



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

03 FEB 1999

CECW-PE (10-1-7a)

SUBJECT: Delaware Bay Coastline, Delaware and New Jersey, Roosevelt Inlet-Lewes Beach, Delaware, Interim

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on the study of hurricane and storm damage reduction for the community of Lewes Beach, Delaware, on the Delaware Bay Coastline, in Sussex County, Delaware. It is accompanied by the report of the district and division engineers. These reports are in partial response to a resolution adopted by the Committee on Public Works and Transportation of the United States House of Representatives dated 1 October 1986. This resolution requested review of existing reports of the Chief of Engineers concerning the tidal portion of the Delaware Bay and its tributaries to determine whether any modifications of the conclusions and recommendations contained in the previous reports are advisable at the present time. Preconstruction engineering and design activities, if funded, would be continued under the study authorities cited above.
2. The district and division engineers determined that the Federal navigation works in the vicinity of Lewes Beach are the primary cause of the shoreline erosion at Lewes Beach. These navigation works include a breakwater that provides a harbor of refuge inside Cape Henlopen and jetties and a navigation channel at Roosevelt Inlet. The Federal navigation works have interrupted the natural longshore sand transport, resulting in accelerated shoreline erosion at Lewes Beach. The impacts of the Federal navigation works leave the community of Lewes Beach at a greater risk to damages from hurricanes and coastal storms. The existing Federal navigation projects are described in the district's feasibility report. In addition, the Delaware Breakwater project is described in greater detail in House Document 92, 45th Congress, 3rd session; the Harbor of Refuge, Delaware Bay project, is described in House Document 112, 52nd Congress, 1st session, and the entrance channel and jetty modifications to the Inland Waterway from Rehoboth Bay to Delaware Bay, Delaware, project is described in greater detail in House Document 56, 74th Congress, 1st session.
3. The plan developed by the district engineer consists of a 25-foot wide berm at an elevation of +8.0 feet North American Vertical Datum (NAVD) and a dune with a top elevation of +14.0 feet NAVD and crest width of 25 feet. The total project width of the berm and dune, including side slopes, is 100 feet. The plan also includes dune grass planting, dune fencing, and suitable beachfill with periodic nourishment to ensure the integrity of the design. Lands, easements, and rights-of-way are included as required for the initial construction and maintenance of the project. The

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rights-of-way are included as required for the initial construction and maintenance of the project. The beachfill would extend from Roosevelt Inlet eastward for 900 feet to the intersection of Nebraska and Bay Avenues. A 500-foot taper would extend eastward from this limit for a total project length of 1400 feet. The plan requires an estimated 174,000 cubic yards of initial fill and subsequent periodic nourishment of 132,000 cubic yards, on average, every 6 years for 50 years. The anticipated method of construction would be to place dredged material from Roosevelt Inlet on the beach. The recommended plan also provides for a 550 feet long terminal groin at the western end of Lewes Beach, with an additional 160-foot taper to tie-in with the existing revetment. The groin would be parallel to and would extend into the bay an equal distance as the groin on the opposite side of the inlet. The groin would have a top elevation of +8.0 feet NAVD, bottom elevation of -3.0 feet NAVD, top width of 12 feet, and side slopes of 2H:1V.

4. Based on October 1998 price levels, the initial construction cost of the plan is estimated at \$3,393,000. Under cost sharing specified by the Water Resources Development Act (WRDA) of 1986, Public Law 99-662, \$2,620,000 of the initial construction cost of the plan would be Federal and \$773,000 would be non-Federal. Project costs are allocated to compensation for the impact of Federal navigation projects and storm damage reduction. The plan developed by the district engineer is considered a modification to the existing Federal navigation works responsible for shoreline erosion. Of the total project cost, 16.7 percent is assigned to mitigation of breakwater impacts, 75 percent is assigned to mitigation of jetty impacts and 8.3 percent is assigned to storm damage reduction. Of the Federal share, 100 percent of the initial construction cost of the recommended plan assigned to mitigation of breakwater impacts would be \$564,000; 74 percent of the initial construction cost of the recommended plan assigned to mitigation of jetty impacts would be \$1,874,000; and 65 percent of the initial construction cost of the non-mitigation portion of the recommended plan assigned to storm damage reduction would be \$182,000. Of the non-Federal share, the total cash contribution required would be \$757,000. The land requirements would be a non-Federal responsibility and the balance of the non-Federal share would consist of \$16,000 for the estimated creditable cost for lands, easements, rights-of-way, relocations, and suitable borrow and dredged or excavated material areas. Of the non-Federal share, 26 percent of the initial construction cost of the recommended plan assigned to mitigation of jetty impacts would be \$659,000 and 35 percent of the first cost of the recommended plan assigned to the non-mitigation portion of the plan for storm damage reduction would be \$98,000. Under the provisions of WRDA 1986, the non-Federal sponsor would also be required to pay 100 percent of the OMR&R estimated to total \$865,000 over fifty years.

5. The proposed plan calls for renourishment of the oceanfront beachfill, on average, every 6 years, or 8 times during the 50-year period following the initial construction. At October 1998 prices, each renourishment cost is estimated at \$1,232,000. However, in the twenty-fourth year of the project a cost adjustment of an additional \$1,355,000 is made for nourishment requirements of a low frequency but high intensity storm. The cumulative costs over 50 years

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for periodic renourishment would be \$11,210,000. Total periodic renourishment costs also include beachfill performance monitoring and major renourishment costs. In accordance with cost sharing specified by WRDA 1986, the cumulative costs over 50 years for periodic renourishment would be allocated \$8,698,000 Federal and \$2,512,000 non-Federal. The ultimate project cost, including initial construction and periodic nourishment, is estimated at \$14,603,000 allocated, \$11,318,000 Federal, and \$3,285,000 non-Federal.

6. Based on a discount rate of 6.875 percent and a 50-year period of economic analysis, average annual national economic development (NED) benefits accruing to the shore protection project are estimated at \$602,000, and average annual costs are estimated at \$461,000. Equivalent annual net benefits are estimated at \$141,000. The resulting ratio of benefits-to-costs is 1.3. The shore protection plan developed by the district engineer is the NED plan.

7. The Administration has proposed a new cost sharing policy for the periodic nourishment of shore protection projects. This proposed cost sharing change does not apply to periodic nourishment costs associated with navigation works mitigation, which will continue to be cost shared in accordance with WRDA 1986. However, under the proposed cost sharing policy, periodic nourishment assigned to storm damage reduction (8.3 percent of total project cost) will generally be 35 percent Federal and 65 percent non-Federal. The total cumulative cost of periodic nourishment assigned to the non-mitigation portion of the plan is \$930,000. The Federal cumulative cost of periodic nourishment assigned to the non-mitigation portion of the plan would be 35 percent or \$325,000 and the non-Federal cost would be 65 percent or \$605,000. The cumulative costs over 50 years for periodic renourishment for the entire proposed project to include the effect of the Administration's proposal would be allocated \$8,418,000 Federal and \$2,792,000 non-Federal. The total ultimate project cost, including initial construction, periodic nourishment and monitoring is estimated at \$14,603,000 allocated, \$11,038,000 Federal, and \$3,565,000 non-Federal.

8. The plan developed by the reporting officers is technically sound, economically justified, and environmentally and socially acceptable. The plan conforms with essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, and other Administration, U.S. Army Corps of Engineers, and legislative policies and guidelines. Washington level review indicates that the proposed plan is technically sound, economically justified and environmentally and socially acceptable. Also, the views of interested parties, including Federal, State, and local agencies, have been considered. The non-Federal sponsor supports the project identified by the reporting officers and supports its implementation consistent with cost sharing enacted by Congress in law.

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9. Accordingly, I recommend that the improvements for mitigating impacts caused by the Federal navigation works and hurricane and storm damage reduction be authorized in accordance with the reporting officers recommended plan, subject to the Administration's proposed cost sharing for shore protection projects, with such modifications as the Chief of Engineers deems advisable. My recommendation for Federal implementation is subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies and with the following requirements:

- a. Enter into an agreement which provides, prior to construction, 25 percent of design costs;
- b. Provide, during construction, any additional funds needed to cover the non-Federal share of design costs;
- c. Provide 35 percent of the initial construction costs assigned to the non-mitigation portion of the project for hurricane and storm damage reduction and, for the impacts attributable to Federal navigation works, share in the costs in the same proportion as the cost sharing provisions applicable to the project causing the erosion impacts (26 percent of project costs assigned to mitigation of jetty impacts), and as further specified below:
 - (1) Provide all lands, easements, and rights-of-way, including suitable borrow areas, and perform or ensure the performance of any relocations determined by the Federal Government to be necessary for the initial construction, periodic nourishment, operation, and maintenance of the project;
 - (2) Provide, during construction, for the non-mitigation portion of the project, any additional amounts as are necessary to make its initial contribution equal to 35 percent of initial construction costs assigned to hurricane and storm damage reduction;
 - (3) Provide, during construction, for the impacts attributable to Federal navigation works, any additional amounts necessary to make its cost share equal to the same proportion as the cost sharing provisions applicable to the project causing the erosion impacts.
- d. Provide, during construction, 65 percent of each periodic nourishment costs assigned to the non-mitigation portion of the project for hurricane and storm damage reduction and, for the impacts attributable to Federal navigation works, share in the periodic nourishment costs in the same proportion as the cost sharing provisions applicable to the project causing the erosion impacts (26 percent of project costs assigned to mitigation of jetty impacts);

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e. For so long as the project remains authorized, 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 purpose and in accordance with applicable Federal and State laws and regulations, and any specific directions prescribed by the Federal Government.

f. Grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor, now or hereafter, owns or controls for access to the project for the purpose of inspection and, if necessary after failure to perform by the non-Federal sponsor, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Federal Government shall relieve the non-Federal sponsor of responsibility to meet the non-Federal sponsor's obligations, or to preclude the Federal Government from pursuing any other remedy at law or equity to ensure faithful performance.

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

h. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR), Section 33.20.

i. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 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 required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations 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.

j. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated

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materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project.

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

l. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the initial construction, periodic nourishment, operation, and maintenance of the project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

m. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S. C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

n. Provide the non-Federal share (35 percent of initial construction and 65 percent of periodic nourishment) of that portion of total historic preservation mitigation and data recovery costs attributable to hurricane and storm damage reduction that are in excess of 1 percent of the total amount authorized to be appropriated for the project; and provide the non-Federal share of that portion of total historic preservation mitigation and data recovery costs attributable to the navigation impacts in the same proportion as the cost sharing provision applicable to the project causing the erosion impacts (26 percent of project costs assigned to mitigation of jetty impacts) that are in excess of 1 percent of the total authorized to be appropriated for the project;

o. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

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p. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation and maintenance of the project.

q. Not less than once each year, inform affected interests of the extent of protection afforded by the project.

r. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies, for their use in preventing unwise future development in the floodplain, and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the project.

s. For so long as the project remains authorized, the non-Federal sponsor shall ensure continued conditions of public ownership and use of the shore upon which the amount of Federal participation is based.

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

u. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

v. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

w. At least annually 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 Government.

10. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch.

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Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the State of Delaware; interested Federal agencies; and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



JOE N. BALLARD
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Chief of Engineers