DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, DC 20310-2600

DEC 19 2018

DAEN

SUBJECT: Pawcatuck River Coastal Storm Risk Management Project

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm risk management for the Pawcatuck River, Rhode Island. It is accompanied by the report of the district and division engineers. This report is an interim response to the study authority contained in a resolution by the Committee on Public Works of the U.S. Senate, dated 12 September 1969. Authorization and funding for this report was also provided under investigations heading, Title X, Chapter 4, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013. Preconstruction engineering and design activities for the project will continue under this most recent authority.

2. The reporting officers recommend a project that will contribute to economic efficiency by providing coastal storm risk management. Based on an evaluation of alternative plan costs and economic benefits, the Recommended Plan is a Locally Preferred Plan (LPP) that costs less than the National Economic Development (NED) plan. The non-federal sponsor, the Rhode Island Coastal Resources Management Council (RICRMC), supports the LPP.

a. The NED plan consists of proposed work on 385 structures: elevating 357 structures to a target elevation of Base Flood Elevation + 1' + intermediate sea level change (0.8' over the next 50 years), the flood proofing of 21 primarily commercial structures, and the acquisition of 7 Coastal Barrier Resource Act unit related properties, including their demolition and restoration of the site to natural conditions.

b. Working with the communities, the RICRMC identified 102 structures that if elevated would subject these sub-standard constructed, single season use structures to additional storm damage risk (in addition, these structures are not owned by the same entity who owns the land), 7 structures that were scheduled for elevation through other means, and 1 structure that had already been elevated. These structures, along with the 7 properties identified for acquisition, were eliminated from the NED plan. The resulting LPP consists of proposed work on 268 structures: elevating 247 structures and flood proofing 21 commercial structures. It is recommended that the LPP be authorized for implementation over a 20-year term construction period. The risk evaluation and forecast, plan selection, and risk reduction design elevations are based on the projection of an intermediate rate of relative sea level rise.

3. RICRMC is the non-federal cost sharing sponsor for all features. Based on October 2018 price levels (Fiscal Year 2019), the estimated project first cost of the NED plan is $77,320,000

and the estimated project first cost of the LPP is $54,660,000. Since the LPP is of less cost than the NED plan, the LPP will receive full federal cost sharing in accordance with the provisions of Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended by Section 215 of WRDA 1999, as follows.

4. The federal share of the LPP cost for initial construction would be approximately $35,530,000 and the non-federal share would be approximately $19,130,000, which equates to 65 percent federal and 35 percent non-federal (with estimated lands, easements, rights-of-way, relocations and dredged or excavated material disposal areas (LERRD) applied). The non-federal costs include the value of LERRD estimated to be $2,850,000. Once eligible properties have been identified, the non-federal sponsor will be required to obtain temporary work area easements for construction, staging and storage, in accordance with construction requirements. The non-federal sponsor will also be required to obtain permanent easements limiting alteration of the elevated or flood proofed structure for human habitation below a height corresponding to the targeted first floor elevation for each structure in the case of elevation. The easement shall be recorded by the non-federal sponsor in the public records of the county in which the property is located prior to commencement of the non-structural improvements on the property.

5. Based on the Fiscal Year 2019 discount rate of 2.875 percent and a 50-year period of analysis, the total equivalent average annual costs of the project are estimated to be $2,110,000. All project costs are allocated to the authorized purpose of coastal storm risk management. The equivalent average annual benefits are estimated to be $8,860,000 with net average annual benefits of $6,750,000. The benefit to cost ratio is approximately 4.2 to 1. The project would reduce coastal damages to residential and commercial property in the coastal flood plain.

6. Risk and uncertainty was factored into the economic analysis through the use of statistical risk based models. Beach-fx, was used in the study to formulate and evaluate the structural alternatives in Westerly. The non-structural evaluations for all four study area communities were conducted using HEC-FDA, which is a probability based model. 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 prevent damages to structures; it is not intended to, nor will it, reduce the risk to loss of life during major storm events. Loss of life can only be prevented by residents and visitors following the local evacuation plans that are already in place. These residual risks have been communicated to the residents of the Pawcatuck coastal communities.

7. In accordance with the Corps Engineering Regulation (ER 1100-2-8162) on sea level change, the study's analysis evaluated the effects of different rates of sea level change on the structure with and without project condition. The Corps' Climate Preparedness & Resilience Community

of Practice suggested that the final plan selection must consider 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 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. However, the Corps will continue to monitor local conditions and determine if the intermediate scenario of relative sea level rise is occurring. If observed conditions deviate from the intermediate forecast during design or construction, reevaluation of the LPP will be required.

8. In accordance with the Corps' Engineering Circular (EC 1165-2-214) on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and rigorous review process to ensure technical quality. This included District Quality Control review, Agency Technical Review (ATR), Major Subordinate Command review and a Corps Headquarters policy and legal review. All concerns of the ATR have been addressed and incorporated into the final report. The requirement to perform Independent External Peer Review was waived by Corps Headquarters since there was no Environmental Impact Statement for the study, it had negligible adverse impacts to the environment and is not controversial. All comments from the above referenced reviews have been addressed and incorporated into the final documents. Overall, the reviews resulted in improvements to the technical quality of the report.

9. 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.

10. I concur in the findings, conclusions and recommendations of the reporting officers. Accordingly, I recommend the plan to reduce hurricane and storm damages for the Pawcatuck River Coastal Storm Risk Management Project to be authorized in accordance with the reporting officers' recommended plan at an estimated project first cost of $54,660,000 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 off 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 Operations, Maintenance, Repair, Replacement &

Rehabilitation (OMRR&R). This recommendation is subject to the non-federal sponsor agreeing to comply with all applicable federal laws and policies.

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

(1) 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;

(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 construction and for 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 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 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 use of the elevated or flood proofed structure in a manner consistent with which the federal participation is based;

f. Hold and save the United States free from all damages arising from the initial construction, OMRR&R of the project, except for damages due to the fault or negligence of the United States or its contractors;

g. 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;

h. 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;

i. 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;

11. 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 significant modifications and will be afforded an opportunity to comment further.

TODD T. SEMONITE
Lieutenant General, USA
Chief of Engineers

An important investment to protect the citizens of Westerly, Charleston, South Kingston, and Narragansett, R.I. Proud to endorse this critical project to protect up to 247 families in danger.