DRAFT
PUBLIC REVIEW

Hashamomuck Cove
Southold, New York
Coastal Storm Risk Management

Feasibility Study

Draft Integrated Feasibility Report & Environmental Assessment

July 2016

New York
Department of
Environmental Conservation

U.S. Army Corps of Engineers
New York District
New England District

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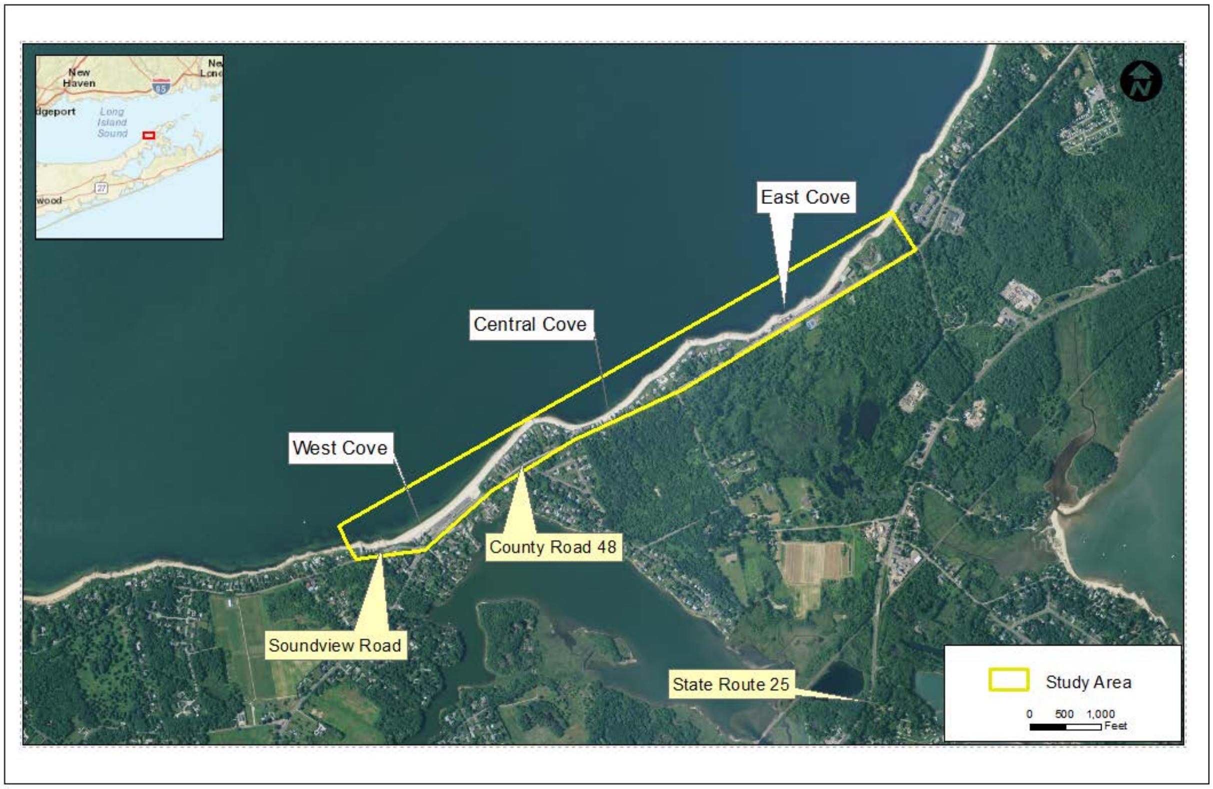
EXECUTIVE SUMMARY

This Draft Integrated Feasibility Report and Environmental Assessment is for the Hashamomuck Cove, Southold, New York (Suffolk County), Coastal Storm Risk Management Feasibility Study. The study area is on the North Fork of Long Island fronting Long Island Sound and includes about 1.5 miles of developed coast in the Town of Southold. County Road 48 parallels the coast and provides a primary transportation route at the northeast end of Long Island. The Hashamomuck Cove study area includes three coves that, for the purposes of this study, are called West Cove, Central Cove, and East Cove.



In the study area, residential and commercial properties, the Southold Town Beach, and County Road 48 are vulnerable to erosion, wave attack, and inundation from coastal storms. The study area includes 58 residential structures and 2 commercial properties. The total value of the existing residential and commercial inventory is estimated to be about $46 million. Many of the private properties have existing shorefront armor protection constructed to reduce storm damages. Approximately 40% of the study area shoreline is protected by bulkheads, and approximately 15% of the shoreline is protected by stone revetments.

The Feasibility Study plan formulation considered a range of nonstructural and structural measures to reduce the risk of storm damage in the study area. Through an iterative planning process, potential coastal storm risk management measures were identified, evaluated, and compared. Alternatives evaluated included nonstructural (buyout of properties), hard structural (new bulkheads), and soft structural (beach nourishment).

Evaluation of costs and benefits (damage reduction) of the alternatives showed that the cost of several of the alternatives exceeded the benefits to be provided by the alternative. For example, a new sheet pile bulkhead constructed shoreward of the existing properties would provide risk reduction but the cost of the bulkhead exceeded the benefits to be provided. Based on an evaluation of the costs and benefits of the alternatives, including potential environmental impacts, beach nourishment was identified as the tentatively selected plan to reduce coastal storm risk.

Beach nourishment consists of the artificial building up and/or widening of the beach by the placement of sand fill material on the shore to reduce storm damages. Beach nourishment projects require periodic re-nourishment to replace sand lost to erosion. For the purposes of the study, it was assumed that the sand fill would be obtained from an upland sand source.

At this point in the study, the Tentatively Selected Plan (TSP) for coastal storm risk management at Hashamomuck Cove is a beach nourishment project approximately 8,500 feet (ft.) in length consisting of a 25 ft. wide berm in the West Cove, a variable width berm in Central Cove (25-75 ft.), and a 25 ft. wide berm in the East Cove. The beach fill would be built up to elevation +6 ft. NAVD88 to resemble an average natural elevation of existing shoreline. These are preliminary dimensions, and the final dimensions of the project would be determined as part of the optimization and feasibility design process to follow the public and agency reviews of this Draft Report. During this optimization and feasibility design process, costs as well as benefits may also be adjusted.

The non-Federal project partner for the study is the New York State Department of Environmental Conservation (NYSDEC). The non-Federal sponsor for project implementation has not been identified at this point in the study, but a non-Federal sponsor for the project would be required for project implementation.

PERTINENT DATA

PROJECT AREA

Hashamomuck Cove project area is in the Town of Southold, New York in Suffolk County. The project area is on the north shore of Long Island on Long Island Sound. The project area is within the study area and is the area in which the storm risk reduction project would be constructed.

TENTATIVELY SELECTED PLAN FEATURES*

Berm Length: 8,500 linear feet (ft.)
Berm Height: 6 ft. NAVD88
Foreshore Slope: Sand graded seaward on a slope of 1 Vertical to 10 Horizontal.
Berm Width: West Cove 25 ft. Central Cove: 25-75 ft., East Cove: 25 ft.
Sand Source: Trucked from upland source
Initial Placement Volume: 160,000 cubic yards
West Cove: 34,000 cubic yards
Central Cove: 56,000 cubic yards
East Cove: 70,000 cubic yards
Average Renourishment Volume: 65,000 cubic yards (total over the 50 year period of analysis)
West Cove: 28,000 cubic yards
Central Cove: 17,000 cubic yards
East Cove: 20,000 cubic yards

*Note: The above dimensions and nourishment requirements will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

Renourishment Interval: The re-nourishment interval depends on a variety of factors including sea level rise, storm frequency, and type of storms. The renourishment costs for the TSP were estimated based on a 5 year interval (9 events) assuming 7,250 cubic yards per renourishment event.

Construction Method: Sand would be trucked to the site and be delivered to staging points with direct access to the beach. Trucks would deposit sand at appropriate locations to facilitate subsequent spreading and regrading by bulldozers or front end loaders. Initial construction is estimated to take approximately 7.5 months (middle of March until October 2019). It was assumed that the construction would occur in 2019 for the economics evaluation, but the construction timing is subject to future project approval and funding requirements.

PROJECT COST

The "Project First Cost" estimate is broken out by cost component in Table E-1. The Project First Cost includes the initial berm construction, real estate, pre-construction engineering & design, and construction management (contingencies are included). The TSP initial construction Project First Cost is estimated at $13,488,000. The "Total Nourishment Cost" includes the Project First Cost plus Continued Construction and is estimated at $17,749,000.

Table E-1. TSP Refined Cost Estimate
(Fiscal Year 2016 Price Level)

Account/Cost Component	**Cost ($)**
Initial Construction Cost (Project First Cost)	
01 – Lands and Damages	2,445,000
17 – Beach	9,590,000
30 – Pre-Construction Engineering & Design	707,000
31 – Construction Management	746,000
Total	**13,488,000**
Total Nourishment Cost	
Initial Construction Cost	13,488,000
Continued Construction (periodic nourishment and monitoring)	4,261,000
Total	**17,749,000**

*Note: These costs will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

REAL ESTATE REQUIREMENTS

The real estate cost estimate is $2,445,000. The real estate cost estimate and real estate requirements are detailed in the Real Estate Plan (Appendix F). The total lands and easements required in support of the TSP includes approximately 14.96 acres required in permanent easements. Temporary easements needed for construction would be determined during the pre-construction, engineering, and design (PED) phase of the project. The project impacts approximately 80 parcels, affecting approximately 75 private owners and 2 public owners. The standard permanent easement real estate (USACE Perpetual Beach Storm Damage Reduction

Easement) required for the project allows for public use of the easement area. The non-Federal sponsor is required to obtain the real estate interests for the project and the cost for the acquisition is then credited against the non-Federal share of the project.

PUBLIC USE AND ACCESS

US Army Corps of Engineers beach nourishment projects require public use and access to the project in order for the project to meet the requirement for Federal cost-sharing. The non-Federal sponsor for the project would be responsible for developing and implementing the public access plan. The beach fill easement areas would be made available for public access.

The purpose of the public access plan is to describe public accessibility to the project beach area. Requirements of the Public Access Plan are:

- Establish Access Points that are open to all on equal terms
- Public access points every one half mile, so that a visitor is never more than a quarter mile away from an access point within the project area
- Establish designated parking areas consistent with expected use

The public access plan would identify locations for public access to the beach along the 1.6 mile project area at approximately ½ mile intervals. The report contains a "Public Access Concept Plan" that identifies one known location of public access, Southold Town Beach. Public access sites would also need to be identified for Central and East Cove. It is acknowledged that these specific public access features would need to be further developed prior to a final report, and it is expected that these refinements would be made based upon public and agency input received during review of the draft report.

ECONOMIC ANALYSIS

Annual Cost and Benefit of the TSP is provided in Table E-2. Projects costs are annualized over a 50-year period of analysis at the Fiscal Year 2016 (FY16) Federal interest rate for evaluation water resource projects (3.125%). Dividing the annual benefit of the project by the annual cost estimate results in an estimated Benefit-Cost Ratio of 1.4.

Table E-2. Refined TSP, Annual Benefit and Cost Summary*
(FY16 Price Level, FY 16 3.125 % discount rate)

TSP Project Economic Cost	**($)**
Initial Investment Cost	
First Cost (includes constr., cont., PED &CM)	13,488,000
Interest During Construction	139,000
Total Investment Cost	13,627,000
Annualized Investment Cost	542,000
Continuing Construction	
Annualized Beach Nourishment Cost	73,000
Annualized Monitoring Cost	500
OMRR&R	
Annualized Berm Maintenance Cost	8,800
Annual Economic Cost	624,300
TSP Economic Benefit	
Annual Damage and Loss Reduction Benefit	855,000
Annual Transportation Delay Reduction Benefit	45,200
Total Annual Benefit	900,200
Net Benefit and BCR	
Annual Net Benefit	276,000
Benefit-Cost Ratio Estimate	1.4

*Note: The above Benefit-Cost Ratio will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

FEDERAL AND NON-FEDERAL PROJECT COST SHARING

In accordance with the cost share provisions in Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. 2213), the Federal and non-Federal shares are as follows: Initial construction is cost shared 65% Federal and 35% non-Federal and continuing construction is cost shared 50% Federal and 50% non-Federal. The Table E-3 provides the details of the TSP cost apportionment.

Table E-3: Cost Apportionment

Hashamomuck Cove, Southold, New York Coastal Storm Risk Management TSP			
Cost Apportionment			
	Federal Share	**Non-Federal Share**	**Total Cost**
Project First Cost *,**			
Initial Construction, Cash Contribution	$ 8,767,200	$ 2,275,800	$ 11,043,000
Real Estate Cost		$ 2,445,000	$ 2,445,000
Total First Cost	**$ 8,767,200**	**$ 4,720,800**	**$ 13,488,000**
Continuing Construction *,***			
Beach Renourishment	$ 2,124,000	$ 2,124,000	$ 4,248,000
Total Nourishment Cost	**$ 10,891,200**	**$ 6,844,800**	**$ 17,736,000**
Annualized Berm Surveillance and Maintenance	$ -	$ 8,800	$ 8,800
Annual OMRR&R Cost ****	$ -	$ 8,800	**$ 8,800**
* FY 2016 Price Level			
** Shared based on 65% Federal and 35% non-Federal for initial construction			
*** Shared based on 50% Federal and 50% non-Federal for continuing construction			
*** OMRR&R 100% non-Federal			

Hashamomuck Cove, Southold, New York
Coastal Storm Risk Management Feasibility Study

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Hashamomuck Cove, Southold, New York
Coastal Storm Risk Management Feasibility Study

Chapter 1: Introduction

1.1 Draft Integrated Feasibility Report and Environmental Assessment

The U.S. Army Corps of Engineers (USACE), New York District and New England District prepared this draft Integrated Feasibility Report and Environmental Assessment (DIFREA) for the Hashamomuck Cove, Coastal Storm Risk Management Feasibility Study. This report presents the Tentatively Selected Plan (TSP) for managing coastal storm risk at Hashamomuck Cove, Southold, New York (Figure 1). The Town of Southold is located in Suffolk County. Over the course of the review process, the report will be updated to include input from New York Department of Environmental Conservation (NYSDEC), who is the non-Federal Sponsor, local governments, natural resource agencies, and the public.

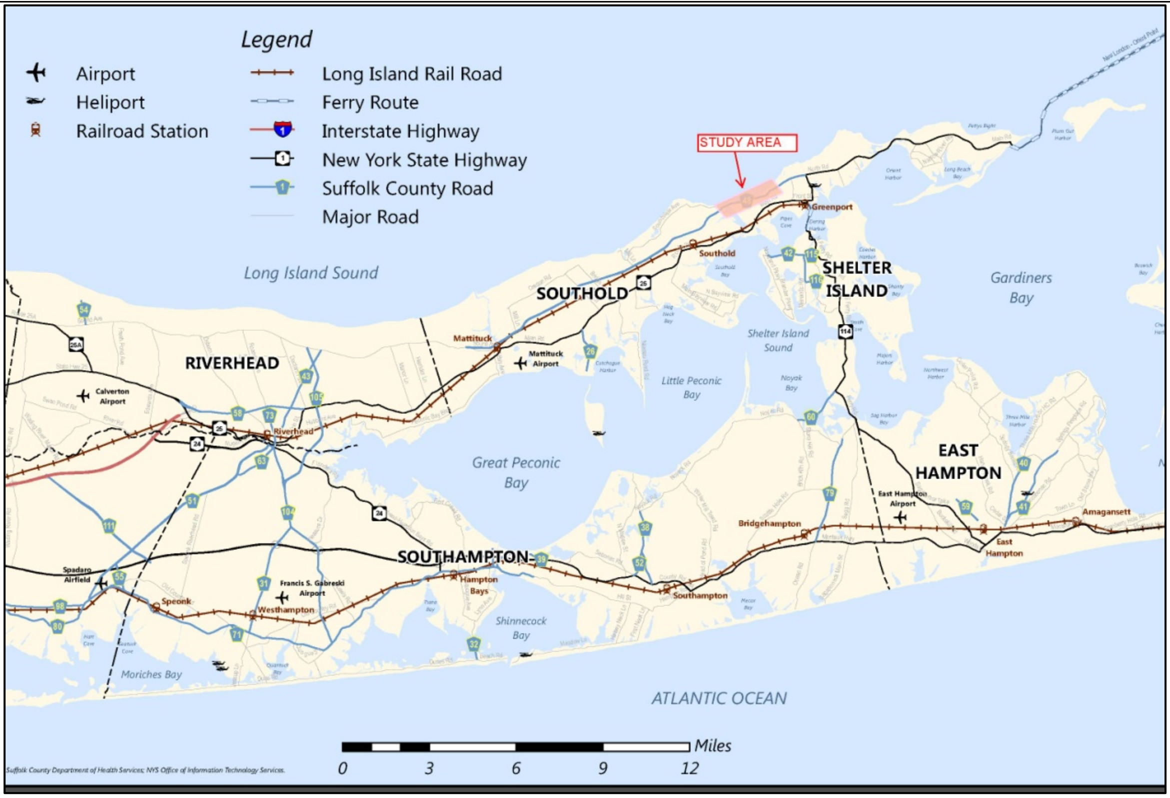

Figure 1. Hashamomuck Cove Location Map

The Federal objective of water and related land resources project planning is to contribute to national economic development (NED) consistent with managing and reducing risk to the nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements (Principles and Guidelines (P&G), 1983).

Water and related land resources projects are formulated to alleviate problems and take advantage of opportunities in ways that contribute to this objective. Pursuant to this, the DIFREA (1) summarizes the problems, needs, and opportunities for coastal storm risk management at Hashamomuck Cove; (2) presents and discuss the results of the plan formulation for protection of coastal resources; (3) identifies specific details of the Tentatively Selected Plan, including inherent risks; (4) and will be used in part to determine the extent of the Federal interest and local support for the plan.

This DIFREA is being released for concurrent public and agency technical review. USACE has evaluated an array of alternatives including bulkheads, beach nourishment, and buyouts for the identification of the TSP. The TSP will be refined based on comments from public review and agency review and contain additional feasibility level optimization for the Final Integrated Feasibility Report and Environmental Assessment.

1.2 National Environmental Policy Act Requirements

This draft Integrated Feasibility Report and Environmental Assessment (EA) was prepared pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's (CEQ) Guidance Regarding NEPA Regulations, and the USACE's Procedures for Implementing NEPA (Engineering Regulation [ER]-200-2-2).

An EA is a concise public document prepared by the Federal agency to determine whether the proposed action has the potential to cause significant environmental effects (40 Code of Federal Regulations (CFR) 1508.9(a)). The purposes of an EA are to:

- provide evidence and analysis sufficient to determine whether an Environmental Impact Statement (EIS) is required;
- aid a Federal agency's compliance with NEPA when no EIS is necessary;
- facilitate preparation of an EIS when one is necessary; and serve as the basis to justify a finding of no significant impact (FONSI).

The EA must discuss:

- the need for the proposed action;
- the proposed action and alternatives;
- the probable environmental impacts of the proposed action and alternatives;
- and the agencies and persons consulted during preparation of the EA.

NEPA requires Federal agencies to integrate the environmental review into their planning and decision-making process. This integrated report is consistent with NEPA statutory requirements. The report reflects an integrated planning process, which avoids, minimizes, and mitigates adverse project effects associated with coastal storm risk management actions. Sections of the report that are required to fulfill the requirements of National Environmental Policy Act (NEPA) of 1970 are marked with an asterisk (*) in the headings.

1.3 Study Purpose Need for Action*

The purpose of the study is to determine if there is a technically feasible, economically justified and environmentally compliant recommendation for Federal participation in coastal storm risk management for Hashamomuck Cove study area in Southold, NY. The study is needed as existing shore front properties and County Road 48 are at risk from coastal storm damage. Homeowners have implemented individual solutions but the area continues to experience storm damage due to erosion, wave effects, and inundation.

1.4 Study Authority

The Hashamomuck Cove Study is authorized by House of Representatives, Committee on Transportation and Infrastructure, Resolution, Docket Number 2773 (May 2007):

> *"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that the Secretary of the Army is requested to review the reports of the Chief of Engineers on the North Shore of Long Island, Suffolk County, New York, published as House Document 198, 92nd Congress, 2nd Session, as well as other related reports with a view to determine whether the modifications of the recommendations therein are advisable at the present time in the interest of navigation, streambank stabilization, flood damage reduction, floodplain management, water quality, sediment control, environmental preservation and restoration, and other related purposes in Hashamomuck Cove and tributaries."*

<u>Additional Study Guidelines</u>. The Hashamomuck Cove Feasibility Study is being completed with funds authorized by the Disaster Relief Appropriations Act of 2013 (Public Law No. 113-2). Projects authorized by this Act are subject to USACE Headquarters and North Atlantic Division Hurricane Sandy-related guidance. To date, the following guidance has been issued:

- 17 December 2013 Engineering and Construction Bulletin 2013-33, "Application of Flood Risk Reduction Standard for Sandy Rebuilding Projects."
- 9 December 2013 CECW-ZA guidance, "Disaster Relief Appropriations Act of 2013, Policy Guidance Memorandum Construction Account."
- 7 July 2013 CECW-ZA guidance, "Disaster Relief Appropriations Act of 2013, Policy Guidance Memorandum Expenses and Investigations Accounts."

1.5 Non-Federal Sponsor

The Non-Federal Sponsor for the study is the New York State Department of Environmental Conservation (NYSDEC). Based on Public Law 113-2, the feasibility study is being completed with 100% Federal funding.

1.6 Prior Studies, Reports, and Existing Water Projects

USACE initiated the Reconnaissance Phase in July 2007. The Reconnaissance Report was completed in July 2008. The report described the study area, its problems, and recommended the continuation of the study into the feasibility phase for coastal storm risk management. In December 2012, USACE and the New York State Department of Environmental Conservation executed a Feasibility Cost Sharing Agreement (FCSA). The passage of Sandy Recovery Improvement Act of 2013, Public Law 113-2, resulted in a FCSA amendment (April 2014) to complete the study at 100% Federal cost.

Prior reports that have been prepared documenting coastal erosion and storm damages along the north shore of Long Island Sound and the Hashamomuck Cove Study Area in Southold, New York include:

- USACE, New York District, June 2008, Section 905(b) Reconnaissance Study, New York District. The report recommended a Feasibility Study that included the Hashamomuck Cove study area.
- Long Island North Shore Heritage Area Planning Commission, 2005, Long Island North Shore Heritage Area Management Plan. This report includes information on resources in the study area.
- USACE, New York District, 1995, North Shore of Long Island, New York, Storm Damage Protection and Beach Erosion Reconnaissance Study, New York District. This report further described erosion (including erosion rates) and coastal storm

damage along the north shore of Long Island, including discussion of the Hashamomuck Cove area.

- New York State University, circa 1973, North Shore of Long Island Sound, Technical Report #18. Report evaluates areas along the north shore but did not include Hashamomuck Cove study area specifically.
- USACE, New York District, 1969 Survey Report of the North Shore of Long Island. This Survey Report addressed conditions along the entire north shore of Long Island, including within the study area. Erosion and coastal storm damage problems were identified, and general opportunities to address these problems for the North Shore of Long Island were discussed. No recommendations were made specific to the Hashamomuck Cove study area.

Federal Projects. The Orient Harbor coastal storm risk management revetment was constructed by USACE in the Town of Southold, New York. The project area is located along the Peconic Bay shore immediately adjacent to State Route 25, approximately 5 miles east of Hashamomuck. The project is maintained by the New York State Department of Transportation.

1.7 Study Area

The Hashamomuck Cove study area is in the Town Southold, New York on the north fork of Long Island on Long Island Sound. The study area extends from Soundview Road near the Southold Town Beach west about 1.5 miles to Sound View Inn and includes and the near shore area in Long Island Sound and County Road 48 (Figure 2). For ease in discussion in the report, the coves in the study area are being called West Cove, Central Cove, and East Cove.

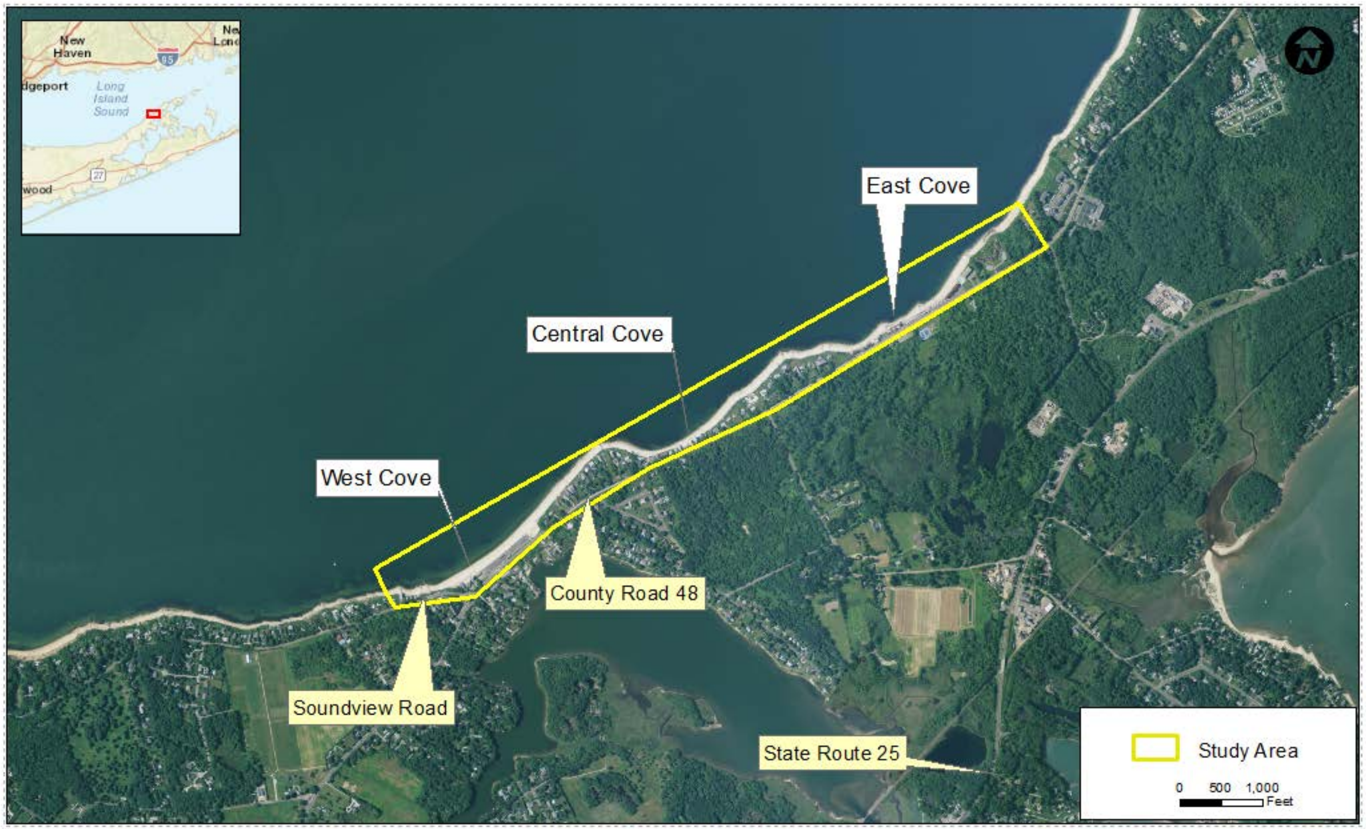

Figure 2. Study Area

The project area, which is the area in which storm risk reduction measures are considered, is the developed coast in the Hashamomuck Cove study area. The project area is one system and contains the three component coves (West, Central, and East Coves). County Road 48 is constructed parallel to the coast immediately landward of the three coves.

Coastal storm damages in the project area include damages to structures and contents, land loss, and transportation infrastructure (County Road 48). Economic damages in the project are estimated using Beach-fx, a computer program developed by the USACE to assist study teams with coastal storm risk assessments. For Beach-fx modeling the project area is delineated by reaches (Figure 3). Each reach is associated with a representative beach profile and man-made elements in the project area (buildings, roads, etc.) are located in these reaches.

Figure 3. Project Area Beach-fx Model Reaches

<u>West Cove (Reach E1-E5)</u>. West Cove is approximately 3,100 linear ft. and includes 25 residential properties, and the Southold Town Beach. County Road 48 is located landward of the beach and shorefront development. Private bulkheads are located in front of some of the residences.

<u>Central Cove (Reach E6-E11)</u>. Central Cove is approximately 2600 linear ft. and includes 20 residential properties. County Road 48 is located landward of the beach and shorefront development. Private bulkheads are located in front of some of the residences. The concave portion of the cove (Reach E8), includes homes that are in very close proximity to mean high water (within 10 feet). County Road 48 is approximately 100 ft. from mean high water in this area. Private bulkheads are located in front of some of the residences (Figure 4).

Figure 4. View of Central Cove

East Cove (Reach E12-E15). East Cove is approximately 2700 linear feet. Many of the residences are also not far (100 ft. or less) from mean high water. Private bulkheads are located in front of some of the residences. Sound View Restaurant and Sound View Inn are located in Reach E14 and E15. These buildings in some locations are within 50 ft. of mean high water (Figure 5). County Route 48 is landward of the shorefront development.

Figure 5. View of Commercial Building

Chapter 2: Existing Conditions*

Existing conditions serve as the basis for the characterization of problem identification and projection of future without project conditions. Existing conditions are described in this Chapter (coastal setting, storms and assets at risk) and in Chapter 3 (environmental resources).

2.1 Coastal Setting and Storms

Climate. Suffolk County has a moderate coastal climate with warm, humid summers and moderately cold winters. The temperature averages 51 degrees Fahrenheit (°F) annually, ranging from a low monthly average of 32°F in February to a high monthly average of 72°F in July. The average annual precipitation ranges from 40 to 45 inches and is fairly evenly distributed throughout the year.

Tides. The mean spring tide range at Hashamomuck is estimated at 4.81 ft. (ft.) and the mean tide range is estimated at 4.21 ft. (Table 1).

Table 1. Estimated Tidal Datums, Hashamomuck Cove Southold, NY

Southold, NY	
Condition	Elevation in ft., NAVD88*
Mean spring high water	+2.16
Mean higher high water	+2.12
Mean high water	+1.86
NAVD88	0.00
Mean tide level	-0.25
Mean low water	-2.35
Mean lower low water	-2.61
Mean spring low water	-2.65

*North American Vertical Datum of 1988 (NAVD88)

Historical Storms. Two types of storms of primary significance along the North Shore are tropical storms (hurricanes), which typically impact the New York area in summer and fall and extratropical storms (nor'easters), which are primarily winter storms. Nor'easters are usually less intense than hurricanes but tend to have much longer durations. These storms often cause high water levels and intense wave conditions and are responsible for significant erosion and flooding throughout the coastal region of the north shore. Table 2 lists historic storms that have had impacts in the New York area.

Table 2. Historical Storms Impacting New York Area

Hurricane		Nor'easter*	
Date	Name	Date	Name
14 Sep 1904		03 Mar 1931	
08 Sep 1934		17 Nov 1935	
21 Sep 1938		25 Nov 1950	
14 Sep 1944	-	06 Nov 1953	
31 Aug 1954	Carol	11 Oct 1955	
02 Sep 1954	Edna	25 Sep 1956	
05 Oct 1954	Hazel	06 Mar 1962	
03 Aug 1955	Connie	05 Nov 1977	
12 Sep 1960	Donna	17 Jan 1978	
10 Sep 1961	Esther	06 Feb 1978	
20 Aug 1971	Doria	22 Jan 1979	
14 Jun 1972	Agnes	22 Oct 1980	
06 Aug 1976	Belle	28 Mar 1984	
27 Sep 1985	Gloria	09 Feb 1985	
19 Aug 1991	Bob	30 Oct 1991	
08 Oct 1996	Josephine	01 Jan 1992	
07 Sep 1999	Floyd	11 Dec 1992	
01 Sep 2006	Ernesto	02 Mar 1993	
28 Aug 2011	Irene	12 Mar 1993	
29-30 Oct 2012	Sandy	28 Feb 1994	
		21 Dec 1994	
		05 Jan 1996	
		06 Oct 1996	
		02 Feb 1998	
		14 Apr 2007	
		15 Nov 2009	Nor'Ida
		13 Mar 2010	
		25 Dec 2010 (added)	
		17 Apr 2011	
		7 Nov 2012 (added)	
		26 Dec 2012 (added)	

*Nor'easters generally have no assigned names. Hurricane Sandy affected the project area in late October, 2012, followed by two Nor'easters. This table list historical storms affecting the New York Area.
SOURCE: Beach Erosion Control and Storm Damage Reduction Feasibility North Shore Of Long Island, Asharoken, New York, Engineering Appendix, Draft March 2014.

Coastal Storm Climatology. Existing coastal processes at Hashamomuck Beach are driven by high energy waves and water levels generated by both tropical and extratropical storms. Based on data developed for the North Atlantic Coast Comprehensive Study (NACCS[1], USACE 2015), tropical storm events occur at the Hashamomuck Beach study area at a frequency of approximately once every 6.8 years. These tropical storms occur between June and November, with 74 percent of the storms occurring in the months of August and September.

Extratropical storms are a frequently occurring storm type that impacts Hashamomuck Beach with events occurring at a rate of approximately 1.2 storms per year. Extratropical storms typically occur at the project area between early fall through the spring (October through May), with most occurring in the months of November through February.

Tropical storm events are typically fast moving storms associated with elevated water levels and large waves, whereas extratropical storms are slower moving with comparatively lower water level elevations and large wave conditions. Both storm types can produce beach erosion and morphology change, as well as coastal inundation, leading to economic losses to property.

[1] The North Atlantic Coast Comprehensive Study (NACCS) addresses the coastal areas defined by the extent of Hurricane Sandy's storm surge in the District of Columbia and the States of New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. The Engineer Research and Development Center (ERDC) conducted rigorous regional statistical analysis and detailed high-fidelity numerical hydrodynamic modeling for the North Atlantic coastal region to quantify coastal storm wave, wind, and storm-driven water level extremes. The NACCS modeling efforts included the latest atmospheric, wave, and storm surge modeling and extremal statistical analysis techniques. Products from this work incorporated into the Coastal Hazards System (CHS) database include simulated winds, waves, and water levels for approximately 1,050 synthetic tropical events and 100 extratropical events computed at over 3 million computational locations. A smaller number -18,000 locations -save the same information at higher frequency for more convenient/concise data handling. These storm events are determined to span the range of practical storm probabilities.

Relative Sea Level Change (RSLC). The mean sea level trend (low/historic rate) at Montauk, New York (NOAA 8510560) is 0.00961 ft/year based on regionally corrected mean sea level data from 1947 to 2014 (Figure 6). USACE calculated intermediate and high rates of RSLC are 0.018 and 0.045 ft/year, respectively. Over a period of 50 years this equates to an increase of about 0.5 ft for the low rate and about 2.5 ft, for the high rate.

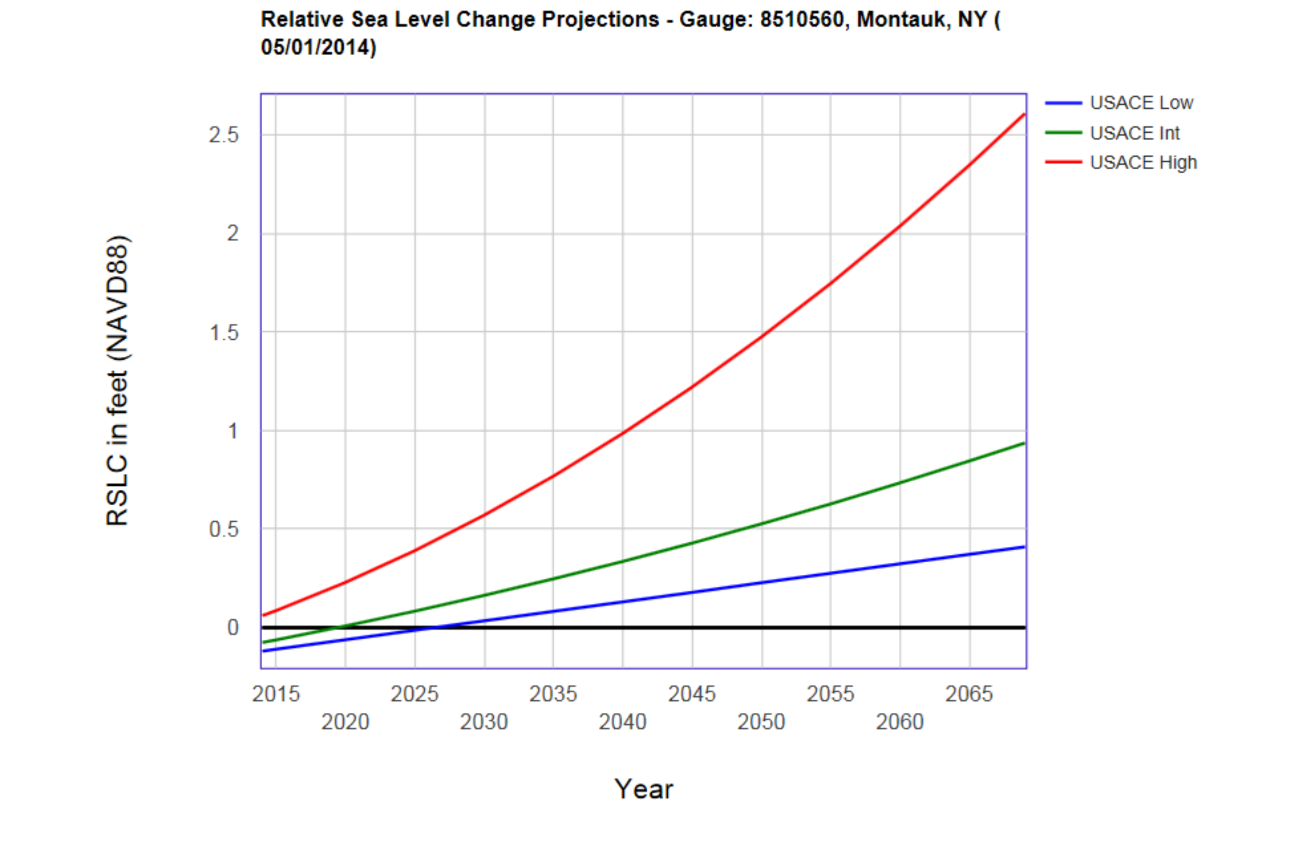

Figure 6. Mean Sea Level Change Trend

Beach Erosion. Coastal erosion is a shore process that reduces the width of the beach. These processes include long-shore and cross-shore sediment transport resulting from both typical and storm induced wave conditions. In some cases, the storm-induced erosion component of beach change, although devastating to development, may be short-term in nature. Following storms, the coastline tends to reshape itself into its former configuration, and some of the sand displaced from the beach is returned by wave action. The beach shape then conforms to the prevailing wave climate and littoral processes. However, over time, portions of the beach can experience permanent land loss. In developed areas bulkheads and revetments will help to limit landward erosion but may these structures may fail due to toe erosion and wave overtopping.

Review of historic aerial photographs during the study provided a visual interpretation of the current beach/water interface (shoreline) in non-storm tide condition compared to the estimated location of the 1965 shoreline[2]. This comparison indicates there is long-term erosion (land loss) in portions of the study area, particularly in the concave portions of the three cove areas. Aerial photographs from 1960, 1974, 1993, 2001, and 2010 were reviewed and analyzed to calculate the historic shoreline change rate for the area (Figure 7).

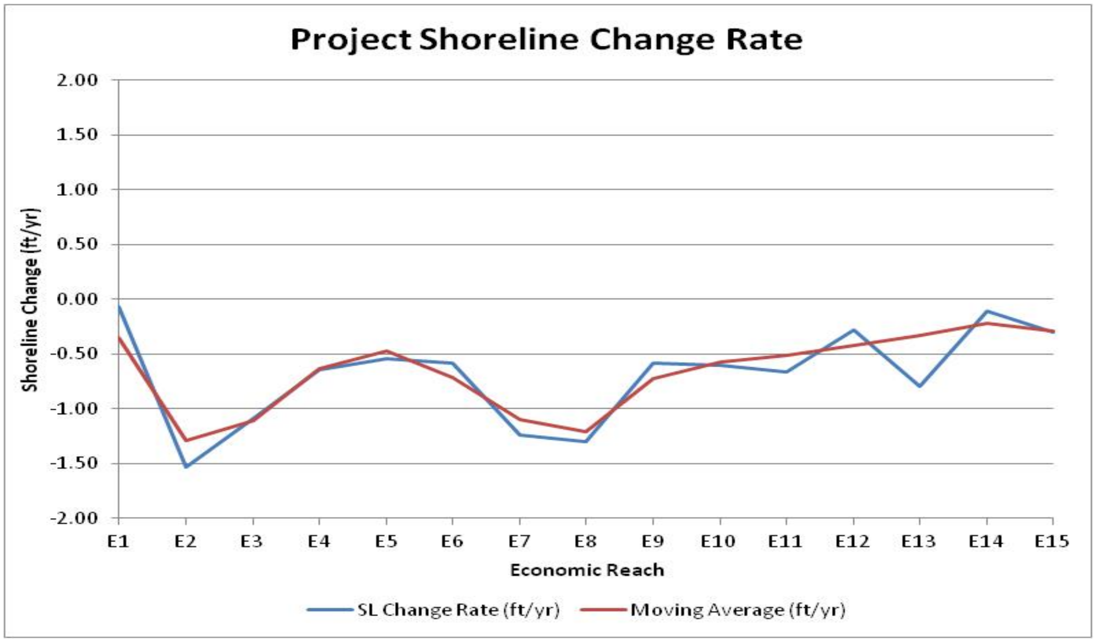

Figure 7. Project Shoreline Change Rate

[2] The 1965 shoreline shown was digitized from Plate 26 in the report "North Shore of Long Island Beach Erosion Control and Interim Hurricane Study" 1969, USACE, New York District.

FEMA Flood Plain. Generalized FEMA mapping for Southold, New York near the project area is shown in Figure 8. The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Southold (Suffolk County 2009) provides information on flood elevations. FEMA Transect 55 from the FIS is located about 1500 ft. west of the Town Beach and flood elevation at this transect are shown in Table 3.

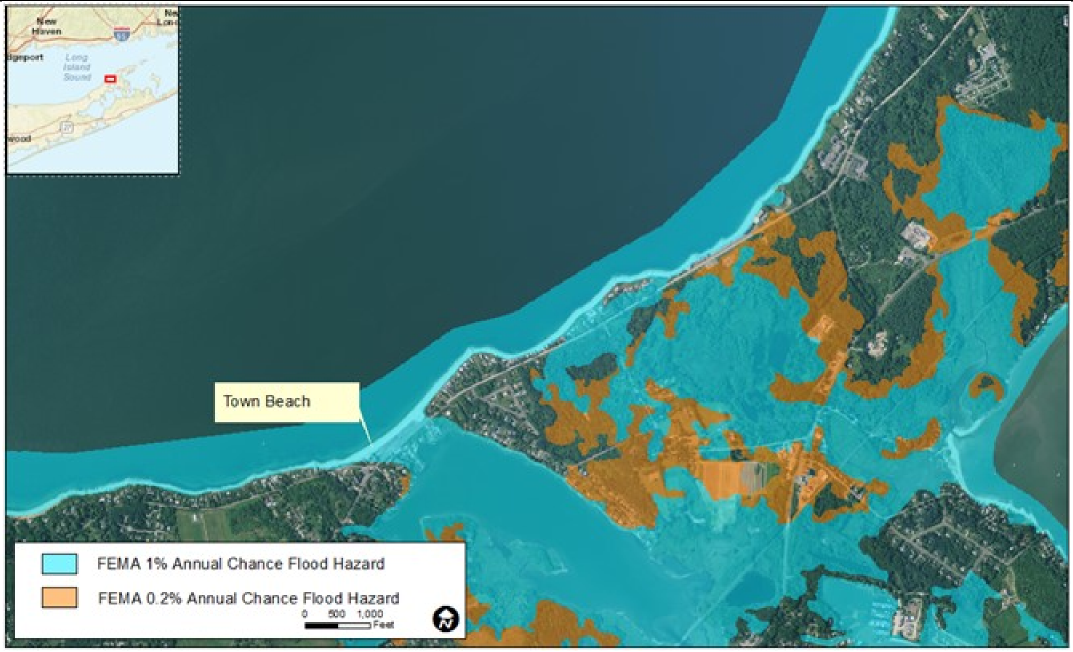

Figure 8. Flood Hazard Map

Table 3. Flood Insurance Study, Flood Elevations

Still Water Elevation (ft. NAVD 88)[3]					**Base Flood Elevations (ft. NAVD 88)[3]**	
Transect 55	10 % (10-yr.)	2% (50-yr.)	1% (100-yr.)	0.2% (500-yr.)	Zone[4]	
	5.7	**7.1**	**10.5[1]**	**9.3**	**VE**	**13-16**
					AE	**12-13**
	5.7	**7.1**	**7.8**	**9.3**	**AE**	**11[2]**

1- Includes wave set up for the 100-yr. event. There is an increase in water level caused by waves breaking ashore during a storm event. This increase in water level is called wave setup.
2- Includes wave run-up, the rush of water that extends inland where waves come ashore and these elevation may be higher than the still water elevations.
3-source: FEMA Flood Insurance Study Suffolk County 2009, Transect 55, page 87
4-VE zone, coastal areas subject to wave action; AE zones, areas landward of V zones

2.2 Existing Coastal Structures

USACE conducted a field visit of the study area on 4-5 August 2014 to review existing coastal erosion protection structures along the shoreline. During the field visit, the existing coastal protection structures were inventoried to determine the location, size, type, and general condition. Areas without protection were also noted and erosion conditions in these areas were documented. The data collected in August 2014 was used in conjunction with the elevation survey data collected by the USACE survey team to document existing conditions for use with coastal and economic models.

The primary measure of erosion protection for the residential properties are bulkheads installed by individual owners. The bulkheads vary in height depending on the upland height. The bulkhead sheeting is constructed of various materials including pressure treated wood, fiberglass, and vinyl. The sheeting material is supported by wooden pilings. In some locations, the bulkheads include rocks at the base of the structure. There are also concrete bulkheads in some locations. The bulkheads are located along approximately 40% of the coastline in the study area. Overall, the bulkheads are generally in fair condition. In most cases, the bulkheads are contiguous and provide a continuous erosion protection measure. In some areas, there were small rock revetments installed as erosion protection. The rock revetments are located along approximately 15% of the beach front properties within the study area. Bulkheads are maintained by local property owners.

There are no coastal storm risk management features on the remainder of the beachfront properties (approximately 45%). Significant erosion was observed in several of such locations. In some areas, there are buildings (residences, hotel, and restaurant) with concrete foundations that are exposed to wave action at high tides. Portions of the restaurant and hotel buildings are raised on wooden supports.

There were also numerous groins observed during the August 2014 site visit. Conditions of the groins varied, some groins have significant gaps between the stone and are in poor condition. Some of the groins were constructed with stone while others used reinforced concrete structures such as jersey barriers or concrete filled pipes.

2.3 Access Routes

County Road 48 is a primary transportation route for Suffolk County. There are two roads (County Road 48 and State Route 25) that provide access from Southold to Orient Point (north fork tip of Long Island). Both roads are heavily traveled under daily conditions. County Road 48 handles about 6,000 cars per day (annual average daily traffic) in both the east and west directions. (Source: New York State Department of Transportation, Station 071118, County Road 48, count report 08/16/2012.) Closure of County Road would result in rerouting of traffic onto local roads and State Route 25. County Road is a critical infrastructure link for socially vulnerable populations neighboring Greenport, NY which is in top 25% of populations with high social vulnerability. County Road 48/North Road provides vital access to Southold and Greenport for three nursing homes, one hospital, and two daycare centers (Figure 9).

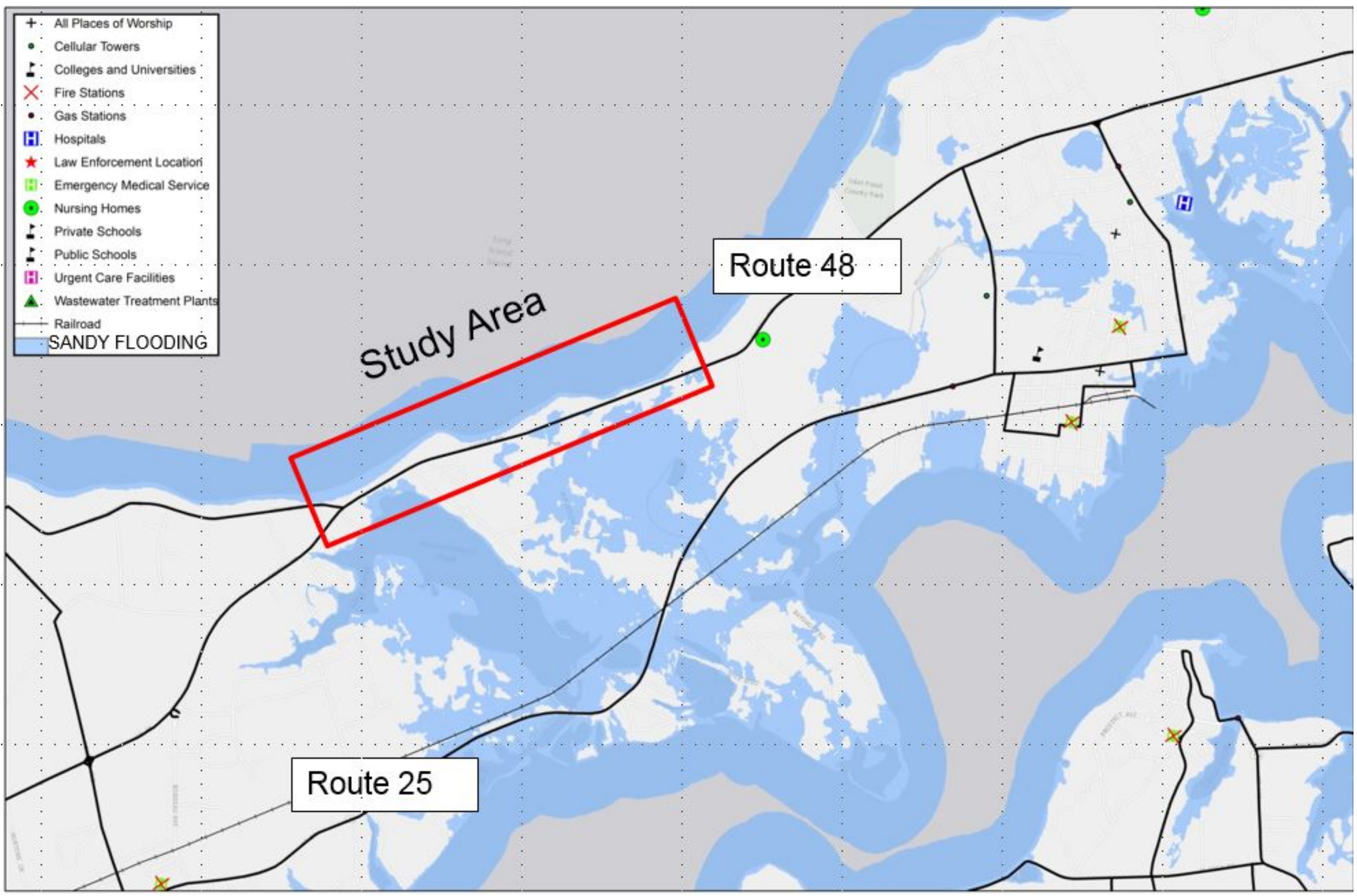

Figure 9. Critical Infrastructure, Hurricane Sandy Flooding

Chapter 3: Existing Conditions Affected Environment*

This description of the existing environment conditions is in accordance with the requirements of National Environmental Policy Act (NEPA), and serves as the baseline for Chapter 5: Environmental Impacts and Chapter 6: Cumulative Impacts of this draft integrated report.

3.1 Topography, Geology, and Soils

The Town of Southold is located at the northeastern end of the North Fork of Long Island on Long Island Sound. Great Peconic Bay and Little Peconic Bay separate the Town of Southold from the South Fork of Long Island to the south. The Town of Southold has a total area of 404.5 square miles, of which, 53.7 square miles of it is land and 350.8 square miles of it (86%) is water. The town has approximately 163 linear miles of coastline (U.S. Census Bureau 2015).

Long Island was formed largely by the glacial advance and retreat of the Wisconsin Glacier that occurred approximately 21,000 years ago. As the glacier melted and receded to the north, sands, gravels and rocks that accumulated in the glacier were deposited forming glacial moraines. The till ranges from about 5 to 50 ft. in thickness and contains many boulders. Lighter weight materials were carried away from the moraines by streams and melt-water, which created glacial outwash plains composed of primarily gravel and sand. The southern moraine, known as the Ronkonkoma, forms the main portion of Long Island. Southold is located on the northern moraine, known as the Harbor Hill moraine, and has a landscape characterized by a pronounced bluff along the shore with outwash plains in the interior and southern coastline. Most of the coastal bluffs have slopes exceeding 50 percent and are subject to extreme soil erosion from wind and wave action (Southold 2011). Gaps in the moraine, such as Hashamomuck Pond, are areas where blocks of glacial ice were partially buried and then melted after the retreat of the main ice front (Crandell 1963 in Southold 2011).

The Harbor Hill Moraine is located along the entire northern coastline of the Town of Southold, gradually decreasing in height from west to east. Topographic elevations in Southold range from sea level to 160 ft. above mean sea level (msl) in the Mattituck Hills (western portion of the town) (Southold 2011).

The predominant soils present within the Hashamomuck Cove project area are categorized as Beaches. There are small areas of Haven loam (2 to 6 percent), Plymouth loamy sand (3 to 8 percent slopes), Riverhead sandy loam (3 to 8 percent slopes) and Carver and Plymouth sands (15 to 35 percent slope) soils associated with the escarpments in the backshore area. These soils occur throughout Suffolk County in rolling to steep areas on moraines and on level to gently sloped areas of outwash plains. They are generally deep, well to excessively drained, medium to coarse textured soils that formed in a sandy loam, loamy or silt mantel over stratified coarse sand and gravel (NRCS 2015a). (See Secion 2.1 above on beach erosion.)

The Federal Farmland Protection Policy Act (FPPA) of 1981 was enacted to minimize the extent to which Federal programs contribute to the irreversible conversion of farmland to nonagricultural uses. The Act applies to farmland with soil types classified as prime, unique, or of statewide or local importance. Haven loam (2 to 6 percent slopes) and Riverhead sandy loam (3 to 8 percent) are designated as a “prime farmland” and Plymouth loamy sand (3 to 8 percent slopes) is designated as “farmland of statewide importance.”

The FPPA applies only to Federal assistance and actions that would convert important farmland to nonagricultural uses. Section 658.3 Applicability and exemptions provides that “Assistance and actions related to the purchase, maintenance, renovation, or replacement of existing structures and sites converted prior to the time of an application for assistance from a Federal agency, including assistance and actions related to the construction of minor new ancillary structures (such as garages or sheds), are not subject to the Act.” (7 CFR Ch. VI (1–1–03 Edition) (NRCS 2015b). The areas designated as prime farmlands within the project area are Haven, Plymouth and Riverhead soils associated with the escarpment along the backshore area and are primarily located on private property. The proposed project involves beach nourishment and would not involve impacts to prime farmlands.

3.2 Water Resources

3.2.1 Regional Hydrogeology and Groundwater Resources

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

The Upper Glacial Aquifer is the primary source of fresh groundwater in the Town of Southold. This aquifer is underlain by the Magothy Aquifer which also provides public water supply to the town but only west of Mattituck Creek. East of Mattituck Inlet, the Magothy Aquifer contains saline groundwater. Below the Magothy Aquifer is a late Cretaceous age layer of clay (the

Raritan formation) and beneath that is the Lloyd Aquifer. The Lloyd Aquifer contains only saltwater within the Town of Southold (Southold 2011).

Nassau and Suffolk counties utilize an aquifer designated by the U.S. Environmental Protection (USEPA) Agency, pursuant to the Federal Safe Drinking Water Act of 1974 (Public Law 93-523), as a sole source aquifer (43 Fed. Reg 26,611 (1978)). As defined by the USEPA, a sole source aquifer supplies at least 50 percent of the drinking water for its service area and there are no reasonably available alternative drinking water sources should the aquifer become contaminated. The Suffolk County Government Office of Water Resources enforces regulations controlling 39 Community Water Supplies (CWS) and 254 Non-Community Water Supplies (NCWS) in Suffolk County. The public water suppliers serve more than 90% of Suffolk County's 1.45 million residents (Suffolk County Government 2015).

The New York State Department of Environmental Conservation (NYSDEC) Water Quality Standards are the basis for programs to protect the state waters. Standards set forth the maximum allowable levels of chemical pollutants and are used as the regulatory targets for permitting, compliance, enforcement, and monitoring and assessing the quality of the state's waters. Waters are classified for their best uses (fishing, source of drinking water, etc.) and standards (and guidance values) are set to protect those uses. Water Quality Standards are found in New York Codes, Rules and Regulations Title 6 (6 NYCRR). All fresh groundwater in New York State is Class GA. The best usage of Class GA waters is as a source of potable water supply (NYSDEC 2015).

3.2.2 Surface Water

The Long Island Sound estuary is open to the ocean at both ends (through Block Island Sound to the east and the lower Hudson River estuary to the west) and most of its fresh water input is located at the higher salinity eastern end (through the Connecticut and Thames River). Salinity at the western boundary of the Sound ranges from around 22 parts per thousand (ppt) in the spring to 27 ppt in the fall, increasing eastward to 30 to 31 ppt at the western end of the Sound. The project area salinity (in April) is approximately 27-28 ppt (NOAA 2003). Thermal stratification in the Sound develops in the spring and breaks down in the fall. The surface temperatures in the open Sound range from 36 to 41°F in the winter and from 68 to 77°F in late summer (Riley, 1956 in NOAA, 2003).

The project area is located within the Eastern Suffolk County Drainage Basin (NYSDEC 2015). Long Island Sound and Hashamomuck Pond, within the project area and vicinity, are designated as Class SA. There are also freshwater wetlands located south of Route 48 in the vicinity of the East Cove portion of the study area. One unnamed pond within this large wetland complex is designated as Class C.

The best usages of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival. The inland tidal and freshwater portions of Mattituck Creek are designated Class SC and Class C, respectively. The best usage of Class SC and Class C waters is fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes (NYSDEC 2015).

3.2.3 Coastal Processes

Three primary factors shape coastal zone morphology: 1) ocean factors; 2) beach characteristics; and 3) other natural physical variables. Ocean factors include waves, tidal variations, storm surges, and sea level change. Beach characteristics include beach sediment volume, composition, and grain size. Other natural variables include rainfall runoff, groundwater flow, pore pressures, and existing vegetative cover (Komar 1998 in USACE 2015a). All three factors interact in a dynamic process, which defines the coastal zone area. Anthropogenic can also play a role in shaping the coast. As shorelines retreat due to longshore currents, wave and tidal action, and storm events, artificial structures are often constructed to slow down or minimize further erosion. These structures typically modify the coastal zone to increase sediment retention within heavily utilized or populated areas (USACE 2000 in USACE 2015a). There are bulkheads and groins scattered throughout the study area, although many have not been maintained.

3.3 Vegetation

3.3.1 Upland

The beach in the proposed project area is narrow and backed by low bluffs in some areas. The area inland of the beach along County Road 48 ranges in elevation with a maximum height of about +12 ft. NAVD88. Vegetation in the project area is characterized by herbs and low shrubs. The area adjacent to the south side of the project area includes a freshwater wetland and Hashamomuck Pond.

Natural features in the project area are interspersed with extensive public and private shorefront properties and man-made structures (e.g., parking lots, bulkheads, revetments, seawalls, groins, etc.). In addition, Route 48, a major transportation route, runs parallel to the coastline within the project area and is being undermined in some areas due to coastal erosion. Upland vegetation within the study area is limited to maintained landscaped areas associated with residential and commercial buildings, stabilized areas landward of bulkheads, and narrow beach. These areas area dominated by grasses, herbs and shrubs such as evening primrose (*Oenothera biennis*), common milkweed (*Asclepias syriaca*), Montauk daisy (*Nipponanthemum nipponicum*) (escaped from residential gardens), catbrier (*Smilax rotundifolia*), and staghorn sumac (*Rhus typhina*). Some of the woodland trees that are commonly found in yards and along streets in the project vicinity include white oak (*Quercus alba*), red oak (*Q. rubra*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), American elm (*Ulnus americana*), yellow poplar (*Liriodendron tulipifera*) and hickory (*Carya* spp.) In the higher portions of the beach, early successional vegetation is sparsely growing including American beachgrass (*Ammophila breviligulata*), silverweed (*Potentilla anserina*), sea lavender (*Limonium nashii*), morning glory (Convolvulaceae), and seaside goldenrod (*Solidago sempervirens*). Some non-native invasive species, such as common reed (*Phragmites australis*), Japanese knotweed (*Fallopia japonica*) and honeysuckle shrubs (*Lonicera* sp.) were also observed in the project area.

3.3.2 Wetland

The project area and vicinity are characterized by a variety of habitat types and special plant communities. Pursuant to the U.S. Fish and Wildlife Service's Planning Aid Letter, dated August 13, 2015, the Service defines wetlands as transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (USFWS 2015a). Intertidal and shallow subtidal habitats provide a variety of ecosystem functions and values, including primary production, provision of fish and shellfish habitat and nursery areas, biogeochemical cycling of nutrients, carbon sequestration, sediment trapping, and wave attenuation (Currin *et al.* 2010 in USFWS 2015a).

The U.S. Fish and Wildlife Service (USFWS) classifies wetlands according to the *Classification of Wetlands and Deepwater Habitats* (Cowardin et al., 1979) in the National Wetland Inventory. The Cowardin system is a hierarchical classification system in which wetlands are divided into systems, subsystems, classes and subclasses. Of interest in the project area are the following wetland systems:

Palustrine - all non-tidal wetlands dominated by trees, shrubs and persistent emergent herbaceous plants. Five classes were used to characterize this system by the dominant form of vegetation or composition of the substrate; aquatic bed, emergent, scrub/shrub, forested and unconsolidated bottom.

Estuarine – deepwater tidal habitats and adjacent tidal wetlands and is more strongly influences by land than the Marine system. There are two subsystems, subtidal and intertidal, and ten classes used to characterize this system by the dominant form of vegetation or composition of the substrate; rock bottom, unconsolidated bottom, aquatic bed, reef, streambed, rocky shore, unconsolidated shore, emergent wetland, scrub/shrub wetland and forested wetland.

According to the USFWS National Wetland Inventory, the general project area includes subtidal and intertidal estuarine wetlands and palustrine (freshwater) emergent, forested, scrub/shrub pond wetlands. Modifiers provided for each wetland characterize water regimes or other unique features (Figure 10 - USFWS National Wetland Inventory).

Within the proposed project area, the estuarine intertidal unconsolidated sandy shore (E2US2P) is narrow, ranging in width from about 20 to 100 ft. (average width for the narrowest and widest portion of each cove) and is backed by low bluffs in some areas. This beach area is composed of sand and cobbles with some scattered successional vegetation in the upper portion (above mean high water) of the beach as described in Section 2.1.4.1. The NYSDEC classifies this beach area as Coastal Shoals, Bars and Mudflats. This zone is not vegetated and is covered by water at high tide, and is either exposed or covered by a maximum of one foot of water at low tide. The subtidal habitat is classified by the NYSDEC as the Littoral Zone; a zone of open water with a maximum depth of six ft. measured from mean low water elevation (Southold 2011).

The adjacent estuarine subtidal habitat (E1UBL) is characterized by the National Wetland Inventory as having an unconsolidated bottom. Eelgrass mapping was also conducted during a study entitled *Eelgrass Survey for Eastern Long Island Sound, Connecticut and New York* (Tiner et al. 2003) which included the near shore area (i.e., to a depth of –15 ft. at mean low water) along the North Shore of Long Island from Southold to Orient Point. Survey methods included mapping eelgrass beds through aerial photo-interpretation and follow-up ground-truthing using visual observation and an underwater video camera where beds or bottoms were not visible from the boat. No eelgrass was observed in the Hashamomuck Cove project area during this study.

A survey was also conducted on September 21, 2015 by the U.S. Army Corps of Engineers, New England District (USACE 2015a) in the project area to document the presence or absence of eelgrass (*Zostera marina*) in the subtidal nearshore environment. Three transects paralleling the Hashamomuck Beach shoreline were established for the eelgrass survey prior to the start of field activities. Transect 1 was located 50 ft. from the shoreline, Transect 2 was located 100 ft. from the shoreline, and Transect 3 was located 200 ft. from the shoreline. Transects were traversed at low speeds by a boat operator while visual observations of the bottom were made by a marine ecologist through a viewing bucket. No eelgrass was observed in the survey area. Additionally, no eelgrass blades were observed within the beach wrack along the entire Hashamomuck Cove project area. The subtidal survey area was dominated by sandy expanses interspersed with areas of cobble and large boulders extending beyond the offshore transect. Sparse patches of various macroalgal species typical of a nearshore environment were present on both bottom types. See Appendix A2 – 2015 Sediment Sampling, Benthic Community Analysis and Eel Grass Survey for additional information.

Freshwater wetlands are scattered throughout the Town of Southold. The largest concentration of freshwater wetlands, the Arshamomaque Preserve wetland complex, is located on the south side of Route 48 and southeast of the Hashamomuck Cove project area (Figure 10 – USFWS National Wetland Inventory). This preserve includes an old field successional community along with mixed hardwood forest, swamp cottonwood *(Populus deltoides*) and cattail (*Typha* sp.) marsh (Southold 2015). Some areas within the Arshamomaque Preserve have been designated as a Significant Natural Community by the NYSDEC. Portions of the Hashamomuck Cove project area located within 100 foot buffer zone for state-regulated freshwater wetlands and within the one half mile buffer zone of designated Significant Natural Communities.

In March of 1987, the New York State Department of State designated Hashamomuck Pond as a Significant Coastal Fish and Wildlife Habitat (New York State Department of State 2005 in USFWS 2015a). Hashamomuck Pond is located west of Conklin Point emptying through Mill Creek into Shelter Island Sound in the Town of Southold. There is moderate to high density residential development on the north and northwest sides of the pond and marina development at the mouth of Mill Creek. The southwest side of the pond remains largely undeveloped, and a large parcel on the eastern side of the pond has been preserved (New York State Department of Environmental Conservation 2002 in USACE 2015a).

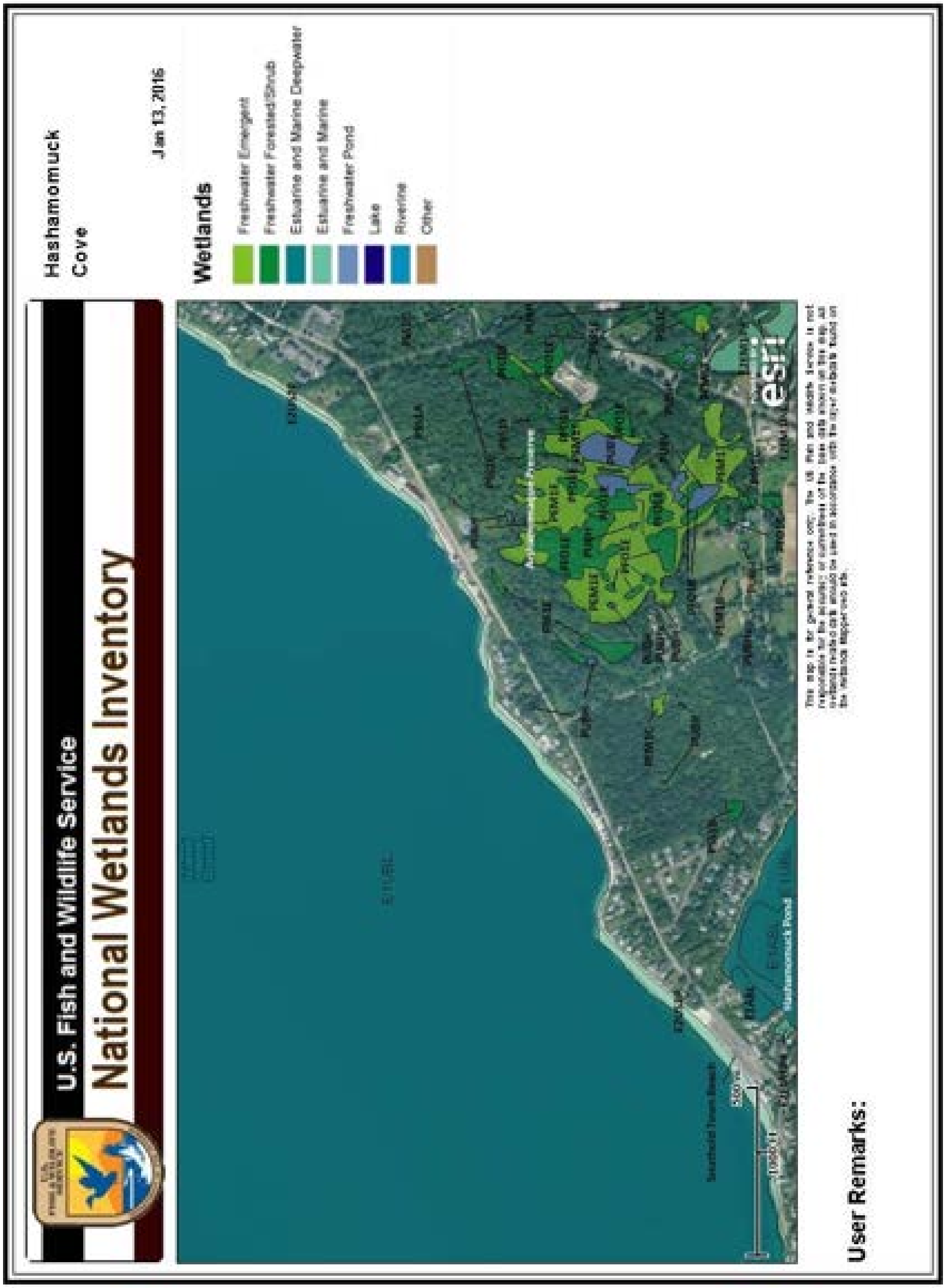

Figure 10. USFWS National Wetland Inventory

3.4 Fish and Wildlife

The marine waters in and around the Town of Southold support a variety of finfish, shellfish, and crustaceans. These marine organisms are important not only for their role as natural resources, but also because of the degree to which they support the Town's commercial and recreational fishing industry (Southold 2011).

3.4.1 Finfish

Long Island Sound and the Peconic Estuary are very important nursery and spawning habitat for coastal fish. Anadromous fish, such as shad (*Alosa sapidissima*), white perch (*Morone americana*), striped bass (*Morone saxatilis*), and Atlantic menhaden *(Brevoortia tyrannus)*, spawn in Atlantic coast rivers. The young emerge from the spawning estuaries for annual migrations to coastal waters and then return as adults to spawn at their natal estuaries in the spring. Estuarine fish, such as winter flounder (*Pseudopleuronectes americanus*), blackfish or tautog (*Tautoga onitis*) and many of the principal bait fish, including Atlantic silversides (*Menidia*), striped killifish (*Fundulus majalis*), and sand lance (*Ammodytes amenicanus*), generally remain within an estuary throughout their lives. Other popular food and sport fish found in the area include bluefish (*Pomatomus saltatrix*), fluke or summer flounder (*Paralichthys dentatus*), weakfish (*Cynoscion regalis*), porgies or scup (*Stenotomus chrysops*), and sea bass (*Centropristis striata*). These species range from New England to the Carolinas and generally migrate inshore and north in the spring and summer, and offshore and south in the fall and winter. Most of these species spawn while the fish are away from New York, and young fish and adults move into our shallow coastal waters and estuaries in the spring. Others, such as weakfish, spawn as they move into our waters in the spring. Offshore fish, such as Atlantic cod (*Gadus morhua*), whiting or silver hake (*Merluccius bilinearis*), tuna (*Thunnus spp.*), haddock (*Melanogrammus aeglefinus*), and several species of shark may or may not be migratory, but generally do not enter New York State waters in large numbers (Southold 2011).

3.4.2 Shellfish

A variety of edible shellfish are found in the Southold area include hard-shelled clams or quahogs (*Mercenaria mercenaria*), soft-shelled clams or steamers (*Mya arenaria*), surf clams, (*Spisula solidissima*), oysters (*Crassostrea virginica*), bay scallops (*Argopecten irradians*), blue mussels (*Mytilus edulis*), channeled whelk (*Busycon canaliculatum*) and knobbed whelk (*Busycon caricum*) (Southold 2011). Within the Hashamomuck Cove project area, hard-shelled clam, blue mussels and whelks are likely to found. Hard-shelled clams are found near the top of sandy or muddy sand substrates in creeks, bays and along ocean beaches and are currently the most important commercial shellfish in Southold (Southold 2011). Blue mussels are common, attaching themselves to intertidal rocks, pilings, scattered shells and other mussels and whelks are carnivorous sea snails commonly found throughout the Long Island Sound. The project area is not included as a shellfish harvest area (Map II-9) in the Town of Southold Local Revitalization Program report (Southold 2011).

3.4.3 Benthic Resources

Benthos is the complex community of plants and animals that live on or in bottom sediments of oceans, bays, streams, and wetlands. In September 2015, field studies were conducted by the U.S. Army Corps of Engineers, New England District to provide baseline information on biological resources (i.e., benthos and eelgrass) of the study area as well as document the existing physical properties (grain size) of the beach sediments in the study area (USACE 2015a).

The study area extends about 1.5 miles west from Soundview Road near the Southold Town Beach and includes three coves: Southold Town Beach Cove (West Cove), Hashamomuck Cove (Center Cove), and Pebble Beach Cove (East Cove) separated by slightly protruding headlands (USACE 2015a). Ten transects were established within the project area to collect samples for benthic community analysis and sediment grain size.

Samples were collected on September 21, 2015 at low tide. A sample for benthic community analysis and a sediment sample for grain size analysis were taken at the high-intertidal level, the mid-intertidal level, and the low-intertidal tide level along all transects with the exception of Transect 5. No high-intertidal or mid-intertidal samples were collected on Transect 5 as the area was a bulkhead with large armor stone. Organisms identified during sampling were identified to the lowest taxon possible and enumerated.

Twenty-eight cores for benthic community analysis were processed at the New England District's Environmental Laboratory. A total of fifteen different taxa were observed in the 28 samples. The following narrative provides a description of the benthic communities in the High, Mid and Low-Intertidal stations.

High-intertidal Stations - The benthic communities in the high-intertidal area were generally azoic or consisted of typical opportunistic annelid species. Six of the nine stations sampled did not have species present. In the 3 stations where species were present, they were represented by a single polychaetes species, *Capitella capitata*, which is a known opportunistic annelid. Data on the benthos collected at the high-intertidal stations are presented in Table 4a.

Mid-intertidal Stations - The benthic communities in the mid-intertidal areas were also dominated by typical opportunistic annelid species (*Capitella capitata* and *Scalibregma inflatum*) commonly found along Long Island Sound beaches. Of note at the mid-intertidal station T-10 – M (i.e., Transect 10 – mid-intertidal) blue mussels were found. These mussels were juvenile and were attached to large gravel-sized sediments. Data on the benthos collected at the mid-intertidal stations are presented in Table 4b.

Low-intertidal Stations - The low-intertidal communities were also dominated by typical opportunistic annelid species (*Capitella capitata* and oligochaetes), but also contained a varied mix of other typical sandy shore species. These species included various crustacean isopods, amphipods, and decapods as well some typical intertidal gastropods species (*Crepidula plana* and *Nassarius trivitatus*). A lone blue mussel was found at station T-4 - L (i.e., Transect 4 - low-intertidal). Data on the benthos collected at the low-intertidal stations are presented in Table 4c.

The grain size data showed that the sediments in the high-, mid-, and low-intertidal areas were predominately a mix of cobble-gravel-sand. The benthic communities in the high-intertidal area were generally azoic or consisted of typical opportunistic annelid species, while the communities in the mid-intertidal areas were dominated by typical opportunistic annelid species. The low-intertidal communities were also dominated by typical opportunistic annelid species, but also contained a varied mix of other typical sandy shore species such as isopod and decapod crustaceans and a few gastropod species.

Table 4. Benthic Invertebrates

Table 4a– High Intertidal, Data collected from the high-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. No high intertidal sample was collected at Transect 5. Numbers are per 0.003 m^{2}.

	HIGH-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**
ANNELIDA										
POLYCHAETA										
Capitella capitata	3	*	1	*	-	*	2	*	*	*
INDIVIDUALS / SAMPLE	3	0	1	0	-	0	2	0	0	0
SPECIES / SAMPLE	1	0	1	0	-	0	1	0	0	0

Table 4b.-Benthic invertebrates collected from the mid-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. No mid-intertidal sample was collected at Transect 5. Numbers are per 0.003 m^2

	MID-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**
ANNELIDA										
POLYCHAETA										
Capitella capitata	111	*	7	*	-	17	4	*	11	*
Scalibregma inflatum	*	3	1	*	-	*	6	*	13	34
OLIGOCHAETA										
Unidentified Oligochaete sp.	10	*	*	*	-	9	*	*	1	*
MOLLUSCA										
BIVALVIA										
Mytilus edulis	*	*	*	*	*	*	*	*	*	2
GASTROPODA										
Nassarius trivitatus	*	*	1	*	-	*	*	*	*	2
INDIVIDUALS / SAMPLE	121	3	9	0	-	26	10	0	25	38
SPECIES / SAMPLE	2	1	3	0	-	2	2	0	3	3

Table 4c-Benthic Invertebrates – Low Intertidal Data collected from the low-intertidal locations at Hashamomuck Beach Study Area on Sept. 21, 2015. Numbers are per 0.003 m^2

	LOW-INTERTIDAL									
TRANSECT NUMBER	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**
ANNELIDA										
POLYCHAETA										
Capitella capitata	*	25	67	25	72	91	6	*	*	3
Exogone sp.	*	*	*	*	*	*	1	*	1	*
Leitoscoloplos robustus	*	5	19	*	*	*	*	*	*	*
Scalibregma inflatum	*	3	*	*	*	1	*	*	*	*
Streblospio benedicti	*	*	1	*	*	*	*	*	*	*
OLIGOCHAETA										
Unidentified Oligochaete sp.	*	1	3	*	27	15	10	1	*	17
ARTHROPODA										
CRUSTACEA										
ISOPODA										
Sphaeroma quadridentata	*	*	*	14	*	*	*	*	5	*
AMPHIPODA										
Unidentified Amphithoidae	*	*	*	2	*	*	*	*	*	*
CUMACEA										
Unidentified Cumacean	1	*	*	1	*	*	*	*	*	*
DECAPODA										
Pagurus longicarpus	1	*	*	*	*	*	*	1	*	*
Hemigrapsus sanguineus	*	*	*	4	*	*	*	*	*	*
MOLLUSCA										
BIVALVIA										
Mytilus edulis	*	*	*	1	*	*	*	*	*	*
GASTROPODA										
Mitrella lunata	*	1	*	*	*	*	*	2	*	*
Crepidula plana	*	*	*	*	*	*	*	5	1	*
Nassarius trivitatus	*	*	*	*	*	*	*	*	2	*
INDIVIDUALS / SAMPLE	**2**	**35**	**90**	**42**	**99**	**107**	**17**	**9**	**9**	**20**
SPECIES / SAMPLE	**2**	**5**	**4**	**6**	**2**	**3**	**3**	**4**	**4**	**2**

3.4.4 Reptiles and Amphibians

Site-specific studies or surveys describing the diversity and abundance of amphibians and reptiles within the study area are not available. No amphibians are expected to inhabit the shoreline project area because of the density of development and road infrastructure, narrow beach and lack of fresh water within the project boundaries. The common garter snake (*Thamnophis sirtalis*) is frequently found in lawns and so may be found in some residential areas within the project. The common garter snake is 16 to 30 inches in length and consumes many kinds of insects, slugs, worms and an occasional small frog or mouse (NYSDEC 2016a).

New York waters are primarily used as "nursery" waters for young sea turtles. Sea turtles arrive in New York every year in late May as water temperatures rise. By mid-November, they migrate south in search of warmer waters. Turtle species that may have the potential to occur seasonally in the offshore environmens of Long Isalnd include the Kemp's ridley sea turtle (*Lepidochelys kempii*), loggerhead sea turtle (*Caretta caretta*) green sea turtle (*Chelonia mydas*), and leatherback sea turtle (*Dermochelys coriacea*). Of these species, the leatherback is a highly pelagic fast swimming open water animal and is not expected to visit the sound. Studies of sea turtles near Long Island, NY have shown that the species typically occur in waters with depths between 16 and 49 ft. deep and in areas where the waters are slow-moving or still (i.e., less than 2 knots) (Ruben and Morreale 1999). As such, other than transient individuals, it would be unlikely that sea turtle would be found in the nearshore waters of the project area.

All sea turtle populations are either threatened or endangered and are protected under the U.S. Endangered Species Act. Additional information about sea turtles is found in Section 4.1.2 Federal Endangered and Threatened Species.

3.4.5 Birds

No site-specific bird surveys have been conducted in the study area, however a diversity of bird species is likely to be present due to the variety of habitats in the Hashamomuck Cove project area. The most abundant species are likely to be habitat generalists that are tolerant of development such as house sparrow (*Passer domesticus), mourning dove (Zenaida macroura),* crow (*Corvus brachyrhynchos*), eastern tufted titmouse (*Parus bicolor),* northern cardinal *(Cardinalis cardinalis),* Carolina wren (*Thryothorus ludovicianus*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), European starling (*Sturnus vulgaris*), common grackle (*Quiscalus quiscula*), and brown-headed cowbird (*Quiscalus major*). Herring gulls (*Larus argentatus*), great blackbacked gulls (*Larus marinus*), double-crested cormorants (*Phalacrocorax auritus*) and sanderlings (*Calidris alba*) have been observed resting and feeding in the study area. The closest designated Bird Conservation Area is the Peconic River Headwaters located approximately 20 miles southwest of the project area in Brookhaven and Riverhead, NY (NYSDEC 2016d).

The primary statutory authority for *Birds of Conservation Concern (BCC) 2008* (U.S. Fish and Wildlife Service 2008) is the Fish and Wildlife Conservation Act of 1980, as amended; other authorities include the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-j), the Endangered Species Act (ESA) of 1973, as amended (87 Stat. 884, as amended), and the Migratory Bird Treaty Act (MBTA) of 1918. The USFWS provided a list of BCC birds in their letter dated 13 August 2015 that are protected under the MBTA, which prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service (USFWS 2015a). The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." Unauthorized taking of birds is a violation of the MBTA. Neither the MBTA nor its implementing regulations, 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds. Bald and golden eagles are afforded additional legal protection under the Bald and Golden Eagle Protection Act. The list of migratory birds provided by the USFWS in their 13 August 2015 letter will be consulted in accordance with Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." to assess impact to migratory birds as a result of project activities (USFWS 2015a).

3.4.6 Mammals

Site specific studies describing the diversity and abundance of mammals within the study area are not available. Mammals likely to inhabit the study area would be generalist tolerant of development such as raccoon (*Procyon lotor*), opossum (*Didelphis virginiana),* eastern cottontail *(Sylvilagus floridanus),* and white-tailed deer *(Odocoileus virginianus).*

Harbor seals (*Phoca vitulina*) are the most abundant seals found in New York State. Places where people view harbors seals in Suffolk County are Cupsogue Beach State Park and Montauk Point State Park located on the southern shore of Long Island. Seals are likely to be seen at these parks during the day from early winter (November) and into spring (May) (NYSDEC 2016b). Seal haul-out locations have been documented in the Gardiners Bay area most recently in 2012. Bottlenose dolphin (*Tursiops truncatus*) are also periodically observed in the Atlantic Ocean off of Long Island (NYSDEC 2016c).

3.5 Federal Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service Information, Planning and Conservation System (IPaC) website, six (6) Federally protected animal or plant species have identified as possibly being present along the coastal beach in the proposed project area; roseate tern (*Sterna dougallii dougallii)* (northeastern population), piping plover (*Charadrius melodus*), red knot (*Calidris* *canutus rufa*), sandplain gerardia (*Agalinis acuta*), seabeach amaranth (*Amaranthus pumilus*) and northern long-eared bat (*Myotis septentrionalis*).

Roseate Tern - The northeastern population of the roseate tern was designated as Federally endangered on 2 November 1987. Roseate terns were once abundant but a variety of threats have resulted in much-reduced populations. According to the 1998 U.S. Fish and Wildlife Service Roseate Tern Recovery Plan – Northeastern Population, the numbers of roseate terns were severely reduced in the 1870s and 1880s by commercial hunting for the millinery trade. The total number of roseate terns was estimated to be roughly 2,000 pairs at the lowest point in about 1890 (Nisbet 1980 in USFWS 1998). Roseate tern populations increased following protection efforts but declined again to a low of 2,500 pairs in 1977 due to habitat loss and gull encroachment.

Roseate terns generally nest on sandy, gravelly, or rocky islands. As per the U.S. Fish and Wildlife Service 2010 Caribbean Roseate Tern and North Atlantic Roseate Tern (*Sterna dougallii dougallii*) 5-Year Review: Summary and Evaluation, in 2009, approximately 94% of the population of Roseate Tern pairs were concentrated at just 3 colonies: Great Gull Island, New York (NY); Bird Island, Marion, Massachusetts (MA); and Ram Island, Mattapoisett, MA (USFWS 2010). Roseate terns feed almost exclusively on small and/or juvenile fish; occasionally it includes crustaceans and insects in its diet. Its feeding habits are fairly specialized, consuming primarily sand lance. Roseate terns capture food mainly by plunge-diving (diving from heights of 1-12 meters (m) and often submerging to 50 centimeters (cm)), but also by surface-dipping and contact-dipping (MA NHESP 2007).

Piping Plover - The piping plover, a Federally threatened species, is a small species of shorebird which breeds in the northeastern Atlantic coast. Plover nest above the high tide line on coastal beaches, sand flats at the ends of sandspits and barrier islands, gently sloping fore dunes, blowout areas behind primary dunes, sparsely vegetated dunes, and wash over areas cut into or between dunes. Feeding areas include intertidal portions of ocean beaches, wash over areas, mudflats, sandflats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (USFWS 1996 in USFWS 2015a). Plover prey on a variety of invertebrate species such as earthworms, larval insects, amphipods, isopods, tiny crabs and shrimp, polychaete worms, and small mollusks (Sibley et al. 2001). Plover broods prefer ephemeral pools and bay tidal flats over other habitat types due to higher arthropod abundance and relatively increased availability of escape cover (Elias et al. 2000 in USACE 2015a). Breeding plover on the Atlantic Coast are generally found at accreting ends of barrier islands, along sandy peninsulas, and near coastal inlets (USFWS 1996 in USFWS 2015a). The coastline within the study area may support suitable nesting and foraging piping plover habitat (USFWS 2015a).

The NY Natural Heritage Program is a partnership between the NYS Department of Environmental Conservation (NYSDEC) and the State University of New York College of Environmental Science and Forestry. The Natural Heritage Program mission is the conservation of rare animals, rare plants, and natural ecosystems (refer to as "natural communities") (NYSDEC 2016f).

The Natural Heritage Program indicated in a letter dated January 13, 2016, that piping plover (also listed by New York State as endangered) nested at Hashamomuck Beach (Southold Town Beach) in 2004. The North Fork Audubon Society (NFAS) and The Nature Conservancy (TNC) initiated a monitoring program for piping plover in 1996. Monitoring protocols involve multiple visits to approximately 20 sites during the period of April 1 to August 15.

Based on a review of the most recent monitoring reports (2008-2015), no piping plover nesting has been recorded at Hashamomuck Beach in the near-term. The Town of Southold contracts annually for piping plover monitoring in the town (telecom on January 27, 2016 with John Sepenoski, Town of Southold, Office of Engineering). The North Fork Audubon Society (NFAS) completed monitoring reports from 2008 to 2011 and the Group for the East End, in partnership with NFAS, prepared the 2012 to 2015 monitoring reports. Hashamomuck Beach had a Habitat Suitability Rating of 3 throughout the years 2008-2011 which was defined as, "Suitable nesting habitat but frequent human disturbance and/or predator presence. Ample beach space above the high tide mark, but other factors diminish nesting success." However, in 2012, the Hashamomuck Beach Habitat Suitability Rating was reduced to 4, which is defined as, "Generally unsuitable habitat. Significant human disturbance and/or predators are present. Insufficient area above high tide mark for nesting and some suitable foraging habitat is present."

Some of the issues cited in the monitoring report that diminish habitat suitability and deter nesting at Hashamomuck Beach include a lack of upper beach habitat; intimidation and predatory behaviors of a large population of gull species (herring, great black-backed and ring-billed), and the high concentration of summer visitors to the popular beach. Recommendations for improving conditions include, increased signage to educate visitors about piping plover; requiring that dogs are leashed while walking on the beach, encouraging visitors not to feed gulls (which attracts more gulls), and to remove their trash.

Increasing the width of the beach as propose, may increase the Habitat Suitability Rating for Hashamomuck Beach and increase the potential for piping plover to nest and forage in the project area. The USACE New England District, on behalf of the USACE New York District, will coordinate with the USFWS, NYSDEC and the Town of Southold to prepare a Piping Plover Management Plan to assure the protection of piping plover in the project area (see Section 6.5 for additional information on the Piping Plover Management Plan).

Red Knot - The red knot, was listed as a Federally threatened species on January 12, 2015. The red knot is makes one of the longest yearly migrations of any bird, traveling 15,000 km (9,300 mi) from its Arctic breeding grounds to Tierra del Fuego in southern South America. During migration, red knots concentrate in huge numbers at traditional staging grounds during migration. Delaware Bay is an important staging area during spring migration, where the knots feed on the eggs of spawning horseshoe crabs. The red knot breeds in drier tundra areas, such as sparsely vegetated hillsides. Outside of breeding season, red knot is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays (USFWS 2015d). It is unlikely that the Hashamomuck Cove project area is used by red knots as other than a transient stopover to or from their breeding grounds in the Canadian Arctic. While there is no known survey efforts being conducted within the project area for red knot, there have been no documented observations of red knot in the project area on the ebird.org website (Cornell Lab of Ornithology 2016).

Northern Long-Eared Bat - The northern long-eared bat *(Myotis septentrionalis*), a Federally threatened species, is a medium-sized bat found across much of the eastern and northcentral United States. White-nose syndrome is responsible for much of the species' recent population decline. Northern long-eared bat (NLEB) typically winters in caves and abandoned mines. There are approximately 90 hibernacula known to occur across the state (USFWS 2015b in USFWS 2015a). During the summer months, northern long-eared bats roost in under loose bark, in cracks, crevices, and cavities within a variety of tree species. Other roosting habitat includes human made structures such as buildings, utility poles, and barns (USFWS 2015b in USFWS 2015a). While the forested uplands on the south side of Route 48 (Arshamomaque Preserve) in the project vicinity have the potential to support summer roosting habitat for northern long-eared bat (USFWS 2015a), there would be no bridge or culvert work (structures which can be used by roosting bats) and no trees cutting is anticipated. Additionally, there is no known occurrence of northern long-eared bat in the general project vicinity (telecom on March 29, 2016 with Terra Gulden-Dunlop, Fish and Wildlife Biologist, USFWS Long Island Field Office).

Sandplain Gerardia - The sandplain gerardia (*Agalinis acuta*) is the only Federally endangered plant species in the State of New York. The sandplain gerardia is a small annual plant that is found in coastal grassland areas on Long Island. Loss of habitat to development, and encroachment by invasive exotic competitors are the main reasons why this plant is considered to be in imminent danger of extirpation (NYSDEC 2016e). This species is very rare and the project area lacks coastal grasslands and, therefore, it is unlikely to be found in the project area.

Seabeach Amaranth - The seabeach amaranth (*Amaranthus pumilus*) is listed a Federally threatened. The seabeach amaranth is an annual plant with reddish stems and small, rounded leaves. This species occurs on barrier island beaches, where its primary habitat consists of overwash flats at accreting ends of islands and lower foredunes and upper strands of non-eroding beaches. It occasionally establishes small temporary populations in other habitats, including sound-side beaches, blowouts in foredunes, and sand and shell material placed as beach replenishment or dredge spoil. The species appears to need extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner. These characteristics allow it to move around in the landscape as a fugitive species, occupying suitable habitat as it becomes available (USACE 2015a). Thought to be extirpated from New York State, it was found again in 1990 (NYSDEC 2016e). Construction of beach stabilization structures that stop the natural movement of sand has degraded much seabeach amaranth habitat. The plants grow close to the surface and can range in size from less than an inch to more than a foot across. Flowering and seed production usually start in July and continue until the plants die in the fall (NYSDEC 2016e). Beaches in the project area are narrow and lack the highly dynamic process needed to create seabeach amaranth habitat.

In addition, as designated on the National Marine Fisheries Service (NMFS) species distribution maps website,[3] the proposed project location overlaps with areas of potential distribution for Atlantic sturgeon (*Acipenser oxyrinchus*); sea turtles of the New England region including the threatened Atlantic loggerhead (*Caretta caretta)* and green sea turtle (*Chelonia mydas*) and endangered Atlantic leatherback (*Dermochelys coriacea*) and Atlantic Kemp's ridley (*Lepidochelys kempi*); as well as large Atlantic whales including the endangered humpback (*Megaptera novaeangliae*), right (*Eubalaena glacialis*), and fin (*Balaenoptera physalus*) whales.

Atlantic Sturgeon - Atlantic sturgeon, from any of the five Distinct Population Segments (DPS) (Gulf of Maine DPS is listed as threatened other four DPSs are listed as endangered), may be present in the project area. After emigration from the natal estuary, sub-adult and adult Atlantic sturgeon forage within the marine environment, typically in waters less than 50 meters depth (ASSRT 2007). Atlantic sturgeons forage for benthic invertebrates and small fish such as sand lance while making coastal migrations. In bays and harbors foraging often occurs at or near areas with submerged vegetation or shellfish resources. The project area does not provide suitable habitat for overwintering; so the presence of Atlantic sturgeon is likely limited to the warmer months. The nearest spawning rivers are the Kennebec River, Maine and the Hudson River, New York, so no eggs, larvae or juvenile Atlantic sturgeon are likely to occur in the project area.

Sea Turtles - Endangered and threatened sea turtles are seasonal or occasional visitors to the offshore environments of Long Island Sound. Sea turtles may be present from May through

[3] http://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/index.html

November; the loggerhead, Kemp's ridley and green sea turtles are mostly juvenile and sub-adult individuals foraging in nearshore coastal waters.

The most frequently seen sea turtle in NY waters, the loggerhead, has a conspicuously large, block-like head, and averages 3 ft. long and 300 pounds. Juvenile loggerheads regularly inhabit Long Island Sound and the eastern bays where they feed mainly on crustaceans and shellfish. Some adults can be found along the ocean shore and in New York Harbor (CRESLI 2016). Loggerheads feed on benthic organisms found in large bay systems and forage in the open waters in search of hard-shelled prey (crabs, crustaceans, mollusks), in addition to jellyfish, fish and eelgrass.

The most endangered and smallest of the sea turtles, the Kemp's ridley averages 20-28 inches long and 80-110 pounds. It is the second most commonly seen sea turtle in New York. The Kemp's ridley appears to prefer estuarine areas where green crabs and mussels are found. In New York, the waters off Long Island are used by immature (2-5 year-old) Kemp's ridleys.

Green sea turtles utilize Long Island's warm shallow bays and Long Island Sound to feed on crabs, crustaceans and submerged aquatic vegetation such as eel grass. They feed and may be the least likely of the turtles to be seen in the Sound due to the relative paucity of sea grasses found in the Sound. On Long Island, juvenile green turtles can be found entrapped in fishing gear during the summer and a small number suffer cold stunning each year (CRESLI 2016).

The leatherback turtle is a highly pelagic fast swimming open water animal and not an expected visitor to the Sound. Leatherbacks are commonly seen in Long Island's offshore waters during the late summer (CRESLI 2016).

Large Atlantic Whales - As depicted on NMFS Estimated Range of Large Atlantic Whales map,[4] the humpback, right and fin whales have the potential to be transiting through the eastern most portion of Long Island Sound.

Right whales are primarily transiting the New York area on their way to more northerly feeding and concentration areas. During late winter and early spring, they begin moving north along the coast past Cape Hatteras and near the Long Island Coast. Individual have been sighted along the south shore of Long Island, Block Island Sound, Gardiners Bay and south shore inlets and bays. Humpback whale presence in the northwestern Atlantic is variable and probably a response to the changing distribution of preferred food sources. For the most part, humpbacks are in transit through the New York area from June through September on their northward migration to

[4] http://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/atlanticlargewhales.pdf.pdf

summering areas in the Gulf of Maine. Finback whales occupy both deep and shallow waters and are probably the most abundant large cetacean in Atlantic coast New York waters. They are most abundant in spring and summer, but do have some presence during the winter months.

Large whales are generally not encountered in Long Island Sound proper. According to the distribution of sightings reports performed between 2007 and 2011, these whale species were not observed in the project area (Waring *et al.* 2015). These whales are unlikely to occur within the project vicinity or in the shallow depths of the proposed project area.

Coordination with the USFWS and NMFS pursuant to Section 7 of the Endangered Species Act continues.

3.6 State Threatened and Endangered Species

This section will discuss the following State protected species; the piping plover (*Charadrius melodus*), listed as State endangered and the least tern (*Sternula antillarum)*, listed as State threatened.

Piping Plover – In a letter dated 13 January 2016, the Natural Heritage Program stated that piping plover had nested at Hashamomuck Beach (Southold Town Beach) in 2004 and additional coordination with Michelle Gibbons, Wildlife Manager of the NYSDEC Region 1 was recommended. Ms. Gibbons confirmed in a telecom on 20 January 2016 that one pair of piping plover nested at Hashamomuck Beach in 2004 but no nesting has been documented since. In annual monitoring reports between the years of 2008 -2011, Hashmomuck Beach was given a Habitat Suitability Rating of 3, which was defined as, "Suitable nesting habitat but frequent human disturbance and/or predator presence. Ample beach space above the high tide mark, but other factors diminish nesting success. However, in 2012, the Hashamomuck Beach Habitat Suitability Rating was reduced to 4, which is defined as, "Generally unsuitable habitat. Significant human disturbance and/or predators are present. Insufficient area above high tide mark for nesting and some suitable foraging habitat is present."

Increasing the width of the beach as proposed, may increase the Habitat Suitability Rating for Hashamomuck Beach and increase the potential for piping plover nesting in the project area. The USACE New England District, on behalf of the USACE New York District, will coordinate with the USFWS, NYSDEC and the Town of Southold to prepare a Piping Plover Management Plan to assure the protection of piping plover in the project area (see Section 6.5 for additional information on the Piping Plover Management Plan).

Least Tern - The least tern is the smallest American tern, measuring about 9 inches (23 cm) in length. Arriving at its nesting colony by late April to mid-May, the least tern breeds in colonies of up to 200 birds. Nests are scraped in sand, shell or gravel, and may be sparingly lined with small shells or other debris. By late August and early September, least terns leave their northern breeding grounds to head for wintering areas. Least terns feed mostly on small fish caught by skimming the surface of the water or by making dives from the air (NYSDEC, 2016g).
Least tern colonies are monitored annually in the Hashamomuck Cove project vicinity by the North Fork Audubon Society (NFAS) and The Nature Conservancy (TNC) in conjunction with piping plover monitoring. The monitoring protocols involve multiple visits to approximately 20 sites during the period of April 1 to August 15. The number of least tern nesting colonies ranged between three (3) and seven (7) between the years of 2008-2015, with the number of nesting pairs ranging from 220 in 2009 to 49 in 2012. Hashmomuck Beach was not listed as a least tern nesting colony at any time during that 8 year period. The limited size of the beach, the high gull population and the high number of summer visitors to Hashamomuck Beach deter nesting by least terns, similar to piping plover.

3.7 Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Conservation Management Act strengthen the ability of the National Marine Fisheries Service and the New England Fishery Management Council to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat" and is broadly defined to include, "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The project area Essential Fish Habitat (EFH) Designation is included within the 10 minutes x 10 minutes square coordinates $41^0$10.0’N, 72^0 20.0’W, $41^0$00.0’N and 72^0 30.0’W. (NMFS 2016).[5]

As stated in the National Marine Fisheries Service (NMFS) source documents (NMFS 2016), fourteen (14) Federally managed fish species, one (1) shark species and two (2) skate species have the potential to occur within the project area. EFH designated species are identified to potentially occur within the intertidal and nearshore subtidal zones along the Hashamomuck Cove project area shoreline.

The species listed for the project area include Atlantic sea herring (Clupea harengus) (juveniles, adult), Atlantic mackerel (*Scomber scombrus*) (eggs, larvae, juveniles, adults), Atlantic salmon (Salmo salar) (juveniles, adults),black sea bass (*Centropristis striata*) (juveniles), bluefish (*Pomatomus saltatrix*) (juveniles, adults), cobia (*Rachycentron canadum*) (eggs, larvae,

[5] Source: http://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/ConnNYNJ.htm

juveniles, adults), king mackerel (*Scomberomorus cavalla*) (eggs, larvae, juveniles, adults), pollock (*Pollachius virens*) (juveniles, adults), red hake (*Urophycis chuss*) (eggs, larvae, juveniles, adults), scup (*Stenotomus chrysops*) (eggs, larvae, juveniles, adults), Spanish mackerel (*Scomberomorus maculatus*) (eggs, larvae, juveniles, adults), summer flounder (*Paralichthys dentatus*) (juveniles); windowpane (*Scophthalmus aquosus*) (eggs, larvae, juveniles, adults), winter flounder (*Pseudopleuronectes americanus*) (eggs, larvae, juveniles, adults); sand tiger shark (*Carcharias taurus*) (larvae), little skate (*Leucoraja erinacea*) (juveniles, adults), and winter skate (*Leucoraja ocellata*) (juveniles, adults). Information and detailed descriptions of the life history requirements of these species was derived from the National Marine Fisheries Service (NMFS) "Guide to EFH Species Designations" and in the provided Essential Fish Habitat Assessment (Appendix A1).

3.8 Socioeconomic

The Town of Southold is one of ten towns in Suffolk County. The town contains ten individual villages. These are Cutchogue, East Marion, Fishers Island, Greenport West, Laurel, Mattituck, New Suffolk, Orient, Peconic and Southold (Southold 2016). The following census data included the entire Town of Southold.

In 2010, the population of the Town of Southold was 21,968 which equates to 408 persons per square mile. Historic trends show a steady increase in the population of the town, which increased to 22,248 in 2014 (an increase of 1.3% since 2010).

The 2010 to 2014 median household income in the Town of Southold (in 2014 dollars) was \$83,559 (U.S. Census 2010). In the 2010 census, about 84.8% of the Southold's residents were identified as Caucasian/White, 2.7% as Black or African American, 0.1% as American Indian, 0.8% as Asian, 0.1% Native Hawaiian and Other Pacific Islander, 1.5% as two or more races, and 10.8% Hispanic or Latino.

According to the 2010 census, there were 15,377 housing units, of which 82.5% were owner-occupied (U.S. Census 2010). In 2010, the age distribution for the Town of Southold was 4.0% persons under 5 years, 18.8% persons under 18 years, and 24.7% persons 65 years and over. Female persons represented 50.8% of the population. In 2010, 5.3% of the population of the Town of Southold met the criteria for families below poverty level (U.S. Census 2010).

In 2000, on average, roughly 55.8% of the Town of Southold's residents lived and worked in Southold. A significant portion of the remainder were employed throughout the North Fork of Long Island with some residents commuting further west on Long Island and to New York City, Connecticut, and elsewhere on a regular basis (Southold 2016).

3.9 Environmental Justice

In accordance with Executive Order 12898 (dated February 11, 1994), Federal agencies are required to identify and address the potential for disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations.

As compared to the United States, which has 14.8% of families below poverty level and a minority population of approximately 36%, the Town of Southold does not have a large low income or minority population (5.3% and 15%, respectively) (U.S. Census 2010).
The NYSDEC Office of Environmental Justice has prepared maps identifying potential Environmental Justice Areas throughout New York (NYSDEC, 2016h). The Town of Southold is not listed as an Environmental Justice Area. Potential Environmental Justice Areas are defined as 2000 U.S. Census block groups of 250 to 500 households each that had populations that met or exceeded at least one of the following statistical thresholds:

1. At least 51.1% of the population in an urban area reported themselves to be members of minority groups; or
2. At least 33.8% of the population in a rural area reported themselves to be members of minority groups; or
3. At least 23.6% of the population in an urban or rural area had household incomes below the Federal poverty level.

The proposed project involves beach nourishment and is not targeted towards minority or low income populations. The project would not involve disproportional environmental and health hazards targeted towards minority or low income populations. There are no environmental justice issues identified.

3.10 Cultural Resources

As a Federal agency, USACE 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, regulations, and Executive Order governing the identification, protection and preservation of these resources include the National Historic Preservation Act of 1966 (NHPA), as amended; the National Environmental Policy Act 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 New York Historic Preservation Office (NYHPO). The Advisory Council on Historic Preservation, Native American Tribes, other interested parties and the public are given opportunities to participate in the process.

The APE for this undertaking includes all areas directly impacted by activities required to construct project features as well as construction access and staging areas (see Chapter 4, TSP Figures). The APE also includes viewsheds and landscapes in the vicinity of the project area.

Pre-Contact Period Context

Long Island was not a coastal location at the time of Paleo-Indian occupancy. A hypothetical reconstruction of the land area of the Middle Atlantic coast c. 10,000 to 12,000 years ago postulated that evidence of Paleo-Indian occupation along the northern side of Long Island would not relate directly to coastal environments, but rather to the exploitation of inland/riverine habitats. Evidence of this occupation is generally in the form of isolated fluted point sites and reflects the presence of early human groups in the region.

Paleo-Indian occupants would have co-inhabited the region with a rich fauna, such as forest mastodon, deer, small game, and possibly caribou. The proximity of a riverine habitat would have supported aquatic resources, both flora and fauna.

Dated and stratified archaic sites have been found on Long Island. The Wading River site, located in Brookhaven Township, is situated in a small valley or hollow overlooking a broad salt marsh along the Wading River. This winter habitation site produced a significant number of faunal remains within a midden consisting of shellfish (soft-shelled clam and oyster) deer, bird, and turtle. Lithic remains consisted of numerous stemmed and side-notched projectile points.

Hypothetical reconstructions of the Middle Atlantic coast between 6,000 and 8,000 years ago suggest that estuarine areas were approaching their current coastline locations, with the shoreline achieving its current location approximately 3,000 years B.P. (Before Present). Climatic conditions were warm and somewhat moister than in the preceding Boreal Phase with hemlock as the dominant vegetation species.

This time period coincides with the emergence of the Middle Archaic Period. Material culture changes during the Middle Archaic to include the appearance of ground stone tools in addition to flaked stone artifacts. There is also a shift in the dominant raw materials utilized for tools, away from cryptocrystalline rocks to rhyolite, argillite, and other rock types, which may be suggestive of increasing mobility of people and also possibly of changes in social organization.

Native American occupation sites producing cultural materials datable to the Middle Archaic are considered to be rare on Long Island. Diagnostic Early Archaic lithic artifacts associated with these sites are side-notched points (Hardaway), as well as stemmed (Stanley) points, two broad diagnostic forms that span as much as 2,000 years of occupation in the eastern United States.

Climatic changes commencing about 4,600 B.P. produced the warmest and driest conditions of the current post-glacial period, with oak and hickory becoming dominant tree species. These climatic changes appear to roughly coincide with the emergence of the archaeologically defined Late Archaic/Transitional or Terminal Archaic Period. This period is characterized by diagnostic lithic forms and an increase in the number of base camps. Late Archaic occupations have been documented across Long Island and southern New England. Sites of note include the Stony Brook site located along Long Island Sound and the Orient Sites Numbers 1 and 2, also located on the Sound at the eastern end of the island.

Orient culture burials found on Long Island are often found with carved soapstone/steatite objects quarried in Connecticut and Rhode Island and transported to Long Island. A large Late Archaic site in Northport suggests year-round habitation. The Crabmeadow site is a shell midden complex site which occupies an area roughly one square mile in size. A portion of this site contained artifacts dating to the Late Archaic such as Wading River projectile points.

The appearance of cache pits and ceramic storage vessels, a key characteristic of the successive Transitional and Early/Middle Woodland Periods, indicates a greater degree of sedentism among Native Americans in the Middle Atlantic region. Evidence for long-distance trade and exchange is manifested in the presence of Meadowood cultural materials from western New York at habitation and other sites dating from around 3,250 to 2,500 years B.P.

Late Woodland occupation has been documented at numerous locations throughout Long Island. The majority of sites reported on from this period consist of shell mounds or middens. The entire isthmus of land on the west side of Oyster Bay/Mill Neck contained traces of shell heaps. Presumably, these traces of middens would all represent pre-contact site locations dating to the Late Archaic through Woodland Periods.

Ceramic vessel sherds found on Late Woodland sites on Long Island are similar to sherds found on Late Woodland sites in southeastern New York, northern New Jersey, and Connecticut. Surface decorations consist of cord, fabric and net impressions, as well as incised, stamped and punctuated. The Crabmeadow site in Northport produced a full range of lithic tools and a wide variety of ceramics dating to the Late Woodland Period. There were nine shell middens ranging in size from 20 to 70 ft. in length.

Early contact between Native Americans and Europeans has been documented across Long Island. The land comprising Southold was home to the Corchaug tribe of Algonquians. Their name for the area was Yennecott, meaning an extended stretch of land. The Corchaugs lived in what are now the current villages of Mattituck, Cutchogue, Aquebogue and Hashamomuck.

Southold was the first town settled by Europeans on Long Island. The Reverend John Youngs organized a church and left New Haven with his followers in October of 1640. Title to all the land from Orient Point to the Wading River had already been bought by New Haven from the Corchaugs.

The settlement slowly grew and a new church for a larger congregation was built in 1684. In 1664, the settlers severed ties with Connecticut and came under the control of the New York colony. The Town of Southold was occupied by the British during the entire Revolutionary War.

The biggest transformation of Southold came with the arrival of the railroad in 1844. The village of Greenport was chosen as the terminal. The railroad brought isolation from the rest of the state to an end. Farmers began to grow crops for market. The town began to prosper. Greenport became a small shipbuilding and whaling center. Summer visitors were attracted to the area. Boarding houses were established and hotels built in all of the small hamlets and villages. Orient had the oldest summer resort on Long Island, the hotel of a Jonathan Latham.

After the Civil War, Southold continued to grow. Greenport had a thriving fishing, scalloping and oyster industry. Six steamboats carried tourists from New York City, Connecticut, and Rhode Island to the town daily during the summer. During the early twentieth century, with the improvement of the roads, large summer estates and horse farms were constructed in the area.

Religious groups built campgrounds where families could enjoy a vacation in a "moral and refined" atmosphere. The agricultural economy also continued to thrive.

The end of World War II was another turning point in the Town of Southold's development. Relative prosperity and improved transportation combined to increase the number of second homes on eastern Long Island. People from New Jersey, New York City, Brooklyn, Nassau and Queens Counties began spending summers on the North Fork.

The year-round population of Southold in 1940 was 12,000. Magazine articles began promoting Southold as an ideal and inexpensive place for retirement. The promotion attracted enough people to the area so that by the 1960s, Southold had the highest median age in New York State.

Long used for potato farming, large areas of Southold were redeveloped as vineyards in the late twentieth century. There is now a thriving wine making industry on this part of Long Island.

Hashamomuck was an area the Corchaug Indians had their settlements when the Europeans first came to the area in 1640. Decimated by disease and pushed out of their ancestral homelands, they were mostly gone by the early eighteenth century. The area also bears witness to the second home boom that began with the arrival of the railroad in the mid-nineteenth century and intensified with the popularity of the automobile in the twentieth century.

Archaeological Sensitivity. The impact to archaeological resources is dependent on the area and the alternative selected. A historic architectural survey of the resources in the location of any structural alternative should be undertaken.

3.11 Coastal Zone Management

A project in the Hashamomuck study area is located in or could affect coastal zone resources of the State of New York. Therefore, it is necessary to analyze the project in greater detail with respect to its consistency with the State Coastal Policies of the NYS Coastal Zone Management (CZM) plan as well as the Town of Southold's, Local Waterfront Revitalization Policies (LWRP). The New York State Department of State administers the CZM plan and has established 44 coastal policies which are the basis for determining if an action is consistent with the state's program. Similarly the LWRP contains policies that must be evaluated. Each policy was reviewed in the context of the proposed project, and where an interaction occurred, a responsive statement was prepared which evaluated the plan's consistency with that policy. Pursuant to Section 307(c) of the Coastal Zone Management Act of 1972 (16 U.S.C. 1456(c), the U.S. Army Corps of Engineers New England District reviewed all the policies listed in the programs. This review is provided in Appendix A3.

3.12 Land Use and Zoning

The current land use in the project area consists of a public beach, developed residential areas with private access to the beach and commercial property (restaurant and motel). Residential areas cover the majority of the project area, including the areas abutting the beach. Current zoning in the area is low density residential.

3.13 Hazardous, Toxic, and Radioactive Waste

A search of Federal and State environmental databases was conducted for a corridor study along the shoreline (EDR 2016). The researched area was approximately one mile west, east, north, and south of the proposed shoreline. Governmental agency records were reviewed for information that would be helpful in determining the environmental status, the presence, or potential of hazardous, toxic, or radioactive waste (HTRW) contamination. Because regulated facilities may impact other properties, it was also necessary to review governmental records for the surrounding area.

There were four sites on the NY Spills database near the study area and one on the LTANKS database.

- At 60125 North Road, there was a yellow greasy material floating at the water's edge in Long Sound. The spill closure date was June 20, 1997.

- At Clarks Beach, several bags of asbestos were found abandoned on the beach. The cleanup was completed in September of 1996.
- A small amount of diesel fuel was spilled as a result of a traffic accident on State Route 25. The spill was contained and the spill closure date was February 2001.

- Excavation of an underground storage tank (UST) at a residence at 57035 Route 48 identified the UST as having holes and the surrounding soil being contaminated. Corrective action was taken and the project cleanup was completed on April 5, 2011.

- The LTANKS database identified one site near the study area. A residence at 825 Clark Road had an aboveground storage tank with a small leak. Cleanup and disposal was completed by the homeowner and cleanup ceased on March 2, 1995.

3.14 Aesthetic and Scenic Resources

The shoreline of Hashamomuck Cove project area includes a public beach in the West Cove portion of the project area. The Central and East Cove portions of the project area are developed with a motel, restaurant and private homes. Unobstructed views of Long Island Sound from Route 48 are generally limited to the public beach (West Cove) portion of the project area. There is a scenic view of Hashamomuck Pond, on the south side of Route 48 opposite from the Town of Southold public beach (West Cove). In addition, the Arshamomaque Preserve wetland complex, located on the south side of Route 48 southeast of the East Cove portion of the project provides for passive recreational opportunities for residents and visitors.

3.15 Recreation

Recreational opportunities in the project area include the Southold Town beach. Other portions of the beach within the project area are privately owned. The Town of Southold contains a variety of parks under the jurisdiction of the State, county, and town that provide additional opportunities for public access to coastal resources (Southold, Town of 2011).

3.16 Air Quality

The Project area is located in the north/central part of Long Island on the Long Island Sound, in Suffolk County, which is part of the New York, Northern New Jersey, Long Island, and Connecticut ozone nonattainment area. Suffolk County has been designated with the following attainment status with respect to the National Ambient Air Quality Standards (NAAQS) for criteria pollutants: 'moderate' nonattainment area for the 2008 8-hour ozone standard and a maintenance area for the 2006 particulate matter less than 2.5 microns (PM2.5) standard (40 CFR §81.333). The county is part of the Ozone Transport Region. Oxides of nitrogen (NOx) and volatile organic compounds (VOCs) are precursors for ozone and sulfur dioxide (SO2) is a precursor pollutant for PM2.5. Suffolk County is in attainment of the NAAQS for all other criteria pollutants.

Emissions from the Project are associated with non-road construction equipment working on the site and on-road trucks moving on public roads to and from the Project site. Emissions from these two source categories are primarily generated from their diesel engines, with emissions that include NOx, VOCs, SO2, and PM2.5. Emissions from Federal Actions, such as the Proposed Project, are regulated under 40 CFR §93 Subpart B General Conformity. Fugitive dust on the worksite can potentially be generated due to trucks and equipment moving on unpaved surfaces, but can be significantly reduced through the use of best management practices relating to site work dust mitigation. Fugitive dust is made up of PM and can contain PM2.5.

3.17 Greenhouse Gases (GHGS)

In addition to the applicable regulated pollutants (Section 3.13.1), each Federal Agency project's NEPA assessments will need to consider and evaluate GHGs consistent with Council on Environmental Quality (CEQ) revised draft guidance on the consideration of GHGs emissions and the effects of climate change.[6]

3.18 Noise

Noise is defined as unwanted sound. The day-night noise level (Ldn) is widely used to describe noise levels in any given community (USEPA 1978). The unit of measurement for Ldn is the "A"-weighted decibel (dBA), which closely approximates the frequency responses of human hearing. The primary source of noise in the study area is vehicular traffic on local roadways and local construction projects that may be underway. The typical Ldn in residential areas ranges from 39 to 59 dBA (USEPA 1978). It is assumed that the existing sound levels in the study area are roughly within this range.

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[6] See https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance

Chapter 4: Plan Formulation

The 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies (Principles and Guidelines) laid out an iterative 6-step planning process used for all USACE Civil Works studies in developing and evaluation of alternatives. For coastal storm risk management problems, the study team develops and evaluates potential alternatives consistent with USACE policy, regulations, and guidance. From the range of alternatives compared, the team will identify the plan with the highest net National Economic Development (NED) benefits while protecting the Nation's environment.

4.1 Problem and Opportunity Statement

The problem and opportunity statements and discussion provided below set the focus of the feasibility study. These statements are developed at the start of the study and lead to the identification of the study objectives.

Problems

- Continued Coastal Storm Erosion and Damage to Properties
- Continued Risk of Coastal Storm Damage to County Road 48
- Increased Transportation Delays

Opportunities:

- Reduce Risk to Properties and Infrastructure
- Provide More Resilient Transportation Network
- Improve Recreation

The study area is affected by both nor'easters and tropical storms. In October 2012, Hurricane Sandy impacted the north shore of the Town of Southold with about a 6 ft. storm surge. Storm driven surge and waves can cause beach and bluff erosion and flooding of low lying areas. Erosion during storms can result in loss of land, damages to homes, businesses, and roads. In the project area the erosion is most pronounced within the concave portions of the three coves.

For example, in December 2010, a winter storm cut into the cliff along the Sound View Road and eroded much of the parking area at the Southold Town Beach (Figure 11). County Road 48, which runs along the shoreline, is in danger of being undermined in several locations. Figure 12 shows County Road and adjacent properties in the October 2015 storm. The closure of County Road 48 would result in traffic delays, unavailability of an evacuation route, and hamper emergency rescue operations.

Figure 11. December 2010 Storm

Figure 12. October 2015 Storm

4.2 Planning Goals/Objectives

The project goal is to provide coastal storm risk management for the Hashamomuck Cove Study Area. Plans are formulated to achieve **planning objectives.** Planning objectives and constraints are generated from the problems and opportunity statements. A planning objective asserts the intended purposes of the planning process and is a statement of what solutions should try to achieve.

<u>Goal</u>

- Provide Coastal Storm Risk Management for the Study Area

<u>Planning Objectives</u>

- Reduce Coastal Storm Damage to Shorefront Properties
- Reduce Coastal Storm Damage to Roadways

4.3 Planning Constraints

Constraints are restrictions that limit the extent of the planning process. They can be divided into **general constraints** and **study-specific constraints**. General planning constraints are the technical, legal, and policy constraints to be included in every planning study that are recognized in the development of alternatives, but not explicitly used to eliminate alternatives in the screening process. Study-specific planning constraints are statements identified in particular for the Hashamomuck study that are used to specifically screen alternatives.

<u>General Constraints</u>

- Plans should be formulated and evaluated in compliance with USACE regulations and NEPA.
- Plans should avoid and minimize environmental impacts to the maximum degree practicable.
- Plans should not adversely impact threatened or endangered species or their habitat.
- Plans should be compliant with all Federal environmental laws, Executive Orders, and guidance.
- Plans should represent sound, safe, and acceptable engineering solutions.

<u>Study Specific Constraints</u>

- The narrow beach, existing structures, and bordering freshwater wetlands limits the land area for relocation of vulnerable structures and the roadway.

4.4 Future Without Project Condition

The future without project condition serves as the base condition to use as a comparison for all the other alternatives. The future without project condition at Hashamomuck Cove within the period of analysis (2019-2069) are identified as continued damages to shoreline properties, structures, and roads from future storm events. This will result in continued maintenance and reconstruction of private armoring (bulkheads) and repairs to houses and roads following storm events.

4.4.1 Environmental Without Project Conditions

In the absence of Federal action, the condition of wetlands, air quality, flora & fauna, threatened and endangered species, cultural resources, and HTRW is expected to remain consistent with current conditions.

4.4.2 Economic and Social Without Project Conditions

Because the coastline of the study area is almost entirely developed, there is little opportunity for new expansion. The total value of the existing residential and commercial inventory in the study area is estimated to be $46 million. There are a few vacant parcels, which are among the most severely eroded properties as they are unprotected by bulkheads.

Without the project, existing bulkheads, homes and businesses would continue to be at risk of damage due to coastal storms. County Road 48 would be in danger of being undermined in several locations. The closure or loss of County Road 48 would result in traffic delays and loss of an evacuation route. The evacuation routes are County Road 48 and State Route 25. Both are two lane highways (one traffic lane in each direction.). These roads carry traffic in the community of Southold, New York. In the event that County Road 48 became impassable, traffic would be detoured to State Route 25. As the capacity of State Route 25 is limited to one lane in each direction, there would likely be traffic delays and these delays would likely impact storm related evacuation to emergency shelters, emergency rescue operations, and local traffic.

4.4.3 Estimate of Future Without Project Damages

In order to estimate damages in the Without Project condition, the USACE Beach-fx software was utilized. Beach-fx was developed by the USACE Engineering Research and Development Center (ERDC) in Vicksburg, Mississippi. Coastal modeling to provide the storm response data base for Beach-fx was performed using SBEACH software (Storm-induced BEAch CHange Model). This model simulates cross-shore beach, berm, and dune erosion produced by storm waves and water levels. The storm suite used for the study area was developed from The North Atlantic Coast Comprehensive Study (NACCS) information. The NACCS modeling efforts included the latest atmospheric, wave, and storm surge modeling and external statistical analysis techniques. Products from this work include simulated winds, waves, and water levels for approximately 1,050 synthetic tropical events and 100 extratropical events computed at over 3 million computational locations. (See Appendix C, Coastal Engineering.)

The Beach-fx model links the predictive capability of coastal evolution modeling performed with project area infrastructure information, structure and content damage functions, and economic valuations to estimate the costs and total damages under various shore risk management alternatives. Beach-fx fully incorporates risk and uncertainty, and is used to simulate future hurricane and storm damages at existing and future years and to compute accumulated present worth damages and costs. Beach-fx is an event-driven life-cycle model that estimates damages and associated costs over the 50-year period of analysis based on storm probabilities, tidal cycle, tidal phase, beach morphology and many other factors. Damages or losses to developed shorelines include buildings, parking lots, roads, seawalls, revetments, and bulkheads.

For this study, the geometry of the coastline (three "pocket coves") necessitated developing a separate model for each of the three small coves. Typically, the shoreline being modeled under Beach-fx is a long, straight beach area, or a single pocket cove. Breaking up the study area into the three coves in Beach-fx provided a better representation of the project area.

Future Without Project Condition Damages. The Beach-fx model was used to estimate damages to the assets in the study area over the 50 year period of analysis with no Federal action (i.e. the "future without project condition"(FWOP)). For the alternatives evaluation and comparison a low rate of sea level rise was assumed. Detailed information on the damage inventory, damage calculations, and Beach-fx are provided in Appendix B, Economics.

Table 5 provides a present worth summary of structure, content, and armor damages for the FWOP. Structure damages include road damage and damages to commercial and residential buildings. Content damages, includes damages to material items housed within the buildings. Armor damages include damages to the existing armor protection structures.

The total average discounted sum for these three damages categories is $31.8 million dollars. Table 6 provides the annualized damages for the three categories and also includes the annual land loss cost and the annual traffic delay costs. The total FWOP equivalent annual damages is $1.4 million dollars (rounded).

Table 5. Damages Without Project Condition
Average Discounted Sum*

	Damages for Structure, Content, and Armor			
Damage Category	**West Cove ($)**	**Central Cove ($)**	**East Cove ($)**	**Total ($)**
Structure Damages	4,518,600	4,844,100	4,471,700	13,834,400
Content Damages	1,480,300	3,136,900	1,407,100	6,024,300
Armor Damages	5,453,400	3,972,000	2,498,400	11,923,800
Total	11,452,300	11,953,000	8,377,200	31,782,500

*Federal Water Resources Discount Rate FY16, 3.125%

Table 6. Without Project Equivalent Annual Damages*

Damage Category	**West Cove ($)**	**Central Cove ($)**	**East Cove ($)**	**Total ($)**
Average Annual Damages: Structure, Content, Armor	456,000	476,000	333,000	1,265,000
Average Annual Land Loss Cost	29,000	25,000	11,000	65,000
Average Annual Traffic Delay (Applied to Total)				52,000
Total				1,382,000

*Federal Water Resources Discount Rate FY16, 3.125%

4.5 Key Uncertainties

Limitations to the quantity and quality of information result in uncertainties. Three major uncertainties in this phase of the planning process are:

Sea Level Change (SLC). The rate of SLC in future years is not known, but there are several projections of what may occur varying from low (historic) to high rate of change projections. This uncertainty will be addressed by considering three rates of rise per USACE guidance in ER 1100-2-8162 dated 31 December 2013. Based on historical climate data for the area and professional judgment, the economic damages were calculated assuming the low (historic) rate of SLC, which generally provides a conservative estimate of damages that to be used for alternatives comparison. The Tentatively Selected Plan (TSP) will be evaluated under both the intermediate and the high rates of SLC as a sensitivity analysis prior to study completion.

Data. Although the survey that was conducted by USACE in 2014 was very extensive, there are still gaps in the data between profiles. This is an inherent data uncertainty in any coastal study as it is cost prohibitive to obtain profile data to eliminate all uncertainty. In addition, there is no historic detailed shoreline survey data to determine shoreline erosion rates. Instead, the Beach-fx model calibration was based on long-term erosion rates established from analysis of aerial photographs from 1960, 1974, 1993, 2001, and 2010.

Real Estate Risk (private property). Most of the study area is privately owned. Ownership issues and current public access improvement requirements for USACE projects contribute to uncertainties related to local acceptability and the schedule for project implementation.

4.6 Management Measures – Screening of Candidate Measures

Strategies to address coastal storm risk include accommodation, retreat, and no action (USACE 2015). To enact these strategies, nonstructural measures (actions to reduce flood damages without significantly altering the nature or extent of flooding) and structural measures (physical modifications designed to reduce the frequency of damaging levels of flood inundation) may be deployed. Examples of accommodation include the elevation of structures at risk (nonstructural) or the construction of seawalls, bulkheads, revetments, breakwaters, groins, etc., which are all considered hard structural measures. Beach nourishment is also a structural measure, but it is considered a soft structural measure. Retreat measures consist of moving at-risk structures back from the shoreline and/or property buy-outs (nonstructural).

In the 1950s and 1960s, USACE favored hard structures for beach erosion protection. The armoring measures are excellent for protecting property, however, the hard structures can result in increased erosion in front and on the sides of the armor. Also, armoring prevents the natural processes of sand migration. Groins are similar in that they hold sand on one side of the structure (up-drift), but lose sand on the other side (down-drift). Since the 1970s, soft alternatives have been favored over hard structures and are more often selected for risk management projects.

Measures to reduce coastal storm damages considered for this project are discussed below. The measures can be used individually or combined with other management measures to form alternative plans. The list of measures considered was derived from a variety of sources including prior studies, the public scoping process, and the study team's experience. All measures were screened for their capability to meet objectives, be feasible economically, be constructible, and avoid constraints to be included in the Initial Alternatives Array.

Nonstructural Measures:

Elevate Buildings. This measure would raise the elevations of the buildings at risk by placing them on piles. This is a relatively low cost measure. In addition, it is environmentally beneficial in that it does not alter the natural processes of sand movement. There are a few buildings in that are already on pilings. While the pilings elevating the structure above beach elevation reduce the damages from storm flooding, it is an incomplete solution as the shoreline would continue to erode under the structures. This measure was not retained for the Initial Alternatives Array.

Buyouts. This measure may be applicable for some of the properties within the study area. This alternative is environmentally beneficial in that it does not alter the natural processes of sand movement. There would continue to be a loss of shorefront land under this measure. Also, this measure is relatively high cost and homeowners may not be amenable to buyouts. This measure was retained for the Initial Alternatives Array.

Relocations. Relocations were not considered a viable measure as the amount of buildable land along the shoreline is limited and cost for land is very expensive. This measure was not retained for the Initial Alternatives Array.

Structural Measures:

Beach Nourishment. This measure consists of the artificial building up and/or widening of the beach by the placement of sand fill material on the shore. A beach nourishment project typically includes a berm backed by a dune or an existing bulkhead that, in combination, reduce erosion, wave impact, and inundation damages to landward areas. Beach nourishment represents a near natural method for reducing damages. Public access requirements are applicable as part of a beach nourishment project. Beach nourishment projects require periodic re-nourishment to replace sand lost to erosion. This measure was retained for the Initial Alternatives Array.

Beach Nourishment with Dune. This measure is similar to beach nourishment, except that a dune is also constructed in conjunction with the beach fill. This measure has the same benefits as the sand beach nourishment measure, plus the added benefit of better protection behind the dune. In addition, the dune can provide a source of sand for the beach. A combination of dune and berm would require more initial sand placement and re-nourishment than a stand-alone berm. This measure was retained for the Initial Alternatives Array.

Beach Nourishment with Reinforced Dune**.** This measure is also similar to beach nourishment, except the dune is reinforced with a hard structure. This measure is more expensive due to the hardened core, but the hardened core is designed to withstand successive storms. The hardened core is covered by sand to create a dune. This measure would also require beach re-nourishment to replenish the dune and berm. This measure was retained for the Initial Alternatives Array.

Bulkhead. A bulkhead is a sheeting material driven into the ground creating, a physical barrier between the water and the land. The sheeting material can be metal, pressure treated wood, or fiberglass. The sheeting is supported by pilings. Often there are rocks on the seaward side of the structure to protect the bulkhead against wave action. This measure would consist of the installation of a new bulkhead to protect the land behind the bulkhead. Bulkheads provide protection of land behind the bulkhead, but the seaward side will eventually become depleted of sand. An advantage of a new bulkhead is that it does not require much land area to implement.

The disadvantages of a bulkhead are that it is not natural looking, requires periodic maintenance, and reduces availability of sand. As the property lines for many of the shorefront properties extend to the historic mean high water, the new bulkhead(s) would need to be installed on private property and within the inter-tidal zone. Real estate and legal review would be required to identify real estate requirements for the project. Environmental mitigation would be required due to the inter-tidal impacts. Many of the existing properties (approximately 40%) within the study area are protected by bulkheads. This measure was retained for the Initial Alternatives Array.

Revetment. A revetment consists of stone, concrete, etc. placed on an embankment to protect the slope from erosion. There are several rock revetments existing in the study area (approximately 15% of properties). Revetments reduce wave energy and do not require much maintenance if installed properly. One of the major disadvantages of a revetment is it takes up a substantial amount of space, thereby limiting beach area. Similar to bulkheads, they promote erosion in front of the structure and restrict sand flow. Real estate and legal review would be required to identify real estate requirements for the project. Environmental mitigation would be required due to the inter-tidal impacts, which would be significantly greater than for a bulkhead. This measure was not retained for the Initial Alternatives Array as it provides similar benefits as a bulkhead but requires additional land area and impacts more inter-tidal zone.

Stone Toe to Protect Existing Bulkheads. In areas where private bulkheads currently exist, a stone toe could be added to reduce erosion. Most of the existing bulkheads do not have toe protection. The stone toe would reduce scour at the base of the bulkhead. This measure was retained for the Initial Alternatives Array.

Improve Existing Groins. Groins are stone structures which extend perpendicular from the shore into the ocean. Their function is to hold or stabilize sand by trapping the littoral drift of sand. Groins are effective in holding sand on the up-drift side of the structure, but often create a reduction in sand on the down-drift side of the groin. Regulatory agencies have expressed their reluctance to implement hard structures, especially below mean high water. Furthermore, Southold officials have expressed legal concerns with groins as in the past were sued by residents due to perceived loss of property (beach area) resulting from the implementation of groins. This measure was not retained for the Initial Alternatives Array.

Off-Shore Structure. Off-shore structures interrupt the movement of waves to the shore, thereby reducing the energy of wave impact on the shore. They are constructed of rock and are very expensive to install. In addition, environmental regulatory agencies will not support an off-shore structure. This measure was not retained for the Initial Alternatives Array.

4.7 Initial Alternatives Array – Evaluation of Retained Measures

Management measures retained in the Initial Alternatives Array were evaluated for inclusion in the Final Alternatives Array based on the degree to which the alternative to meet the project objectives and minimize or avoid project constraints. Specifically, measures were further evaluated based on the ability of the measure to reduce storm induced damages, be cost effective, be efficient, and minimize environmental impacts. Also considered were property ownership and State and Local environmental agencies input regarding solutions. The Initial Alternatives Array are evaluated in Table 7.

Table 7. Evaluation of Initial Alternatives

Alternative	Risk Reduction Shorefront Properties	Risk Reduction to County Road 48	Likely NED Benefit	ROM COST LOW < $10M MED $10-$20M HIGH >$20M	Environment Compliance Concerns	Alternative Retained for Final Array
No Action	Not Applicable	Not Applicable	None	Not Applicable	Not Applicable	Yes
Buyouts	SOME	NA	MED	HIGH	NONE. Nonstructural Alternative	Yes
Beach Nourishment	YES	YES	HIGH	LOW	HIGH. Sand Placement Below Mean High Water.	Yes
Beach Nourishment with Dune	YES	YES	HIGH	MED	HIGH. Sand Placement Below Mean High Water.	Yes
Beach Nourishment with Reinforced Dune	YES	YES	HIGH	HIGH	HIGH. Sand Placement Below Mean High Water.	Not Cost Effective
Bulkhead	YES	YES	MED	MED	HIGH. Bulkhead Below Mean High Water: Mitigation Required	Yes
Toe Protection at Existing Bulkheads	SOME	NA	LOW	LOW	HIGH. Stone Placement Below Mean High Water: Mitigation Required	No. Limited Risk Reduction Low NED Benefits. High Environ-mental Impact.

4.8 Final Array of Alternative Plans

The Final Array of Alternative Plans for the study area were developed from the identified measures discussed above in Section 4.7. An alternative plan is a set of one or more management measures functioning together to address one or more planning objectives. These five general alternatives were selected for further evaluation in the Beach-fx model. Due to the unique configuration of the Study Area (three small "pocket" coves), it was not possible to model the alternatives in one model. Instead, a separate model was developed for each cove (West, Central, East). The five general alternatives were further refined to evaluate the alternatives performance under different variables. Below is the list of the retained alternatives identified above in Table 7:

- No Action: Without Project Condition
- Beach Nourishment – Berm: Various berm widths were evaluated
- Beach Nourishment – Dune: Various dune widths and heights were evaluated
- Bulkhead: Variations on lengths were evaluated
- Buyout: Variations on the number of properties bought out were evaluated

Alternative 1: No Action Plan: Under this Alternative, no Federal action would be taken to protect the properties and roads within the three coves. Failure to take action would result in further damage to residential property, homes, commercial property, the beach parking lot, the beach, utilities, and County Road 48. This plan fails to meet the USACE study objectives or needs for the majority of the project area. The Future Without Project (FWOP) condition alternative serves as the baseline against which the other alternatives are evaluated. This alternative was run in Beach-fx and the results are documented in Tables 5 and 6 above.

Alternative 2: Beach Nourishment (Berm)

Under this alternative, beach nourishment would be placed along the shoreline at each cove. This alternative is expected to be successful in reducing damages to existing erosion control measures, building structures, and roads. The berm crest height was set at +6 ft. NAVD88 elevation based on survey data and the estimated historical natural elevation of the beach. The amount of sand required for each iteration was estimated by Beach-fx based on the width of the berm and the assigned depth of closure (-21 ft NAVD88). Although many variations of berm widths were run in Beach-fx, three variations are presented in the report. Alternative 2A consisted of a 25ft. wide berm. Alternative 2B consisted of a 50 ft. berm. Alternative 2C consisted of a 75 ft. berm in the area of the highest historic shoreline change rate and/or damages, tapering to a 25 ft. berm. The existing groins will help to prevent excessive lateral movement of sand. Periodic beach renourishment will be required.

The beach nourishment alternative will likely provide relatively high NED benefits at a relatively low implementation cost. The cost of this alternative is driven by the cost and availability of suitable sand for beach fill. For the Beach-fx model runs, it was assumed that the beach fill would be obtained from an upland source at a cost of $48 per cubic yard, including trucking and placement. This estimated sand cost is consistent with other recent planning projects in the area. Below is Table 8 indicating the amount of initial sand placement and the average total nourishment over 50 years as calculated by the Beach-fx model at the historic (low) rate of sea level rise. The total nourishment volume assuming one standard deviation is also provided to illustrate the relative variability in the sand quantity estimate.

Table 8. Alternative 2 – Beach-fx Estimated Beach Nourishment Volumes

Cove	Alternative	Beach-fx Average Initial Placement (CY)	Beach-fx Average Total Nourishment (CY)	Average Total Nourishment, Plus One Stand. Dev. (CY)
West	Alt 2A (25 ft.) Berm)	33,630	61,546	92,345
	Alt 2B (50 ft.) Berm)	112,497	145,362	176,286
	Alt 2C (75 ft./25 ft.)	55,504	74,626	96,834
Central	Alt 2A (25 ft. Berm)	39,190	61,368	81,490
	Alt 2B (50 ft. Berm)	97,576	130,258	156,357
	Alt 2C (75 ft./25 ft.)	55,850	73,320	99,828
East	Alt 2A (25 ft. Berm)	70,253	90,128	116,383
	Alt 2B (50 ft. Berm)	137,616	154,415	181,346
	Alt 2C (75 ft./25 ft.)	136,595	156,115	184,457

In comparison to other beach fill projects on the Atlantic coast (ocean side), the nourishment volumes estimated for the Hashamomuck Cove Study by Beach-fx are relatively low. There are several factors likely contributing to the low nourishment volumes. For one, this project is on the north side of Long Island on the Sound (bay side) a more sheltered shore. Secondly, the sediment grain size for the area is extremely large compared to more typical beach nourishment projects. As such, the sand is generally more resistant to erosion processes. In addition, the armor protection on 55% of the project area limits landward erosion. Except for major events, this translates into lower overall nourishment volumes. Lastly, the study area is relatively small (about 1.5 miles) and the erosion is primarily concentrated in portions of each of the coves. Taken together, these factors result in low nourishment requirements for this project under the beach fill alternatives.

Alternative 3: Beach Nourishment (Berm and Dune)

Under this Alternative, a dune would be constructed in addition to the beach nourishment berm. Alternative 3 is similar to Alternative 2 in that it will be effective in protecting the properties, the existing erosion control armor, and the road. The berm width for all model runs for this Alternative was assumed to be 50 feet. For the West Cove, a dune top width of 10 ft. was assumed. For both the Central and East Cove, a dune top width of 5 ft. was assumed. It was assumed that the dune would be sloped at 3V:1H. The dune elevation was assumed to be +12 ft. NAVD88 for the West Cove, variable from +9 to +12 ft. NAVD88 for the Central Cove (depending on the Reach), and +11 ft. NAVD88 for the East Cove. The dune elevations were designed to prevent overtopping of the existing bulkheads. Alternative 3 is anticipated to provide relatively high NED benefits and a medium implementation cost driven by the cost and availability of suitable sand for beach fill.

Below is Table 9 indicating the amount of initial sand placement and the average total nourishment over 50 years as calculated by the Beach-fx model at the historic (low) rate of sea level rise. The total nourishment volume assuming one standard deviation is also provided to illustrate the relative variability in the sand quantity estimate.

Table 9. Alternative 3 – Dune/Berm Beach Nourishment Volumes

Cove	Alternative	Beach-fx Average Initial Placement (CY)	Beach-fx Average Total Nourishment (CY)	Average Total Nourishment, Plus One Stand. Dev. (CY)
West	Alt 3 – Dune/Berm	119,074	138,050	167,345
Central	Alt 3 – Dune/Berm	90,273	113,277	136,306
East	Alt 3 – Dune/Berm	133,736	146,777	170,938

Alternative 4: Bulkhead Installation

Under this alternative, a new bulkhead would be constructed to protect all the properties within the study area. The bulkhead would be constructed in front of the existing erosion protection measures (where they exist). The bulkhead would be approximately 8,500 linear feet. It was assumed that the bulkhead would be driven 20 ft. deep with 10 ft. above grade, which is consistent with standard USACE engineering practices (one third of structure above grade). It was assumed that the sheeting would be steel sheeting due to the proposed installation depth, and the observed cobbles, both of which would hinder the installation of fiberglass or vinyl sheeting. The toe of the bulkhead would be protected from scour by two layers of toe protection (1-2 ton stones). It was assumed that the sheeting could be installed at a rate of 100 ft. per day. The final crest elevation for the bulkhead will be +10.5 ft, NAVD88, matching the 1 percent tidal flood elevation. The bulkhead will require timber stair walkovers to maintain waterfront access at six locations.

While the new bulkhead would be effective in protecting the properties and road in this area, there are concerns about the feasibility of implementing this alternative due to regulatory concerns regarding constructing hard structures within the inter-tidal zone. Mitigation would be required for the bulkhead due to filling behind the bulkhead structure with sand. The bulkhead alternative for the entire project area (Alternative 4A) was run on the Beach-fx model to evaluate the reduction in damages in comparison to the Without Project Condition.

Alternative 4B was a variation of this alternative in that the bulkhead was only constructed in areas where the road was vulnerable to damage. The bulkhead would be installed immediately adjacent to the road. The bulkhead would be driven flush with the existing grade to allow access to existing property seaward of the bulkhead. This alternative would require utility relocation for existing services to the affected homes. For the West Cove, the bulkhead would be installed in Reach E3 (approximately 1500 linear ft.). At Central Cove, the bulkhead would be installed in Reach E8 (approximately 500 linear ft.). At East Cove, the bulkhead would be installed in Reach E13-E15 (approximately 1500 linear ft.). This variation would not protect the existing properties, nor prevent erosion up to the bulkhead. This alternative was also run on the Beach-fx model to evaluate the reduction in damages in comparison to the Without Project Condition.

<u>Alternative 5: Property Buyouts</u>

Under this Alternative, properties at high risk of damage were evaluated for removal from the coastal hazard area. Tax assessment information was provided by the Southold Tax Assessors office, which was used to conduct an initial screening of potential buyout properties. USACE appraised the properties by valuing a universe of properties (eighty parcels) as of 16 November 2015 based on recent sales data within the Southold, New York area. The sales data were converted into general units of comparison (price per dwelling unit land and building merged) that established a range of supportable values from the market. The unadjusted units of comparison were applied to the actual property specific data supplied to the appraiser to estimate the market values. The property values were determined based on an assumption of non-impairment. In other words, the properties were appraised assuming the values are not affected by the potential for damage due to coastal storms.

Based on this appraisal process, residential properties in West Cove, Central Cove, and East Cove were considered. In addition, the East Cove also includes commercial properties that were considered. The appraisal process for the commercial properties is more uncertain due to the lack of suitable comparable properties. As a result, a contingency factor of 30% was added to the appraisal of these properties. A demolition cost of $100,000 was added to the appraisal cost for each residential property, and a demolition cost of $500,000 was added to the appraisal cost for each commercial property. The Beach-fx model was run for this alternative to estimate the damages reduced when candidate properties are not included in the damages calculation. This Alternative would not reduce coastal storm risk to the Town Beach or County Road 48. In addition, it is uncertain if the property owners would be willing to participate in this alternative. Figure 13 illustrates the areas modeled (candidate areas are shaded).

Figure 13. Alternative 5

4.9 Costs for Alternatives

The costs for each alternative were estimated in order to compare alternatives and calculate the Benefit/Cost Ratio for evaluation purposes. For Alternatives 2 and 3, initial placement volumes and renourishment volumes (present value) were calculated in the Beach-fx model. Cost estimates are based on an estimated sand placement cost of $48/cy. The rate includes pre-construction engineering and design, and construction management. A contingency of 18.5% was added to the sand placement. Bulkhead alternatives costs were estimated using a conceptual design to determine material and quantities and include pre-construction engineering and design and construction management. A contingency of 21.5% was added to the bulkhead costs. Contingency percentages were estimated for the alternatives using the abbreviated cost risk methodology.

For Alternative 4A, a portion of the bulkhead alignment would impact intertidal area and a mitigation cost was also added to these estimates.

Real Estate Costs were estimated for the alternatives and include the permanent easement cost, incidental costs, and contingencies. The cost of Alternative 5 – Property Buyouts, was estimated based on evaluated real estate cost. The costs for this alternative also includes a demolition cost of $100,000 for residential property and $500,000 for commercial properties. The costs for the alternatives are presented in Table 10.

Table 10. Estimated Alternatives Costs, Present Value

(FY16 price level, 3.125 % discount rate)

Alt.	Description	Cove	Sand Placement (48$/cy)	Contingency ($)	Mitigation ($)	Real Estate ($)	Estimated Cost ($)
2A	Berm (25' Wide)	West	2,293,100	424,200	na	1,032,100	3,749,400
2A	Berm (25' Wide)	Central	2,381,900	440,700	na	808,900	3,631,400
2A	Berm (25' Wide)	East	4,025,400	744,700	na	429,900	5,200,000
TOTAL			**8,700,400**	**1,609,600**		**2,270,900**	**12,580,800**
2B	Berm (50' Wide)	West	6,091,100	1,126,900	na	1,032,100	8,250,100
2B	Berm (50' Wide)	Central	5,336,800	987,300	na	808,900	7,134,000
2B	Berm (50' Wide)	East	7,028,000	1,300,200	na	429,900	8,758,100
TOTAL			**18,455,900**	**3,414,400**		**2,270,900**	**24,142,200**
2C	Berm (25'/75' Wide)	West	3,023,000	559,300	na	1,032,100	4,614,400
2C	Berm (25'/75' Wide)	Central	3,052,600	564,700	na	809,900	4,427,200
2C	Berm (25'/75' Wide)	East	6,965,000	1,288,500	na	429,900	8,683,400
TOTAL			**13,040,600**	**2,412,500**		**2,271,900**	**17,724,900**
3	Berm with Dune	West	6,039,100	1,117,200	na	1,032,100	8,188,400
3	Berm with Dune	Central	4,761,500	880,900	na	809,900	6,452,200
3	Berm with Dune	East	6,658,200	1,231,800	na	429,900	8,319,800
TOTAL			**17,458,800**	**3,229,900**		**2,271,800**	**22,960,400**

Alt.	Description	Cove	Bulkhead ($)	Contingency ($)	Mitigation ($50/sq. ft.)	Real Estate ($)	Estimated Cost ($)
4A	Bulk-heads (All)	West	11,644,700	2,504,000	200,000	1,032,100	15,380,800
4A	Bulk-heads (All)	Central	10,257,400	2,205,500	350,000	809,900	13,622,700
4A	Bulk-heads (All)	East	10,444,600	2,245,300	650,000	429,900	13,769,700
TOTAL			**32,346,700**	**6,954,800**	**1,200,000**	**2,271,900**	**42,773,200**
4B	Bulk-heads (Road)	West	3,726,900	782,600	na	329,700	4,839,200
4B		Central	1,782,700	374,400	na	54,400	2,211,500
4B		East	5,348,500	1,123,200	na	193,800	6,665,500
TOTAL			**10,858,100**	**2,280,200**	**-**	**577,900**	**13,716,200**

Alt.	Description	Cove	Demolition ($)	Contingency ($)	Mitigation ($)	Real Estate ($)	Estimated Cost ($)
5	Buy-outs (6 propertie	West	600,000	na	na	8,659,200	9,259,200
5	Buy-outs (15 propert	Central	1,500,000	na	na	30,947,900	32,447,900
5	Buy-outs (8 propertie	East	1,600,000	na	na	16,112,200	17,712,200
TOTAL			**3,700,000**	**-**	**-**	**55,719,300**	**59,419,200**

4.10 Economic Evaluation and Comparison

The alternatives were evaluated using the Beach-fx model. East, Central and West Coves were simulated in Beach-fx for the without project and with project (alternative) conditions. Model output of damages was used to calculate the reduction in damages achieved by an alternative. A 50-year period (2019-2069) was analyzed and the FY16 discount rate of 3.125% was used to calculate present value (PV) of the damages. Below are the alternatives simulated in the Hashamomuck Beach-fx model.

Alt.	**Description**
1	Without Project
2B	Berm (all reaches 50 ft. wide)
2A	Berm (all reaches 25 ft. wide)
2C	Berm (width varies, 25 ft. /75 ft.)
3	Berm/Dune (all reaches)
4A	New Bulkhead full length of study area
4B	New Bulkhead at road
5	Buyouts of properties in high damage areas

The calculation of benefits (PV of reduction in damages) for each alternative from Beach-fx are presented in Table 11 below. Details are provided in Appendix B, Economics.

Damages refer to economic losses for the properties and roadways situated along the coastline being exposed to wave attack, inundation, and erosion damages. Structure damages refer to damages to building, roads, and parking lots. Content damages refer to the material items housed within the aforementioned structures that are potentially subject to damage. Armor damages refers the cost of repairing existing armor (bulkheads) at the properties.

All of the alternatives evaluated provided some amount of damage reduction. Table 11 does not include the land loss benefit or the annual transportation delay reduction benefit. The annual land loss benefit is added to the annual cost and benefits presented in Table 12. Table 12 is used to compare the alternatives by cove to identify the alternative for each cove with the largest net benefit to be used for the combination plan evaluation (Table 13).

Table 11. Alternatives Present Value Damage Reduction Benefit
(FY16, 3.125 % interest rate)

Information presented in this Table does not include land loss benefit.

Cove	Alternative	Sum of PV Damage (Structure, Content, Armor)	Sum of PV Damage Reduction Benefit (Structure, Content, Armor)
West Cove	1 (FWOP)	11,452,300	0
	2A	2,099,800	9,352,500
	2B	2,081,300	9,371,000
	2C	2,586,300	8,866,000
	3	1,373,300	10,079,000
	4A	863,500	10,588,800
	4B	11,052,500	399,800
	5	10,347,700	1,104,600
Central Cove	1 (FWOP)	11,953,000	0
	2A	7,784,600	4,168,400
	2B	7,227,900	4,725,100
	2C	5,884,400	6,068,600
	3	5,089,400	6,863,600
	4A	2,355,000	9,598,000
	4B	11,474,200	478,800
	5	8,455,100	3,497,900
East Cove	1 (FWOP)	8,377,200	0
	2A	4,052,700	4,324,500
	2B	4,403,400	3,973,800
	2C	5,814,400	2,562,800
	3	3,468,500	4,908,700
	4A	1,497,400	6,879,800
	4B	6,972,100	1,405,100
	5	4,249,900	4,127,300

Table 12. Alternatives Average Annual Benefits
(FY16 Price Level, FY 16 3.125 % discount rate)
(Does not include transportation reduction delay benefits)

Alt.		Cove	Annual Benefit	Annual Cost	Annual Net Benefits
2A	Berm (All 25 ft. Wide)	West	$401,400	$150,000	$251,400
2A	Berm (All 25 ft. Wide)	Central	$191,100	$145,300	$45,800
2A	Berm (All 25 ft. Wide)	East	$182,900	$208,000	($25,100)
2B	Berm (All 50 ft. Wide)	West	$402,100	$330,000	$72,100
2B	Berm (All 50 ft. Wide)	Central	$213,200	$285,400	($72,200)
2B	Berm (All 50 ft. Wide)	East	$168,900	$327,000	($158,100)
2C	Berm (Width Varies)	West	$382,000	$185,800	$196,200
2C	Berm (Width Varies)	Central	$266,700	$178,300	$88,400
2C	Berm (Width Varies)	East	$112,800	$349,600	($236,800)
3	Berm/Dune (All)	West	$430,300	$327,500	$102,800
3	Berm/Dune (All)	Central	$273,100	$258,100	$15,000
3	Berm/Dune (All)	East	$206,100	$332,800	($126,700)
4A	Bulk-heads (All)	West	$450,600	$615,200	($164,600)
4A	Bulk-heads (All)	Central	$381,900	$544,900	($163,000)
4A	Bulk-heads (All)	East	$284,600	$550,800	($266,200)
4B	Bulk-heads (Road)	West	$15,900	$193,600	($177,700)
4B	Bulk-heads (Road)	Central	$19,100	$88,500	($69,400)
4B	Bulk-heads (Road)	East	$55,900	$266,600	($210,700)
5	Buy-outs	West	$44,000	$370,400	($326,400)
5	Buy-outs	Central	$139,200	$1,297,900	($1,158,700)
5	Buy-outs	East	$164,200	$708,500	($544,300)

Alternatives (from above) with Largest Net Benefit

2A	Berm (All 25 ft. Wide)	West	$401,400	$150,000	$251,400
2C	Berm (Width Varies)	Central	$266,700	$178,300	$88,400
2A	Berm (All 25 ft. Wide)	East	$182,900	$208,000	($25,100)

With the exception of transportation delay reduction benefit and additional vehicle operating cost the three coves may be evaluated separately, or incrementally with respect to structure, content and road damage. However, post-storm recovery detours due to road re-construction have to be evaluated on a system wide basis (e.g. across all there coves). A County Road 48 outage will impact all users irrespective on which cove it appears in. Benefit cannot be claimed for prevention of road damage in the East Cove if damage also occurs in either the West or Central Coves. Delay reduction benefit is only realized when all there coves are included in a plan. Table 13 below provides the possible combination of the three alternatives identified in Table 12 above. The annual transportation delay reduction benefit is added to the plan that includes the three coves. Review of Table 13 shows that the plan with the highest net benefits that provides for risk management for both County Road 48 and shorefront development in the coves is the plan that includes Alternative 2A West Cove, Alternative 2C Central Cove, and Alterative 2A East Cove.

Table 13. Alternatives Combinations, Average Annual Benefits

(FY16 Price Level, FY 16 3.125 % discount rate)

Alternative	Annual Damage Reduction Benefit	Annual Transportation Delay Reduction Benefit	Annual Total Benefit	Annual Cost	Annual Total Net Benefit	Benefit-Cost Ratio
2A West + 2C Central+ 2A East	$855,000	$45,200	$900,200	$536,300	$363,900	1.7
2A West + 2C Central	$672,100	$0	$672,100	$328,300	$343,800	2.0
2A West Only	$405,400	$0	$405,400	$150,000	$255,400	2.7
2A West + 2A East	$588,300	$0	$588,300	$358,000	$230,300	1.6
2C Central Only	$266,700	$0	$266,700	$178,300	$88,400	1.5
2C Central + 2A East	$449,600	$0	$449,600	$386,300	$63,300	1.2
2A East Only	$182,900	$0	$182,900	$208,000	-$25,100	0.9

4.11 Environmental

Of the alternatives evaluated, only the Bulkhead alternative (4A) involved permanent environmental impacts in the intertidal area and thus would require mitigation. Short-term impacts are expected with the beach nourishment alternatives (2A, 2B, and 3A); turbidity impacts are limited to the construction timeframe and it is anticipated that the benthic community will recover within one year. The berm and dune alternatives would have short-tem impacts to intertidal areas. The short-term impact to intertidal and subtidal habitats would increase with alternatives 2B and 3A because more sand is needed to build a wider beach or dune. The buyout alternatives would result in removal of structures from the coastal area and, although there would be temporary construction impacts, the area would become part of the natural coastal environment once manmade structures were removed.

4.12 Other Social Effects Benefits and Regional Economic Development

In the Other Social Effects (OSE) category, the benefit of the alternative is to reduce safety and health risks that occur during and after storms. Reducing damages to County Road 48 due to coastal storms has the benefit of safeguarding evacuation and emergency access routes and aiding in recovery after a storm event.

The Regional Economic Development Account (RED) reflects changes in the distribution of regional economic activity that result from each alternative plan. The alternatives are not anticipated to have a significant impact on this account. They neither contribute to nor detract from the RED account.

4.13 Identification of Tentatively Selected Plan

The project that reasonably maximizes the net economic benefits (i.e. highest net annual benefits) while protecting the Nation's environment is identified as the National Economic Development "NED" plan. To identify the NED plan, the alternative with the largest net benefit for each cove was selected for the combination plan (Tables 12 and 13 above). This comparison identified the combination of Alternative 2A West Cove, Alternative 2C Central Cove, and Alterative 2A East Cove as the NED Plan, which is also the Tentatively Selected Plan (TSP). The TSP would provide a 25 ft. wide berm in the West Cove, a combination 25-75 ft. wide berm in Central Cove, and a 25 ft. wide berm in East Cove. Economic benefits of the TSP are summarized below in Table 14.

The TSP meets the 1983 Principles and Guidelines Criteria of completeness, effectiveness, efficiency, and acceptability. The plan includes all necessary components to obtain the objectives (complete), is the plan with the largest net benefits (efficient), the plan makes a significant contribution to the planning objectives to reduce coastal storm damages to shore front development and roadways (effective) and is acceptable as beach nourishment (sand placement) represents a near natural, reversible soft solution for reducing damages on the open coast that is adaptable to rising sea level. Further evaluation and optimization of the TSP will occur as the study progresses. This will include refinement of beach dimensions, as well as costs and benefits. It is expected that with refinements of the engineering and economics model that the plan dimensions could change. Currently, no locally preferred plan is identified.

Table 14. Tentatively Selected Plan, Annual Benefit and Cost Summary
(FY16 Price Level, FY 16 3.125 % discount rate)

	West Cove	**Central Cove**	**East Cove**	**All Coves**
	Alt 2A	**Alt 2C**	**Alt 2A**	
Annual Benefit				
-Damage Reduction	405,400	266,700	182,900	855,000
- Delay Reduction				45,200
Total Annual Benefit	405,400	266,700	182,900	**900,200**
Annual Cost	150,000	178,300	208,000	**536,300**
Annual Net Benefit	255,400	88,400	-25,100	**363,900**
Benefit-Cost Ratio				**1.7**

Chapter 5: Tentatively Selected Plan*

5.1 Proposed Action/Plan Components

The proposed plan is beach nourishment. The Tentatively Selected Plan (TSP), which is also the NED Plan, consists of a 25 ft. wide berm in the West Cove, a 25 ft. wide berm in the Central Cove (except in Reach E8 where the berm would be 75 ft. wide), and a 25 ft. wide berm in the East Cove. The selected plan for each cove is illustrated in Figures 13, 14 and 15. Additional information is included in the Civil Engineering Appendix (Appendix D).

Further evaluation and optimization of the tentatively selected plan will occur after public and agency review of the DIFREA as the study progresses. This will include improvements in the engineering and economic analysis, refinements to the plan and design. Based on the alternative analysis conducted to date it is expected that the beach berm optimization will not exceed 75 ft.

PERTINENT DATA

TENTATIVELY SELECTED PLAN FEATURES*

Berm Length: 8,500 ft.
Berm Height: +6 ft. NAVD88
Foreshore Slope: Sand graded seaward on a slope of 1 Vertical to 10 Horizontal.
Berm Width: West Cove 25 ft. Central Cove: 25-75 ft., East Cove: 25 ft.
Sand Source: trucked from upland source
Initial Placement Volume: 160,000 cy
West Cove: 34,000 cy
Central Cove: 56,000 cy
East Cove: 70,000 cy
Average Renourishment Volume: 65,300 cy (total over the 50 year period of analysis)
West Cove: 27,900 cy
Central Cove 17,500 cy
East Cove 19,900 cy

Renourishment Interval: The re-nourishment interval depends on a variety of factors including sea level rise, storm frequency, and type of storm. To estimate costs for the TSP a 5 year interval (9 events) and 7,250 cy per re-nourishment event was used.

*Note: The above dimensions and nourishment requirements will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

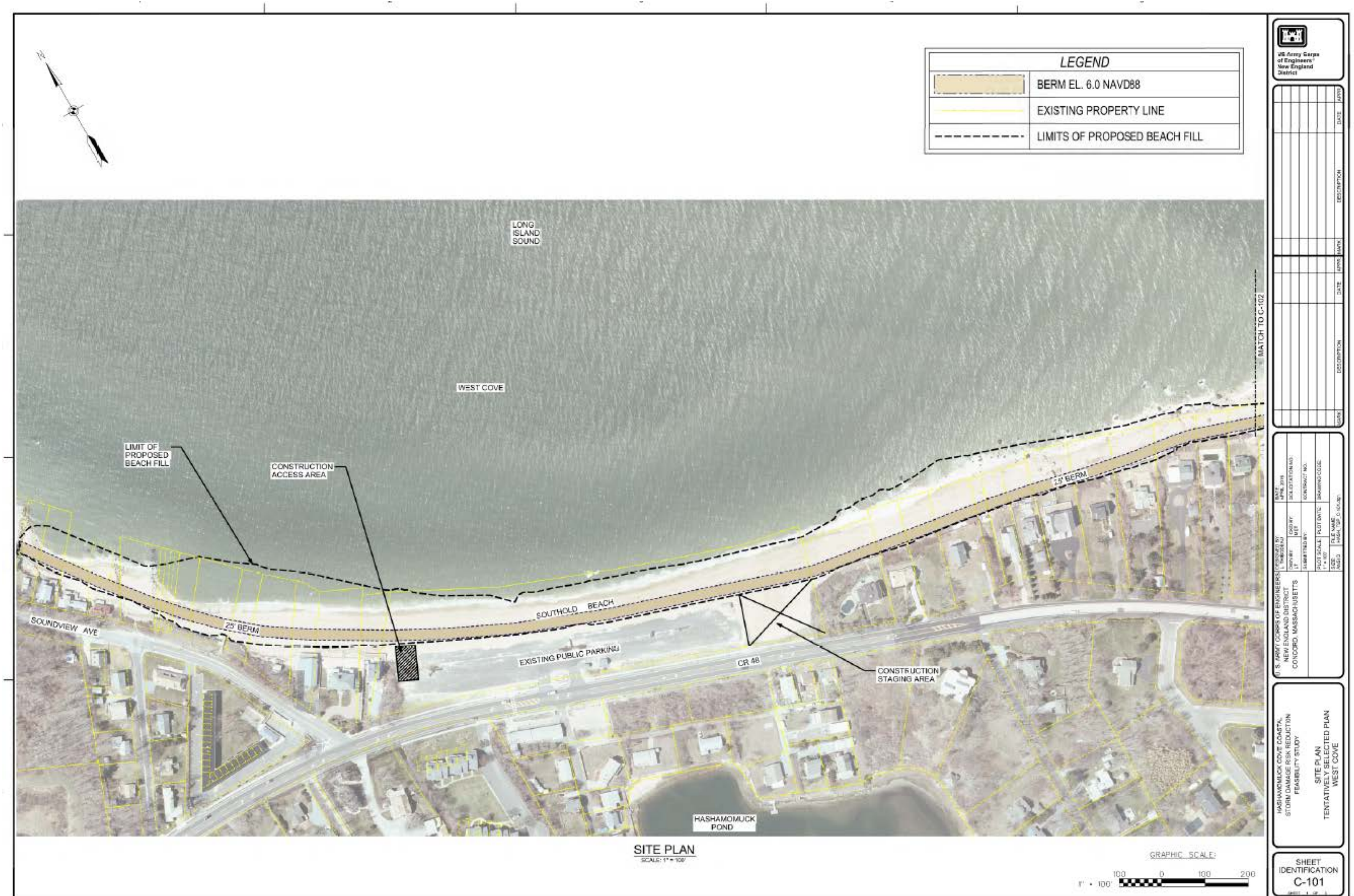

Figure 14. TSP West Cove

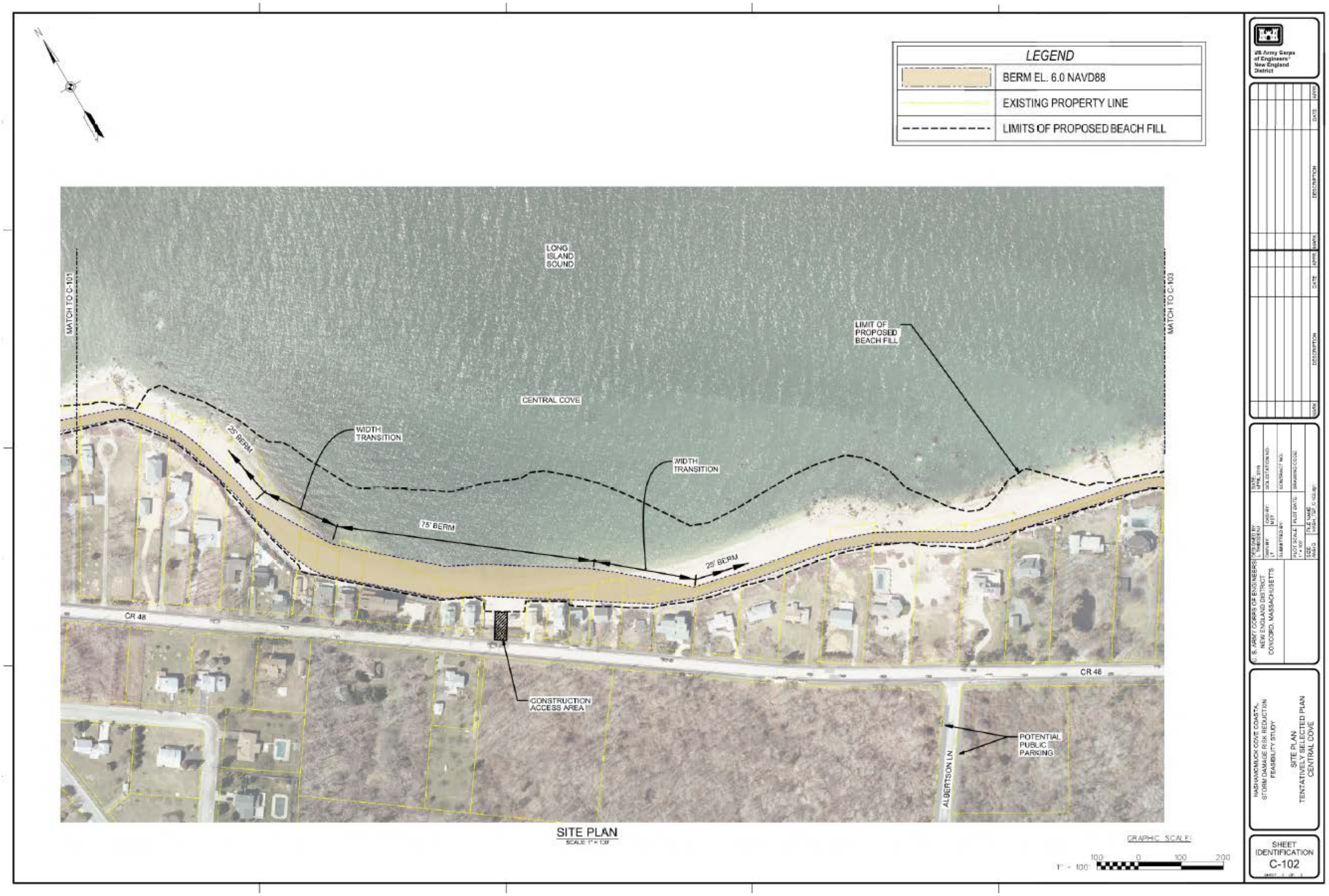

Figure 15. TSP Central Cove

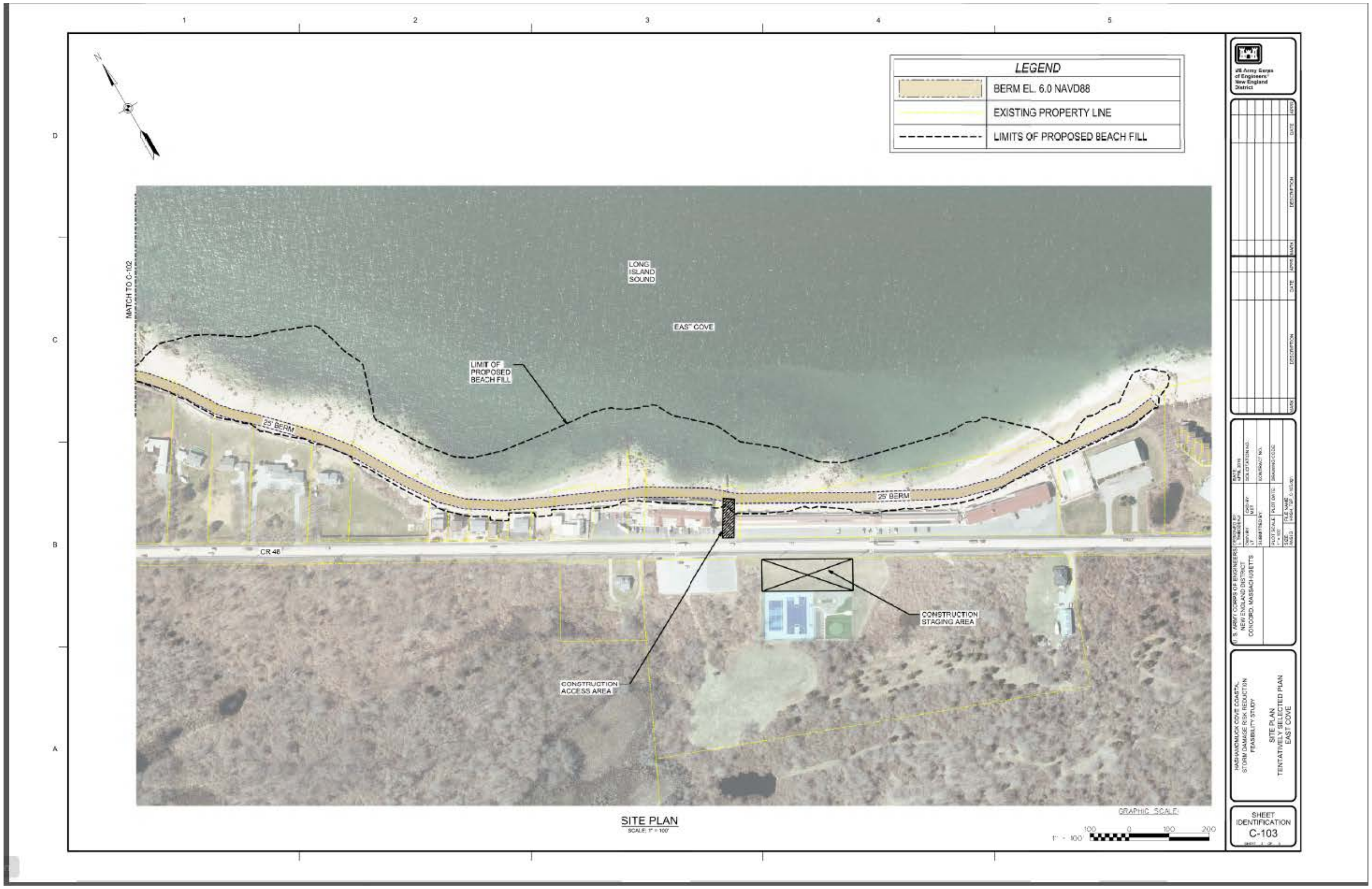

Figure 16. TSP East Cove

Construction Method: Sand will be trucked to the site and would be delivered to staging points with direct access to the beach. Trucks would deposit sand at appropriate locations, for subsequent spreading and regrading by bulldozers or front end loaders. Initial construction is estimated to take from the middle of March 2019 until October 2019 (construction year assumed for economics evaluation, but subject to future project approval and funding requirements).

Real Estate Requirements. USACE projects require the non-Federal sponsor provide lands, easements, rights-of-way and relocations, and disposal/borrow areas (LERRDs) for a project. Currently, the TSP will require the non-Federal sponsor to acquire temporary and permanent easements for berm construction. Details are provided in Appendix F, Real Estate Report and in Section 9.4.

5.2 TSP Refined Cost Estimate

The cost presented for arriving at the TSP were developed using the Beach-fx life cycle cost analysis. Following selection of the TSP, the USACE refined the alternatives cost estimate, using USACE Micro-Computer Aided Cost Estimating System (MCACES), Second Generation (MII). The MII cost estimate used RSMeans, MII Cost Libraries, and vendor quotations. Nourishment quantities are from the Beach-fx modeling. The project contingencies were developed through the Abbreviated Risk Analysis (ARA) tool provided by the USACE Cost Center of Expertise. The summary of the results of this risk analysis, and more detail on the cost estimate, can be viewed in the Cost Engineering Appendix (Appendix E).

The "Project First Cost" estimate is broken out by cost component in Table 15. This includes the initial berm construction, real estate, pre-construction engineering & design, and construction management (contingencies are included). The TSP initial construction Project First Cost (Table 15, line 7) is estimated at $13,488,000. The "Total Nourishment Cost" includes the Project First Cost plus Continued Construction and is estimated at $17,749,000 (Table 15, line 12).

Table 15. TSP Refined Cost Estimate[7]
(FY16 Price Level, FY 16 3.125 % discount rate)

Account/Cost Component	Cost ($)
Initial Construction Cost (Project First Cost)	
01 – Lands and Damages	2,445,000
17 – Beach	9,590,000
30 – Preconstruction Engineering & Design (PED)	707,000
31 – Construction Management	746,000
Total	**13,488,000**
Total Nourishment Cost	
Initial Construction Cost	13,488,000
Continued Construction (periodic nourishment and monitoring)	4,261,000
Total	**17,749,000**

*Note: These costs will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

Future monitoring costs include environmental monitoring and periodic checks of the berm width. The environmental monitoring is expected to be a continuation of the monitoring that is currently conducted by the Town of Southold. Monitoring costs are estimated at $500/year. This estimate may increase once the berm monitoring plan is more fully developed. Berm monitoring can be conducted along with the sponsor's maintenance activities.

Operation, maintenance, repair, rehabilitation, and repair (OMRR&R) requirements are not included in the total nourishment cost presented in Table 16 but are considered in the economic analysis for the project. The non-Federal sponsor is responsible for 100% of requirements. This would consist of periodic project surveillance and maintenance. Surveillance includes identification of unusual conditions such as escarpment formation or excessive erosion. Maintenance includes reshaping of any minor damage to the beach and grading any large escarpments. The OMRR&R cost is estimated at $8,800/year.

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5.3 Refined Annual Cost and Benefit of the TSP

Table 16 shows that dividing the benefits estimated in Table 13 by the more refined cost estimate discussed in Section 5.2 results in an estimated BCR of 1.4.

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[7] Initial construction is cost shared 65% Federal and 35% non-Federal and continuing construction is cost shared 50% Federal and 50% non-Federal. See Section 9.2 for cost apportionment.

Table 16. Refined TSP, Annual Benefit and Cost Summary*
(FY16 Price Level, FY 16 3.125 % discount rate)

TSP Project Economic Cost	**($)**
Initial Investment Cost	
First Cost (includes constr., cont., PED &CM)	13,488,000
Interest During Construction	139,000
Total Investment Cost	13,627,000
Annualized Investment Cost	542,000
Continuing Construction	
Annualized Beach Nourishment Cost	73,000
Annualized Monitoring Cost	500
OMRR&R	
Annualized Berm Maintenance Cost	8,800
Annual Economic Cost	624,300
TSP Economic Benefit	
Annual Damage and Loss Reduction Benefit	855,000
Annual Transportation Delay Reduction Benefit	45,200
Total Annual Benefit	900,200
Net Benefit and BCR	
Annual Net Benefit	276,000
Benefit-Cost Ratio Estimate	1.4

*Note: The Benefit-Cost Ratio will be revised by further project evaluation, agency reviews, and optimization as the study progresses.

5.4 Risk and Uncertainty Analysis

Risk and uncertainty has been explicitly factored into the economic analysis of this project. A statistical risk based model, Beach-fx, was used in this study to formulate and evaluate the project in a life-cycle approach. Beach-fx integrates the engineering and economic analyses and incorporates uncertainty in both physical parameters and coastal storms, which enables quantification of risk with respect to project evolution and economic costs and benefits of project implementation.

5.5 Economic, Environmental, and Other Social Effects

In reducing damages from future events, the TSP contributes to National Economic Development. In addition to reducing property damage, it would also reduce damages to evacuation routes, access routes for emergency vehicles, and the local roads that feed into these major roads.

USACE guidance requires that study alternatives be evaluated under all accounts the National Economic Development (NED), Regional Economic Development (RED), Other Social Effects (OSE) and Environmental Quality (EQ). NED effects have been addressed above and in the Economics Appendix. RED effects would be the impact of project spending, either direct or induced, on the local economy. It is expected that with increased Federal spending on beach construction and nourishment spending, income and employment would show some modest temporary increase. With respect to the OSE account the project would maintain the viability of County Road 48 providing access and egress to both the north and south sections of the north fork of Long Island. County Road 48 is the main road serving the North Fork of Long Island. Maintaining its integrity will increase the efficiency of emergency response teams in the area.

The environmental effects of the TSP (EQ account) are covered in the next sections of the report.

Chapter 6: Environmental Impacts*

6.1 Topography, Geology, and Soils

No-Action Alternative: Under the No-Action alternative, topography may change due to continued soil erosion as a result of storm events and flooding. Average annual land loss from erosion is estimated to be 0.06 acres for the West Cove, 0.05 acres for the Central Cove and 0.02 acres for the East Cove. The geology of the project area will not change under the no action alternative.

Proposed Action: Beach nourishment (sand placement) represents a near natural, reversible soft solution for reducing damages on the open coast. The topography (beach profile and elevation) will change with project implementation. The beach profile will be initially wider and higher than existing conditions but will be subject to continued erosion requiring periodic re-nourishment to maintain project effectiveness. Future renourishment requirements will be influenced by future storms that impact the area and future sea level rise.

From a beach management perspective, only areas that demonstrate significant erosion would be renourished. Historically, the area at the concave portions of the three coves have demonstrated the greatest degree of erosion. The beach berm will be evaluated periodically, and when a sufficient amount of berm loss is observed, a renourishment event would be scheduled. It should be noted that there would also be operational considerations of a minimum quantity required to trigger placement of additional sand at the project. It does not make economic sense to mobilize equipment for sand placement for small quantities of sand.

Based on the above discussion, we are assuming an average renourishment rate of once every ten years for sand placement for the purposes of assessing environmental impacts of the project. Soil erosion (landward of the beach) may also continue to occur depending on intensity of storm events over the period of analysis). The short and long-term changes to topography and soil are not considered significant as the project is located within a dynamic coastal environment. No impacts will occur to the geology with the implementation of the proposed action.

6.2 Water Resources

6.2.1 Regional Hydrogeology and Groundwater Resources

No Action Alternative: The no action alternative will have no effect on hydrogeology and groundwater, as natural processes will continue.

Proposed Action: The implementation of the proposed action will have neither short nor long-term impacts to regional hydrology and groundwater resources.

6.2.2 Surface Water

No Action Alternative: The no action alternative will allow the natural flood processes to continue.

Proposed Action: During construction of the proposed action, there will be minor short-term impacts to the surface water with an increase in suspended sediments in the water. This will be localized to the immediate area and will dissipate quickly. There will be no long-term impacts to surface water.

A Section 404(b)(1) Clean Water Act (CWA) Evaluation is located in Appendix A7. The Evaluation presents a review of compliance with the CWA and a finding of compliance with Section 404(b)(1) guidelines. A Section 401 Water Quality Certificate will be obtained from the State of New York prior to the start of construction; all permit requirements will be addressed and/or implemented.

6.2.3 Coastal Processes

No Action Alternative: The no action alternative will have neither short nor long-term impacts to coastal processes.

Proposed Action: The project would not change the rate of erosion or sediment transport in the project area. However, the proposed action will reduce the influence of the existing coastal processes on the land-based structures. In particular, the tentatively selected plan will provide coastal storm risk management to residences and roads as beach nourishment will diminish the impact of erosion.

6.3 Vegetation

6.3.1 Upland

<u>No Action Alternative</u>: The no action alternative may have minor impacts to upland vegetation as continued erosion may destroy vegetation which has become established above the Mean High Water elevation on the beach/bluff and ornamental vegetation and lawns associated with private residences in the project area.

<u>Proposed action</u>: Implementation of the proposed action will have periodic short-term impacts to beach vegetation growing above the Mean High Water elevation. This vegetation will be buried with project implementation and periodic beach re-nourishment estimated to be approximately once every 5- 10 years, depending on sea level rise rates (see Section 6.1 for additional discussion on renourishment). The high beach vegetation community generally consists of herbaceous species that are adapted to a dynamic environment (flooding, erosion and deposition). Re-colonization of the high beach community should occur within a few years and therefore these short-term impacts are not considered to be significant. In addition, native vegetation will be planted along the upland edge of berm in appropriate areas to provide some habitat. Therefore this impact is not expected to be significant.

6.3.2 Wetlands

<u>No Action Alternative</u>: Under the no action alternative, the majority of freshwater wetlands associated with the Arshamomaque Preserve wetland complex (located on the south side of Road 48) and two small palustrine wetlands (located north of Road 48), will continue to be inundated by flood waters during extreme flood events (Figure 10 – USFWS Wetland Inventory). These freshwater wetlands are located too far landward to be impacted under the no action alternative.

With regard to coastal wetlands, under the no action alternative, average annual land loss from erosion is estimated to be 0.06 acres for the West Cove, 0.05 acres for the Central Cove and 0.02 acres for the East Cove. Over the 50-year period of analysis, this average annual land loss equates to approximately 3 acres for the West Cove, 2.5 acres for the Central Cove and 1 acre for the East Cove for a total of 6.5 acres over the 50-year period of analysis. It is difficult to quantify the change in the amount of wetland habitat (intertidal and subtidal habitat) over the period of analysis due to a high level of uncertainty of future events (e.g., storm events, effects of bulkheads on coastal processes, slope of beach, elevation of beach, etc.). However, for general purposes, it is assumed that the amount of intertidal habitat will remain similar to existing conditions and the amount of subtidal habitat will increase as the mean high water line migrates gradually landward due to continued erosion (e.g., upland transitions to intertidal habitat and intertidal habitat transitions to subtidal habitat).

Proposed Action: There will be no short or long-term direct impacts to freshwater wetlands located in the project vicinity due to the proposed action. Freshwater wetlands located to the north and south of Road 48 will continue to be inundated by flood waters in extreme storm events. Freshwater wetlands in the project vicinity are located too far inland to be affected by project activities over the 50-year period of analysis (see Figure 10- USFWS Wetland Inventory).

Under the proposed action plan, the initial placement of sand and periodic renourishment activities will result in the burial of benthic resources in intertidal and subtidal habitat. These impacts are expected to be short-term as benthic resources would begin to recolonize immediately following the completion of each construction reach (Wilber and Clarke, 1998). There will be no long-term impacts to the benthic resources since quantity and diversity of benthic resources are expected to return to pre-construction levels (USACE, 2014). See Section 6.4.3 for additional discussion on impacts to benthic resources.

The total area of sand fill (footprint of the berm) for the initial construction of the project was estimated to be 516,000 square-ft. (sf) (11.8 acres) for intertidal habitat and 464,000 sf (10.6 acres) for subtidal habitat (see Table 19. Area of Intertidal and Subtidal Disturbance). Under the proposed project, initially, the Mean High Water line will migrate seaward, transitioning intertidal habitat to beach (above Mean High Water) and subtidal habitat to intertidal habitat. However, erosion and coastal processes will continue to change and re-shape the beach over time, requiring sand re-nourishment activities to be conducted on a periodic basis to maintain project functionality. In general, it is expected that the amount of intertidal habitat will remain similar to existing conditions while subtidal habitat in the project will be reduced, the amount of which will vary over time depending on future conditions (e.g., slope of the beach, amount of erosion, etc.). This reduction in subtidal habitat is not considered significant in comparison to the quantity of similar habitat in the surrounding area. Therefore, no significant short or long-term impacts on the amount of coastal wetland habitat is anticipated.

Table 17. Area of Intertidal and Subtidal Habitat Disturbance

Area of Intertidal and Subtidal Habitat Disturbance (square-ft.)		
	Intertidal	Subtidal
West Cove	164,000	69,000
Central Cove	149,000	249,000
East Cove	151,000	198,000
Total	**464,000**	**516,000**

6.4 Fish and Wildlife

No Action Alternative: The no action alternative may have long term minor effects on intertidal and nearshore benthics due to siltation from erosion and input of fine sediments which may influence the types of benthic organisms and have indirect on fish and wildlife.

6.4.1 Finfish

The proposed action is expected to have an indirect, short-term impact on fish species in the immediate construction area. Motile species would likely avoid burial during the construction by relocating outside of the area. However, the potential for some fish mortality does exist. Demersal fishes that may reside just offshore of the construction footprint (*e.g.*, winter flounder, windowpane flounder, summer flounder, etc.) would be temporarily displaced until appropriate invertebrate species return to the area. Resident fish are expected to feed in surrounding areas, and therefore be relatively unaffected by temporary, localized, reductions in available benthic food sources (USACE, 2000).

There will be no long-term adverse impacts on fish.

6.4.2 Shellfish

The proposed action is expected to have a direct, short-term, impact on shellfish. Sessile shellfish that are present in the immediate construction area such as blue mussel are likely to be buried. Two juvenile blue mussels were found attached to cobbles at one mid-intertidal station and a lone blue mussel was also found at one low-intertidal station (USACE 2015). However, no shellfish with significant commercial or recreational importance were identified. Certain crustacean species which are highly mobile and wary such as blue claw (*Callinectes sapidus*) have a good chance of avoiding the study area during construction and therefore would not be impacted. Upon construction completion, any shellfish that moved can return (Wilber and Clarke 1998).

There will be no long-term impacts on shellfish.

6.4.3 Benthic Resources

The implementation of the proposed action is expected to have a direct, short-term impact on benthic resources. However, the high-intertidal area was generally azoic or consisted of typical opportunistic annelid species, while the communities in the mid-intertidal areas were dominated by typical opportunistic annelid species. The low-intertidal communities were also dominated by typical opportunistic annelid species, but also contained a varied mix of other typical sandy shore species such as isopod and decapod crustaceans and a few gastropod species.

Benthic organisms living in the sediments of the beach or the nearshore areas may be impacted during the placement process by being buried by the addition of sand. Resettling of suspended sediments may indirectly impact any benthic organisms in adjacent areas. Benthic organisms inhabiting intertidal and surf zone areas are well adapted to and tolerant of considerable changes in their environment (Naqvi and Pullen, 1982). Mobile organisms living on the surface sediments would be displaced. Benthic organisms would begin to recolonize immediately following the completion of each construction reach, and populations are expected to revert to pre-construction levels within approximately one year (Wilber and Clarke, 1998). Diversity and abundance is expected to be similar to preconstruction conditions because the new substrate will be of similar grain size to the existing conditions.

Construction is estimated to take approximately 7 to 10 months, starting in the late winter timeframe (March). Portions of the beach constructed prior to the spring would benefit from recruitment of benthic organisms to intertidal and adjacent subtidal habitats from neighboring habitats and, consequently, recovery would be quicker. Although there will be some variability of the rate of recovery due to the timing of completion of each reach, a temporal reduction in abundance of the benthic community is not likely to significantly affect the quality of the habitat in Long Island Sound in the nearshore zone because common bottom-feeding species like winter flounder, summer flounder, windowpane flounder, and scup are opportunistic predators and will switch from less abundant to more abundant species.

Impacts related to renourishment cycles, estimated to be approximately once every 5 - 10 years depending on sea level rise rates (see Section 6.1 for additional discussion on renourishment), will be similar to those resulting from the initial fill but to lesser degree. It is anticipated that sand will be trucked to the project site from an upland sand source, so there will be no impacts associated with dredging sand from an off-shore source. Each renourishment cycle requires smaller volumes of sand than the initial fill (see Table 8. Alternative 2 – Beach Nourishment Volumes). Thus, a smaller zone of the intertidal and littoral benthos will be affected. Sand renourishment would not occur in areas of the project that are already at or above the design template, or only minimally disturbed. There will be no long-term impacts on benthic resources, as they are expected to return to preconstruction levels (USACE 2014b).

6.5 Reptiles and Amphibians

No Action Alternative: The no action alternative will have neither short nor long term impacts on reptiles and amphibians.

Proposed Action: The implementation of the proposed action is expected to have neither short nor long-term impacts on reptiles and amphibians. As stated in section 3.4.4, there are low numbers, if any, reptiles and amphibians in the construction area. Any reptiles in the bay would be able to move and avoid construction.

6.6 Birds

No Action Alternative: The no action alternative will have neither short nor long-term impacts on birds.

Proposed Action: The most abundant species in the project area are likely to be habitat generalists that are tolerant of development. The closest designated Bird Conservation Area is the Peconic River Headwaters, located approximately 20 miles southwest of the project area in Brookhaven and Riverhead, NY (NYSDEC 2016d). Birds that currently use the area may experience indirect short-term impacts. Increased noise and heavy machine activity could cause their displacement or disruption in foraging within the immediate vicinity of the construction. Avian species are highly mobile and are expected to avoid the construction area and return after completion of the construction. There will be no long-term impacts on bird species. . See Sections 6.8 and 6.9 for additional information regarding Federal and State listed bird species, respectively.

6.7 Mammals

No Action Alternative: The no action alternative will have neither short nor long-term impacts on mammals.

Proposed Action: Mammals in the construction area may experience short-term impacts during construction activities. During construction, heavy machinery activity and increased noise levels may indirectly cause displacement of individuals near construction activities. Mammals are mobile species and will move to avoid the construction areas, thus minimizing the impacts of construction activities on them. Most mammals inhabiting the study area are accustomed to human activities and would likely return after completion of construction. It is anticipated that any raccoon, eastern cottontail, opossum or white tail deer in the area would return to areas after construction. There will be no long-term impacts on upland mammals.

The project area is not a documented haul out site for harbor seals and it is unlikely that bottlenose dolphin would be found in the near shore waters of the project area. Therefore, no short or long term-term impacts to seals or dolphins are anticipated.

6.8 Federal Threatened and Endangered Species

No Action Alternative: The no action alternative will have neither short nor long-term impacts on Federally threatened and endangered species.

Proposed Action: There are six (6) Federally protected animal or plant species under the jurisdiction of the USFWS that have been identified as possibly being present along the coastal beach in the proposed project area: roseate tern (*Sterna dougallii dougallii)* (northeastern population), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), sandplain gerardia (*Agalinis acuta*), seabeach amaranth (*Amaranthus pumilus*), and northern long-eared bat (*Myotis septentrionalis*). In addition, the proposed project location overlaps with areas of potential distribution for eight (8) Federally protected animal species under the jurisdiction of the NMFS: Atlantic sturgeon (*Acipenser oxyrinchus*); sea turtles of the New England region, including the threatened Atlantic loggerhead (*Caretta caretta)* and green sea turtle (*Chelonia mydas*) and endangered Atlantic leatherback (*Dermochelys coriacea*) and Atlantic Kemp's ridley (*Lepidochelys kempi*); as well as large Atlantic whales including the endangered humpback (*Megaptera novaeangliae*), right (*Eubalaena glacialis*), and fin (*Balaenoptera physalus*) whales.

The last record of piping plover on Southold Beach was in 2004. In its current condition, the beach is unsuitable for nesting piping plover. Beach widening may increase the suitability of the habitat for nesting and foraging piping plover (beneficial effect). None of the other Federally-listed species outlined above have been documented as being in the project area. The USACE will request concurrence from USFWS and NMFS pursuant to the Endangered Species Act regarding the individual finding of impact for each species as follows:

A finding of "may affect but is not likely to adversely affect"

Roseate Terns. The project area does not support suitable breeding habitat for roseate terns. While the off-shore waters of the Hashamomuck Cove project area may be used by roseate terns for transient foraging, the project area has not been document as a significant foraging area for roseate terns and, therefore, project activities may affect but are not likely to adversely affect this species because the effects to roseate terns are expected to be insignificant or discountable.

Piping Plover. The last record of nesting piping plover on Southold Beach was in 2004. This is most likely due to significant human disturbance insufficient area above high tide mark for nesting. The initial beach nourishment activities will be conducted starting in the late winter (March) timeframe and continue for 7 to 10 months until project completion.

After the initial sand placement, continued erosion will require beach re-nourishment estimated to be approximately once every 5 - 10 years, depending on sea level rise rates (see Section 6.1 for additional discussion on renourishment). Renourishment would not occur in areas of the project that are already at or above the design template, or only minimally disturbed. While there will be will be a temporary loss of benthic organisms with implementation of the proposed project, foraging piping plover would have an abundance of similar habitat to use in nearby areas. Benthic resources would begin to recolonize immediately following the completion of each construction reach, and populations are expected to revert to pre-construction levels within one year (Wilber and Clarke, 1998). Diversity and abundance of benthic species after recovery is expected to be similar to preconstruction conditions because the new substrate will be of similar grain size to the existing conditions.

The proposed project may improve habitat and encourage nesting and foraging for piping plover due to beach widening. In light of this possibility, the USACE will work collaboratively with the USFWS, the NYSDEC and the Town of Southold to prepare a piping plover management plan for the Hashamomuck Cove project area. This plan will expand annual monitoring to include the Central and East Cove (in addition to Hashamomuck Beach [West Cove] which is already monitored annually). Also, due to the potential for piping plover to use the widened beach after initial beach nourishment, the management plan will require that renourishment activities be restricted during the piping plover nesting window (April 1 to August 31) in any year. Other recommendations will include, but are not limited to, signage to educate visitors about piping plover vulnerability and life history, actions to deter gull feeding, and dog leashing requirements (see Appendix A5, Piping Plover Management Plan).

In summary, beach widening may increase the suitability of the habitat for nesting and foraging piping plover (beneficial effect). To assure the protection of piping plover that may utilize the habitat after project implementation, a piping plover management plan will be prepared. Therefore, the proposed project may affect but is not likely to adversely affect this species because the effects to piping plover are expected to be insignificant or discountable.

Red Knot - The red knot, a Federally threatened species, makes one of the longest yearly migrations of any bird to its Arctic breeding grounds. During migration, red knots concentrate in huge numbers at traditional staging grounds during migration. It is unlikely that the Hashamomuck Cove project area is used by red knots as other than a transient stopover to or from their breeding grounds. Given the lack of suitable foraging and roosting habitat and the limited known occurrences of red knot roosting and foraging habitat, the proposed project may affect but is not likely to adversely affect red knot or critical habitats because the effects to red knot are expected to be insignificant or discountable.

Sea Turtles. Studies of sea turtles near Long Island, NY have shown that the species typically occur in waters with depths between 16 and 49 ft. and in areas where the waters are slow-moving or still (i.e., current of less than 2 knots) (Ruben and Morreale 1999).

In the event that a loggerhead or Kemp's ridley sea turtle would forage close to shore during placement of sand, there is little probability that direct contact impacts would arise from construction methods including equipment utilized to place sand, and/or the potential from burial with sand during placement would occur. It is possible that a sea turtle may encounter a zone of increased turbidity along the shore during placement, especially if surf conditions were rough. Direct impacts from increased turbidity (or noise) may cause turtles to move away from the area but this disturbance behavior would be considered an insignificant impact. Sea turtles are not expected to forage in the shallow waters where fill sand will bury the intertidal and nearshore littoral benthos and so the project would contribute to a loss of foraging habitat. Therefore, project activities may affect but are not likely to adversely affect endangered and threatened sea turtles because the effects to sea turtle species are expected to be insignificant or discountable.

Atlantic Sturgeon. Atlantic sturgeon spawning and early life stages occur in major tidally influenced freshwater rivers. No spawning or early life stages of Atlantic sturgeon occur in the action area as the environment is completely saline. The project area does not provide suitable habitat for overwintering; so the presence of Atlantic sturgeon is likely limited to the warmer months (April – November). The project area does not provide highly productive foraging habitat preferred by Atlantic sturgeon and therefore, the occurrence of sub-adult and adult Atlantic sturgeon would probably be transient. Sturgeon are tolerant of turbid conditions (in rivers) and would likely move out of the area of disturbance. Therefore, beach nourishment activities on sturgeon are insignificant.

A finding of "no effect" for the following species:

Northern Long-Eared Bat. The forested uplands adjacent to the project vicinity may support summer roosting habitat for northern long-eared bat (USFWS 2015a). However, there will be no bridge or culvert work (structures which can be used by roosting bats) and no tree cutting is anticipated as part of the project action. Additionally, there is no known occurrence of northern long-eared bat in the project area (telecom on March 29, 2016 with Terra Gulden-Dunlop, Fish and Wildlife Biologist, USFWS Long Island Field Office). Therefore, there will be no effect on the northern long-eared bat as a result of the Hashamomuck Cove project.

Sandplain Gerardia. The sandplain is very rare and the project area lacks coastal grasslands and therefore,sandplain gerardia is unlikely to be found in the project area. Therefore, there will be no effect on the sandplain gerardia as a result of project activities.

Seabeach Amaranth. The seabeach amaranth, appears to need extensive areas of barrier island beaches and inlets, functioning in a relatively natural and dynamic manner. Beaches in the project area are not suitable for the establishment of seabeach amaranth and therefore, there will be no effect on the seabeach amaranth as a result of project activities.

Large Atlantic Whales. Humpback, right and fin whales are unlikely to occur within the project vicinity or in the shallow depths of the proposed project area and therefore, project activities should have no effect on any endangered whale species.

Coordination with the USFWS and NMFS pursuant to Section 7 of the Endangered Species Act continues.

6.9 State Threatened and Endangered Species

No Action Alternative: There will be no short-or long-term impacts to endangered piping plover and State threatened least tern under the no action alternative.

Proposed Action: No least tern nesting colonies have been identified in project area during annual monitoring. Increasing the width of the beach as proposed, may have a beneficial effect on piping plover by increasing the suitability of the area for nesting. The USACE New England District, on behalf of the USACE New York District, will coordinate with the USFWS, NYSDEC and the Town of Southold to prepare a Piping Plover Management Plan to assure the protection of piping plover in the project area (see Section 6.5 for additional information on the environmental consequences of the proposed action on piping plover and a general description of the Piping Plover Management Plan).

Increasing the width of the beach as proposed may attract least terns to the project area. However, because least terns nest in colonies, it is expected that the size of the beach would be still be a significant deterrent and limiting factor for a large least tern nesting colony. Least terns feed mostly on small fish caught by skimming the surface of the water or by making dives from the air (NYSDEC, 2016g). Therefore, beach widening will not have a beneficial or detrimental effect on least tern foraging.

6.10 Essential Fish Habitat

No Action Alternative: The no action alternative will have neither short nor long-term impacts on essential fish habitat.

Proposed Action: The proposed action is expected to have an indirect, short-term impact on food availability for benthic-feeding EFH designated species in the construction area. The beach nourishment project may cause mortality of benthic infaunal organisms. However, resident fish are expected to feed in surrounding areas, and therefore be relatively unaffected by temporary, localized, reductions in available benthic food sources (USACE 2004). If winter flounder spawning does occur around the project area, there is the potential for adverse impacts to eggs and newly settled juveniles due to burial at the project site. These potential impacts are not expected to be significant. A detailed EFH assessment is provided in environmental Appendix A1. The assessment indicates that implementation of the proposed action will have minimal short-term effects on EFH species, their habitat, and no long-term impacts. This EA and the EFH Assessment will be submitted to NMFS during coordination and updates will be made to this section as needed.

6.11 Socioeconomics

No Action Alternative: The no action alternative may have short- or long-term impacts on socioeconomics. Continued erosion may permanently impact existing businesses, homes and County Road 48, which runs along the shoreline and is in danger of being undermined in several locations. In addition, the continued loss of beach may curtail recreational use of the currently popular Hashamomuck Town Beach in the future. These potential impacts may equate to a reduced number of visitors patronizing local businesses during the summer season. Households and businesses may not rebuild and leave empty lots or unrepaired homes. The closure or loss of County Road 48 would result in traffic delays, loss of an evacuation route, and hamper emergency rescue operations.

Proposed Action: The implementation of the proposed action may have positive short- and long-term socioeconomic impacts. Maintaining existing buildings, the usefulness of County Road 48 as a transportation route, and the suitability of the Southold Town Beach as an attractive coastal destination should have positive socioeconomic impacts over the period of analysis. In the construction phase of the project, the introduction of construction workers into the community should result in their purchasing of supplies and food which may contribute to a minor, indirect temporary economic benefit to the local economy. Access to the beaches would be temporarily impeded during the construction period, but long term the project would increase public access to beaches in the project area. The implementation of the plan is expected to have a direct positive impact on housing and structures due to a reduction in future storm damage to existing properties, and the subsequent reduction in costs to repair such damages. Residential property values may increase in the project area due to the added coastal storm risk management of storm damages.

6.12 Environmental Justice

As stated in Section 3.9, the Town of Southold is not considered an Environmental Justice Area according to the NYSDEC Office of Environmental Justice (NYSDEC, 2016h.)

No Action Alternative: The no action alternative will have neither short nor long-term impacts to an Environmental Justice Area.

Proposed Action: The implementation of the proposed action will have no short-or long-term impacts on an Environmental Justice Area.

6.13 Cultural Resources

No Action Alternative: The no action alternative will have neither short nor long-term impacts on cultural resources.

Proposed Action: The proposed action should have no effect on historic properties. There are no historic properties in the project area. The proposed project involves placing sand on a beach which has been disturbed by wave action and erosion. Placement of sand should also have no effect on any historic architectural properties in the vicinity of the West, Central or East Coves because they are already in a coastal setting. This proposed action is currently being coordinated with the New York State Historic Preservation Office and the Shinnecock Tribe, who is anticipated to concur with this no effect determination.

6.14 Coastal Zone Management

No Action Alternative: The no action alternative will have neither short nor long-term impacts in terms of Coastal Zone Management policies.

Proposed action: In conformance with 15 CFR Part 903 subpart C and enforceable policies of New York's Coastal Zone Management Program, USACE has determined that the proposed action is consistent to the maximum extent practicable with the relevant enforceable policies of the New York State Coastal Management Program, in this instance the Town of Southold Local Waterfront Revitalization Program policies (see Appendix A3). Coordination with the New York Department of State, Office of Planning and Development on the USACE's consistency determination is on-going. This section will be updated once coordination is complete.

6.15 Land Use and Zoning

No Action Alternative: The no action alternative may have short- and long-term impacts as erosion, storm damage and flooding will continue and possibly necessitate changes in land use as property is destroyed and land lost.

Proposed Action: Implementation of the proposed action will have no negative short- or long-term impacts to land use and zoning. The implementation of the proposed coastal storm risk management measures is not expected to significantly induce future development in the adjacent residential areas, because most, if not all, of the developable areas are developed.

6.16 Hazardous, Toxic, and Radioactive Waste

No Action Alternative: The no action alternative will have neither short nor long-term impacts from HTRW.

Proposed Action: There will be neither short nor long-term impacts from HTRW. There were five HTRW sites located within the study area, all of which were addressed as stated in Section 3.13. Therefore, no short or long-term impacts will occur from implementation of the proposed action.

6.17 Aesthetic and Scenic Resources

No Action Alternative: The no action alternative may have negative short- and long-term impacts as beaches will continue to erode, causing damage to the scenic resources present in Southold.

Proposed Action: Implementation of the proposed action will have negative short-term impacts to aesthetics and scenic resources. Construction equipment and vehicles which are generally not considered visually appealing will be on the beach during the implementation of the plan. Long-term impacts of the proposed action will be positive impacts. The view shed at several locations along County Road 48 towards Long Island Sound may be improved for the general public that finds a wide sandy beach visually appealing.

6.18 Recreation

No Action Alternative: The no action alternative may have negative short-and long-term impacts because the beaches and businesses that provide recreation or recreational services may be impacted by continued erosion and may be inaccessible during and after storm events until repairs are complete. The narrow width of the beach may limit the recreational carrying capacity of the public beach (e.g., adverse effects due to crowding).

Proposed Action: Implementation of the proposed action will have negative short-term impacts to recreation because beaches will be temporarily inaccessible during construction. Long-term impacts will be positive since beach will be nourished and there will be expanded public use in adjacent coves.

6.19 Air Quality

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

As stated in Section 3.16, Suffolk County has been designated with the following attainment status with respect to the National Ambient Air Quality Standards (NAAQS) for criteria pollutants: 'moderate' nonattainment area for the 2008 8-hour ozone standard and a maintenance area for the 2006 particulate matter less than 2.5 microns (PM2.5) standard. Ozone is controlled through the regulation of its precursor emissions, which include oxides of nitrogen (NOx) and volatile organic compounds (VOCs). VOCs are emitted at a fractional rate compared to NOx emissions. Sulfur dioxide (SO2) is a precursor for PM2.5. Because of these designations and since the project is a Federal Action taken by the USACE, this project triggers a General Conformity Review under 40 CFR §93.154. General Conformity ensures that Federal Actions do not have a negative impact on State Implementation Plans (SIPs).

The emissions associated with the project estimated as part of the General Conformity Review are summarized below.

			tons	
	NO_x	VOC	SO_x	$PM_{2.5}$
	tons	tons	tons	tons
Project Emissions:	**10.2**	**0.4**	**0.007**	**0.3**

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 NOx (100 tons in any year), VOC (50 tons in any year), PM2.5 (100 tons in any year), and

SO2 (100 tons in any year). Therefore by rule, the Project is considered de minimis and will have only a temporary impact around the construction activities with no significant impacts.

6.20 Greenhouse Gases (GHGS)

The primary GHG emitted by diesel-fueled engines is CO_2. The project is estimated to generate a total of 658 metric tons of CO_2, which is equivalent to 139 passenger vehicles annual CO_2 emissions.[8] The GHG emissions associated with the project are temporary and insignificant compared to over 1.1 million registered passenger vehicles in Suffolk County.[9] The project is significantly below the CEQ evaluation level of 25,000 metric tons per calendar year.

6.21 Noise

No Action Alternative: Under the no action alternative there may be negative short-term impacts from noise due to construction activities associated with storm damage repairs.

Proposed action: With implementation of the proposed action, there would be negative short-term impacts from noise due to use of construction equipment. There will be no long-term impacts.

Chapter 7: Cumulative Impacts*

The Council on Environmental Quality defines “cumulative impact" as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or 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.

The following section describes past, present and future Federal and local projects in the Southold area and near vicinity which represents prior work that was conducted in the study area.

There are no existing USACE coastal storm risk management projects (CSRM) within the Hashamomuck Cove Study Area in Southold, New York. USACE currently has one other CSRM project under study on the north shore of Long Island located approximately 50 miles west of Southold at Asharoken Beach. If these projects are constructed, then the Asharoken

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[8] EPA Greenhouse Gas Equivalent Calculator, www2.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed October 7, 2015

[9] NYS Department of Motor Vehicles, NYS Vehicle Registrations on File – 2014, *dmv.ny.gov/statistic/2014ReginForce-Web.pdf*, accessed October 7, 2015

project would have no measurable influence on the Hashamomuck project due to the distance between the two areas.

Orient Harbor Revetment. The Orient Harbor coastal storm risk management revetment was constructed by USACE in the Town of Southold, New York. The project area is located along the Peconic Bay shore immediately adjacent to State Route 25, approximately 5 miles east of Hashamomuck. The project is maintained by the New York State Department of Transportation.

Bulkheads and Groins. There are a number of existing bulkheads and groins located within the Study Area. They were built mainly for the purpose of shoreline erosion management. The bulkheads are located along approximately 40% of the coastline in the study area. In some areas, there were small rock revetments installed as erosion protection. The rock revetments are located along approximately 15% of the beach front properties within the study area.

Southold Town Beach. A blizzard on December 26, 2010 caused damages at the Southold Town Beach. In 2011, 6,400 cubic yards of sand material acquired from a dredging project at the Cross Sound Ferry Terminal in Orient was transported to Southold Town Beach, placed on the beach, and graded by the Town of Southold. (Periodic redistribution and grading of littoral drift (which forms at the Low Water Line) has occurred at Southold Town Beach since 2011 (approximately once a year).

TSP Periodic Beach Renourishment Activities. Future cumulative activities include the potential Hashamomuck Cove beach renourishment TSP as follows:

West Cove. It is estimated 33,630 cubic yards (cy) of sand will be used initially. An estimated total of 27,916 cy of sand, on average will be needed to renourish the beach to the design profile over the 50-year period of analysis.

Central Cove. It is estimated 55,850 cy of sand will be used initially. An estimated total of 17,470 cy of sand, on average, will be needed to renourish the beach to the design profile over the 50-year period of analysis.

East Cove. It is estimated 70,253 cy of sand will be used initially. An estimated total of 19,875 cy of sand, on average, will be needed to renourish the beach to the design profile over the 50-year period of analysis.

A number of bulkheads, groins and rock revetments located in the project area that were constructed in the past have permanently altered coastal habitat. With initial placement of sand under the TSP, the Mean High Water line seaward will be moved seaward. However, the project area will still be subject to continued erosion and storm events which will require periodic beach renourishment activities in the future. The changes to intertidal and subtidal habitat are not considered to be cumulatively significant due to the area's dynamic and changing environment.

The previous construction of groins permanently displaced sand and cobble habitats with rock, thereby modifying the benthic community from infauna to sessile type fauna. No additional permanent cumulative impacts to the benthic community are anticipated with implementation of the proposed project. There are potential short-term negative impacts to the benthic communities resulting from the initial sand placement and subsequent beach renourishment activities. However, these impacts are not cumulatively significant when added to past measures because the intertidal and subtidal benthic communities are expected to recolonize with similar species within a few months and be at pre-construction densities within a year (Wilber and Clarke, 1998).

There are no anticipated cumulative impacts to fish and wildlife, or Federal and/or State threatened and endangered species. This project will be coordinated with the appropriate State and Federal agencies to ensure no significant impacts occur.

Socioeconomics of the area would benefit from the construction of the project as proposed. Specifically, construction would have a positive benefit by reducing costs resulting from storm and water damage.

Chapter 8: Coordination & Compliance with Environmental Requirements*

8.1 Compliance Summary

Table 18. Summary of Primary Federal Laws and Regulations Applicable to the Proposed Project

Item	Citation	Compliance
Clean Air Act	42 U.S.C. §§ 7401 et seq.	On-going,
Clean Water Act	33 U.S.C. 1251 et seq.	USACE will obtain a Water Quality Certificate to comply with the Clean Water Act (Section 401)
Coastal Zone Management Act	16 U.S.C. §§ 1451-1464 NY Executive Law §§ 91, 913, Article 42	A CZM Determination was prepared and is located in Appendix A3 and will be coordinated with the State during public review of the DIFREA
Endangered Species Act of 1973	16 U.S.C. 1531 et seq.	USACE Section 7 Coordination with USFWS is on-going regarding endangered species.
Environmental Justice in Minority and Low Income Populations	Executive Order 12898	USACE performed an analysis and has determined that a disproportionate negative impact on minority or low-income groups in the community is not anticipated; a full evaluation of Environmental Justice issues is not required.
Fish and Wildlife Coordination Act	16 U.S.C. 661 *et seq.*	On-going
Magnuson-Stevens Act Fishery Conservation and Management Act	16 U.S.C. 1855(b)(2)	EFH Assessment was prepared and submitted to NOAA-Fisheries as part of the DIFREA review. The EFH Assessments are located in Appendix A1.
National Environmental Policy Act of 1969	42 U.S.C. 432 *et seq.*	The circulation of the Draft EA fulfills requirements of this act.
National Historic Preservation Act of 1966	16 U.S.C. 470 et seq.	On-going. Correspondence included in Appendix A6.
Protection of Wetlands	Executive Order 11990	Circulation of this report for public and agency review fulfills the requirements of this order.
Protection of Children from Environmental Health Risks and Safety Risks	Executive Order 13045	Implementation of this project will reduce environmental health risks. Circulation of this report for public and agency review fulfills the requirements of this order.

8.2 Compliance with Executive Order (EO) 11988

Executive Order 11988 requires that Federal agencies avoid, to the extent possible, adverse impacts associated with the occupancy and modification of flood plains and to avoid support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

The Water Resources Council Floodplain Management Guidelines for implementation of EO 11988, as referenced in ER 1165-2-26, requires an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to, or are within the floodplain. The eight steps and project-specific responses to them are summarized below.

EO 11988 Step	Project-Specific Response
Determine if a proposed action is in the base floodplain (that area which has a one percent or greater chance of flooding in any given year).	The proposed action is within the base floodplain. However, the project is designed to reduce damages to existing infrastructure located landward of the proposed project.
If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or to location of the action in the base flood plain.	Practicable measures and alternatives were formulated and evaluated against USACE guidance, including nonstructural measures such as buy-outs (land acquisition and demolition of structures).
If the action must be in the flood plain, advise the general public in the affected area and obtain their views and comments.	The Draft integrated Feasibility Report and Environmental Assessment will be released to public review, and coordination with agency officials and the public have been held throughout the study.
Identify beneficial and adverse impacts due to the action and any expected losses of natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain will affect the base flood plain, impacts resulting from these actions should also be identified.	The anticipated impacts associated with the Selected Plan are summarized in Chapters 4 and 5 of this report. The project would not alter or impact the natural or beneficial flood plain values.

EO 11988 Step	Project-Specific Response
If the action is likely to induce development in the base flood plain, determine if a practicable non-flood plain alternative for the development exists.	The project will not encourage development in the floodplain because all properties available for development have been developed. The project provides benefits solely for existing development.
As part of the planning process under the Principles and Guidelines, determine viable methods to minimize any adverse impacts of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the "no action" alternative.	The project would not induce development in the flood plain. Chapter 4 of this report summarizes the alternative identification, screening and selection process. The "no action" alternative was included in the plan formulation phase.
If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.	The Final Integrated Feasibility Report and Environmental Assessment will document the final determination.
Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order.	The Recommended Plan is the most responsive to all of the study objectives and the most consistent with the executive order.

8.3 List of Environmental Assessment Report Preparers

Individual	Responsibility
Judith Johnson	Biologist; NEPA
Kate Atwood	Archeologist: NEPA, SEC. 106
Jenine Gallo	Biologist: Clean Air Act, NEPA

Chapter 9: Plan Implementation

The implementation process would carry a plan that is recommended through pre-construction engineering and design (PED), including development of plans and specifications, and construction. Funding by the Federal Government to support these activities would have to meet the requirements of Public Law 113-2 or traditional civil works budgeting criteria.

9.1 Consistency with Public Law 113-2

This draft feasibility report has been prepared in accordance with the Disaster Relief Appropriations Act of 2013, Public Law 113-2. Specifically, this section of the report addresses:

- the specific requirements necessary to demonstrate that the project is technically feasible, economically justified and environmentally complaint;
- the specific requirements necessary to demonstrate resiliency, sustainability and consistency with the North Atlantic Coast Comprehensive Study (NACCS);
- and the costs and cost-sharing to support a Project Partnership Agreement (PPA).

Economics Justification and Environmental Compliance. The prior sections of this draft report demonstrate that the TSP is technically feasible. It also identifies the TSP at this point in the study to have benefits greater than costs. The draft Environmental Assessment has been prepared to meet the requirements of NEPA and demonstrate that the TSP is compliant with environmental laws, regulations, and policies and has effectively addressed any environmental concerns of resource and regulatory agencies.

Resiliency and Consistency with the NACCS. The North Atlantic Coast Comprehensive Study (NACCS) was released in January 2015 and provides a risk management framework designed to help local communities better understand changing flood risks associated with climate change and to provide tools to help those communities better prepare for future flood risks. In particular, it encourages planning for resilient coastal communities that incorporate, wherever possible, coastal landscape systems that take into account future sea level and climate change scenarios (USACE, 2015).

The process used to identify the TSP was a risk management approach that included evaluation of the benefits and costs of an array of alternative solutions both structural and non-structural and took into account storm data, climate change and rising sea levels consistent with NACCS. The TSP beach nourishment alternative represents a solution that is adaptable to changing conditions and provides a solution that can be adapted through planned beach renourishment.

9.2 Cost Sharing and Non-Federal Sponsor Responsibilities

Cost Apportionment. The details of cost of apportionment of the TSP are shown in Table 21 and discussed below.

Table 19: Cost Apportionment

Hashamomuck Cove, Southold, New York Coastal Storm Risk Management TSP						
Cost Apportionment						
		Federal Share		**Non-Federal Share**		**Total Cost**
Project First Cost *,**						
Initial Construction, Cash Contribution	$	8,767,200	$	2,275,800	$	11,043,000
Real Estate Cost			$	2,445,000	$	2,445,000
Total First Cost	**$**	**8,767,200**	**$**	**4,720,800**	**$**	**13,488,000**
Continuing Construction *,***						
Beach Renourishment	$	2,124,000	$	2,124,000	$	4,248,000
Total Nourishment Cost	**$**	**10,891,200**	**$**	**6,844,800**	**$**	**17,736,000**
Annualized Berm Surveillance and Maintenance	$	-	$	8,800	$	8,800
Annual OMRR&R Cost ****	$	-	$	8,800	**$**	**8,800**
* FY 2016 Price Level						
** Shared based on 65% Federal and 35% non-Federal for initial construction						
*** Shared based on 50% Federal and 50% non-Federal for continuing construction						
*** OMRR&R 100% non-Federal						

Based on FY 2016 price levels, the estimated total nourishment cost is $17,736,000, which includes the project first cost of initial construction of $13,488,000 and a total of nine periodic renourishment cycles at a total cost of $4,248,000.

In accordance with the cost share provisions in Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. 2213), the Federal and non-Federal shares are as follows: a. The Federal share of the project first cost is estimated to be $8,767,200 and the non-Federal share is estimated to be $4,720,800, which equates to 65% Federal and 35% non-Federal. The non-Federal costs include the value of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas (LERRD) estimated to be $2,445,000. b. The Federal share of each future periodic renourishment is estimated to be $236,000 and the non-Federal share is estimated to be $236,000 which equates to 50% Federal and 50% non-Federal.

Annual OMRR&R costs, such as inspection costs and vegetation maintenance costs, are 100% non-Federal responsibility. The Federal government is responsible for preparing and providing an OMRR&R manual to the sponsor.

9.3 Design and Construction Considerations

Preconstruction, Engineering and Design. Because Hashamomuck Cove project has been included as a project under study as part of the Public Law 113-2 response to Hurricane Sandy, initial construction of the project would be authorized upon approval by the Assistant Secretary of the Army for Civil Works. Continuing construction (renourishment) described in this report would require congressional authorization for implementation. If agreeable to the parties involved, a Project Partnership Agreement could be entered into for initial construction of the project. The necessary pre-construction engineering and design (PED) could be cost shared under this Project Partnership Agreement (PPA), if there are sufficient Public Law 113-2 funds to complete initial construction of the project. PED is cost shared 65% Federal and 35% non-Federal.

Draft Schedule. The draft schedule for plan implementation was developed for planning and cost estimating purpose. See Appendix E, Cost Engineering for the proposed construction schedule. The construction duration for the TSP was estimated at 7-10 months. Environmental windows are not required for initial construction.

Table 20: Draft TSP Implementation Schedule

Hashamomuck, New York Coastal Storm Risk Management Project	
Implementation Schedule	Date
Submission of Chief's Report	
Chief Signs Report	April-17
Project Partnership Agreement (PPA)	
PPA Execution	Jul-17
Pre-Construction Engineering & Design (PED)	
Prepare Plans & Specifications &RFP	Nov-17
Contract Award	Jan-18
Construction	
Construction complete	2018

9.4 Real Estate Requirements

The draft real estate cost estimate is provided in Table 21 above. The real estate cost estimate and real estate requirements are detailed in the Real Estate Plan (Appendix F). The total lands and easements required in support of the TSP is approximately 15 acres required in permanent easements. Temporary easements needed for construction will be determined during the PED phase of the project. The project impacts approximately 80 parcels affecting about 75 private owners and 2 public owners.

9.5 Views of Non-Federal Sponsors and Other Agencies

The non-Federal sponsor has indicated their support for releasing this report for public and agency input. The non-Federal sponsor's support for the TSP will be confirmed through a Letter of Support following Public and Agency reviews.

9.6 Public Access

Public access to the project area is required by USACE public access requirements, which are identified in ER 1165-2-130, and based upon U.S.C 426e(d). The USACE policy requires public access points every one half mile, so that a visitor is never more than a quarter mile away from an access point while on the beach. In order for the project to be eligible for Federal and State cost-sharing, as described in Section 9.2 public use and access is required. The non-Federal sponsor for the project is responsible for developing and implementing the public access plan.

The purpose of the public access plan is to describe public accessibility to the project beach area. Requirements of the Public Access Plan are:

- Establish Access Points that are open to all on equal terms
- Public access points every one half mile, so that a visitor is never more than a quarter mile away from an access point within the project area
- Establish designated parking areas consistent with expected use

The "Public Access Concept Plan" provided here identifies one known location of public access, Southold Town Beach (Figure 17). Public access sites would also be needed in the Central and East Coves. It is acknowledged that the specific public access features would need to be further developed prior to a final report, and it is expected that these refinements would be made based upon public and agency input received during review of the draft report.

New York State's Coastal Management Program, as refined in the Town of Southold Local Waterfront Revitalization Program, provides enforceable public coast policies to ensure public access to coastal resources located in the Town of Southold. Policy 9 provides for public access to, and recreational use of, coastal waters, public lands, and public resources of the Town of Southold. Its subsections include:

9.1 Promote appropriate and adequate physical public access and recreation to coastal resources.
9.2 Protect and provide public visual access to coastal lands and waters from public sites and transportation routes where physically practical.
9.3 Preserve the public interest in and use of lands and waters held in public trust by the State and the Town of Southold.
9.4 Assure public access to public trust lands and navigable waters.
9.5 Provide access and recreation that is compatible with natural resource values.

Figure 17. Public Access Plan Concept

Chapter 10: Local Cooperation Requirements

The non-Federal Sponsor, would need to provide their support of the recommendations presented in this report and agree that they intend to execute a Project Partnership Agreement (PPA) for the recommended plan before the Draft Integrated Feasibility Report and Environmental Assessment can move forward to the Civil Works Review Board Milestone. A coordinated PPA package would be prepared subsequent to the approval of the Feasibility Report, which would reflect the recommendations of the report.

Federal implementation of the recommended project would be subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, including but not limited to:

a. Provide a minimum of 35 percent of initial project costs assigned to coastal and storm damage reduction, plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits, and 50 percent of periodic nourishment costs assigned to coastal and storm damage reduction, plus 100 percent of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do provide public benefits, and as further defined below:

(1) Provide, during design, 35 percent of design costs allocated to coastal and storm

damage reduction in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

(2) Provide all lands, easements, rights-of-way, including suitable borrow areas, and perform or assure performance of all relocations, including utility relocations, as determined by the Federal government to be necessary for the initial construction, periodic nourishment or operation and maintenance of the project;

(3) Provide, during construction, any additional amounts necessary to make its total contribution equal to 35 percent of initial project costs assigned to coastal and storm damage reduction plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function;

c. Participate in and comply with applicable Federal floodplain management and flood insurance programs; comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the flood risk management features;

d. Operate, maintain, repair, replace, and rehabilitate the completed project, or function portion of the project, at no cost to the Federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal government;

e. For so long as the project remains authorized, ensure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based;

f. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms;

g. At least twice annually and after storm events, perform surveillance of the beach to determine losses of nourishment material from the project design section and provide the results of such surveillance to the Federal government;

h. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating, or replacing the project;

i. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the project, except for damages due to the fault or negligence of the United States or its contractors;

j. Keep, and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, and other evidence are required, to the extent and in such detail as will properly reflect total cost of the project, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and local governments at 32 CFR, Section 33.20;

k. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal government determines to be necessary for the initial construction, periodic nourishment, operation and maintenance of the project;

l. Assume, as between the Federal government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way required for the initial construction, periodic nourishment, or operation and maintenance of the project;

m. Agree, as between the Federal government and the non-Federal sponsor, that the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

n. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law 99-662, as amended, (33 U.S.C. 2211(e)) which provide that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

o. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended, (42 U.S.C. 4601-4655) and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way necessary for construction, operation, and maintenance of the project including those necessary for relocations, the borrowing of material, or the disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

p. Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C.

2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled “Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army”; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (revising, codifying and enacting without substantive change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c)); and

q. Not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the non-Federal sponsor’s obligations for the project unless the Federal agency providing the funds verifies in writing that such funds are authorized to be used to carry out the project.

Chapter 11: Recommendations (DRAFT)

In making the following recommendations, I have given consideration to all significant aspects in the overall public interest, including environmental, social and economic effects, engineering feasibility and compatibility of the project with the policies, desires and capabilities of the State of New York and other non-Federal interests.

I recommend that the selected plan for coastal storm risk management at Hashamomuck Cove, Southold, New York, as fully detailed in this Integrated Feasibility Report and Environmental Assessment, be authorized for construction as a Federal project, subject to such modifications as may be prescribed by the Chief of Engineers.

The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of highest review levels within the Executive Branch. Consequently, the recommendations may be modified (by the Chief of Engineers) before they are transmitted to the Congress as proposals for authorization and implementing funding. However, prior to transmittal to Congress, the partner, the State, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

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

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