

# REPORT SUMMARY FOR THE CIVIL WORKS REVIEW BOARD

## Freeport Harbor, Texas Channel Improvement Project

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### STUDY INFORMATION

**Study Authority.** Authority for the study is contained in Section 216 of the 1970 Flood Control Act.

*Section 216. The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest.*

**Study Sponsor.** Port Freeport is the non-Federal sponsor for the study.

**Study Purpose and Scope.** The purpose of this study is to develop and evaluate alternatives and recommend a feasible navigation improvement plan to contribute to National Economic Development for the Port Freeport. The scope of the study included a wide range of possible solutions to address current and future navigation inefficiencies and potential cost savings in light of current and future projected needs.

**Project Location/Congressional District.** Freeport Harbor is located immediately south of the city of Freeport in Brazoria County, Texas, on the middle Texas coast (Figure 1) approximately 140 miles southwest of the Houston-Galveston area (See attached map). It is located in Senators Cornyn's and Hutchison's Districts (TX) as well as Congressmen Paul's (TX-14), and Olson's (TX-22) Districts.

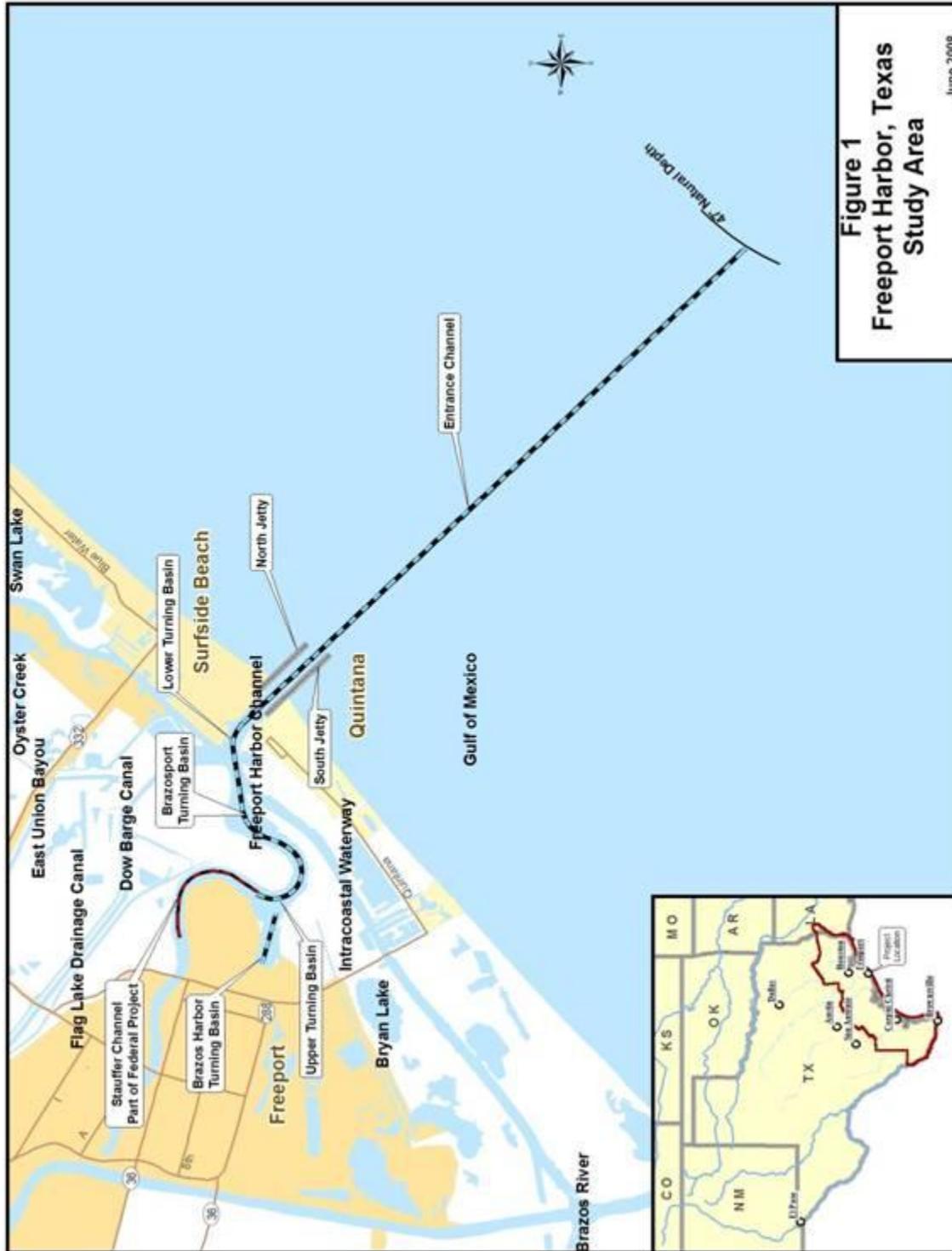


Figure 1

**Prior Reports and Existing Water Projects.** The original project for Federal improvement at Freeport was authorized by the River and Harbor Act (RHA) of June 14, 1880, which provided for construction of jetties for controlling and improving the channel over the bar at the mouth of the Brazos River. The work was started in 1881 and continued until 1886 when operations were suspended for lack of funds. Partial construction of the jetties was accomplished, but the work was not successful in obtaining an adequate depth over the bar. On March 28, 1899, the Brazos River Channel and Dock Company, under authority granted by the RHA of August 21, 1888, started work to provide a navigation channel at the mouth of the Brazos River and thence inland between the banks of the river. The company was unable to finance completion of the work, and on April 25, 1899, in accordance with requirements of the RHA of March 3, 1899, transferred all its work, rights, and privileges to the United States. This constituted the initial authorization for the existing project for Freeport Harbor.

Construction of the navigation channel was authorized by the RHAs of May 1950 and July 1958. The RHAs provided for an Entrance Channel 38 feet deep and 300 feet wide from the Gulf of Mexico to a point inside the jetties and for inside channels 36 feet deep and 200 feet wide to and including the Upper Turning Basin. The project was completed in 1962. Greater depth and width were authorized by Congress in 1970 and by the President in 1974. These authorizations were for the Jetty Channel to be relocated and deepened to 45 feet, widened to 400 feet, and the North Jetty to be relocated northward. The relocated Outer Bar Channel was authorized to a 400-foot width, to a 47-foot depth, and to extend approximately 4.6 miles into the Gulf. An FEIS for the project was prepared by the USACE in 1978. At that time Seaway Pipeline, Inc., under a Department of Army permit, widened the Outer Bar Channel to 400 feet and the Jetty Channel to 230 feet.

In October 2002, the USACE completed a Reconnaissance Report Section 905(b) Analysis for Freeport Harbor. This report concluded that channel modifications that would improve the efficiency and safety of the channels appeared feasible. The report recommended detailed studies to quantify the magnitude of the costs and benefits associated with several types of improvements.

**Federal Interest.** The Federal interest in navigation improvements is well documented in policy, law and primary Corps mission areas, as well as Administration priority. The study demonstrated conclusively that the NED benefits of the recommended plan outweigh the costs and that the project is in the Federal interest. The Recommended Plan, the 55-foot main channel and 50-foot Stauffer Channel improvement, is the locally preferred plan (LPP), preferred by the sponsor. The total project cost is about \$281,943,000. All pertinent cost and benefit information can be found in Tables 3 and 4.

**Problems and Opportunities.** Existing navigation problems and opportunities for Freeport Harbor were identified through coordination with Federal and State agencies, area residents, waterway users, and the non-Federal sponsor. Most of the identified problems and opportunities are not unique to Freeport but are common to ports on the coast of Texas and the nation.

Since the completion of the 45-foot Project, the size of ships using the waterway has steadily increased so that many vessels currently have to be light-loaded (lightened) to traverse the waterway. In addition, the current channel depth requires that large crude carriers remain offshore and transfer their cargo into smaller crude tankers for the remainder of the voyage. This lightering operation takes place in the Gulf of Mexico where the two ships, the mother ship and the lightering ship, come together so that the cargo transfer can take place. Current projections suggest that crude imports will increase throughout the period of evaluation. As these imports increase, the number of lightering vessels and product carriers will also increase, adding to the shipping delays and congestion.

The depth and width of the existing channel system remain restrictive to a large portion of the current world fleet because of their size. Beam width restrictions continue to cause delays for larger ships wishing to enter Freeport's port facilities. Increased channel depths would reduce the need for lightering and lightening. Access to additional facilities would also allow the Port of Freeport to utilize facilities for future development. A project addressing current shipping delays while increasing safety for both the industry and the environment is needed.

The opportunity exists to deepen the channel to allow the traverse of the channel by the larger current day and future expected vessels without the need for lightering or transfer operations to smaller vessels. This opportunity results in significant cost savings to the operations of the existing and future fleet that translate into significant economically feasible benefits to the national economy.

**Planning Objectives.** The primary objective of Federal navigation activities is to contribute to the Nation's economy while protecting the Nation's environmental resources in accordance with existing laws, regulation, and executive orders. More-specific planning objectives were identified by area residents and concerned State and Federal agencies or suggested by existing opportunities for improving the quality of life. Plans were formulated and evaluated with the following objectives in mind:

- Increase the navigational efficiency and safety of the deep-draft navigation system at Freeport Harbor, and
- Maintain, protect, or restore the quality of the Freeport Harbor area's terrestrial, cultural, and coastal resources.

**Planning Constraints.** Planning constraints are restrictions that limit the planning process and the available scope of solutions to the identified problems, or that limit consideration of opportunities. The following constraints apply to this feasibility study:

- Fish and wildlife habitat in the study area should be preserved, if possible;
- The study process and plans developed must comply with Federal laws and policies; and
- Alternative plans that resolve problems in one area should not create or amplify problems in other areas.
- Plans must be formulated with regard to addressing channel constraints in two areas. Widening in the Jetty Channel area will be limited to a top width based on

the distance between the jetties. Relocation of the jetties could make the project economically infeasible. The second area with physical constraint issues is in the channel reach between the Brazosport Turning Basin and the Upper Turning Basin. Within this reach, there are dock facilities whose modifications could make channel widening economically infeasible.

## ALTERNATIVES

**Plan Formulation Rationale.** The planning framework requires a systematic preparation and evaluation of alternative ways of addressing the project problems, needs, concerns, and opportunities while considering environmental factors. The planning objectives and constraints guide plan formulation, alternative screening, and ultimately identification of the Recommended Plan.

An initial set of alternative plans was developed to improve navigation efficiency while maintaining the ecological value of coastal and estuarine resources within the project area. These alternatives were then screened and compared at a feasibility level of detail to develop the NED plan which was then subjected to further refinement and comparison to the Locally Preferred Plan.

**Management Measures and Alternative Plans.** A management measure is a feature or activity at a site that addresses one or more of the planning objectives. A wide variety of measures is usually considered. These measures are evaluated separately or combined to form alternative plans for evaluation. Initial measures identified for consideration include both nonstructural and structural. Specific measures are combined to form alternatives for potential screening and consideration.

Structural and nonstructural measures were examined and combined into alternatives to address the navigation problems and opportunities of the study area. The following is a list of the alternatives considered:

Future Without-Project Condition (No-Action Alternative) - Under the No Action Plan, the Freeport Harbor project will be maintained at the authorized depth of 45 feet.

The future without-project condition would consist of the existing 45-foot-deep Outer Bar Channel, which would be widened from 400 to 600 feet by the non-Federal sponsor at their own initiative and expense, but not deepened. This action by Port Freeport is within the footprint of the proposed Federal project.

Measures/alternatives for this study consisted of the following:

Nonstructural Alternatives

- Modification of existing pilot rules on the waterway.
- Lightering and Lightening
- Alternate mode of commodity transport,

Structural Alternatives

- Widening of the Outer Bar and Jetty channels only with no deepening
- Deepening to 50, 55, or 60 feet from the Gulf of Mexico to the Upper Turning Basin, with and without widening, and with widening to 500 and 600 feet only through the Jetty Channel.
- Deepening to 40, 42, or 45 feet the Brazos Harbor Channel and Turning Basin, without widening and with widening to 300 feet
- Reauthorization of Stauffer Channel to 30 feet
- Deepening the lower (3,700-foot) reach of the Stauffer Channel to 36, 40, 42, 45, and 50 feet without widening and with widening to 300 feet
- Dredging the upper (remaining 3,400 feet) reach of the Stauffer Channel to its previously authorized 30-foot depth

Several screening iterations of alternatives resulted in elimination of nonstructural alternatives. The nonstructural alternatives did not address the navigational efficiency of the waterway and would not allow the vessels utilizing the channel to load more fully. Current pilot rule restrictions prevent two ships from passing in the channel. These rules are agreed upon by the shipping industry, supported by the USCG, and administered by the BPA. This measure would only maintain current operations, with its increased costs and delays. Another nonstructural measure is use of lightering and lightening vessels. This is another practice already in use and would offer no additional benefits. Another alternative was alternative mode of commodity transport (i.e. an inactive proposal for Texas Offshore Port System (TOPS)). However, the TOPS facility is now known to not be a potential for the foreseeable future. Therefore, nonstructural alternatives were not considered feasible or did not fully address the opportunities.

Structural measures considered include dredging to widen and deepen the existing Freeport Harbor. These measures allow existing ships to more fully utilize the proposed channel. It also allows ships to avoid delays due to the ability to meet more safely in a wider channel. All plans considered, included, and evaluated the needs and costs for placement of any dredged material including during initial construction and for long term maintenance needs.

**Final Array of Alternatives.** The objective of a feasibility study is to arrive at a recommended plan after a reasonable number of alternatives have been analyzed. This involves a comparison between each alternative and the future without-project conditions and consequences, considering economic, environmental, and social impacts. Based upon the initial screening and subsequent evaluations of measures and alternatives the final array of alternatives included:

**No Action Plan**

**Gulf to Upper Turning Basin Channel Alternatives:**

- Widen only to 600 feet through the Outer Bar and Jetty channels.
- Deepen to 50 feet from the Gulf of Mexico to the Upper Turning Basin and widen to 600 feet through the Jetty Channel.
- Deepen to 55 feet from the Gulf of Mexico to the Upper Turning Basin and widen to 600 feet through the Jetty Channel.

- Deepen to 60 feet from the Gulf of Mexico to the Upper Turning Basin and widen to 600 feet through the Jetty Channel.

**Stauffer Channel Alternatives:**

- Dredge the Stauffer Channel to the previously authorized dimensions of 30 feet deep and 200 feet wide.
- Widen the lower 3,700 feet of the Stauffer Channel to 300 feet and its previously authorized depth of 30 feet, with the upper 3,400 feet of the Stauffer Channel dredged to previously authorized dimensions of 30 feet deep and 200 feet wide.
- Widen the lower 3,700 feet of the Stauffer Channel to 300 feet and deepen to 40 feet, with the upper 3,400 feet of the Stauffer Channel dredged to previously authorized dimensions of 30 feet deep and 200 feet wide.
- Widen the lower 3,700 feet of the Stauffer Channel to 300 feet and deepen to 50 feet, with the upper 3,400 feet of the Stauffer Channel dredged to previously authorized dimensions of 30 feet deep and 200 feet wide.
- With the exception of No Action, a detailed analysis of benefits and costs was performed for each of these alternatives. This information used in selection of the plan.

As detailed plan formulation began, the final array alternatives were reevaluated. In reevaluation of the Jetty Channel area, it was determined that in order to provide adequate stability of the rock jetties, the bottom width for a 60-foot-deep channel would have to be reduced. It was determined that 540 feet was the maximum bottom width that could be constructed between the jetties and maintain an acceptable factor of safety for jetty stability.

**Comparison of Alternatives.** After the conclusion of the preliminary screening, detailed plan formulation focused on the refinement of two alternatives determined to be the most feasible: 60-x-540-foot and 55-x-600-foot channel improvements. All nonstructural alternatives had been eliminated. Detailed engineering analysis focused on development of hydrology and hydraulic analysis, channel layout, engineering quantities, geotechnical analysis, operations and maintenance, and cost estimating.

To evaluate the channel alternatives, several studies were conducted by the ERDC. The studies included Hydrodynamic/Salinity Modeling, Ship Simulation, Desktop Sediment Analysis, Hurricane Storm Surge, and Shoreline Impacts.

Along with these studies, benefits and cost analyses were conducted for the alternative depth and width alternatives. Since the new project channel in the Gulf of Mexico could extend up to an additional 2.6 miles, consideration of operation and maintenance costs was deemed necessary in conducting the analysis.

Environmental analyses were performed to identify the affected environment and what impacts the project would have on the area. Coordination with the resource agencies was conducted. Cultural studies were conducted for the study area. Mitigation requirements were determined.

Economic and environmental factors as well as local preferences were utilized to identify the Recommended Plan. Costs were estimated for all the alternatives and compared to the benefits.

Based on the ship simulation studies, the Brazosport Turning Basin was set at 1,200 feet. No work was proposed for the Brazos Harbor Channel and Turning Basin. Included in the costs are dredging, PA levee construction, and O&M costs for the 50-year period of analysis. Ecosystem mitigation requirements and costs were determined. Table 1 presents the economic summary of the final screening of alternatives, based on crude petroleum, petroleum products and chemicals, including BCRs and net excess benefits.

**Table 1**  
**Freeport Harbor Economic Summary Data**  
**Cost and Benefits (\$million) by Channel Depth Alternative**  
**(50 Year Period of Analysis at 4.125%)**  
**(October 2009 Price Levels)**

	50'	52'	50/55'	55'	58'	50/60'	60'
<b>First Cost of Construction</b>	218.1	240.4	270.1	273.8	318.8	346.1	348.8
<b>Total Annual Cost</b>	15.2	16.8	19.0	19.2	22.4	24.4	24.5
<b>Average Annual Benefits</b>	11.8	17.3	21.3	21.3	31.5	39.8	39.8
<b>Net Excess Benefits</b>	-3.3	.5	2.3	2.1	9.1	15.3	15.4
<b>BCR</b>	0.8	1.0	1.1	1.1	1.4	1.6	1.6

During detailed plan formulation, the local Sponsor expressed their preference for a channel deepening and widening project slightly different than the plan resulting from the NED analysis. This plan was designated as the Locally Preferred Plan (LPP). Analysis of the LPP was conducted.

**Key Assumptions.** Under the No Action Plan, the Freeport Harbor project would be maintained at the authorized depth of 45 feet. Shoaled material would be removed and placed in the designated offshore site for the Outer Bar and Jetty channels and in PA 1 for the channel inshore reach of the Jetty Channel. None of the dredged material would be used beneficially. Environmental impacts currently associated with the Freeport Harbor Project would continue. Possible relative sea level rise was estimated for a 50-year period of analysis to range from 0.36 to 2.40 feet. For this feasibility study, the non-Federal widening is assumed to be in place and is considered the future without-project (FWOP-1) condition.

**Recommended Plan.** Analyses were conducted during the planning study process to identify the NED Plan and the LPP with the ultimate goal of identifying the Recommended Plan. The plan selected will be recommended for implementation to the U.S. Congress. The Recommended Plan addresses the problems and opportunities identified at the beginning of the study and satisfies the planning objectives of increasing navigation efficiency and reliability along the Freeport Harbor Channel while maintaining or enhancing terrestrial, cultural, and coastal resources within the project area.

The Recommended Plan is the LPP, the plan preferred by the Sponsor. The Recommended Plan, described below, calls for a 55-foot-deep by 600-foot-wide channel. The current discount rate of 4.125 percent was used, and the period of analysis is 50 years.

Based on the economic, engineering, and environmental factors considered, the Recommended Plan (LPP) includes deepening of the Outer Bar Channel from the jetties into the Gulf of Mexico

to -57 feet MLT (-58 feet MLLW); deepening from the end of the jetties in the Gulf of Mexico to the Lower Turning Basin to -55 feet MLT (-56 feet MLLW); deepening from the Lower Turning Basin to Sta. 132+66 (ConocoPhillips dock area, above 1,200-foot Brazosport Turning Basin) to -55 feet MLT (-56 feet MLLW); deepening of Freeport Harbor from Sta. 132+66 through the Upper Turning Basin to -50 feet MLT (-51 feet MLLW) (although the benefits would continue to increase, Port Freeport did not consider that the depth over -50(-51) feet was needed); deepening and widening the lower 3,700 feet of the Stauffer Channel at a depth of -50 feet MLT (-51 feet MLLW) and 300 feet wide; and dredging the remainder of the Stauffer Channel to a depth of -25 feet MLT (-26 feet MLLW), in lieu of restoring it to its previously authorized dimensions of 30 feet by 200 feet. Depths shown exclude advance maintenance and allowable over-depth. It is estimated that the approximately 17.3 mcy of new work material (including advance maintenance and allowable over-depth) would require eight separate dredging contracts to complete. The work is estimated to begin in 2012 and be complete by 2018. Dredged material management will be performed according to the Dredged Material Management Plan.

**Systems / Watershed Context.** Freeport Harbor is located immediately south of the city of Freeport in Brazoria County, Texas, on the middle Texas coast. In 1929 the river was subsequently diverted to the west into the Gulf of Mexico about 6 miles above Freeport, resulting in a harbor and ship channel that no longer receives natural freshwater inflow from the river. Although extensive coastal marshes are found along this part of the Texas coast, the immediate project area is heavily developed with limited natural resources remaining. Freeport Harbor crosses no estuary.

**Environmental Operating Principles.** The Recommended Plan fully supports each of the seven USACE Environmental Operating Principles:

- 1. Strive to Achieve Environmental Sustainability.** Construction designs of upland placement areas and mitigation sites were developed for a 50-year period of analysis. Design of these areas considered potential changes over time (e.g., sea-level rise, shoreline erosion, etc.).
- 2. Consider environmental consequences.** The direct and indirect effects of the project on the environment were quantified using ecological modeling. Compensatory mitigation is provided in the Recommended Plan for all unavoidable project impacts.
- 3. Seek Balance and Synergy.** The Recommended Plan provides economic benefits to the Nation while minimizing project impacts to the greatest extent practicable.
- 4. Accept Responsibility.** Implementation of the Recommended Plan will comply with all applicable Federal and State environmental laws and regulations.
- 5. Mitigate Impacts.** All project impacts were identified in the study reports and mitigation will be provided to compensate for all significant, unavoidable impacts.
- 6. Understand the Environment.** Stakeholders, interest groups, resource agencies and the general public were consulted in our effort to understand all social, physical and biological aspects of the project environment. This open and inclusive process assisted in the development of an environmentally sustainable project.
- 7. Respect other views.** The views of stakeholders, interest groups, resource agencies and the general public were valued and helped identify problems and opportunities that were addressed by the study.

**Independent Technical Review and Agency Technical Review.** An Agency Technical Review (ATR) was conducted by the Deep Draft Navigation Planning Center of Expertise (DDNPCX) that was appropriate to the level of risk and complexity inherent in the project. The feasibility report was reviewed for compliance with established principles and procedures, using clearly justified and valid assumptions. Further, study methods and procedures were reviewed to determine the appropriateness, correctness, and reasonableness of results, including determination of whether the project meets the customer's needs consistent with law and existing United States Army Corps of Engineers policy. An independent technical review team composed of members from New Orleans, Mobile, Savannah, Wilmington and Walla Walla Districts performed the technical review. Comments were evaluated by the Project Delivery Team (PDT) and addressed to the satisfaction of the ATR team. There are no remaining open comments. In concert with the Cost DX, the Mii cost estimate was reviewed by the ATR cost engineer and all associated comments were satisfied. Galveston District coordinated directly with the Cost DX to obtain project cost certification. The DDNPCX reviewed model spreadsheets for the project study. A determination on the models' "approval for use on this study" was provided. The ATR was certified in December 2009.

An Independent External Peer Review (IEPR) was conducted that was appropriate to the level of risk and complexity inherent in the project. The feasibility report was reviewed for compliance with established principles and procedures, using clearly justified and valid assumptions. Further, methods and procedures were reviewed to determine the appropriateness, correctness, and reasonableness of results, including determination of whether the project meets the customer's needs consistent with law and existing United States Army Corps of Engineers policy.

A panel of external independent experts (Panel) performed this independent review. The Panel was selected by an independent outside eligible organization (OEO), Battelle Memorial Institute, that has experience in establishing and administering independent review panels. The DDNPCX managed the conduct of this review. The IEPR was initiated on 12 June 2008 and the initial review report was completed and submitted on 20 August 2008. Due to the new guidance, the OEO placed the review comments in Dr. Checks on 20 October 2008, and evaluations by the PDT were accomplished in Dr. Checks in December 2008. The Panel assessed the PDT evaluations and the OEO provided a back-check in Dr. Checks on 12 January 2009.

The Panel's review found that certain aspects of the economic analysis and plan formulation in the report were inadequate, and during the back-check non-concurred on nine (9) comments. The PDT indicated that the areas of concern would be addressed through provision of additional information and revisions to the feasibility report. The revised data was presented to the Panel and a teleconference between the PDT, the Panel, the OEO, and the DDNPCX was held on 9 February 2009, to discuss the content of the revisions. Five comments were changed to concur.

There remained four (4) unresolved comments in this IEPR. To facilitate resolution, the DDNPCX formed a separate panel of subject matter experts from Southwestern Division (SWD), Mobile District (SAM), and the Institute of Water Resources (IWR) to resolve the remaining concerns. This panel of subject matter experts (Resolution Panel) was empowered to evaluate the IEPR Panel's comments and the PDT's responses and make recommendations as to whether the PDT's responses were adequate or whether additional evaluations were necessary to satisfy the Corps planning requirements. The Resolution Panel held a teleconference to discuss its findings with the PDT members on 7 May 2009, and render its decision.

On 24 June 2009, a teleconference between the Resolution Panel and the DDNPCX was held to discuss and summarize the independent findings of the respective panel members. This summary of findings was then provided to the PDT. In July 2009, a teleconference was held between the Resolution Panel, the PDT, and the DDNPCX. Extensive discussions ensued and the PDT agreed to address the recommendations of the Resolution panel. The recommendations were posted in DrChecks and closed out by the Resolution Panel.

In December 2010, a back-check IEPR was initiated. The primary purpose of the back-check was to review the new sensitivity analyses in the draft final Feasibility Report. SWG asked that Battelle use the same reviewers. IEPR review was begun 14 February 2011. The reviewers had responses on all 22 of the original comments from the 2008 review and 3 new comments on the sensitivity portion of the report. Review discussions were conducted between the DDNPCX, Battelle, and SWG on preliminary comments. IEPR was concluded in Dr. Checks on 25 April. There were 4 non-concurrences; two from the original 22 and 2 from the new sensitivity analyses review. Issues that did not reach concurrence from the 2008 review were related to traffic and commodity growth forecasts and calculation of transportation cost benefits. On the sensitivity analysis review, the two non-concur issues were related to sensitivity of benefits to key drivers and the sensitivity of analyses to forecast methodology and assumptions. Numerous new sensitivity analyses are being incorporated to address a majority of the reviewers concerns, however, one issue in particular caused SWG to be unable to reach concurrence on two of the comments.

## **EXPECTED PROJECT PERFORMANCE**

**Project Costs.** The project first cost for the Recommended Plan is \$281,943,000, as shown in the Table 2. Costs include implementation costs and associated costs. Implementation costs include post-authorization planning and design costs, GNF construction costs, construction contingency costs, and O&M costs. The GNF costs include costs for dredging and placement area construction, fish and wildlife mitigation, and aids to navigation. A programmatic agreement is in effect for any cultural resource mitigation, if required at a later date. No cultural resource mitigation costs are expected at this time. Aids to navigation (estimated at \$113,000) are provided by the Coast Guard, and are a Federal cost included in the economic justification, but are not subject to project cost sharing. Construction General funding will fund the Federal share of all project construction.

**Table 2**

**First Cost Summary**

**Freeport Harbor**

**(all costs in \$) (October 2009 price level)**

Construction Dredging and PAs	181,261,000
Fish and Wildlife Facilities	124,000
Lands and Damages	1,751,000
Administrative Costs for Lands	77,000
Preconstruction Engineering and Design	26,404,000
Construction Management	16,788,000
Relocations	-0-
Berthing and Dock Modifications	56,935,000
<b>Total:</b>	<b>284,713,000</b>

**Equivalent Annual Costs and Benefits.** To determine whether Federal interest in the proposed improvements is warranted, the project has been evaluated for its environmental impacts, social effects, and economic justification. Project benefits were developed based on October 2009 price levels using a project base year of 2019. Economic justification is expressed in terms of a Benefit-Cost analysis. Project costs are discounted to present value and amortized over the period of analysis. They are then compared to average annual economic benefits that would be produced by the project. To be recommended a project must have a Benefit to Cost Ratio (BCR) of greater than one-to-one. In addition, alternative plans for different channel depths are compared to determine and recommend the plan which has the highest annual net benefits. Net benefits are total annual benefits minus total annual costs. The project was examined incrementally foot-by-foot to determine the channel depth yielding the highest net benefit. The annual costs, annual benefits, and benefit cost analysis for the project are shown in Table 3.

**Table 3**  
**Freeport Channel and Stauffer Modifications**  
**LPP Economic Summary**  
**Average Annual Values at 4.125% and \$1,000s**

	<b>Freeport Channel</b>	<b>Lower Stauffer</b>	<b>Upper Stauffer</b>	<b>Totals</b>
	<b>55/50 feet</b>	<b>50 feet</b>	<b>25 feet</b>	
First Cost of Construction	\$270,064	\$11,201	\$3,448	\$284,713
Interest During Construction	\$19,462	\$115	\$5	\$19,581
Total Investment	\$289,526	\$11,316	\$3,453	\$304,295
Average Annual Cost	\$13,767	\$538	\$164	\$14,469
Average Annual O&M	\$5,236	\$787	\$22	\$6,046
Total Annual Cost	\$19,003	\$1,325	\$186	\$20,515
Average Annual Benefits	\$21,269	\$2,428	\$196	\$23,894
Net Excess Benefits	\$2,265	\$1,103	\$9	\$3,378
B/C Ratios	1.1	1.8	1.1	1.2

Note: Totals may not add due to rounding.

**Cost Sharing.** The GNF costs for deepening to 20 feet are cost shared at 10 percent non-Federal and 90 percent Federal, between 20 and 45 feet are cost shared at 25 percent non-Federal and 75 percent Federal; costs for deepening below 45 feet are cost shared at 50 percent non-Federal and 50 percent Federal. Fish and wildlife mitigation is considered a GNF and is cost shared in the same manner as other GNF costs. Non-Federal costs include non-Federal Sponsor and berthing/dock owner costs. Owners of berth and dock facilities that would require modification in conjunction with the Recommended Plan would be responsible for 100 percent of those associated costs. The non-Federal Sponsor is responsible for 100 percent of Lands, Easements, and Rights-of-Way. The USCG is responsible for 100 percent of the cost for aids to navigation. The First Cost for all project components is separated into expected non-Federal and Federal cost shares and detailed in Table 4. For the Lower Stauffer Channel, the NED Plan is 45 feet. The

non-Federal sponsor has chosen to use 50-foot depth for the Lower Stauffer Channel and will pay the incremental cost difference between the plans. Table 5 displays the project cost apportionment.

Section 101 of PL 99-662 requires for all cost shared navigation channel depths that the non-Federal sponsor must provide an additional cash contribution equal to 10 percent of fully funded GNF costs (minus costs for LERRs). These costs may be paid over a period not to exceed 30 years.

**Project Implementation.** The non-Federal sponsor is Port Freeport and would supply all necessary items of local cooperation, including the non-Federal shares of design and construction costs, berthing deepening, lands, easements, and rights-of-way.

**Table 4**  
**Cost Sharing Apportionment**

<b>Cost Apportionment Navigation</b>	<b>First Cost</b>
Federal Navigation	
Freeport Channel	106,690,000
Lower Stauffer Channel	5,776,000
Upper Stauffer Channel	2,232,000
Lands & Damages	77,000
Mitigation	102,000
<b>Total Federal Navigation</b>	<b>114,877,000</b>
 Non-Federal Navigation	
Freeport Channel	106,767,000
Lower Stauffer Channel	3,630,000
Upper Stauffer Channel	663,000
Land & Damages	1,751,000
Mitigation	90,000
<b>Total Non-Federal Navigation</b>	<b>112,901,000</b>
<b>Total Navigation</b>	<b>227,778,000</b>

**Operation and Maintenance.** The maintenance of project features will be funded through annual appropriations of the O&M program. The actual amounts will vary on a year-to-year basis because of variability in the volume of material removed during each dredging cycle and the variability of the cycles. Costs for maintenance of the Freeport Harbor Project will be in accordance with Section 101(b) of WRDA 86 (Planning Guidance Letter [PGL] 47, Cost Sharing

for Dredged Material Disposal Facilities and Dredged Material Disposal Facility Partnerships), which allocates costs for maintenance of channel depths over 45 feet as 50 percent non-Federal and 50 percent Federal. O&M of the completed project would be limited to periodic maintenance dredging of the channels and other dredging features of the project. The non-Federal Sponsor and other terminal owners would be responsible for the periodic maintenance of their individual berths. The average annual incremental O&M costs for the project is about \$4.7 million.

**Table 5**

**Lower Stauffer Channel  
Freeport Harbor, Texas – Channel Improvement Project –  
Cost Apportionment for NED and LPP and Adjustment for Sponsor  
of the LPP over the NED (all cost shown at October 2009 prices)**

Feature	Quantity (cy)	Federal Cost	non-Federal Cost	Total Cost
<b>Cost Apportionment of National Economic Development Plan</b>				
18- to 20-foot depth	30,500	260,000	29,000	289,000
20- to 45-foot depth	1,082,500	4,501,000	1,500,000	6,001,000
Over 45-foot depth	NA	NA	NA	NA
Lands and Damages		0	0	0
Const/L&D Subtotal		4,761,000	1,529,000	6,290,000
Planning, Engineering & Design		590,000	190,000	780,000
Construction Management		375,000	121,000	496,000
Total Apportionment		5,726,000	1,840,000	7,566,000
<b>Cost Apportionment of Locally Preferred Plan</b>				
18- to 20-foot depth	30,500	217,000	24,000	241,000
20- to 45-foot depth	1,082,500	4,510,000	1,503,000	6,013,000
Over 45-foot depth	274,000	0	1,443,000	1,443,000
Lands and Damages		0	0	0
Const/L&D Subtotal		4,727,000	2,970,000	7,697,000
Planning, Engineering & Design		641,000	403,000	1,044,000
Construction Management		408,000	257,000	665,000
Total Apportionment		5,776,000	3,630,000	9,406,000

Additional PA capacity for the Recommended Plan will be constructed regularly over the 50-year period of analysis in conjunction with maintenance dredging cycles. Costs for disposal facility maintenance associated with the project will be allocated as 50 percent non-Federal and 50 percent Federal for the increment associated with depths over 45 feet and 100 percent Federal for depths for the increment less than 45 feet.

**Key Social and Environmental Factors.** The project is not anticipated to have any negative social impacts. Construction will be limited to the existing channel footprint, with the exception of the two new upland placement areas (PAs) 8 and 9. These PAs would be constructed on existing Port Freeport land in an area with no immediately contiguous housing or population concentrations. Analysis has determined that there will be no Environmental Justice (E.O. 12898) or Protection of Children from Environmental Health Risks and Safety Risks (E.O. 13045) impacts from the project.

The primary impact of the Recommended Plan will be associated with the construction of new upland placement areas (PAs) 8 and 9. Approximately 21 acres of low quality riparian forest, 39 acres of low quality freshwater wetlands and 358 acres of grassland will be destroyed by construction of the PAs. A Habitat Evaluation Procedure (HEP) analysis was used to determine the amount of mitigation required to compensate for project impacts. The mitigation plan consists of 1) the preservation of approximately 131 acres of riparian forest by conservation easement and improving its habitat value by establishing 11 acres of high quality riparian forest in place of 11 acres of invasive tree species; and 2) the creation of three acres of high quality wetlands and an associated one acre of high quality riparian forest. A monitoring and contingency plan for these mitigation measures is included in the Recommended Plan. Periodic monitoring of the mitigation areas will continue until the Division Commander determines that the ecological success criteria of the mitigation measures have been met. Federal and state resource agencies will be consulted annually to determine progress in the planning, construction, and post-construction evaluation of the ecological success of these features.

The U.S. Fish and Wildlife Service submitted a Coordination Act Report that concluded the proposed USACE mitigation plan would be acceptable provided that the entire approximately 131-acre wooded tract, within which the riparian forest mitigation tracts are located, is included in a permanent conservation easement. Port Freeport has agreed to grant a conservation easement for lands used for mitigation to an appropriate state agency or a recognized nature conservancy. USFWS also asserted that the project will adversely impact approximately 358 acres of coastal prairie and recommended mitigation of the loss of this habitat. USACE did not concur with this recommendation, determining that the affected "coastal prairie" was actually grassland pasture that was neither scarce nor unique. They are degraded grassland primarily consisting of non-native pasture grasses of limited wildlife habitat value that does not merit mitigation.

Consistent with increasing navigational efficiency in an environmentally sustainable manner, the project will be designed, constructed and operated to avoid impacts to threatened and endangered sea turtles and migratory birds. Hopper dredging during construction is likely to adversely affect but is not likely to jeopardize the continued existence of threatened or endangered loggerhead, Kemp's ridley, hawksbill, leatherback, and/or green sea turtles. All dredging will be undertaken in compliance with reasonable and prudent measures outlined in the Biological Opinion issued by National Marine Fisheries Service (NMFS). Construction contracts would include instructions to avoid impacts to migratory birds and their nests from construction-related activities. All

practicable means to avoid or minimize adverse environmental effects have been incorporated into the recommend plan.

**Stakeholder Perspectives and Differences.** Port Freeport has actively participated in the entire planning process, fully supports the project, is willing to sponsor project construction and has indicated financial capability to satisfy its obligations for the construction of the Recommended Plan. Their primary concern has been to provide the community with a channel design, preferably 55 feet deep in the Main Channel and 50 feet in the Lower Stauffer Channel, to increase navigation efficiency and safety. Because of financial constraints, the sponsor has indicated a preference for the 55-foot project. Therefore, this LPP has been selected as the Recommended Plan.

A scoping meeting for the proposed project was held 15 January 2004. Two other meetings were held in 2006 and 2008 to provide updates on the study process. The draft Feasibility Report and Draft Environmental Impact Statement were released for public review in December 2010, and a public meeting was held on 13 January 2011 to provide agencies and the public an opportunity to comment on the draft documents. The majority of the public comments related to the misconception that the proposed project will increase Gulf shoreline erosion and adversely affect air quality. The shoreline erosion impacts of the proposed project are negligible and air emissions analysis and consultation with the Texas Commission on Environmental Quality has determined that the project will conform to the State Implementation Plan, no mitigation is proposed.

Local Texas governments have expressed support for the project.

None of the comments received from the public or resource agencies raised significant new issues that could affect plan formulation or selection.

**Environmental Compliance.** The project was designed and the study conducted in accordance with the requirements of the National Environmental Policy Act. An Environmental Impact Statement was prepared for this project. The Draft Feasibility Report and Draft EIS were released for public and agency review for 45 days on 23 December 2010, with the Notice of Availability published in the Federal Register on 23 December 2010. The DEIS public review period closed on 5 February 2011. The public meeting was held in Freeport, Texas on 13 January 2011. Comments and concerns raised by the reviewers have been addressed and incorporated into the Final Feasibility Report and Final EIS.

At the conclusion of Design Phase investigations and detailed implementation plans, the Federal and State regulatory processes would be completed and the final regulatory approvals obtained for the project. Any significant new information developed in the Design Phase, and changes to the project recommendation, and any construction sequencing or changes in air quality compliance, would be published in additional NEPA documents to solicit public participation.

**State and Agency Review.** State and agency review is currently scheduled for 16 September through 14 October.

**Certification of Peer and Legal Review.** Certifications of the technical and legal adequacy of the final feasibility report have been received.

ATR certification was received 16 December 2009 and June 2011. Initial IEPR final certification was received 24 December 2009. Legal review certification was received 12 April 2011.

The Cost Engineering DX reviewed and certified the cost estimate for the Freeport Harbor Channel Improvement Project in October 2009 and June 2011.

**Policy Compliance Review. (To be inserted by HQUSACE after the S&A Review ends)**