US Army Corps
of Engineers ®
Galveston District

Appendix D

Clean Water Act Compliance

(404(b)(1) Long Form and

Water Quality Certification Waiver)

for

Coastal Texas Protection and Restoration Feasibility Study

August 2021

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Acronyms and Abbreviations

H_2S	hydrogen sulfide
BU	beneficial use
CSRM	coastal storm risk management
DIFR-EIS	Draft Integrated Feasibility Report and Environmental Impact Statement
DMMP	dredge material management plan
DO	dissolved oxygen
ER	ecosystem restoration
FWP	Future With-Project
GIWW	Gulf Intracoastal Waterway
mcy	million cubic yards
MSL	mean sea level
NED	National Economic Development
NER	National Ecosystem Restoration
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
ODMDS	Ocean Dredged Material Disposal Sites
PED	Preconstruction Engineering and Design
PDT	Product Delivery Team
PL	Public Law
ppt	parts per thousand
RSLR	relative sea level rise
TSP	Tentatively Selected Plan
USACE	U.S. Army Corps of Engineers
WRDA	Water Resources Development Act

1.0 PROJECT DESCRIPTION

1.1 LOCATION

The study area for the Coastal Texas Protection and Restoration Study (Coastal Texas Study) consists of the entire Texas Gulf Coast from the mouth of the Sabine River to the mouth of the Rio Grande and includes the Gulf of Mexico (Gulf) and tidal waters, barrier islands, estuaries, coastal wetlands, rivers and streams, and adjacent areas that make up the interrelated ecosystem along the coast of Texas. The study area encompasses 18 coastal counties along the Gulf coast and bayfronts (U.S. Army Corps of Engineers [USACE], 2015). This area is where significant project impacts would likely occur. The Texas shoreline is characterized by seven barrier islands: Galveston, Follets, Matagorda, St. Joseph's (San José), Mustang, Padre, and Brazos. These islands serve as the backbone for the Texas Gulf coast. A key feature of the study is the Gulf Intracoastal Waterway (GIWW), which parallels the Texas Coastline and can be found directly behind the seven barrier islands. The study area can be divided into three sections: Upper Texas Coast, the Middle Texas Coast, and the Lower Texas Coast. Additional information can be found in Section 1.0 (Purpose and Need for the Action) of the Final Environmental Impact Statement (EIS).

1.2 TIERED ENVIRONMENTAL REVIEW

The Coastal Texas Study employs a tiered National Environmental Policy Act (NEPA) compliance approach, in accordance with the Council on Environmental Quality's (CEQ's) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500—1508, specifically 1502.20)[1]. Under this structure, the USACE will conduct additional environmental reviews for certain measures included in the Recommended Plan. For projects as large and complex as the Coastal Texas Study, this approach has been found to better support disclosure of potential environmental impacts for the entire project at the initial phase.

The Recommended Plan for the Coastal Texas Study contains sixteen project measures. The measures fall into one of two categories regarding the Tiered NEPA approach: Tier One Measures or Actionable Measures. The Tier One Measures are project features included in the Recommended Plan that will require future tier two environmental reviews. These Tier One Measures will have Section 404(b)1 evaluations preformed as part of the future tier two environmental studies. The product delivery team has coordinated with resource agencies to identify environmental impacts, including actions subject to 404 of the Clean Water Act. The tier one analysis of the impacts for these measures is a broad level review and we are not seeking final CWA compliance on any of the Tier One Measures in this review. The broad level analyses of impacts for the Tier One Measures can be found in Section 4.0 of the EIS.

[1]The final rule to update the Council on Environmental Quality's (CEQ) regulations (40 CFR 1500-1508, 1515, 1516,1517, and 1518) for Federal agencies to implement the National Environmental Policy Act went into effect on September 14, 2020. This EIS was substantially complete before the regulations were effective, therefore this document is proceeding under the 1978 regulations and their existing agency NEPA procedures.

The EIS contains complete environmental reviews for six project measures that could provide benefits soon after construction and currently have enough design detail to complete the impact analysis. These measures are referred to as "actionable measures" because the EIS provides a complete environmental compliance review consistent with the pertinent laws, regulations, and Executive Orders. These measures are comprised of features routinely constructed within the Galveston District (*e.g.* breakwaters, beneficial use of dredge material, construction of bird islands, and beach nourishment). The Environmental Consequences of these Actionable Measures are described in Section 5.0 of the EIS.

Two of the project measures that were listed as Actionable Measures in the Draft Environmental Impact Statement, which was distributed to the public on October 30, 2020, have been moved to the list of Tier One Measures. These measures include W-3 – Port Mansfield Channel, Island Rookery, and Hydrologic Restoration, and the South Padre Island Beach Nourishment. The designs and footprints for these measures have not changed. The status was changed to allow for some additional coordination regarding compliance with the Endangered Species Act. These Tier One Measures will have Section 404(b)1 evaluations preformed as part of the Tier Two environmental studies that will occur prior to construction.

1.3 GENERAL DESCRIPTION

The Final Feasibility Report (FR) and EIS for the Coastal Texas Study examines coastal storm risk management (CSRM) and ecosystem restoration (ER) opportunities within 18 counties along the entire Texas Gulf coast. The report presents the investigation of comprehensive water resource management for the Texas Gulf coast to ensure public safety and benefit the Nation, while balancing the primary missions of navigation, flood, and hurricane storm damage reduction and environmental stewardship. The FR and EIS will be used to inform decision makers, stakeholders, and the public of the tradeoffs that should be considered in future decisions to maintain existing coastal storm risk levels and/or reduce coastal storm risk along the Texas Gulf coast. Additional information regarding the purpose of the study can be found in Section 1.0 of the EIS.

The CSRM planning goals promote a sustainable economy by reducing the risk of storm damage to residential structures, industries, and businesses critical to the nation's economy. The CSRM measures and alternatives were formulated to achieve National Economic Development (NED) principles and objectives. CSRM features include surge gates, levees, floodwalls, environmental gates, pump stations, and, potentially, nonstructural approaches (e.g., buyouts, policy changes, etc.). All of the CSRM measures included in the Recommended Plan are Tier One Measures that will have future 404(b)(1) Evaluations.

The planning goals for ER would significantly and sustainably reduce coastal erosion, restore fish and wildlife habitat, such as coastal wetlands, oyster reefs, beaches and dunes, and evaluate a range of coastal restoration components to address a multitude of ecosystem problems. ER measures and alternatives were formulated to achieve National Ecosystem Restoration (NER) principles and objectives. Contributions to the NER are designed to increase the net quantity and/or quality of desired ecosystem resources and are measured in the study area and nationwide. ER measures and alternatives include a collection of projects aiming to restore oyster reefs, marshes, beaches and dunes, tidal hydrology, and bird islands. All of the ER measures, except for B-2 Folletts Island Beach and Dune Nourishment Measure and W-3 – Port Mansfield Channel, Island Rookery,

and Hydrologic Restoration are Actionable Measures. This 404(b)(1) Evaluation is applied to the Actionable Measures which consists of the measures listed in Table 1-1.

Table 1-1: Actionable Measures in the Recommended Plan

Actionable Measures	Brief description of action
G-28 – Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection	40.4 miles of rock breakwater, 18 acres of oyster cultch, 664 acres of marsh restoration, 5 miles bird island restoration (326 acres)
B-12 – West Bay and Brazoria GIWW Shoreline Protection	43 miles of rock breakwater, 0.17 acres of oyster cultch, 551 acres of marsh restoration
CA-5 – Keller Bay Restoration	3.8 miles of rock breakwater, 2.3 miles of oyster reef using reef balls
CA-6 – Powderhorn Shoreline Protection and Wetland Restoration	5 miles of rock breakwater, 529 acres of marsh restoration
M-8 – East Matagorda Bay Shoreline Protection	12.4 miles of rock breakwater, 14.6 acres of oyster cultch, 236 acres of marsh restoration, 96.1 acres bird island restoration
SP-1 – Redfish Bay Protection and Enhancement	7.4 miles of rock breakwater, 1.4 miles oyster reef using reef balls, 391.4 acres island restoration

The Tier One Measures include the following ten project measures: 1) B-2 – Follets Island Gulf Beach and Dune Restoration. 2) Bolivar Roads Gate System. 3) Bolivar and West Galveston Beach and Dune System. 4) Galveston Seawall Improvements. 5) Galveston Ring Barrier System. 6) Clear Lake Surge Gate System. 7) Dickinson Surge Gate System. 8) Non-structural Measures. 9) W-3 – Port Mansfield Channel, Island Rookery, and Hydrologic Restoration. 10) South Padre Island Beach Nourishment. Again, this 404(b)(1) Evaluation is not for the Tier One Measures. When additional design information for those measures is available, 404(b)(1) Evaluations will be made for these measures.

1.4 AUTHORITY AND PURPOSE

From USACE (2015), the study is authorized under Section 4091, Water Resources Development Act (WRDA) of 2007 Public Law (PL) 110-114 which states:

"Sec. 4091. Coastal Texas Ecosystem Protection and Restoration, Texas.

(a) In General. — The Secretary shall develop a comprehensive plan to determine the feasibility of carrying out projects for flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration in the coastal areas of the State of Texas.

(b) Scope. — The comprehensive plan shall provide for the protection, conservation, and restoration of wetlands, barrier islands, shorelines, and related lands and features that protect critical resources, habitat, and infrastructure from the impacts of coastal storms, hurricanes, erosion, and subsidence.

(c) Definition. — For purposes of this section, the term "coastal areas in the State of Texas" means the coastal areas of the State of Texas from the Sabine River on the east to the Rio Grande on the west and includes tidal waters, barrier islands, marshes, coastal wetlands, rivers and streams, and adjacent areas."

Along the Texas coast, vital resources critical to the economic and environmental welfare of the Nation are at risk from coastal storm damage. Forty percent of the nation's petrochemical industry, 25 percent of national petroleum-refining capacity, eight deep-draft ports, 750 miles of shallow-draft channels (including 400 miles of the GIWW), and critical transportation infrastructure will continue to be at risk without a comprehensive plan to protect, restore, and maintain a robust coastal ecosystem and reduce the risk of storm damage to industries and businesses critical to the Nation's economy and protect the health and safety of Texas coastal communities. The study area also includes critical coastal ecosystems in need of restoration, including wetlands, seagrass beds, sea turtle nesting habitat, piping plover critical habitat, and whooping crane critical habitat, as well as numerous State and Federal wildlife refuges (USACE, 2015). Additional information can be found in Section 1 (Purpose and Need for the Action) of the EIS.

The feasibility study identified critical data needs and recommend a comprehensive strategy for reducing coastal storm flood risk through structural and nonstructural measures that take advantage of natural features like barrier islands and storm surge storage in wetlands. Structural alternatives to be considered include improvements to existing systems.

1.5 GENERAL DESCRIPTION OF DREDGED OR FILL MATERIAL

1.5.1 General Characteristics of Material

The PDT used information from ongoing Operations and Maintenance (O&M) work on federal navigation channels near the Actionable Measures. Finer sub strates (muds and silts) have been identified for marsh restoration efforts. Coarser sub strates have been identified for beach and dune nourishments, and bird island creation or improvements could use a range of fine and coarser materials. Depending on the restoration goals, specific habitat goals will be selected in collaboration

with the resource agencies, in the Pre-construction, Engineering, and Design phase (PED) of project development. Oyster restoration efforts would include a discharge of cultch (e.g., oyster shell, limestone, rock, gravel, etc.) or reef balls. Fill discharges would occur where rock breakwaters are proposed.

1.5.2 Sources and Quantity of Material

The volumes, borrow source locations, and effected waterbodies are summarized in Table 1-2. Most of the material needed to construct the Actionable Measures would be O&M material from currently authorized navigation channels. For G-28, B-12, and M-8, fill material will be obtained from dredging shoaled GIWW material, while fill for CA6 will be obtained from dredging shoaled material from the Matagorda Ship Channel, and SP-1 will be from Ocean Dredged Material Disposal Site (ODMDS) 1. Containment dikes would be constructed from excavated in situ material via barge-mounted clamshell draglines. If project schedules work out and material is available from the Coastal Texas Tier One measures, some of that material could be utilized for G-28. However, a separate 404(b)(1) evaluation would be done for that work.

Table 1-2 Dredge Material Volumes by Measure

Measure	Discharge Location/ Waterbody	Borrow Source Location	Marsh discharge volume (cy)	Island discharge volume (cy)	Beach Nourishment volume (cy)
G-28	Galveston Bay	GIWW, HSC, and project materials	715, 047	5,822,917	--
B-12	Galveston Bay Christmas Bay Bastrop Bay	GIWW	639,105	--	--
M-8	East Matagorda Bay	GIWW	147,778	1,195,299	--
CA-6	Matagorda Bay	Matagorda Ship Channel	432,288	--	--
SP-1	Redfish Bay	ODMDS 1	--	6,685,556	--
W-3	Laguna Madre Gulf of Mexico	Mansfield Channel and Jetties	--	488,431	1,500,000
South Padre Island Beach Nourishment	Gulf of Mexico	Brazos Island Harbor	--	--	168,000
Total			1,934,218	13,192,203	1,668,000

1.6 DESCRIPTION OF THE PROPOSED DISCHARGE SITES

1.6.1 Type of Site and Habitat

The Actionable Measures involve the restoration of marshes, creation of oyster habitat, and restoration of islands. Most of these areas are currently unvegetated open water habitats that were formerly marsh, island, or SAV habitat. Before project construction begins, habitat surveys will be conducted in PED to ensure any habitat changes that occur between the feasibility and design phases are considered in the development of the plans and specifications. The types of habitat that could be directly impacted by the Actionable Measures include:

- Estuarine emergent wetlands
- Submerged Aquatic Vegetation (seagrasses)
- Oyster reef

Additional information on habitats that could be impacted by the measures can be found in Appendix I (Ecological Modeling) of the EIS. The discharge sites are currently open water sites with sandy to muddy soft substrates that are in highly erosive environments.

1.6.2 Time and Duration of Discharge

Construction is expected to occur from 2025 until 2035.

1.6.3 Description of Disposal Method

Marsh restoration actions, fill discharges may consist of thin-layer placement, or confined placement, depending on the target restoration elevations. Direct placement of dredge material is anticipated for larger marsh restoration areas and bird island creation and restoration. For these larger placement areas, small training berms would be constructed prior to dredge material placement to contain the slurry and allow settlement. Rock breakwaters will be constructed with a barge and excavator or similar method and equipment. Oyster reef areas would be constructed with a barge or similar vessel and equipment. Additional information on construction methods can be found in Appendix D (Engineering Appendix) of the Feasibility Report. More information would be obtained during the PED phase.

2.0 FACTUAL DETERMINATIONS

2.1 PHYSICAL SUBSTRATE DETERMINATIONS

2.1.1 Substrate Elevation and Slope

Marsh and oyster restoration actions would result in elevations ranging from below mean sea level (MSL) to about +1.5 feet MSL; slopes would be generally flat. For marsh the target elevations are the regionally appropriate optimal elevation for the target native vegetation. For this analysis the optimal elevations for *Spartina alterniflora* were used to calculate material quantities. Bird islands would range in elevations (i.e., 10 to 14 feet high). The current designs for the bird islands include shorelines protected by breakwaters and some that transition to marsh, SAV, or oyster habitat. The final slopes for the bird islands will be determined in PED using geotechnical information. Expected slopes for the bird islands would range from 1:3 to 1:5 for shorelines protected by rock breakwaters and gentler slopes for shorelines that would transition to marsh, SAV, and oyster habitat. Rock breakwaters would have a crest height of 10 feet and would have 2:1 slope. Additional information on the feasibility level designs can be found in Appendix D (Engineering Appendix) of the Feasibility Report.

2.1.2 Sediment Type

Finer substrates (muds and silts) would be used for marsh restoration efforts, sands would be used for beach and dune nourishments, and a range of sediment types may be used for bird island creation. Oyster restoration efforts would include a discharge of cultch (e.g., oyster shell, limestone, rock, gravel, etc.) or reef balls or preformed castles. Rock discharges would occur where breakwaters are proposed. Although all sediment sources have been identified, their specific locations have not; however, all borrow locations have been previously dredged and there have been no concerns with sediment quality to date. If a source of material has not be previously dredged, the sediments would be tested and would have to comply with State and Federal regulations before being used for beneficial use (BU). More information would be obtained during or prior to the PED phase.

2.2 DREDGED/FILL MATERIAL MOVEMENT

In most instances, project actions would use a containment structure to hold materials in situ; in other instances, thin layer placement would be performed where some material movement throughout the marsh is intended.

Physical Effects on Benthos

There would be direct impacts to benthic organisms, which would be buried or removed during construction of the Actionable Measures. Excavation of sediments removes and buries benthic organisms, whereas placement of dredged material and structures smothers or buries benthic communities. Dredging and placement activities may cause temporary ecological damage to benthic organisms due to physical disturbance, mobilization of sediment contaminants, and increasing concentrations of suspended sediments (Montagna et al., 1998).

Recolonization of areas impacted by dredging and dredged material placement occurs through vertical migration of buried organisms through the dredged material, immigration of organisms from

the surrounding area, recruitment from the water column, and/or sediments slumping from the side of the dredged area (Bolam and Rees, 2003; Newell et al., 1998). The response and recovery of the benthic community from dredged material placement is affected by many factors, including environmental (e.g., water quality, water stratification), sediment type and frequency, and timing of disposal. Communities in these dynamic ecosystems are dominated by opportunistic species tolerant of a wide range of conditions (Bolam et al., 2010; Bolam and Rees; 2003, Newell et al., 2004; Newell et al., 1998). Although changes in community structure, species composition, and guild function may occur, these impacts would be temporary in some dredging and disposal areas (Bolam and Rees, 2003). Shallower, higher energy estuarine habitats can recover as fast as 1 to 10 months from perturbation, while deeper, more stable habitats can take up to 8 years to recover (Bolam et al., 2010; Bolam and Rees, 2003; Newell et al., 1998; Sheridan, 1999; Sheridan, 2004; Wilber et al., 2006; VanDerWal et al., 2011).

The release of nutrients during dredging may also enhance species diversity and population densities of benthic organisms outside the immediate dredge placement area as long as the dredged material is not contaminated (Newell et al., 1998). During construction of the Actionable measures, temporary disturbances and impacts to benthic organisms would occur but full colonization is anticipated.

2.2.1 Other Effects

Construction activities may also have temporary and localized disturbances to the Federally listed piping plover (*Charadrius melodus*), whooping crane (*Grus Americana*), eastern black rail (*Laterallus jamaicensis jamaicensis*), and rufa red knot (*Calidris canutus rufa*); however, long-term benefits to these species are anticipated due to habitat creation and maintenance (these species forage and loaf on these habitats). Additional information can be found in Appendix B (Endangered Species Act – Biological Assessment) of the EIS.

2.2.2 Actions Taken to Minimize Impacts

This project was fully coordinated with State and Federal resource agencies, and responses to their comments have been incorporated into the EIS. The Actionable Measures are intended to be restorative actions and should have long-term beneficial impacts. In PED, surveys will be conducted to ensure impacts to existing habitats like SAV, marsh, and oyster reef are avoided. Best management practices, including silt curtains, would be deployed during construction to prevent movement of sediments into nearby SAV beds and oyster reef habitats.

2.3 WATER CIRCULATION, FLUCTUATION, AND SALINITY DETERMINATIONS

2.3.1 Water

2.3.1.1 Salinity

The Actionable Measures are not intended to have an adverse effect on water circulation, fluctuation, or salinity. By restoring the geomorphology of the systems (beaches, dunes, estuarine wetlands, and islands), water circulation patterns are expected to return to a less degraded state. The PDT worked

with the resource agencies to ensure that the Actionable Measures would not cut off historic channels.

2.3.1.2 Water Chemistry

Dredging and placement actions would result in short-term and localized impacts and would not be expected to degrade the long-term water quality within the project area. These patterns would return to their previous condition following completion of dredging. Temporary changes to dissolved oxygen (DO), nutrients, turbidity, and contaminant levels may occur due to sediment disturbance and mixing during construction. Temporary DO decreases may also happen from aerobic decomposition from short-term increases in organic matter suspended within the water column.

The Actionable Measures would benefit water chemistry in the long-term. Wetlands and oyster reefs have proved water quality benefits including the sequestration of chemicals.

2.3.1.3 Clarity

There would be some temporary increase in local turbidity during dredging and placement operations. Water clarity is expected to return to normal background levels shortly after operations are completed, as discussed further in the EIS.

The Actionable Measures would benefit water clarity in the long-term. The breakwaters, oyster habitat, and marsh restoration areas would reduce erosion, improve water filtration, and trap sediments which would improve water clarity and decrease turbidity.

2.3.1.4 Color

Water immediately surrounding the construction area would become discolored temporarily due to disturbance of the sediment during dredging and placement actions but would return to normal after operations cease. The Actionable Measures are not expected to have a permanent impact on water color. The majority of the restoration areas that comprise the actionable measures are in close proximity to navigation channels traversed by commercial vessels that frequently disturb bottom sediments which are known to create similar to the temporary changes to water color as those expected during construction.

2.3.1.5 Odor

Negligible amounts of hydrogen sulfide may be expected during excavation and placement activities, which would be temporary and localized.

2.3.1.6 Taste

It is anticipated that no drinking water sources would be impacted by the Recommended Plan; no effects to taste are anticipated.

2.3.1.7 Dissolved Gas Levels

Negligible amounts of hydrogen sulfide (H_2S) may be expected. H_2S and other gases like methane are associated with high amounts of decaying organic matter, which are not expected to be present in excavated and placed materials. Offshore sediments may be very low in total organic carbon, an indicator of organic content. Dissolved gases have not been identified as a problem with maintenance material of the current channels, which may also be a source of BU sediments. Temporary DO decreases associated with dredging for the Actionable Measures are expected to be short lived and would return to normal soon after construction is complete.

2.3.1.8 Nutrients

The Actionable Measures are not expected to have a noticeable change to nutrients. However, the Actionable measures include a total of 2,052 acres of marsh restoration. Estuarine wetlands (marsh) has proven nitrogen cycle benefits which would benefit the systems with proposed marsh restoration. Additionally, dredging the Mansfield Channel would have the ancillary benefit of ameliorating agricultural nutrients that run off into the Laguna Madre from the Arroyo Colorado and other drainages.

2.3.1.9 Eutrophication

The Actionable Measures are not expected to have a noticeable change to nutrients. However, the Actionable measures include a total of 2,052 acres of marsh restoration. Estuarine wetlands (marsh) has proven nitrogen cycle benefits which would benefit the systems with proposed marsh restoration. Additionally, oyster reefs are highly productive systems which have been shown to improve nutrient cycles.

2.3.1.10 Others as Appropriate

No other potential impacts to water quality have been identified.

2.3.2 Current Patterns and Circulation

2.3.2.1 Current Patterns and Flow

The Actionable Measures are not expected to have an adverse effect on water current and flow. Wetlands and oyster reefs do reduce erosion which can help maintain shoreline integrity which would maintain current patterns and flow. Re-opening the Port Mansfield channel would beneficially restore flow between the Lower Laguna Madre and the Gulf of Mexico, which would preserve the salinity regime habitats in the Laguna Madre have become accustomed to.

2.3.2.2 Velocity

The Actionable Measures are not expected to have an adverse effect on water velocities.

2.3.2.3 Stratification

The Actionable Measures are not expected to have an adverse effect on stratification.

2.3.2.4 Hydrologic Regime

The Actionable Measures are not expected to have any adverse effect on hydrologic regime. Each of the measures are designed to restore historic conditions which includes limiting the extent of tidal influence into interior habitats.

2.3.3 Normal Water Level Fluctuations

The Actionable measures are not intended to alter water level fluctuations. There are some indications that the breakwaters may make some of the marsh and SAV habitats more resilient to relative sea level rise (RSLR).

2.3.4 Salinity Gradients

Some of the Actionable Measures may have some localized and relative minor effect to hydrosalinity gradients near marshes that are restored. The Study team worked with resource agencies to ensure that tidal inlets would not be blocked or obstructed by the proposed ER measures. Coordination with the resource agencies will also continue into PED. Periodic breaks, gaps, weirs, and fish passage structures are planned for the breakwaters to allow for hydrologic exchange which will reduce adverse effects to hydrosalinity.

2.3.5 Actions that Will Be Taken to Minimize Impacts

This project was fully coordinated with State and Federal resource agencies, and responses to their comments have been incorporated into the development of the EIS. The Actionable Measures are intended to be restorative actions and should be beneficial.

2.4 SUSPENDED PARTICULATE/TURBIDITY DETERMINATION

2.4.1 Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site

There will be some temporary increase in local turbidity during dredging and placement operations. Water clarity is expected to return to normal background levels shortly after operations are completed, as discussed further in the EIS.

2.4.2 Effects on Chemical and Physical Properties of the Water Column

2.4.2.1 Light Penetration

The temporary and localized turbidity increases during dredging and placement actions would also have temporary and localized impacts to light penetration. Conditions are anticipated to return to normal levels of light penetration following construction. All the breakwaters included in the Actionable Measures are designed to reduce erosion which in turn reduces turbidity which would improve light penetration. The study team worked with the resource agencies on the designs for ER measures. SP-1, CA-5, and CA-6 were specifically designed to improve conditions for SAVs.

2.4.2.2 Dissolved Oxygen

Temporary DO decreases associated with extended periods of construction and dredged material placement may happen from aerobic decomposition from short-term increases in organic matter suspended within the water column. The dredge material would be from existing channels, the depths would not change and there are expected negative impacts to DO for these proposed actions. Incidentally, SAVs, and algae on oyster shells has been shown to raise DO levels, even if minimially.

2.4.2.3 Toxic Metals and Organics

Sediments are not expected to contain toxic metals and organics. Past sediment testing records and the results of the HTRW analysis (Appendix L) will be used to reduce the risk of encountering toxic metals and organics. Higher risk portions of the channels will be avoided (e.g. near industrial facilities).

2.4.2.4 Pathogens

Sediments are not expected to contain or influence pathogens.

2.4.2.5 Aesthetics

The Actionable Measures would restore natural viewshed and would reduce erosion and future losses of landscapes. All of these activities would have a beneficial effect on aesthetics by restoring natural viewsheds.

2.4.2.6 Others as Appropriate

No other potential impact to water quality has been identified from the Actionable Measures.

2.4.3 Effects on Biota

Long-term effects to biota are expected to be beneficial due to restoration actions; negative effects to biota are expected to be temporary and localized.

2.4.4 Actions Taken to Minimize Impacts

This project was fully coordinated with State and Federal resource agencies, and responses to their comments have been incorporated into the development of the EIS. The Actionable Measures are all designed to be restorative actions and should be beneficial. Best management practices including the use of silt curtains and dredge booms will be used to minimize impacts during construction. Additionally, surveys will be conducted prior to the construction of these measures to ensure that healthy marsh, SAV, and oyster habitats are avoided.

2.5 CONTAMINANT DETERMINATIONS

Maintenance records from previous testing will be reviewed prior to construction and only materials that are free from contaminants would be used for construction of the Actionable Measures. Additionally, an HTRW review was performed and areas with risks of contamination identified in that analysis would be avoided (includes known issues with pipelines and industrial facilities). The HTRW analysis is included in Appendix L.

2.6 AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS

2.6.1 Effects on Plankton

Turbidity from total suspended solids tends to reduce light penetration and thus reduce photosynthetic activity by phytoplankton (Wilber and Clarke, 2001). Such reductions in primary productivity would be localized around the immediate area of the dredging and placement operations. This reduced productivity may be offset by an increase in nutrients released into the water column during dredging activities that can increase productivity in the area surrounding the dredging activities (Newell et al., 1998; Wilber and Clarke, 2001). In past studies of impacts of dredged material placement from turbidity and nutrient release, the effects are both localized and temporary (May, 1973). Due to the capacity and natural variation in phytoplankton populations, the impacts to phytoplankton from project construction, dredging within the project area, and dredged material placement of material would be temporary.

2.6.2 Effects on Benthos

Impacts to benthos would be localized and temporary; however, benthic organisms are expected to quickly rebound following construction activities. There would be direct impacts to benthic organisms, which would be buried or removed during construction of the Coastal Barrier. Excavation of sediments removes and buries benthic organisms, whereas placement of dredged material and structures smothers or buries benthic communities. Dredging and placement activities may cause ecological damage to benthic organisms due to ecosystem physical disturbance, mobilization of sediment contaminants making them more bio-available, and increasing concentrations of suspended sediments (Montagna et al., 1998).

2.6.3 Effects on Nekton

Although there may be temporary and localized effects to nekton due to dredging and placement operations, long-term benefits are anticipated due to restoration actions.

2.6.4 Effects on Aquatic Food Web

The effects on benthic biota (such as infauna) and nekton (e.g. plankton) that form the base of the aquatic food web would be localized, temporary, and not result in significant adverse impacts to populations. Long-term benefits to ecological functions, including trophic dynamics, are expected due to restoration actions that benefit biota.

2.6.5 Effects on Special Aquatic Sites

The Actionable Measures are anticipated to have long-term benefits to special aquatic sites. Specifically, the breakwaters and islands would reduce wave energy and fetch which is favorable for SAVs and estuarine wetlands. The measures include the restoration of 2,052 acres of estuarine wetlands and 37 acres of oyster reef. The measures on the middle and lower coast were designed with the Interagency Team to protect and restore thousands of acres of SAVs.

2.7 PROPOSED DISPOSAL SITE DETERMINATIONS

2.7.1 Mixing Zone Determination

The Actionable Measures do not have discharge quality concerns. No mixing zones would be required.

2.7.2 Determination of Compliance with Applicable Water Quality Standards

Project actions would be performed in compliance with State and Federal regulations and would adhere to applicable water quality standards.

2.7.3 Potential Effects on Human Use Characteristics

2.7.3.1 Municipal and Private Water Supply

The Actionable Measures are not expected to affect municipal or private water supply. The Actionable measures are all in the coastal zone which is subject to tidal fluctuation and is brackish and not usable for municipal or private water supplies.

2.7.3.2 Recreational and Commercial Fisheries

The Actionable Measures are anticipated to improve habitat for recreational and commercial fisheries. Marsh and SAV habitats improve the fishery productivity and provide additional nursery habitat for numerous recreational and commercial fish species. Additionally, oyster reef is an incredibly productive habitat that concentrates a high diversity of marine species.

2.7.3.3 Water-related Recreation

These Actionable Measures would contribute to improving water-related recreation. Marsh and SAV habitats improve the fishery productivity and provide additional nursery habitat for numerous recreational and commercial fish species. Also, birders on Texas waterbodies constitute a growing recreational group. Additionally, beaches are undeniably popular areas for recreation.

2.7.3.4 Aesthetics

The Actionable Measures would restore natural viewshed and would reduce erosion and future losses of landscapes. All of these activities would have a beneficial effect on Aesthetics.

2.7.3.5 Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The Actionable Measures would result in benefits to several national wildlife refuges and Padre Island National Seashore through implementation of restoration actions. Additionally, ER measures may prevent erosion of several parks and preserves or ameliorate RSLR.

2.8 DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM

Positive environmental impacts would result from the Actionable Measures, which include beach and dune restoration, marsh restoration, shoreline protection, bird island restoration, and oyster reef creation. Many past, present, and reasonably foreseeable projects address restoration of coastal resources (which have the capacity to alter geomorphology and coastal processes). Some of these projects reduce erosion, provide habitat, function as storm buffers, promote recreational and commercial fisheries, and improve water quality, for example; the Actionable Measures would result in the same benefits. Construction is anticipated to temporarily increase turbidity, dissolved oxygen, and contaminants in the water column that would occur during dredging activities and placement of rock breakwater and sediments. Long-term direct and indirect impacts of the Actionable Measures on wetlands and marshes in the region will be positive and will help offset some marsh loss from shoreline erosion and sea level rise. Revetments and breakwaters will diffuse erosional forces approaching the shoreline and protect sediments from disturbances. Marsh nourishment efforts would complement current and future marsh restoration efforts by state, federal, non-government organizations, and private entities. With regards to ER measures, the cumulative effects of the Recommended Plan would be beneficial when combined with other past, present, and reasonably foreseeable restoration actions around Galveston Bay.

2.9 DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM

No significant adverse secondary effects on the aquatic ecosystem should occur as a result of implementing the Actionable Measures; beneficial secondary effects are anticipated due to the large-scale restoration actions. Interagency coordination, regulatory compliance, monitoring, and adaptive

management strategies are intended to decrease the risk of failed restorative efforts. All of the secondary effects from the Actionable Measures are expected to be beneficial (improved habitat, decreased turbidities, decrease perturbation, and substrate enhancement).

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Findings of Compliance with

Section 404(b)(1) Guidelines

Coastal Texas Protection and Restoration Study

U.S. Army Corps of Engineers

1. No significant adaptations of the guidelines were made with respect to the evaluation completed for this project. The feasibility analysis for the Coastal Texas Protection and Restoration Study (Study) was conducted using the formulation process for Civil Works projects to identify the combined NED/NER Plan. The National Economic Development (NED) Plan is the plan that reasonably maximizes net benefits. The National Ecosystem Restoration (NER) Plan is the alternative that reasonably maximizes ecosystem restoration benefits compared to cost. The combined NED/NER Plan produces both NED benefits and NER benefits and results in a best recommended plan. The Study utilizes a Tiered NEPA approach, where many of the measures that make up the recommended plan will have follow on environmental reviews as more detailed information becomes available and six of the ER measures have sufficient detail to be moved forward as Actionable Measures. This finding is complete for the six actionable ER measures and preliminary for the remaining measures that will receive future environmental consideration.

2. The objective of Civil Works ecosystem restoration is to restore degraded significant ecosystem structure, function, and dynamic processes to a less degraded level or more natural condition. Six alternative combinations of eight ER measures were reviewed and evaluated. The alternative selected as the NER plan was the all-inclusive alternative which includes all eight ER measures and yielded the highest amount of ER benefits. The Alternative Analysis consistent with the Council on Environmental Quality (40 CFR 1502) and the USACE procedures for implementing NEPA (33 CFR 230) is documented in Section 2 of the EIS.

3. The planned disposal of dredge material will not violate any applicable State or Federal water quality criteria or toxic effluent standards of Section 307 of the Clean Water Act.

4. Use of the selected disposal sites for the Actionable Measures will not harm any endangered species or their critical habitat or violate protective measures for the Long Bay Marine Sanctuary.

5. The Proposed disposal of dredged material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

6. Appropriate steps to minimize potential adverse impacts on the aquatic system include close coordination with state and Federal resource agencies during final Project design prior to construction to incorporate all valid suggestions.

7. Based on the guidelines, the Applicant's Proposed Project Alternative is specified as complying with the requirements of the Section 404(b)(1) guidelines.

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For Amanda M. McGuire

Chief, Compliance Branch

Regional Planning and Environmental Center

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 18, 2021

Mr. Jeff Pinsky
Galveston District CESWG-PE-RE
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Coastal Texas Protection and Restoration Feasibility Study Final EIS

Dear Mr. Pinsky:

This letter is in response to the Coastal Texas Protection and Restoration Feasibility Study Final EIS dated April 2021 (FEIS) and the United States Army Corps of Engineers (USACE) request for 401 water quality certification of six actionable measures from the recommended plan identified in the FEIS. The recommended plan includes coastal storm risk management (CSRM) and ecosystem restoration (ER) that together are intended to function as a system to reduce the risk of coastal damages to natural and man-made infrastructure and to restore degraded coastal ecosystems. The FEIS includes proposed CSRM and ER projects located in eighteen counties along the Texas Gulf coast.

The six actionable measures from the FEIS that USACE is seeking 401 water quality certification are:

- G-28 - Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection
- B-12 – West Bay and Brazoria GIWW Shoreline Protection
- CA-5- Keller Bay Restoration
- CA-6- Powderhorn Shoreline Protection and Wetland Restoration
- M-8- East Matagorda Bay Shoreline Protection
- SP-1 – Redfish Bay Protection and Enhancement

In coordination with state and federal resource agencies, impacts and gains to aquatic resources anticipated from the construction of these actionable measures were quantified using the Habitat Evaluation Procedure (HEP), a procedure developed by the U.S. Fish and Wildlife Service to measure the suitability of habitats based for local flora and fauna. Results of the HEP indicate that a net gain of 13,970 Annual Average Habitat Units (AAHUs) is anticipated from the six actionable measures.

These actionable measures and accompanying Monitoring and Adaptive Management Plan have been developed to a feasibility level of design (i.e., estimates, design level that is not detailed enough for construction) based on currently available data and information developed during plan formulation. There is significant institutional knowledge regarding

the construction of the restoration measures; therefore, there is minimal uncertainty from a construction standpoint. Uncertainties relating to measure design and performance are mainly centered on site-specific, design-level details (e.g., exact sediment quantities, invasive species removal needs, extent of erosion control needs, construction staging area locations, pipeline pathways, timing and duration of construction, engineering challenges, etc.), which would be addressed during the pre-engineering and design phase (PED). Sediment sampling protocols are in place to ensure that the beneficial use of sediment does not inadvertently impact water quality.

Timing of initial construction of the actionable measures is dependent on a number of factors including: timing of authorization, duration of pre-engineering and design (PED) phase, identification of a cost-share sponsor, and Federal- and non-federal funding cycles. A number of measures depend on material dredged from existing channels during the normal operations and maintenance (O&M) cycle or as part of another project.

At the current design phase of this study, potential pipeline routes and staging areas have not been identified. Identification of access routes, staging areas, pipeline routes, and placement of floatation docks would occur during PED. Each disturbance for access and staging would be placed outside of environmentally sensitive areas to the greatest extent practicable and utilize areas already disturbed when possible. The disturbance would be limited to the smallest area necessary to safely operate during the project. All ground disturbance for access and staging areas would be temporary and fully restored to result in no permanent loss.

A Monitoring and Adaptive Management Plan (Appendix K of the EIS) has also been developed for the six actionable measures. The Monitoring and Adaptive Management Plan addresses uncertainties associated with ecosystem function and how the ecosystem components of interest will respond to the restoration efforts in light of changing conditions (e.g., sea-level change is different than anticipated) or new information (e.g., surveys indicate the design needs modification in order to function properly).

The Texas Commission on Environmental Quality (TCEQ), including personnel from its Galveston Bays and Estuaries Program, coordinated with USACE and other state and federal agencies during the development of the Coastal Texas Protection and Restoration Feasibility Study. On behalf of the Executive Director and based on our evaluation of the information contained in the FEIS and related documents, the TCEQ certifies that there is reasonable assurance that the project will be conducted in a way that will not violate water quality standards.

No review of property rights, location of property lines, nor the distinction between public and private ownership has been made, and this certification may not be used in any way with regard to questions of ownership.

The TCEQ looks forward to continued coordination with USACE on the additional CSRM and ER measures identified in the FEIS to ensure an efficient 401 water quality certification review process on these projects. If you require additional information or further assistance, please

contact Mr. Peter Schaefer, Water Quality Assessment Section, Water Quality Division (MC-150), at (512) 239-4372 or by email at peter.schaefer@tceq.texas.gov.

Sincerely,

Robert Sadlier, Deputy Director
Water Quality Division
Texas Commission on Environmental Quality

RS/PS

ccs: Mr. Jesse Solis, Texas General Land Office, via e-mail at Federal.Consistency@GLO.TEXAS.GOV