



DEPARTMENT OF THE ARMY  
CHIEF OF ENGINEERS  
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WASHINGTON, D.C. 20310-2600

DAEN

6 MAR 2020

SUBJECT: Delaware Beneficial Use of Dredged Material for the Delaware River, Delaware

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on beneficially using dredged materials from two federal navigation projects – Delaware River between Philadelphia, Pennsylvania and Trenton, New Jersey, and Delaware River Philadelphia, Pennsylvania to the Sea – to provide coastal storm risk management along the Delaware Estuary shoreline. It is accompanied by the report of the District Commander. These reports are an interim response to a resolution by the Committee on Environment and Public Works of the United States Senate (“Resolution”), adopted 26 October 2005 and the Disaster Relief Appropriations Act, 2013, Public Law (P.L.) 113-2. The resolution requested a review of the report of the Chief of Engineers on the Delaware River between Philadelphia, Pennsylvania and Trenton, New Jersey, and Philadelphia to the Sea, published as House Document 358, Eighty Third Congress, Second Session (1954), and other pertinent reports, with a view to determining “whether any modifications of the recommendations contained therein are advisable in the interest of beneficial use of dredged material resulting from the aforementioned project, including transfer and transport facilities for the drying, rehandling, and transferring of dredged material, as it relates to comprehensive watershed and regional sediment management, ecosystem restoration, navigation, stream restoration, water quality, restoration of coal and other mined areas, cover material for sanitary landfills and other allied purposes.” Pursuant to the Resolution, the U.S. Army Corps of Engineers (USACE) undertook a reconnaissance study to look at the beneficial use of dredged material for a variety of purposes, including ecosystem restoration, flood risk management and navigation. In 2012, the “Delaware River New Jersey, Delaware and Pennsylvania Dredged Material Utilization and Beneficial Use Opportunities Expedited Reconnaissance Study” (Reconnaissance Study) was completed. It was recommended that the Reconnaissance Study proceed to the feasibility phase.

In January 2013, Congress passed the Disaster Relief Appropriations Act, 2013 (P.L. 113-2) in the aftermath of Hurricane Sandy (October 2012). In P.L. 113-2, Congress directed USACE to prepare and submit “an interim report identifying...any project under study by the Corps for reducing flood and storm damage risks in the affected area” and also appropriated \$29,500,000 for the Secretary of the Army to “expedite and complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy in the North Atlantic Division of the United States Army Corps of Engineers.” At the time P.L. 113-2 was passed, this study was between the reconnaissance and feasibility phases. Accordingly, it was identified as a “project under study” in the interim report submitted to Congress and was an “ongoing study” eligible for a portion of the funds appropriated by Congress in P.L. 113-2 to continue to the feasibility phase. Therefore, this feasibility study and report, which looks at beneficially using

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dredged material for coastal storm risk management benefits in various Delaware communities, was prepared in response to both the 2005 Resolution and P.L. 113-2. Preconstruction, engineering and design activities, if funded, for the Delaware Beneficial Use of Dredged Material for the Delaware River will continue under the 2005 Resolution authority cited above. I am recommending that the Congress authorize initial construction and periodic nourishment of the project.

2. The reporting officers recommend authorizing the National Economic Development plan to beneficially use dredged materials to manage coastal storm risk by constructing dunes and/or berms at seven different locations. These locations combined span approximately 29 linear miles along the Delaware Bay and include: Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes Beach. Dunes and berms will be constructed at Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes Beach while only berms will be constructed at Pickering Beach and Kitts Hummock. All of the design profiles consisting of both dune and berm have a dune slope of 1 vertical (V):5 horizontal (H), foreshore slope of 1V:10H, and a berm elevation of +7 feet North American Vertical Datum of 1988 (NAVD88). The berm elevations are selected to match the natural berm elevations in the study area. Slaughter Beach was optimized to a relatively low dune at +8.5 feet NAVD88 and the remaining sites were optimized to a design dune elevation of +12 feet NAVD88. Berm widths were 100 feet for Pickering Beach, Kitts Hummock, and South Bowers Beach, 75 feet at Bowers Beach, and 50 feet at Slaughter Beach, Prime Hook Beach and Lewes Beach. The proposed dredged material source is the Miah Maull and Brandywine Ranges of Lower Reach E (Lower Reach E) of the Delaware River Main Channel. Lower Reach E is anticipated to have approximately 465,000 cubic yards (cyds) of dredged material available annually that will need to be removed to maintain the 45 foot depth. The anticipated dredging cycle for Lower Reach E is every two years to remove and place 930,000 cyds (465,000 x 2) of dredged material. Actual dredged material quantities will be verified prior to construction; therefore, USACE recognizes the possibility that there may be greater or lesser quantities available at the time of construction than currently projected. To maintain the integrity of design beachfill alternatives, periodic renourishment must be included in the project design. A six-year periodic renourishment cycle is anticipated to maintain optimal coastal storm risk management. This renourishment cycle coincides with the proposed maintenance dredging to be performed in Lower Reach E.

3. Initial construction quantities of 1.3 million cyds exceed the projected quantity assumed to be available from each dredging cycle. Therefore, the projected implementation of this recommended plan assumes initial construction to be split over two maintenance cycles in 2024 and 2030. The three southernmost sites (Lewes, Prime Hook, and Slaughter) are planned to be constructed in 2024, and the remaining four northern sites (Pickering, Kitts Hummock, Bowers, and South Bowers) are planned to be constructed in 2030 during the first periodic nourishment cycle for the three southernmost sites. If there is less dredged material available than anticipated for initial construction, the Buoy 10 open water disposal site may serve as an alternate source of sediment for initial construction as it contains approximately 750,000 cyds of sand previously

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dredged from Lower Reach E during maintenance of the Delaware River, Philadelphia to the Sea navigation project. USACE recognizes that the use of Buoy 10 as an alternate sediment source would necessitate a benthic habitat assessment and ultimately a Supplemental Environmental Assessment (EA). In 2036, all seven sites are planned to be on the same six-year periodic nourishment cycle. The recommended plan has been determined to be economically justified and environmentally acceptable. The recommended plan would not have any significant adverse effects; therefore, no compensatory mitigation measures would be required.

4. The Delaware Department of Natural Resources and Environmental Control is the non-federal cost-sharing sponsor for all features. Based on October 2019 price levels, the estimated initial construction cost of the plan is \$81,880,000. In accordance with the cost sharing provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 202 of WRDA 1996, the federal share of the initial construction costs of the coastal storm risk management reduction features would be about \$53,220,000 (65 percent) and the non-federal cost share would be about \$28,660,000 (35 percent). The cost of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas included in the initial construction cost is estimated at \$17,270,000. The total cost includes \$232,760,000 for scheduled nourishment. The federal and non-federal shares of the periodic nourishment would be \$116,380,000 (50 percent) each. The Delaware Department of Natural Resources and Environmental Control would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at about \$180,000 per year. The total cost of the project would be \$331,930,000. Total federal costs would be \$169,610,000 and total non-federal costs would be \$162,320,000.

5. Based on a 2.75-percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be \$7,880,000, including OMRR&R. The recommended plan reduces 66.2% of damages in the study area. The equivalent average annual benefits are estimated to be \$13,090,000 with net average annual benefits of \$5,210,000. The benefit-cost ratio is approximately 1.7 to 1.

6. The recommended plan was developed in coordination and consultation with federal, state, and local agencies and numerous tribes. Risk and uncertainty were addressed during the study by completing a cost and schedule risk analysis and a sensitivity analysis that evaluated the potential impacts of a change in economic assumptions.

7. In accordance with USACE guidance on the review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and rigorous review process to ensure technical quality. This includes a District Quality Control review, an Agency Technical Review, and a Corps Headquarters policy and legal review. All comments from the above referenced reviews have been addressed and incorporated into the final documents.

8. Washington level review indicates that the plan recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan

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complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation Studies. The recommended plan complies with other administration and legislative policies and guidelines. The views of interested parties including federal, state, and local agencies have been considered.

9. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that the plan to beneficially use dredged materials to reduce hurricane and storm damages for Pickering Beach, Kitts Hummock, Bowers Beach, South Bowers Beach, Slaughter Beach, Prime Hook Beach and Lewes Beach, be authorized in accordance with the reporting officers' recommended plan, with such modifications as in the discretion of the Chief of Engineers may be advisable. The estimated cost of the project is \$331,930,000, which includes an estimated total cost for periodic nourishment of \$232,760,000 for eight cycles of periodic nourishment and an estimated total cost of \$81,880,000 for initial construction. My recommendation is subject to cost sharing, financing, and other applicable requirements of federal laws, regulations, and policies, including Section 103 of WRDA 1986, as amended (33 U.S.C. 2211), and to the non-federal sponsor agreeing, prior to project implementation, to perform the required items of local cooperation, including but not limited to the following:

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

(1) Provide, during design, 35 percent of design costs in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;

(2) Provide all lands, easements, rights-of-way, including suitable borrow areas, and perform or assure performance of all relocations, including utility relocations, as determined by the Federal government to be necessary for the initial construction, periodic nourishment or operation and maintenance of the project, all in compliance with applicable provisions of the Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 C.F.R. Part 24;

(3) Provide, during construction, any additional amounts necessary to make its total contribution equal to 35 percent of initial project costs, and 50 percent of periodic nourishment costs assigned to coastal storm risk management, plus 100 percent of initial project costs and periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the

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outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function;

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

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

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

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

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

h. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

i. Perform, or ensure performance of, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, or operation and maintenance of the project. However, for lands, easements, or rights-of-way that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigation unless the Federal Government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

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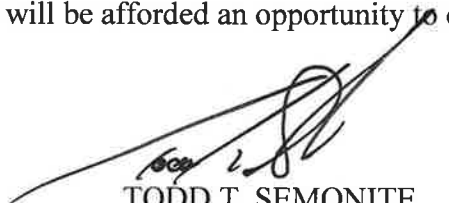
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j. Assume complete financial responsibility, as between the Federal Government and the non-federal sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements,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

k. Agree, as between the Federal Government and the non-federal sponsor, that the non-federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.

10. The recommendation contained herein reflects the information available at this time and current departmental policies governing the formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of the national civil works construction program or the perspective of higher levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to Congress for authorization and/or implementation funding. However, prior to transmittal to Congress, the state, interested federal agencies, and other parties will be advised of any significant modifications in the recommendations and will be afforded an opportunity to comment further.

*Great Project -  
an innovative beneficial  
use of dredged material  
from a Federal navigation  
project to reduce coastal  
storm risk to Delaware  
communities.*



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