



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

DAEN (1105)

June 10, 2022

MEMORANDUM FOR THE SECRETARY OF THE ARMY

SUBJECT: Charleston Peninsula, South Carolina, Coastal Storm Risk Management

1. I submit for transmission to Congress my report on the study of coastal storm risk management for the Charleston Peninsula, South Carolina. It is accompanied by the report of the Charleston District Commander. This report is an interim response to a resolution of the Senate Committee on Environment and Public Works, adopted April 22, 1988, which authorizes the Secretary of the Army to study the entire Coast of South Carolina in the interests of beach erosion control, hurricane protection, and related purposes. This report is also an interim response to Public Law 84-71, which authorizes an examination and survey to be made of the eastern and southern seaboard of the United States with respect to hurricanes, with particular reference to areas where severe damages have occurred, to include possible means of preventing loss of human lives and damages to property. Preconstruction engineering and design (PED), if funded, will continue under these same study authorities.

2. The reporting officers recommend a plan that will reduce the risk of potential damage caused by coastal storms. The recommended plan is the National Economic Development (NED) Plan with the following features:

a. A storm surge wall approximately 8.7 miles in length along the perimeter of the peninsula (7.2 miles of T-wall on land and 1.5 miles of steel combination wall in marsh) with a top elevation of 12 feet North American Vertical Datum of 1988 (NAVD88).

b. The storm surge wall would include multiple pedestrian, vehicle, railroad, and storm (tidal flow) gates.

c. Approximately five temporary and five permanent small to medium hydraulic pump stations.

d. Approximately 9,300 feet of oyster reef-based living shoreline sills.

e. Floodproofing or elevating for approximately 100 structures, with a minimum first floor elevation of 12 feet NAVD88, in residential areas where construction of the storm surge wall would be impracticable.

f. After avoidance and minimization, the recommended plan would have some remaining adverse environmental impacts which will be fully mitigated. The storm surge wall in the marsh

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would permanently impact approximately 35 acres of salt marsh wetlands. Compensatory mitigation is expected to be accomplished through purchase of credits from an approved wetland mitigation bank with an estimated first cost for wetland mitigation of \$7,602,000. The storm surge wall would also permanently impact aesthetic resources. Compensatory mitigation would be accomplished through design modifications to be developed during PED. Adverse effects to historic properties will continue to be avoided, minimized, and then compensated for during PED under a Programmatic Agreement involving continued consultation with the South Carolina State Historic Preservation Office, National Park Service, Advisory Council on Historic Preservation, and other appropriate entities.

3. The City of Charleston is the non-federal cost-sharing sponsor for all features.

4. Project costs for the recommended plan are allocated to the coastal storm risk management purpose and based on October 2021 (Fiscal Year 2022) price levels.

a. Project First Cost. The estimated project first cost of the recommended plan is \$1,132,096,000. This project first cost estimate includes the cost for lands, easements, rights-of-way, relocations, and disposal areas (LERRDs) of \$145,439,000.

b. Estimated Federal and Non-federal Share. The total estimated federal and non-federal shares of the project first cost are \$735,862,000 and \$396,234,000, respectively, in accordance with Section 103(c)(5) of WRDA 1986, as amended (33 U.S.C. § 2213(c)(5)).

c. The estimated average annual cost of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) is \$3,000,000. The OMRR&R activities, which will be conducted in accordance with the provisions of an O&M Manual that is developed during PED, include operation and maintenance of floodwalls, gates, and other flood control structures, repair to damaged sections of the living shoreline sills, and monitoring and inspections to ensure the project functions as designed. The non-federal sponsor will be responsible for 100 percent of the OMRR&R costs.

5. Based on a 2.25 percent discount rate and a 50-year period of analysis, the average annual equivalent costs of the project are estimated to be \$42,500,000. The average annual equivalent benefits for the project are estimated to be \$493,000,000 with net average annual benefits of \$447,500,000, which results in a benefit-to-cost ratio of approximately 10.8 to 1. All project costs are allocated to the authorized purpose of coastal storm risk management.

6. The storm surge wall would prevent stillwater overtopping for a 0.7% annual exceedance probability (AEP) surge event in 2032 and a 1% AEP event in 2082, assuming an intermediate rate of sea level rise. The construction of the storm surge wall would allow its elevation to be raised to adapt to changing conditions. The nonstructural measures would have the same level of performance as the storm surge wall. The recommended plan would greatly reduce, but not eliminate, the risk of future damages from coastal storm surge. The expected damages remaining, or residual damages are estimated to be around 17 percent. The recommended plan, together with

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appropriate risk communication and planning by the City of Charleston, would effectively reduce life safety risk from coastal storm surge.

7. In accordance with the U.S. Army Corps of Engineers guidance on review of decision documents, all technical, engineering, and scientific work underwent an open, dynamic, and rigorous review process. This included district quality control, agency technical review, a headquarters policy and legal compliance review, and Independent External Peer Review. All concerns of the reviews have been addressed and incorporated into the final report. A Safety Assurance Review will be conducted during PED.

8. Washington level review indicates that the plan recommended by the reporting officers complies with all essential elements of the U.S. Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. The recommended plan complies with administrative and legislative policies and guidelines. The views of interested parties, including federal, state, and local agencies, have been considered and all comments from public reviews have been addressed and incorporated into the final report documents where appropriate.

9. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that coastal storm risk management improvements for the Charleston Peninsula be authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of \$1,132,096,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. Federal implementation of the project for coastal risk management includes, but is not limited to, the following items of local cooperation to be undertaken by the non-federal sponsor in accordance with applicable federal laws, regulations, and policies:

a. Provide 35 percent of construction costs, as further specified below:

i. 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;

ii. Provide all lands, easements, rights-of-way, and placement areas and perform all relocations determined by the Federal government to be required for the project;

iii. Provide, during construction, any additional contribution necessary to make its total contribution equal to at least 35 percent of construction costs;

b. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) that might reduce the level of coastal storm risk reduction the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;

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c. Inform affected interests, at least yearly, of the extent of risk reduction afforded by the project; participate in and comply with applicable Federal floodplain management and flood insurance programs; prepare a floodplain management plan for the project to be implemented not later than one year after completion of construction of the project; 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 the project;

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

e. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project to inspect the project, and, if necessary, to undertake work necessary to the proper functioning of the project for its authorized purpose;

f. Hold and save the Federal government free from all damages arising from design, construction, operation, maintenance, repair, rehabilitation, and replacement of the project, except for damages due to the fault or negligence of the Federal government or its contractors;

g. Perform, or ensure performance of, any investigations for hazardous, toxic, and radioactive wastes (HTRW) that are determined necessary to identify the existence and extent of any HTRW regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, and any other applicable law, that may exist in, on, or under real property interests that the Federal government determines to be necessary for construction, operation and maintenance of the project;

h. Agree, as between the Federal government and the non-Federal sponsor, to be solely responsible for the performance and costs of cleanup and response of any HTRW regulated under applicable law that are located in, on, or under real property interests required for construction, operation, and maintenance of the project, including the costs of any studies and investigations necessary to determine an appropriate response to the contamination, without reimbursement or credit by the Federal government;

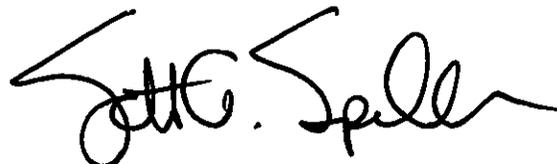
i. Agree, as between the Federal Government and the non-federal sponsor, that the non-federal sponsor shall be considered the owner and operator of the project for the purpose of CERCLA liability or other applicable law, and to the maximum extent practicable shall carry out its responsibilities in a manner that will not cause HTRW liability to arise under applicable law; and

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j. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4630 and 4655) and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring real property interests necessary for construction, operation, and maintenance of the project including those necessary for relocations, and placement area improvements; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

10. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. These recommendations do 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. Consequently, the recommendations may be modified before they are transmitted to Congress as proposals for authorization and implementation funding. However, prior to transmittal to Congress, the non-federal sponsor, the state, interested federal agencies and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

A handwritten signature in black ink, appearing to read "S.A. Spellmon". The signature is stylized with a large initial "S" and a long horizontal flourish at the end.

SCOTT A. SPELLMON
Lieutenant General, USA
Chief of Engineers