US Army Corps
of Engineers
Philadelphia District

DELAWARE BAY COASTLINE
DELAWARE AND NEW JERSEY
OAKWOOD BEACH
HURRICANE AND STORM DAMAGE REDUCTION PROJECT
SALEM COUNTY, NJ

DRAFT ENVIRONMENTAL ASSESSMENT (EA)

NOVEMBER 2013

PREPARED BY:

U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

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DELAWARE BAY COASTLINE
DELAWARE AND NEW JERSEY
OAKWOOD BEACH
HURRICANE AND STORM DAMAGE REDUCTION PROJECT
SALEM COUNTY, NJ
FINDING OF NO SIGNIFICANT IMPACT (FONSI)

In 1999, the United States Army Corps of Engineers, Philadelphia District, evaluated the environmental impacts associated with the construction of the Oakwood Beach Storm Damage Reduction Project, and prepared a Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), which was signed on 26 April 1999. The selected plan at Oakwood Beach consists of a 50-foot wide berm at an elevation of +6.0 feet NAVD for a total project length of 9,500 feet. The selected plan includes suitable beachfill with periodic nourishment to ensure the integrity of the design. The plan requires approximately 346,000 cubic yards of initial fill and advanced nourishment to be placed on Oakwood Beach and subsequent periodic nourishment of 33,000 cubic yards every 8 years for 50 years. Approximately 35.6 acres of shallow oligohaline to mesohaline aquatic habitat will be affected by the placement of beachfill, of these approximately 8.2 acres will be intertidal and 27.4 acres will be subtidal. The plan also includes the extension of five stormwater outfall pipes. Sand from the Reedy Island range of the Delaware River main channel will be used for beachfill at Oakwood Beach.

In compliance with the National Environmental Policy Act of 1969, as amended, and the White House's Council on Environmental Quality (CEQ) regulations, the Philadelphia District has prepared an Environmental Assessment (EA) to evaluate new information and proposed modified actions subsequent to the 1999 EA/FONSI. The Draft EA for the project was forwarded to the U.S. Environmental Protection Agency Region II, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the New Jersey and Delaware State Historic Preservation Offices, the New Jersey Department of Environmental Protection (NJDEP), the Delaware Department of Natural Resources and Environmental Control (DNREC) and all other known interested parties for comment.

The EA concludes that the proposed storm damage reduction project, if implemented, would not likely jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

The EA also concludes that the project can be conducted in a manner, which should not violate New Jersey's and Delaware's Surface Water Quality Standards. Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality

Certificate (WQC) was received from the NJDEP in 1999. A Section 401 WQC is being requested from the DNREC. Based on the information developed during preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(c) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Programs of New Jersey and Delaware. Federal consistency determinations for this project were provided by NJDEP and DE DNREC in 1999.

The project area does not include known properties listed on, or eligible for listing on the National Register of Historic Places (NRHP); therefore, the proposed project will have no effect on historic properties eligible for or listed on the NRHP.

The proposed Oakwood Beach Storm Damage Reduction Project will not significantly affect the quality of the human environment; therefore, an Environmental Impact Statement is not required.

_____ _____

Date

John C. Becking, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

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1.0 INTRODUCTION

This document is being issued pursuant to 33 CFR 230.10(a) and is intended to present and evaluate new information for the Delaware Bay Coastline – Delaware & New Jersey – Oakwood Beach Hurricane and Storm Damage Reduction Project located along the Delaware Bay coastline of New Jersey. The information in this document updates the previously published National Environmental Policy Act (NEPA) document, which is the Final Feasibility Report and Integrated Environmental Assessment (EA) (dated April 1999). A Finding of No Significant Impact was signed on April 26, 1999. To minimize duplication, only items involving new pertinent information and changes in the plan as previously proposed are addressed in this document. Items covered previously in the Final Feasibility Report and Integrated EA are incorporated by reference and are referenced herein as USACE (1999), unless otherwise specified. USACE (1999) can be accessed by the following link:

http://www.nap.usace.army.mil/Missions/CivilWorks/PublicNoticesReports.aspx

Oakwood Beach is a bayfront community located in Elsinboro Township, Salem County, New Jersey in the upper region of the Delaware Bay (Figure 1). Oakwood Beach is located near the mouth of the Salem River within the transitional area of the Delaware River and Bay. Although the project is located along the New Jersey shoreline, the affected area is within State of Delaware waters up to the mean low water line of Oakwood Beach, and also includes the proposed sand source in the Reedy Island Range of the Delaware River . The project area limits extend from the Salem River southwest to Elsinboro Point, a distance of approximately 3 miles (Figure 2). Significant beach erosion has left the project area vulnerable to storm damages. Continued erosion has resulted in a reduction in the height and width of the beach.

USACE (1999) evaluated alternative plans of improvement formulated on storm damage reduction benefits and reduced Federal maintenance dredging benefits. The selected plan at Oakwood Beach consists of berm restoration utilizing sandy beachfill with periodic nourishment. Sand dredged from the Reedy Island Range of the Delaware River main navigation channel would be used for the beachfill.

The New Jersey Department of Environmental Protection (NJDEP) is the non-Federal sponsor for this project.

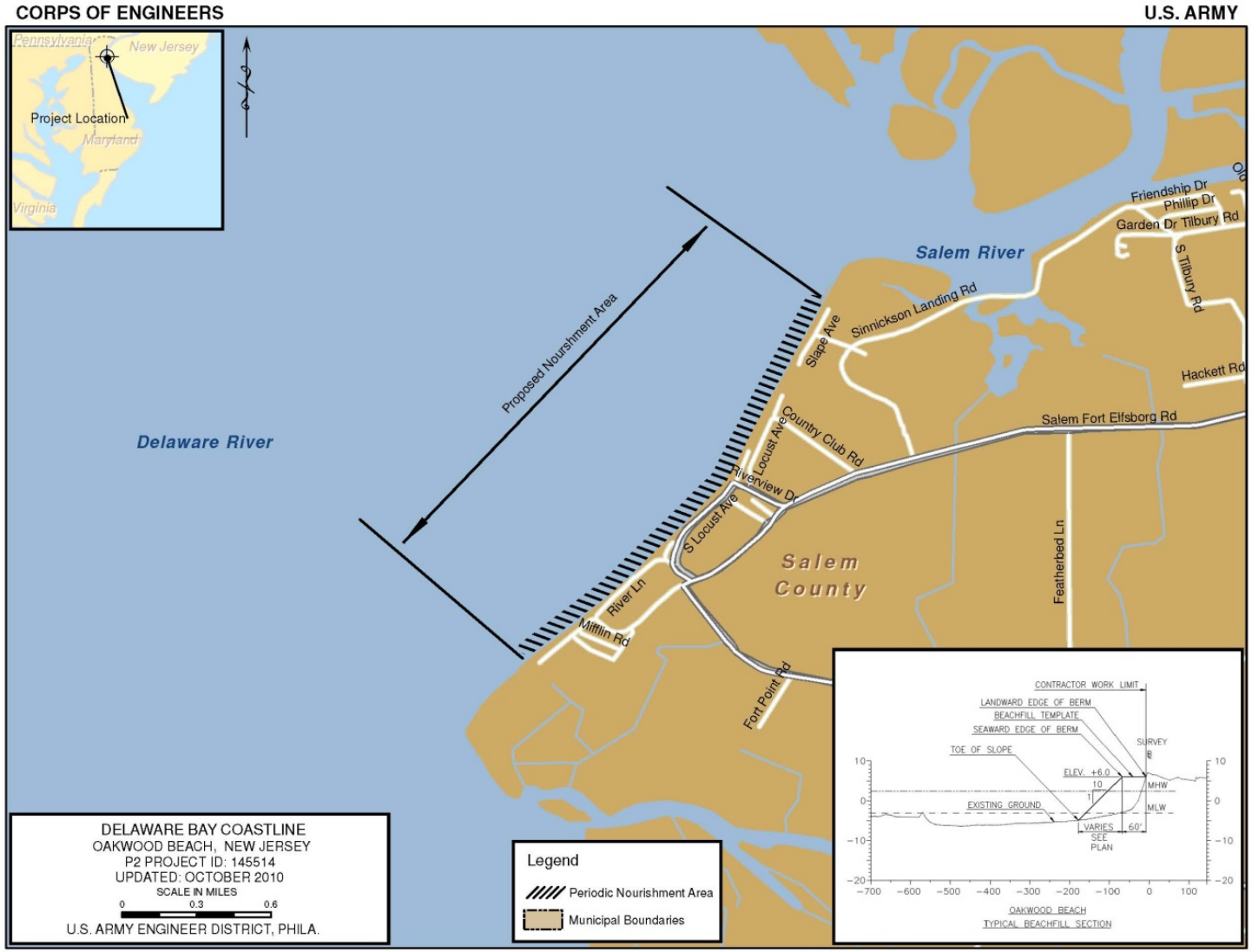


Figure 1. Project Vicinity

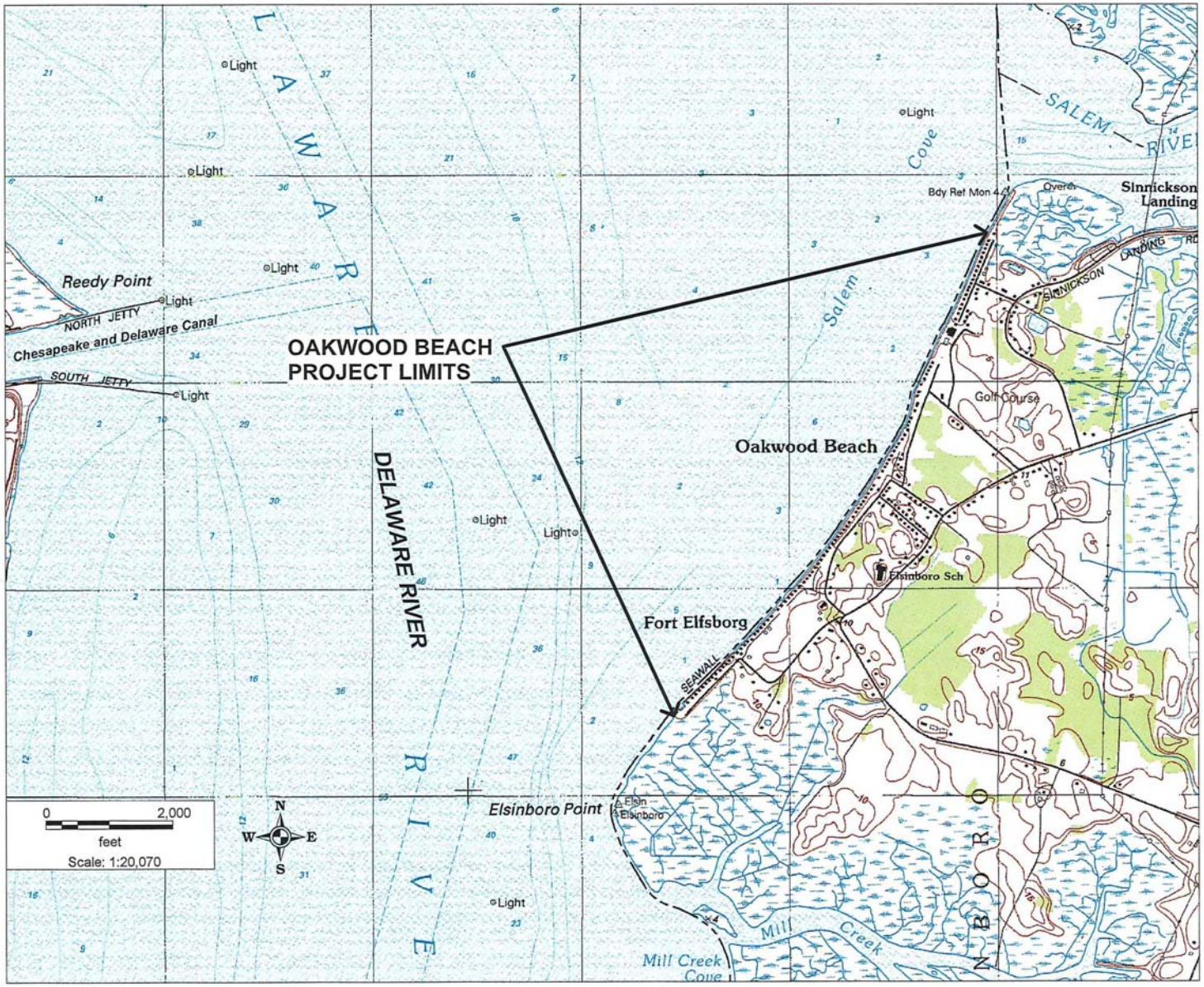


Figure 2. Project Area Limits

2.0 PURPOSE AND NEED

As presented in USACE (1999), the purpose of this project is to provide hurricane and storm damage reduction for the next 50 years, for the community of Oakwood Beach in Elsinboro Township, Salem County, New Jersey, based on this bayfront community's vulnerability to storm damages. Problems identified in the project area include 1) long term shoreline erosion as a result of natural forces; 2) storm damage vulnerability with potential for storm-induced erosion, inundation and wave attack exacerbated by long term erosion; and 3) shoreline erosion as a result of Federal navigation projects in the vicinity.

Subsequent to USACE (1999), the project area has experienced several significant storm events, most notably the Nor'Ida Storm of 2009, Hurricane Irene in 2011, and Hurricane Sandy in October 2012, which has caused severe economic damages in the region. The proposed Federal storm damage reduction project would address the identified problems over the next 50 years, thereby providing a long-term commitment to this vulnerable bayfront community. In response to Hurricane Sandy, the project schedule for implementation is being expedited in accordance with P.L. 113-2: Disaster Relief Appropriations Act (FY 2013) for authorized Federal projects in areas affected by Hurricane Sandy that have not been constructed.

3.0 ALTERNATIVES CONSIDERED

In USACE (1999), a number of structural and non-structural storm damage reduction alternatives were identified and evaluated individually and in combination on the basis of their suitability, applicability and merit in meeting the planning objectives, planning constraints, economic criteria, environmental criteria and social criteria for the study.

Three levels of screening investigated an array of structural and non-structural alternatives that address storm damage reduction. This screening involved the following alternatives:

a. Non-structural measures

(1) No Federal Action
(2) Floodplain Management
(3) Permanent Evacuation

b. Structural measures

(1) Berm Restoration
(2) Berm Restoration With Dune
(3) Groins

(4) Bulkheads
(5) Offshore Detached Breakwater
(6) Seawall
(7) Perched Beach
(8) Revetment

Several sand sources were evaluated in USACE (1999). A 1.9-mile long segment of the Delaware River Navigation Channel within the Reedy Island Range was selected, which provides economic benefits for maintenance of the Federal navigation channel.

4.0 PROPOSED PROJECT, EXISTING CONDITIONS, AND NO ACTION

4.1 Proposed Oakwood Beach Plan

The selected plan at Oakwood Beach consists of a 50-foot wide berm at an elevation of +6.0 feet NAVD for a total project length of 9,500 feet (Figures 3 to 6). The selected plan includes suitable beachfill with periodic nourishment to ensure the integrity of the design. The plan requires 346,000 cubic yards of initial fill and advanced nourishment to be placed on Oakwood Beach and subsequent periodic nourishment of 33,000 cubic yards every 8 years for 50 years. Additionally, the plan includes the extension of five stormwater outfall pipes that range in size from 10 inches to 24 inches in diameter with extensions ranging from 54 feet to 162 feet (Figure 7). These outfall extensions will be supported by timber cribbing mounted on 20-foot long and 12-inch diameter timber piles spaced 18-feet apart. Sand from the Reedy Island Range of the Delaware River main channel will be used for beachfill at Oakwood Beach (Figure 8). The northern extent of the borrow area lies directly adjacent to the northern limit of Reedy Island in the Reedy Island range of the Delaware River. The proposed borrow area extends from this point approximately 1.9 miles down-river. There is an estimated quantity of 1.0 million cubic yards of beach quality sand located in this borrow area to a depth of -51 feet mean lower low water (MLLW).

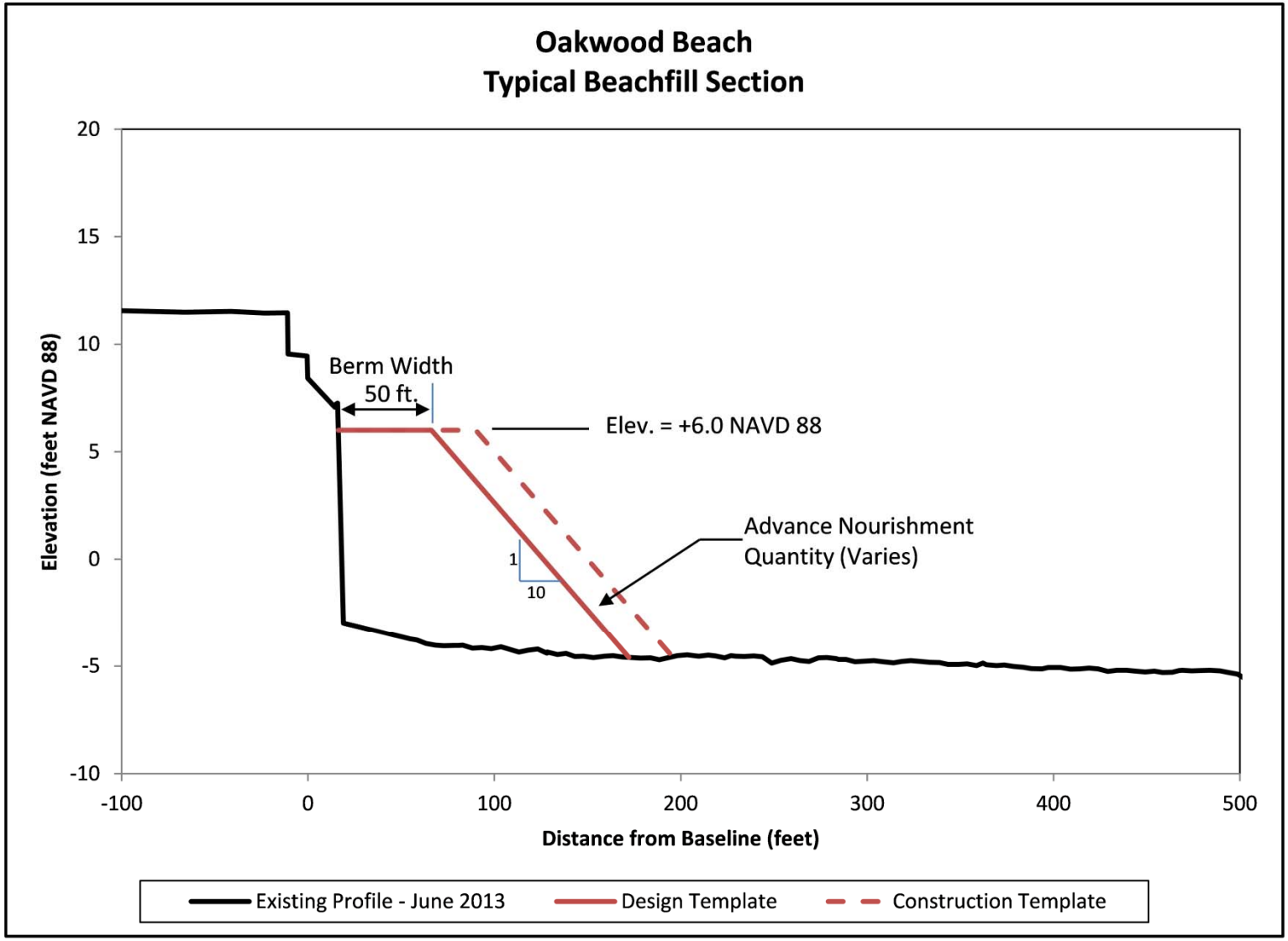


Figure 3. Selected Plan Design Template for Oakwood Beach (Note: Mean High Water = +2.55 ft. NAVD; Mean Low Water = -2.79 ft. NAVD**)**

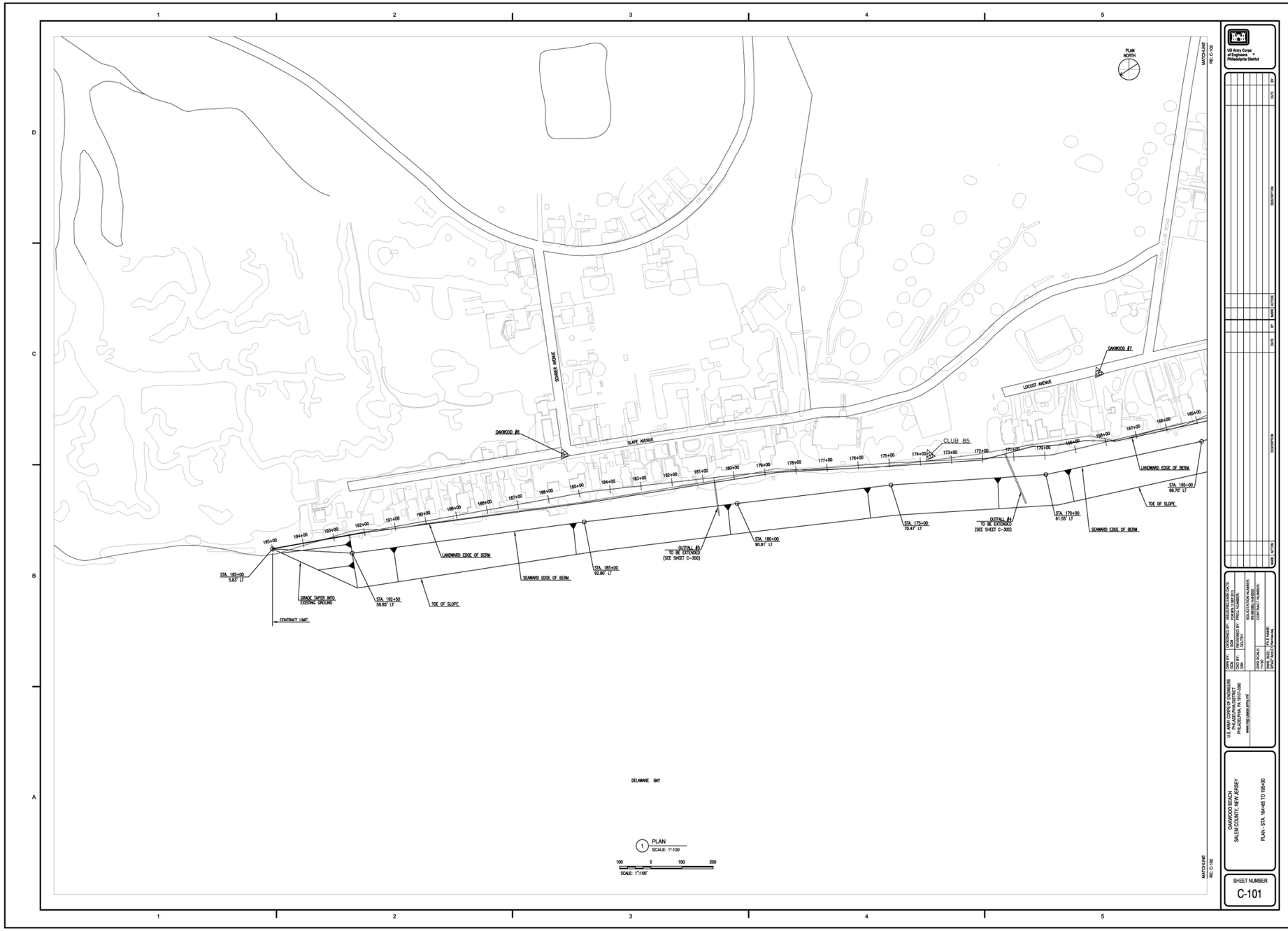


Figure 4. Proposed Plan Layout (North End)

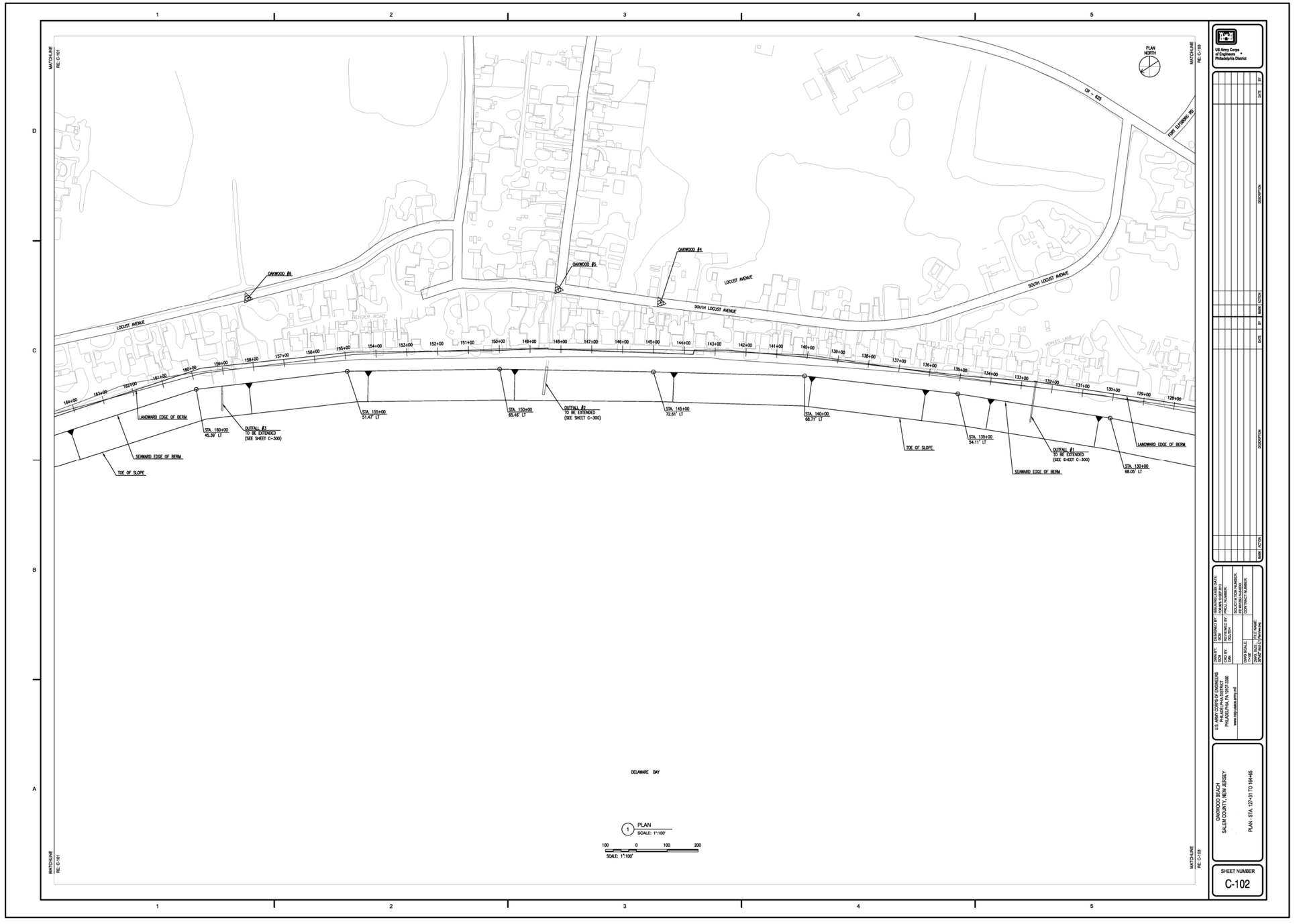
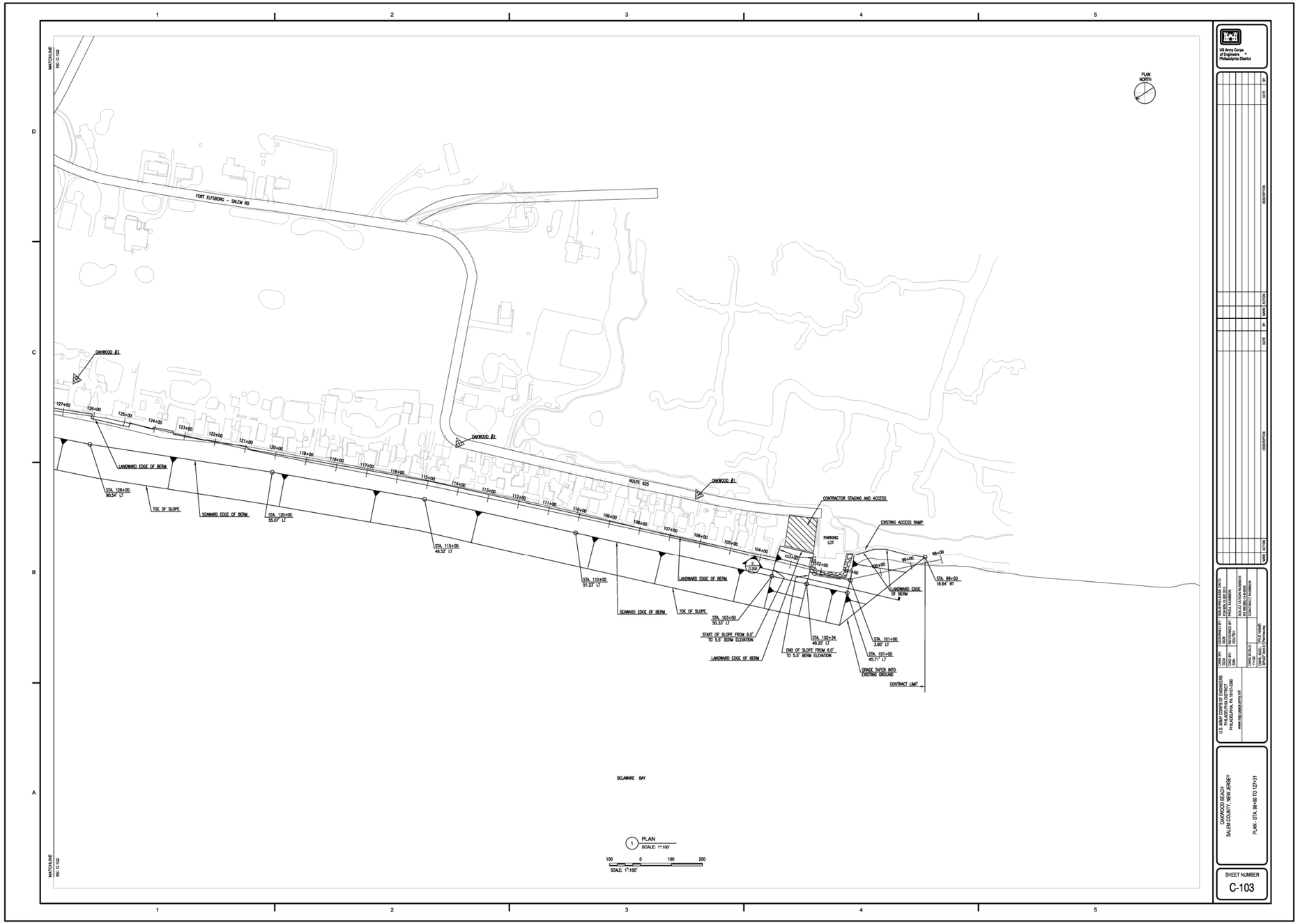


Figure 5. Proposed Plan Layout (Middle Portion)



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OAKWOOD BEACH
SALEM COUNTY, NEW JERSEY

PLAN - STA. 99+00 TO 127+31

SHEET NUMBER
C-103

Figure 6. Proposed Plan Layout (Southern End)

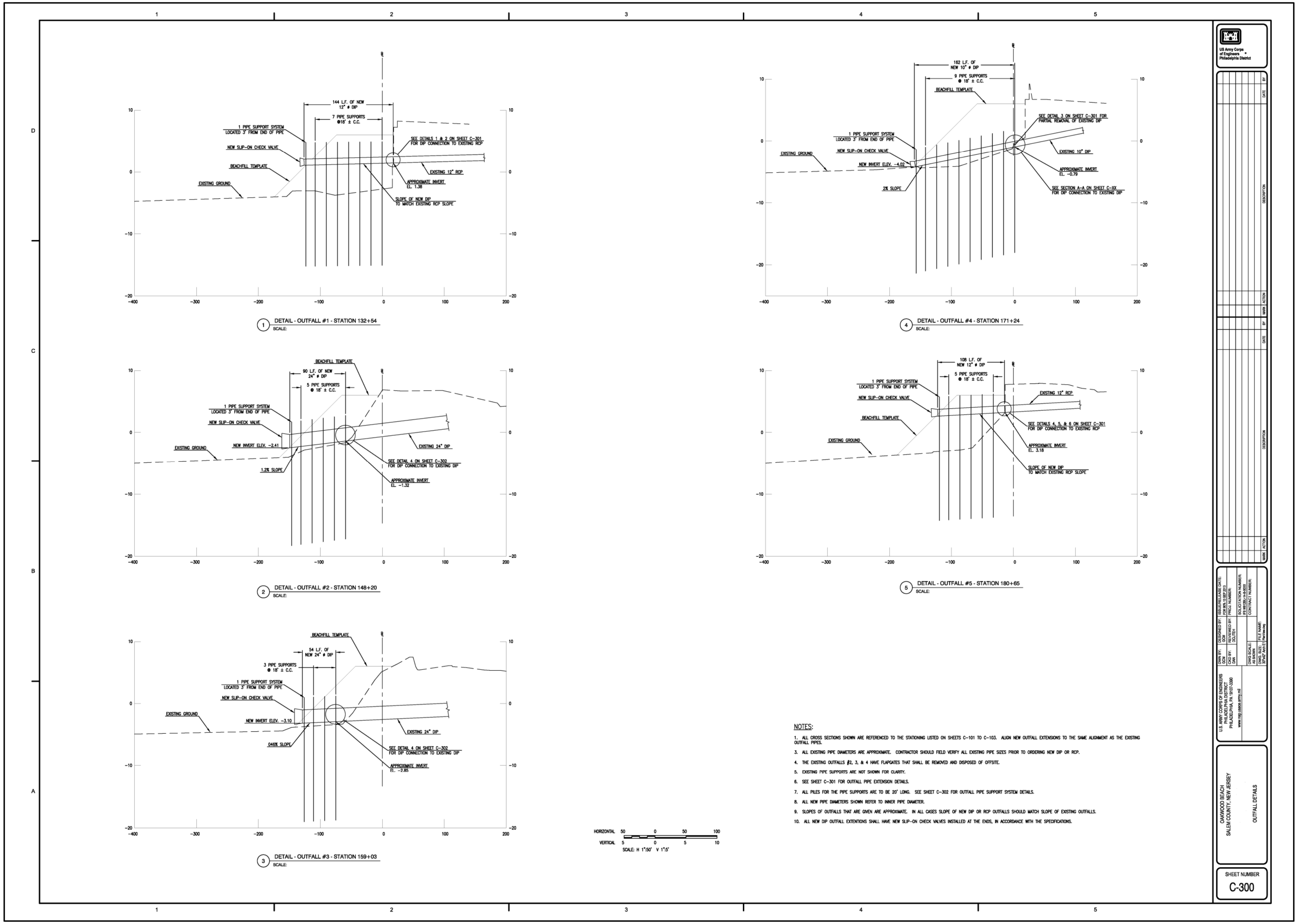

Figure 7. Proposed Outfall Extensions (X-Sections)

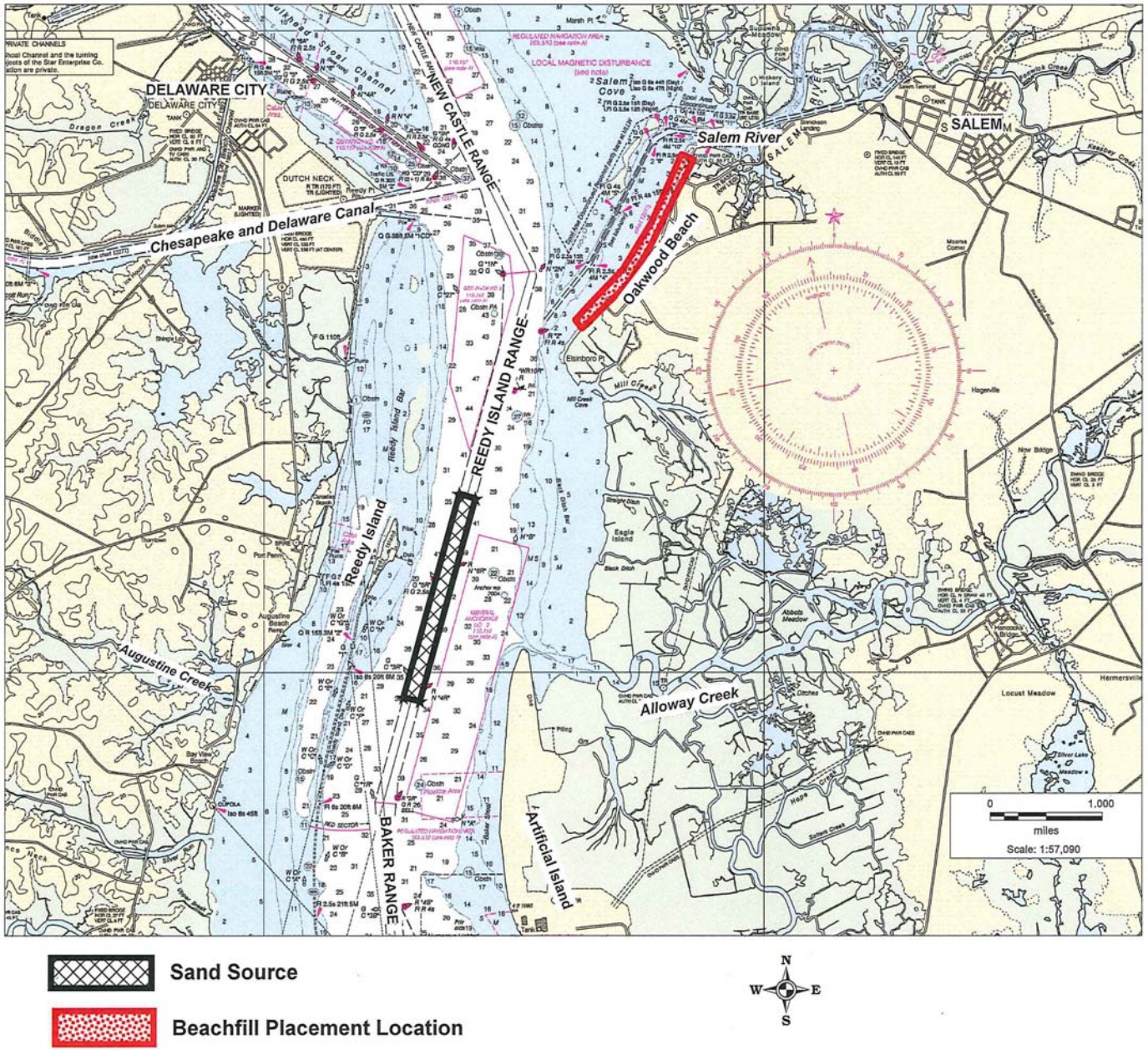

Figure 8. Oakwood Beach Sand Source/Borrow Area - Delaware River Main Channel

4.2 Project Plan Changes

There have been no significant changes to the project subsequent to USACE (1999). The project linear extents, the design template, the sand source location, and the periodic nourishment cycles have not been significantly modified subsequent to USACE (1999). However, changes have occurred in the sand quantities required, stormwater outfall extensions, and channel deepening that has occurred within the sand source. It should be noted that significant beach erosion was documented in USACE (1999) where the Oakwood Beach shoreline was mainly composed of a mixture of hardened structures including stone revetments, concrete revetments, and bulkheads that left very little sandy beach at low tide. This condition has remained relatively unchanged since 1999.

4.2.1 Sand Quantity Changes

The sand quantity required to construct the project has increased from 332,000 cubic yards in the feasibility study to 346,000 cubic yards based on current surveys of the beach area (June 2013). The 346,000 cubic yards includes an advance nourishment quantity of 33,000 cubic yards. The project includes the periodic nourishment of approximately 33,000 cubic yards of sand every 8 years, which is 1,000 cubic yards more than the estimate provided in USACE (1999).

4.2.2 Stormwater Outfall Extension Changes

Subsequent to USACE (1999) an additional three stormwater outfalls were evaluated that require extensions, which increases the number of required outfall extensions from two to five (Figure 7). These stormwater outfall pipes that range in size from 10 inches to 24 inches in diameter with extensions ranging from 54 feet to 162 feet (Figure 7). These outfall extensions will be supported by timber cribbing mounted on 20-foot long and 12-inch diameter timber piles spaced approximately 18-feet apart. Combined, these outfalls will occupy approximately 0.06 acres of existing intertidal habitat that will be filled with beachfill.

4.2.3 Affected Aquatic Habitat Changes

USACE (1999) provided estimates of aquatic habitat affected by sand fill placement within the intertidal and subtidal portions along the Oakwood Beach shoreline. In USACE (1999), it was estimated that approximately 23.7 acres of shoreline would be covered with sand, which would have included 3.3 acres of intertidal habitat and 20.4 acres of subtidal habitat (below mean low water). As part of this environmental assessment, new estimates of affected aquatic habitat were conducted.

Based on the current construction template, approximately 35.6 acres of aquatic habitat (below mean high water) would be impacted by fill placement along the shoreline. This includes approximately 8.2 acres of intertidal habitat composed of either hardened erosion control structures or natural soft bottom and 27.4 acres of soft bottom subtidal habitat. Approximately 19.4 acres of this would be converted to upland (above mean high water). Approximately 8.2 acres of existing intertidal area composed of hardened structures and natural (sand and clay) substrates would be converted to approximately 12.2 acres of sandy intertidal habitat. The differences in estimates from USACE (1999) and current estimates are likely attributed to increases of fill material required and inclusion of advanced nourishment (sacrificial portion of project template) in the construction template. Also, it is not certain if the estimate for intertidal habitat impacts in USACE (1999) included the hardened substrates that were placed by residents along the shoreline.

4.2.4 Sand Borrow Source Change

The Delaware River Main Navigation Channel has been deepened from -40 ft. MLLW to -45 ft. MLLW (Mean lower low water [MLLW] is the vertical datum used for the Delaware River Main Channel navigation project) in 2012 and 2013 as part of the Delaware River Main Channel Deepening Project (DRMCD). The proposed sand source is located within the Reedy Island Range of the Delaware River. According to the most recent channel surveys, approximately 56% of the sand source within the Reedy Island Range was already naturally deep, and did not require any dredging to -45 ft. Approximately 44% of the sand source was deepened to -45 feet. The dredging plan for the Oakwood Beach sand source allows a dredging depth to -50 ft (+1 foot over-dredge depth). Based on the most recent navigation channel hydrographic surveys obtained in June 2012, there are approximately 1,000,000 CY of sand available within the limits of the borrow area above the plane of -51 feet MLLW. Thus, there is sufficient sand available within the borrow area limits for initial construction, periodic nourishment, and major renourishment activities over the life of the project. Therefore, the DRMCD project is not expected to have a significant effect on the quantity and quality of the sand resources available for the Oakwood Beach project.

4.3 Affected Environment Changes

Several changes to the project affected environment subsequent to USACE (1999) have occurred. On 26 November 2004, the M/T *ATHOS I (Athos)* struck a large, submerged anchor while preparing to dock at a refinery in Paulsboro, New Jersey. The anchor punctured the vessel's bottom, resulting in the discharge of nearly 265,000 gallons of crude oil into the Delaware River and nearby tributaries. The January 2009 Draft Damage Assessment and Restoration Plan and Environmental Assessment for the November 26, 2004, M/T Athos I Oil Spill (NOAA, 2009) concluded that the Athos Oil Spill only temporarily (14 months) contributed to an increase in toxicity of sediments in the Delaware River. Similarly, sediment sampling conducted by the USACE in 2005 (Versar, 2005b) also indicates that there has been no change in sediment quality. Therefore, based on this and the distance of the project area downstream from the spill

(approximately 23 miles), it has been determined that the Athos Oil Spill will have no significant adverse effect on construction or maintenance of the project by dredging the borrow area within the Delaware River Main Channel.

In 2012, dredging commenced to deepen the Delaware River Federal Navigation channel from -40 ft. (MLLW) to -45 ft. (MLLW) within Reach D of the Delaware River Main Channel Deepening (DRMCD) Project. The Reedy Point Range is within Reach D of the DRMCD Project, and the deepening work was completed in May 2013. This portion of the channel is now to be maintained at -45 ft. MLLW, although maintenance dredging of this area has not been required to date. As discussed in 4.2.3, the plan for the Oakwood Beach project was to dredge the borrow area within the Reedy Island Range to -51 ft. (MLLW) for beachfill sand. The sand quantity available after DRMCD completion of Reach D was reevaluated, and found to contain suitable quantities for the initial construction and periodic nourishment of the Oakwood Beach Project.

4.4 Regulatory Changes

On October 6, 2010, the National Marine Fisheries Service (NMFS) published a Notice in the Federal Register proposing to list three Distinct Population Segments (DPSs) of Atlantic sturgeon (*Acipenser oxyrhinchus oxyrinchus*) in the Northeast Region. The New York Bight DPS, which includes Atlantic sturgeon whose range occurs in watersheds that drain into coastal waters, including Long Island Sound, the New York Bight, and the Delaware Bay, from Chatham, MA to the Delaware-Maryland border on Fenwick Island, as well as wherever these fish occur in coastal bays, estuaries, and the marine environment from Bay of Fundy, Canada to the Saint Johns River, FL, was proposed for listing as endangered. On February 6, 2012, NMFS issued two final rules (77FR 5880 and 77 FR 5914) listing five DPSs of Atlantic sturgeon as threatened or endangered under the Endangered Species Act (ESA). The effective date of the listing was April 6, 2012. In 2012, the Philadelphia District reinitiated consultation in accordance with 50 CFR 402.14(c) under Section 7 of the Endangered Species Act to address the Delaware River Main Channel Deepening Project's effects on Atlantic Sturgeon. A Biological Assessment (BA) was prepared by the Philadelphia District and submitted to the NFFS. The NMFS subsequently issued a Biological Opinion dated July 11, 2012 for the DRMCD and maintenance of the 45-foot channel, which included four geographically distinct population segments of the Atlantic sturgeon, the shortnose sturgeon, and four species of sea turtles. In this opinion, NMFS concluded that the proposed action is likely to adversely affect, but not likely to jeopardize the continued existence of endangered shortnose sturgeon, the threatened Gulf of Maine Distinct Population Segment (DPS) of Atlantic sturgeon, the endangered New York Bight, Chesapeake Bay, or South Atlantic DPS of Atlantic sturgeon; the Northwest Atlantic DPS of loggerhead sea turtles or Kemp's ridley sea turtles. NMFS also concluded that the proposed action may affect, but is not likely to adversely affect, green or leatherback sea turtles. The project impacts are discussed further in Section 6.6.

In 2011, anadromous fish collectively called river herrings: alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*), were designated as candidate species for listing under the Endangered Species Act (ESA). Anadromous fish such as river herrings migrate through the Delaware Bay to reach freshwater tributaries for spawning or growth to maturity. However, on August 9, 2013, NMFS determined that neither species are threatened or endangered, therefore, listing under the Federal Endangered Species Act is not warranted at this time. NMFS still has concerns about the status and threats to these species. As a result, both species are still included on their Species of Concern list (accessed from NERO website on 9/11/2013 http://www.nero.noaa.gov/stories/2013/riverherringlisting.html).

Subsequent to USACE (1999), the *rufa* subspecies of the red knot (*Calidris canutus rufa*) was added to the list of Federal candidate species in 2006 due to the high magnitude of imminent threats to the subspecies, and the U.S. Fish and Wildlife Service (USFWS) is currently determining whether to designate it as threatened or endangered. Since 2006, listing has been precluded by other, higher priority listing actions. The Service is now preparing a Proposed Rule to list the species as either threatened or endangered. The Service must also consider whether there are areas of habitat believed to be essential to red knot conservation. If prudent and determinable, those areas will be proposed for designation as Critical Habitat. Transient red knots may be found anywhere along New Jersey's coasts. Concentrations of migrating birds are known to occur in Cumberland, Cape May, and Atlantic Counties ("Red Knot - New Jersey Field Office - U.S. Fish & Wildlife Service." *Red Knot - New Jersey Field Office - U.S. Fish & Wildlife Service*. N.p., n.d. Web. 24 July 2013. http://www.fws.gov/northeast/njfieldoffice/endangered/redknot.html).

4.5 No Action

The no Federal action alternative does not involve any Federal measure to provide erosion control or storm and inundation damage protection to structures landward of the bayfront. This alternative would not stop or reduce the continuing erosion of the beach, nor would it prevent property from being subjected to higher storm damages from beach recession, flooding, and wave attack. No Action is likely to perpetuate existing conditions, which would be the continued use of non-uniform hardened structures placed by individual homeowners along the riverfront. The environmental effects of No Action were discussed in USACE (1999), and no significant changes or new impacts are expected subsequent to that document. No Action is not expected to adversely affect wetlands, fish and wildlife resources, threatened and endangered species, air quality, noise, cultural resources and recreation. Adverse effects of No Action would be the continued loss of beach habitat to soft-bottomed benthic organisms and the introduction of non-point source pollution from continued erosion, which could have minor direct impacts on water quality in the area and indirect impacts on aquatic biota.

5.0 AFFECTED ENVIRONMENT

USACE (1999) provided a discussion on affected resources within the project area. A review of the affected environment resources was conducted to determine if significant changes have occurred subsequent to USACE (1999). This review is presented as Table 1. Resource topics that do not require further discussion are incorporated by reference. Resources that require further discussion are presented as indicated in Table 1.

Table 1. Status of Affected Resources

Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
General Environmental Setting	USACE (1999)	No	No further discussion.
Site Geology and Groundwater	USACE (1999)	No	No further discussion.
Air Quality	USACE (1999)	Yes	A new updated CAA analysis is required.
Water and Sediment Quality	USACE (1999)	Yes	New data evaluated (DRBC, 2012).
Vegetation and Wetland Habitats	USACE (1999)	No	No wetland areas in affected project area, but an important resource in region. Discussion from USACE (1999) added.
Beach and Intertidal Habitat	USACE (1999)	No	As discussed in USACE (1999), the shoreline is comprised of an eroding sandy beach with underlying clay exposures. This shoreline is composed of haphazard hardened structures where little or no sandy beach exists at high tide.
Shellfish	USACE (1999)	Yes	Channel deepening has occurred, but no

Table 1. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
			significant changes to resource or new info.
Finfish	USACE (1999)	Yes	Channel deepening has occurred, but no significant changes to resource or new info.
Essential Fish Habitat	Was not performed in USACE (1999)	Yes	No EFH assessment in USACE (1999).
Benthos	USACE (1999)	Yes	Channel deepening has occurred recently resulting in some bottom disturbance to benthic community in channel borrow area. No significant changes to shoreline intertidal and subtidal benthos.
Wildlife (non-T/E)	USACE (1999)	Yes	Channel deepening has occurred. No significant changes , but discussion from USACE (1999) added.
Threatened and Endangered Species	USACE (1999)	Yes	Atlantic sturgeon listing requires Section 7 consultation. A BO was issued for the Delaware River Deepening in 2012.
Recreation	USACE (1999)	No	
Land Use	USACE (1999)	No	
Visual and Aesthetic Values	USACE (1999)	No	
Cultural Resources	USACE (1999)	No	No significant changes, but

Table 1. Status of Affected Resources			
Resource Topic	**Incorporate By Reference**	**Have There Been Any Significant Changes or New Information Since USACE (1999)?**	**Notes**
			discussion from USACE (1999) was included.
Hazardous, Toxic and Radioactive Waste (HTRW)	USACE (1999)	Yes	Changes to NJ residential soil standards and DE soil screening criteria . No new sources identified.
Socioeconomics	USACE (1999)	Yes	Socioeconomics were updated since the 1999 Feasibility Study/EA.

5.1 Air Quality

The Environmental Protection Agency (EPA) adopts National Ambient Air Quality Standards (NAAQS) for the common air pollutants, and the states have the primary responsibility to attain and maintain those standards. Through the State Implementation Plan (SIP), The New Jersey Department of Environmental Protection – Division of Air Quality manages and monitors air quality in the state. The goal of the State Implementation Plan is to meet and enforce the primary and secondary national ambient air quality standards for pollutants. New Jersey air quality has improved significantly over the last 40 years, but exceeds the current standards for ozone (O_3) throughout the state and fine particles (PM_{10} or $PM_{2.5)}$ in many urban areas. New Jersey has attained the sulfur dioxide (SO_2) (except for a portion of Warren County), lead (Pb), and nitrogen dioxide (NO_2) and Carbon Monoxide (CO) standards. The New Jersey Division of Air Quality also regulates the emissions of hazardous air pollutants (HAPs) designated by the federal EPA ("NJDEP Division of Air Quality." *NJDEP Division of Air Quality*. N.p., n.d. Web. 15 July 2013. <http://www.state.nj.us/dep/daq/>.)

The Clean Air Act requires that all areas of the country be evaluated and then classified as attainment or non-attainment areas for each of the National Ambient Air Quality Standards. Areas can also be found to be “unclassifiable” under certain circumstances. The 1990 amendments to the act required that areas be further classified based on the severity of non-attainment. The classifications range from

"Marginal" to "Extreme" and are based on "design values". The design value is the value that actually determines whether an area meets the standard. For the 8-hour ozone standard for example, the design value is the average of the fourth highest daily maximum 8-hour average concentration recorded each year for three years. Their classification with respect to the 8-hour standard is shown in Figure 9. Ground-level ozone is created when nitrogen oxides (NOx) and volatile organic compounds (VOC's) react in the presence of sunlight. NOx is primarily emitted by motor vehicles, power plants, and other sources of combustion. VOC's are emitted from sources such as motor vehicles, chemical plants, factories, consumer and commercial products, and even natural sources such as trees. Ozone and the pollutants that form ozone (precursor pollutants) can also be transported into an area from sources hundreds of miles upwind. The project area falls within the Delaware Bay Region, which covers Salem and Cumberland Counties. The entire state of New Jersey is in non-attainment and is classified as being "Marginal." A "Marginal" classification is applied when an area has a design value of 0.085 ppm up to but not including 0.092 ppm (NJDEP, 2012 Ozone Summary).

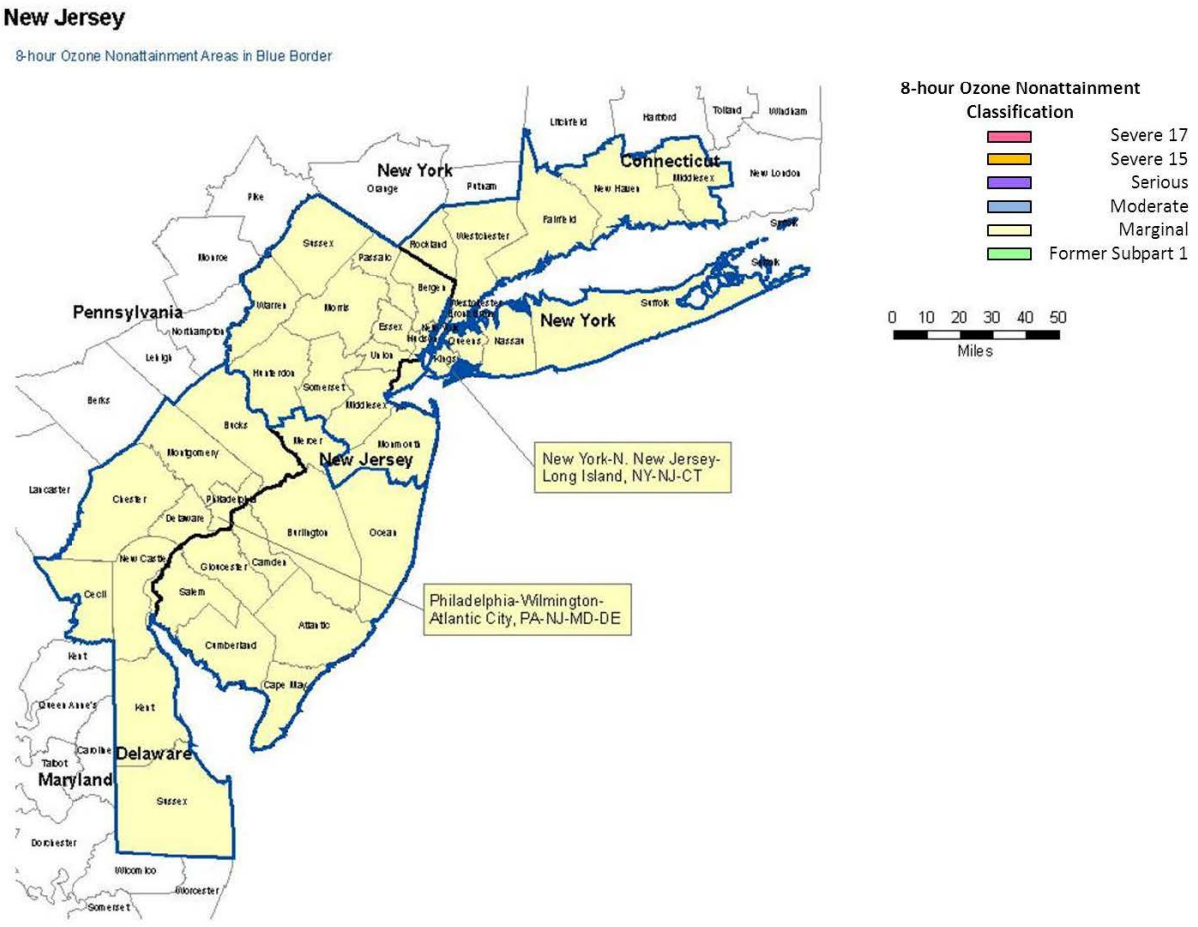

Figure 9. New Jersey Non-Attainment Areas for Ozone (Source: NJDEP, 2012).

5.2 Water Quality and Sediment Quality

Water quality in this portion of the Delaware estuary is generally characterized as fair to good. This portion of the estuary is a transition zone between urbanized upstream areas and rural Delaware Bay. This zone is also the transitional area between the freshwater habitats upstream and more saline areas downstream. The salinity ranges from 0.5 to 5.0 ppt (USACE, 1999), but a measurement as high as 15 ppt was observed in the project area (see Figure 11). The largest salinity variation occurs around, and below the C&D Canal, this limits the organisms that can inhabit this region to a relatively few hearty species (Sutton, 1996) (USACE, 1999). The Delaware River Basin Commission (DRBC) is responsible for managing the water resources within the entire Delaware River Basin. Pursuant to Section 305(b) of the Clean Water Act, the DRBC prepares biennial assessments of water quality for the Delaware River. In order to more accurately characterize the entire river, the DRBC has divided the area into six water quality zones. The study area falls into zone five, which extends from the Pennsylvania-Delaware-New Jersey border at Marcus Hook to Liston Point, Delaware. The DRBC prepared a 305(b) report in 2012 (DRBC, 2012). This report provides an assessment of waters in the Delaware River and Bay for support of various designated uses in accordance with Section 305(b) of the Clean Water Act and identifies impaired waters, which consist of waters that do not meet Delaware River Basin Commission's (DRBC) Water Quality Regulations (18 CFR 410). It assesses data compiled from October 1, 2006 through September 30, 2011 (a five-year data window) into the 2012 Delaware River and Bay Water Quality Assessment (2012 Assessment). The composite aquatic life assessment for 2012 yields a result of "Not supporting" for all assessment units (Table 2). It is important to note, however, that this result is largely driven by the requirement to categorize as not meeting criteria any assessment unit with 1 exceedance plus 1 confirmatory exceedance.

Table 2. Aquatic LIfe Designated Use Assessment Results For Zone 5 (DRBC, 2012)

Zone (Assessment Unit)	DO	pH	Turbidity	Temperature	TDS	Alkalinity	Toxic Pollutants	Biological Assessment	2012 Composite	2010 Composite
5	-[A]	+	-	-[A, B]	N/A	+	-	NC	NS[E]	NS[E]

Notes:
+ - meets criteria
- - Does not meet criteria
A – Rate of criteria exceedance is below the historical threshold of 10%.
B – Temperature criteria exceedance may be driven, in part, by meteorologic and atmospheric

conditions. The proportion of temperature exceedance caused by controllable anthropogenic inputs is unknown at this time.
NC – No criteria developed.
E – Based primarily on fewer than 10% exceedances of criteria
NS – The assessment does not support the designated use
N/A – The parameter is not applicable in this assessment unit

For dissolved oxygen in Zone 5, all of the seasonal criteria have been met, but 96% of the daily observations met criteria. Observed turbidity levels in Zone 5 are more problematic, where only 37% of turbidity observations met criteria. However, DRBC (2012) suggest that the turbidity exceedances could possibly be more of a natural phenomenon based on the estuary turbidity maximum, which spans this zone, instead of a pollution problem. Temperature for the most part met criteria (98.8% of the observances), and DRBC notes that the exceedances may be more attributable to meteorologic and atmospheric inputs, but the amount of anthropogenic inputs in this area is less understood. For toxic contaminants, data showed exceedances of DRBC acute marine stream quality objective for copper in Zone 5 as well as exceedances of the DRBC chronic freshwater stream quality objective for copper in Zone 5. DRBC notes that "assessment of metals in ambient water is complicated by factors such as field sampling and analytical issues with contamination, the applicability of DRBC's freshwater or marine criteria, and the influence of other water quality attributes that influence the partitioning and toxicity of copper." In DRBC (2012), criteria for fecal coliform bacteria and enterococcus bacteria were met in Zone 5 to support the classification that this zone fully supports primary and secondary recreational uses. Fish consumption is not a supported use in all zones based on fish consumption advisories in Pennsylvania, Delaware and New Jersey. In Zone 5, both States of Delaware and New Jersey have a no consumption advisory from the State line to the Chesapeake and Delaware Canal for the presence of mercury, PCBs, Dioxin, and chlorinated pesticides in fish tissue. From the C & D Canal to the head of Delaware Bay, the State of Delaware has fish consumption advisories for 1) weakfish and bluefish (1 meal/month – PCBs); 2) white perch, American eel, channel catfish, white catfish and bluefish > 14 inches (1 meal/yr.; PCBs and mercury); and 3) striped bass (2 meals/yr.; PCBs and mercury) (DRBC, 2012).

As discussed in USACE (1999), the State of New Jersey (NJDEP, 1997) states that testing of dredged material for contaminants will not always be necessary. Several cases are presented that allow for testing exclusions. In this document, Case 1 is for sand and is the only applicable case. Case 1 states: "No further testing will be required if the material to be dredged is greater than 90% (grain size >0.0625) and other background information (for example, no known historical spills or discharges of pollutants in the project area, previous sediment chemistry data, etc.) do not lead the Department to believe the material may be contaminated." The percentage of sand in the sediment for Reedy Island Range of the Delaware River is above this criterion.

Sediment quality was addressed in USACE (1999) citing an investigation (Urie and Ettinger, 1995) where two vibracores (DRV 13-194 and DRV-14-94) were collected (within the proposed sand source or in close proximity to the sand source) to provide

physical and chemical characteristics of the sediments in support of the Delaware River Main Channel Deepening (DRMCD) Project. Although core # DRV-13-94 is about 500 feet upstream of the delineated sand source, the top and bottom segments of this core are 98.7 % and 94% sand (grain size > 0.075) respectively, while core# DRV-14-94 (located about 2,600 feet above the downstream end of the sand source) top and bottom segments are 95% and 96.7% sand (grain size > 0.075) respectively.

Additional physical sediment characterizations were conducted on sediments within the proposed sand source. A total of ten (10) vibracore borings were conducted within the proposed borrow area, as part of the Delaware River Main Channel Deeping (DRMCD) project (see Appendix B). The vibracores were performed in December 1997 and July 2012 to characterize the sub-bottom sediments and extended to depths of approximately -50 feet MLLW. The table in Appendix B presents sediment characterization for the proposed Oakwood Beach borrow area. The borrow area material consisted predominantly of fine to coarse sands and some fine gravel. The grain size distribution for the borrow area material ranged from 0.2 to 3.0 mm with an average grain size of 0.9 mm. The recent DRMCD to -45 ft. is not expected to significantly alter the grain size distribution since the cores demonstrate that suitable sand exists below -45 ft. Additionally, it was estimated that approximately 44% of the sand source was deepened during the initial construction of the DRMCD project, therefore more than half of the sand source area had not been affected by dredging for the DRMCD .

Because of historical anthropogenic pollution within the Delaware River basin, chemical data from within the proposed borrow area was collected as part of the Delaware River Main Channel Deepening Project. The Greely-Polhemus Group, Inc., prepared the report “Delaware River - Philadelphia to the Sea Chemical Analysis of Sediments” for the USACE (Urie and Ettinger, 1995). This report characterized the chemical and geotechnical properties of the sediment present in the navigational channel of the Delaware River. Sediment cores were obtained using vibracore equipment from the two cores (DRV-13-94 and DRV-14-94) in the Reedy Island range of the Delaware River, the location of the proposed project borrow area. The cores, which were approximately ten feet in length, were subdivided based on sediment stratification. Each sample was subjected to extensive chemical and geotechnical analysis. Bulk sediment analyses were conducted to quantify the levels of metals, pesticides, PCBs volatile organic compounds, semivolatile organic compounds, and total organic carbon (TOC). In addition, Toxicity Characteristic Leaching Procedure (TCLP) testing was conducted on the sediment to determine the potential for contaminant release. Particle size analysis was performed to characterize the nature (i.e., amounts of gravel, sand, and silt/clay) of the sediment at each sampling location.

Table 3 lists the metals that were detected. There are no promulgated standards for sediment criteria. However, Table 3 presents comparisons with ecological guidelines, human health criteria for soils in New Jersey and soil screening levels in Delaware. The comparisons presented in Table 3 provide a reasonable basis for determining the level of contamination in the sandy material proposed for use as

Table 3. Inorganic Chemical Analysis of Sediments in Delaware Main Channel Within the Proposed Borrow Area (USACE, 1999; Long, MacDonald, Smith and Calder, 1995; N.J.A.C., 2012; DNREC 2013)

Parameters Detected (mg/kg)	ER-L*	NJ Residential Soil Stds. **	DNREC SIRS Screening Level***	DRV-13-94		DRV-14-94	
				Above 3.5 feet	Below 3.5 feet	Above 7.9 feet	Below 7.9 feet
Arsenic	8.2	19	11	1.56	1.96	1.29	4.53
Barium	na	16000	1500	11.2	26.3	9.51	11.8
Beryllium	na	16	16	0.205	0.222	0.179	0.138
Cadmium	1.2	78	7	1.100	2.210	0.955	0.809
Copper	34	3100	310	2.35	2.33	3.87	2.89
Nickel	20.9	1600	160	4.34	4.26	5.11	4.73
Lead	46.7	400	400	7.29	12.10	5.38	9.37
Selenium	na	390	39	31.0	53.2	19.3	18.3
Vanadium	na	78	134	5.56	8.58	8.68	7.91
Zinc	150	23000	2300	14.1	15.4	12.9	29.5

na – guideline not available.
*The ER-L is a value where concentrations equal to or above this represent a possible effects range within which effects would occasionally occur to aquatic biota (primarily benthic organisms) (Long, MacDonald, Smith and Calder, 1995).
**"Residential direct contact soil remediation standard" is used in New Jersey, and means a soil remediation standard for the ingestion-dermal and inhalation exposure pathways established or developed pursuant to this chapter that is designed to protect human health at residential use sites, schools (pre-K-12) and childcare centers (N.J.A.C. 7:26d, 2012).
*** The SIRS (Site Investigation and Restoration Section) Screening Level Table in DNREC (2013) is used in Delaware, and combines background, risk-based and regulatory values in soil and groundwater. The screening levels should be used to determine the contaminants of potential concern (COPCs) in the risk assessment process. Any laboratory confirmed analyte concentration exceeding the Screening Level Table values may require further evaluation.

beachfill at Oakwood Beach. Core # DRV-13-94 showed a cadmium level (top segment - 1.100 mg/kg, bottom segment - 2.210 mg/kg) that was close to or slightly higher than the Effects Range –Low (ER-L) guideline value of 1.2 mg/kg. The ER-L is a value where concentrations equal to or above this value (but below the Effects Range Median Value of 9.6 mg/kg) represent a possible effects range within which effects would occasionally occur to aquatic biota (primarily benthic organisms) (Long, MacDonald, Smith and Calder, 1995). USACE (1999) reported that the cadmium levels exceeded the New Jersey Residential Criteria (1 mg/kg) as presented in the New Jersey

Department of Environmental Protection's "The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters (October 1997). The New Jersey residential soil criteria were later revised for cadmium to 78 mg/kg (N.J.A.C. 7:26d, 2012), which is much higher than the highest detection. The New Jersey Residential criteria are human-health based criteria is designed to protect human health at residential use sites, schools (pre-K-12) and childcare centers. Since this material would also be placed in Delaware waters, the cadmium screening level for soils is 7 mg/kg (DNREC, 2013). The Delaware Screening Level for selenium (39 mg/kg) was exceeded at DRV-13-94 below 3.5 feet. Acetone was the only other constituent detected, and is assumed to be a result from laboratory contamination since it is a common solvent used in laboratories. No other chemical contaminants were detected. Because the sediments are predominantly sand in this stretch of the Delaware River, and past data does not demonstrate significant levels of contaminants, it is concluded that there is a low probability of sediment contamination within the sand source.

The New Jersey Department of Environmental Protection has approved use of this material for beach nourishment through issuance of a Section 401 water quality certificate and a Federal consistency determination with their Coastal Zone Management Regulations. However, water quality certification has not been issued by the Delaware Department of Natural Resources and Environmental Control. The Philadelphia District has requested Section 401 WQC from DNREC, and the review will be conducted concurrently with the review of this EA.

5.3 Vegetation and Wetlands

As discussed in USACE (1999), the shoreline in the study area is characterized by residential development. Most of the plants are ornamental. The yards are mowed grasses. The land use/cover types for the project area would be described as urban, range herbaceous, range shrub, range mix, water riverine, and wetland non-forest.

There are no wetlands directly on the project area, but they can be found at the extreme ends of Oakwood Beach outside of the affected area. Due to the oligohaline water characteristics (0.5 to 5.0 ppt) the coastal wetlands of this area are characterized by the presence of salt-tolerant species. According to the National Wetlands Inventory Mapping, the wetlands in the vicinity of the Oakwood Beach project are classified as estuarine intertidal emergent persistent and partially drained/ditched (E2EM1Pd) . The two dominant plants in these wetlands are the common reed (*Phragmites australis*) and cord grass (*Spartina alterniflora*). The common reed is evidence of diked or otherwise altered marshlands. Other common plants in the marshes are wild rice (*Zizania aquatica*), cattail (*Typha* sp.), salt hay (*Spartina patens*), spikegrass (*Distichlis spicata*), groundsel bush (*Baccharis halimifolia*), and marsh elder (*Iva frutescens*). The wetlands in the area are designated as priority wetlands by the Department of the Interior under the Emergency Wetlands Resources Act of 1986 (100 Stat. 3582) because of the national ecological significance of these wetlands.

5.4 Fisheries

5.4.1 Shellfish

As stated in USACE (1999), the New Jersey, Bureau of Marine Fisheries states that the Oakwood Beach area is important to juvenile and adult blue crabs (*Calinectes sapidus*), and that there is a sizeable commercial fishery for blue crabs at Oakwood Beach.

The American oyster (*Crassostrea virginica*) inhabits Delaware Bay from the mouth to Bombay Hook on the western side (Delaware) of the estuary, and to just below Artificial Island on the eastern (New Jersey) side, a distance of about 50 miles. Oysters have provided a sustainable food supply and contributed to the local economy of Delaware and New Jersey for centuries. The fishery peaked in 1880, but was later decimated over the next century by two diseases: MSX and dermo. Concerted efforts involving a number of public and private agencies have been underway since the 1990's to restore the fishery, with some success (USACE, 2009a). The nearest oysterbed to the Oakwood Beach affected area is located near the mouth of Hope Creek on the New Jersey side of the Delaware Bay. This "Hope Creek Bed" is the northernmost significant oyster resource in the Delaware Bay, and is approximately 3.5 miles south of the proposed Oakwood Beach sand source in the Reedy Island Range of the Delaware Bay, and would not be affected by project activities.

In the Delaware Estuary, copepods provide the major food for developing fishes, including the larvae stage of economically important species. The following copepods are known to tolerate oligohaline waters and are found in abundance around Oakwood Beach: *Halicyclops fosteri*, *Eurytemora affinis*, *Acaryia tonsa*, *A. hudsonica*, and *Pseudodiaptomus pelagicus* . Another important food item for juvenile fish are mysid shrimp. The mysid shrimp (*Neomysis americana*) is omnivorous, consuming algae, plankton, and plant detritus. Other ecologically important crustaceans that can be found in the surrounding waters are grass shrimp (*Palaemonetes* spp.), and fiddler crabs (*Uca minax*, *U. pugnax*, and *U. pugilator*) (USACE, 1999).

The wedge rangia (*Rangia cuneata*) is an important bivalve filter feeder in soft bottom areas with oligohaline waters. The coffee-bean snail (*Melampus bidentatus*) serves as a detrital/algal grazer in the marsh (USACE, 1999).

The deepening of the Delaware River Main Navigation Channel from -40 ft. to -45 ft. occurred recently (2012-2013) in Reach D, which includes the Reedy Island Range. The impacts of this action were assessed in USACE (1992) and USACE (1997), USACE (2009), and USACE (2013) for shellfish resources within the affected area. No significant changes to shellfish resources within the Oakwood Beach project affected areas from the channel deepening action are expected.

5.4.2 Finfish

Finfish were described in USACE (1999). No new significant information on finfish in this area is discussed subsequent to USACE (1999). The finfish population of the Delaware Estuary is extensive and diverse, because of the large salinity range fresh water and marine species utilize the habitat. Some of the species spend only part of their life cycle in the area, others just migrate through, and finally some spend their whole life in this part of the estuary. Table 4 is a list of common fish and their scientific names that utilize the estuary between Wilmington and Liston Point, Delaware at some point in their life cycle. Species of current recreational and commercial importance that can be found near the study site include: weakfish, American shad, white perch, striped bass, windowpane flounder, summer flounder, and spot. The State of New Jersey, Department of Environmental Protection, Bureau of Marine Fisheries stated that the nearshore area of Oakwood Beach location is a nursery area for many fish species, including striped bass (*Morone saxatilis)* , bluefish (*Pomatomus saltatrix*), silverside (*Menidia* spp.), anchovy (*Anchoa* spp.), spot (*Leiostomus xanthurus*), and Atlantic menhaden (*Brevootria tyrannus*). Commercially valuable fish in the project area include American shad (*Alosa sapadissima*), weakfish (*Cynoscion regalis*), Atlantic menhaden, blueback herring (*Alosa aestivalis*), bluefish, summer flounder (*Paralichthys dentatus*), striped anchovy (*Anchoa hepsetus*), bay anchovy (*Anchoa mitchilli*), alewife (*Alosa pseudoharengus*), and white perch (*Morone americana*). Important recreational fish in the project area include bluefish, striped bass, spot, and weakfish.

Table 4. Common Fish Species That Utilize The Delaware Estuary Between Wilmington and Liston Point, Delaware (USACE, 1999)

TABLE 4: COMMON FISH SPECIES THAT UTILIZE THE DELAWARE ESTUARY BETWEEN WILMINGTON AND LISTON POINT, DELAWARE.

Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Atlantic sturgeon *Acipenser oxyrhnchus*		Anadromous (spring)	March - May	?
American eel *Anquilla rostrata*		Catadromous (adults in fall)		Feb. - April
Blueback herring *Alosa aestivalis*		Anadromous (Mar. - May)		late April - Nov.
Alewife *Alosa pseudoharengus*		Anadromous (Mar. - May)		April - Nov.
American shad *Alosa sapidissima*		Anadromous (Mar. - May)		

TABLE 4: COMMON FISH SPECIES THAT UTILIZE THE DELAWARE ESTUARY BETWEEN WILMINGTON AND LISTON POINT, DELAWARE.				
Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Atlantic menhaden *Brevoortia tyrannus*				summer - early fall
Bay anchovy *Anchoa mitchilli*	year round		May - Sept.	May - Nov.
Carp *Cyprinus carpio*	year round			May – fall
Silvery minnow *Hybognathus nuchalis*	year round			
Spottail shiner *Notropis hudsonius*				April – fall
White catfish *Ictalurus catus*	year round			May – fall
Brown bullhead *Ictalurus nebulosus*	year round			
Channel catfish *Ictalurus punctatus*	year round			
Banded killifish *Fundulus diaphanus*	year round			
Mummichog *Fundulus heteroclitus*	year round		April - Sept.	May - Dec.
Atlantic silverside *Menidia menidia*	year round		April - Aug.	
White perch *Morone americana*	winter			April. - Oct.
Striped Bass *Morone saxatilis*	year round		Early April - Early July	Early April - Fall
Weakfish *Cynoscion regalis*				mid May – Fall
Spot *Leiostomus xanthurus*	year round			June - Dec.
Summer flounder *Paralichtys dentatus*				fall – spring
Windowpane flounder *Scophthalumus aquosus*	year round		late April - Dec.	late summer - fall

TABLE 4: COMMON FISH SPECIES THAT UTILIZE THE DELAWARE ESTUARY BETWEEN WILMINGTON AND LISTON POINT, DELAWARE.				
Species	Common Residence	Migrate Anadromous or Catadromous	Spawn in Area	Nursery in Area
Hogchoker *Trinactes maculatus*	year round		May - Aug.	May – fall

The deepening of the Delaware River Main Navigation Channel from -40 ft. to -45 ft. occurred recently (2012-2013) in Reach D, which includes the Reedy Island Range. The impacts of this action were assessed in USACE (1992), USACE (1997), USACE (2009), and USACE (2013) for finfish resources within the affected area. No significant changes to finfish resources within the Oakwood Beach project affected areas from the channel deepening action are expected.

5.4.3 Essential Fish Habitat

Under provisions of the reauthorized Magnuson-Stevens Fishery Conservation and Management Act of 1996, the entire study area including the borrow area, nearshore and intertidal areas were designated as Essential Fish Habitat (EFH) for species with Fishery Management Plans (FMP's), and their important prey species. The project site is located on sheet 107 of the "Guide to Essential Fish Habitat Designations in the Northeastern U.S., Volume IV: New Jersey and Delaware, March 1999". The study area contains EFH for various life stages for 21 species of managed fish and shellfish. Table 5 presents the managed species and their life stage that EFH is identified for within the 10 x 10 minute square (#9307530) that covers the affected area (Figure 10). This map identifies locations in the Delaware Bay that the National Marine Fisheries Service has identified as the mixing zone (M). In the above referenced guide, the National Marine Fisheries Service has determined that the project may contain essential fish habitat for various life stages of the managed species in Table 5. The general habitat requirements for the identified species and life stage identified for the mixing zone are presented in Table 6. The 1999 Guide does not include any information relating to skate species. However, information obtained from other sources would indicate that the Delaware Bay mixing zone could offer EFH for the clear nose skates, little skates and winter skates. As such, these species will be discussed further below.

The National Marine Fisheries Service has identified EFH within 10 minute X 10 minute squares (Figure 8), which the project area is designated in the "mixing zone" biosalinity zone of the Delaware Estuary. The habitat requirements for identified EFH species and their representative life stages are provided in Table 5.

Table 5. Summary of EFH Designated Species and Their Life Stages Within the Delaware Estuary Mixing Zone.

Table 5. Summary of EFH Designated Species and Their Life Stages Within the Delaware Estuary Mixing Zone EFH Square 39307530.					
Managed Species	**Eggs**	**Larvae**	**Juveniles**	**Adults**	**Spawning Adults**
Redfish (*Sebastus fasciatus*)	n/a				
Winter flounder (*Pleuronectes americanus*)	X	X	X	X	X
Windowpane flounder *(Scopthalmus aquosus)*	X	X	X	X	X
Atlantic sea herring *(Clupea harengus)*			X		
American plaice (*Hippoglossoides platessoides*)			X		
Bluefish *(Pomatomus saltatrix)*			X	X	
Long finned squid *(Loligo pealei)*	n/a	n/a			
Short finned squid *(Illex ilecebrosus)*	n/a	n/a			
Atlantic butterfish *(Peprilus tricanthus)*			X		
Summer flounder *(Paralicthys dentatus)*			X	X	
Scup *(Stenotomus chrysops)*			X		
Black sea bass *(Centropristus striata)*			X		
Surfclam *(Spisula solidissima)*	n/a	n/a			
Ocean quahog *(Artica islandica)*	n/a	n/a			
Spiny dogfish *(Squalus acanthias)*	n/a	n/a			
King mackerel *(Scomberomorus cavalla)*	X	X	X	X	
Spanish mackerel *(Scomberomorus maculatus)*	X	X	X	X	
Cobia *(Rachycentron canadum)*	X	X	X	X	
Clearnose skate (*Raja eglantteria*)			X	X	
Little skate (*Leucoraja erinacea*)			X	X	
Winter skate (*Leucoraja ocellata*)			X	X	

"n/a": species either have no data available on designated lifestages, or those lifestages are not present in the species reproductive cycle.

Figure 10. Delaware Estuary Mixing Zone Essential Fish Habitat Square 39307530

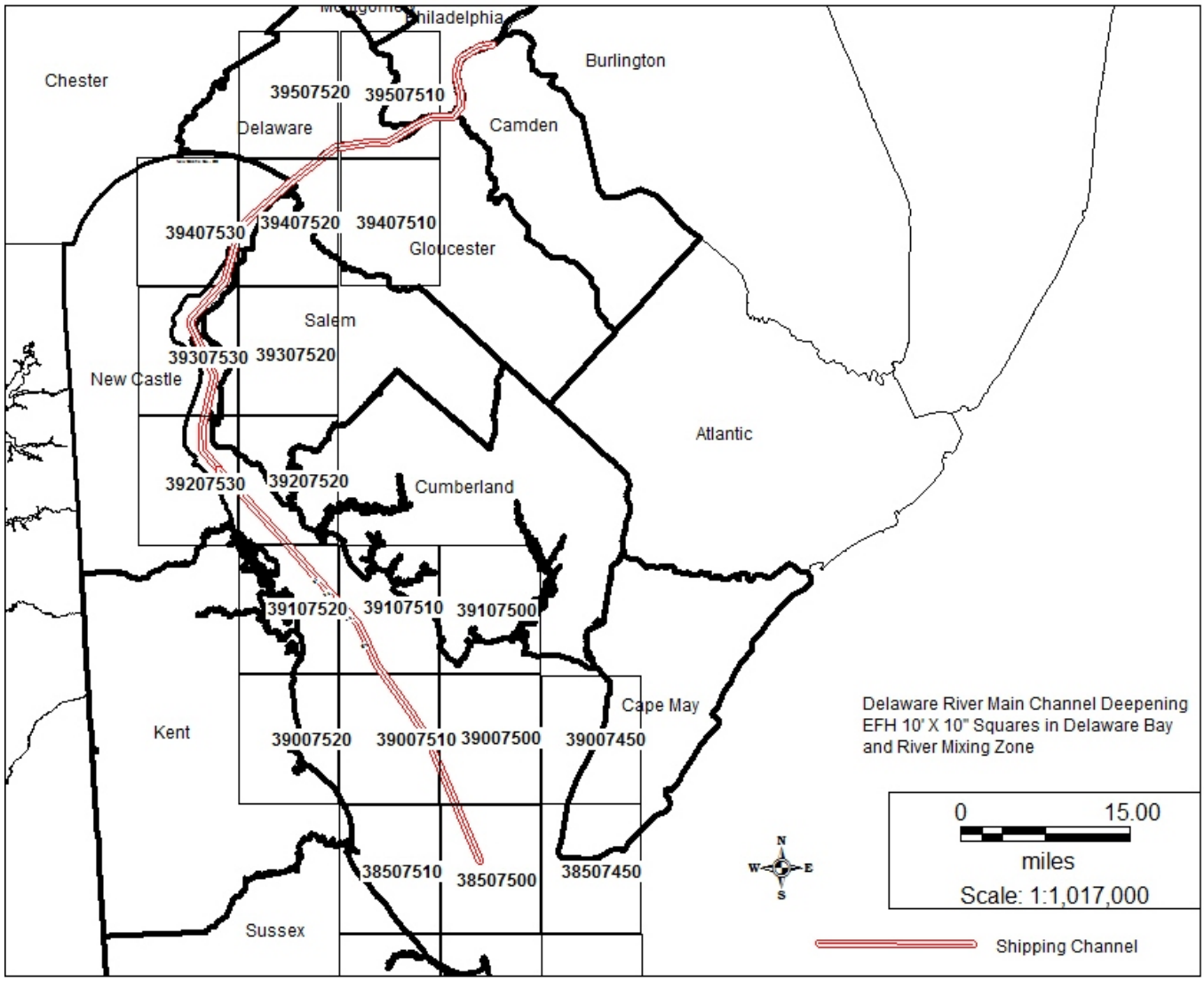

Table 6. Habitat Utilization of Identified EFH Species in the Delaware Estuary Mixing Zone (NOAA, 1999)

Table 6. Habitat Utilization of Identified EFH Species In The Delaware Estuary Mixing Zone (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Winter flounder (*Pseudopleuronectes americanus)* (NOAA, 1999); Pereira et al, 1998; McClane, 1978)	**Habitat:** Mud to sand or gravel; from Jan to May with peak from Mar to April in 0.3 to 4.5 meters inshore; 90 meters or less on Georges Bank. 10 to 32 ppt salinity.	**Habitat:** Planktonic, then bottom oriented in fine sand or gravel, 1 to 4.5 m inshore. 3,2 to 30 ppt. salinity. **Prey:**nauplii, harpacticoids, calanoids, polychaetes, invertebrate eggs, phytoplankton.	**Habitat:** Shallow water. Winter in estuaries and outer continental shelf. Equally abundant on mud or sand shell. **Prey:** copepods, harpacticoids, amphipods, polychaetes	**Habitat:** 1-30 m inshore; less than 100m offshore; mud, sand, cobble, rocks, boulders. **Prey:** omnivorous, polychaetes and crustaceans.
Windowpane flounder *(Scopthalmus aquosus)* (Chang, 1998)	**Habitat:** Surface waters, peaks in May and October.	**Habitat:** Pelagic waters.	**Habitat:** Bottom (fine sands) 5-125m in depth, in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae	**Habitat:** Bottom (fine sands), peak spawning in May, in nearshore bays and estuaries less than 75 m **Prey**: small crustaceans (mysids and decapod shrimp) polychaetes and various fish larvae
American plaice (*Hippoglossoides platessoides*)		**Habitat:**		
Atlantic sea herring *(Clupea harengus)* (Reid et al., 1998)			**Habitat:** Pelagic waters and bottom, < 10 C and 15-130 m depths **Prey:** zooplankton (copepods, decapod larvae, cirriped larvae, cladocerans, and pelecypod larvae)	
Bluefish *(Pomatomus saltatrix)*			**Habitat:** Pelagic waters of continental shelf and in Mid Atlantic estuaries from May-Oct.	**Habitat:** Pelagic waters; found in Mid Atlantic estuaries April – Oct.
Long finned squid *(Loligo pealei)*	n/a	n/a		
Atlantic butterfish *(Peprilus tricanthus)*			**Habitat:** Pelagic waters in 10 – 360 m	
Summer flounder *(Paralicthys dentatus)*			**Habitat:** Demersal waters (mud and sandy substrates)	**Habitat:** Demersal waters (mud and sandy substrates). Shallow coastal areas in warm months, offshore in cold months
Scup *(Stenotomus chrysops)*			**Habitat:** Demersal waters	
Black sea bass *(Centropristus striata)*			**Habitat:** Demersal waters over rough bottom, shellfish and eelgrass beds, man-made structures in sandy-shelly areas, *Sabellaria* reefs	.
Spiny dogfish *(Squalus acanthias)*	n/a	n/a		

Table 6. Habitat Utilization of Identified EFH Species In The Delaware Estuary Mixing Zone (NOAA, 1999)

MANAGED SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
King mackerel *(Scomberomorus cavalla)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone.	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone
Spanish mackerel *(Scomberomorus maculatus)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Cobia *(Rachycentron canadum)*	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory	**Habitat:** Pelagic waters with sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters from the surf to the shelf break zone. Migratory
Clearnose skate (*Raja eglantteria*)			**Habitat:** Soft or rocky bottoms in depths of 8-14 m. Broad distribution.	**Habitat:** Soft or rocky bottoms in depths of 8-14 m. Broad distribution.
Little skate (*Leucoraja erinacea*)			**Habitat:** Sand, gravelly or muddy bottoms. Present in bay during winter months. Offshore in summer months. Broad distribution.	**Habitat:** Sand, gravelly or muddy bottoms. Present in bay during winter months. Offshore in summer months. Broad distribution.
Winter skate (*Leucoraja ocellata*)			**Habitat:** Sand, gravelly or muddy bottoms. Broad distribution.	**Habitat:** Sand, gravelly or muddy bottoms. Broad distribution.

5.5 Benthos

USACE (1999) evaluated the benthic resources within the project vicinity including those typical of the Oakwood Beach shoreline (intertidal and nearshore) and Delaware River/Bay. It was described that the most abundant taxa were polychaetes, bivalves, oligochaetes, isopods and amphipods. Benthic sampling was not conducted in the proposed borrow area located in the Delaware River main navigation channel. Portions of the proposed borrow area are periodically disturbed by channel

maintenance dredging. However, dredging was most recently conducted for the Main Navigation Channel deepening in 2013. This deepening from -40 ft. to -45 ft. in Reach D includes the Reedy Island Range. The impacts of this action were assessed in USACE (1992) for benthic resources within the affected area. Although dredging temporarily removes the existing benthic community within the affected area, no significant changes to benthic resources within the Oakwood Beach project affected areas from the channel deepening action are expected.

USACE (1999) documents that there has been a loss of sandy substrate within the defined beach placement project area resulting in exposures of the underlying clay layer along the shoreline. Although no beach benthic fauna sampling has been conducted here, this clay layer provides less suitable habitat than sandy substrate for many benthic species. Since USACE (1999), there have been no significant changes in the shoreline or intertidal and nearshore benthic habitat due to the presence of existing hardened erosion control structures such as riprap revetments, stone revetments, and bulkheads.

5.6 Wildlife

Due to the developed nature of the project site, most of the wildlife that can be found in the area will either be transient in nature or very adaptable to human intervention. Table 7 shows the faunal species that might be found at or around the project site.

5.6.1 Threatened and Endangered Species

In USACE (1999), it was stated that the U.S. Fish and Wildlife Service (USFWS) determined that with exception for the occasional transient species bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*), no Federally listed or proposed threatened or endangered species under their jurisdiction are known to exist in the project area. Since then, the bald eagle and peregrine falcon have been removed from the Federal endangered species list. However, the bald eagle is still protected under the Bald and Golden Eagle Protection Act (Eagle Act) and both birds are protected under the Migratory Bird Treaty Act.

Subsequent to USACE (1999), the *rufa* subspecies of the red knot (*Calidris canutus rufa*) was added to the list of Federal candidate species in 2006 due to the high magnitude of imminent threats to the subspecies. On September 30, 2013, the *rufa* supcpecies of the red knot was proposed in the Federal register to be listed as threatened under the Endangered Species Act (ESA). If this rule is finalized, this species will be offered full protections under the ESA. Transient red knots may be found anywhere along New Jersey's coasts. Concentrations of migrating birds are known to occur in Cumberland, Cape May, and Atlantic Counties (http://www.fws.gov/northeast/njfieldoffice/endangered/redknot.html internet website accessed on 7/24/2013). Although the red knot can be found along the Delaware Bay

Table 7. Wildlife in the Vicinity of the Oakwood Beach Project

Amphibians			
American toad	*Bufo americanus*	leopard frog	*Rana pipens*
Reptiles			
Common snapping turtle	*Chelydra serpentine*	eastern garter snake	*Thamnophi sirtalis*
Smooth green snake	*Opheodrys vernalis*	Kemp's Ridley turtle	*Lepidochelys kempii*
Hawksbill turtle	*Eretmochelys imbricata*	loggerhead turtle	*Caretta caretta*
Diamondback terrapin	*Malaclemys terrapin terrapin*	green turtle	*Chelonia mydas*
Birds			
Peregine falcon	*Falco perginus*	osprey	*Pandion halieatus*
bald eagle	*Haliaeetus leucocephalus*	northern harrier	*Circus cyaneus*
American bittern	*Botaurus lentiginosus*	least bittern	*Ixobrychus exilis*
great blue heron	*Ardea herodias*	little blue heron	*Egretta caerulea*
tri-colored heron	*Egretta tricolor*	green-back heron	*Butorides stratus*
black-crowned night heron	*Nycticorax nyticorax*	snowy egret	*Egretta thula*
Yellow-crowned night heron	*Nycticorax violaceus*	great egret	*Casmerodius albus*
Glossy egret	*Plegadis falcinellus*	black duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*	green-winged teal	*Anas crecca*
king rail	*Rallus elegans*	black rail	*Laterallus jamaicensis*
Northern clapper rail	*Rallus longerostris crepitans*	marsh wren	*Cistothorus palustris*
Coastal plain swamp sparrow	*Melospiza georgiana*		
Mammals			
Raccoon	*Procyon lotor*	eastern grey squirrel	*Sciurus carolinensis*
Striped skunk	*Mephitis mephitis*	woodchuck	*Marmotoa monax*
white-footed mouse	*Peromyscus leucopus*	house mouse	*Mus musculus*
Norway rat	*Rattus norvegicus*	eastern cottontail	*Sylvilagus floridanus*
marsh rice rat	*Oryzomys palustris*	muskrat	*Ondatra zibethicus*

coastlines, it is more commonly found during migrations from Fortescue, NJ, and south along the Delaware Bay, and not as likely to be found in the Oakwood Beach project area.

As discussed in USACE (1999), the diamondback terrapin (*Malaclemys terrapin terrapin*), a species of special concern in NJ, occurs within the vicinity of the project area.

The National Marine Fisheries Service has jurisdiction over the endangered shortnose sturgeon (*Acipenser brevirostrum*), Kemp's Ridley turtle (*Lepidochelys kempii*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*) and green turtle (*Chelonia mydas*). The shortnose sturgeon has been found throughout the estuary though spawning is thought to be limited to areas well upstream from the project area. The sea turtles are known to use the estuary as far upriver as the Delaware Memorial Bridge (about 11 miles upstream of the Oakwood Beach area) during the summer.

Some marine mammals may be classified as threatened or endangered species, but all fall under the jurisdiction of the Marine Mammal Protection Act. The marine mammal species that are commonly encountered in the Delaware Estuary are bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocoena phocoena*), humpback whale (*Megatera novaeangliae*), harbor seal (*Phoca vitulina concolor*), and gray seal (*Halichooerus grypus*). Species not commonly sighted but which may incidentally utilize the estuary are pygmy sperm whale (*Kogia breviceps*), long-finned pilot whale (*Globicephala melaena*), fin whale (*Balaenoptera physalus*), northern right whale (*Eubalaena glacialis*), harp seal (*Cystophora cristata*), and ringed seal (*Poca hispida*).

The New York Bight distinct population of the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) was recently listed as endangered by the NMFS. Atlantic sturgeon are anadromous, spending a majority of their adult life phase in marine waters, migrating up rivers to spawn in freshwater then migrating to brackish water in juvenile growth phases. The Atlantic sturgeon are known to spawn within the Delaware River and migrate along the coasts of New Jersey and Delaware. This species could be present within the project impact area. Studies have indicated that depth distribution appears to be seasonal, with sturgeon inhabiting the deepest waters during the winter and the shallowest during summer and early fall.

5.7 Cultural Resources

In preparing the Final Feasibility Report and Integrated Environmental Assessment (USACE, 1999), the USACE consulted with the New Jersey State Historic Preservation Office (NJSHPO), the Delaware State Historic Preservation Office (DESHPO) and other interested parties to identify and evaluate historic properties in order to fulfill our responsibilities under the National Historic

Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR Part 800. As part of this work, the Philadelphia District conducted an evaluation of existing site conditions and previous cultural resources investigations to determine the potential for significant cultural resources in the Oakwood Beach project area. The results of this assessment indicate that the likelihood for intact and undisturbed historic properties eligible for or listed on the National Register of Historic Places (NRHP) is extremely minimal.

There are no historic properties listed on the NRHP located within the project's Area of Potential Effect (APE). Numerous residential structures dating from roughly the 1920's to the present are located along the shoreline landward of the existing shore protection structures. The project area shoreline, which lies riverward of the existing shore protection structures, has never been investigated for cultural resources. However, numerous cultural resources investigations have been conducted within the immediate project vicinity in association with the proposed deepening of the Delaware River Main Channel (Cox, 1986 and 1988; Dolan Research, Inc. and Hunter Research, Inc. 1995 and 1995a; GAI Consultants Inc., 1983; Gilbert/ Commonwealth, 1979; Heite and Heite 1986). The proposed project borrow area, which is located in the existing Delaware River Channel between River Mile 252+000 and 262+000, was investigated for submerged cultural resources as part of the Delaware River Main Channel Deepening project (Cox, 1995). Researchers did not identify any anomalies exhibiting characteristics of submerged historic properties in the proposed project borrow area.

5.8 Hazardous, Toxic and Radioactive Wastes (HTRW)

In accordance with ER 1165-2-132 entitled Hazardous, Toxic and Radioactive Wastes (HTRW) Guidance for Civil Works Projects, dated 26 June, 1992, the USACE is required to conduct investigations to determine the existence, nature and extent of hazardous, toxic and radioactive wastes within a project impact area. Hazardous, toxic and radioactive wastes are defined as any "hazardous substance" regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. 9601 et seq, as amended. Hazardous substances regulated under CERCLA include "hazardous wastes" under Section 3001 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6921 et seq; "hazardous substances" identified under Section 311 of the Clean Air Act, 33 U.S.C. 1321, "toxic pollutants" designated under Section 307 of the Clean Water Act, 33 U.S.C. 1317, "hazardous air pollutants" designated under Section 112 of the Clean Air Act, 42 U.S.C. 7412, and "imminently hazardous chemical substances or mixtures" that EPA has taken action on under Section 7 of the Toxic Substance Control Act, 15 U.S.C. 2606.

As discussed in USACE (1999), a preliminary assessment was conducted for the Oakwood Beach project area to determine the potential of encountering HTRW during construction. A thorough literature search identified no areas of

concern within a 2 mile radius of the Oakwood Beach shoreline. A report prepared by Environmental Risk Information and Imaging Services (ERIIS) for the U.S. Army Corps of Engineers Philadelphia District was the primary reference used to identify any HTRW concern sites in the study area. ERIIS is a service which provides information from numerous Federal and state environmental databases which monitor HTRW. As such, a USACE project at Oakwood Beach will neither be impacted by nor will it impact upon any HTRW sites. Bulk sediment testing and TCLP were performed for sediments within the sand borrow area of the Federal navigation channel (Greeley Polhemus Group, 1995; USACE, 1997). No significant contamination was identified in the results of this testing. However, one sample detected selenium that exceeded the soil screening level (39 mg/kg) in Delaware (measured at 53.2 mg/kg) (DNREC, 2013). For Delaware, an exceedance of the screening values, identifies selenium as a contaminant of particular concern (COPC), and may require further evaluation. This value will be reported to DNREC as part of the application for Section 401 Water Quality Certification in Delaware. New Jersey residential standards for cadmium were raised from 1 mg/kg to 78 mg/kg. None of the contaminants analyzed exceed the New Jersey Residential Standards for soil (N.J.A.C. 7:26D, 2012).

5.9 Socio-Economic Statistics of Project

Salem County is located in the southwest portion of New Jersey, on the eastern shore of the Delaware Bay. According to the U.S. Census Bureau, the county has a total area of 373 sq. miles, 332 of which is land. According to the 2010 census, it has a population of 66,083 and is the least densely populated county in New Jersey.

As presented in Table 7, the population of Salem County has remained fairly stable since 1970. Conversely, the population of New Jersey has been growing.

According to the U.S. Department of Commerce Bureau of Economic Analysis (BEA), Salem County had a per capita personal income (PCPI) of $39,704 for 2010. This PCPI ranked 20th in the state and was 78 percent of the state average, $51,139, and 99 percent of the national average, $39,937.

The per capita personal income developed by the BEA differs from the per capita money income developed by the U.S. Bureau of Census. The Census' per capita money income does not include various "lump sum" payments such as capital gains or inheritances that are included in the BEA's per capita personal income series. The definition of salary, for personal income, includes wages in kind. This includes, for example, allowances for food, clothing, and lodging paid in kind to employees. These allowances represent income to employees and a

cost to the employer. These types of allowances are not included in the definition of salary for money income. Table 8 displays the income trends since 1970.

Table 9 displays the unemployment rates for the county, state and the United States for the period 2006 through 2011. Salem County's unemployment rate has been consistently and significantly higher than the state and national rates over the past 6 years.

Table 8. Population Statistics for Salem County Compared with State of New Jersey per Year

Table 7 Population Statistics YEAR	**SALEM COUNTY**	**STATE OF NEW JERSEY**
1970	60,346	7,168,164
1980	64,676	7,364,823
1990	65,294	7,730,188
2000	64,285	8,414,350
2010	66,083	8,791,894
2011 estimate	65,902	8,821,155

Table 9. Income Trends (Per Capita)

YEAR	SALEM COUNTY	STATE OF NJ	UNITED STATES
1970	$ 4,273	$ 4,813	$4,084
1980	$ 9,604	$11,676	$10,091
1990	$ 19,086	$24,354	$19,354
2000	$27,793	$38,667	$30,319
2010	$ 39,704	$51,139	$39,937

Source: US Department of Commerce's Bureau of Economic Development

Table 10. Unemployment Trends (Percent)

YEAR	SALEM CO.	STATE OF NJ	UNITED STATES
2006	5.0	4.6	4.6
2007	5.0	4.3	4.6
2008	6.3	5.5	5.8
2009	10.5	9.0	9.3
2010	11.5	9.6	9.6
2011	10.8	9.3	8.9

Source: US Department of Labor's Bureau of Labor Statistics

6.0 ENVIRONMENTAL IMPACTS

USACE (1999) provided a discussion on the environmental effects of the selected plan. A comparative impact analysis of the alternatives considered was also provided in this document and is incorporated by reference. The No Action alternative was re-evaluated subsequent to USACE (1999), and no significant changes to the impacts on resources listed in Table 11 were determined. Table 11 provides a review of the affected environment resources, and whether or not there are significant changes in the project or project area that require additional discussion. Resource topics with impacts that do not require further discussion are incorporated by reference (USACE, 1999). Resources that require further discussion are presented as indicated in Table 11.

Table 11. Impacts on Affected Resources

Impact Category	Incorporate By Reference	Impacts of changes since USACE (1999)?	Section
Air Quality	USACE (1999)	An updated CAA conformity analysis was conducted. Emissions are expected to be within threshold levels.	6.1
Water and Sediment Quality	USACE (1999)	No significant changes since 1999. NJ residential soil criteria and DE soil screening criteria updated.	6.2
Vegetation and Wetland Habitats	USACE (1999)	No significant changes since 1999. No effects on wetland habitats. Taper zones will avoid adjacent wetland areas.	6.3
Shellfish	USACE (1999)	Minor changes in quantity of affected aquatic habitat along shoreline.	6.4.1
Finfish	USACE (1999)	Minor changes in quantity of affected aquatic habitat along shoreline.	6.4.2
Essential Fish Habitat		An EFH assessment wasn't provided in USACE (1999). Impacts on EFH are provided.	6.4.3
Benthos	USACE (1999)	Recent channel deepening of the borrow area will have a temporary effect on benthos, but no significant changes to impacts as described in USACE (1999) since the channel is disturbed periodically from maintenance dredging. Minor changes in quantity of affected aquatic habitat along shoreline.	6.5

Impact Category	Incorporate By Reference	Impacts of changes since USACE (1999)?	Section
Wildlife	USACE (1999)	No significant changes since 1999.	6.6
Threatened and Endangered Species	USACE (1999)	Atlantic sturgeon listing requires Section 7 consultation. A biological opinion was prepared for the Delaware River Main Channel Deepening in 2012.	6.7
Hazardous, Toxic and Radioactive Waste (HTRW)	USACE (1999)	No significant changes since 1999. NJ residential soil criteria and DE soil screening criteria updated in Section 6.2.	6.8
Cultural Resources	USACE (1999)	No significant changes since 1999. Delaware River Main Channel was recently deepened.	6.9
Socioeconomics and Environmental Justice	USACE (1999)	No significant changes since 1999. The project will have positive economic benefits and will not have adverse impacts on low income and minority populations.	6.10
Cumulative Impacts	USACE (1999)	An updated discussion of cumulative impacts was provided.	6.11

6.1 Air Quality

Air quality impacts resulting from the release of carbon monoxide and particulate emissions will occur at the site during project related activities and may be considered offensive, but are generally not considered far-reaching. Exhaust from the construction equipment will have an effect on the immediate air quality around the construction operation but should not impact areas away from the construction area. These emissions will subside upon cessation of operation of heavy equipment.

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a non-attainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). In the case of the Oakwood Beach Storm Damage Reduction Project, the Federal action is to construct a berm restoration project utilizing beachfill sand dredged from the Delaware River Federal Navigation Channel as a borrow area. The U.S. Army Corps of Engineers, Philadelphia District would be responsible for construction. Salem County, New Jersey within which the Federal Action will take place is classified as marginal nonattainment for ozone (oxides of nitrogen [NOx] and volatile organic compounds [VOCs]). Salem County, NJ is within the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE Nonattainment Area.

There are two types of Federal Conformity: Transportation Conformity and General Conformity (GC). Transportation Conformity does not apply to this project because the project would not be funded with Federal Highway Administration money and it does not impact the on-road transportation system. However, GC is applicable to this project. Therefore, the total direct and indirect emissions associated with project construction must be compared to the GC trigger levels presented below.

Pollutant	General Conformity Trigger Levels (tons per year)
NOx	100
VOCs	50

Total direct and indirect emissions are calculated by determining horsepower-hours (hp-hrs), which are generated by cost engineers as part of the Micro Computer Aided Cost Estimating System (MCACES) cost estimate of the project. The cost estimate provides a detailed account of power equipment, the horsepower of the equipment, and the amount of time the equipment is being used. Once the hp-hrs are generated, a load factor is assigned to the equipment, which provides an average of the degree of how hard the equipment is operating (eg. full power or half power). Once the hp-hrs are adjusted based on load factor, they are multiplied by the emissions factor, which is an estimate of the amount of emissions produced per hp-hr (an example would be grams of NOx per hp-hr. This value is then converted to tons of the constituent emitted. Indirect emissions for this project are typically computed by estimating the work crew travel trips to the work site and back during the construction period with an estimate of the emissions produced by this activity.

The emissions estimates for the initial construction were determined to be 58 tons of NOx and 1.5 tons of VOCs, which fall below the general conformity trigger levels. A statement of conformity is provided in Appendix A along with the supporting estimate data.

6.2 Water and Sediment Quality

Water quality impacts were evaluated in USACE (1999). The selected plan may have a short-term effect on turbidity levels during both excavation of the borrow site and the placement of sand along the shore. Elevated levels of particulate concentrations at the discharge location may also result from “washout” after beachfill is placed. The river current in this area should carry the

limited turbidity out of the area in a short time period. High turbidity levels can stress aquatic organisms by clogging respiratory organs. The turbidity may also decrease the hunting capacity of visual predators. To minimize these effects, a proper erosion and sediment control plan shall be implemented during the construction phase.

Short-term adverse impacts to water quality in the immediate vicinity of the dredging and placement site can occur. Aquatic ecosystems concentrate biological and chemical substances such as organic matter, nutrients, heavy metals, and toxic chemical compounds in bottom sediments. When introduced into the water column, these substances tend to bind with suspended particulate matter and eventually settle to the bottom. Dredging operations typically elevate levels of suspended particulates in the water column through excessive agitation of the sediment. Adverse impacts to the water quality may include oxygen depletion and the release of chemical substances, making them biologically available to aquatic organisms through ingestion or respiration. However, this is considered to be a minor effect since the sediment is predominantly sand, and is not expected to be contaminated.

Based on previously collected data and the composition of sand, the borrow area material is not expected to contain significant contamination, and is not expected to violate water quality standards in Delaware and New Jersey. The selected plan should have limited or no impact on pH, nutrient levels, bacteria, or DO. A Section 401 Water Quality Certificate was provided by the New Jersey Department of Environmental Protection in 1999. A Section 401 WQC is being requested from the Delaware Department of Natural Resources and Environmental Control and will be obtained prior to start of work. The project is not expected to change the DRBC designated uses within Zone 5 of the Delaware Estuary.

6.3 Vegetation and Wetland Habitats

Wetland habitats mapped as E2EM1Pd in the National Wetlands Inventory are prevalent around the project area vicinity. However, the affected portions of the project area shoreline are an eroded sandy beach bordered by hardened structures such as revetments and bulkheads on the landward side and open water of the Delaware Bay. A small portion of these wetlands are landward of the taper zones at the north and south ends of the project. These wetlands will be delineated on the contract drawings and avoided during construction. Therefore, no fill placement will occur in these wetlands.

6.4 Fisheries

A review of the Delaware Basin Fish and Wildlife Cooperative Policy for in-water activities dated July 2007 was performed for this project. Although there were dredging and sand placement restrictions for the horseshoe crab, and sandbar shark from the mouth to the Delaware River Memorial Bridge, these restrictions do not apply to the affected portions of the project area. However, USFWS (1999) recommends a seasonal window of beachfill placement to be prohibited between March 1 and October 30 to minimize impacts to juvenile finfish and blue crabs.

6.4.1 Shellfish

As stated in USACE (1999), there will be a short-term impact due to burial of bivalves during placement activities in the intertidal and nearshore zones. A review of the current project plans in 2013 estimates that approximately 35.6 acres of shallow oligohaline to mesohaline aquatic habitat will be affected by the placement of beachfill, of this, approximately 8.2 acres will be intertidal and 27.4 acres will be subtidal habitats impacted. Approximately 19.4 acres of this aquatic habitat would be converted to upland (above mean high water) sandy beach. However, this conversion is expected to lessen between periodic nourishment periods due to increases in intertidal habitat resulting from beach erosion and adjustments of the beach profile. This habitat should recover due to recruitment from surrounding areas and vertical migration through the sediment. The more mobile shellfish such as the blue crab will avoid the area during placement, although USFWS (1999) recommended a seasonal window of beachfill placement to be prohibited between March 1 and October 30th. No impacts to oyster beds are expected since the dredging and beachfill placement are more than 3 miles away from the nearest Hope Creek Bed. Subsequent to USACE (1999), about 44% of the sand source was subject to channel deepening as part of the Delaware River Main Channel Deepening Project, which occurred in 2012-2013. Although channel deepening would have removed the benthic community in the portions of the channel that were deepened, no significant impacts on commercial and recreational shellfish resources were anticipated. Recovery of the benthic community is expected following the dredging. Therefore, channel deepening is not expected to have resulted in any significant changes to shellfish resources within the sand source. Except for some localized short-term turbidity during construction, the five stormwater outfall pipe extensions are not expected to have any significant adverse effects on shellfish resources.

6.4.2 Finfish

As discussed in USACE (1999), the selected plan will have limited and short-term impact on finfish. With the exception of some small finfish, most bottom dwelling and pelagic fishes including diadromous fishes (river herrings, American shad, striped bass, American eel) are highly mobile and should be capable of

avoiding turbidity impacts due to beachfill placement and dredging operations. The primary impact to fisheries will be felt from the disturbance of benthic and epibenthic communities. The loss of the benthos and epibenthos smothered during berm construction and removal during borrow activity will temporarily disrupt the food chain in the impacted areas. A review of the current project plans in 2013 estimates that approximately 35.6 acres of shallow oligohaline to mesohaline aquatic habitat will be affected by the placement of beachfill, of these approximately 8.2 acres will be intertidal and 27.4 acres will be subtidal habitats impacted. Approximately 19.4 acres of this aquatic habitat would be converted to upland (above mean high water) sandy beach. However, this conversion is expected to lessen between periodic nourishment periods due to increases in intertidal habitat resulting from beach erosion and adjustments of the beach profile. These effects are expected to be temporary as these areas become rapidly recolonized by pioneering benthic invertebrate species. Subsequent to USACE (1999), about 44% of the sand source was subject to channel deepening as part of the Delaware River Main Channel Deepening Project, which occurred in 2012-2013. Although channel deepening would have removed the benthic community in the portions of the channel that were deepened, no significant impacts on commercial and recreational finfish resources were anticipated. Recovery of the benthic community is expected following the dredging. Therefore, channel deepening is not expected to have resulted in any significant changes to shellfish resources within the sand source.

Except for temporary increases in turbidity during construction, five stormwater outfall pipe extensions are not expected to have any significant effects on finfish.

6.4.3 Essential Fish Habitat

As discussed previously, there are a number of Federally managed fish species where essential fish habitat (EFH) was identified for one or more life stages within the project impact areas. Fish occupation of waters within the project impact areas is highly variable spatially and temporally. Some of the species are strictly offshore, while others may occupy both nearshore and offshore waters. In addition, some species may be suited for the open ocean or pelagic waters, while others may be more oriented to bottom or demersal waters. This can also vary between life stages of Federally managed species. Also, seasonal abundances are highly variable, as many species are highly migratory.

In general, adverse impacts to Federally managed fish species may stem from alterations of the bottom habitat, which result from dredging in the borrow site and beachfill placement in the intertidal zone and nearshore. A review of the current project plans in 2013 estimates that approximately 35.6 acres of shallow oligohaline to mesohaline aquatic habitat will be affected by the placement of beachfill, of this, approximately 8.2 acres will be intertidal and 27.4 acres will be subtidal habitats impacted. Approximately 19.4 acres of this aquatic habitat

would be converted to upland (above mean high water) sandy beach. However, this conversion is expected to lessen between periodic nourishment periods due to increases in intertidal habitat resulting from beach erosion and adjustments of the beach profile. This habitat should recover due to recruitment from surrounding areas and vertical migration through the sediment. EFH can also be adversely impacted temporarily through water quality impacts such as increased turbidity and decreased dissolved oxygen content in the dredging and placement locations. These impacts would subside upon cessation of construction activities. More long-term impacts to EFH involve physical changes to the bottom habitat, which result in changes to bathymetry, sediment substrate, and benthic community as a food source.

The project impact areas are located along the tidal portion of the transitional zone of the Delaware River/Bay where the sand source is within the Reedy Island Channel Range and the beachfill placement (Oakwood Beach) is located immediately south of the mouth of the Salem River (see Figure 8). According to information obtained from 35 years of daily salinity monitoring at a nearby station at Reedy Island, DE, the salinity in the vicinity of the affected areas is quite variable from oligohaline (0.5 to 5 ppt) to mesohaline (5 ppt to 18 ppt) depending on the time of year, precipitation, and tides (Figure 9). A calculated mean of the data shows that salinities are generally the lowest in the spring (1-2 ppt) and highest in the late summer (6-7 ppt). However, the highest value recorded was nearly 15 ppt in October of one year.

Winter Flounder–Except during periods of extreme drought, salinity levels at the project site are marginally within or too low for the established thresholds for all life stages of this species. NOAA (1999) reports that winter flounder eggs are found in salinities between 10 and 30 ppt, and although the mean salinities are lower than this range, Figure 9. demonstrates that salinities may be suitable some years for egg habitat. Eggs and juveniles are typically not found in depths greater than 5 meters (16.4 ft.), which limits any potential impacts to the beachfill placement area. Based on this, dredging within the channel borrow area (approximately -45 ft. mllw) is not expected to have any adverse impacts on eggs or juvenile winter flounder. Therefore, the affected areas could contain marginal essential fish habitat for this species based upon the average low salinity levels at this location. Any juveniles or adults that might wander into the project area would most likely be migrating to or through the site in the early spring or summer months. It is during this period that the salinity levels on average would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species most years.

Windowpane Flounder - It is unlikely that this project site would contain any essential fish habitat for this species based upon very low salinity levels at this location. Except during periods of extreme drought, salinity levels at the project site would be far below the established thresholds for all life stages of this species. Any juveniles or adults that might wander into the project would most

likely be migrating to or through the site during the spring or early summer months. It is during this period that the salinity levels would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species.

Atlantic sea herring – This species is identified as a pelagic species. As such, this project would have no effect on this species since the site does not contain suitable habitat.

Bluefish - No effect on juveniles or adults. Adults are normally pelagic off the coast on the continental shelf in more saline waters. Any juveniles that might wander into the project area would most likely be found in the area during the spring and summer months. However, it is during these periods when the salinity levels would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species' juvenile life stage.

Atlantic Butterfish – Due to the fact that the affected areas are located well upstream in the mixing zone and generally supports a very low salinity, particularly during the spring and summer months, this site would not generate suitable EFH parameters for this species.

Summer Flounder – Except for occasional variations in salinity and temperature, it is unlikely that the affected areas would contain any essential fish habitat for this species based upon the average low salinity levels at this location. Except during periods of extreme drought, salinity levels at the affected areas are marginally within or too low for the established thresholds for all life stages species of this species. Any juveniles or adults that might wander into the project areas would most likely be migrating to or through the site in the early spring or summer months. It is during this period that the salinity levels would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species.

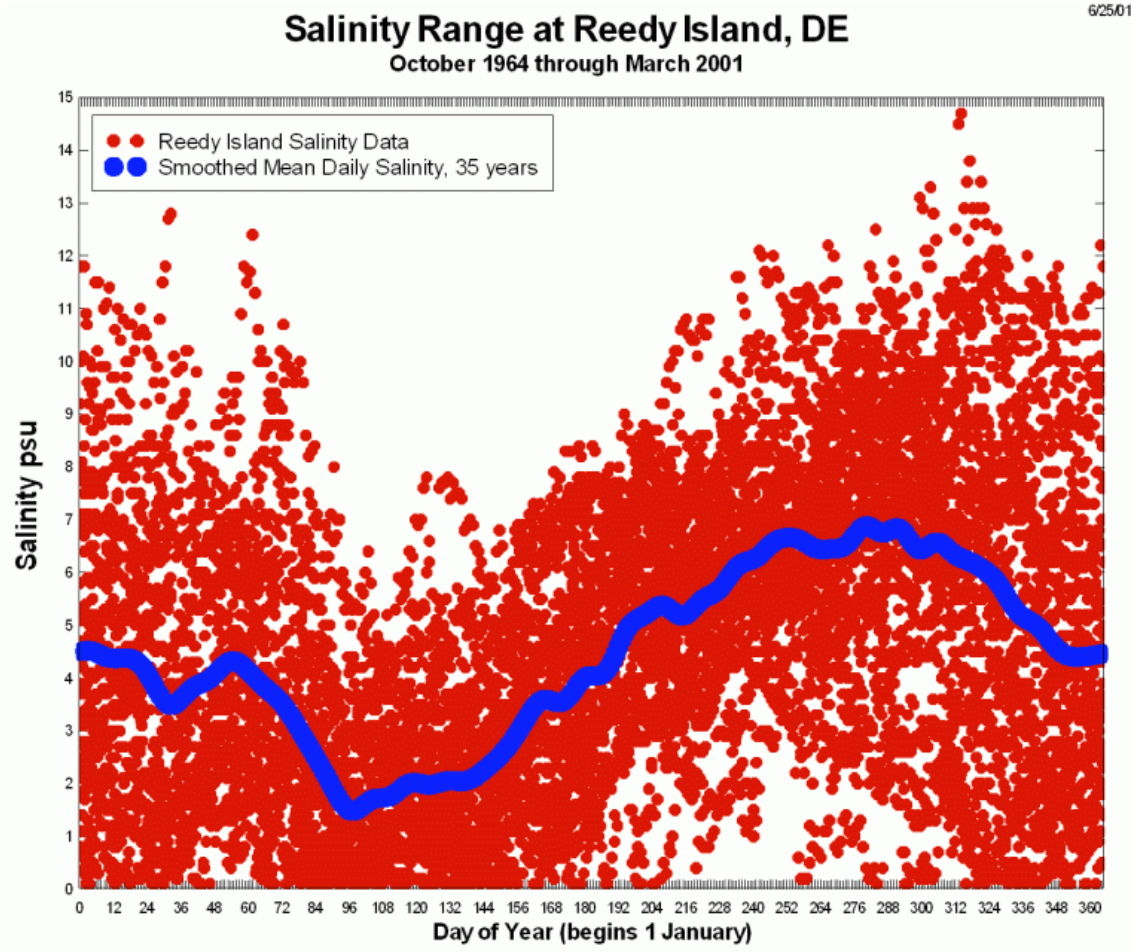

Figure 11. Salinity Ranges Measured at Reedy Island, Delaware River from 1966 to 2001

Scup – It is unlikely that the affected areas would contain any essential fish habitat for this species based upon very low salinity levels at this location. Except during periods of extreme drought, salinity levels at the affected areas would be far below the established thresholds for all life stages of this species. Any juveniles or adults that might wander into the project areas would most likely be migrating to or through the site in the early spring or summer months. It is during this period that the salinity levels would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species.

Black Sea Bass – It is unlikely that the affected areas would contain any essential fish habitat for this species based upon very low salinity levels at this location. Except during periods of extreme drought, salinity levels at the project site would be far below the established thresholds for all life stages of this species. Any juveniles or adults that might wander into the project areas would most likely be migrating to or through the site in the early spring or summer months. It is during this period that the salinity levels would be at or near 5 ppt. This condition would not generate suitable EFH parameters for this species.

King Mackerel – No effect on all life stages since they would be found in those portions of the mixing zone with at least a seasonal fluctuation to full brackish or saline conditions.

Spanish Mackerel - No effect on all life stages since they would be found in those portions of the mixing zone with at least a seasonal fluctuation to full brackish or saline conditions.

Cobia - No effect on all life stages since they are would be found in those portions of the mixing zone with at least a seasonal fluctuation to full brackish or saline conditions.

Skates – No effect: This would include the clear nose skate, little skate, and winter skate. These species would be found in soft sandy sediments in brackish and saline environments. Based upon the extremely low salinity levels, this project site is not expected to offer suitable habitat parameters for any of the listed species of skates.

Based upon the environmental parameters at the Reedy Island Range and Oakwood Beach, EFH resources would not be adversely affected for the species described for the Delaware Bay mixing zone. It is further noted that this work would utilize best management practices to minimize turbidity and disturbance to aquatic habitats. Additionally, five stormwater outfall pipe extensions are not expected to have any significant effects on EFH. Based upon these conditions

and the lack of or marginal suitable habitat parameters, it is concluded that the proposed project would have no significant direct, indirect, or cumulative adverse effects on any EFH and/or prey resources of the Delaware Bay.

6.5 Benthos

USACE (1999) provided an assessment of impacts on benthic organisms affected by beachfill placement along the shoreline and from sand dredging operations in the channel borrow area. The primary ecological impacts of dredging the sand borrow site will be the complete removal of the existing benthic community through entrainment into the dredge. Mortality of the benthic and epibenthic organisms will occur as they pass through the dredge and/or as a result of being transplanted into an unsuitable habitat. A benthic study performed for the Delaware Estuary Program (ECSI, 1993) did not show significant differences between the navigation channel and the shallow/intermediate zone. The navigation channel should recover to pre-dredge conditions within 1-2 years after disturbance. However, this recovery may be interrupted based on navigation channel maintenance needs. Benthic pioneer species will move in from neighboring areas.

There will be an impact to benthos due to burial of the benthic community during placement activities in the intertidal and nearshore zone of Oakwood Beach. A review of the current project plans in 2013 estimates that approximately 35.6 acres of shallow oligohaline to mesohaline aquatic habitat will be affected by the placement of beachfill, of these approximately 8.2 acres will be intertidal and 27.4 acres will be subtidal habitats impacted. Approximately 19.4 acres of this aquatic habitat would be converted to upland (above mean high water) sandy beach. However, this conversion is expected to lessen between periodic nourishment periods due to increases in intertidal habitat resulting from beach erosion and adjustments of the beach profile. Except for the areas converted to upland habitat, this habitat should recover due to recruitment from surrounding areas, and may recover within weeks to months after the fill placement. Additionally, approximately 12.2 acres of sandy intertidal habitat would be created along the foreshore slope, which would be an improvement over the existing intertidal habitat primarily composed of haphazard hardened erosion control structures along the shoreline. The five stormwater outfall pipe extensions are not expected to have any significant effects on benthic organisms within the intertidal zone. Combined, these outfalls will occupy approximately 0.06 acres of existing intertidal habitat that will be filled with beachfill.

6.6 Wildlife

USACE (1999) concluded that the selected plan will have only short-term effects on wildlife. This is still the case, as most of the wildlife will avoid the

construction area including the outfall extensions due to the noise of the construction activity. The wildlife will return to the area quickly after completion of the work.

6.7 Threatened and Endangered Species

In Section 5.6.1, the Federally listed threatened and endangered species in the affected area were discussed. Subsequent to USACE (1999), changes in species listings have occurred, most notably is the recent listing of the Atlantic sturgeon. In 2012, the Philadelphia District conducted formal Section 7 Consultation for the Delaware River Main Channel Deepening (DRMCD) and subsequent maintenance of the 45-foot channel. The NMFS issued a Biological Opinion (BO) for this project (NMFS, 2012). This consultation also reinitiated formal Section 7 consultation for the shortnose sturgeon and four species of sea turtles (loggerhead, Kemp's ridley, green sea turtle and hawksbill), and now supersedes the previous BO (NMFS, 1996) for these species for Delaware River dredging activities. NMFS (2012) provided a comprehensive review of potential impacts related to all aspects of dredging to the two sturgeon species and four sea turtle species. Entrainment, turbidity, contaminants, habitat alterations, and food resource impacts were all evaluated based on the type of dredging activity (hydraulic, hopper, mechanical) and disposal (confined disposal, beneficial use – beach replenishment). NMFS (2012) concluded that "After reviewing the best available information on the status of endangered and threatened species under NMFS jurisdiction, the environmental baseline for the action area, the effects of the action and the cumulative effects, it is NMFS' biological opinion that the proposed action may adversely affect, but is not likely to jeopardize the continued existence of the shortnose sturgeon, any DPS of Atlantic sturgeon, Kemp's ridley and loggerhead sea turtles, and is not likely to adversely affect green or leatherback sea turtles. Because no critical habitat is designated in the action area, none will be affected by the proposed action." NMFS (2012) provided reasonable and prudent measures (RPMs) to minimize impacts and monitor for incidental take, which include the implementation of state of the art turtle deflectors on hopper dredge dragarms, endangered species monitors on hopper dredges or disposal locations, notification procedures, and post dredge substrate monitoring. The Oakwood Beach project dredging and beachfill will abide by the RPMs outlined for activities within the Federal channel in NMFS (2012).

The Reedy Island Range, which is the borrow area portion of the Oakwood Beach project has been deepened to -45 feet, therefore, borrowing sand from this area is covered under the maintenance of the 45-foot channel. However, the initial construction of the Oakwood Beach project would require a portion of the channel within the Reedy Island Range borrow area to be dredged to -50 feet to acquire enough sand required for the beachfill template for initial construction and/or periodic nourishment. This represents a differing condition than was

contemplated in NMFS (2012). Also, the beachfill placement at Oakwood Beach was not considered in NMFS (2012). The removal of additional sand in this portion of the channel and sand placement on Oakwood Beach do not represent a significant change from the actions described in the USACE's Biological Assessments (BA) (USACE, 2009 and USACE, 2011). The USACE does not believe the modification to the action previously coordinated represents an impact to any listed species that was not covered in the previous coordination. Since these activities are very similar to the activities evaluated in NMFS (2012), the Philadelphia District has determined that the proposed project may adversely affect, but is not likely to jeopardize the continued existence of the shortnose sturgeon, any DPS of Atlantic sturgeon, Kemp's ridley and loggerhead sea turtles, and is not likely to adversely affect green or leatherback sea turtles.

As discussed in 5.6.1, the *rufa* subspecies of the red knot was listed as a Federal candidate species. The red knot is a migratory shorebird that is typically found on beaches south of Fortescue, NJ. Although the Oakwood Beach area is within the red knot range, it is not an area of known for frequent occurrences of this species. Additionally, the current beach offers suboptimal habitat for feeding due to the prevalence of hardened erosion control structures and little natural beach at low tide. Based on the range of the red knot, the actions proposed for the Oakwood Beach project may affect, but are not likely to adversely affect this species.

The northern diamondback terrapin, a species of concern in NJ, nests above the high tide line of sandy beaches or gravelly areas. The Oakwood Beach is within the range of nesting in the Delaware Estuary, but the present shoreline is unsuitable for nesting due to the presence of revetments and bulkheads. Nesting habitat along the Oakwood Beach shoreline will be improved by providing a sandy beach above the high tide line. However, periodic nourishment has the potential to bury nests if beachfill is placed above the high tide line between early June and late October or even later (Some hatchlings overwinter in the nest, and remain buried into the following spring). This provides little seasonal windows to place beachfill. Measures to minimize burial of nests would be to avoid beachfill placement above the high tide line as much as practicable and/or the physical removal and relocation of nests and hatchlings during each periodic nourishment (approximately every 8 years).

The five stormwater outfall pipe extensions may affect these species, but are not likely to adversely affect these species.

6.8 Hazardous, Toxic, and Radioactive Waste (HTRW)

HTRW was assessed in USACE (1999), and no new information has been identified subsequent to this document. A thorough literature search in USACE (1999) identified no areas of concern within a 2-mile radius of the Oakwood Beach shoreline. Based on this and previous sediment testing of the sand source, it is expected that this project will neither be impacted by nor will it impact upon any HRTW sites.

6.9 Cultural Resource and Historical Impacts

On the basis of the current project plan, the USACE has determined that sand placement within the 50- foot wide shoreline and nearshore areas will have no effect affect on historic properties eligible for or listed on the NRHP. The soil deposits within this very narrow 50-foot wide area are severely eroded and extensively modified up to the existing shore protection structures. Due to the extensive modification of the sand placement area, no subsurface cultural resources investigations were conducted in this area.

Project construction will be conducted on the river-side of the existing shore protection structures and will have no effect on existing residential structures located adjacent to the construction area.

The project borrow area was investigated for cultural resources in 1993 as part of the larger Delaware River Main Channel Deepening project (Cox 1995). Results of this investigation found no significant anomalies exhibiting characteristics of submerged historic properties in the borrow area.

Considering the severely eroded conditions of the project area shoreline and the results of previous cultural resources investigations in the project borrow area, the USACE has determined that the proposed project will have no effect on properties eligible for or listed on the NRHP. Both the New Jersey and Delaware State Historic Preservation Officers concur with this finding (NJDEP letter dated1/11/1999 and DESHPO letter dated 1/15/1999).

6.10 Socioeconomics

A reanalysis of project benefits was conducted as part of the draft Hurricane Sandy Limited Reevaluation Report (HSLRR) (USACE, 2013b), and was found to be economically justified. Table 12. summarizes the changes in the economic analysis benefits and costs from the Feasibility Report (USACE, 1999) to the

current Hurricane Sandy Limited Reevaluation Report. The benefit-cost ratio is 1.2, with net benefits of $200,000.

Table 12. Benefits, Costs, and Benefit Cost Ratio (BCR) of Oakwood Beach Project (USACE, 2013b)

Benefits, Costs, and BCR Category	Approved Feasibility	Current HSRR Estimate	Difference
PROJECT BENEFITS (Avg. Ann.)			
Total Average Annual Benefits	$660,000	$1,045,000	$385,000
PROJECT COSTS (Avg. Ann.)			
Total Average Annual Costs	$333,000	$845,000	$515,000
BCR	2.0	1.2	(0.8)
Net Benefits	$327,000	$200,000	($127,000)

USACE (1999) concluded that the selected plan complies with Executive Order 12989-Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994; and no impacts were expected to occur. No significant changes to populations in the affected area have occurred subsequent to USACE (1999); therefore this finding still applies.

6.11 Cumulative Impacts

Cumulative Impacts, as defined in CEQ regulations (40 CFR Sec. 1508.7), are the "impacts on the environment which result 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."

Cumulative impacts of the project were assessed in USACE (1999). Subsequent to USACE (1999), a number of related activities have occurred or are in the planning stages within the Delaware Estuary. One of the biggest changes was the commencement of the Delaware River Main Channel Deepening (DRMCD) project from Philadelphia to the Sea. As of July 2013, portions of Reaches A, B, C, and D have been deepened to -45 feet (Figure 12).

To date all of the completed dredging within these reaches was accomplished by the pumping of the dredged material into upland confined disposal facilities (CDFs). The lower portion of Reach E (Brandywine Range) is scheduled to start construction in the fall of 2013. Approximately 1.6 million cubic yards of sand dredged from within this area will be beneficially used as beachfill for the eroding beach at Broadkill Beach on the Delaware side of the lower Delaware Bay. Other planned projects in the Delaware Bay include two ecosystem restoration projects at Cape May Villas and Reeds Beach. These small beach communities are located along the New Jersey side of the lower Delaware Bay, and their purpose is to restore horseshoe crab spawning habitat and migratory shorebird resting and feeding habitat. Currently, there are no Federal funds to construct these areas. These projects make use of nearby offshore sand borrow areas in the Delaware Bay to supply the sand to restore the beach habitats. As part of the Prime Hook National Wildlife Refuge Comprehensive Conservation Plan, the USFWS is proposing the implementation of a plan that includes dune restoration and salt marsh restoration to restore wetland habitats compromised by subsidence and erosion (USFWS, 2013). At this level of planning, a sand and sediment source for the dune and marsh have not been defined, but is likely to be a Delaware Bay source.

Although there are a number of related actions either completed, underway, or in the planning phases that have similar effects (including impacts on water quality, essential fish habitat, wildlife habitat, endangered species, benthos, and shellfish) as the proposed Oakwood Beach project, the Oakwood Beach project is not expected to result in significant cumulative impacts on the affected resources. This conclusion is supported in that the sand source is from

Figure 12. Delaware River Main Channel Deepening Project Status as of July 2013

within the navigation channel that is an existing disturbed bottom habitat from either dredging or propwash from large ships. This avoids the disturbance of undisturbed estuarine habitat for a new source of sand. Other reasons that support minimal cumulative impacts include the use of sand that will have short term and minor impacts on water quality. Also, as discussed in USACE (1999), Oakwood Beach had a historically wider beach, and has lost about 100 ft. of beach width over the last century. Although the beachfill placement will cover aquatic shallow bay habitat, this will not result in losses of additional shallow aquatic habitat significantly beyond historical beach widths.

7.0 COMPLIANCE WITH ENVIRONMENTAL STATUTES

Compliance with applicable Federal Statutes, Executive Orders, and Executive Memoranda, was originally discussed in the USACE (1999). Table 9 is a complete listing of compliance status relative to environmental quality protection statutes and other environmental review requirements.

Table 13. Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements

FEDERAL STATUTES	**COMPLIANCE W/PROPOSED PLAN**
Archeological - Resources Protection Act of 1979, as amended	Full
Clean Air Act, as amended	Full
Clean Water Act of 1977	Partial
Coastal Barrier Resources Act	N/A
Coastal Zone Management Act of 1972, as amended	Full
Endangered Species Act of 1973, as amended	Full
Estuary Protection Act	Full
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act, as amended	N/A
Marine Protection, Research and Sanctuaries Act	Full
Magnuson-Stevens Fishery Conservation and Management Act	Partial
National Historic Preservation Act of 1966, as amended	Full
National Environmental Policy Act, as amended	Partial
Rivers and Harbors Act	Full
Watershed Protection and Flood Prevention Act	N/A
Wild and Scenic River Act	N/A
Executive Orders, Memorandums, etc.	
EO 11988, Floodplain Management	Full
EO 11990, Protection of Wetlands	Full

FEDERAL STATUTES	COMPLIANCE W/PROPOSED PLAN
EO12114, Environmental Effects of Major Federal Actions	Full
EO 12989, Environmental Justice in Minority Populations and Low-Income Populations	Full
County Land Use Plan	Full

Full Compliance - Requirements of the statute, EO, or other environmental requirements are met for the current stage of review.
Partial Compliance - Some requirements and permits of the statute, E.O., or other policy and related regulations remain to be met.
Noncompliance - None of the requirements of the statute, E.O., or other policy and related regulations have been met.
N/A - Statute, E.O. or other policy and related regulations are not applicable.

- **National Environmental Policy Act (NEPA)**: The Final Environmental Assessment was prepared with a signed Finding of No Significant Impact on April 26, 1999 (USACE, 1999). This draft Environmental Assessment and Finding of No Significant Impact (FONSI) provides an updated review of the project and affected resources. Assuming a FONSI is deemed appropriate following public review, full compliance with NEPA will be achieved when the FONSI is signed.
- **Endangered Species Act/Fish and Wildlife Coordination Act**. A final FWCA 2(b) report was provided by USFWS in 1999. A programmatic BO was completed by the National Marine Fisheries Service in 1996 to address hopper dredging activities and their effects on threatened and endangered sea turtles and marine mammals. In 2012, the New York Bight Distinct Population Segment of the Atlantic sturgeon was listed as endangered by the NMFS. The Philadelphia District has initiated formal consultation in accordance with Section 7 of the Endangered Species Act with NMFS. A BO (NMFS, 2012) was issued by the NMFS for the Delaware River Main Channel Deepening Project and maintenance of the 45-foot navigation channel. Since the actions of the Oakwood Beach Project are very similar as those contemplated in the BO, the Philadelphia District has reached the same conclusions as those in the BO. The Philadelphia District will seek a concurrence from NMFS on this conclusion or to determine if further Section 7 consultation is required.
- **Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)**. An evaluation for Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act was not performed in USACE (1999). The Philadelphia District conducted an EFH assessment (contained within this EA) to address changes in the project, additions of new Federally managed species, and changes in existing conditions. The Philadelphia District is requesting a review of the EFH assessment in this EA.
- **Clean Water Act**. An evaluation was performed in accordance with the Section 404(b)(1) guidelines in USACE (1999), and is incorporated by

reference. No significant project changes warrant a new evaluation. Section 401 Water Quality Certification was provided by NJDEP in 1999. Section 401 Water Quality Certification is also required from the Delaware Department of Natural Resources and Environmental Control (DNREC). DNREC requires that detailed project plans be available for their review. Once detailed plans are available, the Philadelphia District will request Section 401 WQC from DNREC.

- **Coastal Zone Management Act**. Federal coastal zone consistency determinations were provided by the New Jersey DEP and Delaware DNREC in 1999.
- **Section 106 National Historic Preservation Act**. The New Jersey and Delaware State Historic Preservation Offices (SHPOs) concurred with the Philadelphia District's "No adverse effect" determination. Based on this, and the fact that there have been no significant changes to the project that could potentially affect cultural resources, no additional coordination with the SHPO is required.
- **Clean Air Act (CAA)**. A CAA statement of conformity was signed in USACE (1999). However, because the project will involve emissions within non-attainment areas, a new Clean Air Act Conformity Analysis is required. An updated emissions estimate was performed in 2013 based on the current plan, and the total project NOx and VOCs emissions fell below the *deminimis* thresholds of 100 tons/yr of NOx and 50 tons/yr of VOCs within a marginal non-attainment area. A draft statement of conformity and emissions estimate is provided in Appendix A. .

8.0 CONCLUSIONS

In 1999, USACE completed a Final Environmental Assessment and Finding of No Significant Impact (EA/FONSI) for the construction of a Federal Storm Damage Reduction Project for the community of Oakwood Beach (Elsinboro Township), Salem County, New Jersey. This EA evaluated the impacts associated with changes that have occurred since the EA/FONSI was completed in 1999. New information, new statutes and the development of different operating practices subsequent to USACE (1999) required that the proposed Federal action be evaluated pursuant to the National Environmental Policy Act of 1969, as amended.

The evaluations presented in this EA address the changes in the project area, changes in the proposed project, and regulatory changes. These changes are consistent with the project actions previously detailed and documented, and would not result in any new or significant impacts to the project area. Based on the data presented and continuing coordination with State and Federal resource agencies, no significant adverse environmental impacts are expected to occur as a result of the proposed project changes. Since the potential impacts from these

changes identified have been determined to be minor, localized and temporary, the preparation of a new or Supplemental Environmental Impact Statement is not warranted and a Finding of No Significant Impact (FONSI) for the proposed action is appropriate.

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APPENDIX-A

CLEAN AIR ACT STATEMENT OF CONFORMITY

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CLEAN AIR ACT
STATEMENT OF CONFORMITY
OAKWOOD BEACH
STORM DMAGE REDUCTION PROJECT
SALEM COUNTY, NEW JERSEY

Based on the conformity analysis in the subject report, I have determined that the proposed action conforms to the applicable State Implementation Plan (SIP). The conformity analysis provided a detailed accounting of the emissions resulting from the project construction. These emissions are below the General Conformity trigger levels of 100 tons per year of NOx and 50 tons per year of VOCs for a marginal nonattainment area. General Conformity under the Clean Air Act, Section 176 has been evaluated for the project according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project because the total emissions from the project are below the conformity threshold values established at 40 CFR 93.153(b) for ozone (NOx and VOCs) in a marginal nonattainment area (100 tons of NOx and 50 tons of VOCs per year). The project is not considered regionally significant under 40 CFR 93.153 (i).

Date

John C. Becking, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

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U.S. Army Corps of Engineers
NAP - Post Sandy-Related Projects
Conformity Related Emission Estimates
Oakwood Bay 1-Nov-13
DRAFT

Equipment/Engine Category	Type	# of Engines	HP	Total Hours	LF	Emission factors NOx g/hphr	Emission factors VOC g/hphr	Emissions NOx (tons per project)	Emissions VOC (tons per project)
Marine									
Hydraulic Pipeline Dredge - Prime Engine	Hydraulic Pipeline Dredge - Main Pump	1	3,400	560	0.80	9.70	0.20	16.29	0.34
Hydraulic Pipeline Dredge - Dredge Pump	Hydraulic Pipeline Dredge - Secondary	1	1,900	560	0.43	7.50	0.20	3.78	0.10
Tugboat - Prime Engine	Ocean tow - propulsion	2	1,000	1,120	0.69	9.70	0.37	16.53	0.63
Tugboat - Auxiliary Engine	Ocean tow - auxiliary	2	25	1,120	0.40	7.50	0.20	0.19	0.00
Crew/Survey Workboat - Prime Engine	Crewboat propulsion	1	100	560	0.50	9.70	0.37	0.30	0.01
Crew/Survey Workboat - Auxiliary Engine	Crewboat auxiliary	1	40	560	0.40	7.50	0.20	0.07	0.00
Floating Booster Pump - Pump Engine	Booster pump	2	3,000	560	0.43	9.50	0.20	15.13	0.32
Floating Booster Pump - Auxiliary Engine	Booster pump	2	150	560	0.43	9.50	0.20	0.76	0.02
Derrick Barge - Prime Engine	Dredge auxiliary	2	150	2,800	0.40	7.50	0.20	2.78	0.07
Derrick Barge - Auxiliary Engine	Dredge auxiliary	2	25	2,800	0.40	7.50	0.20	0.46	0.01
Land-side, nonroad									
Front End Loader	Rubber tired loader	1	250	560	0.59	9.50	0.19	0.86	0.02
Dozer	Dozer	1	250	560	0.59	9.50	0.19	0.86	0.02
Total project emissions								**58.0**	**1.5**

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APPENDIX-B

SAND BORROW AREA SEDIMENT GRAIN SIZE CHARACTERISTICS

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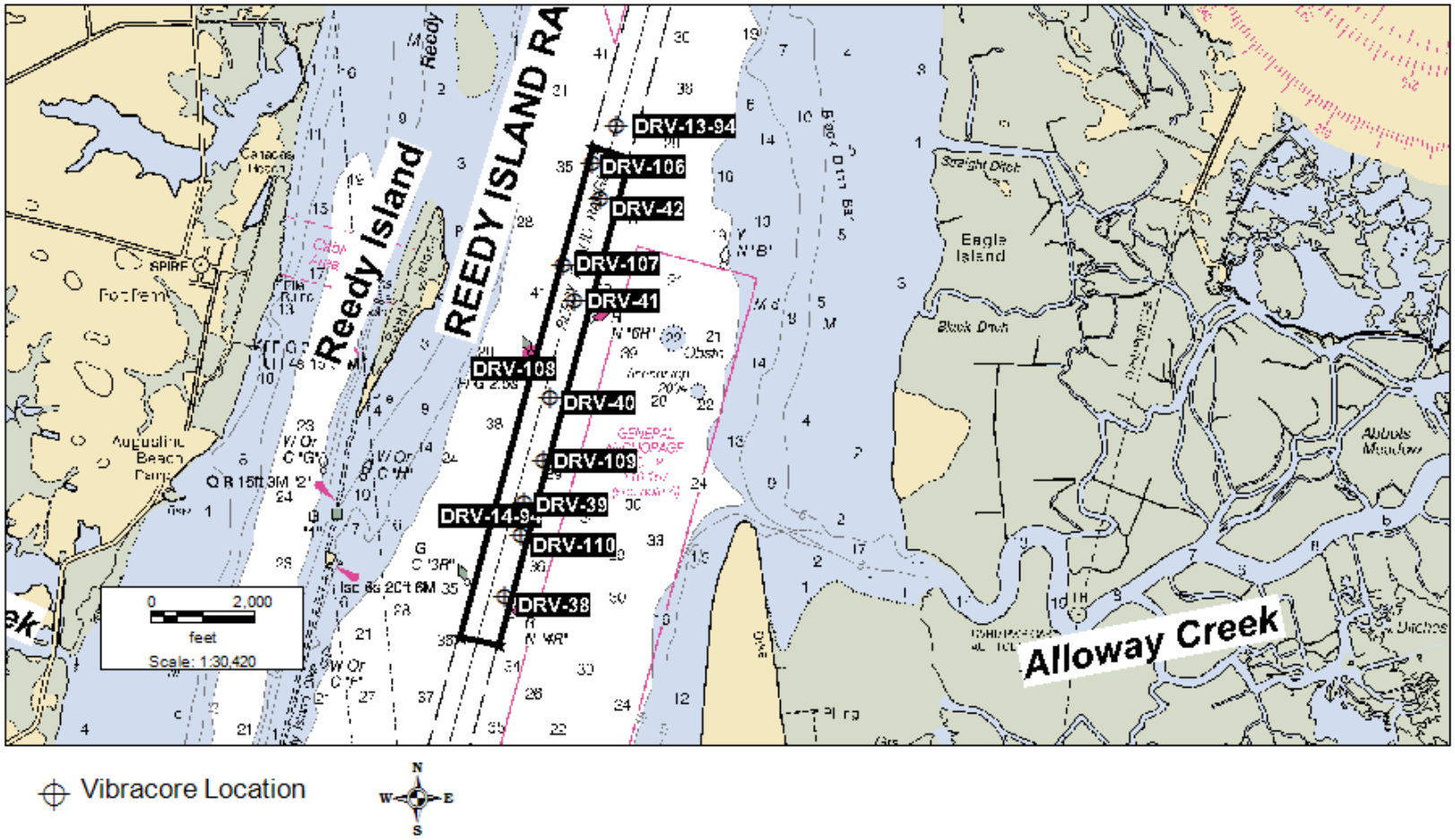
Oakwood Beach Sand Source Vibracore Boring Sediment Characteristics

Boring I.D.	Approx. Channel STA.	Date Collected	Location (NJ State Plane NAD 83)		Top Elevation	Sample Depth	Soil Type for Material	% Fines	% Sand	% Gravel	S Avg. Grain Size d-50 mm	% Coarse Grained (sand+grav)	Notes
			Easting	Northing	(ft MLLW)	(ft BGS)							
DRV-106	250150	7/7/2012	252600.43	195714.13	-43.5	2.5	SP	2.5	94.6	2.9	0.6	97.5	Sand, poorly-graded, < 5% fines.
DRV-42	251000	12/5/1997	251889.00	195880.00	-42.2	1.3	SP	4.5	94.5	1.0	0.4	95.5	Sand, poorly-graded, < 5% fines.
						3.4	SP	2.5	54.5	43.0	1.5	97.5	
						7.6	SP	4.0	96.0	0.0	0.4	96.0	
						11.3	SM	22.5	77.5	0.0	0.2	77.5	Silty Sand, fines from 12% to 50%.
						15.9	SP-SM	12.0	88.0	0.0	0.2	88.0	Sand with little silt, fines from 5% to 12%.
DRV-107	252450	7/17/2012	250607.57	195117.09	-42.5	0.5	SP	1.6	85.9	12.5	0.8	98.4	Sand, poorly-graded, < 5% fines.
						1.6	SW	2.7	84.1	12.2	1.4	96.3	Sand, well-graded, < 5% fines.
DRV-41	253000	12/5/1997	249894.00	195360.00	-43.9	3.0	SP	2.5	71.5	26.0	1.8	97.5	Sand, poorly-graded, < 5% fines.
						6.9	SP-SM	10.0	90.0	0.0	0.3	90.0	Sand with little silt, fines from 5% to 12%.
						12.1	SP	4.9	92.6	2.5	0.7	95.1	Sand, poorly-graded, < 5% fines.
						13.7	SP	4.9	95.1	0.0	0.5	95.1	
						16.3	SP	2.5	89.5	8.0	0.5	97.5	
DRV-108	254500	7/17/2012	248663.07	194561.10	-42.5	0.5	SP	0.1	99.9	0.0	0.7	99.9	Sand, poorly-graded, < 5% fines.
						3.0	SP	3.4	70.7	25.9	1.2	96.6	
DRV-40	255000	12/5/1997	247999.00	194840.00	-46.0	2.2	SP	2.5	92.0	5.5	0.7	97.5	Sand, poorly-graded, < 5% fines.
						6.1	SP	1.0	58.0	41.0	2.5	99.0	
						11.2	SP	1.0	63.0	36.0	2.1	99.0	
						14.4	SP	1.0	63.0	36.0	3.0	99.0	
						17.0	SP	1.0	55.0	44.0	2.5	99.0	
DRV-109	256150	7/17/2012	246739.21	194689.66	-43.4	3.0	SM	13.3	77.1	9.6	0.5	86.7	Silty Sand, fines from 12% to 50%.
DRV-39	257150	12/5/1997	245904.00	194319.00	-46.3	3.3	SP	2.5	80.0	17.5	0.5	97.5	Sand, poorly-graded, < 5% fines.
						7.1	SP	2.5	97.5	0.0	0.3	97.5	
						9.4	SP-SM	9.0	91.0	0.0	0.2	91.0	Sand with little silt, fines from 5% to 12%.
						12.9	SP	2.5	81.5	16.0	0.5	97.5	Sand, poorly-graded, < 5% fines.
						17.1	SP	1.5	80.5	18.0	0.9	98.5	
DRV-110	257750	7/17/2012	245267.83	194242.14	-43.2	2.0	SP (visual)	na	na	na	na	na	Sand, poorly-graded, < 5% fines.
DRV-38	259000	12/5/1997	244068.00	193892.00	-46.1	2.9	SP	2.5	87.5	10.0	0.4	97.5	Sand, poorly-graded, < 5% fines.
						8.4	SP	2.5	90.0	7.5	0.4	97.5	
						13.0	SP	1.5	91.0	7.5	1.0	98.5	
						17.3	SP	2.5	87.5	10.0	0.5	97.5	
Oakwood Beach Borrow Area Sediment Characterization								**4.2**	**82.6**	**13.1**	**0.9**	**95.7**	

na - not available, insufficent sample size



Oakwood Beach Sand Source Vibracore Location Map