



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

DAEN

23 Apr 2020

SUBJECT: Houston Ship Channel Expansion Channel Improvement Project, Harris, Chambers, and Galveston Counties, Texas, Final Integrated Feasibility Report – Environmental Impact Statement

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on navigation improvements for the Houston Ship Channel (HSC) Expansion Channel Improvement Project (ECIP), Harris, Chambers, and Galveston Counties, Texas. It is accompanied by the Final Integrated Feasibility Report - Environmental Impact Statement (FIFR-EIS) of the Galveston District Commander. This report is an interim response to the study authority, Section 216 of the Flood Control Act (FCA) of 1970 (Public Law [P.L.] 91-611), as amended. Section 216 of the 1970 FCA authorizes the Secretary of the Army to review the operation of projects constructed by the U.S. Army Corps of Engineers (USACE) when found advisable due to significantly changed physical, economic, or environmental conditions. Preconstruction engineering and design activities, if funded, would be continued under this same authority.

2. The reporting officers recommend a plan that will contribute to the economic efficiency of commercial navigation. The National Economic Development (NED) Plan includes widening 11 miles of the lower bay channel from 530 feet to 700 feet (Bolivar Roads to Redfish Reef). Additionally, Bayport Ship Channel (BSC) and Barbour's Cut Channels (BCC) would be widened up to 455 feet, with a flare expansion at BSC, and a combined flare and turning basin at BCC. HSC main channel segments from Boggy Bayou to the main turning basin would be deepened to depths ranging from 46.5 feet to 41.5 feet and improvements would be made to existing turning basins. Lastly, non-federal improvements for which the Government has already assumed maintenance would be added to the federal project. Based on Fiscal Year 2020 price levels, a 2.75 percent discount rate, and a 50-year period of analysis, the Project First Cost of the NED Plan is \$666,265,000, with average annual benefits of \$114,683,000; average annual costs of \$42,006,000; and a benefit-to-cost ratio of 2.73. The non-federal sponsor subsequently requested a Locally Preferred Plan (LPP) to allow for two additional increments of bay widening from Redfish Reef to BSC (10 miles) and BSC to BCC (5 miles) from 530 feet to 700 feet. The LPP is economically justified. In accordance with USACE policy, the LPP was submitted for consideration to the Assistant Secretary of the Army for Civil Works (ASA(CW)) and approved for consideration as the Recommended Plan on 5 August 2019. The Recommended Plan is the LPP and consists of the following navigation improvements (depths do not include overdepth or advance maintenance depths). All depths are in Mean Lower Low Water (MLLW):

- a. Four bend easings on the main HSC channel with associated relocation of barge lanes;

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- b. Widening of the HSC main channel between Bolivar Roads and BCC from the existing 530-foot width to 700 feet with associated relocation of barge lanes;
 - c. Widening of the BSC on the north side of the channel to 455 feet;
 - d. Widening of the BCC on the north side of the channel to 455 feet;
 - e. Widening of the BCC flare on the north and south side to create a 1,800-foot diameter turning basin;
 - f. Deepening of the HSC main channel from Boggy Bayou to the Hunting Turning Basin up to 46.5 feet;
 - g. Widening of the HSC main channel from Boggy Bayou to Greens Bayou from the existing 400-foot wide channel up to 530 feet;
 - h. Deepening of the HSC main channel from Sims Bayou to the I-610 Bridge up to 41.5 feet;
 - i. Deepening of the HSC main channel from the I-610 Bridge to the Main Turning Basin up to 41.5 feet;
 - j. Improving the Brady Island Turning Basin to a 900-foot diameter;
 - k. Inclusion of the Greens Bayou Channel, a 1.6-mile long channel with a combination of 41.5-foot depth and 16.5-foot depth, into the federal project;
 - l. Inclusion of the Jacintoport Channel, measuring 0.76-mile long by 41.5 feet deep, into the federal project;
 - m. Construction of the recommended plan involves the dredging of approximately 350 million cubic yards of material for both new work and additional operation & maintenance. Material will be removed using multiple types of dredge equipment using mechanical clamshell, hydraulic hopper, and hydraulic cutter suction. Proposed placement sites include upland disposal, marsh island creation, open water placement, and placement in existing ocean dredged material disposal sites, as outlined in the Dredged Material Management Plan;
 - n. To compensate for the unavoidable adverse effects on various significant habitat types, the project includes mitigation of approximately 377 acres of oyster habitat and 72 acres of wetland. Mitigation for wetland impacts would occur through purchase of wetland mitigation bank credits at a bank approved by the USACE Galveston District. Monitoring to determine the success of the mitigation is expected to last three years, but no more than 10 years;
 - o. To mitigate the anticipated air quality impacts from implementing the Recommended Plan, Discrete Emission Reduction Credits would be purchased through an existing emissions bank as outlined in the mitigation plan. This mitigation plan has been approved by the Texas Department of Environmental Quality.
3. The Port of Houston Authority (PHA) is the non-federal cost-sharing sponsor for all features.
 4. Project costs for the recommended plan are allocated to the commercial navigation purpose and are based on October 2019 (Fiscal Year 2020) price levels.

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- a. Project First Cost. The estimated project first cost of construction of the LPP is \$876,848,000, which includes the cost of constructing the general navigation features and the value of lands, easements, rights of-way and relocations estimated as follows: \$743,082,000 for channel modification and dredged material placement; \$81,758,000 for environmental mitigation; and \$52,008,000 for the value of lands, easements, rights-of-way, and relocations.
- b. Estimated Federal and Non-Federal Share. The estimated federal share and non-federal share are \$462,803,000 and \$414,045,000, respectively, as apportioned in accordance with the cost sharing provisions of Section 101 of the Water Resources Development Act (WRDA) 1986, as amended (33 U.S.C. 2211), as follows:
 - (1) The cost for the general navigation features from greater than 20 feet to 50 feet will be shared at a rate of 75 percent by the Government and 25 percent by the non-federal sponsor, plus
 - (2) 100 percent of the costs attributable to the dredging of the locally preferred segments will be the responsibility of the non-federal sponsor.
- c. Additional 10 Percent Payment. In addition to the non-federal sponsor's estimated share of the project first cost determined in (b) above, pursuant to Section 101(a)(2) of WRDA 1986, as amended (33 U.S.C. 2211(a)(2)), the non-federal sponsor must pay an additional 10 percent of the cost of the general navigation features for the NED Plan in cash over a period not to exceed 30 years, with interest. The value of lands, easements, rights-of-way, and relocations provided by the non-federal sponsor under Section 101(a)(3) of WRDA 1986, as amended (33 U.S.C. 2211(a)(3)), and the costs of utility relocations borne by the non-federal sponsor under Section 101(a)(4) of WRDA 1986, as amended (33 U.S.C. 2211(a)(4)), will be credited toward payment of this amount.
- d. Operations and Maintenance Costs. The additional annual cost of operation and maintenance (O&M) is estimated to be \$13,883,000 for the NED Plan and \$16,983,000 for the LPP. Since the NED Plan is in excess of -20 feet MLLW, but not in excess of -50 feet MLLW, the entire cost of the \$13,883,000 will be a federal expense, in accordance with Section 101(b)(1) of WRDA 1986, as amended (33 U.S.C. 2211(b)(1)). The sponsor has agreed to pay all O&M costs above the NED Plan, currently estimated at an annual cost of \$3,100,000.
- e. Estimated associated costs of \$82,813,000 include \$78,204,000 in non-federal costs for development of local service facilities (including dredging of berthing areas) and \$4,609,000 for navigation aids (a U.S. Coast Guard expense).
- f. Authorized Project Cost and Section 902 Calculation. The project first cost, for the purposes of authorization and calculating the maximum cost of the project pursuant to

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Section 902 of WRDA 1986, as amended (33 U.S.C. 2280), includes the cost of constructing the general navigation features and the value of lands, easements, and rights-of-way, and the value of relocations provided under Section 101(a)(3) of WRDA 1986, as amended (33 U.S.C. 2211(a)(3)). Accordingly, as set forth in paragraph 4.a., above, based on October 2019 prices, the estimated project first cost for these purposes is \$876,848,000 with an estimated federal share of \$462,803,000 and an estimated non-federal share of \$414,045,000.

5. Based on Fiscal Year 2020 price levels, a 2.75-percent discount rate, and a 50-year period of analysis, the total equivalent average annual cost of the project is estimated to be \$53,251,000. The average annual equivalent benefits are estimated to be \$133,551,000. The average annual net benefits are \$80,300,000. The benefit-to-cost ratio for the recommended plan is 2.51.

6. The goals and objectives included in the USACE Campaign Plan have been fully integrated into the HSC study process. The recommended plan was developed in coordination and consultation with various federal, state, and local agencies using a systemic and regional approach to formulating solutions and evaluating the benefits and impacts that would result.

7. Risk and uncertainty is inherent in decision making throughout the project lifecycle, especially during the feasibility phase. To attempt to address the critical uncertainties, USACE performed analyses pertaining to key factors such as safe and reliable channel design, economic benefits, and project costs. Uncertainties pertaining to channel width and safe vessel passing were addressed during the feasibility study and will be further analyzed through ship simulation modeling during the design phase. Economic sensitivities examined the effects of commodity forecast growth on the benefits of the recommended plan considering low and high growth scenarios. A Cost Schedule Risk Analysis was conducted to account for key cost uncertainties through inclusion of contingencies in the estimated cost. Finally, the Galveston District Commander will manage placement cost uncertainty by working closely with the sponsor, the PHA, federal and state agencies, and other stakeholders on opportunities within the Galveston Bay Area to identify the least cost placement options and any potential beneficial use as authorized by law.

8. In accordance with the Engineer Circular 1165-2-217 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, Agency Technical Review, Policy and Legal Compliance Review, Cost Engineering Review and Certification, and Type I Independent External Peer Review (IEPR). The IEPR was completed by Battelle Memorial Institute. A total of eight comments were documented. The IEPR comments identified several elements of the project where additional analyses needed to be leveraged or better characterized and places where clarification of future project actions and objectives needed be documented or revised. All comments from the above referenced reviews have been addressed and incorporated into the final report documents.

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9. Washington level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and on the basis of congressional directives, 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 Related Land Resources Implementation Studies*. The Recommended Plan complies with other administrative and legislative policies and guidelines. 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 that the navigation improvements for the HSC ECIP Recommended Plan be authorized in accordance with the reporting officers' Recommended Plan at an estimated first cost of \$876,848,000, 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 laws and policies, including Section 101 of WRDA 1986 as amended (33 U.S.C. 2211), and to the non-federal sponsor agreeing, prior to project implementation, to perform the required items of local cooperation, including but not limited to the following:

a. Provide, during the periods of design and construction, funds necessary to make its total contribution for commercial navigation equal to 25 percent of the cost of design and construction of the general navigation features attributable to dredging to a depth in excess of -20 feet MLLW but not in excess of -50 feet MLLW, plus 100 percent of the costs of the LPP, which the Government determines would exceed such dredging for the NED plan.

b. Provide all lands, easements, rights-of-way, and relocations, including those necessary for the borrowing of material and placement of dredged or excavated material, and perform or assure performance of all relocations, including utility relocations, as determined by the Federal Government to be necessary for the construction or operation and maintenance of the general navigation features, 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;

c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the general navigation features, an additional amount equal to 10 percent of the total cost of construction of the NED Plan general navigation features less the amount of credit afforded by the Federal Government for the value of the lands, easements, rights-of-way, and relocations, including utility relocations, provided by the non-federal sponsor for the general navigation features. If the amount of credit afforded by the Federal Government for the value of lands, easements, rights-of-way, and relocations, including utility relocations, provided by the non-federal sponsor equals or exceeds 10 percent of the total cost of construction of the general navigation features, the non-federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of lands, easements, rights-of-way, and relocations, including utility relocations, in excess of 10 percent of the total costs of construction of the general navigation features;

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d. 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;

e. Ensure that the local service facilities are constructed, operated, and maintained 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, and that all applicable licenses and permits necessary for such construction, operation, and maintenance are obtained;

f. Provide 100 percent of the excess cost of operation and maintenance of the project over that cost which the Government determines would be incurred for operation and maintenance of the NED plan;

g. Hold and save the United States free from all damages arising from the design, construction, or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

h. 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, rights-of-way, relocations, and disposal areas that the Federal Government determines to be necessary for the construction or operation and maintenance of the general navigation features. However, for lands, easements, or rights-of-way that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigation 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;

i. Assume complete financial responsibility, as between the Federal Government and the non-federal sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, rights-of-way, relocations, and disposal areas required for the construction or operation and maintenance of the project;

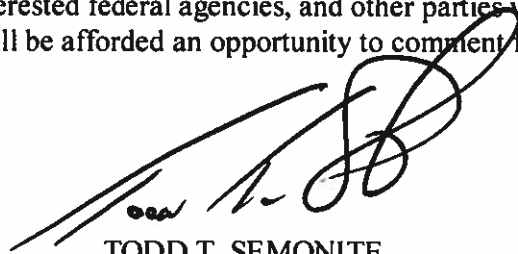
j. Agree, as between the Federal Government and the non-federal sponsor, that the non-federal sponsor shall be considered the operator of the local service facilities for the purpose of CERCLA liability, and, to the maximum extent practicable, perform its obligations related to the project in a manner that will not cause liability to arise under CERCLA.

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11. 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.

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Lieutenant General, USA
Chief of Engineers