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

JAN 19 2021

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SUBJECT: Fairfield and New Haven Counties, Connecticut, Coastal Storm Risk Management

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management for Fairfield and New Haven Counties, Connecticut. It is accompanied by the report of the New England District Commander. This report is an interim response to the study authority contained in a resolution by the Committee on Transportation and Infrastructure of the United States House of Representatives, dated 29 April 2010. The resolution directed the Secretary of the Army to review the report of the Chief of Engineers on Land and Water Resources of the New England-New York Region, published as Senate Document No. 14, 85th Congress, 1st Session, and other reports to determine whether any modifications of the recommendations contained therein are advisable in the interest of flood damage reduction, coastal storm damage reduction, coastal erosion, and other related purposes in the vicinity of the estuaries and shoreline of Fairfield and New Haven Counties, Connecticut. Pre-construction engineering and design, if funded, will continue under the authority cited above.

2. The reporting officers recommend a project that will reduce the potential damage caused by coastal storms and improve safety and coastal resiliency of the Long Wharf study area in the City of New Haven. Based on an evaluation of alternative plan costs and economic benefits, the recommended plan is the National Economic Development (NED) plan. The non-federal sponsors, the Connecticut Department of Energy and Environmental Protection (CT DEEP) and the City of New Haven, support the recommended plan. The recommended plan consists of construction of approximately 5,800 linear feet of pile-supported floodwall with a top elevation of +15 feet North Atlantic Vertical Datum of 1988 (NAVD88), along with 475 linear feet of deployable flood gates (closure structures), five deployable road closure structures, and one pump station.

3. The CT DEEP and the City of New Haven are the non-federal cost sharing sponsors for all features. Project costs for the recommended plan are based on October 2020 (Fiscal Year 2021) price levels.

a. Project First Cost. The estimated first cost of the recommended plan is $133,141,000. This estimate includes $117,793,000 for construction; $397,000 for lands, easements, right-of-ways, relocations, and dredged or excavated material

disposal areas (LERRDs), including federal administrative costs; $8,970,000 for planning, engineering and design; and $5,980,000 for construction management.

b. Estimated Federal and Non-Federal Share. In accordance with the cost sharing provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S. Code 2213), the federal share of the project first cost is estimated to be $86,542,000 and the non-federal share is estimated to be $46,599,000, which equates to 65 percent federal and 35 percent non-federal. The non-federal costs include the value of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas.

c. The non-federal sponsor is responsible for the annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction, estimated at $1,371,000 per year.

4. Based on a 2.50 percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $6,246,000. All project costs are allocated to the authorized purpose of coastal storm risk management. The equivalent average annual benefits are estimated to be $14,028,000 with net average annual benefits of $7,782,000. The benefit to cost ratio is approximately 2.2 to 1. The project would reduce coastal damages to residential and commercial property and transportation infrastructure in the coastal flood plain.

5. Risk and uncertainty factored into the economic analysis through the use of statistical risk-based models. HEC-FDA was used to formulate and evaluate the suite of alternatives within the Long Wharf District (New Haven) focused study area. The HEC-FDA program computes stage-damage curves and equivalent annual damages (with and without project) based on water surface profiles by flood event probability, asset (structure) inventory and damage relationship functions. Uncertainty or error distributions associated with estimating the depth damage functions, structure values, content value ratios, other value ratios and first flood stage are used to develop the total aggregated stage damage-uncertainty functions by damage categories for the damage reach. The project is intended to address coastal storm inundation and manage and reduce damages to structures and adjacent transportation infrastructure.

6. In accordance with Engineering Regulation 1100-2-8126, Incorporating Sea Level Change in Civil Works Programs, the study's analysis evaluated the effects of different rates of sea level change on the structure with and without project condition. The selection of the recommended plan considered how the uncertainty across all future sea level scenarios (i.e. low, intermediate, and high) affects risk levels and plan performance through either a robust design or adaptive capacity. None of the sea level scenarios is considered more likely than any other, nor should it be assumed that the future will follow any one of the scenarios exactly. To address this uncertainty, project performance was assessed by estimating the period of time that the project would

perform at or above a desired level. Based on this additional analysis, it was decided that the intermediate rate of sea level rise offered the best balance between equally unlikely scenarios (i.e. the historic rate of sea level rise continuing indefinitely and the high rate including accelerated rates of change caused by warming temperatures and accelerated ice melt) that risk underperformance and over-performance.

7. In accordance with the U.S. Army Corps of Engineers policy on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and rigorous review process to ensure technical quality. This includes District Quality Control, Agency Technical Review, and a headquarters policy and legal review. Independent External Peer Review was not required. All comments from the above referenced reviews have been addressed and incorporated into the final documents.

8. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the 1983 U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land Related Resources Implementation studies and complies with other administrative and legislative policies and guidelines. Also, the views of interested parties, including federal, state and local agencies have been considered.

9. I concur with the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce coastal storm damages to Fairfield and New Haven Counties be authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of $133,141,000 with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing and other applicable requirements of federal and state laws and policies, including Section 103 of WRDA 1986, as amended. The non-federal sponsor would provide the non-federal cost share and all LERRD. Further, the non-federal sponsor would be responsible for all OMRR&R. This recommendation is subject to the non-federal sponsor agreeing to comply with all applicable federal laws and policies, including but not limited to:

a. Provide a minimum of 35 percent of initial project costs assigned to coastal storm risk management, and as further defined below:

i. Provide, during design, 35 percent of design costs allocated to coastal storm risk management 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 perform or assure performance of all relocations, including utility relocations, as determined by the Federal Government to be necessary for initial construction or operation and maintenance of the project, all in compliance with 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. Par 24.

iii. Provide, during construction, any additional amounts necessary to make its total contribution equal to 35 percent of initial project costs assigned to coastal storm risk management;

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 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 risk reduction afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of the WRDA 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 risk reduction levels provided by the project;

d. Operate, maintain, repair, replace, and rehabilitate the completed project, or function 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. Hold and save the United States free from all damages arising from the initial construction, operation, maintenance, repair, replacement, and rehabilitation of the project, except for damages due to the fault or negligence of the United States or its contractors;

f. Perform, or ensure performance of, 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 USC 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, operation and maintenance of the project;

g. Assume, as between the Federal Government and the non-federal sponsor, complete financial responsibility 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 for the initial construction, or operation and maintenance of the project; and

h. 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, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

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 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 the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the non-federal sponsor, the state, interested federal agencies and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

SCOTT A. SPELLMON
Lieutenant General, USA
Chief of Engineers