitative analysis of GHG emissions and climate change impact. The project at under 9,000 metric tons is only 12% of the reference point, so further quantification has not been performed.

Because the project's emissions are temporary and finite, the project would trade minor short-term emissions of GHGs for the protection of both human life and the land-side environment, which are currently at risk against rising water related to hurricanes and large storms. From a GHG perspective, diesel-powered equipment is very efficient compared to other available construction equipment; therefore, there are no better equipment alternatives for completing the project. The project itself is in part an adaptive measure designed to protect against the long-term effects of climate change, particularly increased storm intensity and higher mean sea levels, the limited short-term increase in GHG emissions will result in a net longer-term benefit that outweighs any potential effect of the emissions on the climate.

5.18 Hazardous, Toxic and Radioactive Waste

No Action Alternative
The No Action Alternative remains unchanged from the project's EIS.

Proposed Action
During development of the project's EIS soil samples were collected to determine if any contaminants of concern were present. Samples were collected from several areas throughout the project's footprint. Laboratory analysis of the soil samples revealed no unusual concentrations or presence of compounds analyzed for. There were low levels of pesticides detected, these were below NJDEP threshold levels. For metals analyzed, arsenic came up in three samples exceeding the NJDEP threshold. It should be noted that geologic formations in this area have arsenic levels exceeding NJDEP threshold. When this occurs the NJDEP reviews projects on a case by case basis. They take into consideration the project's purpose, area(s) impacted and project end use. It is anticipated the arsenic threshold exceedences would not impact the project or the area surrounding the project. Environmental consequences of this project are minimal. Currently accepted practices for containing and mitigating soil with potentially high levels of arsenic would be implemented.

5.19 Cultural Resources

No Action Alternative
There would be no impact to historic resources identified within the project's Area of Potential Effect, particularly to Site 28-Mo-272 (Please see description in Proposed Action section below).

Proposed Action
As a federal agency the Corps has certain responsibilities for the identification, protection and preservation of cultural resources that may be located within the Area of Potential Effect (APE) associated with a proposed project. Present statutes and regulations governing the identification, protection and preservation of these resources include the National Historic Preservation Act of 1966 (NHPA), as amended; the NEPA of 1969; Executive Order 11593; and the regulations implementing Section 106 of the NHPA (36 CFR Part 800, Protection of Historic Properties, August 2004). Significant cultural resources include any material remains of human activity eligible for inclusion on the National Register of Historic Places (NRHP).

As established by 36 CFR Part 60, an historical property (generally a property over 50 years of age) is eligible for listing in the National Register if it possesses "integrity of location, design, setting, materials, workmanship, feeling, and association," and it meets at least one of four criteria:

A. It is associated with events that have made a significant contribution to the broad patterns of our history; or
B. It is associated with the lives of persons significant in our past; or
C. It embodies the distinctive characteristics of a type, period, or method of construction, or it represents the work of a master, or it possesses high artistic values, or it represents a significant and distinguishable entity whose components may lack distinction; or
D. It has yielded, or may be likely to yield information important in prehistory or history.

Cultural resource work is coordinated with the State Historic Preservation Office, which on this project is the New Jersey Historic Preservation Office (NJHPO). The Advisory Council on Historic Preservation, Native American Tribes and other interested parties are given

opportunities to participate in the process.

The District has defined the APE for this project to include all areas that would be impacted by activities required to construct and operate the recommended project including the environmental mitigation measures (See Figure 3). The locations of all project elements have yet to be defined.

Previous Stud**ies**

A Phase I cultural resources survey was conducted for most of the alignment as was proposed in the late 1990s (Harris and Katsakiori 1999). In the study area is the 18th-century Seabrook-Wilson House, which is listed on the NRHP. Changes proposed to the project alignment since the 1999 survey have not yet been surveyed.

One potentially significant resource identified within the APE was a Native American archaeological site (Site 28-Mo-272). The site was largely within what was then a proposed interior drainage ponding are that has since been eliminated from the project. The site however extended into the adjacent Compton Creek levee alignment which remains part of the project. A Phase II study of the portion of the site within the alignment was conducted in 2002. The result of the 2002 field effort was not documented in a report as the project archaeologist who led the work left the New York District and project funding was cut. Analysis of the data and a report on this fieldwork is being prepared. The site, in the marsh, exhibited limited stratigraphy and yielded one jasper scraper, stone debitage and several sherds suggesting the site was a temporary woodland period procurement site. Testing seems to have exhausted the research potential for this site and the Corps is proposing that no further work on it will be undertaken.

Current Studies

Sections of alignment have changed since the initial cultural resources studies were undertaken. Those area have recently been examined. Wetland mitigation sites were also not previously surveyed as their locations had not been proposed. There are no standing structures on the properties now under consideration for mitigation and the surrounding area is comprised primarily of mid-20th century residential structures. One concern of this study is the potential for archaeological resources, particularly prehistoric deposits, underlying the marsh or on upland locations within the wetlands. The cultural resource investigation for the Port Monmouth wetland mitigation areas included background research, fieldwork and report preparation. Fieldwork is largely completed. A single prehistoric argillite flake was excavated from a shovel test on the western side of Pews 4. Four radial tests at 12.5 feet around this find yielded a single argillite flake. A third flake was found during additional testing approximately 100 feet from the first find spot. Radial testing around this test yielded no further prehistoric material. All of the finds have come from soil contexts containing modern artifacts. These artifacts do not appear to represent intact prehistoric archaeological sites. A 3-foot-square excavation unit will be excavated at the first find spot when the contractor's geomorphologist is on site.

No other archaeological sites have been found on any of the other properties surveyed. The report will document the findings. Pending SHPO concurrence, no further work will be conducted where the alignments have shifted or at the wetland mitigation sites. It should be noted that a right-of-entry could not be obtained for a property within the proposed interior drainage area. That property will be tested as the project proceeds.

A known historic property running through a potential mitigation area is the remains of the Raritan and Delaware Bay Railroad line. The alignment between Port Monmouth Road and Broadway was recorded to the Historic American Engineering Record (HAER) standards (Hartwick, Porter & Tucher, n.d.). Sections of the line have been removed since the HAER documentation was prepared.

It should be noted that wetland mitigation construction generally entails shallow excavation and consists largely of the removal of the phragmite rhizome layer. This layer would not contain cultural resources. There may be a few deeper drainage swales excavated in select locations yet to be determined.

Pending NJHPO concurrence, the Corps is of the opinion that the Phase II excavations on Site 28-Mo-272 exhausted the site of any further research potential and no further work will be undertaken on the site.

Section 106 Coordination
All previous Corps studies in the APE were coordinated with the NJHPO (Appendix G). On-going work will be coordinated with the NJHPO, Advisory Council on Historic Preservation, the Delaware Nation, the Delaware Tribe of Indians, the Shawnee Tribe of Oklahoma and Monmouth County Parks System for their review and comment. Public review of the Draft Environmental Assessment prepared under the National Environmental Policy Act served as part of the District's Section 106 public coordination.

6.0 Climate Change and Sea Level Change

The impacts of climate change and sea level change were not addressed in the project's EIS. The impacts of climate change and greenhouse gas emissions are addressed in Section 5.17 Air Quality.

6.1 No Action Alternative

"Global sea level rise is the result of the change in the volume of water in the oceans due primarily to changes in ocean temperature, melting and increased discharge of land-based ice (i.e. glaciers, ice caps, and ice sheets in Greenland and Antarctica), and changes in runoff (e.g. dam construction or groundwater withdrawal)" (NOAA 2012). Changing sea levels can lead to: extreme weather events; increased frequency, magnitude and duration of flooding associated with storms along the coast (NOAA 2012); decreased capacity for stormwater drainage; changes in salinity gradients in estuarine areas that impact ecosystems; increased inundation at high tide; and declining reliability of critical infrastructure services such as transportation, power, and communications (USACE 2015a).

The historic rate of sea level change measured at a station in Sandy Hook, NJ over the past 82 years has been approximately 4.08 mm per year (http://tidesandcurrents.noaa.gov/sltrends/mslUSTrendsTable.htm, accessed on 29 Dec 2015).

Sandy Hook is approximately 15 miles from the project area. Predicted future rates for the New Jersey coastline are expected to increase to 6 mm per year (Cooper et al. 2005; Psuty and Ofiara 2002, as cited in Lathrop and Love 2007); however, there are a range of uncertainties to consider in future global sea level change (NOAA 2012).

It is possible that some level of alteration to the project area shoreline and the Pews and Compton Creek tidal wetlands due to sea-level change in Port Monmouth, NJ would occur, which could in turn have an impact on the fish and wildlife species they support, as well as the surrounding community. Considerably more research is needed in the region to better understand and predict the specific effects of climate change and sea-level change, including the timeframe that would trigger significant changes to the human and natural environment. However, based on existing research, a few general scenarios are possible, although this write up is not comprehensive or a prediction of what is anticipated to occur in the project area given that the impacts of climate change will vary by location and are dependent on a range of biophysical characteristics and socioeconomic factors, including human response (Neumann et al. 2000).

6.1.1 Impacts to the Shoreline

The shoreline in Port Monmouth is susceptible to storm damages. As sea levels change, extreme weather, and increased flooding and erosion may occur. Under the no-action alternative, future sand re-nourishment and maintenance of the dune would occur as part of the project's completed Phase I/shore protection component; thereby providing some level of protection against coastal erosion, storms, and wave attack. However, protection would be limited without construction of Phase II, leaving the Port Monmouth community vulnerable to more frequent flooding, power outages, and damage to infrastructure, business, and residents.

6.1.2 Impacts to Vegetation (non-wetland)

Landward of the dune and adjacent to Old Port Monmouth Road is a strip of native coastal shrub vegetation which may provide nesting and cover for birds in the Port Monmouth project area. Although the habitat is elevated on the beach side, it slopes down on the landward side. Beach erosion and sea level change may eventually change or eliminate this habitat for wildlife (USACE 2015a); although this is unlikely to occur during the 50-year life of the project in which the dune would be maintained, the beach would be renourished, and given the incremental, slow changes in sea level.

6.1.3 Impacts to Tidal Wetlands, Fish and Wildlife

Since tidal wetlands are located on the coastal fringe, they are susceptible to impacts from sea level change, including: inundation; changes in sediment transport and vertical accretion rates; landward migration of tidal waters and habitats; changes in plant and animal species composition, and habitat loss (Cahoon et al. 2009, as cited in NOAA 2011). There are two tidal wetlands located in the Port Monmouth project area: Pews and Compton Creeks.

The primary concern for tidal wetlands from a rise in sea level is inundation leading to wetland plant community stress and loss (NOAA 2011). The ability of tidal marshes to migrate in response to sea level rise depends on the supply of sediment and organic matter that is available to raise the marsh surface, the local tidal range, and the slope of nearby lowland (Titus and Strange, 2008). A rise in sea level can increase plant productivity and enhance sediment

deposition by increasing the efficiency of sediment trapping (Morris et al. 2002, as cited in NOAA 2011). Additional flooding can also lead to greater soil waterlogging or anaerobiosis, slowing decomposition below the ground (Anisfeld et al. 1999, as cited by NOAA 2011). If a marsh grows too high, the supply of sediments and nutrients will decrease, aerobic decomposition will increase, and net accretion will slow down (Cahoon and Reed 1995, as cited by NOAA 2011). As accretion slows, greater flooding is likely to occur in the wetland, increasing net accretion rates (NOAA 2011). Additionally, waterlogging and changes in soil chemistry from tidal inundation may stress wetland vegetation, leading to a change in species composition and vegetation zones, or may cause the vegetation to die-off, eventually converting the wetland to open water or mudflats (Titus and Strange, 2008).

There are too many variables to accurately predict how the wetlands in the project area would react to a change in sea level during the 50-year life of the project under the No Action Alternative. Currently, during a spring tide and rain event, flooding occurs on the road adjacent to the east side of Pews Creek. Assuming increased inundation occurs in Pews and Compton Creeks, and depending on the extent of flooding, it is possible that water would extend beyond the boundaries of the wetland onto adjacent roads and private homes more frequently in the Port Monmouth community. Without the construction of Phase II of the project, portions of the community may be subject to more frequent flooding, road closures, and/or damage to private and public property. Depending on the duration and frequency of flooding, this may be a minor or moderate permanent adverse impact for the community; however, over the next 50 years, it is possible that other measures may be employed by public entities to offset this issue.

The extent of flooding due to increased inundation of the wetlands may also lead to a change in the habitat, although to what degree is difficult to predict. Several scenarios are possible, for example:

- Depending on sources of sedimentation and transport rates, an increase in wetland surface could match or exceed the depth of inundation from sea level rise. It is possible that the wetlands could adapt to changed conditions from sea level rise and experience little to minor impacts over the next 50 years.
- It is possible that the species composition of existing vegetation would change as a result of inundation and changes to salinity gradient, which could in turn impact fish and wildlife species utilizing the wetlands for foraging, reproduction, etc. However, most species have the ability to adapt to changing environments, especially to the incremental-type changes associated with climate change; therefore, the species' may change their behavior or potentially seek out other habitats to survive. It is difficult to say at this time whether or not alternate coastal wetlands would be available, or if large tracts of existing habitat would be lost or changed dramatically due to climate change. However, a change in the species composition could provide habitat for different species. Therefore, impacts could be minor to moderate and permanent: adverse for species experiencing a loss of habitat type; and beneficial for species that have the ability to adapt to the new habitat type, as well as for different species suited to the habitat changes.
- In an extreme case, it is possible that the wetlands would convert to a mudflat or open water in the next 50 years, changing the habitat type significantly. In this case, the species that depend on tidal wetlands, such as marsh-nesting birds, fish,

invertebrates, amphibians, reptiles, and mammals, can show decreased growth, reproduction, or survival from a decrease in habitat quantity or quality (Titus and Strange, 2008), which could be a permanent minor to moderate adverse impact to some species, depending on the loss or gain of tidal wetlands in the Region/eastern coastline. However, this shift would still provide habitat for a variety of fish and wildlife, and would be a beneficial, minor to moderate, permanent impact to those species.

Tidal marshes may also migrate horizontally to keep up with changes in sea level. Migration can occur both landward and seaward, however most marsh edges have sufficient wave energy and ice scouring to prevent migration seaward (Redfield 1972, as cited by NOAA 2011). Limitations of landward migration include roads, seawalls or naturally occurring bedrock. If space is available, wetlands can migrate inland through the conversion of uplands (Cahoon et al. 2009, as cited in NOAA 2011); however, even if anthropogenic barriers do not exist, oftentimes natural slopes will prevent migration (NOAA 2011). In the case of Pews and Compton Creeks, most of the land bordering the tidal wetlands are developed and include roads, an existing levee adjacent to Pews Creek, and developed properties; there are pockets of upland, but these areas are severely limited by existing development. Therefore, horizontal migration of the wetlands is unlikely to occur.

6.2 Proposed Action

The construction of Phase II would not change the potential effects of climate change and sea level change described in the No Action Alternative for the Port Monmouth area. This section describes the potential interaction of the project features with the potential effects of climate change and sea level change.

6.2.1 Impacts to the Shoreline

As sea levels change, extreme weather, and increased flooding and erosion may occur. Construction of Phase II, in conjunction with Phase I, would complete a line of protection around the Port Monmouth community, thereby reducing coastal erosion, flooding, power outages, and damage to infrastructure, business, and residents.

6.2.2 Impacts to Vegetation (non-wetland)

Implementation of Phase II would be similar to that described for the No Action Alternative; construction of the floodwall at the dune tie-in under Contract 3 would not change the potential impacts of sea level rise to the habitat landward of the dune.

6.2.3 Impacts to Tidal Wetlands, Fish and Wildlife

Potential impacts to Pews and Compton Creeks from sea level change would be similar as described for the No Action Alternative.

The primary concern for tidal wetlands from a rise in sea level is inundation leading to wetland plant community stress and loss (NOAA 2011). Construction of the vertical tide lift gate across Pews Creek, and the levees and floodwall system on the border of Compton Creek, would not change the potential for sediment to be transported to the wetlands and for vertical accretion to occur. Therefore, the impacts described for the No Action Alternative are anticipated to be similar.

The extent of flooding due to increased inundation of the wetlands may also lead to a change in the habitat, although to what degree is difficult to predict. Several scenarios are possible, and would be similar as that described for the No Action Alternative, with the exception of those wetland areas bordering the Compton and Pews Creeks, in which impacts could potentially be more severe. The proposed levees and floodwalls along the edge of the wetlands would act as a barrier to the flow of water/potential flooding into the community, particularly in Compton Creek. Depending on the extent of inundation, pooling of water may occur within the wetland and adjacent to the structures, which may lead to erosion of the levees and soil adjacent to the floodwalls and would require additional maintenance or re-evaluation. Pooling may also impact the plant community adjacent to the structures, which may decrease some of the available habitat for some species of fish and wildlife.

Implementation of Phase II of the project would not have a major impact on the ability of Pews and Compton Creeks to migrate horizontally to keep up with changes in sea level since most of the land bordering the tidal wetlands are developed and include roads, an existing levee adjacent to Pews Creek, and developed properties.

In the USFWS PAL (Appendix B), a concern was raised that the potential increase in high tides associated with sea level rise could increase flooding of low lying streets adjacent to the wetlands, particularly in the Pews Creek area, resulting in an increase in usage of the vertical tide lift gate to close off the flow of water to Pews Creek. As a similar concern was raised prior to the PAL due to current flooding of the road adjacent to the east side of Pews Creek, which is reported to occur during a spring tide with a rain event, the Corps determined that the Pews Creek pump station would be used to control the flooding. If sea level rise causes an increase in the severity or duration of flooding to the road, it is anticipated that the pump station would be used to resolve the problem, although it is difficult to predict the severity of flooding over the next 50 years, as well as future changes to the project area. It is anticipated that changes to the tides would be slow and incremental based on predicted changes in sea level rates.

Also, although the District would agree with the PAL that high tides can be an important function of estuarine ecosystems and limiting high tides to some extent could result in adverse effects to Pews Creek fish and wildlife, it is equally important to consider the adverse impacts of increased inundation to tidal marshes from sea level rise, as described in the No Action Alternative, in which the character of the wetland could drastically change.

Assuming increased inundation occurs in Pews and Compton Creeks, and depending on the extent of flooding, it is possible that water would extend beyond the boundaries of the wetland onto adjacent roads and private homes more frequently in the Port Monmouth community. Without the construction of Phase II of the project, portions of the community may be subject to more frequent flooding, road closures, and/or damage to private and public property. Depending on the duration and frequency of flooding, this may be a minor or moderate permanent adverse impact for the community; however, over the next 50 years, it is possible that other measures may be employed by public entities to resolve this issue.

7.0 Cumulative Impacts

The CEQ regulations (40 CFR 1508.7) define cumulative impacts as the "impact on the environment which results from the incremental impact of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time". NEPA documents should only consider those past, present, and future actions that incrementally contribute to the cumulative effects on resources affected by the proposed action (http://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf; accessed on 1/14/16); therefore, this analysis focuses on Phase II (proposed action) of the project only. An analysis of cumulative impacts relevant to Phase I (beach nourishment) was developed for the Union Beach Coastal Storm Risk Management Project (USACE 2015b), and included placement of sand from the Sea Bright Borrow Area to beaches in Keansburg, Port Monmouth, Union Beach, etc. This analysis is incorporated by reference and is not considered below.

For this analysis, the spatial boundaries includes the shoreline of Raritan and Sandy Hook Bay extending from Matawan to Atlantic Highlands from west to east and from the shoreline of the Bay to Route 36 running north to south, in which the habitat is similar to the project area. The timeframe in which the analysis occurs is October of 2012, post Hurricane Sandy, through 2027.

7.1 Actions Considered in Cumulative Analysis

Past and current actions that need to be considered against the proposed action include:

- District and/or New Jersey State Sponsored Projects: levee repair in Keansburg, adjacent to Pews Creek, due to damages from Hurricane Sandy (completed in 2014); replacement of two existing/failing outfall pipes at the dune in Keansburg (to be completed first quarter of 2016);
- Monmouth County Sponsored Projects: beachfront redevelopment project in Union Beach that restored the beachfront, enhanced public access to the beach, and helped to upgrade adjacent commercial and residential areas (construction completion unknown).

There are several reasonably foreseeable future actions to be considered.

- District and New Jersey state sponsored projects include: flood control features in Union Beach, including levees, floodwalls, road raising, tide gates, interior drainage, and pump stations (approximately 14 months; estimated completion in 2018); shore protection in Highlands, to include the raising of existing bulkheads and construction of some floodwalls (approximately 30 months, with estimated completion in 2020); flood control features in Leonardo through non-structural methods to include the raising of homes (construction estimated in 2017).
- The Monmouth County Bayshore Region Strategic Plan outlines potential projects along Raritan Bay (http://co.monmouth.nj.us/documents/24%5CBayshore%20Region%20Plan.pdf, accessed 1/14/16). The plan was developed as part of a study funded by the Office of Smart Growth of the New Jersey Department of Community Affairs with oversight provided by

the Monmouth County Planning Board. It is unclear if and when these initiatives would take place, or if any would overlap with the timeframe of District and NJ State projects. Proposed projects include:

- waterfront/open space initiatives along Raritan Bay to include:
  - Matawan Creek Wetlands - enhancement and/or restoration;
  - Keyport - revitalization efforts in the waterfront business district; bulkhead replacement, a new promenade, Green Acres pier replacement, harbor dredging, American Legion Drive replacement, downtown and waterfront parking, and a waterfront market;
  - Conaskonk Point - enhancement and/or restoration;
  - Natco Lake - enhancement and/or restoration;
  - Union Beach - access to waterfront north of a proposed corporate campus;
  - Waackaack Creek Greenway - enhancement and/or restoration of a riparian corridor;
  - Belford Seafood Cooperative - gateway from Main Street. For example: landscaping, streetscapes, and features and signage identifying the community to direct drivers;
  - Many Mind Creek Greenway - enhancement and/or restoration of a salt marsh;
  - Popamora Park - enhancement and/or restoration of a trail;
  - Highlands Promenade - proposed completion; and
  - Veteran's Point Park - enhancement and/or restoration; water taxi service to Sandy Hook;
  - Regional linear park, called the Bayshore Trail System, to provide continuous visual, pedestrian, and bicycle access to and along the Raritan Bay waterfront for the general public and protect and enhance the scenic, natural, historic, cultural, and open space resources of the Bayshore and integrate them into a major waterfront park. The path would avoid wetlands or other sensitive environmental factors (http://www.visitmonmouth.com/documents/24%5CBayshoreTrailSystemDesignManual1993.pdf, accessed 1/14/16);
  - New Sandy Hook bridge;
  - Redevelopment in Keansburg - improve access to the beachfront while preserving and restoring natural areas.

7.2 Potential Cumulative Impacts

This section presents the results of the cumulative impact assessment; only those resources with anticipated impacts from the proposed action are addressed, based on the analysis in this EA.

7.2.1 Wetlands and Vegetation

Flood control projects in Union Beach and Highlands would have an adverse impact on wetlands, although acreage of impacts would not be available until design progresses. Like Port Monmouth, projects would attempt to minimize impacts through design of structures near the edge of the wetlands; any wetland impacts would be fully mitigated in consultation with NJDEP, DLUR.

The Many Mind Creek Greenway, Matawan Creek Wetlands, and Waackaack Creek Greenway include proposed restoration/preservation of wetlands and riparian corridors. The Port Monmouth project includes mitigation for riparian zones and wetlands, to include a forested wetland. Mitigation for Union Beach and Highlands has not been determined yet, but would include some form of wetland enhancement/restoration. However, all of these efforts would improve habitat in the Raritan Bay area and would be a beneficial cumulative impact.

A temporary and permanent loss of terrestrial vegetation would occur in the footprint of the alignments in Union Beach for construction of the levees and floodwalls, and in Highlands (potentially for floodwall construction only); although the levees would be planted with grass, thereby reducing the total loss of vegetation. Temporary adverse impacts would also occur in these areas, as well as at the dune in Keansburg in/around the outfalls, and for the levee repair in Keansburg; however, replanting would/did occur. Overall, significant cumulative impacts to vegetation are not anticipated since: fragmentation of vegetation/habitat is not anticipated; the project areas are divided geographically, dividing the loss over a large area; and due to the availability of vegetation in the Raritan and Sandy Hook Bay areas.

7.2.2 Fish, Reptiles and Amphibians

Temporary displacement of reptiles and amphibians to nearby undisturbed areas may occur during construction in Port Monmouth, Union Beach and to a lesser extent in Highlands. Installation of levees and floodwalls may also disrupt terrestrial migration patterns, although this is anticipated to be minor. The unprotected sides of the levees and floodwalls may experience higher flood levels adjacent to the structures, which could increase flood depths and may leave more pools of water once the tide recedes; these pools may be utilized by some reptiles and amphibians, although they may also trap some fish and provide a source of food for a variety of bird species. Overall, significant adverse cumulative impacts are not anticipated.

Beneficial cumulative impacts to fish, reptiles and amphibians could occur through the restoration and enhancement of habitat in Port Monmouth, Union Beach, Matawan Creek Wetlands, Natco Lake, Conaskonk Point, and Many Mind Creek Greenway.

7.2.3 Benthos

Potential temporary and permanent loss of benthic invertebrates may occur through: the construction of tide gates, levees and floodwalls in Union Beach, and the Green Acres pier replacement and harbor dredging in Keyport; these would be in addition to similar impacts in Port Monmouth. However, these impacts would be temporary, one-time direct burial of invertebrates; no long term impacts are anticipated since recovery in previous monitoring studies has shown that abundance, biomass and taxa richness recovered within approximately 1 year while recovery of assemblage biomass composition may take from 1.5 to 2.5 years (USACE 2001). Given the nature of recovery times, that construction times would be staggered over several years between projects, and that the distance between impacts is approximately 5 miles, cumulative impacts are not anticipated to be significant.

Beneficial cumulative impacts to the overall benthic community in the area would potentially occur with the restoration and enhancement of wetlands in Port Monmouth, Union Beach, Matawan Creek Wetlands, Natco Lake, Conaskonk Point, and Many Mind Creek Greenway.

7.2.4 Mammals and Birds

A permanent loss of wetland and upland habitat for mammals and birds would occur in Port Monmouth, Union Beach and to a much lesser extent in Highlands due to the placement of levees and floodwalls; however these projects are being designed near the edge of undeveloped lands to avoid habitat fragmentation and to minimize loss of habitat. Wetland impacts would be mitigated through the DLUR permitting process and would provide enhanced and more diverse habitat for mammals and birds. The levees could also provide habitat for some mammals. Areas adjacent to the structures would also be disturbed, including the replacement of outfall pipes in Keansburg, but the disturbance would be temporary and the areas would be re-seeded/re-planted. Significant adverse cumulative impacts are therefore not anticipated.

Beneficial cumulative impacts to mammals would potentially occur with the enhancement/restoration of habitat in Port Monmouth, Union Beach, Matawan Creek Wetlands, Natco Lake, Conaskonk Point, and Many Mind Creek Greenway.

7.2.5 Threatened and EndangeredSpecies and Species of Special Concern

Seabeach Amaranth, Seabeach Knotweed, and Beach Wormwood

Seabeach amaranth were observed on beaches in Port Monmouth and Keansburg; suitable habitat is not available on Union Beach (USACE 2015b) and have not been recorded in other areas along Raritan Bay/Sandy Hook Bay. Seabeach knotweed has been found in Port Monmouth; a literature search revealed no other recorded observations on Raritan Bay/Sandy Hook Bay beaches. Beach wormwood has been observed in the Raritan Bay/Sandy Hook Bay, however, it is considered rare in the state of NJ. Monitoring for all three plant species would take place in Port Monmouth prior to any construction activities. Cumulative adverse impacts are not anticipated for either species.

Bald eagles

Significant cumulative adverse impacts are not anticipated for bald eagles since the eagle is highly mobile and can avoid disturbance from construction activities associated with any of the proposed projects. As a protected species, it is assumed that all Federal, State and County projects would comply with National Bald Eagle Management Guideline Recommendations to avoid and minimize impacts.

Osprey

Osprey are known to occur and breed in the Raritan and Sandy Hook Bay areas. Man-made nesting platforms would be relocated in Union Beach and Port Monmouth to avoid impacts during construction; pre-construction monitoring of osprey would occur in these areas and Highlands to avoid disturbing natural nests. Through the NJDEP DLUR permitting process, nesting ospreys occurring near any projects would be protected via a 1,000 foot buffer from construction activity. Significant cumulative adverse impacts are therefore not anticipated.

Pied-billed Grebe and Cooper's Hawk

A permanent reduction in wetlands and forested habitat would occur in Union Beach and Port Monmouth; additional non-wetland habitat may be removed or disturbed for some of the county projects (e.g., Bayshore trail System, park enhancements, etc.). However, due to the availability of habitat along Raritan and Sandy Hook Bays, wetland mitigation associated with Union Beach and Port Monmouth, and enhancement and/or restoration of wetlands and riparian corridors in various County projects, significant adverse cumulative impacts are not anticipated.

Snowy Egret, Black Skimmer, Least Tern, Silver-bordered Fritillary, and Black Crowned Night Heron

Although there is some potential for the snowy egret, black skimmer, least tern, silver-bordered fritillary, and black crowed night heron to be present in the Federal, State and County project areas, they are all highly mobile and capable of avoiding construction activities, except for the larval stage of the fritillary. Disturbance from construction activities would be temporary and spread over time and location within the Raritan and Sandy Hook Bay areas.

A permanent reduction in wetlands and forested habitat would occur in Union Beach and Port Monmouth; additional non-wetland habitat may be removed or disturbed for some of the county projects (e.g., Bayshore trail System, park enhancements, etc.). However, due to the availability of habitat along Raritan and Sandy Hook Bays, wetland mitigation associated with Union Beach and Port Monmouth, and enhancement and/or restoration of wetlands and riparian corridors in various County projects, significant adverse cumulative impacts are not anticipated.

7.2.6 Essential Fish Habitat

Significant adverse cumulative impacts to EFH species and habitat are not anticipated. Similar impacts to EFH species and life stages described for Port Monmouth in Section 5.6 are anticipated for the Union Beach project.

Beneficial cumulative impacts to EFH habitat is anticipated with the restoration and enhancement of wetlands in Port Monmouth, Union Beach, Matawan Creek Wetlands, Conaskonk Point, and Many Mind Creek Greenway.

7.2.7 Socioeconomics

Cumulative beneficial impacts to socioeconomics would include a positive direct economic impact on existing business in the protected area due to the reduced potential for future flood damages and potential improved accessibility to business during storm events in Port Monmouth, Union Beach and Highlands.

Cumulative beneficial economic impacts on the local economy would occur during construction of all Federal, State and County projects, as well as post construction due to: increased recreational opportunities from the Bayshore Trail System; improved beaches and access in Union Beach, Port Monmouth and Keansburg; availability of and access to promenades in Highlands and Keyport; enhancement of Popamora and Veteran’s Point parks; and alternate and improved transport from Highlands to Sandy Hook.

7.2.8 Land Use and Zoning

Beneficial permanent cumulative impacts on existing residential areas are anticipated in Union Beach, Port Monmouth and Highlands by reducing the potential for future flood damages. It is anticipated that all Federal, State and County projects would not have an impact on future development since existing wetlands already restrict major development; therefore cumulative adverse impacts are not anticipated.

7.2.9 Floodplain

Cumulative effects of the construction and maintenance of all Federal, State and County projects would have no significant negative impact on the existing tidal influences and floodplain values. Union Beach, Port Monmouth and Highlands would have beneficial impacts related to flooding events.

The construction of tide gates, levees, floodwalls and pump stations would not have significant impacts on periodic tidal events; water would still flow freely into and out of the wetlands. Coffer dams or similar would be used during construction of the tide gates to maintain tidal flow.

Wetland mitigation associated with the Federal/State projects and wetland enhancement and/or restoration associated with County projects would provide beneficial cumulative effects to floodplain values.

7.2.10 Aesthetics and Scenic Resources

Significant adverse cumulative impacts are not anticipated for aesthetics and scenic resources from all Federal, State and County projects. Wetland mitigation and restoration/enhancement, and restoration/enhancement of parks, and development of the Bayshore Trail System would provide cumulative beneficial impacts to Raritan Bay and Sandy Hook Bay communities.

7.2.11 Recreation

Beneficial cumulative impacts to recreation are anticipated from: the development of the Bayshore Trail System; improved beaches and access in Union Beach, Port Monmouth and Keansburg; availability of and access to promenades in Highlands and Keyport; enhancement of Popamora and Veteran’s Point parks; and alternate and improved transport from Highlands to Sandy Hook via the replacement bridge and water taxi service.

7.2.12 Transportation

Significant adverse cumulative impacts are not anticipated for transportation due to the spacing of all projects in time and geographic location.

7.2.13 Noise

There would be a negligible increase in noise levels in the immediate vicinity of each project location evaluated for cumulative impacts. Noise would be produced by heavy equipment and construction activities. Since the projects are isolated geographically from one another, additive noise impacts from concurrently operating projects is not anticipated. Therefore, significant adverse cumulative impacts are not anticipated.

7.2.14 Cultural Resources

Cumulative impacts on cultural resources would not be expected as a result of the actions.

7.2.15 HTRW

The cumulative impacts of the HTRW assessment is minimal if at all. The HTRW samples collected during site characterization were all sub-surface and did not impact surface areas or waters. Significant cumulative impacts are not anticipated.

8.0 Project Mitigation

Although the proposed action was designed and further refined to avoid and minimize ecological impacts, there are still unavoidable impacts to wetlands and fish and wildlife habitat. These unavoidable impacts must be mitigated pursuant to the Clean Water Act and the USACE's Engineer Regulation 1105-2-100.

At the time the EIS was developed, 12.76 acres of impacts to tidal wetlands was identified; riparian impacts and freshwater wetland impacts were not identified. As part of the 2000 EIS process, The U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and NJDEP, Division of Land Use Regulation (DLUR) were consulted for the development of mitigation plans using a Habitat Evaluation Procedure (HEP) protocol; a Phragmites Encroachment model, and an incremental cost analysis were also conducted. The District determined that the impacts would be offset through the restoration of 12.8 acres of *Phragmites*-dominated wetland habitat to salt marsh in the south-east corner of the Pews Creek wetland; however, a consensus between State and Federal agencies to determine the appropriate acreage of compensatory mitigation to offset environmental impacts was not reached.

Coordination with Federal and State agencies was re-initiated in 2014. DLUR, NMFS and USFWS agree: that the HEP protocol does not provide a comprehensive evaluation of wetland functions and values and is not appropriate to use for the identification of wetland mitigation acreage; that 12.8 acres of restoration is not adequate compensation for the project impacts; and that ratios should be utilized to determine mitigation (Appendix A). NMFS and USFWS also expressed disapproval of using the Pews Creek mitigation site since the habitat is already suitable for fish and wildlife; this site was later eliminated from consideration.

The USACE Civil Works policy requires a quantitative assessment of wetland impacts and associated mitigation. To meet this requirement, the District selected an Evaluation for Planned Wetlands (EPW) procedure. Since the engineering designs for Contracts 2-5 are not progressing at the same rate, and the construction of Contract 3 is planned in advance of Contracts 2, 4 and 5, the District developed a worse-case scenario of project impacts based on the level of design of each contract at the time the NEPA document was prepared. Through the DLUR permitting process for each contract area, wetland impacts and associated mitigation would be refined based on 90-100% engineering designs, and the EPW would be updated if needed.

Based on the project alignment as of the Fall 2015, project features would impact coastal open water, coastal marsh, freshwater marsh, and riparian zones. The acres of permanent, direct and indirect impacts are shown in Table 6. Direct impacts represent impacts from the footprint of proposed structures, such as levees, floodwalls, vertical lift tide gate, road closure gates, etc. Indirect impacts represent areas where existing wetland hydrology may potentially be cut off

depending on ability of tidal water to flow under the levees/floodwalls, although other wetland characteristics may remain; coordination with DLUR is ongoing to make a final determination on whether or not these impacts require mitigation. The acres of temporary impacts are shown in Table 7 and include temporary staging areas, vegetation free zones, drainage swales, etc.; these areas would be restored with vegetation. Impacts to Contract 3 are based on advanced designs submitted to DLUR for a construction permit and are therefore presented separately from the other contracts.

NJDEP DLUR rules allow for 9,000 square feet (approx. 0.21 acres) of riparian impacts in which mitigation is not required; DLUR agreed that this rule would be applied per watershed for Pews and Compton Creeks. Also, per NJDEP rules, mitigation is not required for transition area impacts (e.g., buffers) on a per acre basis. The transition area impacts are mitigated through providing appropriate width transition areas on the mitigation site; the mitigation site selected would provide a transition area of approximately 200 ft. from private property; therefore, acres of impacts to buffers are not presented.

Table 6: Worse case scenario of permanent, direct and indirect project impacts on wetland and riparian areas.

Contract #	Coastal/ Open (acres)	Coastal/ Marsh (acres)	Freshwater (acres)	Riparian (acres)	Riparian (-.21 acres)	Indirect Coastal Wetlands	Indirect Freshwater Wetlands
3	0	0.01	0.04	0.01	0	0.01	0
2, 4 & 5	0.6	9.47	1.79	1.08	0.76	4.64	0
Total	0.6	9.48	1.83	1.09	0.76	4.65	0

* Permanent and direct impact areas include the footprint of proposed structures, such as levees, floodwalls, tidegate, road closure gates, etc. Indirect impacts include areas where existing hydrology would be cut off.

Table 7: Worse case scenario of temporary, indirect project impacts on wetland and riparian areas.

Contract #	Coastal/ Open (acres)	Coastal/ Marsh (acres)	Freshwater (acres)	Riparian (acres)	Riparian (-.21 acres)	Indirect Coastal Impacts	Indirect Freshwater Impacts
3	0	0.09	1.34	0.43	0.34	0.09	0
2, 4 &5	1.24	10.13	2.71	5.5	5.5	4.64	0
Total	1.24	10.22	4.05	5.93	5.84	4.73	0

***** Temporary and indirect impact areas include temporary staging areas, vegetation free zones, and drainage swales.

The construction and placement of permanent project features from Contracts 2-5 would result in impacts to riparian, coastal and freshwater wetland areas. To mitigate for project impacts: credits from an existing bank would be purchased for freshwater impacts at a 1:1 ratio; as credits are unavailable for the coastal impacts and are not currently allowable for riparian impacts through DLUR regulations, onsite mitigation is required. Subject to additional design changes and in the worse case scenario, it is anticipated that 29.5 acres of mitigation is required for the coastal wetland impacts and 2.18 acres of mitigation is required for riparian impacts.

Through initial EPW evaluations and multiple field visits with USFWS, NJDEP and/or NMFS (e.g., July 21, 2014; April 30, 2015), 11 preliminary mitigation alternatives were identified in the Pews Creek (4 sites) and Compton Creek (7 sites) watersheds. Most alternatives were eliminated because: the site was selected as mitigation for another project; the site was too small for the project's mitigation needs; distance from the creeks were too large; concerns were raised about increasing the flooding potential in the community; potential conflict with local projects that could delay construction; and the habitat of the site was in good condition and/or a mosaic and would not be an efficient site for mitigation. Two viable alternatives remained and were identified as Pews 4 and Compton 6. Testing for hazardous, toxic and radioactive wastes was completed in the Fall of 2015, the results were coordinated with DLUR, and it was determined that the Pews and Compton sites are both suitable for mitigation and no additional action is required to address ecological risk.

Pews 4 is shown in Figure 3 as Contract 1 and consists of dense monocultures of *Phragmites* sp. (common reed), opportunistic weeds and shrubs (e.g., sumacs, etc.), and successional trees. The objective would be to convert the common reed monoculture to maritime forested wetlands to serve as coastal wetland mitigation. After the first year of planting, active management (weeding, etc.) would be necessary to promote optimal tree survival. Per recommendations from the USFWS PAL (Appendix B), and the establishment by President Obama of the Pollinator Health Task Force in 2014, the mitigation design would incorporate herbaceous vegetation that would help support pollinator species.

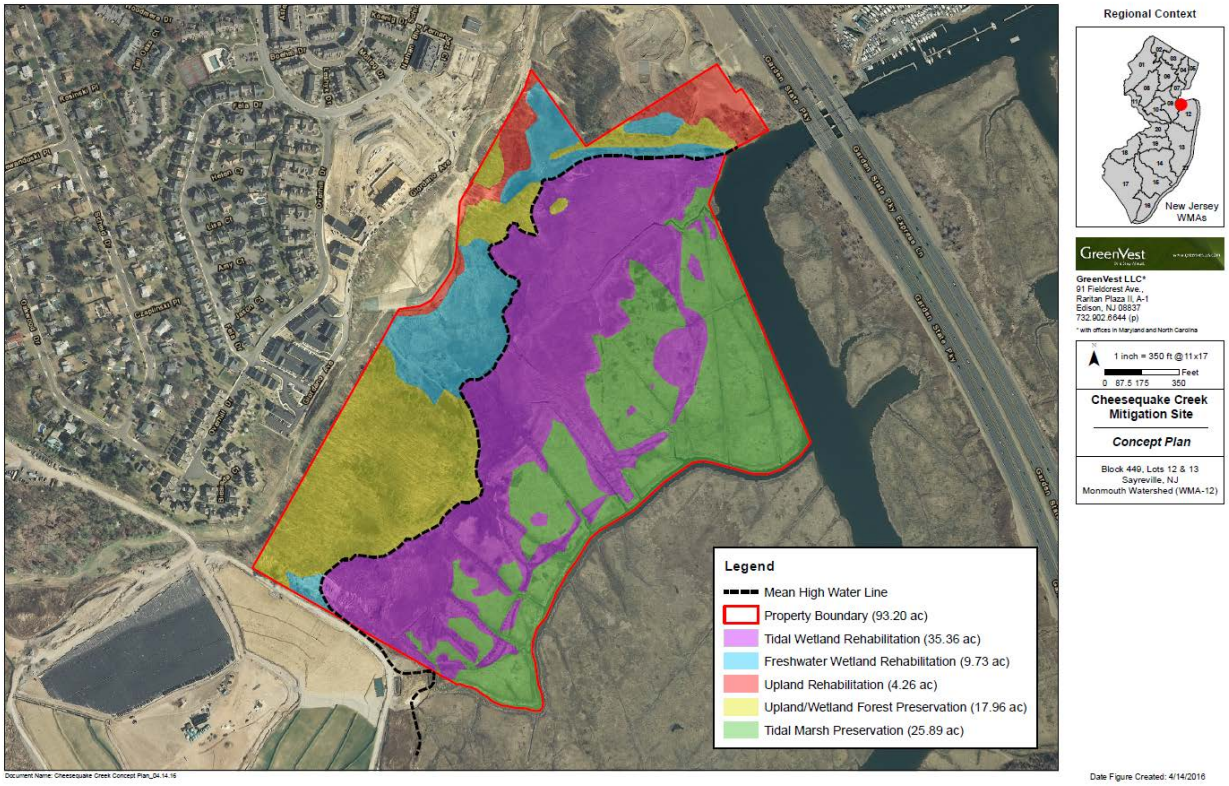
Due to real estate uncertainties, the location of Compton 6 is not mapped. The site consists of a large dense common reed monoculture adjacent to Compton Creek, a tidal waterbody. The objective would be to remove the common reed and replant it with native salt marsh emergent and scrub/shrub species for coastal and riparian mitigation. Based on tidal datum analyses and site topography, additional tertiary channels could be created to improve tidal ebb and flow to the site. After the first year of planting, active management (weeding, etc.) would be necessary to promote optimal survival.

During construction of all contracts, an equipment staging area would be required; however, it is left up to the Contractor's discretion to ultimately decide the location and equipment needed to build each project feature.

Additionally, the District is working with Green Vest LLC (GV), to potentially purchase mitigation bank credits from the Cheesequake Creek Mitigation Site. In the event that the purchase of Compton 6 is not feasible, the District will be able to fulfill mitigation requirements through a combination of mitigation bank credits and habitat restoration at Pews 4. Currently the Cheesequake Creek Mitigation Site is undergoing regulatory review and is not yet fully approved by the NJDEP. GreenVest controls the mitigation site and formally began the mitigation bank approval process for this site. A Draft Mitigation Bank prospectus has been submitted and the Interagency Review Team has conducted a field visit and is familiar with the site. Green Vest has been studying this site for several years and has completed baseline investigations/data collection, surveys and preliminary design. Because GV is well down the road with design and approvals, GV can efficiently secure approvals to develop this site as a standalone mitigation project for the District.

The Cheesequake Creek Mitigation site (Figure 4) is a ±93.2 acre functionally impaired and degraded freshwater and tidal wetland complex, consisting predominately of a monotypic stand of *Phragmites australis*. The forested, scrub-shrub and emergent communities located onsite are reminiscent of this site's historic composition, and indicate the site's strong potential for ecological lift. There is a unique Pinelands Outlier community on this site, within the forested and scrub-shrub community referenced. The Cheesequake Creek Mitigation Site is tributary to Cheesequake Creek and is approximately 1 mile from the confluence with Raritan Bay. The Mitigation Site is situated adjacent to the state owned Cheesequake State Park, which overlaps the northern portion of Monmouth County and southern Middlesex County in the borough of Sayreville. The site is part of the Sandy Hook-Staten Island Drainage Basin USGS HUC 0203104 and is located in the central headwater reaches of the watershed. More specifically, this system is located within NJDEP Watershed Management Area 12. The site is approximately 93.2 acres in size and would yield the following mitigation units (1 mitigation unit = mitigation for 1 acre of wetland impacts).

Figure 4: Cheesequake Creek Mitigation Site Concept Plan



9.0 Consultation and Coordination

Preparation of this Environmental Assessment has included coordination with appropriate Federal and State resource agencies. An initial pre-application meeting was held with the NJDEP DLUR on October 29, 2014 to determine the permitting requirements for construction. For each contract area, applications for Federal Consistency in accordance with the Coastal Zone Management Rules, and for Flood Hazard Area and Freshwater Wetlands would be submitted to the NJDEP.

A pre-application meeting was also held with the Freehold Soil Conservation District to review the project and Contract 3 designs. A formal application for certification of the soil erosion and sediment control plans for all contracts would be obtained by the construction contractor. Coordination with the public included a meeting on October 29, 2015 to discuss the project features and address any questions or concerns with the project. The circulation of a Draft version of this EA fulfilled public coordination requirements in accordance with the NEPA of 1970. Additionally, appropriate residents within and adjacent to the project area would also be notified of the Flood Hazard Area, Freshwater Wetlands, and Federal Consistency permit applications. Table 8 identifies the primary Federal laws and regulations applicable to construction projects.

Table 8: Summary of primary Federal laws and regulations applicable to the proposed project.

Legislative Title	U.S. Code/Other	Compliance
Clean Air Act	42 U.S.C. §§ 7401-7671g	A General Conformity Rule determination and analysis are includes in this EA.
Clean Water Act	33 U.S.C. §§ 1251 et seq.	Coordination with DLUR via the permitting process for freshwater wetlands and federal consistency.
Coastal Barrier Resources Act	16 U.S.C. § 3501 et seq; 12 U.S.C. § 1441 et seq.	The project is not currently mapped within a coastal barrier resources zone.
Coastal Zone Management Act	16 U.S.C. §§ 1451-1464	A coastal zone management statement, using N.J.A.C. 7:7 and 7:7E, are included in this EA.
Endangered Species Act of 1973	16 U.S.C. §§ 1531 et seq.	Formal Section 7 consultation with NMFS was completed and a BO was received. Coordination with USFWS was completed and a PAL was issued. Documentation is included with this EA.
Environmental Justice in Minority and Low Income Populations	Executive Order 12898	An analysis was performed and a disproportionate negative impact on minority or low-income groups in the community is not anticipated and a full evaluation of environmental justice issues is not required.
Fish and Wildlife Coordination Act	16 U.S.C. §§ 661 et seq.	An update to the FWCAR associated with the project's EIS was received and is included with this EA.
Magnuson-Stevens Fishery Conservation and Management Act	Section 305 (b)(2) 1996 amendments	An EFH Assessment was prepared and is included with this EA.
National Environmental Policy Act of 1969	42 U.S.C. §§ 4321-4347	A draft EA was circulated for public and agency review.
National Historic Preservation Act of 1996	16 U.S.C. §§ 470 et seq.	All studies associated with the project's EIS were coordinated with the NJHPO. Additional studies are being conducted based on project changes and will be coordinated with the NJHPO.

Legislative Title	U.S. Code/Other	Compliance
Executive Order 11990, Protection of Wetlands	May 24, 1977	Circulation of this EA for public and agency review fulfills the requirements of this order.
Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks	April 21, 1997	Implementation of this project will reduce environmental health risks. Circulation of this EA for public and agency review fulfills the requirements of this order.

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10.0 List of Report Preparers

Individual	Responsibility
Ann Marie DiLorenzo Diane Kohtio Kimberly Rightler	USACE Ecologist USACE Biologist USACE Biologist
Lynn Rakos	USACE Archeologist; NEPA, Section 106
Howard Ruben	USACE Oceanographer; NEPA, EFH Assessment
Rich Dabal	USACE Environmental Scientist; NEPA, HTRW
Jenine Gallo	USACE Regional Technical Specialist- Ecologist