

REVIEW PLAN

(30 June 2020)

Project Name: GIWW Coastal Resilience Study, Texas (Brazoria and Matagorda Counties, Texas)

P2 Number: 471987

Decision Document Type: Integrated Feasibility Report - Environmental Assessment (IFR-EA)

Project Type: Inland Navigation

District: Galveston District

District Contact: Project Manager, 409-741-5764

Major Subordinate Command (MSC): Southwestern Division (SWD)

MSC Contact: Biologist-Planner 469-487-7045

Review Management Organization (RMO): Inland Navigation Planning Center of Expertise

RMO Contact: Review Manager, 304-399-5848

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: Pending

Date of MSC Approval of Review Plan: Pending

Date of IEPR Exclusion Approval: Pending

Has the Review Plan changed since PCX Endorsement? No

Date of Last Review Plan Revision: Pending

Date of Review Plan Web Posting: Pending

Date of Congressional Notifications: Pending

Milestone Schedule

| | <u>Scheduled</u> | <u>Actual</u> | <u>Complete</u> |
|--|------------------|---------------------|-----------------|
| <u>Funding Received; Study Initiation</u> | 04/06/20 | 04/06/20 | Yes |
| <u>Alternatives Milestone:</u> | 07/20/20 | 07/24/20 | Yes |
| <u>Tentatively Selected Plan:</u> | 05/25/21 | <i>(enter date)</i> | No |
| <u>Release Draft Report to Public:</u> | 07/26/21 | <i>(enter date)</i> | No |
| <u>Agency Decision Milestone:</u> | 12/10/21 | <i>(enter date)</i> | No |
| <u>Final Report Transmittal:</u> | 10/09/22 | <i>(enter date)</i> | No |
| <u>Senior Leaders Briefing:</u> | 01/18/23 | <i>(enter date)</i> | No |
| <u>Chief's Report or Director's Report:</u> | 04/05/23 | <i>(enter date)</i> | No |

- **RP References:**

- Engineer Circular (EC) 1165-2-217, Review Policy for Civil Works (CW), 20 February 2018
- EC 1105-2-412, Assuring Quality of Planning Models, 31 March 2011
- Engineer Regulation (ER) 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 November 2007
- Director's Policy Memorandum (DPM) CW Programs 2018-05, Improving Efficiency and Effectiveness in USACE CW Project Delivery (Planning Phase and Planning Activities), 3 May 2018
- Director of Civil Works (DCW) Memorandum, Revised Delegation of Authority in Section 2034(a)(5)(A) of the Water Resources Development Act of 2007 (WRDA 2007), as amended (33 U.S.C. 2343), 7 June 2018
- Planning Bulletin (PB) 2018-01, Feasibility Study Guidelines, 26 September 2018
- DPM 2019-01, Policy and Legal Compliance Review, 9 January 2019
- Gulf Intracoastal Waterway (GIWW), Coastal Resilience Study, TX Feasibility Study Project Management Plan, June 2020

Project Fact Sheet

Project Name: Gulf Intracoastal Waterway (GIWW), Coastal Resilience Study, Texas

Location: Initial scope for the study includes the GIWW in Brazoria and Matagorda Counties, Texas.

Authority: The study is authorized under the Water Resources Development Act of 2016, Section 1201 (25) GIWW, Texas (TX). Project for navigation and hurricane and storm damage reduction, Gulf Intracoastal Waterway, Brazoria and Matagorda Counties, Texas.

Sponsor: Texas Department of Transportation (TXDOT) is the non-Federal Study Partner.

Type of Study: Feasibility Study

SMART Planning Status: This study is 3x3x3 compliant. The study is currently in the scoping phase. The next planned milestone is the Alternatives Milestone Meeting (AMM).

Project Area: The project area generally encompasses the Texas portion of the Gulf Intracoastal Waterway in Matagorda and Brazoria Counties (**Figure 1**). The GIWW is a man-made shallow draft waterway that is over 100-years old. It spans a 1,100 miles along the Gulf from St. Marks, Florida, to Brownsville, Texas. The portion of the GIWW in Texas is authorized to 125-foot wide and -13 feet mean lower low water (MLLW) for approximately 406 miles along the coast. Maintenance material is placed into confined upland placement areas (PAs), open water unconfined PAs, side-cast along the channel and placed on partially confined barrier islands. Fringe barrier islands that originally buffered the GIWW from Gulf of Mexico currents and waves is eroding or in many cases has eroded away leaving the channel exposed to cross currents and wave action. In other areas there are breaches between features such as the GIWW and lakes or bays.

Problem Statement: The problems for the study have been categorized under the following purposes 1) Navigation Channel and 2) Coastal Storms.

The **problems** specific to the navigation channel include the following:

1. Severe cross-currents, winds, and shoaling are presenting navigation hazards with risks to property damage and life safety, due to degradation, breaches, and erosion of channel-protecting features (such as barrier islands)
2. Channel restrictions due to shoaling in certain areas limit maneuverability which has led to traffic restrictions (one-way vs two-way barge traffic), and reduced speeds for vessels, groundings, and may result in increased frequency of operations and maintenance dredging
3. There is a shortage of dredged material placement areas within the project area which could lead to higher costs of disposal. Many existing disposal locations are unusable due to development, environmental concerns, or other issues.
4. Light-loading due to depth restrictions in the project area which lead to economic inefficiencies (tend to load to 9-10 feet)
5. Sediment can pile up at the mouth of tributaries and has led to re-routing in some areas
6. Increased development has led to the placement of private docks along the navigation channel which have the potential to further restrict the channel.

The **problems** specific to coastal storms include the following:

1. Coastal storms are damaging protective features of the navigation channel and are leading to disruptions for navigation vessels



Figure 1 - GIWW CRS Study Area (Brazoria and Matagorda Counties, Texas)

Federal Interest: The GIWW is the third busiest inland waterway in the United States. The Texas portion of the GIWW handles approximately 70 percent of the total GIWW traffic, connects 20 ports along the coast and allows for movement of about 80 million tons of cargo annually. The GIWW is an integral part of the supply chains of the Texas petrochemical and manufacturing industries – about 90 percent of the cargo each year is classified as petroleum or chemical products. In 2016, the U.S. Department of Transportation approved TXDOT’s application to designate the Texas segment of the GIWW as Marine Highway 69, which was a significant step for the corridor and for the state. This designation is a testament to the importance of this channel to the State of Texas and the Nation.

Risk Identification: The following assumptions, constraints and risks have been considered to develop scope, budget and schedule. The Galveston District Chief of Engineering and Construction

has concurred that conditions now or in the future do not pose a significant threat to human life of the environment with the understanding that this study does not intend to recommend any modifications or effect to levees along the GIWW. See response to “Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?” on following page for more details.

Assumptions:

- The study is a 3x3x3 compliant study and it is anticipated there will be minimal changes to USACE policy or guidance while the project is underway.
- As part of this project TXDOT, as the non-Federal partner would be the responsible entity for all land, easements, rights of way, relocations, and disposals (LERRDs) costs associated with this project.
- The project delivery team (PDT) anticipates an Environmental Assessment (EA) will sufficiently cover compliance with National Environmental Policy Act (NEPA) requirements.

Constraints:

- The alternatives should not negatively impact existing federal projects in the study area.
- The alternatives should be formulated consistent with study authority.

Uncertainties: *A risk register will be developed for the study; however, that action has not yet been conducted.*

- There is some uncertainty regarding the sediment budget in this area and the quality of sediment available for various beneficial uses.
- Winds, waves, and currents are negatively effecting navigation but the extent to which this translates to delays and economic inefficiencies is unclear.
- The potential long-term effects of current economic trends is highly uncertain.
- While this study is aimed at improving the resiliency of the GIWW navigation system in the study area, appropriate methods of measuring the performance of alternatives with regard to this are unclear at this time.
- There are numerous other studies going on in the area and the assurance that these features will be constructed is uncertain which leads to uncertainty in the future without project condition.

1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review.

- Will the study likely be challenging? It is not likely that this study will be challenging as the district has experience with inland navigation projects. Additionally, though we have secondary objectives that include reduction of risk from coastal storms to property and infrastructure within the study area and improving the ability of the study area coastal landscape features to withstand, respond to, and recover from coastal storms and other events, those must be consistent with the primary objective for navigation. The project is likely to involve dredging and placement activities inclusive of beneficial use and erosion protection concepts.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. Navigation safety, which includes potential consequences to human life and the environment due to collisions, allisions and spills, is at risk due to greater wave action under existing conditions where coastal barriers do not exist and is expected increase under no project conditions where barrier reduction is predicted. The magnitude of that risk is low under normal conditions, but high under storm conditions where wave climate is greater. Coastal barrier features that reduce wave action also act as an additional line of defense to coastal infrastructure and levees that protect human life and infrastructure from flood risk. Similar to navigation safety, the risk is lower under normal conditions, but higher under storm conditions and is expected to be greater under future conditions without project. The coastal shoreline is also at risk due to greater wave climate action that can erode and threaten coastal barrier features. **This study does not include modifications to existing levee systems along the GIWW.**
- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? The primary objective for the study is navigation. While the study is targeting both navigation efficiency and vessel safety improvements, it is unlikely to be justified based on life safety benefits or to have any significant effects on life safety. There are no significant threats to human life associated with either construction of the proposed improvements, operation and maintenance of the proposed project, or with project failure. Should the project not perform as expected, the impact would be a lower than expected benefit to NED, resiliency, or other benefit categories, which would not impact human life and/or safety. Non-performance of the project would not affect the well-being of the general public and/or environment, but may negatively affect transportation of commodities coming in through area facilities. There is no residual risk to account for in this project due to the fact that the project purpose does not address or directly affect human health and safety. Climate and sea level change will be considered during the study. These effects will be considered during evaluation of alternatives and final plan. **By email dated 15 June 2020, the Galveston District Chief, Engineering and Construction, concurred that life safety isn't anticipated to be an issue for this project as so long as the study/project does not touch any of the levee systems along the GIWW.**
- Has the Governor of an affected state requested a peer review by independent experts? No, the Governor of Texas has not requested peer review by independent experts nor is such a request expected.
- Will the project likely involve significant public dispute as to the project's size, nature, or effects? The project is unlikely to involve significant public dispute as to the size, nature, or effects of improvements to existing GIWW channel. Dredged material placement alternatives to either keep sediment in the system or beneficial use for construction of features to assist with erosion of shoreline or barrier islands would likely be considered. Through the public review process, the TSP will be coordinated with the public and resource agencies, providing an opportunity to submit comments. The project is not expected to have significant public dispute.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? No, it is not likely that there will be significant public dispute as to economic and/or environmental costs and benefits. Economic costs are offset by benefits received by the project. Any environmental impacts would be avoided to the extent possible; however, should impacts occur, any required mitigation will be coordinated with the resource agencies. Through NEPA, public comments will be taken into consideration. Based on prior study efforts, the project is unlikely to involve significant public dispute as to economic and environmental benefits/costs.
- Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? No, the project would include features such as inland navigation dredging and placement of material, beneficial use of dredged material to construct features such as shoreline restoration, barriers between the Gulf and GIWW to shelter navigation, etc. Overall, it is anticipated there will be low risk associated with the project. Standard engineering, economic and environmental analyses and information will be included in the final feasibility report and supporting documentation. It is expected that the Corps (inclusive of the Engineer Research and Development Center (ERDC)) will have the expertise to utilize any methodologies used for the study/project.

Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? The project design is expected to follow dredging and placement methodologies for navigation projects used previously by the Corps. A secondary objective of the study is to improve the ability of coastal ecosystems in the area to withstand, respond to, and recover from coastal storms and other adverse events (resilient ecosystem) to the extent practicable and consistent with the primary navigation study objective. Common construction methodologies will be used. Redundancy is not needed because the project improvements will be add-ons to the system and not pose risks to existing operations.

- Is the estimated total cost of the project greater than \$200 million? The estimated cost of the project is currently unknown; however, expectations are that the project would be less than \$200 million. However, if the PDT later determines the cost will be greater than \$200 million, the District will inform the PCXIN / SWD for guidance concerning updating or recoordination of the Review Plan.
- Will an Environmental Impact Statement be prepared as part of the study? It is expected that an EA will sufficiently cover the National Environmental Policy Act (NEPA) requirements. However, if after coordination with resource agencies it is determined that an EIS is needed, the PDT will coordinate an update Review Plan.
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. Much of the project area(s) have already been disturbed from dredging and other activities. Nonetheless, a cultural resources survey would likely be

necessary. Avoidance, minimization, or mitigation of any adverse impacts to historic properties would then be required.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? There are no significant adverse impacts expected to occur on fish and wildlife species, or their habitat, prior to the implementation of any, if needed, mitigation measures.
- Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? No significant adverse impacts are expected to occur on an endangered or threatened species, or to their designated critical habitat before mitigation measures are implemented.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan. The DQC review team will be comprised of USACE personnel for each discipline and will be performed in Dr Checks with the four-part comment structure. A DQC Report will be prepared and distributed to the Agency Technical Review team and vertical team.

Agency Technical Review. ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

Independent External Peer Review. Type I IEPR may be required for decision documents under certain circumstances. This is the most independent level of review, and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

Model Review and Approval/Certification. EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Table 1 provides the schedules and costs for reviews. The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Table 1: Levels of Review

| Product(s) to undergo Review | Review Level | Start Date | End Date | Cost | Complete |
|------------------------------|---------------------------------------|------------|----------|-------------|----------|
| DIFR-EA | District Quality Control ¹ | 05/20/21 | 06/14/21 | \$30K | No |
| DIFR-EA | Agency Technical Review ² | 07/21/21 | 08/18/21 | \$60K | No |
| DIFR-EA | Policy and Legal Review | 07/21/21 | 08/19/21 | n/a | No |
| FIFR-EA | District Quality Control ³ | 04/29/22 | 05/23/22 | \$30K | No |
| FIFR-EA | Agency Technical Review ⁴ | 06/03/22 | 06/28/22 | \$52K-\$70K | No |
| FIFR-EA | Policy and Legal Review | 12/14/22 | 01/18/23 | n/a | No |

¹ Estimated as \$3K / reviewer (9)

² Estimated as \$5,720 for PCXIN RMO, \$4,000 ATR Lead, \$5,000/Reviewer – maximum 12 reviewers

³ Estimated as \$3K / reviewer (9)

⁴ Estimated as \$5,720 for PCXIN RMO, \$4,000 ATR Lead, \$3,500-5,000/Reviewer – maximum 12 reviewers

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead should prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team.

Table 2: Required DQC Expertise

| DQC Team Disciplines | Expertise Required |
|--|---|
| DQC Lead | A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.). |
| Planning | A senior water resources planner with experience in leading a team through an inland navigation study and familiarity with the SMART Planning process. |
| Economics | The economics reviewer should be a senior economist with experience in inland navigation studies as well as CE/ICA analysis |
| Environmental Resources / Cultural Resources | The reviewer should have a solid background in and understand the habitat types and ecological processes found in the Gulf Coast area. The reviewer should also have a good understanding of environmental compliance, in particular the NEPA process and regulatory requirements for Gulf Coast projects. The reviewer should also be experienced with environmental coordination and NEPA requirements for shallow draft navigation projects and be familiar with the environmental model identified in Table 5 . The reviewer should also have experience related to Hazardous, Toxic and Radioactive Waste (HTRW) assessments. Cultural resources reviewer should have expertise in evaluating the impacts associated with shallow draft navigation channel improvement and dredging projects as well as extensive knowledge of underwater archaeology. The reviewer should also be familiar with the environmental coordination and NEPA and National Historic Preservation Act (NHPA) requirements for coastal inland navigation projects. The reviewer should also be able to assess the adequacy of mitigation planning documents. |
| Hydrology | The HH&C engineering reviewer should be knowledgeable in the field of hydraulics, have a thorough understanding of coastal nearshore dynamics and have experience in inland navigation studies/projects. The reviewer should also be familiar with computer modeling techniques that will be used in the study (as identified in Table 6). |
| Geotechnical | The reviewer will have an understanding of the behavior or soils, site characterization, material management, slope stability, and the analysis and placement of dredged material. The reviewer should also be familiar with computer modeling techniques identified in Table 6 . |
| Cost Engineering | The cost engineering reviewer should have experience in evaluating cost requirements for an inland navigation channel improvement project and experience with the cost engineering models identified in Table 6 . |
| Construction/Operations | The operations reviewer should have experience in the O&M of inland navigation projects to include channel maintenance dredging, placement, and Beneficial Use. |
| Real Estate | The real estate reviewer should have expertise in the real estate requirements of an inland navigation project. |

Documentation of DQC. Quality Control should be performed continuously throughout the study. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

Documentation of completed DQC should be provided to the MSC, RMO and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h)(1)). Table 3 identifies the disciplines and required expertise for this ATR Team.

Table 3: Required ATR Team Expertise

| ATR Team Disciplines | Expertise Required |
|--|--|
| ATR Lead | The ATR lead will be a senior professional with extensive experience preparing CW decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (e.g., plan formulation, economics, etc.). |
| Planning | A senior water resources planner certified to conduct ATR for Plan Formulation with experience in leading a team through an inland navigation study and familiarity with the SMART Planning process. |
| Economics | The economics reviewer should be a senior economist with experience in inland navigation studies and cost effectiveness analysis. |
| Environmental Resources / Cultural Resources | The environmental reviewer should be certified to conduct ATR for environmental compliance, in particular the NEPA process and regulatory requirements for Gulf Coast projects. The reviewer should also be experienced with environmental coordination and NEPA requirements for shallow draft navigation projects and be familiar with the environmental model identified in Table 5 . The reviewer should also have experience related to Hazardous, Toxic and Radioactive Waste (HTRW) assessments. Cultural resources reviewer should have expertise in evaluating the impacts associated with shallow draft navigation channel improvement and dredging projects as well as extensive knowledge of underwater archaeology. The reviewer should also be familiar with the environmental coordination and NEPA and National Historic Preservation Act (NHPA) requirements for coastal inland navigation projects. The reviewer should also be able to assess the adequacy of mitigation planning documents. |
| HH&C Engineer | The HH&C engineering reviewer should be knowledgeable in the field of hydraulics, have a thorough understanding of coastal nearshore dynamics and have experience in inland navigation studies/projects. The reviewer should also be familiar with computer modeling techniques that will be used in the study (as identified in Table 6). |

| | |
|--|--|
| Geotechnical | The reviewer will have an understanding of the behavior of soils, site characterization, material management, slope stability, and the analysis and placement of dredged material. The reviewer should also be familiar with computer modeling techniques identified in Table 6 . |
| Cost Engineering | The cost engineering reviewer should have experience in evaluating cost requirements for an inland navigation channel improvement project and experience with the cost engineering models identified in Table 6 . |
| Construction/Operations | The operations reviewer should have experience in the O&M of inland navigation projects to include channel maintenance dredging, placement, and beneficial use. |
| Real Estate | The real estate reviewer should have expertise in the real estate requirements of an inland navigation project. |
| Climate Preparedness and Resilience/HH&C Climate | A member of the Climate Preparedness and Resiliency CoP or a HH&C Climate reviewer will participate on the ATR team. Another reviewer can fulfill this requirement as long as that reviewer has the required expertise. |
| <u>Risk and Uncertainty</u> | For decision documents involving hydrologic, hydraulic, and/or coastal related risk management measures, include a subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty. |

Documentation of ATR. DrChecks will be used to document all ATR comments, responses and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Type I IEPR.

- 1) **Decision on Type I IEPR.** Type I IEPR is managed outside of USACE and is typically conducted on studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Based upon the criteria identified in EC 1165-2-217 and the scope of the study, the PDT’s risk informed assessment is that the study does not require Type I IEPR. The risk informed decision used to come to this determination was based on consideration of the following:

The decision document does not meet any of the mandatory triggers for Type I IEPR described in paragraph 11.D.(1) of EC 1165-2-217 and described in detail in Section 5 of this Review Plan. There is no significant threat to human life, the estimated total cost of the project is not expected to exceed the \$200M trigger; the Governor of Texas has not requested peer review by independent experts; and neither the DCW nor the Chief of

Engineer's has determined that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project. Precedent-setting methods or models are not planned for this study.

Additionally, the following were considered:

- The consequences of non-performance on project economics, the environmental and social well-being (public safety and social justice). This project will promote economic efficiency for commercial navigation interests. Should the project not perform as expected, the impact would be a lower than expected benefit to NED, which does not impact human life and/or safety. Non-performance of the project would not affect the well-being of the general public and/or environment, but may negatively affect transportation cost for commercial vessels/commerce.
- The project is not likely to contain influential scientific information or be highly influential scientific assessment. The final report and supporting documentation will contain standard engineering, economic, and environmental analyses and information.
- The decision document also meets both exclusions (a) and (b) as described on pages 36 and 37 of EC 1165-2-217 and discussed in detail in Section 5 of this RP:
 - Exclusion (a): The project study does not include an EIS; the Chief of Engineers has not determined it to be controversial; it has no more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources; and it has no substantial adverse impacts on fish and wildlife species and their habitat prior to implementation of mitigation measures; and before implementation of mitigation measures it has no more than a negligible adverse impact on a species listed as endangered or threatened under the ESA or the critical habitat of such species designated under such Act.
 - Exclusion (b): The project is for an activity for which there is ample experience within USACE and industry to treat the activity as being routine and the project study has minimal life safety risk.

Should this assessment change during the study, the District will inform the PCXIN / SWD and make a determination of revisions to the Review Plan and Approval.

- 2) Decision on Type II IEPR.** Type II IEPR, Safety Assurance Review, is managed outside of the USACE and is performed on design and construction for any project where potential hazards pose a significant threat to human life. For Type II IEPRs, a panel is convened to review the design and construction activities before construction begins and periodically thereafter until construction activities are completed.

The PDT has assessed this study and determined that it does not meet the criteria for conducting Type II IEPR:

- The federal action is not justified by life safety and failure of the project will not pose a significant threat to human life. By email dated 15 June 2020, the Galveston District Chief, Engineering and Construction, concurred that life safety isn't anticipated to be an issue for this project as so long as the study/project does not touch any of the levee systems along the GIWW.

d. MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 5: Planning Models. The following models **may be used** to develop the decision document:

| Model Name and Version | Brief Model Description and How It Will Be Used in the Study | Certification / Approval |
|--|--|---------------------------------|
| Habitat Evaluation Procedure Habitat Suitability Index (Environmental Resources) | The Habitat Evaluation Procedure Habitat Suitability Index (HEP-HSI) model will be used to quantify the potential impacts associated with the project or outputs of proposed BU or mitigation. | Certified |
| Wetland Value Assessment Barrier Headland Community | The Wetland Value Assessment Barrier Headland Community model will be used to define an optimal combination of habitat conditions for all fish and wildlife species utilizing barrier headlands. | Certified |
| Wetland Value Assessment Coastal Marsh Version 2.0 | The Wetland Value Assessment Coastal Marsh model will be used as the primary means of measuring the wetland benefits of marsh restoration projects. | Certified |
| Spreadsheet-Economics | The spreadsheet will compute benefits from dredging | Approval by PCXIN |
| IWR Planning Suite | The model will be used for CE/ICA analysis | Certified |

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 6: Engineering Models. These models **may be used** to develop the decision document:

| Model Name and Version | Brief Model Description and How It Will Be Used in the Study | Model Status |
|---|--|---|
| ADCIRC (HH&C Engineer) | ADCIRC (ADvanced CIRCulation model) is a hydrodynamic modeling technology that conducts short- and long-term simulations of tide and storm surge elevations and velocities in deep-ocean, continental shelves, coastal seas, and small-scale estuarine systems. ADCIRC will be used in conjunction with STWAVE to simulation water levels and waves under existing and future conditions. | CoP Preferred |
| Delft3D (HH&C Engineer) | The Delft3D Flexible Mesh Suite (Delft3D FM) is the successor of the structured Delft3D 4 Suite. Like Delft3D 4, the Delft3D FM Suite can simulate storm surges, hurricanes, tsunamis, detailed flows and water levels, waves, sediment transport and morphology, water quality and ecology, and is capable of handling the interactions between these processes. Delft3D-FM will be used to capture long-term morphologic changes. | Allowed |
| Adaptive Hydraulics (HH&C Engineer) | Adaptive Hydraulics (ADH) is a state-of-the-art Adaptive Hydraulics Modeling system. It is capable of handling both saturated and unsaturated groundwater, overland flow, three-dimensional Navier-Stokes flow, and two- or three-dimensional shallow water problems. ADH contains other essential features such as wetting and drying and wind effects. AdH will be used to capture currents, erosion, and shoaling. | Allowed |
| FUNWAVE-TVD (HH&C Engineer) | FUNWAVE-TVD is the TVD version of the fully nonlinear Boussinesq wave model (FUNWAVE) initially developed by Kirby et al. (1998). This version features several theoretical and numerical improvements, including 1) a more complete set of fully nonlinear Boussinesq equations; 2) MUSCL-TVD solver with adaptive Runge-Kutta time stepping; 3) Shock-capturing wave breaking scheme; 4) wetting-drying moving boundary condition with incorporation of HLL construction method into the scheme; 5) an option for parallel computation. FUNWAVE-TVD will be used to simulate vessel-induced waves. | CoP Preferred |
| SWAN (HH&C Engineer) | Simulating Waves Nearshore (SWAN) a state-of-the-art third-generation wave model which computes random, short-crested wind-generated waves in coastal regions and inland waters. It is fully spectral in frequencies and directions. SWAN will be used to compute wave climate. | Allowed |
| SLOPE/W and SIGMA/W (Part of GeoStudio Family available to USACE) (Geotechnical Engineer) | SLOPE/W is a leading slope stability software for soil or rock slopes. SLOPE/W would be mainly used to analyze proposed channel slopes and the stability on any other features (e.g., raise of Placement Areas, BU creations, etc.) SIGMA/W could be used in combination with SLOPE/W to analyze the stress redistribution (i.e., construction sequence of BUs or raise of the PA). This software could be used to conduct strength reduction slope stability analysis, model stress transfer onto embankment or foundation to even calculate settlements or permanent deformations depending on the loading case. Both software are part of the GeoStudio family available to the USACE. | Allowed |
| Microcomputer Aided Cost Engineering System, MII (Cost Engineer) | Microcomputer Aided Cost Engineering System (MCACES) is the cost estimating software program tools used by cost engineering to develop and prepare Class 3 CW cost estimates. | CW Cost Engineering and ATR MCX Mandatory |
| Cost Schedule Risk Analysis (Cost Engineer) | Cost risk analyses identify the amount of contingency that must be added to a project cost estimate and define the high risk drivers. The analyses will include a narrative identifying the risks or uncertainties. During the alternatives evaluation, the PDT will assist the cost engineer in defining confidence/risk levels associated with the project features within the abbreviated risk analysis. For the Class 3 estimate, an evaluation of risks will be performed using Crystal Ball Cost Schedule Risk Analysis for construction costs over \$40 million. | |
| Total Project Cost Summary (Cost Engineer) | The Total Project Cost Summary (TPCS) is the required cost estimate document that will be submitted for either division or headquarters USACE (HQUSACE) approval. The total project cost for each CW project includes all Federal and authorized non-Federal costs represented by the CW Work Breakdown Structure features and respective estimates and schedules, including the lands and damages, relocations, project construction costs, construction schedules, construction contingencies, planning and engineering costs, design contingencies, construction management costs, and management contingencies. | |
| Corps of Engineers Dredge Estimating Program (Cost Engineer) | Corps of Engineers Dredge Estimating Program (CEDEP) is the required software program that will be used for dredging estimates using floating plants. CEDEP contains a narrative documenting reasons for decisions and selections made by the cost engineer. Software distribution is restricted as it is considered proprietary to the Government. | |

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

(ii) Policy Review.

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

(ii) Legal Review.

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.
- Each participating Office of Counsel will determine how to document legal review input.

