US Army Corps of Engineers
Philadelphia District

Delaware Department of
Natural Resources and
Environmental Control

Delaware Beneficial Use of Dredged Material for the Delaware River

Feasibility Report and Integrated Environmental Assessment
Technical Appendices

Volume V

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Volume V

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Appendix D - Evaluation of Section 404(b)(1) Guidelines

1.0 INTRODUCTION

The following evaluation is prepared in accordance with Section 404(b)(1) of the Clean Water Act of 1977 (CWA) to evaluate the environmental effects of the proposed placement of dredged material in Waters of the United States. Toxic and hazardous waste pertaining to fill or dredge activities are also regulated under the CWA. Specific portions of the regulations are cited and an explanation of the regulation is given as it pertains to the project. These guidelines can be found in Title 40, Part 230 of the Code of Federal Regulations.

2.0 PROPOSED ACTION AND ENVIRONMENTAL SETTING

2.I. Project Description

A. Location: Delaware Bay and bayshore communities (Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes Beach) within the lower portion of DRBC Zone 6 and Lower Reach E (Miah Maull and Brandywine Ranges) of the Delaware River Main Channel. These beach communities are characterized by broad marshes with a narrow barrier of sand along the beach. The post-channel deepening dredged material is anticipated to be predominantly coarse grained sand.

B. General Description: The project entails providing coastal storm risk management improvements (*i.e.* beach nourishment) to various Delaware Bayfront communities with the intent to beneficially use dredged material from the Federal navigation channel within the Delaware River. The required maintenance dredging of the 45-foot channel is anticipated to produce 465,000 cubic yards/year in spot shoals.

C. Authority and Purpose: The study authority for the Delaware Beneficial Use of Dredged Material for the Delaware River Study (DMU) was the October 26, 2005 resolution of the Committee on Environment and Public Works of the United States Senate to request that the Secretary of the Army evaluate the authorized projects on the Delaware River to determine whether any modifications are advisable in the interest of beneficial use of dredged material as it relates to comprehensive watershed and regional sediment management, ecosystem restoration, navigation, stream restoration, water quality, and other allied purposes. In the aftermath of Hurricane Sandy (October 2012) and the subsequent passage of the Disaster Relief Appropriations Act, 2013 (PL 113-2), Congress authorized supplemental appropriations to Federal agencies for expenses related to the consequences of Hurricane Sandy. The U.S. Army Corps of Engineers (USACE) was tasked to prepare an interim report to identify existing USACE projects for reducing flooding and storm damage risks in the area affected by Hurricane Sandy. The purpose of the project is coastal storm risk management using sand dredged periodically from the Delaware River main navigation channel to pump onto Delaware Bayfront communities.

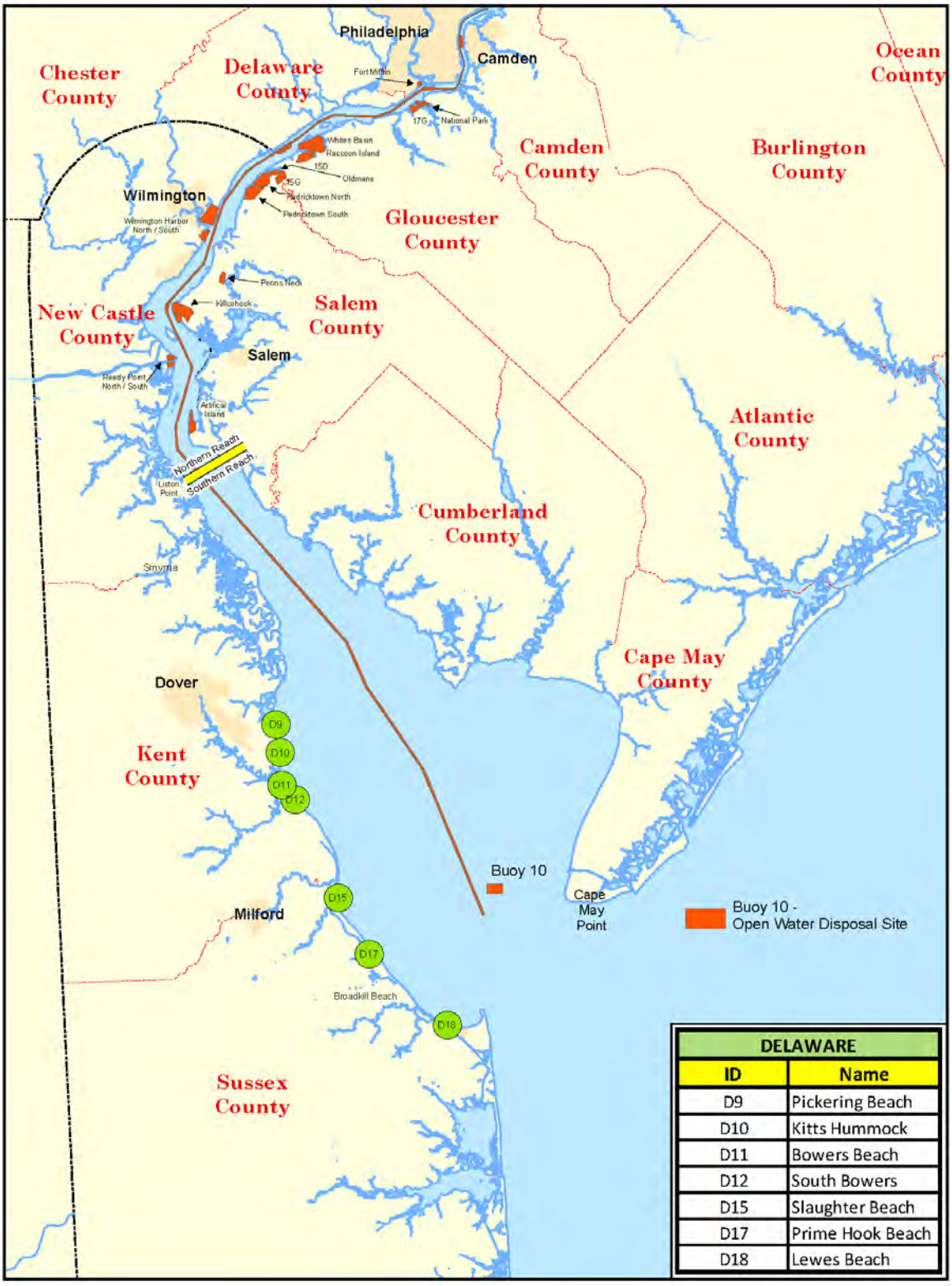
D. General Description of Dredged or Fill Material

Extensive sediment quality sampling and analyses have been conducted within the Delaware Estuary, primarily in association with the USACE Delaware River Main Stem Channel Deepening and Maintenance Dredging projects in the uppermost portions of the navigation project (USACE, 1992, 1997). Most of this sediment testing has occurred within the current project area reaches. The Philadelphia District proposes to place sand dredged from Lower Reach E - Brandywine and Miah Maull ranges of the Main Channel (the project dredged material source area) onto Delaware Bay beaches. Material dredged from the Brandywine and Miah Maull ranges of the Main Channel had been previously placed overboard at the Buoy 10 site in 2011, 2006 and 2005. In 2014, 11 sediment grab samples were collected in and around the Buoy 10 open water disposal site and analyzed for grain size and ranged from 96.1% to 99.8% sand. The remaining component were shell fragments. Channel sediments within the proposed Miah Maull and Brandywine Ranges are suitably clean for beach nourishment purposes.

E. Description of the Proposed Discharge Sites

(1) Location (map): The locations of the dredged material beneficial use sites are shown on Figure 1. The bayfront communities are Pickering Beach (D9), Kitts Hummock (D10), Bowers Beach (D11), South Bowers Beach (D12), Slaughter Beach (D15), Prime Hook Beach (D17) and Lewes Beach (D18).

Figure 1 – Location of Proposed Discharge Sites



(2) Size (acres):

Dredged Material Placement Site	**Acreage**
Pickering Beach	24.61
Kitts Hummock	41.54
Bowers Beach	22.56
South Bowers Beach	18.50
Slaughter Beach	106.17
Prime Hook Beach	53.44
Lewes Beach	84.34

(3) Type of Sites: Existing barrier beaches fronting the Delaware Bay in Kent and Sussex Counties, Delaware.

(4) Types of Habitat: Coastal barrier beach with narrow sandy berm and low dunes with some vegetation.

(5) Timing and Duration of Discharge: Maintenance dredging will occur every two years in selected reaches over a 50 year period. Beach nourishment will be conducted during select maintenance dredging cycles. Specifically, the initial nourishment of Lewes Beach, Prime Hook Beach and Slaughter Beach is projected to occur in 2020. The duration of dredging and associated placement will be approximately 6 months. The initial construction of Pickering Beach, Kitts Hummock, Bowers Beach and South Bowers Beach, as well as the periodic nourishment of Lewes Beach, Prime Hook Beach and Slaughter Beach are projected to occur in 2026. The duration of dredging and associated placement will be approximately 10 months. Future periodic nourishment will occur every 6 years with a dredging/placement duration of approximately 7 months.

F. Description of Disposal Method: Generic medium size hopper dredge utilizing mooring barge and booster pumps for direct placement.

II. Factual Determination

A. Physical Substrate Determinations

(1) Substrate Elevation and Slope: Increase in surface elevations at the beneficial use sites.

The recommended plan consists of beach restoration at 7 dredged material placement locations in the southern reach of the study area. The 7 dredged material placement locations span approximately 29 miles along the Delaware Bay and include (from north to south): Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes. Dune elevations and berm widths from the Beach-fx optimization are presented in the table below. All of the design profiles have a dune slope of 1V:5H, foreshore slope of 1V:10H, and a berm elevation of +7 ft NAVD88. The berm elevations is selected to match the natural berm elevations in the study area. The results of the Beach-fx optimization show that Pickering and Kitts Hummock do not need a dune to maximize net benefits. However, a wider design berm is required since there is no dune. Slaughter optimized to a relatively low dune at +8.5 ft NAVD88 that matches the existing dune conditions and the remaining sites optimized to a design dune elevation of +12 ft NAVD88.

Location	Length of Design Dune/Berm (feet)	Length of Initial Construction Dune (feet)	Southern Taper (feet)	Northern Taper (feet)	Length of Shoreline (feet)	Dune Height (feet NAVD88)	Dune Width (feet)	Berm Height (feet NAVD88)	Design Berm Width (feet)	Advance Berm Width (feet)
Pickering Beach	2,295	N/A	1,010	1,016	4,321	N/A	N/A	7	55	45
Kitts Hummock	4,685	N/A	965	1,000	6,650	N/A	N/A	7	55	45
Bowers Beach	2,326	2,326	34	846	3,206	12	25	7	25	50
South Bowers Beach	1,367	1,367	1,005	129	2,501	12	25	7	25	75
Slaughter Beach	14,468	9,482	1,000	942	16,410	8.5	25	7	25	25
Prime Hook Beach	6,408	4,252	941	258	7,607	12	25	7	25	25
Lewes Beach	7,223	2,515	30	0	9,768	12	25	7	25	25

(2) Sediment Type: The material projected to be dredged from the navigation channel is similar in grain size to the existing sediment types at the beneficial use sites.

(3) Dredged/Fill Material Movement: Not significant. There will be temporary increases in turbidity at the discharge points for the beach placement sites.

(4) Physical Effects on Benthos: Burial within intertidal zone at the beneficial use sites: Benthic evaluations have concluded that the existing benthic communities are neither significant nor unique. The organisms are expected to rapidly recolonize the area from adjacent untouched species.

(5) Action Taken to Minimize Impact: Runoff at the beach placement sites will be minimized through creation of a temporary sand dike during pumping. Standard construction practices to minimize turbidity and erosion would be employed.

B. Water Circulation, Fluctuation and Salinity Determinations

(1) Water. Slight elevation of turbidity in the vicinity of the pump-out site. The effect is short-term.

a. Salinity - No significant effect.

b. Water chemistry - No significant effect.

c. Clarity - Minor short-term increase in turbidity during construction at discharge sites.

d. Color - Minor short-term effect during construction.

e. Odor - No effect.

f. Taste - No effect.

g. Dissolved gas levels - No significant effect.

h. Nutrients - Minor effect.

i. Eutrophication - No effect.

j. Others as appropriate - None.

(2) Current patterns and circulation:

a. Current patterns and flow - No significant impact.

b. Velocity - No significant effects on tidal velocity and longshore current velocity regimes.

c. Stratification - Thermal stratification occurs beyond the mixing region created by the surf at the bay beach intertidal zone. There is a potential for both winter and summer stratification. The normal pattern should continue post construction of the project.

d. Hydrologic regime - The regime is largely marine and estuarine. This will remain the case following construction of the project.

(3) Normal water level fluctuations - Construction of the work would not affect the tidal regime.

(4) Salinity gradients - There should be no significant effect on existing salinity gradients.

(5) Actions that will be taken to minimize impacts –Utilization of sand from a clean, high energy environment and excavation with a hopper dredge and pumping sand directly onto the beach above the mean high tide line. Scheduling and sequencing beach placements to avoid construction on beaches during high use seasons by migratory shorebirds and horseshoe crabs.

C. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulate and Turbidity Levels in the Vicinity of the Placement Sites: there would be a short-term elevation of suspended particulate concentrations during construction phases in the immediate vicinity of the discharge at beneficial use sites.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column:

a. Light penetration - Short-term, limited reductions would be expected as a result of the discharge at the beneficial use sites.

b. Dissolved oxygen - There is a potential for a decrease in dissolved oxygen levels at the beneficial use sites, but the anticipated low levels of organics in the dredged material should not generate a high, if any, oxygen demand. No significant effects anticipated as a result of the short-term placement operations.

c. Toxic metals and organics - No significant impacts.

d. Pathogens - Pathogenic organisms are not expected to be a problem in the areas to receive sand.

e. Aesthetics - No significant impact.

(3) Effects on Biota:

a. Primary production, photosynthesis - Minor, short-term effects related to turbidity. Increase in productivity due to re-establishment of dune vegetation.

b. Suspension/filter feeders - Minor, short-term effects related to suspended particulate outside the immediate deposition zone. Sessile organisms would be subject to burial within the deposition areas at the beneficial use sites.

c. Sight feeders - Minor, short-term effects related to turbidity.

d. Actions taken to minimize impacts include the establishment of a temporary sand dike above the mean high tide line to reduce runoff to the bay during construction and minimize impacts to intertidal benthic resources. Standard construction practices will also be employed to minimize turbidity and erosion.

D. Contaminant Determinations

The discharge of dredged material is not expected to introduce, relocate, or increase contaminant levels at the beneficial use sites in Delaware Bay.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton: The effects on plankton should be minor and mostly related to light level reduction due to turbidity. Significant dissolved oxygen level reductions are not anticipated.

(2) Effects on Benthos: Benthic communities will be temporarily displaced within the intertidal zone of the beneficial use sites. The area is expected to be recolonized within 1-2 growth seasons through horizontal and in some cases, vertical migration of benthos. Impacts on benthic communities will not be significant.

(3) Effects on Nekton: Only a temporary displacement is expected as nekton would probably avoid active work areas.

(4) Effects on Aquatic Food Web: Only a minor, short-term impact on the food web is anticipated. This impact would extend beyond the construction period until recolonization of beneficial use sites occurred (estimated to be between 4 to 18 months).

(5) Effect on Special Aquatic Sites: The overall impact will be positive with beneficial use of dredged material to restore and protect barrier beaches and shoreline habitat.

(6) Threatened and Endangered Species: No significant impacts are expected. Section 7 consultation has been completed with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service during preparation of the integrated feasibility report/environmental assessment. Re-initiation of consultation will occur as needed.

(7) Other Wildlife: No Significant Effect.

(8) Actions to minimize impacts: Recommended environmental windows will be observed to the extent possible to minimize impacts to aquatic resources. Standard construction techniques will be employed to reduce impacts to the beaches and intertidal zone and to marine species at the dredging locations.

F. Proposed Placement Site Determinations

(1) Mixing Zone Determination: The following factors have been considered in evaluating the placement sites:

a. Depth of water at placement locations: Zero to approximately eight feet.

b. Current velocity, direction, and variability at placement locations: predominant current is longshore current which is wind dependent for its velocity in shallow water.

c. Dredged material characteristics, constituents, amount, and type of material, and settling velocities: predominately medium to coarse grained sand as defined by the Unified Soil Classification characteristics for beach and dune construction.

d. Number of discharges per unit of time: continuous over the construction period.

An evaluation of the factors above indicates that the placement sites and/or size of mixing zone are acceptable.

(2) Determination of compliance with applicable water quality standards: extensive testing of water quality parameters has been completed. It is anticipated that the discharges at the beneficial use sites will be in compliance with all State and Federal water quality standards.

(3) Potential Effects on Human Use Characteristics:

a. Municipal and private water supply - No effect.

b. Recreational and commercial fisheries – No significant adverse impacts. Impacts of prey species within the intertidal zone are temporary and the benthic species will recolonize the areas after construction.

c. Water related recreation - No significant impacts. The placement areas will be temporarily cordoned off during construction.

d. Aesthetics - No significant impacts. Aesthetics along the Bayfront placement areas will be improved by re-establishing a natural appearing beach berm and vegetated dune.

e. Parks, national and historic monuments, national seashores, wilderness areas, etc. - Beach restoration will benefit neighboring state and federal wildlife refuges by providing a sand source for longshore transport.

G. Determination of Cumulative Effects on the Aquatic Ecosystem - None anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem - Any secondary effects would be minor.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

A. No significant adaptation of the Section 404(b)(l) Guidelines were made relative to this evaluation.

B. The alternative measures considered for accomplishing the project objectives are detailed in Section 3 of the integrated feasibility report/environmental assessment.

C. It is not anticipated that the placement of dredged material at the selected sites would violate any applicable state water quality standards. No placement of dredged material will occur in wetlands. The disposal operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. Placement of dredged sand on the selected Bayfront beaches is not expected to harm any endangered species or their critical habitat as construction will not occur when listed species are present. Placement operations will restore habitat for beach nesting and foraging species such as migratory shorebirds, horseshoe crabs and diamondback terrapins the following reproductive season following completion of construction. Consultation has been completed with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for the feasibility phase of the study. There are no Marine Sanctuaries designated by the Marine Protection, Research, and Sanctuaries Act of 1972 in the project area. Coordination of the selected plan with the U.S. Fish and Wildlife Service regarding the Coastal Barrier Resources Act will be completed prior to construction.

E. The proposed placement of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability, and recreational, aesthetic and economic values will not occur. The proposed placement sites are expected to provide positive benefits to communities through erosion protection, provide additional beach and intertidal habitat for wildlife, and added recreational areas by beneficially using sand dredged from the main navigation channel that would ordinarily be disposed overboard in the bay's Buoy 10 site.

F. Appropriate steps to minimize potential adverse impacts of the discharge on the marine system. Environmental windows will be observed to the extent possible to minimize impacts to aquatic resources. Standard construction techniques will be used to reduce the impacts of pumping material and water onto the beaches.

3.0 COMPLIANCE WITH THE GUIDELINES

The following objectives should be considered in making a determination of any proposed discharge of dredged or fill material into waters of the United States.

3.1 RESTRICTIONS ON DISCHARGE

"(a) ***except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practical alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences."***

Beach renourishment was the only practicable or feasible alternative identified for providing coastal storm risk management improvements (*i.e.* beach nourishment) to various Delaware Bayfront communities with the intent to beneficially use dredged material from the Federal navigation channel within the Delaware River. No wetlands would be adversely impacted by the beach restoration alternatives considered. Based on the evaluation completed for dredging impacts of the Delaware River Main Channel Deepening project, no violation of state water quality standards will occur.

G. On the basis of the guidelines, the proposed placement sites for the discharge of dredged material are specified as complying with the 404 (b)(1) guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
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December 22, 2014

Peter R. Blum
Chief, Planning Division
Department of the Army
Philadelphia District, Corps of Engineers
Wanamaker Building, 100 Penn Square East
Philadelphia, PA 19107-3390

Dear Mr. Blum:

Thank you for your November 24, 2014, letter requesting the Delaware Division of Fish & Wildlife's participation in the scoping phase of Corps' study to evaluate the feasibility of beneficial use of dredged material to provide flood risk management improvements within risk prone areas of the State of Delaware. The Division is acutely interested in this issue given the significant vulnerability of coastal ecosystems in Delaware and the important role nature-based systems play in abating flooding impacts on coastal communities and infrastructure.

In addition to the scoping information provided herein, the Division requests continued scoping coordination and involvement with this study, particularly to be able to provide additional details regarding the information summarized below. Specific scoping comments at this time consist of:

- **Agency purview:** During this scoping phase, throughout the feasibility study and during implementation and construction planning phases, the Division requests continued dialogue and opportunity for input regarding protections for fish and wildlife resources. Specifically, the Division can provide input on time of year restrictions and other protection and restoration measures that would benefit fish and wildlife species, while also providing improved coastal resiliency and flood risk management through the beneficial use of dredged material.

- **Beneficial Use Sites:** The following sites, in current priority order, would benefit from restoration through the beneficial use of dredged material:
    1. **Little Creek Wildlife Area** to include the Little Creek impoundment levee, within the impoundment and bayfront beach shoreline, the Mahon impoundment bayfront beach shoreline and the Port Mahon Road beach shoreline.

Concur.

2. **Mispillion Harbor Reserve** to include beach and dune restoration along the bayfront shoreline and along the Mispillion River and Cedar Creek shorelines.

3. **Ted Harvey Conservation Area** to include the north and south impoundment bayfront beach shorelines and south impoundment levee.

4. **Augustine Wildlife Area** to include the Lang Marsh coastal impoundment levee and Port Penn levee, and the Lang Marsh, Augustine Beach and Armstrong Marsh-Augustine Creek river shorelines.

5. **Milford Neck Conservation Area** to include bayfront beach shoreline and thin-layering of dredged material to tidal marshes to increase marsh elevations to mitigate sea level rise.

6. **Assawoman Wildlife Area** to include selected small impoundments and thin layering of dredged material on nearby tidal marshes to increase marsh elevations to mitigate sea level rise.

The Division can provide additional information regarding these restoration sites and maps depicting the location of each site.

Thank you for the opportunity to participate in the project scoping and we look forward to continued involvement in this feasibility study. Please contact me if you have any questions or need additional information.

Sincerely,

David E. Saveikis
Director

pc: David S. Small, Secretary
Frank Piorko, Director

UNITED STATES DEPARTMENT OF COMMERCE
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NATIONAL MARINE FISHERIES SERVICE
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DEC 22 2014

Peter R. Blum
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Re: Delaware Beneficial Use of Dredged Material for the Delaware River Study (DMU)

Dear Mr. Blum:

This is in response to your letters received December 5, 2014 and December 9, 2014 requesting information on our concerns regarding the potential impacts from the proposed study. The proposed study involves evaluating the feasibility of providing flood risk management improvements within risk prone areas of the state of Delaware and New Jersey through the beneficial use of dredged material.

The two study areas are located within the Delaware Estuary watershed. For the state of New Jersey, the study extends from Trenton to Cape May Point and includes land and water areas in both freshwater portions of the river to the saline lower bay region adjacent to the Federal navigation projects identified in the study authority. For the state of Delaware, the study extends from the Delaware-Pennsylvania state line to Fenwick Island, DE, including inland bay communities. Tributaries to the Delaware River and Bay within the study area include: Dennis Creek, Maurice River, Cohansey River, Stowe Creek, Alloway Creek, Salem River, Oldmans Creek, Raccoon Creek, Mantua Creek, Big Timber Creek, Cooper River, Pennsauken Creek, Rancocas Creek, and Black Creek.

Magnuson Stevens Act

The Delaware Estuary and the estuarine portions of its tributaries in New Jersey, Delaware, and Pennsylvania have been designated as essential fish habitat (EFH) for a wide variety of species including Atlantic herring (*Clupea harengus*), black sea bass (*Centropristis striata*), bluefish (*Pomatomus saltatrix*), butterfish (*Peprilus triacanthus*), cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), long finned squid (*Loligo pealei*), Spanish Mackerel (*Scomberomorus maculatus*), red hake

(*Urophycis chuss*), summer flounder (*Paralichthys dentatus*), windowpane (*Scopthalmus aquosus*), scup (*Stenotomus chrysops*), winter flounder (*Pseudopleuronectes americanus*) and several species of skates and sharks.

The lower portion of the Delaware Bay has been designated as a Habitat Area of Particular Concern (HAPC) for sandbar shark (*Odontaspis taurus*). HAPC are subsets of EFH identified based on one or more of the following considerations: 1) the importance of the ecological function, 2) extent to which the habitat is sensitive to human-induced degradation, 3) whether and to what extent, development activities are stressing the habitat type, or 4) rarity of habitat type (50 CFR 600.815(a)(8)). Pregnant female sandbar sharks enter the bay between late spring and early summer, give birth and depart shortly after while neonates (young of the year) and juveniles (ages one and over) occupy the nursery grounds until migration to warmer waters in the fall (Rechisky and Wetherbee 2003 and Springer 1960). Neonates return to their natal grounds as juveniles and remain there for the summer as well. Tagging studies done by Merson and Pratt (2001) found that sandbar sharks use the southwestern portions of the bay as a pupping grounds and the entire bay as a summer feeding nursery for young of year and juvenile sharks. They also identified the area between the Broadkill and Murderkill Rivers, including Broadkill Beach as the primary nursery area within the bay.

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires all federal agencies to consult with us on any action authorized, funded, or undertaken by that agency that may adversely affect EFH. Included in this consultation process is the preparation of a complete and appropriate EFH assessment to provide necessary information on which to consult. Our EFH regulation at 50 CFR 600.905 mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. The consultation process for civil works projects is further described in our January 18, 2000 EFH Finding letter to the ACOE's North Atlantic Division.

The EFH final rule published in the Federal Register on January 17, 2002 defines an adverse effect as: "any impact which reduces the quality and/or quantity of EFH." The rule further states that:

> An adverse effect may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat and other ecosystems components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from action occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Additional information on EFH can be found on our website at: http://www.greateratlantic.fisheries.noaa.gov/habitat.

An Essential Fish Habitat Assessment has been prepared.

Other Fishery Resources within Study Area

The waters and wetlands of the Delaware River, Bay, and its tributaries support an abundance of ecologically sensitive aquatic resources possessing complex life cycles. They are present in these waters at various life stages in a variety of hydrologic habitats including oceanic density salt water, tidally-influenced water of variable salinities, and tidal and non-tidal freshwater areas. Since the Delaware Estuary continuum provides an important migratory pathway and critical spawning, nursery and forage habitat for many anadromous fishes, potential impacts to the ecosystem can have far-reaching consequences to the abundance of commercial and recreational fisheries within the watershed, on the continental shelf, and along the Mid-Atlantic coast.

The estuary provides many different benthic habitats, each supporting ecologically diverse faunal communities that serve as forage and are prey species for many federally-managed NOAA trust resources. The species of concern, include but are not limited to American eel (*Anguilla rostrata*), Atlantic croaker (*Micropogonias undulatus*), hickory shad (*Alosa mediocris*), spot (*Leiostomus xanthurus*) tautog (*Tautoga onitis*), yellow perch (*Perca flavescens*), hogchoker (*Trinectes maculatus*), juvenile *Alosids*, bay anchovy (*Anchoa mitchilli*), Atlantic silverside (*Menidia menidia*), striped killifish (*Fundulus majalis*), mummichog (*Fundulus heteroclitus*) and weakfish (*Cynoscion regalis*), as well as and many others.

The New Jersey Department of Environmental Protection, the Delaware Division of Natural Resources and Environmental Control and PSEG all conduct fishery surveys within the Corps' study area. These long-term surveys document the use of the study area by a wide variety of NOAA trust resource species including blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), American eel, Atlantic herring (*Clupea harengus*), Atlantic sturgeon (*Acipenser oxyrinchus*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy, bluefish, gizzard shad (*Dorosoma cepedianum*), hogchoker, striped bass (*Morone saxatilis*), spot (*Leiostomus xanthurus*), yellow perch, white perch (*Morone americana*), Atlantic silversides, and many others. We recommend you reach out to these entities as part of the scoping for this project to obtain more specific data on fish use and abundance.

Because landing statistics and the number of fish observed on annual spawning runs indicate a drastic decline in alewife and blueback herring populations throughout much of their range since the mid-1960's, they have been designated as species of concern by us in a Federal Register Notice dated October 17, 2006 (71 FRN 61022). "Species of concern" are those species about which NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act. The shallow water environment in this section of the Delaware River provides valuable habitat for these species as well as striped bass and American shad.

Striped bass has been the subject of one of the most important fisheries on the Atlantic coast for centuries (ASMFC 2008). Studies done by VERSAR, Inc. (Weisberg and Burton 1990) determined that striped bass eggs and larvae were most abundant between

Wilmington, DE and Philadelphia. Weisberg and Burton (1989) captured eggs and larvae in the Philadelphia/Camden area of the Delaware River into June of 1988 during their survey of the spatial and temporal patterns of striped bass spawning in the Delaware River. In addition, the Screening Level Risk Assessment of the Reserve Basin Sediments prepared by NOAA and EVS Environmental Consultants (1999) for the U.S. Department of the Navy reported another significant species, American shad, which spawn in the Delaware River downstream to Philadelphia. The shad spawning period in the Delaware River runs from mid-April through June (Miller et al. 1982). In recent years, as water quality has improved in the Delaware River, the abundance of juvenile striped bass and American shad have increased dramatically (Weisberg et al. 1996).

Impingement/entrainment studies conducted at the Eddystone Generation Station, owned and operated by Exelon Corporation, and located along Crum Creek, a secondary tributary that flows into the Delaware River, identified 53 species of fish in that section of the river including alewife, American eel, American shad, Atlantic menhaden, bay anchovy, blueback herring, gizzard shad, hogchoker, spot, striped bass and white perch (Waterfield et al. 2008a). Moreover, similar investigations of fish and large macro-invertebrates for the relicensing of the Schuylkill Generating Station were conducted at both the plant site and at the tidal confluence of the Schuylkill and Delaware Rivers, as well as north and south of this point. These studies also found an abundance of alewife, blueback herring, American shad, and striped bass (Normandeau Associates, 1997 and Waterfield et al. 2008b). Data from the PSEG biological monitoring program (PSEG 2003, PSEG 2004, and PSEG 2005) found similar results.

Submerged aquatic vegetation (SAV), principally wild celery (*Vallisneria americana*) has been documented in the freshwater portions of the Delaware River and in some of its tributaries. SAV provides valuable nursery, forage and refuge habitat for a variety of fish including striped bass, American shad, alewife, and blueback herring. In addition, as water quality in the Delaware River continues to improve, more areas of SAV are being detected within the region including near Mantua Creek, in Camden, Philadelphia and at several other proposed development sites in the region.

The estuarine portions of the study area provides habitat for blue crab (*Callinectes sapidus*), horseshoe crab (*Limulus polyhemus*) and American oyster (*Crassostrea virginica*). Efforts have been made over the past few years by the Corps and the States of Delaware and New Jersey to restore oyster beds in Delaware Bay. Ecological conditions of the estuary and the status of the oyster stocks have changed over the past decade when the Corps conducted pre-construction surveys for the Delaware Deepening Project. More information is also now available on water quality in the estuary, the conditions of the oyster seed beds and the benthic communities of the bay from sources such as the Haskin Shellfish Research Laboratory, New Jersey Department of Environmental Protection's Bureau of Marine Water Monitoring and the Delaware Department of Natural Resources and Environmental Control.

Adult female blue crabs migrate to the higher salinity areas of lower Delaware Bay to overwinter, generally December through March, so they are in position to release their

eggs in spring in a location that will allow their eggs to be carried into the ocean. The crabs burrow into surficial sediments of the channel as water temperature declines and overwinter in a dormant, immobile state until water temperature rise above approximately 10 degrees C in the spring. Most of the previous data collected by the Corps is more than a decade old. Since that time, there has been a substantial decline of the blue crabs stock abundance in Chesapeake Bay (Rugolo et al. 1998 in Muffley et al 2007) which has put an increased pressure New Jersey's blue crab resources, particularly in Delaware Bay (Kahn 2003 in Muffley et al. 2007). Kahn (2003) and Coakely (2004) also report recent declines in the Delaware Bay blue crab landings and catch-per-unit-effort (Muffley et al. 2007).

The Atlantic State Marine Fisheries Commission (ASMFC) has designated the nearshore, shallow water intertidal flats in Delaware Bay as prime spawning habitat for adult horseshoe crabs and the most critical are comprised of sand beaches between Maurice River and the Cape May Canal in New Jersey, and between Bowers Beach and Lewes in Delaware (ASMFC, 2010a; Shuster, 1994). The shoal water and shallow water areas Delaware Bay are also important nursery areas where juvenile crabs spend their first two years on the intertidal sand flats. Research suggests that adults horseshoe crabs are found in areas with low wave action and water bottoms of sand or mud, from shallow low-tide depths to water depths of <30 meters which may be why adult crabs typically inhabit bay areas adjacent to spawning beaches like navigation channels during the spawning season (ASMFC, 2010b). Observer by-catch records point to substantial numbers of the species observed entrained during hopper dredge operations (Ray and Clarke, 2010).

Horseshoe crabs also play valuable ecological role in the food web within the Delaware Estuary. Horseshoe crab eggs are a vital food source for the red knot (*Calidris canutus*), a federally listed endangered species. Horseshoe crab eggs and larvae are a food source for a number of other species including striped bass, white perch, weakfish, American eel, silver perch, and federally managed summer flounder and winter flounder (Steimle et al. 2000).

Endangered Species Act

The following endangered species may occur in the Delaware River, Bay, and its tributaries: Shortnose sturgeon (*Acipenser brevirostrum*); Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (Distinct Population Segments [DPS]: New York Bight, Chesapeake Bay, Carolina, South Atlantic); Kemp's ridley sea turtle (*Lepidochelys kempi*); green sea turtle (*Chelonia mydas*); and leatherback sea turtle (*Dermochelys coriacea*).

The following threatened species may occur in Delaware River, Bay, and its tributaries: Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (DPS: Gulf of Maine); and loggerhead sea turtle (*Caretta caretta*) (DPS: Northwest Atlantic Ocean).

Shortnose Sturgeon

The Federally endangered shortnose sturgeon occurs in the Delaware River from the lower bay upstream to at least Lambertville, New Jersey (river mile 148). In the Delaware

River, the concentrated use of the Scudders Falls region (river mile 133) in the spring by large numbers of mature male and female shortnose sturgeon indicate that the area between Scudders Falls and the Trenton rapids (river mile 139) is a spawning area. Movement to the spawning grounds occurs in early spring, typically in late March, with spawning occurring through early May. After spawning, adult shortnose sturgeon migrate rapidly downstream to the Philadelphia area (river mile 100). After adult sturgeon migrate to the area around Philadelphia, many adults return upriver to between river mile 127 and 134 within a few weeks, while others gradually move to the same area over the course of the summer (O'Herron et al. 1993). By the time water temperatures have reached 10°C, typically by mid-November, adult sturgeon have returned to the overwintering grounds in the Roebling (river mile 124), Bordentown (river mile 129), or Trenton reaches (river mile 133). Shortnose sturgeon are likely to occur in the mainstem Delaware River near the Philadelphia site (river mile 100) between mid-April and mid-November. Juvenile shortnose sturgeon overwinter between the bottom of Artificial Island (river mile 53) to Philadelphia (river mile 100) and will stay between Wilmington (river mile 68) to Marcus Hook (river mile 81) year-round (Brundage and O'Herron 2009).

Atlantic Sturgeon

Five Distinct Population Segments (DPS) of Atlantic sturgeon are listed under the ESA. The Gulf of Maine DPS is listed as threatened; the New York Bight, Chesapeake Bay, Carolina and South Atlantic DPSs are listed as endangered. Atlantic sturgeon originating from any of the five DPSs may be present in the Delaware River. In the Delaware River and Estuary, Atlantic sturgeon occur from the mouth of the Delaware Bay to the fall line near Trenton, NJ, a distance of 137 miles (Simpson 2008). Generally, non-natal late stage juveniles (sometimes also referred to as subadults) immigrate into the estuary in spring, establish home range in the summer months in the river, and emigrate from the estuary in the fall (Fisher 2011). Subadults tagged and tracked by Simpson (2008) entered the lower Delaware Estuary as early as mid-March but, more typically, from mid-April through May. Tracked sturgeon remained in the Delaware Estuary through the late fall departing in November (Simpson 2008). Previous studies have found a similar movement pattern of upstream movement in the spring-summer and downstream movement to overwintering areas in the lower estuary (river mile 67-83) or nearshore ocean in the fall-winter (Brundage and Meadows 1982; Lazzari et al. 1986; Shirey et al. 1997, 1999; Brundage and O'Herron 2009; Brundage and O'Herron in Calvo et al. 2010).

Based on recent tagging and tracking studies carried out in 2011, Breece et al. (2013) reports likely spawning locations at RM 75-93 and RM 106-118. Mature adults have been tracked in these areas at the time of year when spawning is expected to occur and movements have been consistent with what would be expected from spawning adults. To date, eggs and larvae have not been documented to confirm that actual spawning is occurring in these areas. However, the presence of YOY in the Delaware River from Deepwater (RM 65) to Roebling (RM 124) during late fall to early spring provides confirmation that spawning is still occurring in this river (Fisher 2009; Calvo et al. 2010; Fisher 2011).

Atlantic sturgeon are known to venture into tributaries, streams, and creeks along Chesapeake Bay and may do the same in the Delaware River.

Sea Turtles

Four species of ESA-listed sea turtles under our jurisdiction may be found seasonally in the coastal waters of Delaware: federally threatened Northwest Atlantic distinct population segment (DPS) loggerhead sea turtles (*Caretta caretta*), and the federally endangered Kemp's ridley (*Lepidochelys kempi*), green (*Chelonia mydas*), and leatherback (*Dermochelys coriacea*) sea turtles. In general, ESA-listed sea turtles are seasonally distributed in coastal U.S. Atlantic waters, migrating to and from ocean/estuarine habitats extending from Florida to New England, with overwintering concentrations primarily occurring in waters south of Cape Hatteras, North Carolina. As water temperatures rise in the spring, sea turtles begin to migrate northward. As temperatures decline rapidly in the fall, sea turtles in northern waters begin their southward migration. Sea turtles are expected to be in the waters of Delaware in warmer months, typically when water temperatures are at least 15°C. This typically coincides with the months of May through November, with the highest concentration of sea turtles present from June through October (Shoop and Kenney 1992; Morreale 1999, 2003; Morreale and Standora 2005). Leatherback sea turtles feed almost exclusively on jellyfish in offshore marine environments, whereas green and Kemp's ridley sea turtles tend to frequent sea grass beds. Loggerhead sea turtles will feed on mollusks and crustaceans in a variety of habitats. When present, sea turtles in Delaware waters would likely be most prevalent at depths between 16 and 49 feet, where light and food are most suitable for foraging (Morreale and Standora 1990). Sea turtles may occur in the action area from May through November.

Conclusion

As listed species of sturgeon and sea turtles may occur in Delaware River, Bay, and its tributaries, and thus, within the vicinity of your proposed project, any proposed in-water work has the potential to impact these species. We would recommend placing a turbidity curtain around any project areas below mean high water where sediment may be placed. This will not only contain suspended sediment within the affected area, but will also prevent sturgeon and sea turtles from coming in contact with any increased turbidity or mechanical activity associated with the project. We would also recommend implementing time of year restrictions for Atlantic and shortnose sturgeon spawning sites (April-June) and overwintering sites (November-March), as deposition of material may adversely affect early life stages and overwintering fish.

As project details become finalized, a consultation, pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, may be necessary as any discretionary federal action, such as the approval or funding of a project by a federal agency, that may affect a listed species must undergo consultation pursuant to section 7 of the ESA of 1973, as amended. If the proposed project has the potential to affect listed species, and it is being approved, permitted or funded by a Federal agency, the lead Federal agency, or their designated non-Federal representative, is responsible for determining whether the proposed action is likely to affect the listed species. The Federal

Section 7 consultation (ESA) has been initiated and will continue throughout project implementation.

agency would submit their determination along with justification for their determination and a request for concurrence, to the attention of the ESA Section 7 Coordinator, NMFS Greater Atlantic Fisheries Regional Office, Protected Resources Division, 55 Great Republic Drive, Gloucester, MA 01930. After reviewing this information, we would then be able to conduct a consultation under section 7 of the ESA.

We look forward to continued coordination with your office on this project as it moves forward. Should you have any questions about ESA listed species or about the ESA section 7 consultation process in general, please contact Edith Carson at 978-282-8490 or by email Edith.Carson@noaa.gov. If you have any questions about EFH or other NOAA trust resources, please do not hesitate to contact Karen Greene at 732-872-3023 or karen.greene@noaa.gov.

Sincerely,

for Kimberly Damon-Randall
Assistant Regional Administrator
for Protected Resources

EC: Carson, NMFS/PRD
Greene, NMFS/HCD
File Code: Section 7/Nonfisheries/ACOE/Technical Assistance/2014/ ACOE Dredged Material Delaware Estuary NJ and DE

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DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Ms. Nekole Alligood, Cultural Preservation Director
Delaware Nation
31064 State Highway 281
PO Box 825
Anadarko, OK 73005

Dear Ms. Alligood:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

The USACE has initiated a screening process to focus the study scope on potential project sites with a high potential for flood-related damages. This letter serves to inform you of progress, to date, identify the focus areas of study, and to solicit any comments or concerns you may have specific to these potential project locations.

The goal of the study, following passage of the Disaster Relief Appropriations Act, 2013 (PL 113-2) in October 2012 and Second Interim Report to Congress (dated 30 May 2013), is to combine risk reduction of flood-prone bayshore community areas with enhancement of shoreline resiliency using dredged material beneficially. The Philadelphia District has narrowed the list of potential project sites to 13 in Delaware and 9 in New Jersey (see attached) based on the extent of damages resulting from flooding and available land and shoreline characteristics of the problem areas for dredged material placement. Potential project sites are actively being screened based on distance from available dredged material sources and other parameters.

The study will evaluate opportunities of using dredged material for beach nourishment to establish berms and dunes, marsh enhancement, riverine levees, and living shorelines with or without hardened support structures such as groins or breakwaters. Delaware's Department of Natural Resources and Environmental Control and New Jersey's Department of Environmental Protection will serve as the nonfederal sponsors to these respective projects. The study is scheduled to be completed by August 2017 and is 100% Federally funded.

As the study progresses, many of the project areas will be found not feasible and a tentatively selected plan (TSP) will arise. In order to better focus our Section 106 process on the TSP, I am proposing the negotiation and execution of a programmatic agreement (PA) in accordance with 36 CFR § 800.6 and § 800.14 (b)(1)(ii). A draft copy of the PA is enclosed for your review.

If you have any further comments or concerns regarding the attached list of screened potential project sites or if you have comments on the draft PA, we invite your input. If you have any questions, please contact me at (215) 656-6556 or via email at nicole.c.minnichbach@usace.army.mil

Respectfully,



Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

Enclosures

1. DEDMU Description
2. NJDMU Description
3. Draft Programmatic Agreement

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Ms. Susan Bachor and Ms. Blair Fink
Delaware Tribe Historic Preservation Representatives
PO Box 64
Pocono Lake, PA 18347

Dear Ms. Bachor and Ms. Fink:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

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Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

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WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Ms. Robin Dushane
Cultural Preservation Director
The Eastern Shawnee Tribe of Oklahoma
12705 S. 705 Road
Wyandotte, Oklahoma 74370

Dear Ms. Dushane:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

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Respectfully,



Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

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DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Mr. Jesse Bergevin, Tribal Historic Preservation Officer
Oneida Indian Nation
2037 Dream Catcher Plaza
Oneida, NY 13421

Dear Mr. Bergevin:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

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The goal of the study, following passage of the Disaster Relief Appropriations Act, 2013 (PL 113-2) in October 2012 and Second Interim Report to Congress (dated 30 May 2013), is to combine risk reduction of flood-prone bayshore community areas with enhancement of shoreline resiliency using dredged material beneficially. The Philadelphia District has narrowed the list of potential project sites to 13 in Delaware and 9 in New Jersey (see attached) based on the extent of damages resulting from flooding and available land and shoreline characteristics of the problem areas for dredged material placement. Potential project sites are actively being screened based on distance from available dredged material sources and other parameters.

The study will evaluate opportunities of using dredged material for beach nourishment to establish berms and dunes, marsh enhancement, riverine levees, and living shorelines with or without hardened support structures such as groins or breakwaters. Delaware's Department of Natural Resources and Environmental Control and New Jersey's Department of Environmental Protection will serve as the nonfederal sponsors to these respective projects. The study is scheduled to be completed by August 2017 and is 100% Federally funded.

As the study progresses, many of the project areas will be found not feasible and a tentatively selected plan (TSP) will arise. In order to better focus our Section 106 process on the TSP, I am proposing the negotiation and execution of a programmatic agreement (PA) in accordance with 36 CFR § 800.6 and § 800.14 (b)(1)(ii). A draft copy of the PA is enclosed for your review.

If you have any further comments or concerns regarding the attached list of screened potential project sites or if you have comments on the draft PA, we invite your input. If you have any questions, please contact me at (215) 656-6556 or via email at nicole.c.minnichbach@usace.army.mil

Respectfully,



Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

Enclosures

1. DEDMU Description
2. NJDMU Description
3. Draft Programmatic Agreement

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Bonney Hartley
Tribal Historic Preservation Officer
Stockbridge-Munsee Mohican Tribal Historic Preservation
New York Office
65 1st Street
Troy, NY 12180

Dear Ms. Hartley:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

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Respectfully,



Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

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DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

REPLY TO
ATTENTION OF

Environmental Branch

March 16, 2016

Mr. Arnold Printup, Historic Preservation Officer
St. Regis Mohawk Tribe
412 State Route 37
Hogansburg, NY 13655

Dear Mr. Printup:

In accordance with the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers (USACE) Philadelphia District is evaluating the feasibility of providing flood risk management improvements within risk prone areas of the Delaware Estuary within the states of Delaware and New Jersey through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

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The study will evaluate opportunities of using dredged material for beach nourishment to establish berms and dunes, marsh enhancement, riverine levees, and living shorelines with or without hardened support structures such as groins or breakwaters. Delaware's Department of Natural Resources and Environmental Control and New Jersey's Department of Environmental Protection will serve as the nonfederal sponsors to these respective projects. The study is scheduled to be completed by August 2017 and is 100% Federally funded.

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Respectfully,



Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison

Enclosures

1. DEDMU Description
2. NJDMU Description
3. Draft Programmatic Agreement

From: Bonney Hartley
To: Minnichbach, Nicole C CIV USARMY CENAP (US)
Subject: [EXTERNAL] RE: Delaware Estuary flod risk management
Date: Thursday, March 24, 2016 10:44:44 AM

Hi Nikki,

Thanks for the additional info. I don't think we need a call after all, but thank you: when I look through the additional info you sent I realize I had it wrong and I was looking at Sussex County Delaware when I thought it was Sussex County NJ. We don't have sites there. Therefore based on the mapping we don't have any areas of interest in the project area and don't need to consult. If the project alternatives change please let me know.

Thanks!
Bonney

-----Original Message-----
From: Minnichbach, Nicole C NAP [mailto:Nicole.C.Minnichbach@usace.army.mil]
Sent: Thursday, March 24, 2016 8:19 AM
To: Bonney Hartley
Subject: RE: Delaware Estuary flod risk management

Also - I have attached some additional information.

The project is currently going through screening of each area - some of them are going to be rejected. That is why I wanted to push the Section 106 work off until after feasibility - to spend our efforts on the alternatives that remain.

Just let me know.

Nicole Cooper Minnichbach
Cultural Resource Specialist and Tribal Liaison (CRSTL) US Army Corps of Engineers Philadelphia District
(O) 215-656-6556
(M) 215-834-1065

-----Original Message-----
From: Bonney Hartley [mailto:Bonney.Hartley@mohican-nsn.gov]
Sent: Wednesday, March 23, 2016 4:21 PM
To: Minnichbach, Nicole C NAP <Nicole.C.Minnichbach@usace.army.mil>
Subject: [EXTERNAL] Delaware Estuary flod risk management

Hi Nicole,

I received the information for the proposed flood risk management improvements for the Delaware Estuary in Delaware and New Jersey.

I'm looking into the three sites proposed in Sussex County NJ to see if we have concerns.

However, can you help me understand please what time of construction or disturbance is planned for these areas? It sounds like dredging but I'm not too clear.

Thank you.
Bonney

Bonney Hartley

Tribal Historic Preservation Officer

Stockbridge-Munsee Mohican Tribal Historic Preservation

New York Office

65 1st Street

Troy, NY 12180

(518) 244-3164

Bonney.Hartley@mohican-nsn.gov <mailto:Bonney.Hartley@mohican-nsn.gov>

BlockedBlockedwww.mohican-nsn.gov <BlockedBlockedhttp://www.mohican-nsn.gov/>

Physical Address: 37 1st Street

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
100 EAST PENN SQUARE, FLOOR 7, WANAMAKER BUILDING
PHILADELPHIA, PENNSYLVANIA 19107-3390

Environmental Resources Branch

AUG 15 2016

Kimberly B. Damon-Randall
Assistant Regional Administrator for Protected Resources
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930

Dear Ms. Damon-Randall:

This letter is in regard to on-going Federal activities within the Philadelphia District of the US Army Corps of Engineers and the National Marine Fisheries Service's June 3, 2016 Federal Register notice that proposes the designation of critical habitat for the Gulf of Maine, New York Bight, and Chesapeake Bay distinct population segments (DPSs) of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Portions of the proposed critical habitat for the New York Bight DPS include the Delaware River and Bay which, as you know, fall within the boundaries of our District. The National Marine Fisheries Service proposes to designate critical habitat for approximately 340 miles of aquatic habitat in rivers in New York, New Jersey, Pennsylvania and Delaware for the New York Bight DPS.

Pursuant to Section 7(a)(4) of the Endangered Species Act of 1973, Federal agencies are required to confer with the Service when an agency action may affect a proposed species or proposed critical habitat. If it is determined that an agency action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat then a conference is required. Federal agencies may also request a conference on any action that may affect proposed species or proposed critical habitat. The purpose of this letter is to initiate conference with the National Marine Fisheries Service for dredging, blasting and placement activities associated with channel deepening and channel maintenance within the Delaware River with regard to potential impacts to the proposed critical habitat for the Atlantic sturgeon.

Federal activities within the Delaware River have the potential to impact Atlantic sturgeon or their habitat (including proposed critical habitat). This letter relates specifically to actions associated with the Delaware River Main Channel Deepening project, the Philadelphia to the Sea maintenance dredging, the Philadelphia to Trenton maintenance dredging and the Delaware River Dredged Material Utilization study. Biological Opinions have been prepared by your office for the Main Channel Deepening and Philadelphia to the Sea projects. ESA consultation has recently been re-initiated for both of these projects. A Biological Assessment was prepared for the Philadelphia to

Trenton project in August 2014. Further information regarding these projects, their locations, and potential impacts to Atlantic sturgeon and other NMFS managed species can be found in these documents. Since some of the project information in these documents is slightly dated, we have included an updated schedule of upcoming work (see Table 1).

The Delaware River Dredged Material Utilization (DMU) study is a new project that is investigating flood risk management improvements (*i.e.* beach nourishment) within several Delaware and New Jersey bayfront communities using material that will be dredged from the Delaware River Main Channel as part of maintenance dredging. The current project plan calls for the placement of material removed from Lower Reach E of the 45-foot channel into the open water site at Buoy 10. The DMU study proposes to beneficially use this material to reduce flooding and storm damage risks in several areas within Delaware Bay that were affected by Hurricane Sandy. The placement sites being considered for this project include: Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach and Lewes Beach in Delaware. In New Jersey, the proposed placement sites include: Downe Township (Gandy's Beach and Fortescue), Reeds Beach, Pierces Point, Del Haven, and Villas (see Figure 1). In order to beneficially use the material associated with the previously coordinated maintenance dredging in Lower Reach E of the Delaware River Main Channel, a hydraulic pipeline dredge or hopper dredge will be used to dredge the material and discharge it directly to the beach placement site. The proposed design template for dredge material placement on the Delaware Bay beaches (excluding Lewes) features a berm of 25' width at a height of 7' (NAVD 88) with a foreslope of approximately 400' length on a slope of 1V:10H extending bayward to depth of closure of -5.0' (NAVD 88). The berm is topped with a dune whose crest width is 25' at a height of 12' (NAVD 88). The dune transitions both bayward to the berm and landward to existing grade on a slope of 1V:5H. It is estimated that all 8 communities (including Lewes) will require an approximate total of 675,000 cy of dredge material to fill their respective design templates. It is expected that periodic nourishment would occur on a 4-year schedule to maintain the design level of protection. The Lewes Beach berm is expected to be between 15 to 25 feet wide.

Critical habitat for the Atlantic sturgeon is currently being proposed within the Main Stem of the Delaware River from the crossing of the Trenton-Morrisville Route 1 Toll Bridge to where the Main Stem discharges at its mouth into the Delaware Bay (at Liston Point, Delaware and Hope Creek, New Jersey). At least some portion of all the projects being discussed in this letter fall within the area being proposed for critical habitat. The deepening of the Main Channel through both dredging and blasting, as well as maintenance dredging from Trenton to the Sea have the potential to alter the physical features of the area being considered for critical habitat. The sand placement associated with the beneficial use of maintenance material under the DMU does not fall within the area proposed as critical habitat.

Dredging activities within the Delaware River will have an impact on proposed critical habitat with soft substrate in waters with salinity between 0.5 and 30 ppt. The salinity in the Delaware River reaches 0.5 ppt around the Marcus Hook range and increases to 30 ppt by the time it reaches the bay. While the dredging will have a temporary impact on the soft sediments during construction, no changes to the substrate type are anticipated from the deepening or subsequent maintenance dredging. Sediment sampling conducted by the USACE has confirmed that the sediment type in the river was unchanged after the deepening activities (USACE 2012). The maintenance material removed from the navigation channel historically consists of a mixture of sand and mud and this will continue to be the case for future work. The project will also have temporary impacts on hard bottom substrate in waters with salinity less than 0.5 ppt. While blasting within the Marcus Hook area will remove bedrock, it is only removing enough rock to deepen to area to the required depth. Because only the top layers of the rock will be removed, and the bedrock extends deep into the river bottom, the substrate will remain rock following the blasting.

Deepening the remainder of the navigation channel from 40' to 45' will not impede sturgeon movements. The five foot increase in depth applies only to a small portion of the area being proposed as critical habitat and still falls within the depth range for sturgeon spawning. Maintenance dredging activities will also change the water depths but these changes simply take the channel back to conditions that existed prior to new sediments being deposited in the channel. Additionally, returning the depths to previous conditions will not impede sturgeon movements within the river. None of the proposed activities will result in a physical barrier to sturgeon passage.

The Federal activities within the Delaware River will not affect water quality in a way that effects the ability of that habitat to support (a) spawning, (b) survival of any life stage, or (c) larval, juvenile or subadult growth, development or recruitment. The proposed activities will not be taking place during sturgeon spawning, which occurs in April and May. In addition, NMFS has already concluded in the November 20, 2015 BO for the deepening project that any effects of the deepening and subsequent maintenance of the 45' channel on Atlantic sturgeon spawning will be insignificant and discountable.

In summary, based on the above information, the proposed projects are not likely to destroy or adversely modify proposed critical habitat within the Delaware River, and further coordination with regard to critical habitat is not required.

As previously discussed with Mr. Zachary Jylkka of your staff, at this time, we would like to combine the ongoing formal consultations for all of the above referenced projects into one Biological Opinion that would address the remaining work on the Main Channel deepening and subsequent maintenance dredging within the river from Trenton to the Sea, as well as the proposed beneficial use of dredged maintenance material for the DMU study.

Please contact Ms. Beth Brandreth of our Environmental Resources Branch at (215) 656-6558 if you have any questions or need additional information. We appreciate your continued partnership on these activities.

Sincerely,

Peter R. Blum, P.E.
Chief, Planning Division

Enclosures

Cc: Karen Greene, NMFS, Sandy Hook

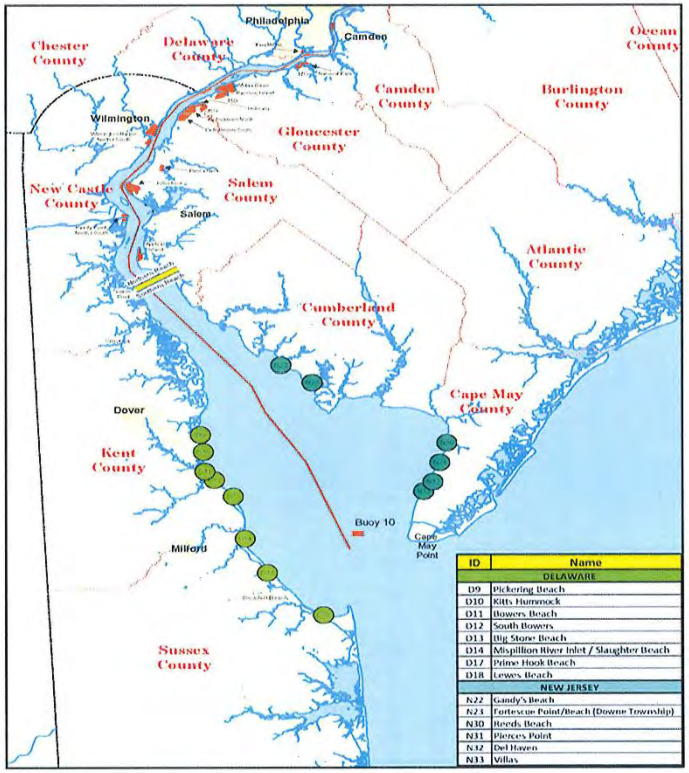


Figure 1 – DMU proposed placement sites

Project	*Channel Reach/Location*	*Duration (Months)*	*Volume (CY)*	*Type of Dredge*	*Scheduled Dates*
Philadelphia to Trenton	Fairless Turning Basin	1	125,000		October 2016 – November 2016
Main Channel Deepening	Contract 9 – Upper Reach E	9	1,000,000	Hopper	October 2017- September 2016
	Contract 10 – Upper Reach B	8	3,485,469	Cutterhead	August 2017 – March 2018
Philadelphia to the Sea (40' maintenance)**	Marcus Hook	2	900,000	Cutterhead	November 2016
	Deepwater Point Range	2	900,000	Cutterhead	December 2016
	New Castle Range	2	750,000	Cutterhead	January 2017
	Marcus Hook Anchorage	2-3	200,000	Hopper	November 2016 or March 2017
DMU	Delaware Beaches	9-12	675,000 (initial construction)	Cutterhead or Hopper	2020 (estimated)
	New Jersey Beaches	9-12	675,000 (initial construction)	Cutterhead or Hopper	2022 (estimated)

Table 1 – Estimates of upcoming construction schedules

** - It is expected that all maintenance dredging will be to the 45' depth after March 2018 if schedules remain as predicted

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
100 EAST PENN SQUARE, FLOOR 7, WANAMAKER BUILDING
PHILADELPHIA, PENNSYLVANIA 19107-3390

Environmental Resources Branch

SEP 20 2016

Mr. Chris Guy, Supervisor
U.S. Fish and Wildlife Service
Chesapeake Bay Ecological Services Field Office
Endangered and Threatened Species Branch
177 Admiral Cochrane Drive
Annapolis, Maryland 21401

Dear Mr. Guy:

The U.S. Army Corps of Engineers, Philadelphia District (District) is currently preparing a Feasibility Report and Integrated Environmental Assessment to beneficially use dredged sand from future maintenance dredging of Lower Reach E (Miah Maull and Brandywine Ranges) of the Delaware River Federal Navigation Channel to pump onto Delaware Bay residential community beaches. The proposed eight Delaware bayshore communities are Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach (Figure 1). These bayshore communities are characterized by broad marshes to the west and also to the north and south in between the communities, with a narrow barrier sandy beach. These communities and their adjacent undeveloped marshes and beaches provide valuable foraging and resting habitat for migratory shorebirds, feeding and nesting habitat in the adjacent marshes for waterbirds and other wildlife including fish, amphibians, reptiles and mammals.

This letter provides project information developed to date to initiate coordination with your agency early in the Feasibility phase with respect to the Coastal Barrier Resources Act (CBRA) in accordance with the National Environmental Policy Act (NEPA). The District seeks to coordinate with your office to ensure compliance with the CBRA prior to the project optimization process. The CBRA was enacted in 1982 in certain coastal areas vulnerable to hurricane damage. While most Federal activities within CBRA units are prohibited, several categories of activities are listed as exceptions (16 USC 3505(a)) to the Federal expenditure within or affecting the Coastal Barrier Resources System (CBRS). The exception in Section 6(a)(6)(G) of CBRA is for "*nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilizing system*" or for "*study, management, protection, and enhancement of fish and wildlife resources and recreational projects*" within the CBRS.

Portions of the proposed berm and dune footprint, as currently designed, are located within CBRA unit H00 at South Bowers Beach, Big Stone Beach, Slaughter Beach, and,

Prime Hook Beach (Figure 2). The proposed berm and dune footprint at Pickering Beach and the northernmost end of the berm and dune footprint at Kitts Hummock Beach occur in CBRA unit DE-01 (the southernmost end of the berm and dune footprint at Kitts Hummock Beach occurs within the Otherwise Protected Area DE-01P).

The objective of this study is to beneficially use high quality sand material dredged from the Delaware River main navigation channel in the lower bay to reduce flooding, erosion, and storm damage risks in coastal areas affected by Hurricane Sandy. The proposed design template for dredge material placement on Delaware Bay beaches (excluding Lewes) features a berm of 25' width at a height of 7' (NAVD 88) with a foreslope of approximately 400' length on a slope of 1V:10H extending bayward to depth of closure of -5.0' (NAVD 88). The berm is topped with a dune whose crest width is 25' at a height of 12' (NAVD 88). The dune transitions both bayward to the berm and landward to existing grade on a slope of 1V:5H. It is estimated that all 8 communities (including Lewes) will require a combined 375,000 cy of dredge material placement to fill their respective design templates. It is expected that periodic nourishment would occur on a 4-year schedule to maintain the design level of protection. The berm at Lewes Beach will be 15' wide but may be enlarged to 25 feet wide as we proceed into the optimization process.

Based on the above information, the District feels that the beneficial use of sand from the Delaware River Main Channel (Lower Reach E) meets the exception in Section 6(a)(6)(G) of CBRA for "*nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system*" within the CBRS. The project is also consistent with the purposes of CBRA to minimize loss of human life and damage to natural resources during severe storm events and for the "*protection, and enhancement of fish and wildlife resources and recreational projects*". The placement of sand also serves to provide a sand source through natural littoral longshore transport to undeveloped adjacent reaches of barrier beach habitat downdrift of the placement sites to reduce further erosion and damages to these natural habitats.

At this time we are requesting your agency's position regarding our proposed plan's qualification as a permissible exception for Federal expenditures (16 USC 3505(a)) under the Coastal Barrier Resources Act and its stated exception (Section 6(a)(6)(G). Should you require further information or have any questions, please contact Ms. Barbara E. Conlin of our Environmental Resources Branch.

Sincerely,

for C. MacIntosh
Peter R. Blum, P.E.
Chief, Planning Division

Enclosures

Figure 1: Delaware and New Jersey Dredged Material Utilization proposed placement sites.

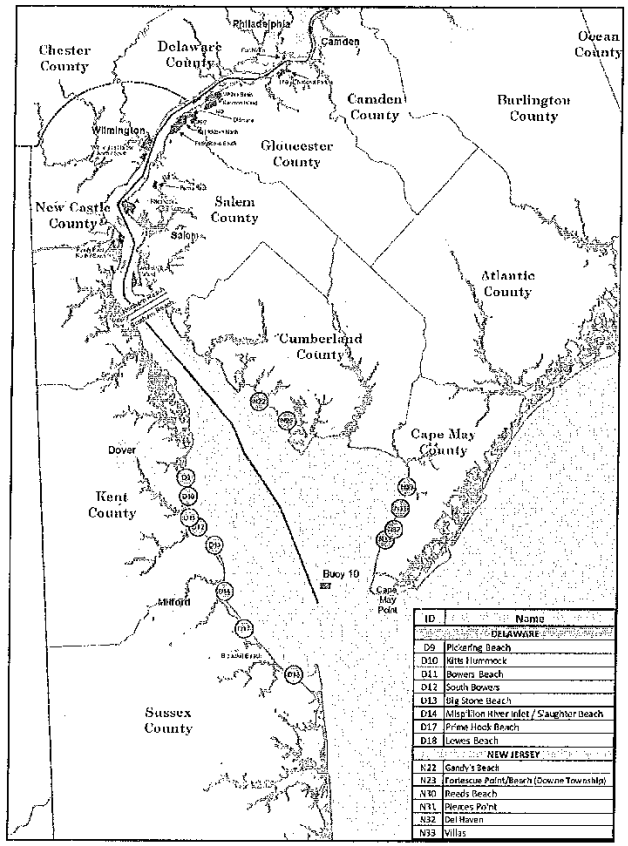
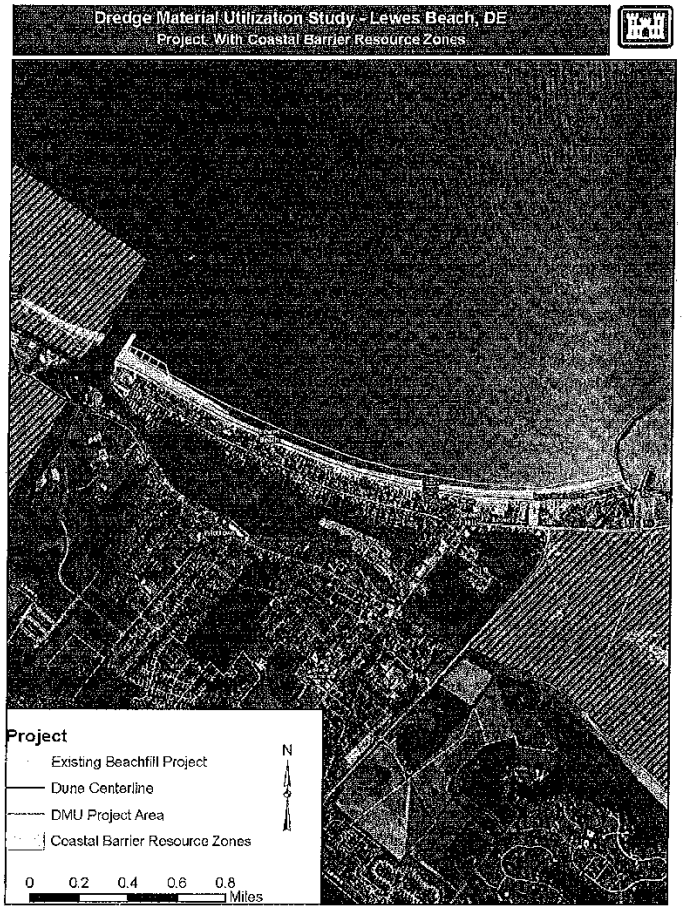


Figure 2: Proposed beach berm and dune locations and CBRA units.


Dredge Material Utilization Study - Lewes Beach, DE
Project With Coastal Barrier Resource Zones
Project
Existing Beachfill Project
Dune Centerline
DMU Project Area
Coastal Barrier Resource Zones
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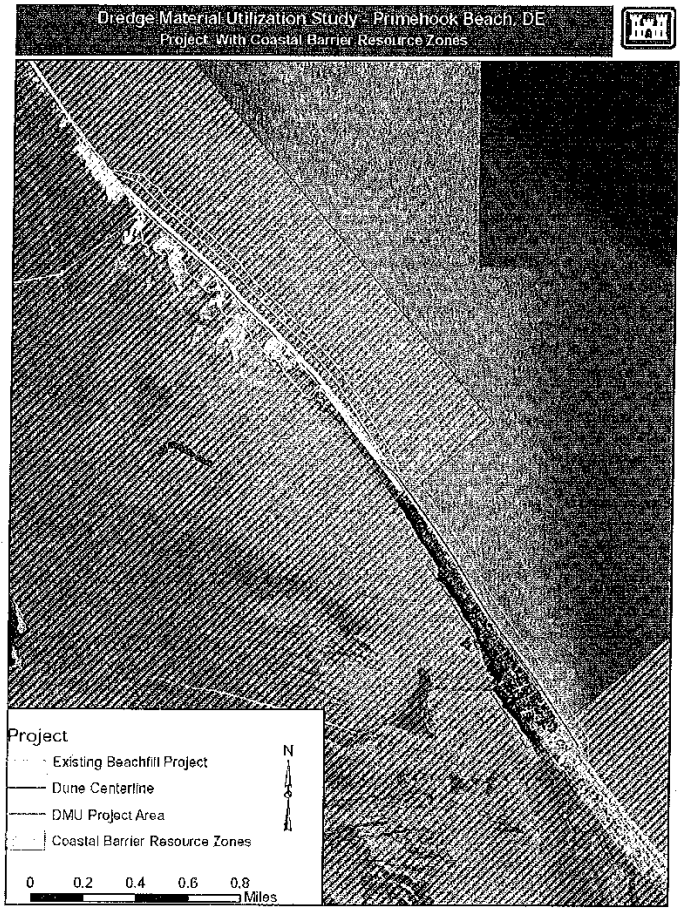
Miles


Dredge Material Utilization Study - Primehook Beach, DE
Project With Coastal Barrier Resource Zones
Project
Existing Beachfill Project
Dune Centerline
DMU Project Area
Coastal Barrier Resource Zones
N
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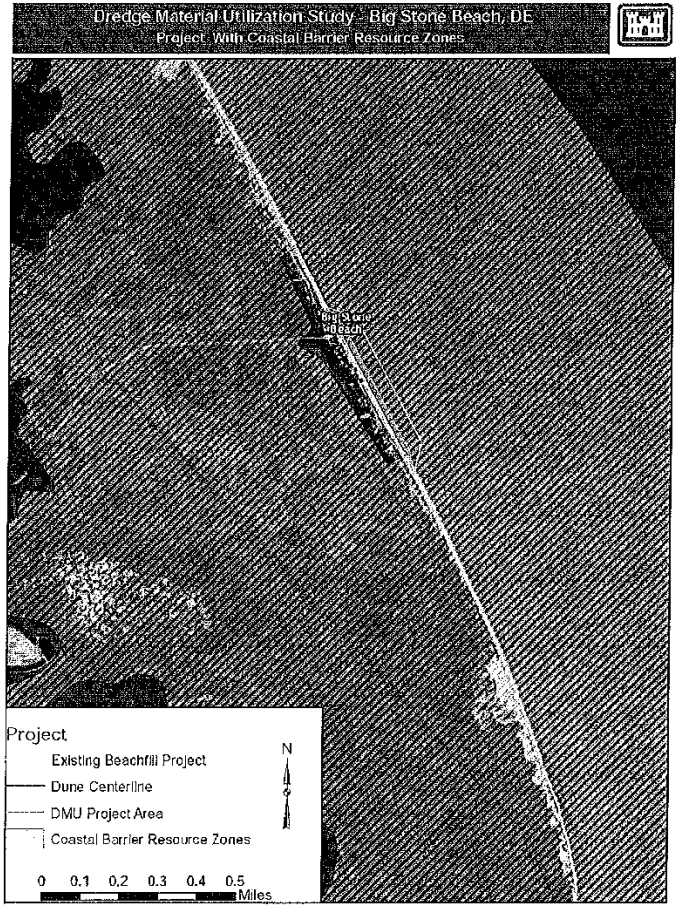
Dredge Material Utilization Study - Big Stone Beach, DE
Project With Coastal Barrier Resource Zones
Project
Existing Beachfill Project
Dune Centerline
DMU Project Area
Coastal Barrier Resource Zones
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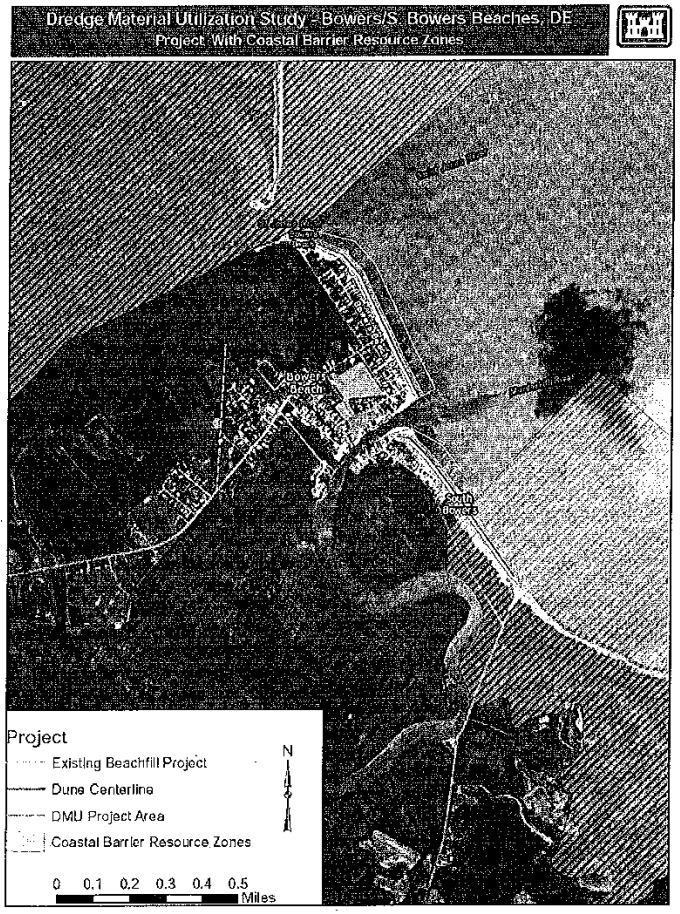
Dredge Material Utilization Study - Bowers/S. Bowers Beaches, DE
Project With Coastal Barrier Resource Zones
Project
Existing Beachfill Project
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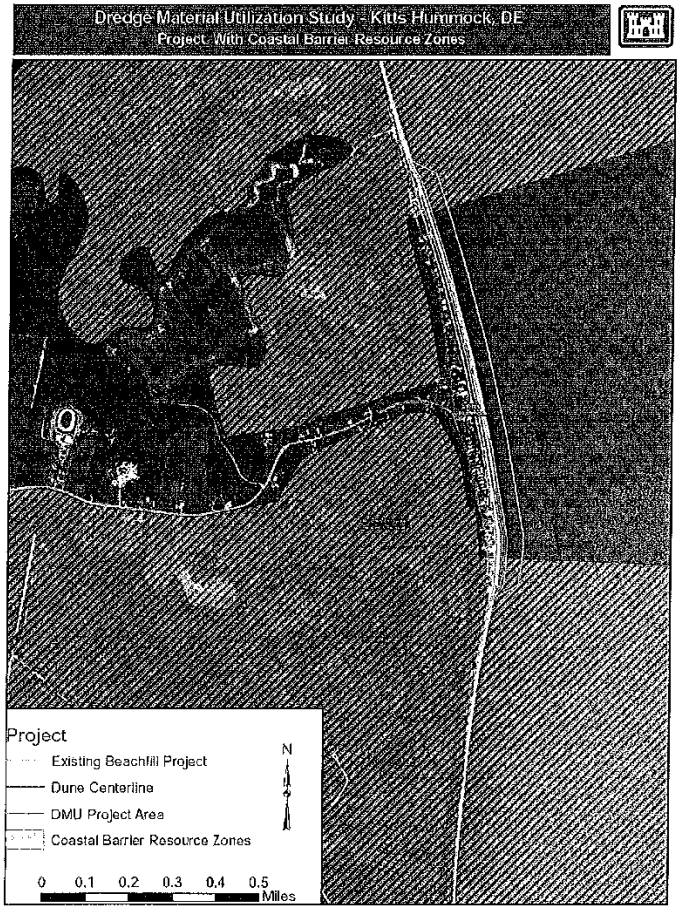
Dredge Material Utilization Study - Kitts Hummock, DE
Project With Coastal Barrier Resource Zones
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DMU Project Area
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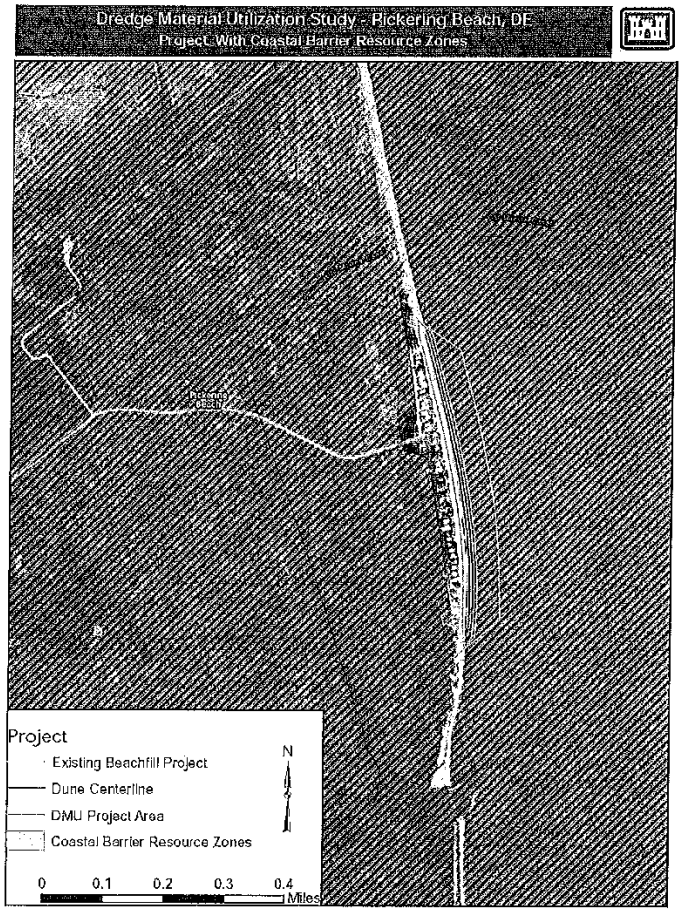
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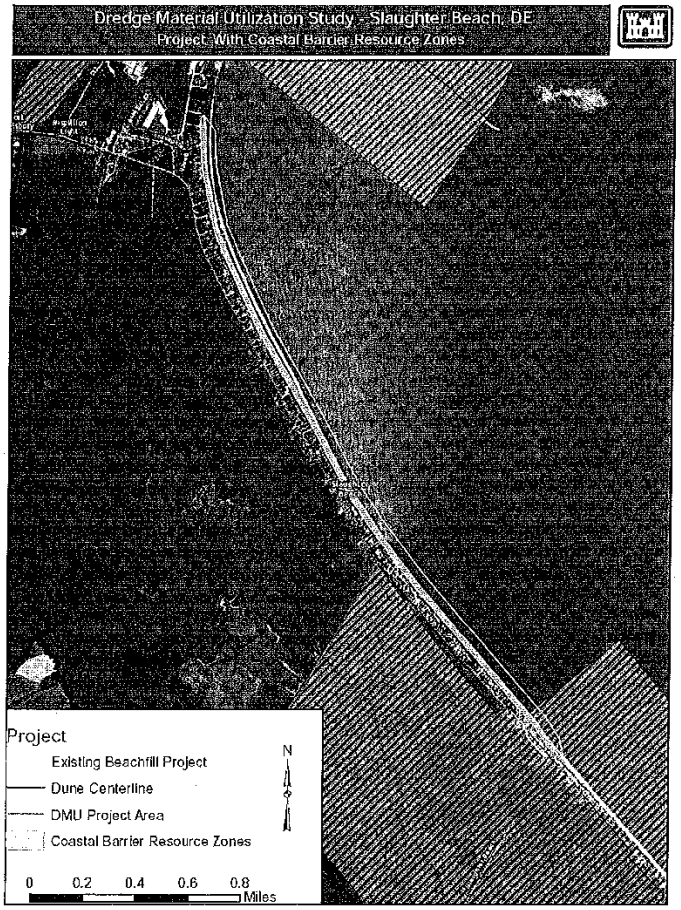
Dredge Material Utilization Study - Slaughter Beach, DE
Project With Coastal Barrier Resource Zones
Project
Existing Beachfill Project
Dune Centerline
DMU Project Area
Coastal Barrier Resource Zones
N
0 0.2 0.4 0.6 0.8
Miles

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

January 3, 2017

Mr. Peter R. Blum, P.E.
Chief, Planning Division
Department of the Army
Philadelphia District, Corps of Engineers
100 East Penn Square, Floor 7, Wanamaker Building
Philadelphia, PA 19107

RE: Coastal Barrier Resources Act/Endangered Species Act/Fish and Wildlife Coordination Act comments for the Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study

Dear Mr. Blum:

The U.S. Fish and Wildlife Service (Service) has reviewed the documents related to the proposed project and offers the following comments in accordance with the Coastal Barrier Resource Act (CBRA) (16 U.S.C. § 3501 *et seq*; 12 U.S.C. § 1441 *et seq*.); the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq*.) and the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.).

Project Description
The objective of this proposed project is the beneficial use of maintenance dredging material obtained from the lower reach of the Delaware River Federal Navigation Channel. The high quality sand material will be potentially placed on beaches at eight Delaware coastal communities including: Pickering Beach, Kitts Hummock Beach, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach. These sites were severely eroded during Hurricane Sandy and subsequent nor'easters. The sand from maintenance dredging operations will be used as nonstructural shoreline stabilization material, reducing flood, erosion, and storm damage risks, while enhancing and restoring these beaches.

The proposed design template for dredge material placement on Delaware Bay beaches (excluding Lewes) features a berm of 25 feet in width at a height of 7 feet with a foreslope of approximately 400 feet in length on a slope of 1Vertical:10 Horizontal extending bayward to depth of closure of -5.0 feet. The berm is topped with a dune whose crest width is 25 feet at a height of 12 feet. The dune transitions both bayward to the berm and landward to existing grade on a slope of 1Vertical:5Horizontal. The berm at Lewes Beach will be 15 feet wide but may be enlarged to 25 feet wide. It is estimated that all eight communities (including Lewes) will require a combined 900,000 cubic yards of dredge material. It is expected that periodic nourishment

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would occur on a 4-year schedule to maintain the design level of protection.

CBRA

CBRA and its amendments prohibit most new federal expenditures that tend to encourage development or modification of coastal barriers. The laws do not restrict activities carried out with private or other non-federal funds and only apply to the areas that are within the defined John H. Chafee Coastal Barrier Resource System (CBRS).

Section 6 of CBRA (16 U.S.C. § 3505) permits certain federal expenditures and financial assistance within the CBRS after consultation with the Service. These exceptions are divided into two groups. The first group only requires that the proposed funding is in fact a listed exception. The second group requires that the exception also meet the three purposes of the CBRA. Those purposes are to minimize the loss of human life; wasteful expenditure of federal revenues; and the damage to fish, wildlife, and other natural resources associated with coastal barriers.

A federal expenditure is allowable within the CBRS, if it meets any of the following exceptions (16 U.S.C. § 3505(a)(1)-(5)):

- Any use or facility necessary for the exploration, extraction, or transportation of energy resources which can be carried out only on, in, or adjacent to a coastal water area because the use or facility requires access to the coastal water body.

- The maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant System unit or portion of the System unit was included within the CBRS.

- The maintenance, replacement, reconstruction, or repair, but not the expansion, of publicly owned or publicly operated roads, structures, or facilities that are essential links in a larger network or system.

- Military activities essential to national security.

- The construction, operation, maintenance, and rehabilitation of Coast Guard facilities and access thereto.

A federal expenditure is allowable within the CBRS, if it meets any of the following exceptions (16 U.S.C. § 3505(a)(6)) **and** is also consistent with the three purposes of the CBRA:

- Projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats, and related lands, stabilization projects for fish and wildlife habitats, and recreational projects.
- Establishment, operation, and maintenance of air and water navigation aids and devices, and for access thereto.
- Projects under the Land and Water Conservation Fund Act of 1965 (16 U.S.C. § 460l-4 through 11) and the Coastal Zone Management Act of 1972 (16 U.S.C. § 1451 *et seq.*).
- Scientific research, including aeronautical, atmospheric, space, geologic, marine, fish and wildlife, and other research, development, and applications.
- Assistance for emergency actions essential to the saving of lives and the protection of property and the public health and safety, if such actions are performed pursuant to sections 5170a, 5170b, and 5192 of title 42 and section 1362 of the National Flood Insurance Act of 1968 (42 U.S.C. § 4103) and are limited to actions that are necessary to alleviate the emergency.
- Maintenance, replacement, reconstruction, or repair, but not the expansion (except with respect to U.S. Route 1 in the Florida Keys), of publicly owned or publicly operated roads, structures, and facilities.
- Nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system.

CBRS designation of the proposed project

The Delaware River Federal Navigation Channel is outside any System Unit or Otherwise Protected Area (OPA). Likewise, Lewes Beach is not located within a System Unit or OPA. Therefore, CBRA does not apply to the proposed dredging operations or the placement of sand on Lewes Beach.

Bowers Beach and the southern portion of Kitts Hummock are part of the Little Creek OPA DE-01P. The designation of OPA allows federal funds, other than federal flood insurance, to be used on these beaches. Therefore, the Corps proposed action to restore these beaches is consistent with CBRA.

Pickering Beach and a small portion of the northern section of Kitts Hummock Beach are within Little Creek System Unit DE-01. Big Stone Beach, the southern section of South Bowers Beach, the southern section of Slaughter Beach, and the northern and southern sections of the Prime Hook Beach are located within System Unit Broadkill Beach H00. Because these sites fall within a System Unit, the use of federal funds on these beaches is prohibited unless they meet one of the exemptions outlined above.

The tentatively selected design plan was subsequently modified to avoid CBRA system units.

Service CBRA exemption evaluation for the proposed project

In a September 20, 2016 letter, and subsequent conference call on November 10, 2016, the Corps requested that the Service evaluate the project within the System Units for three specific CBRA exemption considerations:

- The maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction. A federal navigation channel or a related structure is an existing channel or structure, respectively, if it was authorized before the date on which the relevant System unit or portion of the System unit was included within the CBRS.

- Projects for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats, and related lands, stabilization projects for fish and wildlife habitats, and recreational projects.

- Nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system.

As discussed, the Service concludes that the exemption for the "maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction" does not apply. The dredging operations occur outside of System Units or OPA and are not subject to CBRA and therefore a CBRA exemption cannot be applied.

Likewise, the Service concludes the exemption "for the study, management, protection, and enhancement of fish and wildlife resources and habitats, including acquisition of fish and wildlife habitats, and related lands, stabilization projects for fish and wildlife habitats, and recreational projects" also does not apply. The main objective of the beneficial reuse, by congressional authorization, is reducing flood, erosion, and storm damage risks. Therefore, any enhancement of fish and wildlife resources and habitats are tangential to this objective. Because federal funding is directly tied to reducing flood, erosion, and storm damage risks and not enhancement of fish and wildlife resources and habitats this exemption does not apply.

The Service has determined that the exemptions for "nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system" may be applicable to the project portions that fall within CBRS, if the Corps can justify that the project is consistent with the three purposes of CBRA. The project sites with the small sections that overlap with the CBRS designation are Pickering Beach, Prime Hook Beach, South Bowers Beach, Kitts Hummock, Big Stone Beach, and Slaughter Beach. The communities along these beaches are grandfathered from CBRA because the communities were in existence prior to CBRA. However, the proposed action extends into the CBRS designation. The Service believes the Corps should minimize these sections as much as practicable to avoid overlap into the CBRS Unit.

In addition, the Corps must outline how the project is designed to mimic, enhance, or restore a natural stabilization system. The Service believes that the portions of the project within System Unit Little Creek DE 01 and Broadkill H00 will be exempt if the following conditions are met:

Condition 1. The Corps demonstrates that the proposed berm and dune structure is consistent with natural berm and dune structures along the Delaware beaches. We recommend that the Corps conduct surveys of natural beaches to develop a natural beach profile design for the proposed beach stabilization projects.

Condition 2. The Corps demonstrates that the 4-year dredge placement cycle is appropriate. We recommend the Corps conduct sediment movement studies to determine that the amount of sand leaving these beaches is consistent with the sand that is being placed to stabilize the shoreline.

The Corps must adequately meet the conditions above for the proposed project to meet this exemption and therefore be consistent with CBRA by the Service.

Endangered Species
Red knot, piping plover, and swamp pink are known to occur in the project vicinity. The project as proposed will have "no effect" on the red knot because the Corps have agreed to a time-of-year restriction for project activities conducted on these beaches between April 15 and June 7 when red knots forage on the beaches. This project as proposed will have "no effect" on swamp pink as the project impact area does not include suitable habitat. Finally, this project as proposed is "not likely to adversely affect" the piping plover because nesting habitat for this species is located approximately 847 feet from the western end of the proposed Lewes Beach site and although piping plovers have nested here in the past, there has not been an observed nest for more than 15 years. The next closest piping plover nesting site is 1.76 miles northeast of the eastern end of the proposed Lewes Beach site. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, these determinations may be reconsidered.

Fish and Wildlife Coordination Act
The Service does not have specific comments at this time as the proposed beach placement designs have yet to undergo the optimization process and may be modified. The Service requests that the USACE continue coordination with our office as plan development progresses.

We appreciate the opportunity to review and provide comment on this project. Should you have questions, please contact Trevor Clark of my staff at 410/573-4527 or trevor_clark@fws.gov.

Sincerely,

Genevieve LaRouche
Field Supervisor

The USACE has concluded Section 7 ESA consultation and will consult with the Service as the maintenance dredging and construction schedules are developed.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

JAN - 9 2017

Edward Bonner, Chief
Environmental Resources Branch
Philadelphia District
U.S. Army Corps of Engineers
Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107

Dear Mr. Bonner:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the Draft Feasibility Report and Integrated Environmental Assessment for Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study. EPA supports the use of dredged material for beneficial use and also supports your efforts to use our joint dredging guidance for this action.

The purpose of this report is to analyze coastal storm risk management (CSRM) issues in various Delaware communities, with the intent to beneficially use dredged material from Federal navigation channels within the Delaware River and Bay. The tentatively selected plan (TSP) consists of dune and berm construction at 8 dredged material placement locations in the southern reach of the study area. The 8 dredged material placement locations span approximately 29 miles along the Delaware Bay and include (from north to south): Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach and Lewes.

With regard to air emissions during construction, EPA notes that the use of diesel equipment will be required during project activities. We recommend that clean diesel options be considered, such as implementing diesel controls, cleaner fuel, and cleaner construction practices for on-road and off-road equipment used for transportation, soil movement, or other construction activities. Consider including:

- Strategies and technologies that reduce unnecessary idling, including auxiliary power units, the use of electric equipment, and strict enforcement of idling limits; and
- Use of clean diesel through add-on control technologies like diesel particulate filters and diesel oxidation catalysts, repowers, or newer, cleaner equipment.

For more information on diesel emission controls in construction projects, please see: http://www.northeastdiesel.org/pdf/NEDC-Construction-Contract-Spec.pdf, and http://www.epa.gov/cleandiesel/technologies/index.htm.

Concur. Strategies and technologies to reduce air emissions will be incorporated into the plans and specifications.

Thank you for the opportunity to comment on the Draft Feasibility Report and Integrated Environmental Assessment for Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study. Our comments contained in this letter are intended to help provide useful information that will ultimately inform local, state and federal decision-making officials. Should you have any questions about EPA's review, please feel free to contact Michael Poetzsch of my staff at 212-637-4147.

Sincerely,

Grace Musumeci, Chief
Environmental Review Section

cc: Kristin Regan, Region 3

Sanderson, Scott A CIV USARMY CENAP (US)

From: Philadelphia District Public Affairs-NAP
Sent: Tuesday, January 24, 2017 11:43 AM
To: Sanderson, Scott A CIV USARMY CENAP (US)
Subject: FW: [EXTERNAL] Regarding the "Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study"

Scott,

See below DMU comment. Can you respond directly to this citizen on the easement question? His email is cpmessina@gmail.com

Steve Rochette
Public Affairs Office
U.S. Army Corps of Engineers
Philadelphia District
215-656-6432
http://about.me/usacePhilly

-----Original Message-----
From: Chris Messina [mailto:cpmessina@gmail.com]
Sent: Monday, January 23, 2017 1:27 PM
To: Philadelphia District Public Affairs-NAP <PDPA-NAP@usace.army.mil>
Subject: [EXTERNAL] Regarding the "Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study"

Hello!

I'm a homeowner at Pickering Beach, one of the beaches this study is referring to. I just was sent an email about this.

My name is listed in there as not having given easement rights (I believe). How can I resolve that? Beach replenishment for our community is something I want to have happen, so I don't want anything preventing it from happening.

As far as a public comment, I am highly for having beach replenishment at Pickering Beach. It's been 16 years since the last time we had any sand pumped in. Our cottage is at the far north end of the beach, and every time there's a nor'easter, the bay washes under our cottage. I've attached a picture, just today, from a window looking at towards the bay. This was taken roughly a half hour from low tide. Typically, at low tide, the water is a hundred yards out from where it is now. I fully expect this storm to wash through our property, causing further damage.

Thank you for your attention!

-Chris Messina, Pickering Beach
142 N. Sandpiper Dr
Dover, DE 19901
302-359-7002

Necessary easements will be confirmed prior to construction.

2017 0030

Broadkill Beach Preservation Association

P.O. Box 113 • Milton, DE 19968

JAN 20, 2017

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, DE 19904

JAN 16, 2017

Attn: Robert W. Scarborough

The Broadkill Beach Preservation Association would like to go on record as supporting the Delaware Beneficial Use of Dredged Material. The success of the project utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach amply demonstrates the viability of projects of this nature.

James W. Bailey
President

2017 0030

Delaware Alliance of Bay Communities
401 North Bayshore Drive
Milton, DE 19968

Little Creek, Pickering Beach, Kitts Hummock,
Bowers Beach, South Bowers Beach
Little Creek, Slaughter Beach, Prime Hook Beach, Broadkill Beach
Agricultural, Maritime, and Ecological Communities
www.delabc.com

January 17, 2017

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, DE 19904

Attn: Robert W. Scarborough

The Alliance of Bay Communities strongly supports the conclusions and recommendations in the feasibility report entitled "Delaware Beneficial Use of Dredged Material for the Delaware River."

Coastal protection provided by the recommended approaches has been demonstrably successful. For example, dredged material from the Delaware River Main Channel-Deepening Project was used to rebuild the berm and dune system at Broadkill Beach and protected that community in a major storm last year that damaged nearby coastal areas. Implementation of the recommendations is a viable way to serve national and state interests in protecting the coastal areas of the Delaware Bay.

James W. Bailey
President

Janice Baldwin-Hench and Tom Hench
187 South Bay Drive
Dover, DE 19901
Kitts Hummock

Delaware Coastal Programs
Mr. Robert W. Scarborough -
Acting Administrator

100 W.Water Street
Suite 7B
Dover, DE 19904

Mr. Scarborough:

Please accept this letter supporting Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Thank you.

Janice Baldwin-Hench
Tom Hench

Janice Baldwin-Hench
Tom Hench

1-21-2017

Jbbh916@comcast.net
302-678-2150

January 23, 2017

US Army Corps of Engineers
Philadelphia District
Public Affairs Office
The Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107-3390

Subject: **Delaware River Dredged Material Utilization**

Please accept this letter supporting the Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deepening Project to rebuild the beach and dune system at Broadkill Beach, DE has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Sincerely,

Robert A. Nagle
316 North Bay Drive
Dover, Delaware
19901-7008
phone: (302) 857-3803
cell: (302) 299-9522
email: ranagle1@gmail.com

cc: Delaware Coastal Programs
Mr. Robert W. Scarborough, Acting Administrator
100 W. Water Street
Suite 7B
Dover, DE 19904

Name Elizabeth Porter

(Address-optional) 129 S. Bay Drive, Kitts Hummock
(seasonal - I don't get mail there)

Date 1/21/17

Delaware Coastal Programs
Mr. Robert W. Scarborough-Acting Administrator
100 W. Water Street
Suite 7B
Dover, DE 19904

Mr. Scarborough:

Please accept this letter supporting Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Signature Elizabeth R Porter

Ronald N. Hunsicker
58 Mulberry Dr.
Frederica, DE 19946
302-335-1034

18 JAN 17

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, DE 19904

Attn: Robert W. Scarborough

Please accept this letter supporting Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Additionally, it is our position, established through review of the report and first hand involvement in the Delaware Bayshore Initiative, that this will make a huge contribution to promotion of the Delaware tourist industry thereby providing for continued economic growth in Delaware.

Ronald N. Hunsicker

LeAnn Hunsicker
58 Mulberry Dr.
Frederica, DE 19946
302-335-1034

18 JAN 17

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, DE 19904

Attn: Robert W. Scarborough

Please accept this letter supporting Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Additionally, it is our position, established through review of the report and first hand involvement in the Delaware Bayshore Initiative, that this will make a huge contribution to promotion of the Delaware tourist industry thereby providing for continued economic growth in Delaware.

LeAnn Hunsicker

January 23, 2017

Delaware Coastal Programs
Mr. Robert W. Scarborough-Acting Administrator
100 W. Water Street
Suite 7B
Dover, DE 19904

JAN 25

Mr. Scarborough:

This letter is written in response to your Public Notice asking for comments on the Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030).

Every resident and property that I have spoken with regarding the placing of dredged materials, from the navigation channel in the lower bay, in order to reduce flooding, erosion, and storm damage risks in and around Kitts Hummock are greatly in favor of this proposal and support it enthusiastically.

As you should be aware, the property owners along the Delaware Bay in Kitts Hummock have signed easement agreements with the State designating a portion of the beaches (defined by the Public Easement) as a Public Beach. The use of the dredged materials to rebuild our beaches will help to ensure that the public will have continued access, for recreational purposes, to our local beaches along the Delaware Bay. Because of erosion and the lack of maintenance without some form of replenishment these beaches may soon not be available for public use, therefore we support the use of dredging materials to enhance our dunes and beaches.

Sincerely,

Dr. Michael F. Costello
President, Kitts Hummock Improvement Association
3083 Kitts Hummock Road Dover
Delaware 19901

January 23, 2017



Delaware Coastal Program
100 W. Water Street, Suite 7-B
Dover, DE 19904

Attn: Robert W. Scarborough

As a Pickering Beach homeowner for 20+ years I would like to go on record as endorsing the use of the "Delaware Beneficial Use of Dredged Material" for replenishment purposes.

Through acquaintances at Broadkill beach I am aware of the success of the dredged material used from the Delaware River Main Channel Deepening Project to replenish the beach and dune system.

Our beach is in dire need of replenishment as storms over the past 10+ years has been disartrous for our dune system. We are a Horseshoe Crab sanctuary and a beach where families feel safe to being their children or just to enjoy the outdoors.

Nancy Lawson
35 Sandpiper Drive
Dover, De 19901
302-734-5071

Nancy Lawson

Prime Hook Beach Organization
P. O. Box 352
Milton, DE 19968

January 23, 2017

Re: Support of the Adoption of the Draft of "Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Report and Integrated Environmental Assessment, 11/23/2016"

Delaware Coastal Programs
Mr. Robert W. Scarborough, Acting Administrator
100 West Water Street, Suite 7B
Dover, DE 19904

Dear Mr. Scarborough:

We write on behalf of the Prime Hook Beach Organization ("PHBO"). PHBO is a civic association comprised of 88 members located in the Prime Hook Beach community.

PHBO notes that Prime Hook Beach is included along with the other Delaware Bay beaches within the study entitled, "Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Report and Integrated Environmental Assessment" ("Feasibility Report"). PHBO supports the adoption of the Report and implementation of its recommendations with respect to all of the Delaware Bay Beaches, and in particular, with respect to its recommendations regarding Prime Hook Beach.

This report and its recommendations recognize the importance of maintaining and preserving the Delaware Bay beaches and sets forth the net benefits of doing so. In this regard, we note that protection of Prime Hook Beach is important to safeguard the restored Prime Hook Wildlife Refuge and to ensure that the significant effort in restoring the refuge is not lost due to failure to maintain a robust dune line along Prime Hook Beach. This will also protect farmland adjacent to the western border of the Refuge. In addition, we note that the efforts as replenishing Broadkill Beach appear to be quite a successful defense against the Jonas Storm of January 2016 and should operate as a model for replenishment of all of the Delaware Bay beaches.

PHBO appreciates the report's conclusions and the efforts that went into completing this study. We look forward to more information as it becomes available and to cooperating with Federal and State officials as the report's recommendations are implemented.

Respectfully,

The Board of Directors
Paul Architzel, Chair Paul Architzel
Richard Huffman, Vice Chair
Joan Winchester, Secretary
David Allwood, Treasurer
Dennis Prather
Dan and Tena Stipano

Charles and JoEllen Wallace
57 S. Sandpiper Drive
Dover, DE 19901



January 24, 2017

Delaware Coastal Programs
Mr. Robert W. Scarborough, Acting Administrator
100 W. Water St., Suite 7B
Dover, DE 19904

Mr. Scarborough:

As residents of Pickering Beach we are writing to express our complete and enthusiastic endorsement of the proposed dredging and renourishment of the beach and dunes at Pickering Beach. The balance of nature of Pickering Beach as a horseshoe crab sanctuary is certainly perilous as a result of years of erosion of this beach. The beach is also utilized by many as a public access beach area and is a valuable resource for education and recreation by so many residents and travelers to our area. It has been a very long time since renourishment has occurred at this beach and it is sorely needed.

We would greatly appreciate it if you would advocate for the expedited restoration of this valuable resource. We are available to for any questions or comments you may have at the above address.

Sincerely,

Charles and JoEllen Wallace
302-752-8249

From: **James Kirkbride** jfkirkbride@icloud.com
Subject:
Date: January 23, 2017 at 11:58 PM
To:

JAN 27

Pickering Beach Water Company

P. O. Box 299
Little Creek, Delaware 19961

Monday, January 23, 2017

Mr. Robert W. Scarborough
Delaware Coastal Program
100 W. Water Street, Suite 7-B
Dover, Delaware 19904

Dear Mr. Scarborough:

The Pickering Beach Water Company enthusiastically supports the decision by the Delaware River Main Channel Deepening Project. This reclaimed material would provide substantial value to the Delaware River, Delaware Bay, and Pickering Beach, plus the adjacent beaches.

We, the PBWC, remain committed to this project's success.

James F. Kirkbride
President
Pickering Beach Water Company
(cell 302-740-6015) (hm 302-999-8112)
Email: JFKirkbride@Comcast.net
JFKirkbride@iCloud.com

Name Frank & Toni Kempf

(Address-optional) 216 West Lake Rd. Raeford, NC (Lot 2891 Kitts Hummock Rd.)

Date 21 Jan 2017

JAN 27, 2017

Delaware Coastal Programs
Mr. Robert W. Scarborough-Acting Administrator
100 W. Water Street
Suite 7B
Dover, DE 19904

Mr. Scarborough:

Please accept this letter supporting Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deeping Project to rebuild the beach and dune system at Broadkill Beach has proven the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

Signature

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, DE 19904



January 23, 2017

Attn: Robert W. Scarborough

Mr. Scarborough,

Please accept this letter supporting the Delaware Beneficial Use of Dredged Material and the associated Delaware River Feasibility Study (2017.0030). The success utilizing the dredged material from the Delaware River Main Channel Deepening Project to rebuild the beach and dune system at Broadkill has proven the use of such material is a sensible and viable way to replenish and maintain the coastal areas of the Delaware Bay.

Respectfully,

Kelly Reavis, Resident Kitts Hummock Beach

Subject: Delaware Coastal Programs re: Pickering Beach

Mr. Robert W. Scarborough
Acting Administrator
100 W.Water Street
Suite 78
Dover, De 19904

JAN 27,2017

Mr. Scarborough,

As a full time resident of Pickering Beach, a bird and horseshoe sanctuary community, we would like to bring to your attention the positive results "Delaware Beneficial Use of Dredged Material" would bring to this bay beach.

We have lost all the dune on Pickering Beach over the years of powerful storm surges. January 2016 took out about 8 ft. of the remaining dune here. Our community is host to numerous ecological and scientific visitors. Lonza a major biotech company out of Maryland, brings a bus each year to explore Pickering Beach.

In the spring, Tibetan Monks bless the horseshoe crabs on Pickering Beach. Bird watchers line our beach for a view of the Red Knot, feeding on horseshoe crab eggs, during its migration. School children have field trips here to learn about life on the bay.

Our beach gives life to sea turtles, horseshoe crabs, blue crabs,

numerous birds as well as dolphin and other marine life. Pickering Beach is a true natural Delaware treasure that desperately needs sand replenishment.

Please, put Pickering Beach as a priority in the Coastal Management Program.
Replenish our dunes with sand and dune grass so Pickering Beach can continue to share its natural beauty with visitors coming to Delaware for more than a boardwalk or another restaurant.

Kind regards,
Joy and John Korpela
47 Sandpiper Drive
Dover, De 19901



Capital Daily

DNREC – Delaware Coastal Programs

PUBLIC NOTICE

FEDERAL CONSISTENCY DETERMINATIONS HAVE BEEN SUBMITTED TO THE DELAWARE COASTAL MANAGEMENT PROGRAM FOR THE FOLLOWING:

Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study (2017.0030) The U.S. Army Corps of Engineers has released for public comment the Draft Feasibility Report and Integrated Environmental Assessment (EA): Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study, November 2016. The report presents the alternatives analysis, tentatively selected plan, and an evaluation of potential impacts to the affected environment. The objective of this study is to beneficially use high quality sand material dredged to maintain the Federal navigation channel in the lower bay in order to reduce flooding, erosion, and storm damage risks in coastal areas affected by Hurricane Sandy. Dredged sand will be potentially pumped and placed onto eight Bayfront residential communities: Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach. Documents can be accessed on the Corps' website: http://www.nap.usace.army.mil/publicnotice **Comments concerning this Federal Consistency Determination will be accepted for 20 days from the date of this notice.**

Comments should be sent to: Delaware Coastal Programs, Mr. Robert W. Scarborough, Acting Administrator, 100 W. Water Street, Suite 7B, Dover, DE 19904. For additional information please call (302) 739-9283.
164265 DSN 1/10/2017

MONITION SALE

Parcel #3-00-046.15-01-17.00/000

20901 West Liberty Road
White Hall, MD 21161-9048

Robert Scarborough, PhD
DNREC Environmental Program Manager (Acting Administrator)
100 West Water Street Suite 7B
Dover De 19904

bob.scarborough@state.de.us

Re: Draft Feasibility Report and Integrated Environmental Assessment (EA): Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study. November 2016.

Dear Dr. Scarborough:

We are property owners in Prime Hook Beach and have just received the tentatively selected plan (TSP). We hereby request that a copy of any and all future plans, specifications, correspondence and public notifications be sent directly to our attention at the above referenced address or by email.

Please be advised neither the Alliance of Bay Communities nor the Prime Hook Beach Organization (PHBO) own real property in Prime Hook Beach nor do they have the authority to represent the Prime Hook community concerning property issues. In fact, the PHBO's bylaws were specifically set up to strictly forbid it.

> **BYLAWS OF: The Prime Hook Beach Organization Inc.**
> **(b) The Organization shall have no enforcement powers. Neither the Organization, nor its members, nor its Board of Directors shall have any authority of any kind over the activities or property of its members, or the residents of Prime Hook, Short's Beaches or Clifton Shores whether members of the Organization or not. Nor shall the Organization have any authority to incorporate the communities of Prime Hook and Short's Beaches or Clifton Shores as a municipality or other similar government entity.**

We believe full and complete disclosure of information is the critical component of good faith negotiations. Therefore, the purpose of this letter is obtain full and complete information so we can make informed decisions as to the short-term and the 50 year long-term impact to our property.

The following is a list of questions that we have concerning this proposed project. We ask that your answers reference the individual questions in order and under each individual heading so your answers can be ascertained and understood in an effective and efficient manner. Please give an estimated date or timeline for our receipt of the answers for any questions that cannot be answered at this time. Thank you.

Concur. The USACE will continue to coordinate with DNREC as details involving the maintenance dredging schedule are finalized.

COST and COST SHARING:

1. **Will the State of Delaware pick up the entire 40% LPA cost share of the project or will both the bay front and non-bay front property owners in each community be charged additional yearly tax increases or other fees if the beach becomes public?**
2. **Please provide specific cost figures for both bay front and non-bay front owners.**
3. **Will cost sharing taxes and fees incurred by Prime Hook Beach owners be designated exclusively for Prime Hook Beach nourishment or can the funds be placed in a general beach renourishment account and be used at other beaches?**

HOLD HARMLESS and INDEMNIFICATION LANGUAGE:

The EPA defines dredge spoil as a pollutant.
http://www.epa.gov/region6/6en/w/pollutant.htm
The language contained in the Easement Agreement and Restrictive Covenant Agreements (EARCA) did not disclose these environmental and financial risks.
If current and future owners allow dredge spoil/pollutants with potential Hazardous Materials to be placed on their properties, the owners may well be held liable for all remediation and clean up costs now and into the future, even after they sell their property.
Under the Clean Water Act (CWA) and Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. § 9601 *et seq.* (CERCLA) Delaware's Hazardous Substance Cleanup Act (HSCA) under 7 Del. C., Chapter 91.

Furthermore, the State of Delaware requested this same type of protection language from the Army Corps of Engineers:

"The Corps and DRPA shall indemnify and hold harmless the State of Delaware and its departments, agencies, officials, employers, agents and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representatives of the permittee, undertaken in connection with this project." HEARING OFFICER'S REPORT RECOMMENDATION TO THE SECRETARY U.S. ARMY CORPS OF ENGINEERS APPLICATION FOR PERMIT DELAWARE MAIN CHANNEL DEEPENING PROJECT Timothy Bureau Hearing Officer December, 2003

1. **Who will be held responsible for cleanup and remediation costs if or when pollutants are found in the dredge spoil dumped on our property?**
2. **Will the State of Delaware and/or the ACOE hold harmless and indemnify the property owners in Prime Hook Beach?**
3. **We are requesting that you provide us with copies and evidence that ACOE and DNREC disclosed to the individual property owners their potential risk and responsibility for environmental clean up when asked to donate and allow dredge spoil to be placed on their properties.**

PROPOSED ACCESS TO PRIVATE BEACH AREAS

1. **Provide legal documentation and where the State of Delaware has acquired all of the roads and beach access ways on the subdivision plots.**
2. **Where are any planned public access ways to be located and where is the planned parking areas?**
3. **Are public toilet facilities required? If so, where are they to be located and who will be paying for them?**

POLICING and VEHICLES:

Currently, the Delaware State Police have 24 hour jurisdiction on the private beach areas.

1. **Which Police Department will have jurisdiction if the beach decides to go public, are they open 24 hours, and where are their closest barracks located?**
2. **Will DNREC allow motorized vehicles be on the beach after the initial construction? If not, how will it be enforced?**
3. **Has there been any public nuisance calls to the police since Broadkill Beach has been re-nourished and for what purposes?**

RIPARIAN and FEE SIMPLE OWNERSHIP RIGHTS, RIGHTS OF WAY ACQUISTIONS and CONDEMNATION:

1. **Will the acquisition of property and property rights for this project be conducted in compliance the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601 *et seq.*) a.k.a. "The Uniform Act".**
2. **How will beach restoration affect the property ownership and riparian rights of the upland owners?**
3. **Will the State of Delaware claim fee simple ownership of the re-nourished beach?**
4. **At the other Delaware beaches where beach replenishment has occurred who owns the re-nourished beach areas and up to what specific limits does the State of Delaware claim ownership and public access?**
5. **Will the property owners be under the threat of condemnation if they choose not donate but rather receive just compensation for their property?**

EASEMENT AGREEMENT

1. **Can the property owner sign a License Agreement rather than a perpetual easement as the Delaware Code allows?**

Title 7 Chapter 68 Beach Preservation § 6802. Definitions. "Public beach" means … any beach for which the State has obtained an easement **or agreement** for public use.

A License Agreement in lieu of a perpetual Easement seems more reasonable and sufficient for construction and public access especially since further re-nourishment protection is contingent on future re-nourishment approvals and funding that is not guaranteed.

The purpose of this letter is not to opt out of this planned project but rather to obtain full and complete information so that we as property owners can make an informed decisions as to the 50 year impact to our property.If you have any questions you may contact us by email at rnrasap@yahoo.com. Your anticipated cooperation will be greatly appreciated.

Very truly yours,

S/A
Ron Goodwin

S/A
Marsha Goodwin

Cc: Scott Sanderson Scott.A.Sanderson@usace.army.mil
ACOE Public Affairs Office PDPA-NAP@usace.army.mil

January 26, 2017

Delaware Coastal Programs
100 W. Water Street
Suite 7B
Dover, De 19904

Dredged material from the Delaware River Main Channel Deeping Project was used to rebuild the beach and dune system at Broadkill Beach. The results were amazing. The success of the project has proven that the use of such material is a sensible and viable way to maintain the coastal areas of the Delaware Bay.

We would like to go on record supporting the Delaware Beneficial Use of Dredged Material.

Jones Family Farms
9729 Thirteen Curves Rd
Milford, De 19963

Lisa Jones
Lesley Stayton
Theodore Jones
Connie Jones

444 Troon Road

Dover, DE 19904

January 27, 2017

Mr. Robert W. Scarborough

Delaware Coastal Programs

100 W. Water Street, Suite 7B

Dover, DE 19904

RE: Delaware Beneficial Use of Dredged Material

Delaware River Feasibility Study 2017-0030

Dear Mr. Scarborough:

As a property owner and sometime resident of Bayfront property at Pickering Beach, Delaware, I want to register my support for the plan to used dredged material from the Federal navigation channel onto our and seven other Delaware Bay Bayfront communities.

As a property owner and/or summer resident of Pickering Beach for over 60 years, I have seen and witnessed both the best and worst conditions of our beach. With the current increasing deterioration of our beach, it is obvious that something needs to be done for its continued recreational use, for the increasing bird watching, for the migrant bird flyway, for horseshoe crab spawning, for preservation of the adjoining wetlands, etc. I have watched the filming of a show for Animal Planet International in front of our property, which show told of the importance of our beach for the health of our environment.

As the dredged materials need to go somewhere, their use on our beach sounds like a win-win.

Respectfully,

Bruce C. Ennis

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
OFFICE OF THE SECRETARY

DELAWARE COASTAL MANAGEMENT PROGRAM

100 W. WATER STREET, SUITE 7B
DOVER, DELAWARE 19904

Phone: (302) 739- 9283
Fax: (302) 739-2048

January 31, 2017

Peter Blum, P.E.
Department of the Army
Philadelphia District, Corps of Engineers
100 Penn Square East, 7th Floor Wanamaker Building
Philadelphia, Pennsylvania 19107-3390

RE: Delaware Coastal Management Federal Consistency Certification
Draft Environmental Assessment for Delaware Beneficial Use of Dredged Material for the Delaware River (FC 2017.0030)

Dear Mr. Blum,

The Delaware Coastal Management Program (DCMP) has received and reviewed your consistency certification for the above referenced project (FC#2017.0030). Based upon our review and pursuant to *15 CFR part 930* of National Oceanic and Atmospheric Administration (NOAA) regulations, the DCMP concurs with your consistency determination for the USACE Feasibility Report and Integrated Environmental Assessment titled Beneficial Use of Dredged Material for the Delaware River. Prior to construction, and as details are finalized, the DCMP anticipates supplemental coordination with the USACE in adherence with NOAA regulations (15 CFR part 930.46).

The DCMP received numerous responses to our public notice for this project; 25 letters and calls in support of the project, and one opposed. Comments were from bay beach residents and homeowner organizations, and an elected official from the communities targeted to receive dredged sand to restore or maintain beaches.

Concur. The USACE will continue to coordinate with DNREC as details involving the maintenance dredging schedule are finalized

If you have any questions please feel free to contact me or Tricia Arndt of my staff at (302) 739-9283.

Sincerely,

Kimberly B. Cole, Administrator
Delaware Coastal Programs

cc: File
Barbara Conlin-USACE

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
100 PENN SQUARE EAST, 7th FLOOR WANAMAKER BUILDING
PHILADELPHIA, PENNSYLVANIA 19107-3390

Environmental Branch

FEB 06 2018

Mr. Timothy A. Slavin, Director
Delaware State Historic Preservation Officer
21 The Green
Dover, Delaware 19901

Dear Mr. Slavin:

In October 2005, the Committee on Environment and Public Works of the United States Senate passed a resolution authorizing the U.S. Army Corps of Engineers (USACE) to review the report of the Chief of Engineers for two Federal navigation projects (1. Delaware River between Philadelphia, Pennsylvania and Trenton, New Jersey; and 2. Delaware River Philadelphia, Pennsylvania to the Sea) to determine if there were any opportunities for the beneficial use of dredged material resulting from the aforementioned navigation projects. The current standard practice for the above-referenced navigation projects is to dispose of dredged material via the least cost environmental acceptable disposal location (Federal Standard), not beneficial use. This feasibility study looks at beneficially using dredged material for coastal storm risk management (CSRM) benefits in various Delaware communities. USACE and the Non-Federal Sponsor (Delaware Department of Natural Resources and Environmental Control – DNREC) entered into a feasibility cost share agreement (FCSA) on February 27, 2014.

This report was prepared in response to an October 26, 2005 resolution of the Committee on Environment and Public Works of the United States Senate, as well as the Disaster Relief Appropriations Act, 2013 (PL 113-2) which was passed in the aftermath of Hurricane Sandy (October 2012).

In accordance with the National Historic Preservation Act of 1966, as amended, the USACE Philadelphia District is evaluating the feasibility of providing coastal storm risk management improvements within risk prone areas of the Delaware Estuary within the state of Delaware through the beneficial use of dredged material. Consistent with USACE policies, the investigation of Federal interest must be based on an appraisal of the costs, benefits, and environmental impacts of any recommended project plan.

The USACE conducted a screening process to focus the study scope on potential project sites with a high potential for coastal storm-related damages. Based on the characteristics of the study area and the associated problems, the study area was evaluated in two defined planning reaches within the Delaware Estuary, which includes

the Delaware Bay and the tidal reach of the Delaware River. The "northern reach" is north of the river/bay boundary (Liston Point, DE), while the "southern reach" extends south from the Liston Point, DE area (river/bay boundary) to the mouth of the Delaware Bay. This letter serves to inform you of progress, to date, identify the focus areas of study, and to solicit any comments or concerns you may have specific to these potential project locations.

The study developed a recommended plan consisting of beach restoration at 7 dredged material placement locations in the southern reach of the study area. The 7 dredged material placement locations span approximately 29 miles along the Delaware Bay and include (from north to south): Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes. Delaware's Department of Natural Resources and Environmental Control will serve as the nonfederal sponsor for these projects. The study is 100% federally funded.

We have previously provided for your review a copy of the report titled, *Phase IA Cultural Resources Investigations, Beneficial Use of Dredged Material for the Delaware River, Delaware Bay Coast, Delaware* prepared for the USACE by Tetra Tech and dated August 2017. Based on the recommendations of the report, we are not recommending additional cultural resource investigations at this time; however, surveys may be required as the project plans develop.

In order to better focus our Section 106 process on the feasibility-level recommended plan, we are requesting your continued consultation in accordance with 36 CFR § 800.6(a). A copy of the proposed 30% project plans are enclosed for your review. As the project plans continue to develop, we will continue to provide your office with updates and will request your assistance in ways to avoid, minimize, or mitigate impacts to historic properties eligible for or listed on the National Register of Historic Places (NRHP).

If you have any further comments or concerns regarding the attached list of screened potential project sites or if you have comments on the draft PA, we invite your input. The point of contact is Ms. Nicole Minnichbach at (215) 656-6556 or via email at Nicole.C.Minnichbach@usace.army.mil

Sincerely,

Peter R. Blum, P.E.
Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
100 EAST PENN SQUARE, FLOOR 7, WANAMAKER BUILDING
PHILADELPHIA, PENNSYLVANIA 19107-3390

FEB 1 0 2017

Environmental Resources Branch

Genevieve LaRouche, Supervisor
U.S. Fish and Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307

Dear Ms. LaRouche:

The U.S. Army Corps of Engineers, Philadelphia District (Corps) has received your 3 January 2017 letter providing comments in response to our 20 September 2016 and 14 October 2016 coordination letters and our draft *Feasibility Report and Integrated Environmental Assessment for the Delaware Beneficial Use of Dredged Material for the Delaware River* (DE DMU), pursuant to the Endangered Species Act (ESA), the Coastal Barrier Resources Act (CBRA), and the Fish and Wildlife Coordination Act (FWCA).

In regard to the ESA, the Corps will continue to coordinate with your office as project development progresses. Current projections indicate that approximately 930,000 cubic yards of material will be dredged from Lower Reach E (the projected sediment source area for the DE DMU project beaches) every 2 years. The projected 4 year nourishment cycle was estimated based on this shoaling rate. The Corps will accommodate the April 15 to June 7 time-of-year restriction for beach placement operations to the maximum extent practicable concurrent with up-to-date consultation with your staff.

With respect to the CBRA (16 U.S.C. § 3501 *et seq.*), we submit that the beneficial re-use of high quality sand, via the placement of such material (obtained through maintenance dredging of the Lower Reach E Ranges of the Delaware River Main Navigation channel) on Delaware Bay beaches meets the three CBRA purposes and qualifies for an exception to the Act, as described in your 3 January 2017 letter. As required, we provide a summary of our view that the project meets the three CBRA purposes and also meets the exemption as a nonstructural project for shoreline stabilization that is designed to mimic, enhance, or restore a natural stabilization system.

The Three Purposes of CBRA:

1. Minimize the loss of human life: The eight bayfront communities proposed to receive sand were established prior to enactment of CBRA. Although there were inherent risks associated with constructing homes adjacent to the bayshore around the turn of the century, recent research indicates that adverse consequences and risk to human life have become exacerbated by sea level change (SLC) potentially

associated with global climate change. The Mid-Atlantic region is anticipated to experience SLC greater than the global average (GCRP, 2009). A rise in the frequency and severity of coastal storms may be due to increasing sea surface temperatures. Hurricanes and nor'easters in our area can cause significant flooding and erosion of the Delaware Bay shoreline and other coastal areas within the Mid-Atlantic region. Hurricane Sandy moved alongshore of the east coast with peak winds of 90 mph in October 2012 with a diameter of over 1,000 nautical miles. Sandy caused extensive flooding, beach erosion and coastal damage along the shorelines of Delaware, New Jersey and New York.

Recent research has also noted two other factors playing prominent roles in local SLC: land subsidence and diminished sediment accretion. Subsidence is expected to continue through the next century at an average of 1-2 mm of land elevation loss per year (Engelhart *et al.*, 2009). Sediment accretion is a natural process whereby suspended sediments within the Delaware River, Bay, and tributaries settle and accumulate along the shoreline, on mudflats, and in wetlands. However, the Delaware Estuary is considered a sediment-starved system due to historic diversion processes (*e.g.* upper riverine shoreline armoring, dredging and confined upland disposal operations). Without a sufficient sediment source, shorelines incur more frequent erosion than accretion. The placement of dredged sand on eroded beaches restores sediments lost due to erosion within the shore/shallow water interface, and serves a natural shoreline stabilization function to reduce the risk of flooding and the loss of human life.

2. Minimize wasteful expenditures of Federal revenues: The Delaware River Main Navigation Channel has been deepened from 40 to 45 feet, where needed, along a 102.5 mile distance from Philadelphia to deepwater in the Delaware Bay. The dredged material is authorized to be placed in confined upland disposal facilities and an overboard area and includes periodic maintenance dredging for a 50 year period. The current DE DMU project seeks to tie into the main channel maintenance dredging program to beneficially use the high quality sand material obtained through periodic maintenance dredging of Lower Reach E, rather than dispose of the material overboard. In effect, the proposed project seeks to utilize high quality sand material beneficially such that federal revenues are not only utilized to maintain the navigation channel depths needed, but also to put the sand material to beneficial use rather than dispose the dredged material, thereby providing natural shoreline stabilization on eroded bay beaches.

3. Minimize damage to fish, wildlife, and other natural resources associated with coastal barriers: Delaware bayshore communities are characterized by broad marshes to the west and also to the north and south, with a narrow barrier sandy beach. In lower Delaware Bay, the rate of erosion and landward migration of the shoreline at the Prime Hook NWR was evaluated from 1937 to 2012 via historic aerial images (Psuty *et al.*, 2010). The rate of erosion has accelerated from 3 ft/yr between 1937 and 1954 to 10 ft/yr between 1997 and 2012. Shoreline position has been monitored on the ground every spring and fall since 2011. Between spring 2011 and

spring 2014, the shoreline retreated approximately 27 feet in most areas, which represents a continued shoreline erosion rate of about 10 ft/yr. However, the total shoreline retreat in many areas along the southern bayshore over that time was approximately 30 to 60 ft, which is roughly 20 ft/yr (Psuty *et al.*, 2010). Storms will continue to erode the shoreline, exposing the underlying peat and reducing available sandy beach habitat for wildlife and communities alike. A loss of the barrier beach could not only result in flood inundation to residential communities but also to interior salt marshes, freshwater marshes, forests and neighboring farmland. These community beaches and their adjacent undeveloped marshes provide valuable foraging and resting areas for migratory shorebirds (*e.g.* red knot), foraging and nesting habitat for waterbirds and other wildlife, including fish, amphibians, reptiles, and mammals.

In August 1991, the Corps conducted a review of the Delaware Bay and its tributaries from Woodland Beach to Lewes to determine the magnitude, location, and effect of shoreline erosion problems under the scope of the Delaware Bay Coastline - New Jersey and Delaware Reconnaissance Study. Average minimum and maximum shoreline change rates were calculated from rates obtained from this study and utilized to determine the appropriate periodic nourishment cycle for eroded beaches. Based on a summary of existing conditions at each site, the proposed with-project templates will enhance and restore the existing sandy beach to provide a natural stabilization system. A 4-year periodic nourishment cycle closely mimics the with-project nourishment cycle for existing beach projects within Delaware Bay. During optimization for the current study, with-project erosion rates will be calculated and modeled to insure up-to-date shoreline erosion rates and associated quantity needs. This analysis will support optimization for initial construction (incorporating future storm damages) and refine the periodic nourishment cycle required to maintain the with-project beach profile.

The beaches and shallow water intertidal flats of Delaware Bay's coastline offer prime spawning habitat for horseshoe crabs. The shallow water areas with low wave action and sand or mud substrate also provide important nursery areas for juvenile horseshoe crabs during their first two years. Horseshoe crab eggs and larvae not only provide a major food source for migratory birds but also for several fish species. Beneficial use of maintenance dredged material, consisting of predominantly coarse to medium-grained clean sand, for placement on sandy beaches along the Delaware Bay will not only reduce flood risks but will also, as noted in your 3 January 2017 letter, restore or enhance the natural bayshore habitat. Beach nourishment placement operations employ methodologies to reduce impacts to fish and wildlife through the use of temporary sand dikes during pump-out to minimize turbidity; adherence to time-of-year restrictions; and developing a beachfill design plan that mimics natural beach dimensions and material quality. The nourished sandy beach also reduces damages to fish, wildlife and other natural resources within this coastal barrier system through the restoration of habitat lost to storm erosion.

CBRA Exemption. A Federal expenditure is allowable within the Coastal Barrier Resources System if it is consistent with the three purposes of the CBRA (as described

above) and meets an identified exception (16 U.S.C. § 3505(a)(6). The Corps believes that the DE DMU project is also consistent with the CBRA exemption: "*Nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system.*"

Existing topographic and bathymetric conditions for the DE DMU study area were based on two data sources: (1) 2014 NOAA Post-Sandy Topobathymetric LiDAR, (2) 2015 DNREC beach profile surveys. Together these two data sources were used to define morphologically homogeneous stretches of beach and calculate representative profiles. A total of 13 representative profiles were selected to represent the existing conditions in the study area. An analysis of the characteristics of the representative profiles reveals the following:

- Existing berm elevations are between 4.5 to 7 feet NAVD88;
- Existing berm widths are between 0 and 40 feet;
- Existing dune heights are between 8 to 12 feet NAVD88;
- Existing dune widths are between 10 and 100 feet;
- Existing foreshore slopes are between 1V:10H to 1V:8H;
- Existing dune slopes are between 1V:5H to 1V:10H.

The proposed typical cross-section plan drawing is enclosed showing a 1 vertical:1 horizontal graphical representation to illustrate the similarity of the beach nourishment plan to the existing beach and dune profile. Beach nourishment projects are designed and engineered to work like natural beaches, allowing sand to shift continuously in response to changing waves and water levels (ASBPA, 2007). This sand, once placed, is redistributed gradually by modest waves and wind (*i.e.* natural processes) so that the nourished beach assumes a natural form. The size and composition of the beach fill material is expected to be compatible with the native sand and accommodate horseshoe crabs needs for nesting, egg incubation, and hatching success.

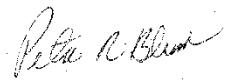
The proposed design template is intended to mimic natural healthy (non-eroded) bay beach conditions. The design incorporates a sand source that is closely compatible in grain size distributions, particle type, and color of the existing beach to maximize fill stability while mimicking the natural appearance of a typical Delaware Bay shoreline. Sand grain size distributions on beaches will naturally distribute the coarsest grains seaward and including the berm crest due to runup sediment transport dynamics. Finer, better-sorted material will be generally found in the dune area, owing predominantly to wind transport processes. Slight variations occur seasonally but the basic cross-shore sediment distribution typically persists in the long-term fill resorting (Stauble, 1992). Furthermore, the design plan includes vegetating the low dune with coastal plants native to the lower Delaware Bay region to maximize durability of the natural shoreline stabilization system while minimizing resuspension, siltation and turbidity.

CBRA System Units. Pickering Beach and a small portion of the northern section of Kitts Hummock Beach are located within the Little Creek System Unit DE-01. Big Stone Beach, the southern section of South Bowers Beach, the southern section of Slaughter Beach,

and the northern and southern sections of Prime Hook Beach are located within System Unit Broadkill Beach H00. The Corps recognizes that the proposed beachfill designs enter into the aforementioned CBRA System Units, however we believe that the proposed project is in compliance with CBRA, as advised, because it meets the three purposes of CBRA and qualifies for the natural shoreline stabilization exception. However, the current beachfill profiles are subject to further design plan optimization that will ultimately refine the final proposed beachfill templates. The Corps anticipates that the design plans may be modified slightly during the optimization process; and the Corps will evaluate practicable opportunities to minimize those sections of the berm/dune footprint that enter into System Units, while maintaining the integrity of the shoreline stabilization and protection objective.

In addition to providing coastal storm risk reduction, beach nourishment projects will provide environmental, recreational, and aesthetic benefits. For example, nourishing and widening an eroding beach is expected to provide critical habitat for horseshoe crabs, migratory birds and fish and other species. Beach nourishment could also help stabilize tidal marsh/barrier beach complex by reducing erosion, turbidity, breaching, and managing impacts from sea level change. All necessary permits and approvals issued by the regulatory agencies will be obtained prior to construction. The Corps is committed to continuing to work closely with Federal and State resource agencies, prior to and during the project's beachfill plan. If you have any questions regarding this project, please contact Ms. Barbara Conlin of the Environmental Resources Branch at (215) 656-6557 or Mr. Scott Sanderson of the Coastal Section at (215) 656-6571.

Sincerely,



Peter R. Blum, P.E.
Chief, Planning Division

Enclosure (2)
1. References
2. Proposed Typical Cross Section – Delaware Bay Beaches

References

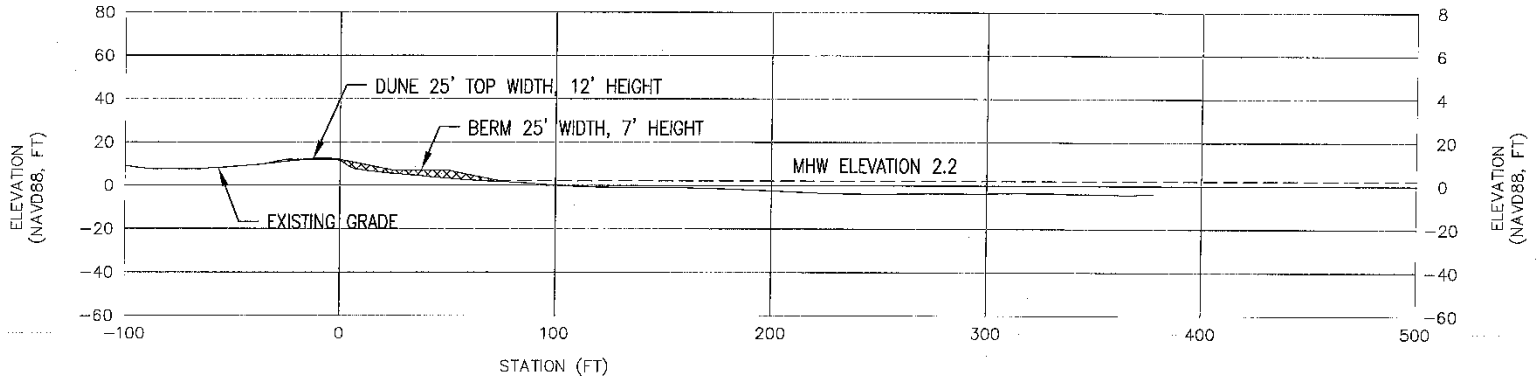
ASBPA, 2007. "How Beach Nourishment Projects Work, Shore Protection Assessment".

Engelhart, S.E., Horton, B.P., Douglas, B.C., Peltier, W.R., Törnqvist, T.E., 2009. "Spatial variability of late Holocene and 20th century sea-level rise along the Atlantic coast of the United States." Geology 37, 1115-1118.

GCRP, 2009: "Coastal Sensitivity to Sea-Level Rise: A Focus on the Mid-Atlantic Region. A report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research." [James G. Titus(Coordinating Lead Author), Eric K. Anderson, Donald R. Cahoon, Stephen Gill, Robert E. Thieler, Jeffrey S. Williams (Lead Authors] U.S. Environmental Protection Agency, Washington D.C., USA.

Psuty, N.P., M. Duffy, J.F. Pace, D.E. Skidds, and T.M. Silveria, 2010. "Northeast Coastal and Barrier Geomorphological Monitoring: Part I - Ocean Shoreline Position." Natural Resources Report NPS/NCBN/NRR-2010/185. National Park Service, Fort Collins, CO.

Stauble, D.K., 1992. "Long Term Profile and Sediment Morphodynamics: Field Research Facility Case History," Technical Report CERC-92-7, U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory, Vicksburg, MS. 252 p.



PROPOSED TYPICAL CROSS SECTION
DELWARE BAY BEACHES

PROPOSED BEACHFILL

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

NOV 17 2017

Peter R. Blum, Chief
Planning Division
Army Corps of Engineers, Philadelphia District
Wanamaker Building, 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

RE: Deepening and Maintenance of the Delaware River Federal Navigation Channel

Dear Mr. Blum,

Enclosed is the biological opinion (Opinion), issued under Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, for the U.S. Army Corps of Engineers' (USACE) ongoing deepening of the Delaware River Philadelphia to the Sea Federal Navigation Project (FNP), as well as 50 years (through 2068) of maintenance dredging of the Federal navigation channel from Trenton, New Jersey to the Sea (to previously authorized depths), associated beach nourishment projects, and the installation of the Marcus Hook range lights.

In this Opinion, we conclude 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 threatened Northwest Atlantic DPS of loggerhead sea turtles, or endangered Kemp's ridley sea turtles. We also conclude that the proposed action may affect, but is not likely to adversely affect, endangered Carolina DPS of Atlantic sturgeon, endangered green sea turtles, or endangered leatherback sea turtles. Lastly, we conclude that the proposed action is likely to adversely affect, but not likely to adversely modify or destroy critical habitat designated for the New York Bight DPS of Atlantic sturgeon.

This document replaces previous opinions covering these activities:

- 2015 Opinion: Deepening of the Delaware River Federal Navigation Channel
- 2013 Opinion: Maintenance of the 40-foot Delaware River Federal Navigation Channel
- 1996 Opinion: Maintenance Dredging Operations within USACE's Philadelphia District

In addition to considering effects of the deepening and maintenance of the Philadelphia to the Sea FNP, the Opinion considers effects of relocation trawling prior to and during the blasting at Marcus Hook and the use of a sound deterrent to attempt to minimize the number of sturgeon exposed to effects of blasting.

Our Opinion includes an Incidental Take Statement (ITS), which is an exemption from the prohibition of take of listed species. Incidental take is defined as "take of listed fish or wildlife species that results from, but is not the purpose of carrying out an otherwise lawful activity conducted by a Federal agency or applicant" [50 CFR §402.02]. "Otherwise lawful activities" are those actions that meet all State and Federal legal requirements, including any state endangered species laws or regulations, except for the prohibition against taking in ESA Section 9. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not prohibited under the ESA, provided that such taking is in compliance with the terms and conditions of this ITS.

The ITS specifies reasonable and prudent measures (RPMs) necessary to minimize and monitor take of shortnose and Atlantic sturgeon and sea turtles. The measures described in the ITS are non-discretionary, and must be undertaken by you so that they become binding conditions for the exemption in section 7(o)(2) to apply. You have a continuing duty to regulate the activity covered by the ITS. If you (1) fail to assume and implement the terms and conditions or (2) fail to require any contractors to adhere to the terms and conditions of the ITS through enforceable terms that are added to permits and/or contracts as appropriate, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, you must report the progress of the action and its impact on listed species to us as specified in the ITS [50 CFR §402.14(i)(3)] (See U.S. Fish and Wildlife Service and National Marine Fisheries Service's Joint Endangered Species Act Section 7 Consultation Handbook (1998) at 4-49).

This concludes formal consultation on the proposed actions. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may not have been previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, section 7 consultation must be reinitiated immediately.

Thank you for working cooperatively with my staff throughout the consultation process. We look forward to continuing to work cooperatively with your office to minimize the effects of dredging projects in the Philadelphia District on listed species. Should you have any questions about this correspondence please contact Zach Jylkka at (978) 282-8467 or by e-mail (Zachary.Jylkka@noaa.gov).

Sincerely,

John Bullard
Regional Administrator

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
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FEB 20 2018

RE: Draft Feasibility Report and Integrated Environmental Assessment, Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study

Dear Mr. Blum:

We have reviewed the draft Feasibility Report and Integrated Environmental Assessment (DFS/IEA) for the beneficial use of dredged material in Delaware. The report analyzes coastal storm risk management (CSRM) issues in various Delaware communities with the objectives of using dredged material beneficially to reduce flood-related impacts to people, property and infrastructure along and adjacent to the Delaware shoreline from 2020 to 2070, and increasing the resiliency of coastal Delaware, specifically along the Delaware River/Bay and Delaware Inland Bay shoreline. The tentatively selected plan (TSP) consists of dune and berm construction at eight dredged material placement locations in the southern reach of the study area spanning approximately 29 miles along the Delaware Bay. These areas include (from north to south): Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach and Lewes.

Based on the volume projections for initial construction at each of the eight placement locations, a total of approximately 900,000 cubic yards of dredged material would be required for initial construction. The proposed source area for the sand is Lower Reach E (Miah Maull and Brandywine Ranges) of the Delaware River, Philadelphia to the Sea navigation project. This area is anticipated to have approximately 465,000 cubic yards of dredged material available annually that will need to be removed to maintain the authorized 45 feet depth. The anticipated dredging cycle for Lower Reach E is every two years to remove and place 930,000 cubic yards of dredged material. We note that this area is also planned to be used as the source of material for similar coastal storm risk management projects proposed for Gandys Beach, Fortescue and Cape May Villas on the New Jersey side of Delaware Bay.

Buoy 10, located at the mouth of Delaware Bay has been identified as a back-up source for initial construction materials if there is less dredged material available than anticipated at the projected date of initial construction in 2020. Buoy 10 contains approximately 750,000 cubic yards of sand previously dredged from Lower Reach E during operation and maintenance of the federal navigation project. The Corps recognizes that the use of Buoy 10 as a back-up source would

The Tentatively Selected Plan (TSP) includes beach nourishment at seven beaches. Big Stone Beach was eliminated in the alternative analyses phase of study.

necessitate a benthic habitat assessment and ultimately a Supplemental Environmental Assessment (EA).

Magnuson Stevens Fishery Conservation and Management Act (MSA)

Delaware Bay has been designated as essential fish habitat (EFH) for a number of federally managed species including Atlantic butterfish (Peprilus triacanthus), Atlantic sea herring (Clupea harengus), bluefish (Pomatomus saltatrix), black sea bass (Centropristis striata), red hake (Urophycis chuss), scup (Stenotomus chrysops), summer flounder (Paralichthys dentatus), winter flounder (Pseudopleuronectes americanus), windowpane flounder (Scophthalmus aquosus), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), cobia (*Rachycentron canadum*), clearnose skate (Raja eglanteria), little skate (Leucoraja erinacea), and winter skate (Leucoraja ocellata).

The lower Delaware Bay area is also EFH for several highly migratory species including dusky shark (Carcharhinus obscurus), sandbar shark (Carcharhinus plumbeus), and sand tiger shark (Carcharias taurus). Sand tiger and dusky shark have been listed as Species of Concern by NOAA. Species of Concern (SOC) are those species about which we have concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the Endangered Species Act (ESA). The goal is to promote proactive conservation efforts for these species in order to preclude the need to list them in the future. The project area has also been designated as a Habitat Area of Particular Concern (HAPC) for sandbar shark and sand tiger shark. HAPCs are discrete subsets of EFH that provide important ecological functions and/or are especially vulnerable to degradation.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Fish and Wildlife Coordination Act (FWCA) require federal agencies to consult with one another on projects such as this that may affect EFH and other aquatic resources. Because this project affects EFH, this process is guided by the requirements of our EFH regulation at 50 CFR 600.905, which mandates the preparation of EFH assessments, lists the required contents of EFH assessments, and generally outlines each agency's obligations in this consultation procedure.

The DFS/IEA contains some information about EFH and evaluates some of the effects the TSP may have on some species. However, due to the general nature of the report, it not sufficiently detailed to serve as an EFH assessment for each of the individual placement areas. We have worked with, and will continue to work with your staff on the development of the necessary information to complete individual consultations as project plans are developed, or to develop a programmatic consultation to address all of the beach nourishment activities that are proposed and ongoing in the Delaware Estuary.

With the information that is included in the DFS/IEA, we can provide some guidance on the development of future EFH assessments, identify sensitive species, life stages and habitats, and offer some general recommendations to help with project planning.

Definitions, EFH Assessments and the Determination of Effects

Essential fish habitat (EFH) is defined as, "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." For the purpose of interpreting the definition of EFH:

- "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate;
- "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities;
- "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem;
- "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The EFH final rule published in the Federal Register on January 17, 2002, defines an adverse effect as: "any impact which reduces the quality and/or quantity of EFH." The EFH final rule further states that:

> An adverse effect may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystems components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from action occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The above definitions set a very low threshold for determining an adverse effect to EFH. Also, because the focus of EFH and EFH assessment are the effects of an action on the habitat, not the individual fish, impacts to the water column, such as increases in suspended sediment; temperature, chemical or biological changes; or impacts to the substrate, even if temporary can be considered an adverse effect if it makes the habitat within the impact area less suitable for a federally managed species. As a result, the ability of a species to move out of the way, or the pelagic nature of any life stage is not a valid reason for determining that an activity has no effect on EFH. If there is a negative alteration of the habitat, even temporary one, it is an adverse effect to EFH.

An adverse effect determination triggers the need to consult with us on an action, but not necessarily a need for us to issue EFH conservation recommendations to avoid, minimize or offset the adverse effect. Through the EFH consultation and the development of a full and complete EFH assessment, the nature and scope of the adverse effects are analyzed. The mobility of a species, their life history and the duration and scope of the effects and measures to reduce the adverse effects are identified and considered to determine if additional actions are need to minimize adverse effects to EFH. Adverse effects that are temporary or no more than minimal may not require any conservation recommendations unless a sensitive, less mobile life

stage is present, or the work prevents a species from reaching a needed habitat at sensitive time of the year.

Aquatic Resources

As discussed above, the Delaware Bay is EFH for a number of federally managed species and has been designated as an HAPC for two species of shark, sandbar shark and sand tiger shark. EFH assessments prepared for the individual projects identified in the TSP should address all of the direct, indirect, individual and cumulative effects to all of the EFH identified in the project area, but there are several species and habitats that warrant particular attention.

Sandbar Shark
The Delaware Bay is one of two principal nursery grounds for the sandbar shark on the U.S. East Coast (McCandless et al., 2007). Sandbar shark nursery areas are typically in shallow coastal waters from Cape Canaveral, Florida to Martha's Vineyard, Massachusetts. Studies indicate that juvenile sandbar sharks are generally found in water temperatures ranging from 15 to 30 °C, salinities at least from 15 to 35 ppt, and water depth ranging from 0.8 to 23 m in sand, mud, shell and rocky habitats from Massachusetts to North Carolina (Grubbs and Musick 2007, Grubbs et al. 2007; McCandless et al. 2002, 2007; Merson and Pratt 2007). These conditions exist at the project sites, particularly in the later spring, summer and early fall.

Pregnant sandbar shark females occur in the area between late spring and early summer, give birth and depart shortly after while neonates (young-of-year) and juveniles (ages one and over) occupy the nursery grounds until migration to warmer waters in the fall (Rechisky and Wetherbee 2003 and Springer 1960). Neonates return to their natal grounds as juveniles and remain there for the summer.

The eight individual project areas, as well as Reach E of the federal navigation project and Buoy 10, the potential source areas are within the HAPC for sandbar shark. As a result, dredging and beach nourishment activities should be avoided from May 1 to September 15 when sandbar sharks use the area as a pupping and nursery ground to minimize adverse effects to the sandbar shark HAPC. In addition, the best management practices described in the DFS/IEA such as floating pipelines, the placement of the dredge pipe above the mean high water line during pump-out and development of the raised beach berm moving along the shoreline will help to minimize adverse effect to sandbar shark and other aquatic species.

Sand Tiger Shark
The Final Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species (HMS) Fishery Management Plan (FMP) was recently released by our Highly Migratory Species Management Division. This amendment to the FMP contains several changes to the EFH designations for sharks and other highly migratory species. In particular, a new HAPC designation for sand tiger sharks was established in Delaware Bay including all of the sand placement areas as well as the Reach E of the federal navigation project and Buoy 10.

The COASTSPAN survey conducted in Delaware and New Jersey state waters reports consistent seasonal use of Delaware Bay by all life stages of sand tiger shark from 2009 to 2014 (NOAA 2009, 2010, 2011, 2012, 2013, 2014). A pop-up satellite archival tags (PSAT) and acoustic tag study conducted on sand tiger sharks in Delaware Bay in 2008 noted seasonal departures of sand tiger sharks from Delaware Bay by October and subsequent annual return to Delaware Bay the following summer (Teter et al. 2015). Additional tagging research also suggested high inter-annual site fidelity of sand tiger sharks for this region (Haulsee et al., unpublished data, American Fisheries Society Annual Meeting 2014). Kilfoil (2014) noted high abundance of sand tigers in Delaware Bay and nearby coastal regions (specifically, between the mouth of the Delaware River and Cape Henlopen, Delaware).

As you are aware, a distinct and further EFH consultation must be reinitiated pursuant to 50 CRF 600.920 (j) if new information becomes available, or if the project is revised in such a manner that affects the basis for our EFH conservation recommendations. The designation of a new HAPC for sand tiger shark triggers this reinitiation requirement for the maintenance dredging within the federal channel so that the potential effects of the dredging on sand tiger shark HAPC can be evaluated.

The June 2009 Amendment 1 to the Consolidated Highly Migratory Species (HMS) Fisheries Management Plan (NOAA 2009) states that non–fishing activities such as mining for sand (e.g., for beach nourishment projects), gravel, and shell stock in estuarine and coastal waters have adverse impacts to sandbars shark EFH due to water column effects, such as changing circulation patterns, increasing turbidity, and decreasing oxygen concentrations. The 2009 amendment also include a number of EFH conservation recommendations for dredging and beach nourishment projects proposed within EFH for highly migratory species. These general EFH conservation recommendations include:

- Sand mining and beach nourishment should not be allowed in HMS EFH during seasons when HMS are using the area, particularly during spawning and pupping seasons.
- Sand and gravel extraction operations should be managed to avoid or minimize impacts to the bathymetric structure in estuarine and nearshore areas.
- An integrated environmental assessment, management, and monitoring program should be a part of any gravel or sand extraction operation, and encouraged at Federal and state levels.
- Planning and design of mining activities should avoid significant resource areas important as HMS EFH.
- Given the increase in sea level rise and potentially growing need to re-nourish beaches, this activity needs to be closely monitored in areas that are adjacent to or located in HMS EFH.

Horseshoe Crabs

The project areas provide important habitat for horseshoe crabs (*Limulus polyhemus*). The Atlantic States Marine Fisheries Commission (ASMFC) has designated the nearshore; shallow water intertidal flats in Delaware Bay as prime spawning habitat for adult horseshoe crabs. The shoal water and shallow water areas of Delaware Bay are also important nursery areas where juvenile horseshoe crabs spend their first two years on the intertidal sand flats. Research suggests that adults horseshoe crabs are found in areas with low wave action and water, bottoms of sand or mud, from shallow low-tide depths to water depths of <30 meters which may be why adult crabs typically inhabit bay areas adjacent to spawning beaches like navigation channels during the spawning season (ASMFC, 2010). Observer by-catch records point to substantial numbers of the species observed entrained during hopper dredge operations (Ray and Clarke, 2010).

Horseshoe crabs also play valuable ecological role in the food web within the Delaware Estuary. Horseshoe crab eggs are a vital food source for the red knot (*Calidris canutus*), a federally listed endangered species. Horseshoe crab eggs and larvae are a food source for a number of other species including striped bass (*Morone saxatilis*), white perch (*Morone americana*), weakfish (*Cynoscion regalis*), American eel (*Anguilla rostrata*) silver perch (*Bairdiella chrysoura*), and federally managed summer flounder and winter flounder (Steimle et al. 2000.)

Dredging and sand placement in these areas can result in the loss of these important species. To minimize adverse effects to spawning adult horseshoe crabs, and their eggs, as well as juvenile horseshoe crabs, dredging and the placement of sand should be avoided from April 15 to September 15 of each year.

Eastern Oyster

Delaware Bay provides valuable habitat for Eastern oyster (*Crassostrea virginica*) and supports a commercially important oyster industry including both direct harvest and aquaculture. Over the past 20 years extensive efforts have been made to restore oyster beds, to manage harvests and to support aquaculture activities in the Bay. In addition to their commercial value, oysters support an increased diversity of finfish and invertebrates, cycle material between the water column and substrate and have the potential to enhance water quality (Dewey 2000; Nakamura and Kerciku 2000; Coen and Grizzle 2007). To protect these areas, the Corps should work with Delaware Department of Natural Resources (DNREC) to identify oyster beds and aquaculture lease sites in the vicinity of the project areas and to determine the appropriate buffers between the beach nourishment projects and the oyster beds and lease sites.

Sabellaria

Sabellaria vulgaris, a tube building, annelid polychaete worm is a food source for a number of federally managed species including summer flounder, winter flounder and scup (Steimle et. al. 2000). Aggregations or reefs of *Sabellaria* can be found in the vicinity of the some of the beaches that are included in the TSP. Because of their ecological importance as a food source for some federally manage species, as construction plans are developed, surveys of the beach nourishment areas should be undertaken to determine the location and extent of these reefs.

Impacts to Sabellaria reefs should be avoided, minimized and offset to the maximum extent practicable.

Diadromous Fishes

Anadromous fishes including alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*) and striped bass are known to migrate to the upstream portions of a number of tributaries to Delaware Bay including the Leipsic River, St. Jones River, Murderkill River, Mispillion River, Prime Hook Creek and the Broadkill River to spawn. Alewife and blueback herring, collectively known as river herring, spend most of their adult life at sea, but return to freshwater areas to spawn in the spring. Both species are believed to be repeat spawners, generally returning to their natal rivers (Collette and Klein-MacPhee 2002.) Because landing statistics and the number of fish observed on annual spawning runs indicate a drastic decline in alewife and blueback herring populations throughout much of their range since the mid-1960's, they have been designated as Species of Concern by NOAA .

Juvenile river herring are a food source for several federally managed species. Buckel and Conover (1997) in Fahey et al. (1999) reports that diet items of juvenile bluefish (*Pomatomus saltatrix*) include *Alosa* species such as these. Juvenile *Alosa* species have all been identified as prey species for windowpane flounder, summer flounder, scup, little skate, and winter skate in Steimle et al. (2000).

The EFH final rule states that the loss of prey may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat may also be considered adverse effects on EFH. As a result, activities that adversely affect the spawning success and the quality for the nursery habitat of these anadromous fish can adversely affect the EFH for juvenile bluefish, windowpane, winter flounder, scup, summer flounder and others by reducing the availability of prey items.

Increases in turbidity due to the resuspension of sediments into the water column during sand placement along the beach near the these waterways can degrade water quality, lower dissolved oxygen levels, mask pheromones used by migratory fishes such as these to reach their spawning grounds and impede their migration (Auld and Schubel 1978; Breitburg 1988; Newcombe and MacDonald 1991; Burton 1993; Nelson and Wheeler 1997). Noise from the construction activities may also result in adverse effects. Effects may include (a) non-life threatening damage to body tissues, (b) physiological effects including changes in stress hormones or hearing capabilities, or (c) changes in behavior (Popper et al. 2004).

In order to minimize the adverse effects of suspended sediment and noise on migrating anadromous fish, sand placement on the beaches adjacent to waterways should be avoided from March 1 to June 30 during the upstream migration to their spawning grounds. As project plans are developed for each project, we will work with your staff and DNREC to develop an

appropriate buffer from the waterway entrances and a more refined seasonal work window.

Mid-Atlantic Fisheries Management Council Policies

A number of the federally managed species for which EFH has been designated in the project area are managed by the Mid-Atlantic Fisheries Management Council (MAFMC). MAFMC has developed a policy statement on beach nourishment activities that may affect federally managed species under their purview including summer flounder, scup, black sea bass, and butterfish. These policies are intended to articulate the MAFMC's position on various development activities and facilitate the protection and restoration of fisheries habitat and ecosystem function.

The MAFMC's policies on beach nourishment are:

1. Avoid sand mining in areas containing sensitive fish habitats (e.g., spawning and feeding sites, hard bottom, cobble/gravel substrate, shellfish beds).

2. Avoid mining sand from sandy ridges, lumps, shoals, and rises that are named on maps. The naming of these is often the result of the area being an important fishing ground.

3. Existing sand borrow sites should be used to the extent possible. Mining sand from new areas introduces additional impacts.

4. Conduct beach nourishment during the winter and early spring, when productivity for benthic infauna is at a minimum.

5. Seasonal restrictions and spatial buffers on sand mining should be used to limit negative impacts during fish spawning, egg development, young-of-year development, and migration periods, and to avoid secondary impacts to sensitive habitat areas such as SAV.

6. Preserve, enhance, or create beach dune and native dune vegetation in order to provide natural beach habitat and reduce the need for nourishment.

7. Each beach nourishment activity should be treated as a new activity (i.e., subject to review and comment), including those identified under a programmatic environmental assessment or environmental impact statement.

8. Bathymetric and biological monitoring should be conducted before and after beach nourishment to assess recovery in beach borrow and nourishment areas.

9. The effect of noise from mining operations on the feeding, reproduction, and migratory behavior of marine mammals and finfish should be assessed.

10. The cost effectiveness and efficacy of investments in traditional beach nourishment projects should be evaluated and consider alternative investments such as non-structural responses and

relocation of vulnerable infrastructure given projections of sea level rise and extreme weather events.

The MAMFC's policies should be incorporated, as appropriate, into this project and any future beneficial use of dredged material projects within the Philadelphia District.

We look forward to continued coordination with your office on this project as it moves forward. If you have any questions or need additional information, please do not hesitate to contact Keith Hanson in our Annapolis field office at (410) 573-4559 or keith.hanson@noaa.gov or Karen Greene in our New Jersey filed office at (732) 872-3023 at karen.greene@noaa.gov .

Sincerely,

Karen M. Greene
Mid-Atlantic Field Offices Supervisor
Habitat Conservation Division

cc: DNREC – J. Clark
MAFMC – C. Moore
NEFMC – T. Nies
ASFMC – L. Havel
GARFO - G. Powers, J. O'Connor, P. Johnsen.
NMFS HMS – J. Cudney
ACOE –B. Conlin

The USACE will continue to coordinate with NMFS with regard to managed species and EFH, pursuant to the MSA and FWCA, as the project moves forward and funded for initial construction.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

February 20, 2018

Peter R. Blum, P.E.
Chief, Planning Division
Department of the Army
Philadelphia District, Corps of Engineers
100 East Penn Square, Floor 7, Wanamaker Building
Philadelphia, PA 19107

Re: Fish and Wildlife Coordination Act comments for the Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study

Dear Mr. Blum:

The U.S. Fish and Wildlife Service (Service) has reviewed the Corps of Engineers (COE) January 25, 2018, February 5, 2018, and February 13, 2018 email messages with attachments that pertain to this proposed project. Endangered Species Act comments regarding this project can be found in the Service's January 3, 2017 letter to the COE. The following comments are in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

The objective of this proposed project is the beneficial use of maintenance dredging material obtained from the lower reach of the Delaware River Federal Navigation Channel. The high quality sand material is proposed to be placed on beaches at seven Delaware coastal communities. These sites were severely eroded during Hurricane Sandy and subsequent nor'easters. The sand from these maintenance dredging operations will be used as nonstructural shoreline stabilization material, reducing flood, erosion, and storm damage risks, while enhancing and restoring these beaches.

The Service has reviewed the final optimized specifications for the proposed berm and dune structures at Pickering Beach, Kitts Hummock Beach, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach. As stated in a January 25, 2018 email message, Big Stone Beach was removed by the COE as it was not cost justified. The Service concurs with the final optimized specifications for the proposed berm and dune structures at the seven aforementioned beaches.

TAKE PRIDE IN AMERICA

We appreciate the opportunity to review and provide comment on this project. Should you have questions, please contact Trevor Clark of my staff at 410/573-4527 or trevor_clark@fws.gov.

Sincerely,

Genevieve LaRouche
Field Supervisor

State of Delaware
Historical and Cultural Affairs

21 The Green
Dover, DE 19901-3611

Phone: (302) 736.7400 Fax: (302) 739.5660

February 26, 2018 Review Code: 2016.02.11.03

Nikki Minnichbach
Cultural Resource Specialist
Philadelphia District
U.S. Army Corps of Engineers, Regulatory Branch
100 Penn Square East
Philadelphia, PA 19107-3390

Project: **Beneficial Use for Dredge Material for the Delaware River, Delaware Bay Coast. Delaware**

Dear Ms. Minnichbach:
From the material submitted, we understand this undertaking will involve the relocation of materials dredged from the Delaware River channel to Delaware Bayside areas that are vulnerable to storm damage. These are include Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Big Stone Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach. As we understand it, this is a work in progress, and the plans have yet to be developed. The current Area of Potential Effect are the proposed beach berms and dunes. In addition, we would include the staging areas and the dredge pipe locations in the A.P.E. The project as conceived may not impact many cultural resources, as many of the beaches are a dynamic environment and have been recently altered by nature or cultural activities.

Over the past decades, a number of surveys and evaluations previously completed for beach replenishment projects. As there are a number of potentially significant archaeological or historic sites near the beach areas, there is some justification for concern. We realize this is a project in development, and we will consult with you continuously to insure lessen the effects the project may have on historic properties. Please send us the plans depicting the complete project when they are developed.

If you have any questions, I can be reached at craig.lukezic@state.de.us

Craig Lukezic
Archaeologist

cc: Gwen Davis, Deputy SHPO, Division of Historical and Cultural Affairs

SAVING DELAWARE HISTORY

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

February 26, 2018

Peter Blum, Chief Planning Division
U.S. Army Corps of Engineers
100 Penn Square East
Philadelphia, PA 19107

RE: Delaware Beneficial Use of Dredged Material for the Delaware River, Feasibility Report and Integrated Environmental Assessment, Volume 1, dated 11/23/2016

Dear Mr. Blum:

Thank you for providing the Wetlands and Subaqueous Lands Section (WSLS) with a copy of the Delaware Beneficial Use of Dredged Material for the Delaware River, Feasibility Report and Integrated Environmental Assessment, Volume 1, dated 11/23/2016.

The WSLS believes that the report is a fundamental foundation for the review of the beneficial reuse of the dredged material from the Delaware Bay. The WSLS supports the use of dredged material in a way that improves public safety, habitat and ecology while minimizing impacts to water quality.

The WSLS issues Water Quality Certifications pursuant to Section 401 of the federal Clean Water Act, for projects such as these that may result in a discharge to State waters. Under State regulations, after receipt of a detailed application, the WSLS must place the project on a 20-day public notice and complete a thorough review of each specific event/project. While we support beneficial reuse of dredged materials, at this time, we cannot provide concurrence for Water Quality Certification. As details are finalized the WSLS anticipates further coordination with the USACE to review and process Water Quality Certifications for each dredging event and associated beach re-nourishments to address any public and environmental concerns.

The USACE will continue to coordinate with DNREC as the project proceeds and the dredging schedule can be determined to complete the Section 401 Water Quality Certification process.

If you have any questions, please contact this office at (302) 739-9943.

Sincerely

By Steven M. Smailer, Section Manager
Wetlands and Subaqueous Lands Section

Tyler Brown, Program Manager
Wetlands and Subaqueous Lands Section

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Office of the
Secretary

Phone: (302) 739-9000
Fax: (302) 739-6242

MAR 1 5 2018

Rec'd
3/16 RM.

Lieutenant Colonel Kristen N. Dahle
U.S. Army Corps of Engineers
Philadelphia District
Wanamaker Building
100 Penn Square East
Philadelphia, PA 19107

Dear Lieutenant Colonel Dahle:

The purpose of this letter is to confirm the Delaware Department of Natural Resources and Environmental Control's (DNREC) support of the U.S. Army Corps of Engineers (USACE) Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study.

It is my understanding that this letter and the attached Non-Federal Sponsor's Self-Certification of Financial Capability Agreement will not obligate the State to an immediate or future financial commitment. However, the State does have the wherewithal to raise or appropriate non-federal match funds for future projects. It is further understood that funds will not need to be obligated until a Project Partnership Agreement has been signed, which cannot happen until the feasibility study has been completed.

Based on the above understanding, DNREC is committed to partnering with the USACE Philadelphia District and will continue to provide the staffing and support needed to complete the study.

If you have any questions, please contact me or have your staff contact Terry Deputy, Acting Director, Division of Watershed Stewardship at (302) 739-9921.

Sincerely,

Shawn M. Garvin
Secretary

NON-FEDERAL SPONSOR'S
SELF-CERTIFICATION OF FINANCIAL CAPABILITY
FOR DECISION DOCUMENTS

I, Robert J. Zimmerman, do hereby certify that I am the Chief Financial Officer for the Delaware Department of Natural Resources and Environmental Control (the "Non-Federal Sponsor"); that I am aware of the financial obligations of the Non-Federal Sponsor for the Delaware Beneficial Use of Dredged Material for the Delaware River Feasibility Study; and that the Non-Federal Sponsor will have the financial capability to satisfy the Non-Federal Sponsor's obligations for that project. I understand that the Government's acceptance of this self-certification shall not be construed as obligating either the Government or the Non-Federal Sponsor to implement a project.

IN WITNESS WHEREOF, I have made and executed this certification this 15th day of March, 2018.

BY: _____

TITLE: Chief Operating Officer

DATE: 3/15/2018

-----Original Message-----
From: Karen Greene - NOAA Federal [mailto:karen.greene@noaa.gov]
Sent: Thursday, May 3, 2018 7:37 AM
To: Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil>; Sanderson, Scott A CIV USARMY CENAP (US) <Scott.A.Sanderson@usace.army.mil>
Cc: Keith Hanson <keith.hanson@noaa.gov>; Weichenberg, Rena CIV USARMY CENAD (US) <Rena.Weichenberg@usace.army.mil>
Subject: [Non-DoD Source] Follow up on EFH comments on the Draft Feasibility Report and Integrated Environmental Assessment for the Delaware Beneficial Use of Dredged Material

Hi Barbara and Scott,

This follows up on our recent telephone conversation and clarifies the comments made in our February 20, 2018 letter concerning the Draft Feasibility Report and Integrated Environmental Assessment for the Delaware Beneficial Use of Dredged Material. In our letter, we provided a number of general EFH conservation recommendations that were based upon the current feasibility level design of the project. Because of the nature and level of detail included in feasibility studies, site-specific EFH conservation recommendations are not possible at this time. Further analysis of the project's effect on EFH based upon the level of detail in this or any similar feasibility study would not contribute to a more thorough assessment of effects or help us to refine our EFH conservation recommendations.

We recognize that the Corps will be refining the project designs and developing a more detailed project schedule for the various project elements as the overall project moves towards the development of plans and specifications. As discussed, during this phase of project development, NMFS and the Corps will coordinate and evaluate the more fine scale effects specific to each proposed beach nourishment location relative to development of the construction schedule and use this to refine our recommendations. We view the EFH coordination for the feasibility phase of the project to be complete and will work with your staff to re-initiate coordination as project implementation plans are developed. This will allow us to work together to develop targeted measures to avoid, minimize or offset adverse effects to EFH on a scale appropriate to the individual project components.

We look forward to continued coordination with you on this and other projects within the District. As discussed, Keith Hanson in our Annapolis field office will be the point of contact for NMFS HCD for all activities within the Philadelphia District. His contact information is:

Keith Hanson
NOAA Fisheries
Habitat Conservation Division
177 Admiral Cochrane Drive
Annapolis, MS 21401
410 573 4559

keith.hanson@noaa.gov <mailto:keith.hanson@noaa.gov>

Thanks.
Karen

Karen Greene

Mid-Atlantic Field Offices Supervisor
NOAA/National Marine Fisheries Service
Greater Atlantic Regional Fisheries Office Habitat Conservation Division James J. Howard Marine Sciences Laboratory
74 Magruder Rd.
Highlands, NJ 07732
732 872-3023 (office)

Email correspondence (March 2017-May 2018) regarding the Coastal Barrier Resources Act between the USACE and USFWS.

-----Original Message-----
From: Clark, Trevor [mailto:trevor_clark@fws.gov]
Sent: Friday, May 11, 2018 9:18 AM
To: Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil>
Cc: Chris Guy <chris_guy@fws.gov>; Cynthia Bohn <cynthia_bohn@fws.gov>; Wright, Dana <dana_wright@fws.gov>; Sanderson, Scott A CIV USARMY CENAP (US) <Scott.A.Sanderson@usace.army.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL] Re: Delaware Beneficial Use of Dredged Material and CBRA Coordination

Hi Barb,

The proposed beach nourishment plans/berm and dune structures at Pickering Beach, Kitts Hummock Beach, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach, and Lewes Beach are all in compliance with the Coastal Barrier Resource Act (CBRA). However, the U.S. Fish and Wildlife Service reserves the right to revisit CBRA compliance for this project prior to project construction based on the potential for changes in land use and regulations.

On Thu, May 10, 2018 at 3:18 PM, Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> > wrote:

Trevor and Chris,

As discussed earlier today by telephone, the Philadelphia District is currently finalizing the DE DMU study report. The Tentatively Selected Plan (see attachment) presented in the report was developed in coordination with your office and the USFWS' Northeast Regional CBRA Coordinator (Cindy) (see attached emails below). The beach berm dimensions were modified (reduced in length) to be in compliance with CBRA (avoid encroaching into system units), consistent with your recommendations:

1. Pickering Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
2. Kitts Hummock Beach: two northern end properties are grandfathered, therefore CSRM project footprint in front of the properties may encroach into CBRA unit.
3. North Bowers Beach: no CBRA system unit impacts.
4. South Bowers Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
5. Slaughter Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
6. Prime Hook: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only. At the northern end of Prime Hook Beach, the CSRM design plan will tie into the existing Prime Hook National Wildlife Refuge project located within a CBRA system unit.
7. Lewes Beach: no CBRA system unit impacts.

For all CSRM project locations cited above and based on our telephone conversations (Feb-May 2017), USFWS representatives concluded that berm tapers may enter CBRA system units as their

function is not to provide coastal storm risk management for the structures located directly behind them but to tie into and support the CSRM function of the berm and dune project ends that would occur outside of the system units.

Please reply to confirm that the proposed beach nourishment plans, as presented above, satisfactorily meet CBRA compliance.

Thank you,

Barb Conlin
Environmental Resources Branch
Philadelphia District USACE

-----Original Message-----
From: Bohn, Cynthia [mailto:cynthia_bohn@fws.gov <mailto:cynthia_bohn@fws.gov>]
Sent: Wednesday, May 10, 2017 10:04 AM
To: Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov> >
Cc: Kathryn Reshetiloff <Kathryn_Reshetiloff@fws.gov <mailto:Kathryn_Reshetiloff@fws.gov> >; Julie Thompson <Julie_Thompson@fws.gov <mailto:Julie_Thompson@fws.gov> >; Genevieve LaRouche <genevieve_larouche@fws.gov <mailto:genevieve_larouche@fws.gov> >; Dana Wright <dana_wright@fws.gov <mailto:dana_wright@fws.gov> >; Trevor Clark <Trevor_Clark@fws.gov <mailto:Trevor_Clark@fws.gov> >; Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> >; Spencer Simon <spencer_simon@fws.gov <mailto:spencer_simon@fws.gov> >
Subject: [Non-DoD Source] Re: Delaware Beneficial Use of Dredged Material and CBRA Coordination

Chris, I concur. Thank you to you and your office and especially the Corps for your leadership in getting this articulated and part of the project. This will be a good example for us to follow in the future. Cindy

Cynthia Bohn
Southeast Region Coastal Program
Southeast and Northeast Region CBRA Coordinator USFWS Southeast Region
1875 Century Blvd, Room 200
Atlanta, GA 30345
Phone: 404-679-7122
Fax: 404-679-7081
cynthia_bohn@fws.gov <mailto:cynthia_bohn@fws.gov> <mailto:cynthia_bohn@fws.gov <mailto:cynthia_bohn@fws.gov> >

Learn more about the Coastal Barrier Resources Act <Blockedhttp://Blockedwww.fws.gov/cbra <Blockedhttp://www.fws.gov/cbra> >

NOTE: This email correspondence and any attachments to and from this sender is subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

On Tue, May 9, 2017 at 2:24 PM, Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov> <mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > > wrote:

For the weekly under coastal Resiliency. This is the first of its kind, Nationwide! I am very proud of the team who came together to make this happen!

Sent from my iPhone

Begin forwarded message:

From: "Conlin, Barbara E CIV USARMY CENAP (US)" <Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> <mailto:Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> > >
Date: May 9, 2017 at 11:04:44 AM EDT
To: "Clark, Trevor" <trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> <mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> > >, Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov> <mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > >
Cc: "Sanderson, Scott A CIV USARMY CENAP (US)" <Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> <mailto:Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> > >
Subject: RE: Delaware Beneficial Use of Dredged Material and CBRA Coordination

Hi Trevor and Chris,

The proposed Coastal Storm Risk Management (CSRM) project design has been modified to be in compliance with CBRA consistent with our coordination with your office and USFWS' Northeast Regional CBRA Coordinator. Based on our coordination, USACE requests your confirmation on the following proposed design considerations:

1. Pickering Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
2. Kitts Hummock Beach: two northern end properties are grandfathered, therefore CSRM project footprint in front of the properties may encroach into CBRA unit.
3. North Bowers Beach: no CBRA system unit impacts.
4. South Bowers Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
5. Slaughter Beach: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only.
6. Prime Hook: CSRM footprint design has been reduced to avoid encroachment on CBRA system unit at southern end with exception of the berm taper only. At the northern end of Prime

Hook Beach, the CSRM design plan will tie into the existing Prime Hook National Wildlife Refuge project located within a CBRA system unit (see attached email correspondence from Al Rizzo, refuge manager).

7. Lewes Beach: no CBRA system unit impacts.

For all CSRM project locations cited above, USACE assumes berm tapers may enter CBRA system units as their function is not to provide coastal storm risk management for the structures located directly behind them but to tie into and support the CSRM function of the berm and dune project ends that would occur outside of the system units.

If you have any questions, please don't hesitate to call or email me or Scott Sanderson (x6571).

Barb Conlin
Environmental Resources Branch
Philadelphia District
215.656.6557

-----Original Message-----
From: Conlin, Barbara E CIV USARMY CENAP (US)
Sent: Tuesday, April 25, 2017 12:06 PM
To: 'Clark, Trevor' <trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> <mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> > >
Cc: 'Chris Guy' <chris_guy@fws.gov <mailto:chris_guy@fws.gov> <mailto:chris_guy@fws.gov> > >; 'Genevieve LaRouche' <genevieve_larouche@fws.gov <mailto:genevieve_larouche@fws.gov> <mailto:genevieve_larouche@fws.gov <mailto:genevieve_larouche@fws.gov> > >; Sanderson, Scott A CIV USARMY CENAP (US) <Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> <mailto:Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> > >; 'Julie Thompson' <julie_thompson@fws.gov <mailto:julie_thompson@fws.gov> <mailto:julie_thompson@fws.gov <mailto:julie_thompson@fws.gov> > >; Falvey, Patrick T CIV USARMY CENAP (US) <Patrick.T.Falvey@usace.army.mil <mailto:Patrick.T.Falvey@usace.army.mil> <mailto:Patrick.T.Falvey@usace.army.mil <mailto:Patrick.T.Falvey@usace.army.mil> > >; Hampson, Robert W CIV USARMY CENAP (US) <Robert.W.Hampson@usace.army.mil <mailto:Robert.W.Hampson@usace.army.mil> <mailto:Robert.W.Hampson@usace.army.mil <mailto:Robert.W.Hampson@usace.army.mil> > >; 'Rizzo, Al' <al_rizzo@fws.gov <mailto:al_rizzo@fws.gov> <mailto:al_rizzo@fws.gov <mailto:al_rizzo@fws.gov> > >
Subject: Delaware Beneficial Use of Dredged Material for the Delaware River Project

Hi Trever,

I just wanted to clarify that your Regional CBRA Coordination folks are on board with our proposed plan as outlined in my 24 April email citing the CBRA avoidance areas (north end of Kitts Hummock is acceptable); tapers are acceptable; and USFWS and USACE beach projects adjoining at the southern end of Prime Hook NWR in CBRA units.

Thanks,
Barb Conlin

-----Original Message-----
From: Conlin, Barbara E CIV USARMY CENAP (US)
Sent: Tuesday, April 25, 2017 11:59 AM
To: 'Clark, Trevor' <trevor_clark@fws.gov <mailto:trevor_clark@fws.gov>
<mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> > >
Cc: Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov>
<mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > >; Genevieve LaRouche
<genevieve_larouche@fws.gov <mailto:genevieve_larouche@fws.gov>
<mailto:genevieve_larouche@fws.gov <mailto:genevieve_larouche@fws.gov> > >; Sanderson, Scott A
CIV USARMY CENAP (US) <Scott.A.Sanderson@usace.army.mil
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<mailto:Scott.A.Sanderson@usace.army.mil> > >; Julie Thompson <julie_thompson@fws.gov
<mailto:julie_thompson@fws.gov> <mailto:julie_thompson@fws.gov
<mailto:julie_thompson@fws.gov> > >; Falvey, Patrick T CIV USARMY CENAP (US)
<Patrick.T.Falvey@usace.army.mil <mailto:Patrick.T.Falvey@usace.army.mil>
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Robert W CIV USARMY CENAP (US) <Robert.W.Hampson@usace.army.mil
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<mailto:Robert.W.Hampson@usace.army.mil> > >; Rizzo, Al <al_rizzo@fws.gov
<mailto:al_rizzo@fws.gov> <mailto:al_rizzo@fws.gov <mailto:al_rizzo@fws.gov> > >
Subject: RE: [Non-DoD Source] Re: Delaware Beneficial Use of Dredged Material for the
Delaware River Project

Hi Trevor,

I wanted to confirm that this has been coordinated with Cindy Bohn or other within
your Northeast Region CBRA Coordinator? This question is coming from our HQ USACE.
Thanks,
Barb Conlin

-----Original Message-----
From: Clark, Trevor [mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov>]
Sent: Monday, April 24, 2017 3:38 PM
To: Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil
<mailto:Barbara.E.Conlin@usace.army.mil> <mailto:Barbara.E.Conlin@usace.army.mil
<mailto:Barbara.E.Conlin@usace.army.mil> > >
Cc: Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov>
<mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > >; Genevieve LaRouche
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<mailto:julie_thompson@fws.gov> > >; Falvey, Patrick T CIV USARMY CENAP (US)

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Subject: [Non-DoD Source] Re: Delaware Beneficial Use of Dredged Material for the
Delaware River Project

Hi Barb,

At Kitts Hummock, it is okay to conduct beach nourishment in front of the one pre-CBRA building and the northernmost property where the building has been demolished. If a building is constructed on the northernmost property where the building has been demolished, we will have to reevaluate the Kitts Hummock portion of this project. Thanks Barb.

On Fri, Apr 21, 2017 at 6:42 AM, Conlin, Barbara E CIV USARMY CENAP (US)
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<mailto:Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> > > > wrote:

Hi Trevor and Chris,

This email message responds to USFWS' 22 March and 14 April emails and our recent telephone conversation (4 April) with you and the USFWS' Northeast CBRA Regional Coordinator Cindy Bohn regarding the CBRA coordination we have been conducting for the Delaware DMU project.

Although USACE believes that the proposed plan to pump high quality sand on bay beaches to provide a natural stabilization system meets the three purposes of CBRA (i.e. minimizes the loss of human life, wasteful expenditure of federal revenues, and damage to fish and wildlife) USACE recognizes USFWS' concern regarding possible encouragement of development in coastal areas. Consequently, USACE will avoid CBRA system units as we continue to optimize our berm and dune design plans at the following locations you identified in your email:

- Southern end of Pickering Beach
- Northern end of Kitts Hummock Beach
- Southern end of Slaughter Beach
- Southern end of Prime Hook Beach

Regarding the northern end of Kitts Hummock Beach, USACE acknowledges USFWS' 14 April email that the dune and berm footprint may extend in front of the two northernmost properties at Kitts Hummock Beach located within the CBRA System Unit because these structures pre-date

establishment of the CBRA System Unit. However, based on a recent discovery that the structure on the northernmost of the two aforementioned properties was recently demolished, it is USACE's understanding that USFWS is currently re-evaluating the position stated in the 14 April email to determine the total extent that the dune and berm footprint may extend into the CBRA System Unit.

Regarding the northern end of Prime Hook Beach that USFWS originally identified as an area to avoid a CBRA system unit, USFWS stated in our 4 April telephone conversation that there is value in the USACE beach and dune design tying into the existing USFWS Prime Hook National Refuge beachfill project; therefore, you indicated that the USACE dune and berm project may enter CBRA System Unit H00. Due to the fact that the Refuge's beachfill project was specifically designed to restore fish and wildlife habitat, the USACE beach berm and dune project will support this intended purpose of the Refuge's objectives as it will enter into the system unit approximately 850 feet and conjoin directly with the Refuge's beachfill project. A natural connection and transition between the USACE and Refuge projects will help bolster the overall success of the Refuge project.

Lastly, USACE appreciates USFWS' position that the berm tapers may encroach into the CBRA System Units at each of the beach locations in the recommended plan as their function is not to provide coastal storm risk management (CSRM) for the structures located directly behind them but to tie into and support the CSRM function of the berm and dune project ends that would occur outside of the System Units.

If you have any questions, please don't hesitate to contact me.

Barb Conlin
Marine Ecologist
U.S. Army Corps of Engineers
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-----Original Message-----
From: Clark, Trevor [mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> <mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> >]
Sent: Friday, April 14, 2017 9:13 AM
To: Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> <mailto:Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> > <mailto:Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> <mailto:Barbara.E.Conlin@usace.army.mil <mailto:Barbara.E.Conlin@usace.army.mil> > > >; Sanderson, Scott A CIV USARMY CENAP (US) <Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> <mailto:Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> > <mailto:Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> <mailto:Scott.A.Sanderson@usace.army.mil <mailto:Scott.A.Sanderson@usace.army.mil> > > >
Cc: Chris Guy <chris_guy@fws.gov <mailto:chris_guy@fws.gov> <mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > <mailto:chris_guy@fws.gov <mailto:chris_guy@fws.gov> > >; Julie Thompson <julie_thompson@fws.gov <mailto:julie_thompson@fws.gov> <mailto:julie_thompson@fws.gov

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Subject: [Non-DoD Source] Delaware Beneficial Use of Dredged Material for the Delaware River Project

Hi Barb and Scott,

The buildings at Kitts Hummock both pre-date the CBRS unit. It is okay to conduct beach nourishment in front of these two pre-CBRA buildings. However, this type of decision will always be on a case-by-case basis.

The Slaughter Beach and Pickering Beach segments of this proposed project should be pulled back to the greatest extent possible or document that the Corps is not providing these buildings with flood control and that the encroachment into the CBRS zone will only be done when it is necessary to stabilize the dunes on the adjacent area outside of the CBRS unit.
Thanks Barb and Scott.

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-----Original Message-----
From: Clark, Trevor [mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov>
<mailto:trevor_clark@fws.gov <mailto:trevor_clark@fws.gov> >]
Sent: Wednesday, March 22, 2017 9:39 AM
To: Conlin, Barbara E CIV USARMY CENAP (US) <Barbara.E.Conlin@usace.army.mil
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<mailto:Barbara.E.Conlin@usace.army.mil> <mailto:Barbara.E.Conlin@usace.army.mil
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Subject: [EXTERNAL] Delaware Beneficial Use of Dredged Material for the Delaware River Project

Hi Barb and Scott,

This email message is in response to your February 10, 2017 letter regarding the Delaware Beneficial Use of Dredged Material for the Delaware River Project.

The CBRA seeks to save taxpayers' money, keep people out of harm's way, and remove Federal incentives to develop coastal barriers by restricting most new Federal expenditures and financial assistance (e.g., beach nourishment, disaster assistance, flood insurance, loans, and grants) that can encourage the development and redevelopment of coastal barriers.

The exception to the CBRA for nonstructural projects for shoreline stabilization that are designed to mimic, enhance, or restore a natural stabilization system (16 U.S.C. 3503(a)(6)(G) also requires that the project be consistent with each of the three purposes of the CBRA, which are to minimize the loss of human life; wasteful expenditure of federal revenues; and the damage to fish, wildlife, and other natural resources associated with coastal barriers. The objective of this proposed project is to beneficially use high quality sand material dredged from the Delaware River main navigation channel in the lower bay to reduce flooding, erosion, and storm damage risks in coastal areas affected by Hurricane Sandy. This project is consistent with the purposes of the CBRA when conducted in front of the small communities that pre-date the CBRS units and are excluded from the CBRS. In these areas, only the beachfront and not the upland coastal barrier areas are within the CBRS. However, this project would not be consistent with the purposes of CBRA if it is conducted in front of developed coastal barrier upland areas that are designated within the CBRS. The very existence of a beach nourishment project can encourage more development in coastal areas (Dean 1999).

The last sentence in the first paragraph on page 5 of the Corps' February 10, 2017, letter states "The Corps anticipates that the design plans may be modified slightly during the optimization process; and the Corps will evaluate practicable opportunities to minimize those sections of the berm/dune footprint that enter into System Units, while maintaining the integrity of the shoreline stabilization and protection objective." The Service advises that the Corps avoid constructing the berm/dune footprint within the CBRS System Units at the following Delaware bayshore community project sites: the southern end of Pickering Beach, DE, the northern end of Kitts Hummock, DE; the southern end of Slaughter Beach, DE and Prime Hook Beach, DE. The attached maps of the project area have been annotated to note areas where beach nourishment would be inconsistent with the purposes of the CBRA. The CBRS System Units at these four project sites need to be avoided in order to meet the exception.

Please contact us if you have any questions. Thanks

--

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From: rh_eh
To: Sanderson, Scott A CIV USARMY CENAP (US)
Subject: [Non-DoD Source] Info
Date: Monday, May 15, 2017 3:31:32 PM
Attachments: Benefits and Costs 2012 Delaware options.pdf

Hello - Thanks for taking the time to discuss PHB and the ongoing beneficial reuse project.

Here is a link which includes Atkins Global study results discussed earlier:
Blockedhttps://www.fws.gov/hurricane/sandy/pdf/PrimeHookEA_Appendix.pdf
The report was submitted to USACE in November 2014 under contract # W9128F-09-D-0041, Task order # CK01.

Part of the Atkins Global work was to model predicted changes in nearshore and borrow area energy transport. The conclusions are on page 20, section 5.7. Tables of results immediately follow the conclusion for various wind and wave scenarios. The appendix was dated February 2015 and includes calculations relating to the Sandy storm as representative of a significant event.

The conclusions of interest here are on page 22, section 5.7. Tables of results immediately follow and consider various scenarios. It was clearly concluded that the dredging had no significant change to the computed pre-dredging nearshore energy transport and so on the erosion of the bayshore. There is no apparent resilience benefit to Prime Hook or Fowler beaches by replacing the 1.1M cy of sand removed for the Fowler restoration, contrary to my previous recollections. However, there may well be a project cost reduction by placing dredge spoils back into the borrow area rather than on Prime Hook beach. Environmental studies already completed concerning the borrow area might also largely remain valid.

Here are some observations and commentaries with a few questions...no reply is necessary.

The seasonal input tables and graphics show significant percentage changes in some the transport energy given the wind and wave directions used for the simulations, particularly at the borrow area. Using the annual conditions, the actual overall energy level is very small compared to storm event levels such as occurred with Sandy. While Sandy was a good choice for a representative storm analysis at the time, the Jan 2016 storm (Jonah) caused different damages than Sandy and occurred after the Fowler beach restoration was substantially completed. Using Jonah data inputs should make the overall results more accurate than when the Fowler breaches were open.

Is either storm representative of a near worst case (30, 50 or 100 year storm conditions) of expected wind and wave conditions and water levels? The Jan. 2016 Jonah storm water level equaled the 1962 storm all time record when measured at Lewes, according to NOAA Lewes tidal gauge data. Sandy also had different wind conditions and directions which changed during the storm; this possibly spared the bayfront but contributed to flooding on the marsh side.

Total flood damages over time have significant dependence on extreme storm conditions. This is very true for a stable beach such as Prime Hook, which has no history at all of public sand placement to correct erosion, according to the ASBPA information, and documented land records extending into the 1800s. But, privately funded sand replenishment has been done at the north end of PHB and 20,000 cy were placed after the 1962 storm. Many of the southern bayfront properties are above the long term flood elevations and have remained undamaged by inundation for decades and more. But, if long term beach erosion is also modeled and it incorrectly predicts erosion (or accretion) of the shoreline, it will incorrectly increase the predicted damages from inundation. By direct observation and reference to ~1980 photos, dunes were much lower (and wider) than today. But, no inundation damage has been sustained at our location since 1968.

Comments noted.

Appendix F – Value Engineering Study

US Army Corps of Engineers®

Philadelphia District



Villas NJ, November 2012

Value Engineering Study

Beneficial Use of Dredged Material

For the Delaware River

In New Jersey & Delaware

By the US Army Corps of Engineers, Philadelphia District

16 March 2016

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1 Executive Summary

A Value Engineering (VE) Study was conducted at the Philadelphia District Office of the US Army Corps of Engineers on 29 February – 8 March 2016 to examine flood risk management (FRM) in 19 communities in New Jersey and Delaware being considered to receive dredged material from the Delaware River Navigation Channel and designated unconfined and confined disposal facilities to address flood risk management (FRM) opportunities. The VE team was comprised of Philadelphia District (NAP) employees and William Easley, USACE-RAO. The VE team employed the VE study methodology outlined in sections 3.3 and 3.4 of this report. This involved the integration of planning criteria along with the 6 step VE job plan to evaluate site alternatives prior to the selection of the Tentatively Selected Plan (TSP).

The VE team has produced evaluations of 19 site alternatives and formulation comments and concerns regarding the overall planning studies. The 19 sites were evaluated based on Acceptability, Efficiency, and Effectiveness in accordance with USACE planning guidance expressed in the Planning Guidance Notebook and Corps Planning Manual, as well as SMART planning guidance. The projects were not rated numerically, but ranked according to whether their ability to meet the specific criteria was High, Medium or Low (Section 3.3).

Section 2.1 outlines the recommendations of the VE team regarding the 19 site alternatives presented by the PDT. Three site alternatives appear to have potentially acceptable Benefit Cost Ratios (BCRs) of ≥1.0 and are recommended for further consideration by the Project Development Team (PDT). Four site alternatives potentially have BCRs ≈ 1.0, but lacked sufficient information for the VE team to determine whether further investigation is warranted. Eleven site alternatives potentially have BCRs ≤ 1.0, as well as constructability issues, lack of Federal interest, or anticipated lack of public acceptance, and therefore are not recommended for further consideration by the PDT. The one remaining site alternative of Lewes Beach, DE was not examined due to lack of information.

The VE team also developed 24 comments and an examination of the economic viability of groins in concert with proposed beach fills in the Delaware Bay.

In conclusion, the VE team was able to evaluate 18 of the 19 site alternatives and recommends 7 of the 19 alternative sites continue to be evaluated, and 11 alternatives be removed from further consideration for the study.
After consideration of the economic viability of groins and terminal jetties in concert with beach fills, the VE Team determined that groins and/or terminal jetties should be removed from consideration for all beachfill alternatives in the Delaware Bay.
The VE Team also determined that restriction of use of dredged material for FRM projects limited the number of viable projects and missed opportunities for successful use of dredged materials. There is need for a systemic approach to regional sediment management that is not currently available within the combination of existing authorizations. The VE Team recommends the removal of the study from the PL 113-2 (Hurricane Sandy) authorization, which requires a focus on FRM, in order to address regional sediment management goals and capitalize on other opportunities, such as ecosystem restoration. See Comment 7 in Section 4.16 for further information.

2 Summary of Results

The VE study produced two products: site **alternative evaluations** and formulation **comments**:

- Evaluations of 19 proposed site alternatives for use of dredged material in FRM projects were performed. The proposed projects under consideration were either earthen levees or beachfills in NJ or DE. The VE team findings are summarized in the table below and individual evaluations are in Section 4 of this report. Explanation of the evaluation criteria, Acceptability, Efficiency and Effectiveness can be found in Section 3.4.
- The VE Team also developed formulation comments regarding issues and concerns that affect the overall study and apply to all the site alternatives. These suggestions can also be found in Section 4.16 of the report.

The alternatives shaded yellow and orange in the table below are recommended for further investigation in preparation for the Tentatively Selected Plan (TSP). The alternatives shaded yellow present the highest probability of viability. The alternatives shaded orange lacked sufficient information for the VE Team to determine whether further investigation is warranted and should therefore continue to be evaluated by the PDT. The alternatives shaded red were found by the VE team to be unacceptable for reasons of constructability, lack of Federal interest, or BCRs which were highly likely to be <1. The alternative shaded blue was not evaluated by the VE team because the site location has not been finalized.

2.1 Table Summary of Alternatives DMU FRM VE Study

Site	Site ID	Acceptability	Efficiency	Effectiveness	Average
Prime Hook*	D17	High	High	High	**High**
Slaughter Beach*	D14	High	High	High	**High**
Villas*	N33	High	Low	High	**Medium**
Kitts Hummock*	D10	High	High	Low	**Medium**
Pickering Beach*	D9	High	Medium	Low	**Medium**
Bowers Beach*	D11	High	Medium	Low	**Medium**
South Bowers*	D12	High	Medium	Low	**Medium**
Penn's Grove Pennsville	N15/N17	Low	Low	Medium	**Low**
New Castle	D2	Low	Low	Medium	**Low**
Woodland Beach	D6	Low	Low	Low	**Low**
Augustine Beach	D4	Not ranked because BCR is highly likely to be <1			**N/A**
Bayview Beach	D5	Not ranked because beach runs along a gated community			**N/A**
Big Stone Beach	D13	Not ranked because BCR is highly likely to be <1			**N/A**
Commercial Township	N25,N26, N27, N28	Not ranked because BCR is highly likely to be <1			**N/A**
Lewes	D18	Not ranked because site location is not finalized			**Not Reviewed**

**Alternatives are recommended for continued investigation in this study.*

3 DMU Planning Studies Background

The VE study examined the Beneficial Use of Dredged Material for the Delaware River in New Jersey & Delaware (DMU) feasibility studies which were originally authorized for reconnaissance phase and any ensuing feasibility phase investigations by a resolution of the Committee on Environment and Public Works of the United States Senate on October 26, 2005. The resolution directed USACE to conduct an investigation of beneficial uses of dredged material within the Delaware River and Estuary area.

In the aftermath of Hurricane Sandy (October 2012) and the subsequent passage of the Disaster Relief Appropriations Act, 2013 (PL 113-2), Congress authorized supplemental appropriations to Federal agencies for expenses related to the consequences of Hurricane Sandy. Chapter 4 of PL 113-2 identifies those actions directed by Congress specific to the U.S. Army Corps of Engineers (USACE), including preparation of two interim reports to Congress, a project performance evaluation report, and a comprehensive study to address the flood risks of vulnerable coastal populations in areas affected by Hurricane Sandy within the boundaries of the North Atlantic Division of USACE. Specifically, the Second Interim Report to Congress (dated 30 May 2013) identified existing USACE projects and studies for reducing flooding and storm damage risks in the area affected by Hurricane Sandy. The New Jersey DMU study was identified in the Second Interim Report, thereby placing additional emphasis on flood risk management (FRM).

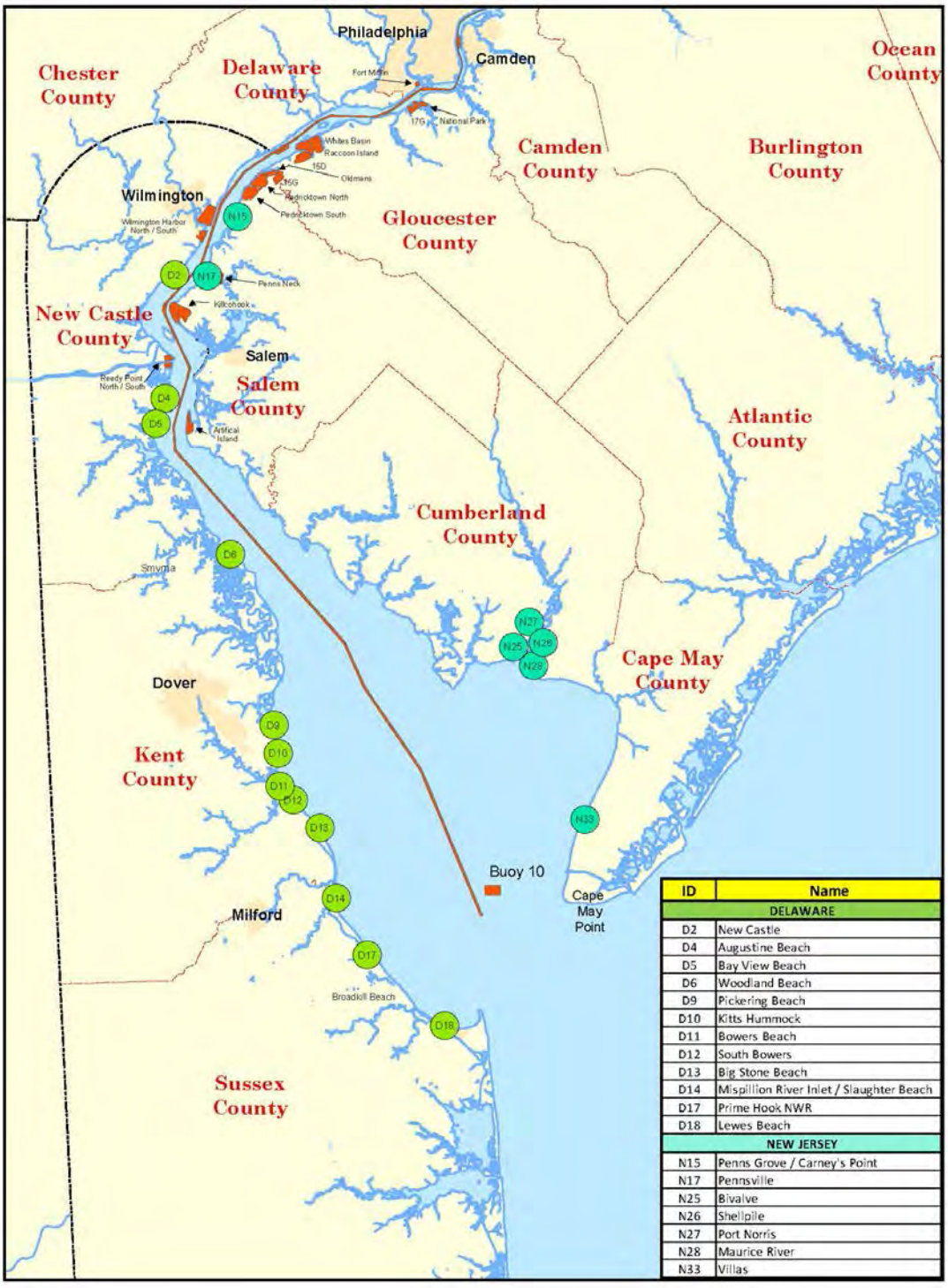
The VE team relied on problems, goals, and objectives from the draft feasibility reports to guide discussion, comments, and recommendations. These draft feasibility reports identify *"storm surge and elevated water levels from coastal storm events, combined with tidal fluctuation, surface runoff, shoreline erosion, and sea-level change causing flood-related damages to the bay shore and flood-prone urban areas along the Delaware River/Bay shoreline of New Jersey and Delaware"* as a problem. The draft feasibility reports outline the following objectives to meet the goal of *"improving Flood Risk Management for the bayshore and flood prone communities along and adjacent to the Delaware River/Bay portion of" both the New Jersey and Delaware shorelines*:

1. *Reduce flood-related impacts to people, property and infrastructure along and adjacent to the Delaware River/Bay shoreline of New Jersey and Delaware from 2020 to 2070, via the beneficial use of dredged material.*

2. *Increase the resiliency of coastal New Jersey and Delaware, specifically along the Delaware River/Bay shoreline, via the beneficial use of dredged material.*

The feasibility studies are currently considering 19 site alternatives in both New Jersey and Delaware, listed in (Section 2.1) and shown in the Site Map (Section 3.2).

3.1 Delaware River Dredged Management Utilization (DRDMU) Site Map



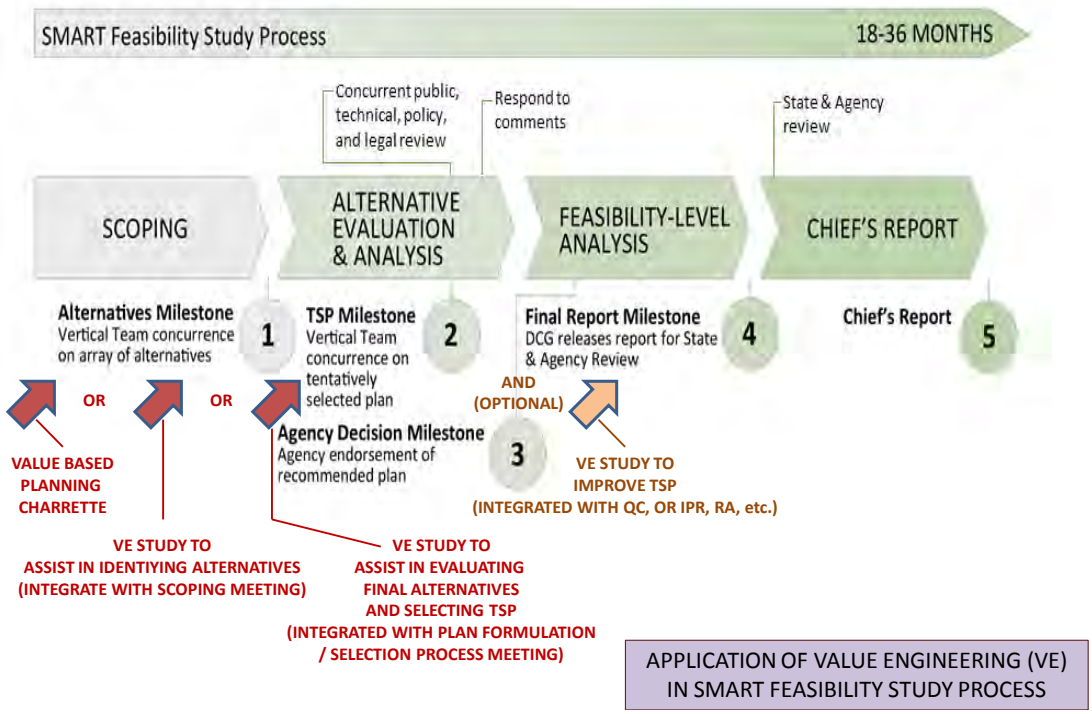
ID	Name
DELAWARE	
D2	New Castle
D4	Augustine Beach
D5	Bay View Beach
D6	Woodland Beach
D9	Pickering Beach
D10	Kitts Hummock
D11	Bowers Beach
D12	South Bowers
D13	Big Stone Beach
D14	Mispillion River Inlet / Slaughter Beach
D17	Prime Hook NWR
D18	Lewes Beach
NEW JERSEY	
N15	Penns Grove / Carney's Point
N17	Pennsville
N25	Bivalve
N26	Shellpile
N27	Port Norris
N28	Maurice River
N33	Villas

Alternatives under Consideration during DMU VE Study 29 Feb 16

3.2 Value Engineering in SMART Planning

The VE job plan has similarities and overlapping processes with planning activities. As such, the opportunity exists to combine VE and planning functions into integrated activities.

In this case, the VE job plan was modified to address these planning needs. This was accomplished by evaluating the preselected 19 alternatives. This 'blended' approach enhanced both VE and the planning process. It is hoped that this VE effort expedited the planning process itself. The PM and VEO opted to perform the VE study to Assist in Evaluating Alternatives and Selecting TSP (see figure below). VE application at this stage assured inclusion of possible new alternatives and enhancements to those already identified; and the VE job plan was tailored to the plan formulation/selection needs.



APPLICATION OF VALUE ENGINEERING (VE) IN SMART FEASIBILITY STUDY PROCESS

This VE Study performed between Nodes 1 & 2

3.3 Value Engineering Job Plan

The VE Team employed the VE study methodology (Appendix D). This involved the Information Phase, Function Analysis (Appendix C), Creative Phase, Evaluation Phase, Development Phase, and Presentation Phase.

During the Information Phase, Several Project Managers from the Planning and Operations Divisions, as well as the Chief of Geotechnical Engineering Section briefed the VE Team on the scope of work for the projects, including history and project constraints. Appendix B is an attendance list for the briefing and the study. The project managers were available during the entire study to assist the team. In considering the proposed site alternatives, the scope of the VE study included several sources of information, including:

Information Considered During Study		
Source	**Item**	**Purpose/Description**
VE Team	Google Maps/Streetview	Type, Density & Elevation of Structures
VE Team	Google Maps	Alignment Orientation relative to other features
VE Team	Google Earth(kml)	Historic Views/Erosion & Accretion Patterns--Alignment
Economics PDT Member	Economic Analysis	Structure Count & Tax Value for Structures and Contents
Hydrology &Hydraulics PDT Member	Topography/Bathymetry	Alignments/Cross Sections
Geotechnical Engineering Section	Background	Informed discussion of dredged material utilization
Operations Division	Dredging History & Material Sources	Confined Disposal Facility (CDF) locations/materials Anticipated maintenance dredging volumes
VE Team	Videos/News Articles	Review flooding severity/frequency (e.g. Hurricane Sandy)
VE Team	DE Flood Monitoring System	http://coastal-flood.udel.edu/ Establish inundation sources and assess vulnerability.
VE Team	Feasibility Report	Villas NJ Ecosystem Restoration, 1999
VE Team	Reconnaissance Report	Delaware Bay Coastline – NJ & DE, 1991

VE Team	NJ & DE DMUs Draft Feasibility Report	Authorization text; Opportunity & Problem statements
VE Team	Delaware River Comprehensive Draft Feasibility Report	Informed VE Team on planning & evaluation criteria
Project Manager	50 Year Beach Maintenance, DE	Past beachfill maintenance history 1958-present
VE Team	EBS Archives	Past projects awarded by NAP
Civil Engineering PDT	Beachfill Quantities	
Cost Engineering PDT	Beachfill Estimates	

VE focuses on project functions rather than features. During the Function Analysis Phase, the VE Team developed a list of random functions, which were organized into a Function Analysis System Technique (FAST) showing the relationship between critical project functions and a FAST diagram was developed (see Appendix C).

Function Analysis flowed into the Creativity Phase, during which the team engaged in free-form brainstorming, resulting in the Speculation List in Appendix D. The VE study produced 2 results:

- **Site Alternatives** presented by the Planning PDT: The PDT is in the process of considering 19 alternative locations in NJ & DE that may benefit from the beneficial use of dredged material. During the Development Phase, the VE Team examined each of these sites currently under consideration to become part of the Tentatively Selected Plan (TSP), and presented recommendations below.

- **Formulation Comments** that address various formulation and design concerns related to operations, future maintenance, ways to reduce project costs or improve the dredging, levee or beach fill projects, etc. During the Evaluation Phase, the VE Team screened the Speculation List to decide which ideas were pertinent to future design. The viable comments, marked C in Appendix D, and the rejected ideas marked X in the same Appendix, are explained in this report.

Understanding the need to combine the VE and planning processes, the VE Team developed a screening process to evaluate each of the 19 site alternatives proposed by the Philadelphia District based on Acceptability, Efficiency, and Effectiveness in accordance with USACE planning guidance expressed in the Planning Guidance Notebook and Corps Planning Manual, as well as SMART planning guidance. Planning guidance also requires consideration of Completeness of each alternative. The VE Team had insufficient information to assess Completeness and deferred determination of Completeness to the PDT.

- **Acceptability** is defined as “the workability and viability of the alternative plan with respect to acceptance by State and local entities, and the public, and compatibility with existing laws, regulations, and public policies.”
- **Efficiency** is defined as “the extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation’s environment.”
  The VE process is too accelerated to do a comprehensive analysis such as that normally performed by the Economics Branch. Efficiency was loosely judged on what the project would be protecting versus the relative expense of what would be required to adequately provide some risk reduction against flooding. Several projects were rated lower than others because raising dunes with beach fill was not enough when the communities were also at risk from the inland side due to riverine or marsh side flooding. Section 3.5 contains cost and benefit information that was available to the VE Team.
- **Effectiveness** is defined as “the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.”
- **Completeness (Deferred to PDT)** is defined as “the extent to which a given alternative plan provides and accounts for all necessary investments of other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions of the objective.”

The projects were not rated numerically, but ranked according to whether their ability to meet the specific criteria was High, Medium or Low.

3.4 Costs and Benefits

3.4.1 Costs

Costs for three beachfill alternative sites for the Reach E and Buoy 10 sources were provided to the VE Team: These costs are parametric and do not include periodic nourishment.

Initial Construction Cost Estimates March 2016 Reach E Source						
Location	**Mobilization* (1)**	**Quantity (CY)**	**$/CY**	**Dredging & Beachfill (2)**	**Design/CM (3)**	**Total (1+2+3)**
Prime Hook Beach	$5,207,152	114,341	34	$5,119,275	$1,087,349	$11,413,777
Bowers 1 Beach	$5,455,823	53,797	36	$2,544,975	$795,657	$8,796,455
Bowers 2 Beach**	$5,581,013	63,352	38	$3,169,944	$813,233	$9,564,190
Slaughter Beach	$5,474,755	172,206	38	$8,428,623	$1,125,717	$15,029,094
Slaughter 2 Beach**	$5,474,755	74,358	39	$3,797,984	$838,622	$10,111,361
Villas	$5,515,034	265,000	38	$13,087,555	$1,485,558	$20,088,147
Initial Construction Cost Estimates March 2016 Buoy 10 Source						
Location	**Mobilization* (1)**	**Quantity (CY)**	**$/CY**	**Dredging & Beachfill (2)**	**Design/CM (3)**	**Total (1+2+3)**
Prime Hook Beach	$5,207,153	114,341	24	$3,539,197	$842,535	$9,588,885
Bowers 1 Beach	$5,455,823	53,797	44	$3,064,600	$809,333	$9,402,285
Bowers 2 Beach**	$5,581,013	63,352	44	$3,592,439	$829,301	$9,948,016
Slaughter Beach	$5,474,755	172,206	26	$5,793,699	$920,715	$12,189,168
Slaughter 2 Beach**	$5,474,755	74,358	28	$2,660,232	$795,657	$8,930,644
Villas	$5,515,034	265,000	22	$7,734,025	$1,070,242	$14,319,301

**Mobilization costs are all similar, $/cy ranges from $22/yd in Villas NJ to $44/yd in Bowers Beach DE.*

***Multiple beach estimates reflect uncertainty of existing conditions and optimal beachfill design template.*

3.4.2 Benefits

Benefits were provided to the VE Team:

100 year Structure & Content Tax Value	
Penn's Grove/Carneys Point	$298,438,412
Pennsville	$622,060,811
Bivalve/Shellpile	$10,503,644
Port Norris	$13,218,757
Maurice River	$3,028,881
Villas	$110,214,865
New Castle	$43,495,648
Augustine Beach	$8,069,352
Bay View Beach	$9,814,077
Woodland Beach	$13,739,708
Lewes Beach	$39,892,191
New Castle	$10,520,665
Augustine Beach	$11,209,525
Bay View Beach	$12,502,376
Woodland Beach	$8,942,433
Lewes Beach	$1,720,402
Slaughter Beach	$66,764,429
Prime Hook Beach	$36,080,493

This table provides the tax value for both the structures and content of buildings that could be affected by a 100 year (1% Annual Chance of Exceedence) storm event. The VE Team used this as a rough guide to estimating the benefit pools for the various site alternatives. However, the BCRs developed by the PDT will use depreciated replacement value, which is different from the tax values listed above. Therefore, all of the BCRs estimated by the VE Team should be interpreted as rough estimations.

4 Study Results

4.1 N15/17 Penn's Grove/Carneys Point & Pennsville, NJ (Proposed Levees)

Planning Criteria Score: Low

Acceptability: Low

- During the information phase, it was determined that USACE does not commonly support the use of dredged material for levee construction.
- The VE team was uncertain about how much dredged material is needed to qualify as dredged material utilization. If too little is used would the project be acceptable to the cost sharing partners?
- Material would either have to be placed in the Delaware River or on occupied real-estate, which would involve buyout and demolition, thereby lowering benefits and increasing costs.
- Placing levee on occupied real-estate would involve temporarily removing existing armoring and replacing it after levee construction.

Efficiency: Low

- Anticipation of high cost of levee construction offsets large benefit pool, potentially realizing low efficiency.
- Rough estimates of BCR indicates potential to be ≥ 1.0, and could be further assessed to clarify BCR using a different source material.
- Silt, sand and organic soil comprise the bulk of dredged material available for use. This material is unsuitable for levee construction without improvement of material and additional imported impervious fill for core.

Effectiveness: Medium

- The specified FRM problem would be better addressed by building a levee to Corps standards.
- Given pervious nature of available dredged material, fill required by levee construction can only be partially supplied by dredged material. Levee core and possibly other sections would need to come from elsewhere, or be improved dredged material (e.g. soil mixing). The specified opportunity of DMU would not be well addressed, due to limited/no use of dredged material.

Other:

- Killcohook Combined Disposal Facility (CDF) is a convenient source of dredged materials.
- Pennsville and Penn's Grove are geographically close and have similar existing conditions, and it is recommended that they be combined in any future investigation.

Conclusion: The VE team does not recommend Penn's Grove and Pennsville sites be further considered in this study, because, in general, the Corps does not accept levee construction as a viable use of dredged materials

4.2 N25-28 Bivalve/Shellpile/Port Norris/Maurice River, NJ (Proposed Levees)

Planning Criteria Score: N/A – not ranked b/c of low BCR

Acceptability: N/A

- During the information phase, it was determined that USACE does not commonly support the use of dredged material for levee construction.
- The VE team was uncertain about how much dredged material is needed to qualify as dredged material utilization. If too little is used would the project be acceptable to the cost sharing partners?
- In Bivalve and Shellpile, material would either have to be placed in river or occupied real-estate, which would involve buyout and demolition, lowering benefits and increasing costs.
- The community in Commercial Township might not have the resources necessary to maintain the closures that would be necessary due to road crossings.

Efficiency: N/A

- Closest source of dredged material is Artificial Island, which would involve significant hauling costs.
- Rough estimate of BCR indicates potential to be < 1.0, but could be further assessed to address retreat of marsh under ecosystem restoration.
- Silt, sand and organic soil comprise the bulk of dredged material available for use. This material is unsuitable for levee construction without improvement of material and additional imported impervious fill for core. However, this material has been found to be acceptable for marsh enhancement (thin layer placement).

Effectiveness: N/A

- Many structures abut the Maurice River, which would preclude protection from levees.
- The specified FRM problem would not be better addressed by building a levee to Corps standards.
- The specified opportunity of DMU would not be well addressed, due to limited/no use of dredged material in a potential levee. However this opportunity could be better addressed using dredged material for marsh enhancement.

Conclusion: The team does not recommend the Commercial Township sites be further considered in this study. A levee project would not offer the most effective form of flood risk management in Commercial Township because many structures abut the Maurice River and would not be protected by a levee. If a levee were constructed, it would require multiple road crossings, which would most likely be difficult for the municipality to oversee given the small size of the community. Future flood risk management consideration in Commercial Township could focus on the potential for bulkheads, elevating structures, or non-structural measures under the Delaware Comprehensive or Section 205 CAP authorities. Ecosystem restoration projects could be considered under Section 206 CAP authority.

4.3 N33 Villas Beach, NJ (Proposed Beachfill)

Planning Criteria Score: Medium

Acceptability: High

- High likelihood of acceptance by the State of New Jersey, local entities, and general public.
- Proposed Beachfill project, as best as can be determined with information at-hand, appears to be compatible with existing laws, regulations, and public policies.
- Currently, there is an authorized, but not constructed, Ecosystem Restoration project for Villas.

Efficiency: Low

- Proposed dune and berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- Alternative borrow sources other than Navigation Channel E or Buoy 10 may be more cost-effective. This is based upon review of costs from 1999 Feasibility Report and 2008 LRR.
- High EAD compared to other DMU communities being investigated for potential flood-risk management benefits. BCR appears to be ≥ 1.0.

Effectiveness: High

- No apparent secondary flood inundation sources; therefore a beachfill along the coastline could be highly effective in reducing flood risk at the community.

Other:

- Applicability of using dredge material from Navigation Channel Reach E or Buoy 10 for beachfill is high.
- Unit cost to transport material to Villas from Navigation Channel Reach E or Buoy 10 compares favorably when compared to other communities being evaluated in this study. However, when compared to other potential sources such as the previously authorized Feasibility Borrow Areas, the unit cost to place sand is very high.
- Use of previously authorized sources would require switching construction authority.

Conclusion: The VE team does recommend Villas Beach, NJ site be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.4 D2 New Castle, DE (Proposed Levee Improvements)

Planning Criteria Score: Low

Acceptability: Low

- During the information phase, it was determined that USACE does not commonly support the use of dredged material for levee construction.
- The VE team was uncertain about how much dredged material is needed to qualify as dredged material utilization. If too little is used would the project be acceptable to the cost sharing partners?
- New Castle has historic buildings, so there would likely be a cultural impact.
- Community members might also have concern about a levee blocking residents' view of the river.
- The existing levee was repaired in 2014 at a cost of $8m; replacement of it could seem wasteful.

Efficiency: Low

- Anticipation of high cost of levee construction coupled with minimal increase in benefit pool by raising existing levee from 8' to 12'.
- Silt, sand and organic soil comprise the bulk of dredged material available for use. This material is unsuitable for levee construction without improvement of material and additional imported impervious fill for core.
- An existing levee would need to be removed, which could be costly, especially if the material needs to be disposed of elsewhere. Planning to reuse the material carries to the high risk of the material being found unacceptable for Corps use.
- It is unclear whether utilities would need to be relocated. Depending on the utility, relocation can be expensive to very expensive.

Effectiveness: Medium

- The specified FRM problem would be better addressed by building a levee to Corps standards.
- Given pervious nature of available dredged material, fill required by levee construction can only be partially supplied by dredged material. Levee core and possibly other sections would need to come from elsewhere, or be improved dredged material (e.g. soil mixing). The specified opportunity of DMU would not be well addressed, due to limited/no use of dredged material.

Conclusion: The VE team does not recommend New Castle be further considered in this study, because, in general, the Corps does not accept levee construction as a viable use of dredged materials. FEMA grant programs can be considered as an alternate means of implementing FRM.

4.5 D4 Augustine Beach, DE (Proposed Beachfill)

Planning Criteria Score: N/A

Acceptability:

- Placing beachfill would involve burying existing armoring.

Efficiency:

- Augustine Beach is furthest of all sites from potential borrow sources at Navigation Channel E or Buoy 10.

Effectiveness:

- Existing armoring, groin, and boat ramp contribute to shore stabilization.

Other:

- Beachfill may hamper access to a boat ramp.
- There has been no record of previous beachfill dating back to 1961.
- Augustine Beach is closest to the Philly to Trenton navigation channel.

Conclusion:

Augustine Beach, DE is a community with only 37 structures with minimal potential FRM benefits. It was not evaluated using the Planning Criteria due to the likelihood of having a BCR less than 1.0. Mobilization/demobilization costs ($5m) alone make justifying a FRM project highly unlikely.

4.6 D5 Bayview Beach, DE (Proposed Beachfill)

Planning Criteria Score: N/A

Acceptability: N/A

This is a private beach (http://www.bayviewbeachonline.com/). It was assumed by the VE team that a Federal project would be unacceptable to the residents.

Efficiency: N/A

Effectiveness: N/A

Conclusion: No Federal interest.



Lone Access to Bayview Beach, DE (private Beach)

4.7 D6 Woodland Beach, DE (Proposed Beachfill)

Planning Criteria Score: Low

Acceptability: Low

- Placing beachfill would involve burying existing armoring.

Efficiency: Low

- The developed area includes 63 structures. Best professional judgment based on other recent FRM projects in Philadelphia District indicates that the BCR will be <1.0.
- Existing armoring provides some level of protection against erosion.

Effectiveness: Low

- The developed area has the Delaware River on one side and wetlands (Duck Creek) on three sides. Inundation is projected to occur from the wetlands as well as the river. Any proposed beachfill along Woodland Beach would not address this secondary inundation source.
- Complete FRM would necessarily include a ring structure around the developed areas, which would result in other issues, including lack of economic efficiency.

Other:

- There has been no record of previous beachfill dating back to 1961.

Conclusion:

Woodland Beach, DE is a community with only 63 structures with minimal potential FRM benefits. It was not evaluated using the Planning Criteria due to the likelihood of having a BCR less than 1.0. Mobilization/demobilization costs ($5m) alone make justifying a FRM project highly unlikely.

4.8 D9 Pickering Beach, DE (Proposed Beachfill)

Planning Criteria Score: Medium

Acceptability: High

- Given past beachfills at Pickering in 1962, 1978, 1990, and 2001 it is anticipated that acceptability would be high.
- PDT should determine whether there is a Federal interest in continuing activities accomplished by the state of DE.

Efficiency: Medium

- This project is similarly efficient to other proposed beachfills in lower Delaware Bay, but trends lower than the other beachfills as it is furthest from Lower Reach E and has one of the lowest structure and content values in the lower Delaware Bay portion of the study.
- Proposed dune and berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- Alternative borrow sources other than Navigation Channel E or Buoy 10 may be more cost-effective.

Effectiveness: Low

- Inundation is projected to occur from the wetlands as well as the river. Any proposed beachfill along Pickering Beach would not address this secondary inundation source. The proposed beachfill would do little to prevent flooding associated with heavy rains as the back side of the community faces the Little Creek Wildlife Area and Cattail Gut.

Other:

- The cost/benefit ratio comparing potential initial construction cost of a beachfill of 64,000cy (appx. $9-10m, 12' high Dune, 50' wide Berm) against Tax Value of structures and content of $10.5m is roughly 1.
- Since further economic analysis will consider only depreciated replacement value and not tax value, the initial construction estimate does not include crossovers or dune grass, and maintenance/renourishment is not factored into this consideration, it is unknown whether this project can sustain a positive benefit to cost ratio.
- Since 1990 two beachfills via hydraulic dredge have taken place. In 1990 55,400 cy was placed and in 2001 27,150 cy was placed.

Conclusion: The VE team cannot screen Pickering Beach, DE site in or out with information provided. It is recommended that it be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.9 D10 Kitts Hummock, DE (Proposed Beachfill)

Planning Criteria Score: Medium

Acceptability: High

- Given 12 separate beachfills at Kitts Hummock since 1961, it is anticipated that acceptability would be high.
- PDT should determine whether there is a Federal interest in continuing activities accomplished by the state of DE.

Efficiency: High

- This project is similarly efficient to other proposed beachfills in lower Delaware Bay, but trends lower than the other beachfills in efficiency as it is second furthest from Lower Reach E and has one of the lowest structure and content values in the lower Delaware Bay portion of the study.
- Proposed dune and berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- Alternative borrow sources other than Navigation Channel E or Buoy 10 may be more cost-effective.

Effectiveness: Low

- Inundation is projected to occur from the wetlands as well as the river. Any proposed beachfill along Kitts Hummock would not address this secondary inundation source. The proposed beachfill would do little to prevent flooding associated with heavy rains, as the back side of the community faces the Ted Harvey Conservation Area.

Other:

- The cost/benefit ratio comparing potential initial construction cost of a beachfill of 92,000cy (appx. $10m, 12' high Dune, 50' wide Berm) against Tax Value of structures and content of $11.2m is greater than 1.
- Since further economic analysis will consider only depreciated replacement value and not tax value, the initial construction estimate does not include crossovers or dune grass, and maintenance/renourishment is not factored into this consideration, it is unknown whether this project can sustain a positive benefit to cost ratio.
- Since 1990 six beachfills (one hydraulic dredge, 5 truckfill) have taken place. In 1996 32,850 cy was placed and in 2010 10,000 cy was placed.

Conclusion: The VE team cannot screen Kitts Hummock, DE site in or out with information provided. It is recommended that it be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.10 D11 Bowers Beach, DE (Proposed Beachfill)

Planning Criteria Score: Medium

Acceptability: High

- Given 15 separate beachfills at Bowers Beach since 1962, it is anticipated that acceptability would be high.
- PDT should determine whether there is a Federal interest in continuing activities accomplished by the state of DE.

Efficiency: Medium

- This project is similarly efficient to other proposed beachfills in lower Delaware Bay with a distance from Reach E similar to Prime Hook Beach and Slaughter Beach.
- Proposed dune and berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- Alternative borrow sources other than Navigation Channel E or Buoy 10 may be more cost-effective.

Effectiveness: Low

- The proposed beachfill could provide mitigation of storm damage that would result from higher than normal wave heights and storm surge, but would do little to prevent flooding from subsidence/sea level rise or flooding associated with heavy rains on the back side of the community that faces the Murderkill and St. Jones Rivers.

Other:

- Since 1990 seven beachfills (three hydraulic dredge, 4 truckfill) have taken place. In 1998 46,240 cy was placed and in 2012 13,000 cy was placed.
- Combining this potential project with the immediately adjacent South Bowers Beach may reduce mobilization costs, potentially improving benefit/cost ratios of both beaches.
- The benefit/cost ratio comparing potential initial construction cost of a beachfill of 63,000cy (appx. $10m, 12’ high Dune, 50’ wide Berm) against Tax Value of structures and content of $12.5m is greater than 1.
- Since further economic analysis will consider only depreciated replacement value and not tax value, the initial construction estimate does not include crossovers or dune grass, and maintenance/renourishment is not factored into this consideration, it is unknown whether this project can sustain a positive benefit to cost ratio.

Conclusion: The VE team cannot screen Bowers Beach, DE site in or out with information provided. It is recommended that it be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.11 D12 South Bowers Beach, DE (Proposed Beachfill)

Planning Criteria Score: Medium

Acceptability: High

- Given 12 separate beachfills at Bowers Beach since 1961, it is anticipated that acceptability would be high.

Efficiency: Medium

- This project is similarly efficient to other proposed beachfills in lower Delaware Bay with a distance from Reach E similar to Bowers Beach, Prime Hook Beach and Slaughter Beach.
- The cost/benefit ratio comparing potential initial construction cost of a beachfill of 53,000cy (appx. $10m, 12' high Dune, 50' wide Berm) against Tax Value of structures and content of $8.9m is slightly less than 1.
- Since further economic analysis will consider only depreciated replacement value and not tax value, the initial construction estimate does not include crossovers or dune grass, and maintenance/renourishment is not factored into this consideration, it seems highly unlikely that this project can sustain a positive benefit to cost ratio.

Effectiveness: Low

- A beachfill would provide resistance to damage from bay side water level increase and storm surge, but would not wholly alleviate the problem of FRM as it does not address marsh side flooding. This is of particular concern given that the highest flood risk relates to the floodplains of the Murderkill, which flank Bowers Beach, potentially inundating the town from the marsh side.

Other:

- Since 1990 four beachfills (two hydraulic dredge, 2 truckfill) have taken place. In 1997 7500 cy was placed and in 2012 2,000 cy was placed. Combining this potential project with the immediately adjacent Bowers Beach may reduce mobilization costs, potentially improving benefit/cost ratios of both beaches. The proposed beachfill could provide mitigation of storm damage that would result from higher than normal wave heights and storm surge, but would do little to prevent flooding from subsidence/sea level rise or flooding associated with heavy rains on the back side of the community that faces the Murderkill and St. Jones Rivers. The potential for storm damage from these rivers may be greater than damage from the Delaware Bay.

Conclusion: The VE team cannot screen South Bowers Beach, DE site in or out with information provided. It is recommended that it be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.12 D13 Big Stone Beach, DE (Proposed Beachfill)

Planning Criteria Score: N/A

Acceptability:

- Big Stone Beach had a beachfill in 1962, delivered by truck.

Efficiency:

- Alternative borrow sources other than Navigation Channel E or Buoy 10 may be more cost-effective.

Conclusion: Big Stone Beach, DE is a community with only 14 structures with minimal potential FRM benefits. It was not evaluated using the Planning Criteria due to the likelihood of having a BCR less than 1.0. Mobilization/demobilization costs ($5m) alone make justifying a FRM project highly unlikely.

4.13 D14 Slaughter Beach, DE (Proposed Beachfill)

Planning Criteria Score: High

Acceptability: High

- Given 10 separate beachfills at Slaughter Beach since 1958, it is anticipated that acceptability would be high.
- PDT should determine whether there is a Federal interest in continuing activities accomplished by the state of DE.
- High likelihood of acceptance by the State of Delaware, local entities, and general public.
- Proposed Beachfill project as best can be determined with information at-hand appears to be compatible with existing laws, regulations, and public policies.

Efficiency: High

- Proposed 12 ft. dune with a 50 ft. berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- High EAD compared to other DMU communities being investigated for potential flood-risk management benefits. BCR appears to be ≥ 1.0.

Effectiveness: High

- Beachfill alone may not effectively address flood risk management for the community. The Mispillion River, Mispillion Inlet, Cedar Creek, and Slaughter Creek complex is immediately north of Slaughter Beach and is a potential secondary inundation source. Any proposed beachfill along Slaughter Beach coastline would not address this secondary inundation source.

Other:

- Applicability of using dredge material from Navigation Channel Reach E or Buoy 10 for beachfill is high. Unit cost to transport material to Slaughter Beach from Navigation Channel Reach E or Buoy 10 compares favorably when compared to other communities being evaluated.
- Proposed plan appears to provide and account for all necessary investments needed to address flood risk management at the community.

Conclusion: The VE team does recommend Slaughter Beach, DE site be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.14 D17 Prime Hook Beach, DE (Proposed Beachfill)

Planning Criteria Score: High

Acceptability: High

- Prime Hook Beach had a beachfill in 1962, delivered by truck.
- PDT should determine whether there is a Federal interest in continuing activities accomplished by the state of DE.
- High likelihood of acceptance by the State of Delaware, local entities, and general public.
- Proposed Beachfill project as best can be determined with information at-hand appears to be compatible with existing laws, regulations, and public policies.

Efficiency: High

- Proposed dune and berm template has not been optimized to date, and therefore it may not be the most cost-effective beachfill geometry.
- High EAD compared to other DMU communities being investigated for potential flood-risk management benefits. BCR appears to be greater than 1.0

Effectiveness: High

- Beachfill alone may not effectively address flood risk management for the community. Large water bodies (ponds and marshes) exist "behind" community due to breach to the north at the National Wildlife Refuge. These could pose as a potential secondary inundation sources. Any proposed beachfill along Prime Hook Beach coastline would not address these secondary inundation sources.

Other:

- Applicability of using dredge material from Navigation Channel Reach E or Buoy 10 for beachfill is high. Unit cost to transport material to Prime Hook Beach from Navigation Channel Reach E or Buoy 10 compares favorably well when compared to other communities being evaluated.

Conclusion: The VE team does recommend Prime Hook Beach, DE site be further considered in this study, because, in general, the Corps does accept beachfill construction as a viable use of dredged materials to implement FRM.

4.15 Evaluation of need of Groins/ Terminal Jetties in proposed alternatives

Through the discussion of the various alternative sites, the VE team realized the need to evaluate groins and terminal jetties. To that end, the VE Team considered the economic viability of groins and/or terminal jetties as a possible FRM measure for the communities being investigated. Groins and/or terminal jetties should be considered in addition to beachfill for a given community and not as an alternative in lieu of a beachfill. While groins and/or jetties do not provide any protection from storm surge, they retain sand at a given community over a longer period of time, and therefore reduce future nourishment quantities needed in order to maintain a beachfill.

In order to determine the economic viability of groins and terminal jetties in conjunction with a beachfill, the VE Team analyzed typical construction costs at nearby communities in New Jersey and Delaware along with typical nourishment rates that can be expected for any of the communities being investigated. One example considered was Oakwood Beach, NJ, an authorized Federal beachfill with no groins located in the Delaware River across from the C&D Canal entrance. Oakwood Beach was evaluated in a 1999 Feasibility Report, in which the 3-mile long beachfill was estimated to have an initial fill of 332,000 cy and a nourishment rate of 32,000 cy (approximately 10% of the initial fill) every 8 years. The VE Team determined that using 10% of an initial fill for a given community over an 8 year cycle would be a reasonable estimate for any of the beachfill communities being considered since Oakwood Beach is in close proximity to many of them.

The VE Team was given estimates of initial fill quantities for the beachfill alternative sites being investigated. Nourishment rates have not yet been determined. The initial fill quantities needed ranged from 25,000 cy to 498,000 cy depending upon community size and geometry of the initial beachfill template.

If nourishment rates are assumed to be 10% of initial fill quantities and are therefore between 2,500 cy and 49,800 cy and are reduced by 50% by the presence of groins and/or terminal jetties that would mean a potential quantity reduction between 1,250 cy and 24,900 cy. However, a 50% reduction in nourishment rates can be viewed as optimistic under most conditions.
For illustrative purposes, if sand costs $35.00 per cubic yard, which is a reasonable estimate based upon rough cost numbers calculated to-date, the cost savings by reducing nourishment by 50% would be between $43,750 and $1,743,000 every 8 years or annually $5,469 to $217,875, depending upon community size.

Groins require a specific alongshore spacing and length to function optimally. This spacing is typically between 500 and 1,000 linear feet and the length could be up to 300 feet. Therefore, it is very conceivable that many groins and linear feet would be needed per community. Assuming a reasonable cost of $3,000 per foot, the cost per a single groin could be as high as $900,000. It can be easily seen that the annualized amount far exceeds the annualized cost savings that could be achieved if groins and/or terminal jetties were incorporated with the initial beachfill. Considering groins and/or terminal jetties is only practical for locations that would need higher nourishment quantities. **Therefore, the VE Team recommends that the PDT remove groins and or terminal jetties from further consideration.**

4.16 Comments

C-1. Use dredged material for sacrificial berms (Speculation List # 2):

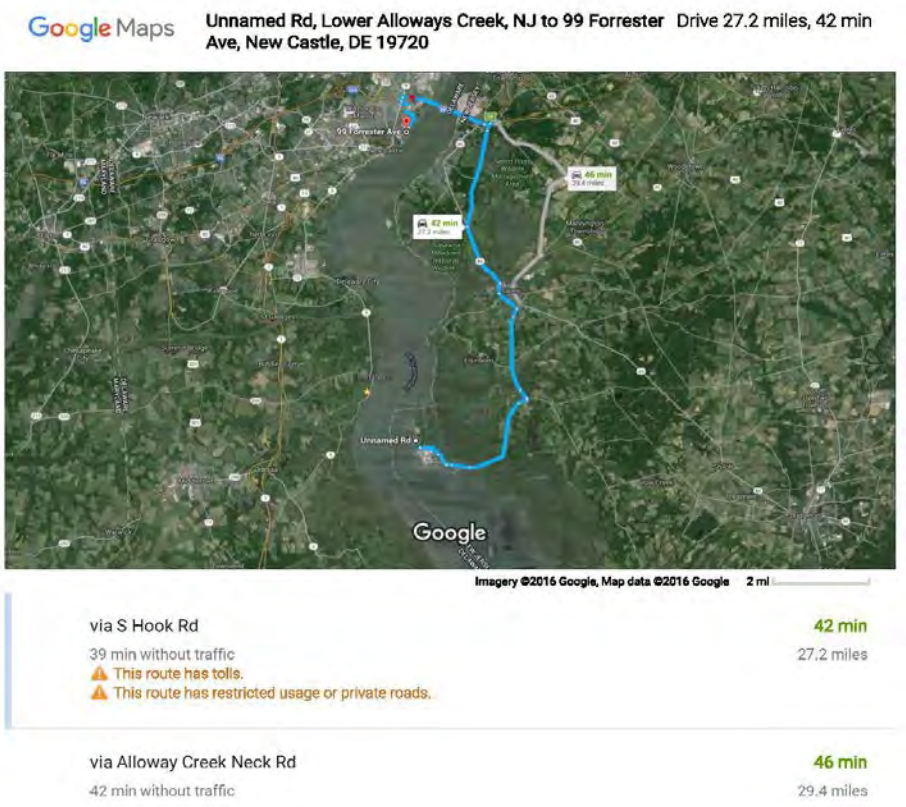
Review of beneficial uses of dredged material design guides, studies, and contacts throughout USACE indicate that it is possible to use dredged material as a sacrificial berm, though this strategy is typically employed in ecosystem restoration. (http://www.epa.gov/sites/production/files/2015-08/documents/role_of_the_federal_standard_in_the_beneficial_use_of_dredged_material.pdf)

C-2. Use sheet pile with dredged material in lieu of levees with impervious core (Consider FRP) (Speculation List # 3):

An alternate design for levee construction could use sheetpiles in lieu of impervious core to reduce footprint, and allow for higher ratio of use of dredged material. If the sheetpile is expected to be concealed, Fiber-Reinforced Pile (FRP) is suggested in lieu of steel for a longer life and reduced costs. FRP is more resistant to saline conditions and wet-dry cycling of tides. It is recommended that UV-resistance be specified in case the pile is periodically exposed due to high winds or storms.

C-3. Truck material from CDF to beaches or levee sites (Speculation List # 7)

It is possible to truck material from CDFs to alternative locations under consideration. A typical haul route is shown from Kilcohook CDF to the northernmost New Castle DE levee location to illustrate.



C-4 Expand authority of study to include material from additional navigation channels, i.e., C&D Canal, NJIWW, Salem (Speculation List # 8):

There are several authorized navigation channels that abut the Delaware River channel (Salem River, Mispillon, C&D Canal, NJIWW) that are semi regularly maintained and contain material appropriate for beachfill. For instance, the Salem River was considered a viable source of material for the recent initial construction of Oakwood Beach, although the Reedy Island Range of the Delaware River was ultimately used for this purpose. Dredge material from these adjacent waterways is sometimes placed in the same CDFs as Delaware River dredged material, thus potentially impacting storage capacity of the CDFs.

C-5. Consider using other authorities to best meet the goals of this project (Speculation List # 9):

Individual alternative write-ups include recommendations for other possible strategies to review proposed projects.

C-6. Pump from closest CDF to site where dredged material will be used (Speculation List # 10):

Augustine Beach, Penn's Grove, and Pennsville are all close to CDFs and it is possible to pump directly from the CDFs to the project site without trucking, barging, or otherwise shipping the dredged material.

C-6. Use geotubes with dredged material as core for groins (Speculation List # 13):

If groins are to be used in conjunction with beachfills, use of additional dredged material in geotubes to perform this function can be considered.

C-7. Consider uses other than flood risk management (FRM) in evaluation of alternatives. (Speculation List # 16)

The Delaware River and Estuary as a system is in a sediment deficit. It is unknown whether this is due to reduced input, sediment entrapment in confined disposal areas, other causes, or a combination. A broader systematic approach that considers this and maximizes regional sediment management (RSM) practices is recommended, perhaps under a specific authorization if the approach cannot be approved under the existing Dredged Material Utilization authorization. Note that the existing DMU authorization does state " …including transfer and transport facilities for the drying, rehandling, and transferring of dredged material, as it relates to comprehensive watershed and RSM…". It is recommended that the approach not be exclusive to Flood Risk Management (FRM). It does not appear that use of dredged material can fully address the FRM needs of the area and limiting use of dredged material to FRM misses ecosystem restoration opportunities. This may necessitate removal from the PL 113-2 (Hurricane Sandy) authorization. A systematic approach would include consideration of ecosystem restoration and beaches within the river and estuary. Thus, the dredged material would be returned to the system, potentially offsetting the sediment deficit and facilitating a complete sediment cycle.

C-8. Use FEMA claim data to prioritize sites to receive material (Speculation List # 18):

If demand for dredged material outstrips supply, alternative locations could be ranked using FEMA claim data.

C-9. Resolve potential schedule conflicts in use of MV McFarland (Speculation List # 22):

It was discussed during the Information Phase that the hopper dredge McFarland is limited to 70 days of operation performing maintenance dredging in the Delaware River. Currently, the arrangement is for the McFarland to spend 40 days performing maintenance dredging in the Philadelphia to Trenton project, and it is anticipated that the McFarland will be able to perform newly necessary maintenance dredging in lower Reach E of the Philadelphia to Sea project as a result of the deepening of the main channel from 40' to 45'. It is possible the new maintenance requirements of Lower Reach E may exceed the availability of the McFarland. A possible way to mitigate this would be for the State of New Jersey to make available disposal areas for the Philadelphia to Trenton project. Current disposal site of Philadelphia to Trenton dredged material is Fort Mifflin CDF, hampering productivity.

C-10. Use dredged material as daily cover for landfill layers (Speculation List # 27):

Pennsylvania currently meets their obligation to accept dredged material for the Philadelphia to Trenton Delaware River Maintenance dredging project by having a private waste disposal company use the material for daily landfill cover.

C-11. Sell dredged material to fund Flood Risk Management (FRM) (Speculation List # 30):
This study has shown that the beneficial use of dredged material and flood risk management may not be optimally compatible. It is feasible to sell dredged materials to parties who may wish to purchase it. Funds raised from this sale could be allocated specifically to FRM projects in the Delaware River basin. Though not directly used for FRM, this would satisfy the requirement of using dredged materials to provide FRM and would allow more efficient and effective FRM measures to be taken.

C-12. Amend dredged material for use in levees (Speculation List # 31):

Use of dredged material in levee construction is hampered by poor structural quality and high permeability of material normally dredged from the Delaware River. It is possible that the dredged material can be amended and improved via soil mixing to increase structural quality and lower permeability.

C-13. Use floating pipe from Reedy Point to Augustine Beach (Speculation List # 32):

If Augustine Beach or Bayview Beach are to have beachfill (which the VE team does not recommend), a possible source could be Reedy Island South CDF with delivery of material via pipeline.

C-14. Identify separate templates for each beach, based on BCR and H&H analysis (Speculation List # 33) & C-23 Perform optimization by considering additional beachfill template geometries other than what has been done to-date once communities are narrowed that are being investigated for possible beachfill placement.

Typically, several berm and dune height beachfill template geometries are investigated per community during "With Project" Conditions Analysis in a Feasibility Study. This is accomplished by investigating the benefits and costs of incrementally increasing dune heights while keeping berm widths static, and incrementally increasing berm widths while keeping dune heights static.

C-15. Use material from lower reach of Philadelphia-to-Trenton for fill on levees and beaches in this study (Speculation List # 17 & 23): State implications of CDF's not being identified in New Jersey.

Use of this source for FRM may have a high cost associated with transport given distance, but significant benefits may arise from its use due to lack of disposal areas in NJ. The VE team suggests the PDT examine this source of material further.

C-16. Require any beaches receiving fill from Federal sources to have public access, including parking (Speculation List # 15) & C-25 Public acceptance may involve significant additional cost (river walks, parking, amenities etc.)

Public acceptance of beachfills and levees may involve construction of ancillary improvements to FRM measures to enhance use of the structures for recreational purposes. This is of concern for potential levee construction with respect to blocking views of the river by raising a levee. It is of concern for potential beachfill construction with respect to public access.

C-18 FRM & DMU may be served more economically by separating the two objectives.

The two objectives of beneficially using dredged material for addressing FRM are not necessarily compatible economically. For example, from the FRM perspective for many communities along the Delaware Bay where beachfill may be viable solution, obtaining sand from the navigation channel or a disposal facility could be more costly than obtaining sand from other sources such as a nearby offshore borrow area. Conversely, from the DMM/DMU perspective, transporting to and placement of suitable material at Delaware Bay communities could be more costly than disposing of material at a commonly-used facility. The FRM benefits to the communities receiving the dredged material along with any cost-saving benefits of reduced maintenance of the Delaware River Navigation Channel in O&M Costs may not offset the additional costs. The VE team could not fully evaluate all of the potential FRM benefits or the costs to the communities being investigated nor could the team determine all of the potential O&M benefits and costs from the DMM perspective to make recommendations concerning if the two objectives can be achieved. Further investigations by the PDT is needed.

C-19 Combine initial construction of beachfill projects across several communities to share mobilization costs.

This concept would involve awarding initial construction projects together, for example for Slaughter Beach and Prime Hook Beach. The anticipated costs for mobilization are approximately $5m for individual beaches and while mobilization would not be cut in half if two projects were merged, some savings would result, thus improving the BCRs.

C-20 Identify what % of Dredged Material is necessary to have a project qualify as a DMU project.

One of the stated objectives of the planning study is to "*Increase the resiliency of coastal New Jersey and Delaware, specifically along the Delaware River/Bay shoreline, via the beneficial use of dredged material.*" It will be important to clarify the degree of utilization to qualify as acceptably meeting this objective. For instance, controlling for BCRs, does a project employing dredged material for beachfill, where no other material or structure is required, have a higher priority than a levee where dredged material is a minority component of the structure required?

C-21 Identify ramifications related to an increase in maintenance dredging of the Delaware River if dredged material is used as beachfill or levees adjacent/near to Delaware River.

Placement of dredged materials at the recommended sites could impact the maintenance dredging that is currently being performed to keep the Delaware River channel to mandated depths. The sites vary in distance from the main channel and will need to be assessed individually for their specific impact. It is anticipated that beachfill projects will have greater impact than levees due to shoaling/sediment transport of beach materials. This type of analysis was done during the Oakwood Beach, NJ Feasibility Study.

In addition to the technical impacts that these proposed projects may have, logistical impacts also need to be considered. If increased maintenance dredging is determined to be required, will there be enough resources to perform the work (e.g. dredge, time, etc.)? Where will this additional material go?

C-22 Consider alternatives to mitigate marsh side flooding as FRM risks are not entirely addressed with bayside beachfill.

Many communities are surrounded by wetlands and/or other bodies of water that are secondary sources of flooding. Potential solutions (i.e. beachfill) along the Bay frontage alone would not be fully complete and address these secondary sources of flooding. The VE team acknowledges that solutions to secondary sources of flooding using dredge material for FRM only is very limited given that many of these communities are surrounded by wetlands. However, during the screening process the PDT could prioritize communities that do not have secondary sources of flooding.

C-24 Improve on HAZUS data. Conduct a structure inventory.

Going forward, accuracy of benefits analysis will need to be increased. A structural inventory may be required to more accurately determine BCR ratios for remaining projects.

C-26 Determine how to tie in project limits to existing conditions while minimizing impact to wetlands.

There is a potential for dredged material from new beachfill projects to migrate into adjacent marshes/wetlands. Consideration should be given to this issue if beachfill alternatives are further developed.

4.17 Rejected Ideas

X-1. Use barge with booster pump between channel and beaches (Speculation List # 4)

Whether the Delaware River channel dredging is performed by USACE personnel or by contract, the contracts/delivery orders/work requests are generally written as service contracts, and the dredger has the prerogative to choose the most economical way to move material from Point A to Point B. The dredger would know the best way based on material composition (specific gravity) and pumping distance.

X-2. Use sidecasting in lieu of pumping (Spec List # 5)

There are some waterways where sidecasting is the most economical way to move material, i.e., wider sections of the Ohio River, but the material being dredged from the Delaware River is not necessarily heavier sand, and it may be more inclined to promptly flow back into the navigation channel.

X-3. Use dock with staging area for truck access (Spec List # 6)

This idea was based on the beachfill or levee site not being directly accessible to pumping from the river. It would not be as economical as direct pumping, and is not applicable to any of the sites under consideration.

X-4. Build up levees with compacted dredged material and "armor" with impervious material (Spec List # 11)

As discussed in the above report, this is not normal Corps practice. Any penetration of the impervious shell would allow migration of the pervious material.

X-5. Use geotubes with dredged material as core for levees (Spec List # 12)

This is similar to recent dune construction projects as practiced by several Districts including Galveston and Philadelphia, however it has not been accepted for levee construction because of the risk of damages if the geotextile material were punctured, even though that's unlikely. More importantly, the material which would fill the tubes is most probably not impervious. X-6. Set up dock with pump out using booster pump in deeper water adjacent to Commercial Township (N25-28) (Spec List # 14)

Rejected for same reason as X-1. The Commercial Township levees are discussed in more depth in the above report.

X-7. Construct bird island in Delaware Bay (Spec List # 19)

This stretch of the Delaware River channel is not as wide as the Chesapeake Bay where Poplar Island is a textbook case of the environmental benefits of dredged material utilization. Identifying beachfill projects is much more practical and would not take the years of public hearings and permitting a new bird island would require.
X-8. Identify way for dredged material to be used as a food source (Spec List # 24)

X-9. Use dredged material to elevate threatened properties (Spec List # 25)

This is less economical than constructing levees or dunes, and could not be done on private properties.

X-10. Use dredged material as aggregate for sea walls or other concrete products (Spec List # 26)

This is not economical. Dredged material would have to be dewatered and carefully analyzed as an alternative to borrow sand and aggregate.

X-11. Identify pump-out site near rail to transport more economically than using trucks (Spec List # 28)

Rejected for same reason as X-6.

4.18 Conclusion

After consideration of available information, the VE Team recommends:

- Further consideration of seven of the 19 site alternatives presented
- Removal of groins and/or terminal jetties from consideration.
- Consideration of removal of the study from the PL 113-2 (Hurricane Sandy) authorization in order to address regional sediment management goals and capitalize on other opportunities, such as ecosystem restoration

5 Appendix A VE Meeting Agenda

All meetings will be held in Philadelphia District Office, Engineering Division Conference Room, 7th floor of the Wanamaker Building, 100 E. Penn Square, Philadelphia, PA 19107. All times will be flexible, related to team processes, work schedules, breaks and lunchtimes. For instance, if the information phase takes less time than expected, the team may start other phases earlier.

MONDAY, 29 FEBRUARY 2016

8:00 AM – 12:00 AM Introductions and Agenda
Brief discussion of Smart Planning process
Brief introduction to Value Engineering process
INFORMATION PHASE
In-briefing by Project Manager:
- Overview of project history and status
- Recommendations and constraints
- Alternatives considered

12:00 AM – 1:00 PM Lunch

1:00 PM – 4:30 PM Continuation of INFORMATION PHASE
- Alternative dredging methods
- Alternative disposal methods
- Alternative disposal sites

FUNCTION ANALYSIS PHASE
What are we doing? Why? How?
Create FAST diagram to show relationship of functions

Homework assignment for evening:
Keep a notepad and pen on your night table in case you come up with questions or ideas in the middle of the night.

TUESDAY, 1 MARCH 2016

8:00 AM – 12:00 AM CREATIVITY PHASE
Freeform brainstorming

1:00 PM – 4:30 PM Complete CREATIVITY PHASE
EVALUATION PHASE
Screen ideas suggested during Speculation for Proposals or Comments to be developed, ideas already being done, or non-viable ideas

WEDNESDAY, 2 MARCH 2016

8:00 AM – 4:30 PM	Complete EVALUATION PHASE Screen ideas suggested during Speculation for Proposals or Comments to be developed, ideas already being done, or non-viable ideas Assign Proposals and Comments Go over formats and procedures for writing up ideas Begin DEVELOPMENT PHASE Write up ideas Pass write-ups on to facilitator when completed

THURSDAY, 3 MARCH 2016

8:00 AM – 4:30 PM	Continue DEVELOPMENT PHASE Write up ideas Pass write-ups on to facilitator when completed

FRIDAY, 4 MARCH 2016

8:00 AM – 4:30 PM Continue DEVELOPMENT PHASE
Write up ideas
Pass write-ups on to facilitator when completed

MONDAY, 7 MARCH 2016

8:00 AM – 4:30 PM Continue DEVELOPMENT PHASE
Write up ideas
Pass write-ups on to facilitator when completed

TUESDAY, 8 MARCH 2016

8:00 AM – 10:30 AM	Complete DEVELOPMENT PHASE Write up ideas Pass write-ups on to facilitator when completed
10:30 AM – 12:30 AM	Team goes over each other's write-ups, compile remaining taskers, prepare for outbrief
1:30 PM – 4:00 PM	PRESENTATION PHASE Present findings to Project Development Team and note initial responses Discuss any remaining to-do items, i.e., uncompleted write-ups, responses from PDT during outbrief requiring follow-up revisions

6 Appendix B VE Team Roster

NAME / EMAIL	ROLE / ORGANIZATION	TELEPHONE
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* *Value Engineering Team Member*

7 Appendix C Function Analysis System Technique (FAST) Diagrams

The key to Value Engineering is studying Functions rather than Features.

Functions are expressed as two-word phrases with an active verb and a measureable noun. In the early 1960's, Charles W. Bytheway, a Mechanical Engineer with Sperry Rand, developed Function Analysis System Technique (FAST) Diagrams as a method to show specific relationships of important functions with respect to each other, deepen the understanding of the problem to be solved, promote discussion and flow from the Information Phase into the Creativity Phase.

FAST diagrams are Function-oriented, not time- or feature-oriented. There are several variations, but Classical and Technical are used most often in USACE studies.

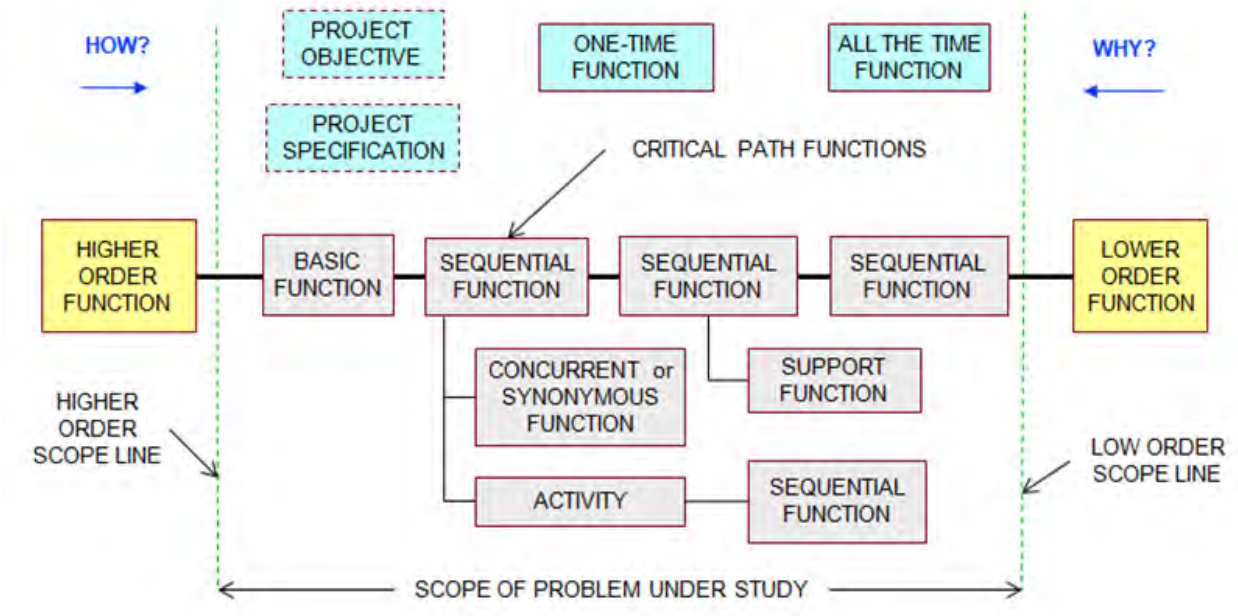
Classical FAST Model:

A diagram displaying the interrelationship of functions to each other in a "how-why" logic. This was first demonstrated by Charles Bytheway and further developed by Wayne "Doc" Ruggles in 1968.

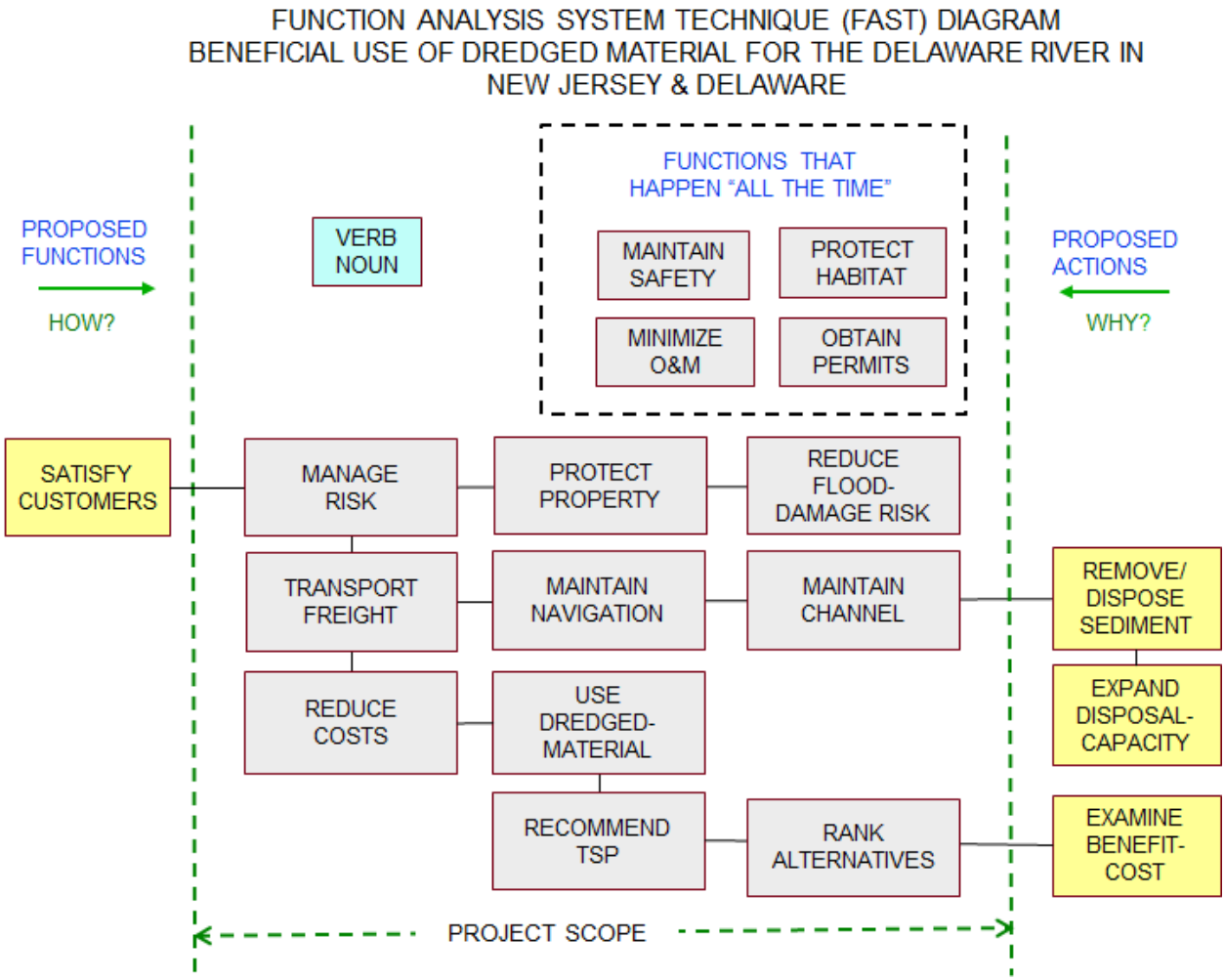
Technical FAST Model:

A variation to the Classical FAST that adds "all-the-time" functions, "one -time" functions and "same-time " or "caused by" functions. This was developed by Richard Park and Frank Wojciechowski and is probably the most commonly used FAST type in construction-oriented projects.

Template for a Technical FAST Diagram:



The following FAST diagram was developed by the Value Engineering Team on 29 February 2016:



8 Appendix D VE Speculation List

No.	Description	Evaluation Decision
1	Use dredged material on either side of impervious core for levees	BD
2	Use dredged material for sacrificial berms	C
3	Use sheet pile with dredged material in lieu of levees with impervious core (Consider FRP)	C
4	Use barge with booster pump between channel and beaches	X
5	Use sidecasting in lieu of pumping	X
6	Use dock with staging area for truck access	X
7	Truck material from CDF to beaches or levee sites	C
8	Expand authority of study to include material from additional navigation channels, i.e., C&D Canal, NJIWW, Salem	C
9	Consider using other authorities to best meet the goals of this project	C
10	Pump from closest CDF to site where dredged material will be used	C
11	Build up levees with compacted dredged material and "armor" with impervious material	X
12	Use geotubes with dredged material as core for levees	X
13	Use geotubes with dredged material as core for groins	C
14	Set up dock with pump out using booster pump in deeper water adjacent to Commercial Township (N25-28)	X
15	Require any beaches receiving fill from Federal sources to have public access, including parking	C
16	Consider benefits other than flood risk management (FRM) in evaluation of alternatives	C
17	Use material from lower reach of Philadelphia-to-Trenton for fill on levees and beaches in this study	C-17/23
18	Use FEMA claim data to prioritize sites to receive material	C
19	Construct bird island in Delaware Bay	X

No.	Description	Evaluation Decision
20	Expand Buoy 10	BD
21	Buy out properties in low-lying locations	BD
22	Resolve potential schedule conflicts in use of MV McFarland	C
23	Identify implications for CDF's not being identified in NJ	C-17/23
24	Identify way for dredged material to be used as a food source	X
25	Use dredged material to elevate threatened properties	X
26	Use dredged material as aggregate for sea walls or other concrete products	X
27	Use dredged material as daily cover for landfill layers	C
28	Identify pump-out site near rail to transport more economically than using trucks	X
29	Use dredged material in mines to offset acid mine drainage	BD
30	Sell dredged material to fund Flood Risk Management (FRM)	C
31	Amend dredged material for use in levees	C
32	Use buried pipe under channel from Reedy Point to Augustine Beach	C
33	Identify separate templates for each beach, based on BCR and H&H analysis	C

Key:

P	Proposal, develop idea in detail (Note that this may have been combined with other ideas
C	Comment or design suggestion
X	Rejected for technical, economic or environmental reasons
BD	Being Done, or already expected to be part of design

9 Appendix E Customer Response Worksheets

DMU VE Study Customer Response		
Filled out By:		
Proposed site Alternative or formulation Comment	**Customer Acceptance of VE recommendation (Y/N)**	**Response/Comments**
Prime Hook Beach, DE		
Slaughter Beach, DE		
Villas Beach, NJ		
Kitts Hummock, DE		
Pickering Beach, DE		
Bowers Beach, DE		
South Bowers Beach, DE		
Penns Grove Levee, NJ		
Pennsville Levee, NJ		
New Castle Levee, DE		
Woodland Beach, DE		

Augustine Beach, DE		
Bayview Beach, DE		
Big Stone Beach, DE		
Commercial Township, NJ		
Comment #1 Use Dredged Material for sacrificial berms		
Comment #2 Use sheet piling with levees		
Comment #3 Truck material from CDF to levees or beachfill sites		
Comment #4 Expand authority to include dredge material from additional navigation channels		
Comment #5 Use other authorities to allow projects to proceed		
Comment #6 Pump from CDF to site		
Comment #7 Consider uses other than FRM in evaluation of alternatives.		
Comment #8 Use FEMA claim data to prioritize sites to receive dredge material		
Comment #9 Resolve potential conflicts in use of McFarland		

Comment #10 Use dredge material as daily cover in landfills		
Comment #11 Sell dredge material to fund FRM		
Comment #12 Amend dredge material for use in levees.		
Comment #13 Use floating pipe from CDF to nearby beachfill project.		
Comments #14&23 Optimize beachfill geometry post TSP.		
Comment #15 Use dredge material from Philadelphia to Trenton project		
Comments #16&#25 Amenities may be required for public acceptance		
Comment #18 FRM and DMM may be better served by separating objectives		
Comment #19 Combine initial construction across communities to reduce mobilization costs		
Comment #20 Identify % of dredge material is necessary		
Comment #21 Identify increase in maintenance dredging as a result of new projects		
Comment #22 Bayfront beachfill does not mitigate marsh side flooding		

Comment #24 Conduct structure inventory		
Comment #26 Minimize impact to wetlands from beachfill projects		

10 Appendix F Certification

This report was commissioned by the US Army Corps of Engineers, Philadelphia District

This report was compiled in accordance with SAVE International Value Methodology by:

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Appendix G – Public Access Plan

Engineering Regulation (ER) 1165-2-130, Federal Participation in Shore Protection Projects, requires that reasonable public access be provided in accordance with the recreational use objectives of the particular area and public use is "construed to be effectively limited to the within one-quarter mile from available points of public access to any particular shore." No two public access points can be further than ½ mile apart, and no visitor can be further than ¼ mile from an individual access point. ER 1165-2-130 also discusses parking requirements and states that parking on free or reasonable terms should be available within a reasonable walking distance of the beach. Public access and parking available and/or needed to comply with ER 1165-2-130 in each community of the recommended plan is described below:

Pickering Beach – Current public access at Pickering Beach is limited to a single point at the intersection of Pickering Beach and South Sandpiper Drive. Two additional public access points will be required at the northern and southern ends of the project.

Kitts Hummock – Current public access at Kitts Hummock is limited to a single point at the eastern end of Kitts Hummock Road. There is also an existing easement to allow beach access for vehicles. Two additional public access points will be required at the northern and southern ends of the project.

Bowers Beach – At Bowers Beach, public access exists at three points (one of which is also used as vehicular access). One additional public access point will be required at the northern end of the project.

South Bowers Beach – At South Bowers Beach, current public access exists at two points (one of which is also used as vehicular access). One additional public access point will be required at the northern end of the project.

Slaughter Beach – Currently, there are 14 public access points at Slaughter Beach (one of which is also used as vehicular access).

Prime Hook Beach – There is no current public access at Prime Hook Beach. Five public access points will be required.

Lewes Beach – Current public access at Lewes Beach consists of 23 public access points (one of which can also be used as vehicular access). No additional public access points are required.

With the exception of Lewes Beach, additional public access is required for the beach restoration sites in the recommended plan. DNREC is committed to provide the necessary public access and associated reasonable parking to comply with ER 1165-2-130.



PLAN NORTH

1 ACCESS PLAN - PICKERING BEACH 1 OF 2
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

US Army Corps of Engineers
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DWN BY: PTF
CKD BY: DAN
DESIGNED BY: PTF
REVIEWED BY: DCUTEH
DWG SCALE: -
DWG. SIZE: 30"x42" Arch E1
ISSUE/RELEASE DATE: FINAL 25JAN2018
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
FILE NAME: CA-102 ACCESS PLAN - PICKERING BEACH 1 OF 2.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - PICKERING BEACH 1 OF 2

SHEET NUMBER
CA-102



PLAN
NORTH

1 ACCESS PLAN - PICKERING BEACH 2 OF 2
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM. REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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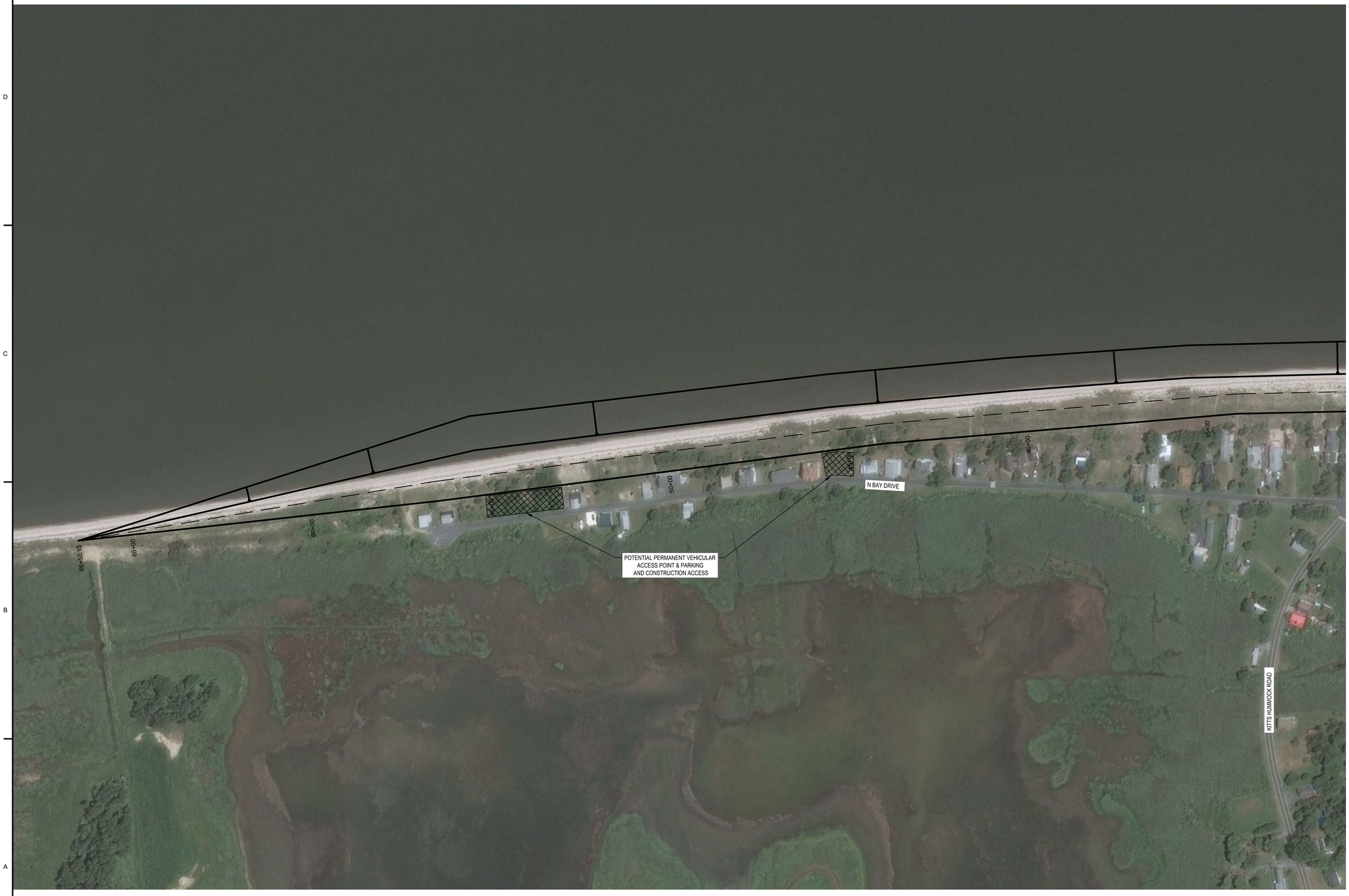

PLAN NORTH

1 ACCESS PLAN - KITTS HUMMOCK 1 OF 2
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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DWN BY: PTF
CKD BY: DAN
DWG SCALE: -
DWG. SIZE: 30"x42" Arch E
DESIGNED BY: PTF
REVIEWED BY: DCL/TEH
FILE NAME: CA-104 ACCESS PLAN - KITTS HUMMOCK 1 OF 2.dwg
ISSUE/RELEASE DATE: FINAL 26JAN2016
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - KITTS HUMMOCK 1 OF 2
-

SHEET NUMBER
CA-104



PLAN NORTH

1 ACCESS PLAN - KITTS HUMMOCK 2 OF 2
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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PLAN NORTH

1 ACCESS PLAN - BOWERS BEACH
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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MARK	FICTION	DESCRIPTION	DATE	BY
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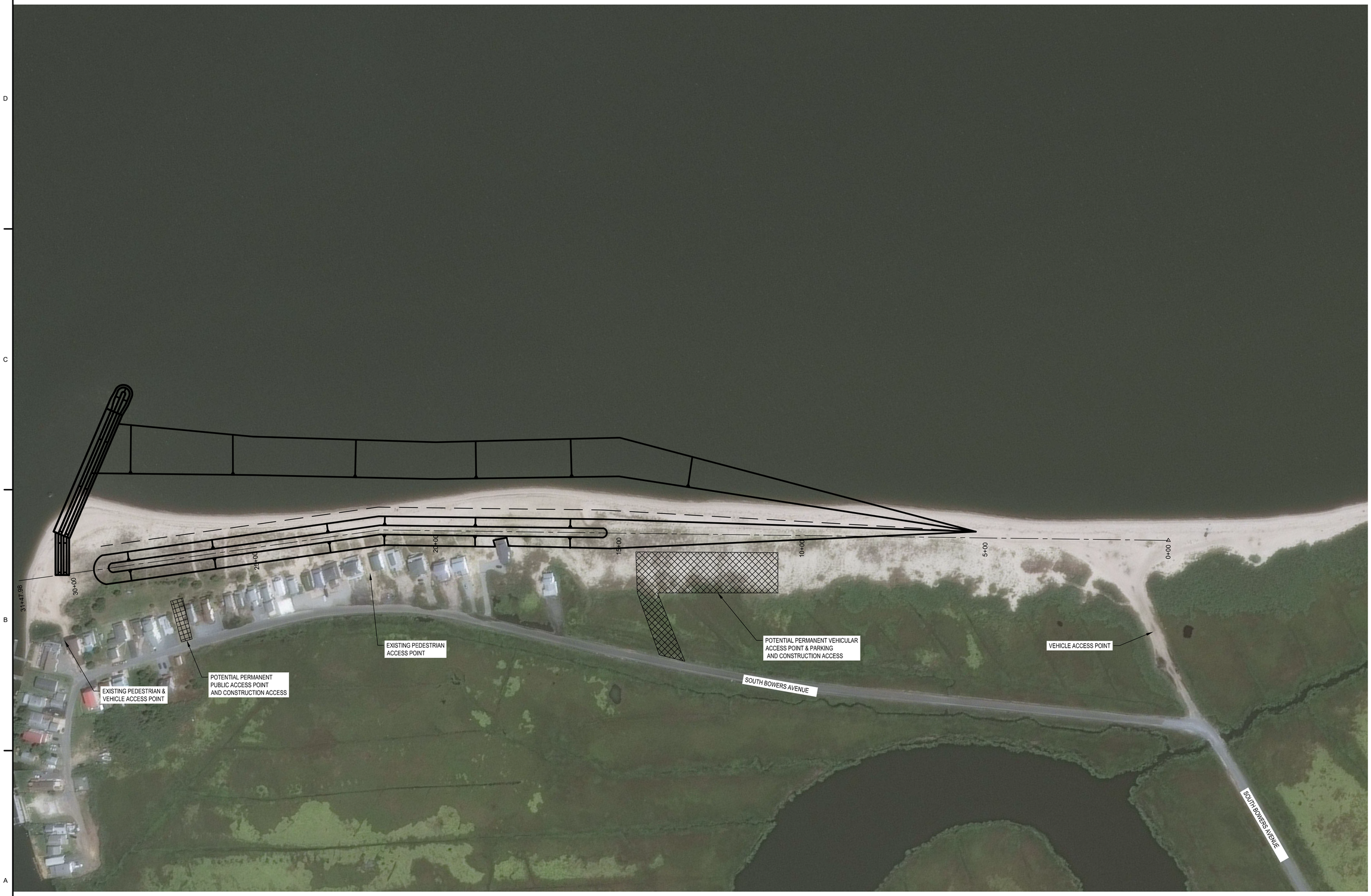

PLAN NORTH

1 ACCESS PLAN - SOUTH BOWERS BEACH
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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PLAN NORTH

1 ACCESS PLAN - SLAUGHTER BEACH 1 OF 5
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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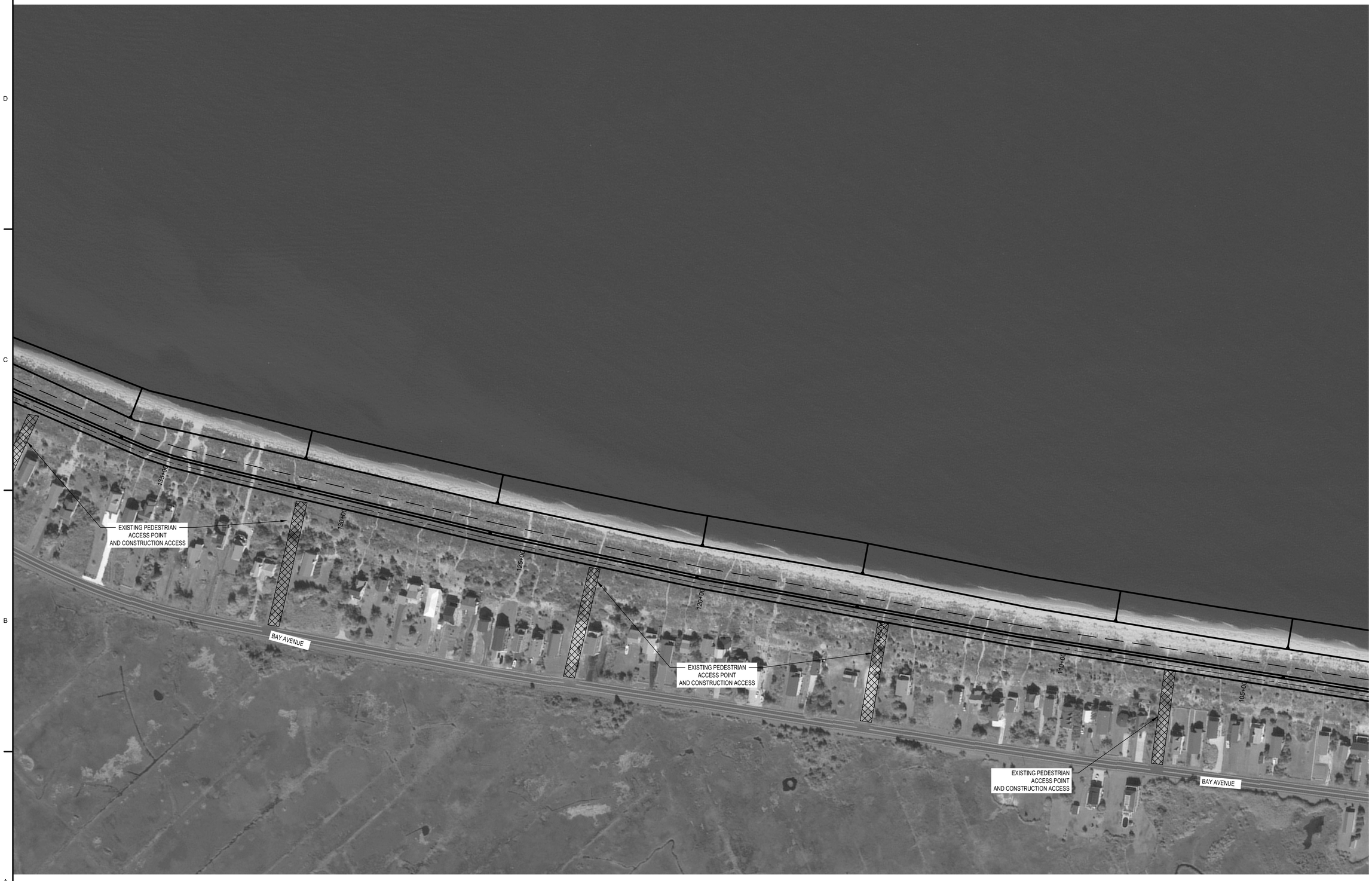

PLAN NORTH

1 PLAN - SLAUGHTER BEACH 2 OF 5
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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DWN BY: PTF
CKD BY: DAN
DESIGNED BY: PTF
REVIEWED BY: DCJ/TEH
DWG SCALE: -
DWG. SIZE: 30"x42" Arch E
ISSUE/RELEASE DATE: FINAL 29JAN2018
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
FILE NAME: CA-109 ACCESS PLAN - SLAUGHTER BEACH 2 OF 5.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - SLAUGHTER BEACH 2 OF 5
-

SHEET NUMBER
CA-109



PLAN NORTH

1 ACCESS PLAN - SLAUGHTER BEACH 3 OF 5
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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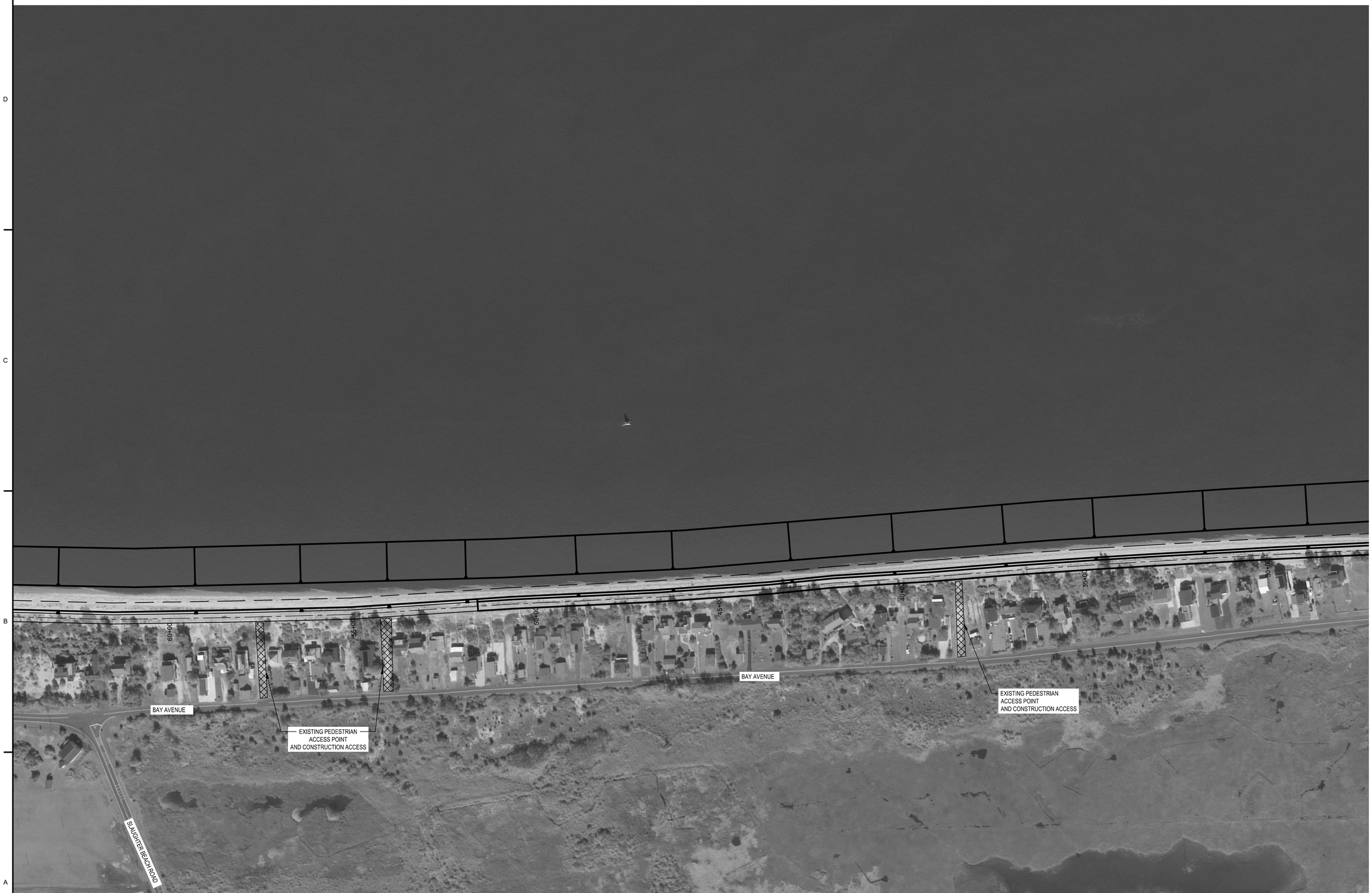

PLAN NORTH

1 ACCESS PLAN - SLAUGHTER BEACH 4 OF 5
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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DWN BY: PTF
CKD BY: DAN
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DWG. SIZE: 30"x42" Arch E
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PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
FILE NAME: CA-111 ACCESS PLAN - SLAUGHTER BEACH 4 OF 5.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - SLAUGHTER BEACH 4 OF 5
-

SHEET NUMBER
CA-111



PLAN NORTH

1 ACCESS PLAN - SLAUGHTER BEACH 5 OF 5
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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DWG SCALE: -
DWG. SIZE: 30"x42" Arch E1
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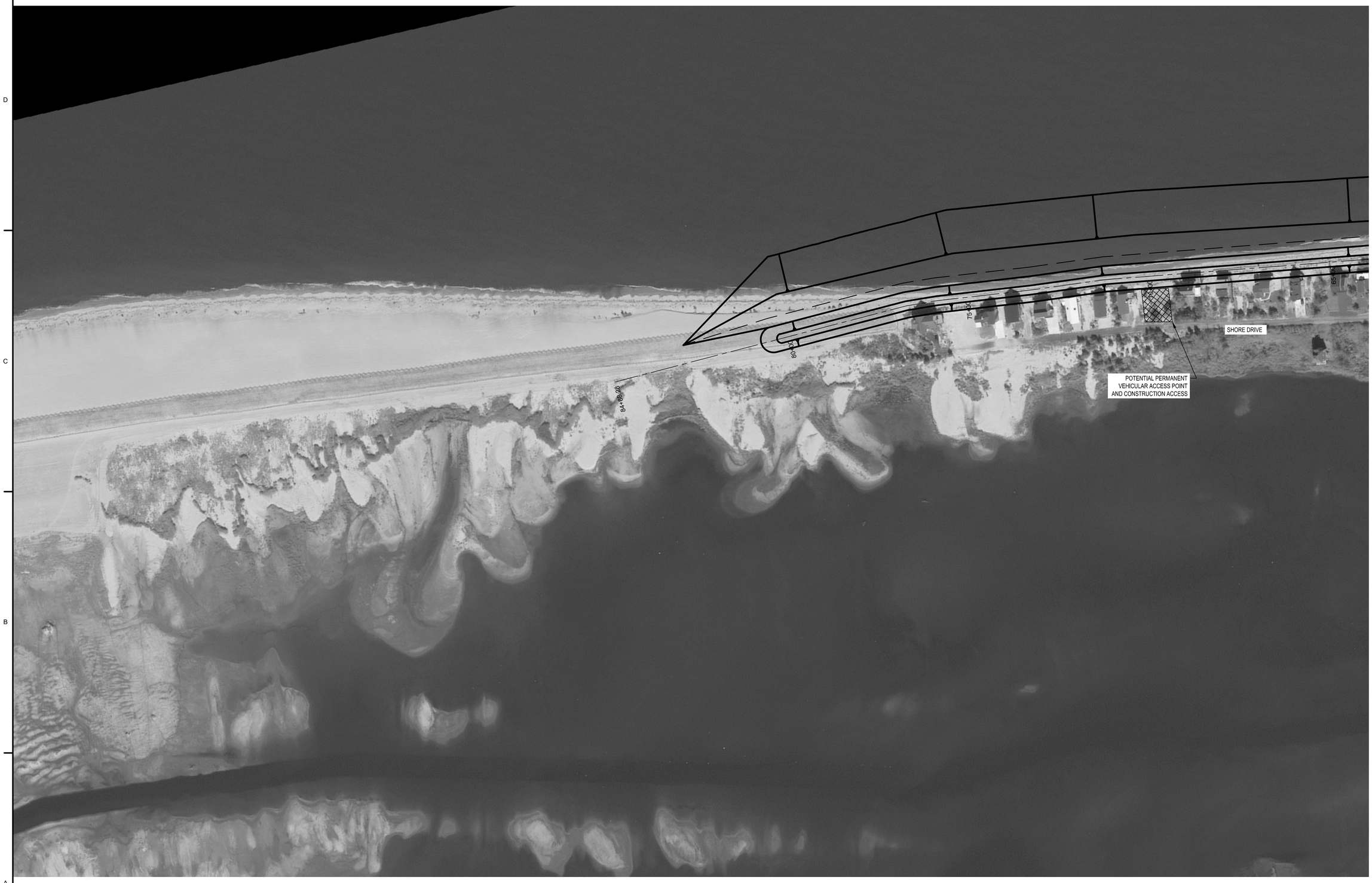
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
FILE NAME: CA-112 ACCESS PLAN - SLAUGHTER BEACH 5 OF 5.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - SLAUGHTER BEACH 5 OF 5
-

SHEET NUMBER
CA-112



PLAN
NORTH

1 ACCESS PLAN - PRIMEHOOK BEACH 1 OF 3
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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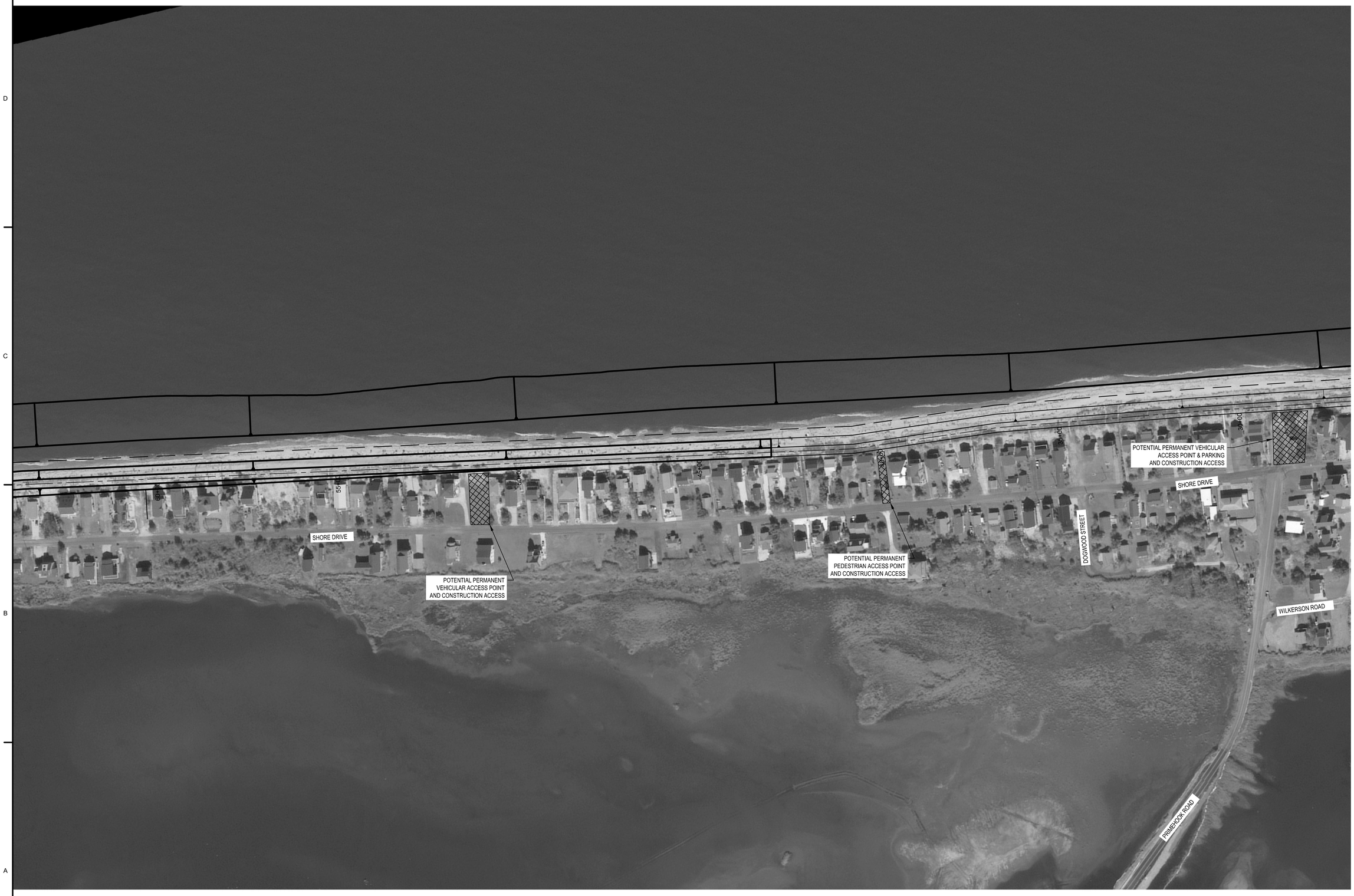

PLAN NORTH

1 ACCESS PLAN - PRIMEHOOK BEACH 2 OF 3
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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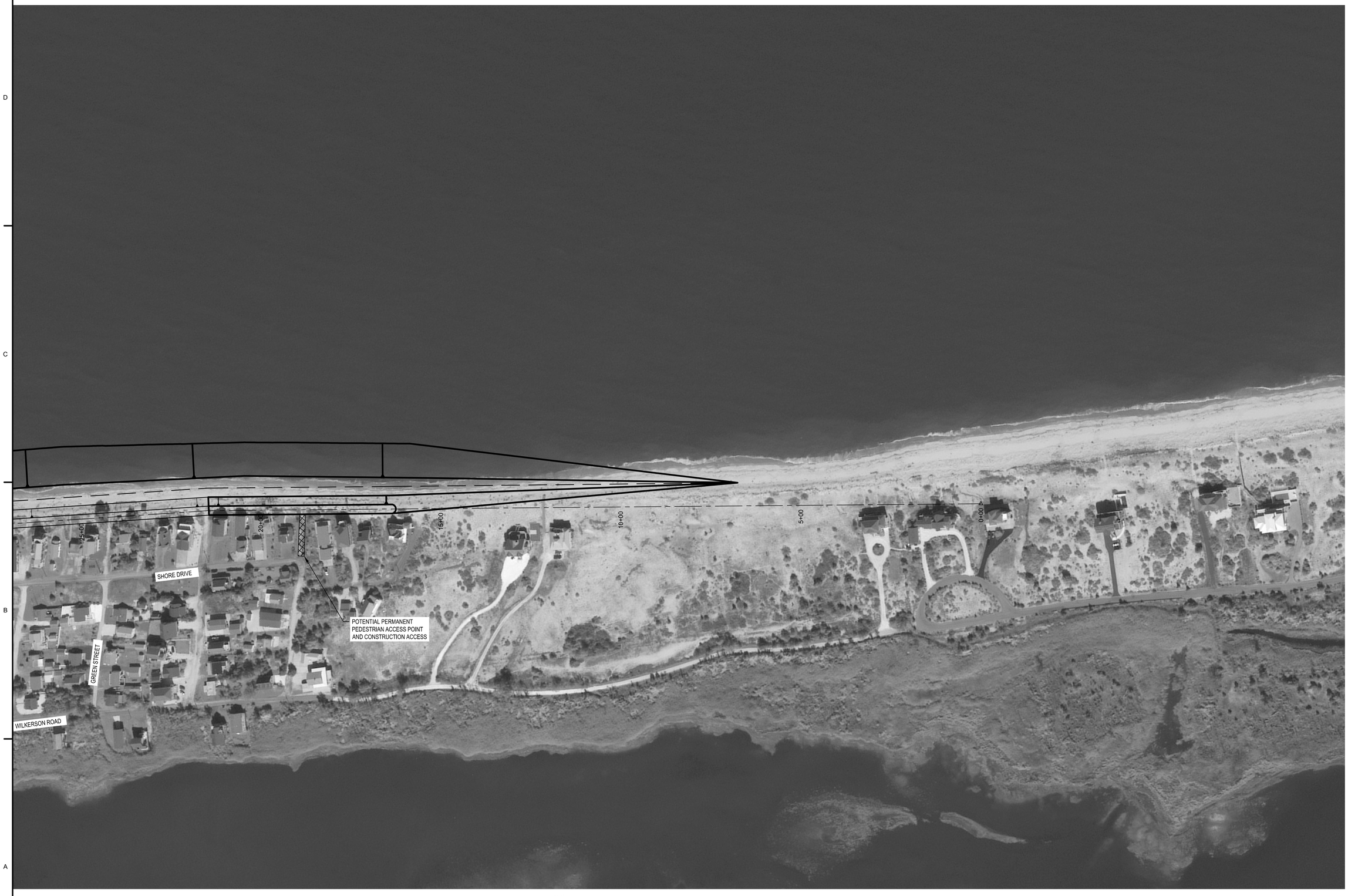
DESIGNED BY: PTF
REVIEWED BY: DCL/TEH
ISSUE/RELEASE DATE: FINAL 25JAN2018
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
DWG SCALE: -
DWG. SIZE: 30"x42" Arch E
FILE NAME: CA-114 ACCESS PLAN - PRIMEHOOK BEACH 2 OF 3.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - PRIMEHOOK BEACH 2 OF 3
-

SHEET NUMBER
CA-114



PLAN NORTH

1 ACCESS PLAN - PRIMEHOOK BEACH 3 OF 3

SCALE: AS SHOWN

100 0 100 200

SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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PLAN NORTH

1 ACCESS PLAN - LEWES 1 OF 3
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
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DWN BY: PTF
CKD BY: DAN
DWG SCALE: -
DWG. SIZE: 30"x42" Arch E
DESIGNED BY: PTF
REVIEWED BY: DCUTEH
FILE NAME: CA-116 ACCESS PLAN - LEWES BEACH 1 OF 3.dwg
ISSUE/RELEASE DATE: FINAL 25JAN2018
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - LEWES BEACH 1 OF 3
-

SHEET NUMBER
CA-116



PLAN NORTH

1 ACCESS PLAN - LEWES 2 OF 3
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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PLAN NORTH

1 ACCESS PLAN - LEWES 3 OF 3
SCALE: AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. AERIAL IMAGERY DATED 08MAY2016.
2. POTENTIAL PUBLIC ACCESS SHOWN IS MINIMUM REQUIRED TO COMPLY WITH USACE ER 1165-2-130.

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REVIEWED BY: DCL/TEH
ISSUE/RELEASE DATE: FINAL 26JAN2018
PROJ. NUMBER: -
SOLICITATION NUMBER: -
CONTRACT NUMBER: -
DWG SCALE: -
DWG. SIZE: 30"X42" Arch E
FILE NAME: CA-118 ACCESS PLAN - LEWES BEACH 3 OF 3.dwg

FOR FLOOD RISK MANAGEMENT, DELAWARE
FINAL FEASIBILITY REPORT
DELAWARE RIVER
DREDGE MATERIAL UTILIZATION
ACCESS PLAN - LEWES BEACH 3 OF 3
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SHEET NUMBER
CA-118