



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

DAEN

SUBJECT: Ala Wai Canal Flood Risk Management Study, Oahu, Hawaii

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on flood risk management in the Ala Wai Canal watershed, within the City and County of Honolulu, Oahu, Hawaii. It is accompanied by the reports of the district and division engineers. These reports were completed under authorities granted by Section 209 of Public Law 84-874, the Flood Control Act of 1962. The law provides the authority for the Secretary of the Army “to cause surveys for flood control and allied purposes, including channel and major drainage improvements, and floods aggravated by or due to wind or tidal effects, to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities: Harbors and rivers in Hawaii, with a view to determining the advisability of improvements in the interest of navigation, flood control, hydroelectric power development, water supply, and other beneficial water uses, and related land resources.” Preconstruction engineering and design activities, if funded, would be continued under the authority provided by the Section 209 study authority cited above.

2. The reporting officers recommend authorization of a plan to reduce flood risk within the Ala Wai Canal watershed of Honolulu, Hawaii. The recommended plan consists of six in-stream debris and detention basins of varying height in the upper reaches of the watershed, one standalone debris catchment structure, three multi-purpose detention basins, floodwalls along the Ala Wai Canal averaging four feet in height and an earthen levee at the perimeter of an adjacent golf course averaging seven feet in height, two pump stations to reduce the threat of interior flooding, and a flood warning system. Unavoidable environmental impacts would be fully compensated for by modifying two existing in-stream structures to eliminate migratory passage barriers for native aquatic species. The recommended plan also includes post-construction monitoring and adaptive management for a period of 5 years to ensure project performance. The recommended plan is the National Economic Development Plan.

3. The State of Hawaii, Department of Land and Natural Resources (DLNR) is the non-Federal cost-sharing sponsor for all features. Based on October 2016 price levels, the estimated total first cost of the recommended plan is \$306,095,000. In accordance with the cost sharing provisions of Section 103 of the Water Resources Development Act of 1986 (WRDA 1986), as amended (33 U.S.C. 2213), flood risk management features are cost-shared at a rate of 65 percent Federal and 35 percent non-Federal. Thus, the Federal share of the total project first costs are estimated to be \$198,962,000 and the non-Federal share is estimated at \$107,133,000. The costs of lands, easements, rights-of-way, relocations, and excavated material disposal areas is estimated to be \$17,194,000. The total cost includes \$229,000 for environmental mitigation, \$46,250 for

1 This report contains the proposed recommendation of the Chief of Engineers. The recommendation is subject to change to reflect Washington level review and comments from Federal and State agencies.



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environmental monitoring and adaptive management. DLNR would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the project after construction, a cost currently estimated at \$985,000 per year. In addition to the above, DLNR would be fully responsible for performing the investigation, cleanup, and response of hazardous materials on the project sites. Currently, no hazardous material work is anticipated. Also in addition to the above, DLNR would be fully responsible for removing and relocating utilities and discharge pipelines on the project site that are non-compensable.

4. Based on a 2.875-percent discount rate and a 50-year period of analysis, the total equivalent annual costs of the project, including OMRR&R, are estimated to be \$13,117,000. The equivalent average annual benefits are estimated to be \$48,331,000 with net average annual benefits of \$35,214,000. The benefit-to-cost ratio is 3.68 to 1. The selected plan is estimated to be 99 percent reliable in protecting portions of the study area from a flood which has a one percent chance of occurrence in any year (100-year flood). The selected plan would reduce average annual flood damages by about 90 percent and would leave average annual residual damages estimated at \$5,388,000.

5. The goals and objectives included in the Campaign Plan of the U.S. Army Corps of Engineers have been fully integrated into the Ala Wai Canal Flood Risk Management study process. The recommended plan was developed in coordination and consultation with various Federal, State, and local agencies using a systems approach in formulating flood risk management solutions and in evaluating the impacts and benefits of those solutions. Plan formulation evaluated a wide range of non-structural and structural alternatives under Corps policy and guidelines as well as consideration of a variety of economic, social and environmental goals. The recommended plan delivers a holistic, comprehensive approach to solve water resources challenges in a sustainable manner.

6. In accordance with USACE Sea Level Change Guidance, ER 1100-2-8162, the study evaluated potential impacts of sea level change in formulating and engineering the recommended plans. The risk reduction system features proposed are based on the intermediate Relative Sea Level Rise (RSLR) projection. The equivalent average annual benefits are estimated to range from nearly \$46.2 million under the low sea level change (SLC) scenario to nearly \$48.3 million under the intermediate SLC scenario. Corresponding annual net benefits range from approximately \$33 million to \$35 million, with benefit-cost ratios ranging from 3.5 to 3.68. The high SLC scenario was not evaluated for economics, but the recommended plan shows high project performance with a 99% conditional non-exceedance probability over a 50-year period under all SLC scenarios. An extension of the floodwall to protect against coastal flooding in the lower tidal portion of the study area was warranted to improve the resiliency of the overall system beyond the 50-year period of analysis. USACE will continue to monitor local conditions and determine if the intermediate scenario of RSLR is occurring. If observed conditions deviate from intermediate to high sea level forecasts during design or construction, reevaluation of the National Economic Development plan will be required.

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7. In accordance with U.S. Army Corps of Engineers policy on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and vigorous review process to ensure technical quality. This included District Quality Control (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR) and a Corps Headquarters policy and legal review. All concerns of the ATR and IEPR have been addressed and incorporated into the final report. Overall the reviews have resulted in the improvement of the technical quality of the report.

8. Washington level review indicated that the plan recommended by the reporting officers is technically sound, economically justified, and environmentally and socially acceptable. As the report discusses, residual risk will remain with this plan in place and the report emphasizes the role of the non-Federal sponsor in addressing and communicating residual risk. The plan complies 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 complies with other administration and legislative policies and guidelines. Also, 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 improve flood risk management in the Ala Wai Canal watershed be authorized in accordance with the reporting officers' recommended plan at an estimated first project cost of \$306,095,000 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 (33 U.S.C. 2213). The non-Federal sponsor would provide the non-Federal cost-share and all lands, easements, rights-of-way, relocations, and disposal areas. 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, as well as the following:

- a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:
 1. Provide 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, during the first year of construction, any additional funds necessary to pay the full non-federal share of design costs;
 3. Provide, during construction, a contribution of funds equal to 5 percent of total project costs;
 4. Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all improvements required on lands, easements, and rights-of-way to enable the

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disposal of dredged or excavated material all as determined by the Government to be required or to be necessary for the construction, 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;

5. Provide, during construction, any additional funds necessary to make its total contribution equal to 35 percent of total project costs;
- b. 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;
- c. 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 level of protection the project affords, hinder operation and maintenance of the project, or interfere with the project's proper function;
- d. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portions of the project, including any mitigation features, 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 construction, operation, maintenance, repair, rehabilitation, and replacement of the project and any betterments, 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), Public Law 96-510, as amended (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 construction, operation, and maintenance of the project;

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- 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 that the Federal Government determines to be required for construction, 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, rehabilitate, and replace the project 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 formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. 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 Congress, the 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