Appendix D – Environmental

Galveston Harbor Channel Extension, TX

Section 216
Draft Validation Report

July 2023

US Army Corps of Engineers
Galveston District

Supplemental Environmental Assessment and Draft Finding of No Significant Impact

Galveston Harbor Channel Extension, TX

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Draft Validation Report

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of Engineers ®
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DRAFT
SUPPLEMENTAL
ENVIRONMENTAL ASSESSMENT

GALVESTON HARBOR CHANNEL EXTENSION
FEASIBILITY STUDY
GALVESTON COUNTY, TEXAS

U.S. Army Corps of Engineers
Southwestern Division
Galveston District

June 2022

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1.0 INTRODUCTION

The US Army Corps of Engineers, Galveston District (USACE) prepared this Supplemental Environmental Assessment (SEA) to evaluate and disclose the potential impacts to the natural and human environment from modifying the authorized, but not constructed Galveston Harbor Channel Extension (GHCE) Project (Recommended Plan [RP]). Since the project was authorized and moved into the pre-engineering design (PED) phase, additional features not considered in the 2016 Environmental Assessment (EA) and Feasibility Report (FR) have been identified as required to construct and operate the channel as authorized.

This SEA has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 U.S. Code [USC] 4321 et seq.) and its implementing regulations published by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR], 1500 to 1508), and the U.S. Department of Army's NEPA regulation (32 CFR 651) and associated implementation guidance (AR 200-2). This EA supplements the Galveston Harbor Channel Extension Feasibility Study Final Environmental Assessment (USACE 2016) and associated Finding of No Significant Impact (FONSI) (USACE 2018) because the action remains to occur and substantial changes to the proposed action are proposed.

1.1 PROJECT HISTORY

The Galveston Harbor and Channel (GHC), Texas Project was part of an earlier study for improving the deep-draft navigation channels within the Galveston Bay area authorized by a resolution of the House Committee on Public Works in October 1967. This resolution authorized a review of previous reports on the Houston Ship Channel (HSC), Galveston Harbor Channel (GHC), and the Texas City Channel. The review was completed in January 1980 and demonstrated that channel modifications necessary to improve the efficiency and safety of Galveston Bay channels were feasible and recommended that studies continue into the feasibility phase. Each of the channels at the time of review were authorized to -37 feet MLLW.

As a result, the Galveston Bay Area Navigation Study (GBANS) Feasibility Report and Environmental Impact Statement (EIS) looked at the feasibility of improving the Houston and Galveston channels. The GBANS was completed in 1987 and recommended that the GHC be deepened to 51 feet and widened to 450 feet to provide access to deeper water in the Gulf of Mexico. Issues raised during the Washington review of the GBANS resulted in a decision by the Assistant Secretary of the Army for Civil Works (ASA(CW)) that a reevaluation study should be performed.

A limited reevaluation report (LRR), known as the Houston-Galveston Navigation Channels, Texas, Galveston Channel Project, Final Limited Reevaluation Report (1995 LRR) and Supplemental Environmental Impact Statement (SEIS), was completed in November 1995. The 1995 LRR presented a plan that consisted of deepening and widening the HSC and deepening of the GHC in two phases. Phase I consisted of deepening the channels to a depth of 46 feet; Phase II further proposed deepening the channels to 51 feet. Environmental studies were conducted at that time to assess the impacts of a 51-foot channel; however, it was later determined that deepening the channel to 51 feet was not economically justified.

Deepening of the HSC portion to 46 feet was completed in 2005. Deepening of the GHC did not proceed at that time due to lack of NFS funds. Once funds were available, the benefits and costs of the RP as identified in the 1995 LRR and authorized by WRDA 1996, were updated by the Houston-Galveston Navigation Channels, Texas, Galveston Channel Project, Final Limited Reevaluation Report, dated May 31, 2007 (2007 LRR). The 2007 LRR updated project design, cost, benefits and environmental impacts specifically related to the Galveston Channel Reach. The 2007 LRR RP consisted of deepening portions of the GHC to 46 feet from Station 0+000 to Station 20+000 (2.16 miles) with a bottom width varying from 650 to 1,112 feet and a side slope of 1 foot vertical to 3 foot horizontal. Deeping was completed in January 2011. Approximately 2,571 feet of the channel remained at a depth of 41 feet MLLW.

Deepening the remaining 2,571 feet of the GHC were investigated in the Galveston Harbor Channel Extension (GHCE) Project, Houston-Galveston Navigation Channels, Texas Feasibility Study. On 08 August 2017, the Chief of Engineers signed the Chief's Report for the GHCE which recommended to Congress that the channel from Station 20+000 to Station 22+571 be deepened to 46 feet. An EA and Finding of No Significance (FONSI) were completed to disclose environmental impacts of the action. Funding for construction of the GHCE was provided by the Infrastructure Investment Jobs Act (IIJA) in 2021, which resumed the PED phase.

1.2 PROJECT AREA

Galveston Bay, the largest inland bay on the Texas coast, is an important commercial and recreational fishing resource and provides access to the deep-water ports of Houston, Texas City, and Galveston. The Houston and Galveston Channels traverse the Galveston Bay area.

Located on the upper Texas coast on the eastern end of Galveston Island, the Port of Galveston is 9.3 miles from the opening of the Gulf of Mexico. The Port of Galveston consists of the Galveston Harbor Channel, the south side of Pelican Island, the north side of Galveston Island and the entrance to Galveston Bay (Table 1 and Figure 1). The GHC serves the Port of Galveston in Galveston, Galveston County, Texas.

Table 1. Approximate Channel Reach Designations for the HGNC Project.

Reach	Reach and Station Numbers	Authorized Depth (MLLW)	Existing Depth (MLLW)	Bottom Width *(feet)*	Channel Length *(feet)*	Channel Length *(miles)*
Offshore	Outer Bar, Entrance and Extended Entrance Channels Offshore (Sta. 21+753 0 to 76+000)	-48	-48	800	54,248	10
	Bolivar Roads and Inner Bar Channels (Sta. 0+000 to 21+753)	-46	-46	800	21,752	4
Galveston Channel	Galveston Harbor Channel - Bolivar Roads to Pier 38 (Sta. 0+000 to 20+000)	-46	-46	1,133 (max)	20,000	6.1
	Channel Extension - Pier 38 to 43rd St (Sta. 20+000 to 22+571)	-46	-41	1,075	2,571	0.5
	Channel Extension (Sta. 22+571 to 23+076	-46	~ -33 to ~ -42	~745 to ~385	505	0.1

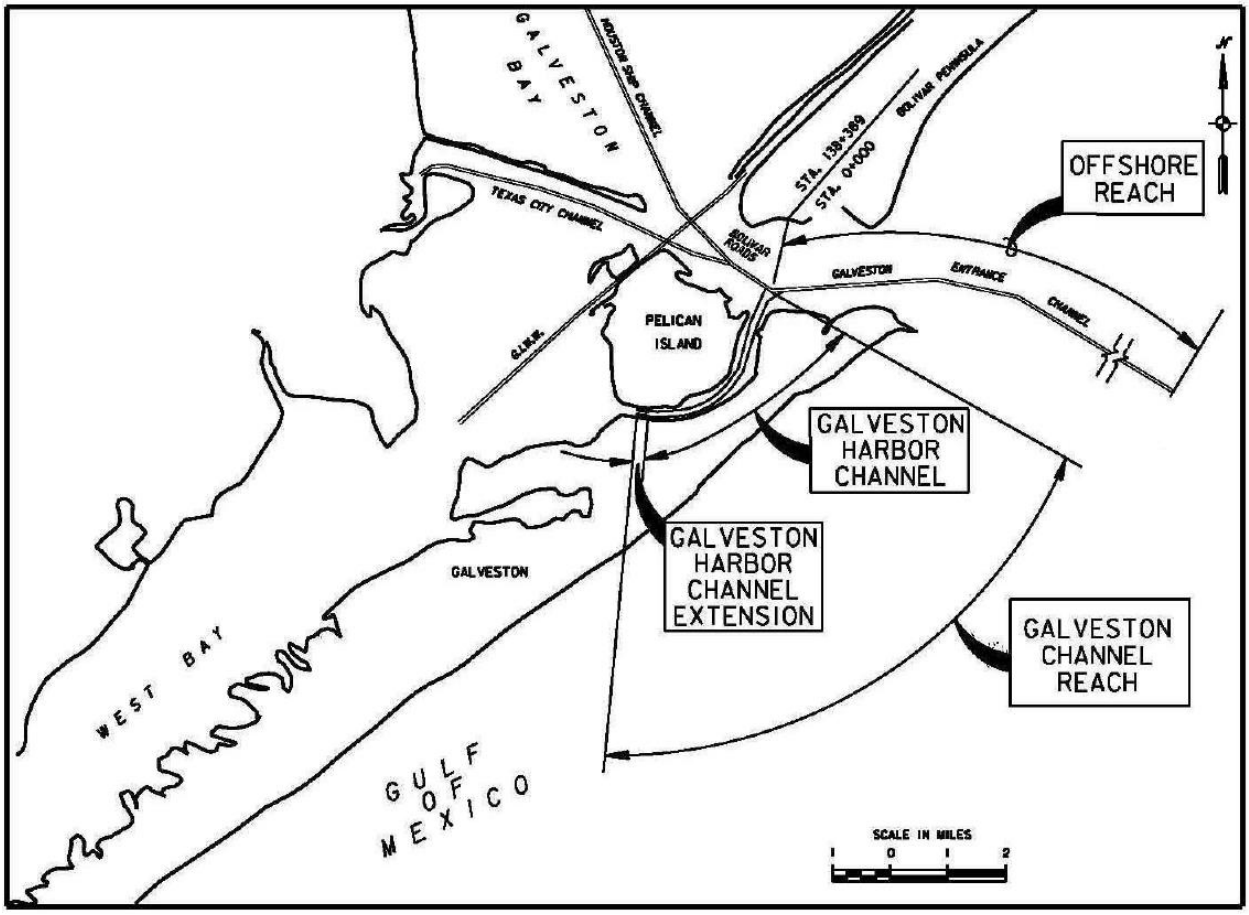

Figure 1. Galveston Harbor Channel (GHC) Project Area

1.3 PURPOSE AND NEED

The purpose of the Federal action to modify the GHCE project is to increase channel efficiency and maneuverability into the docks on the far western end of the channel. Currently, if the GHCE is constructed as authorized, light loading of vessels to access and depart these facilities would continue to be needed resulting in inefficient transportation practices and higher costs. The design did not take into account the turning needs for accessing the berthing areas, so vessels continue to be constrained by channel depth. As a result, an adjustment was identified as being needed between Stations 22+571 to Station 23+076 to increase channel efficiency and maneuverability into the docks on the far western end of the channel.

1.4 SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT (SEA) SCOPE

The 2016 EA analyzed the RP and the no action alternative. The scope of this SEA is to identify and evaluate the environmental effects that could result from implementation of the proposed modification to the RP. Environmental effects analyzed in the 2016 EA that have not changed are incorporated by reference and will not be discussed further in this SEA. The proposed modification will be further discussed in Chapter 2.0.

2.0 ALTERNATIVES

This chapter describes and compares the No Action Alternative (RP) and the proposed modifications to the RP.

2.1 NO ACTION

The future without-project condition (FWOP), also known as the "No Action" Alternative, is the most likely condition expected to occur in the future in the absence of the proposed action or action plans. For this SEA, the No Action is the authorized channel improvement project as defined in the 2017 Chief's Report without any design changes, which is referred to as the RP. The RP consists of deepening the existing channel from -41 feet MLLW to -46 feet MLLW, plus three feet of advanced maintenance and two feet of allowable overdepth, such that the maximum channel depth following periodic maintenance will not exceed -50 feet MLLW. Deepening would begin near Port of Galveston (POG) Pier 38 at Station 20+000, continue westward towards Pelican Island Bridge and end at Station 22+571 (Figure 2) for approximately 2,571 feet. The RP does not include any channel widening, so the bottom width will remain at 1,075 feet or less and the channel top-of-cut will remain consistent with the template of the existing project. Figure 3 shows the channel template.

Channel deepening will be accomplished using a cutterhead, hydraulic pipeline dredge. The project will generate approximately 457,400 cubic yards (cy) of new work material, consisting primarily of firm clays with low plasticity. The new work dredged material will be placed in the Pelican Island Placement Area (PA), a 1,100-acre upland site located approximately 1.25 miles north of the channel (Figure 4). Deepening the channel is not anticipated to change the frequency or quantity of material from the 41-foot-deep project. Maintenance dredging will still be required every four years and generate approximately 648,000 cy and could be placed in the Pelican Island PA, the Galveston Ocean Dredged Material Disposal Site (ODMDS), consistent with existing maintenance dredging.

The RP also involves mechanically raising the dikes at Pelican Island PA prior to deepening the channel to sufficient height to allow for the containment of the new work material and any initial maintenance material that may be encountered above the new work material during the channel deepening. No modification to the existing weir structures located at the northwest corner of Cell B or the drop-outlet structure located in Cell C would be needed as a result of the dike raising.

The construction period for the new work dredging and placement will take approximately four months, including one month to prepare the placement area and three months to construct the channel extension.

The RP did not induce unavoidable, permanent adverse impacts; therefore, no mitigation was identified.

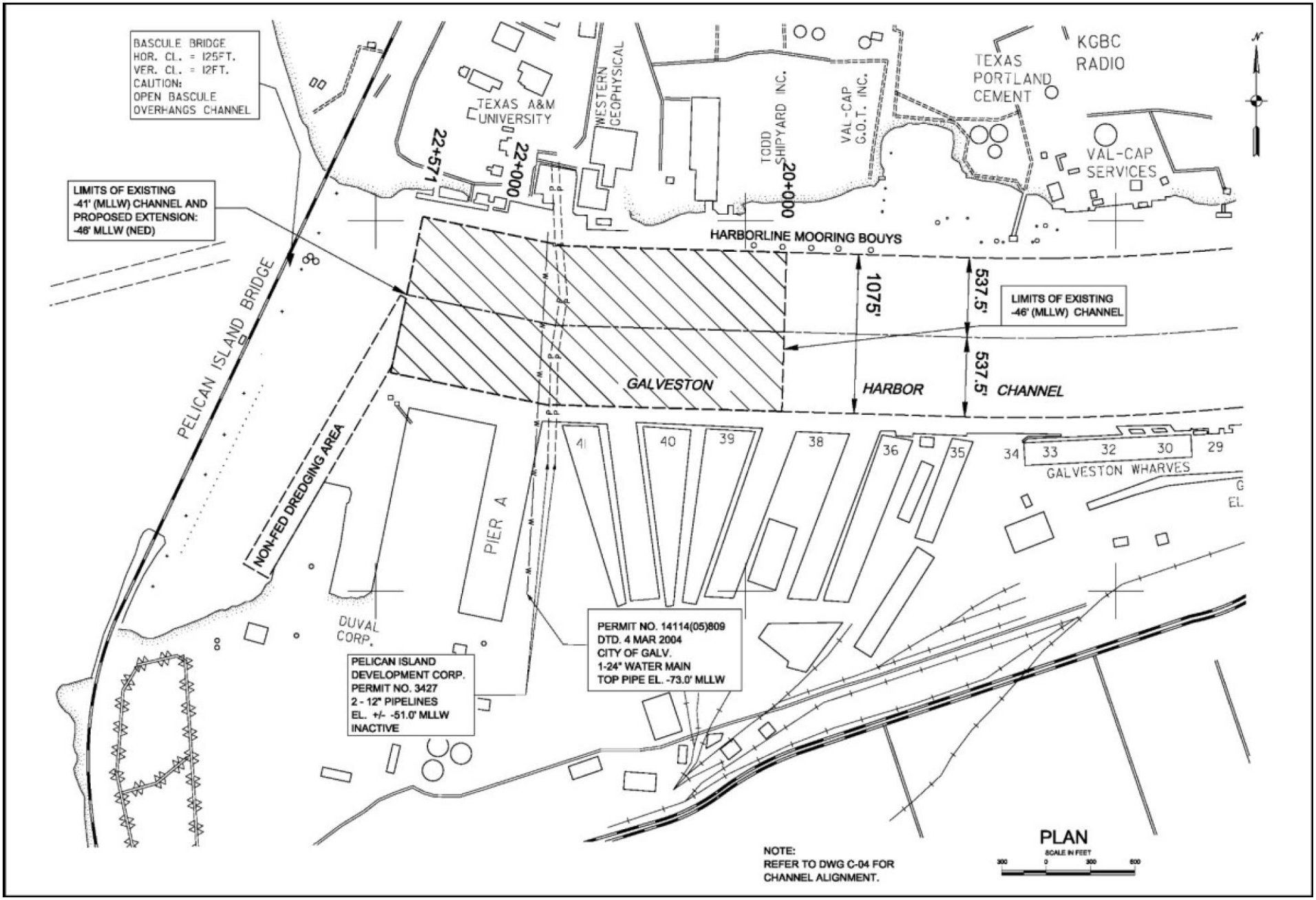

Figure 2. Galveston Harbor Channel Extension Channel Deepening Limits of the Recommended Plan

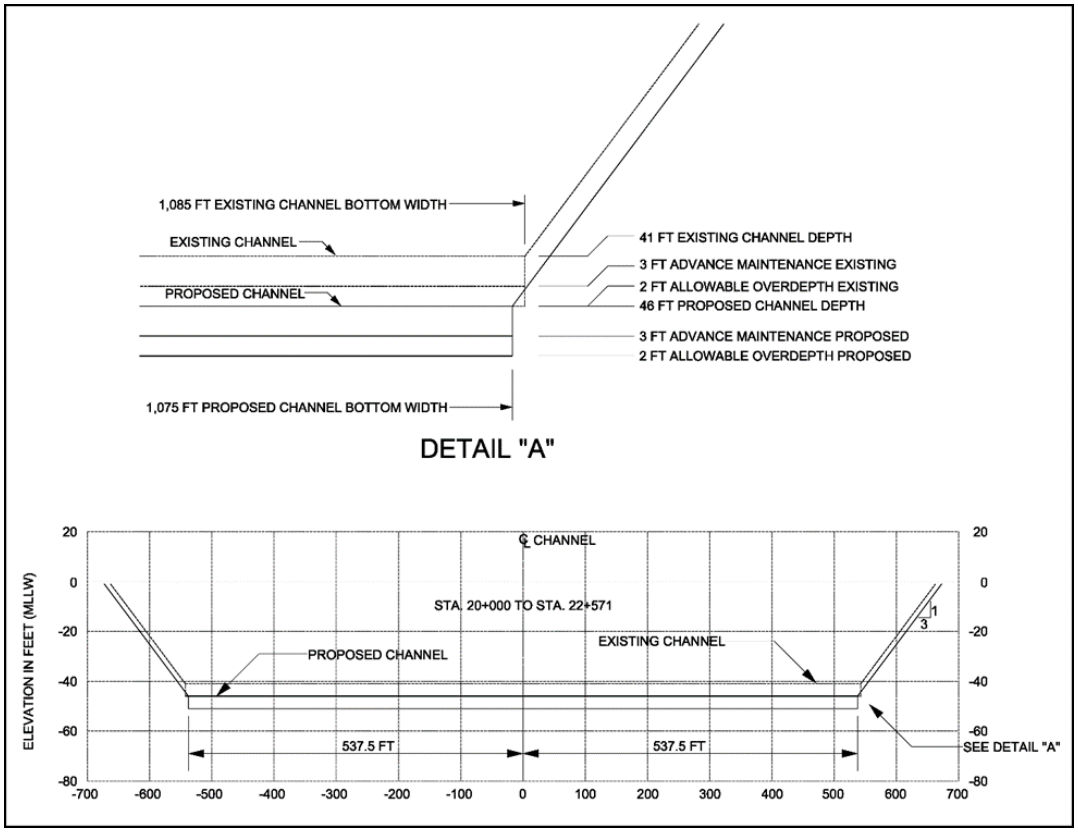

Figure 3. GHCE RP channel template

Figure 4. GHCE Recommended Plan

2.2 PROPOSED MODIFIED RECOMMENDED PLAN

Once the GHCE feasibility study phase concluded, the PED phase began with the design team and the Board of Trustees of the Galveston Wharves (the non-Federal sponsor for the project) working to refine the design of project elements. Proposed modifications were based on a concern raised by the NFS regarding maneuverability and access to berthing areas at the most western end of the channel. Other modifications were the result of more detailed information available or greater certainty of the information, such as the quantity of dredge material anticipated. As a result, the design was revised to resolve the concern and incorporate the new information.

To address the maneuverability and access concerns, additional channel was incorporated into the design between stations 22+571 and 23+076 (Figure 5). The additional channel would involve deepening an additional 505 feet of channel from the existing ground level to a depth of -46 feet, plus four feet of advanced maintenance and one foot of allowable overdepth (Figure 6). The channel bottom width would vary between 385 feet and 738.5 feet. A cutterhead, hydraulic pipeline dredge would be used to remove all material. The additional channel is expected to generate approximately 124,400 cy of new work material. New work and maintenance material would be placed into the Pelican Island PA. Construction of the additional channel is expected to add an estimated 14 days to the total construction duration.

No mitigation is required for the proposed modified RP.

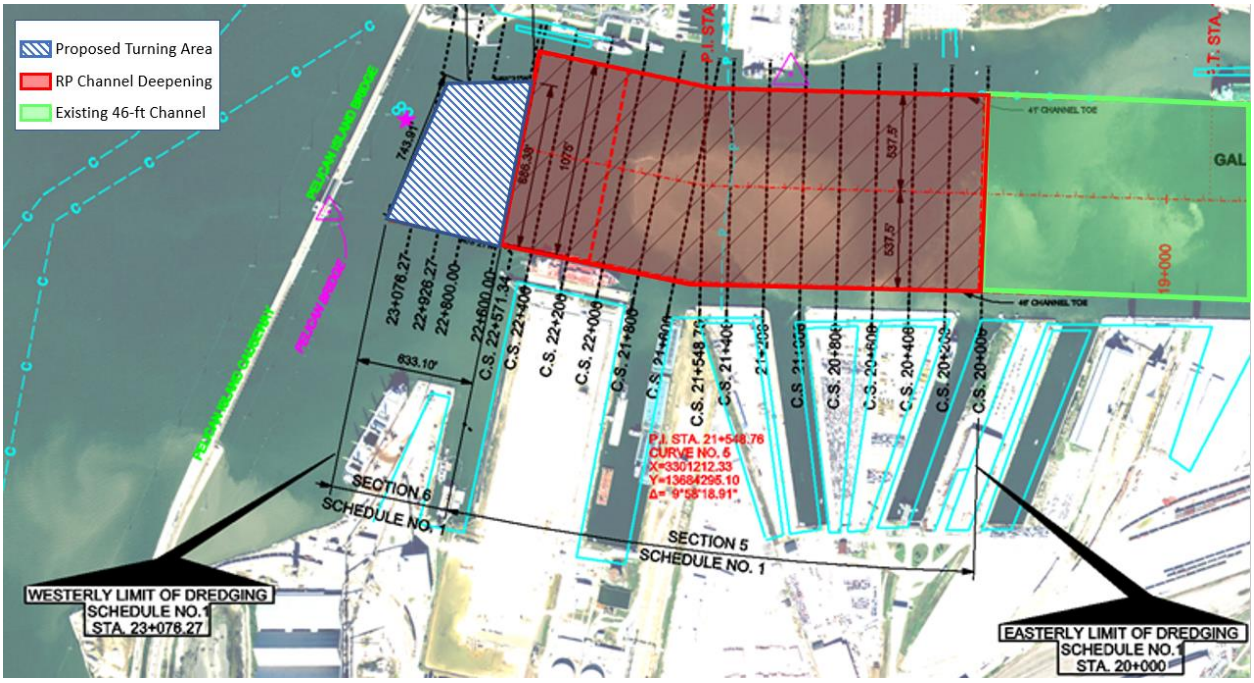

Figure 5. Proposed Additional Channel

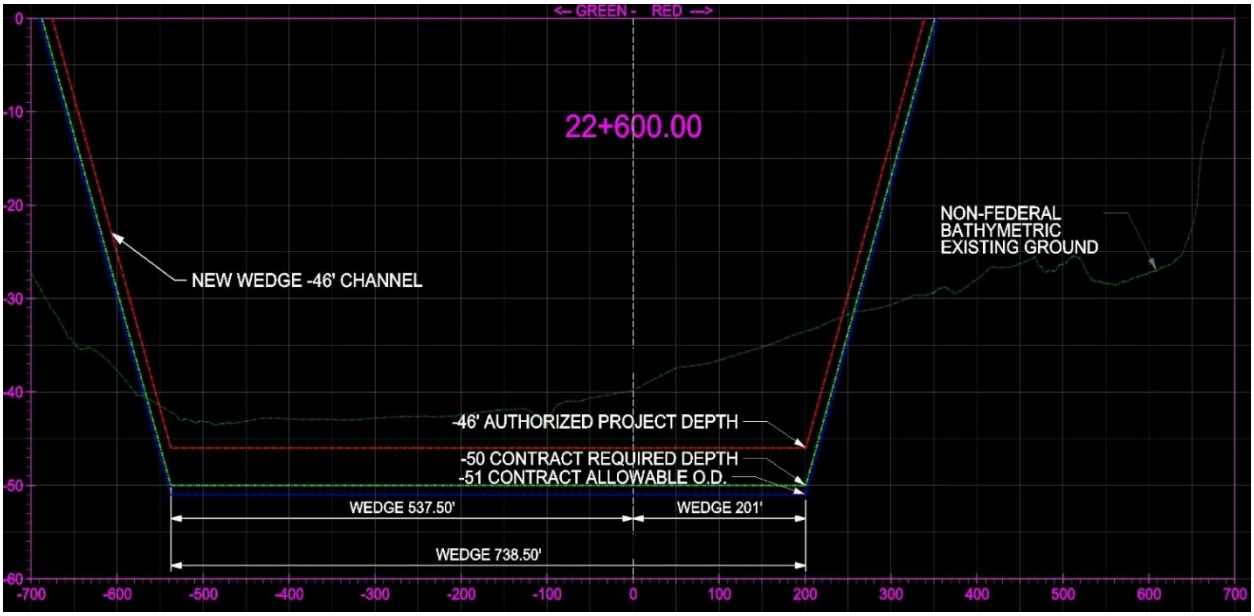

Figure 6. Proposed Additional Channel Template

Other design modifications include:

- change in sediment quantities as a result of updated bathymetric surveys;
- change in channel template design that incorporates new policies regarding advanced maintenance and allowable overdepth (Figure 7); and
- elimination of the Pelican Island PA dike raising.

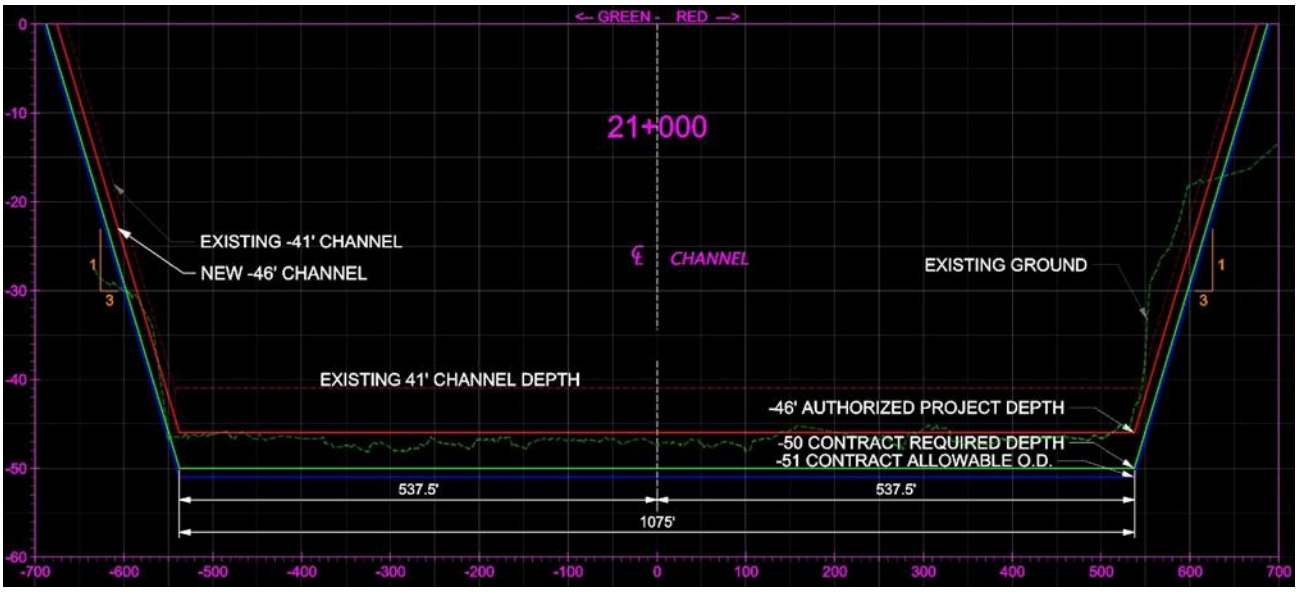

Figure 7. Refined Channel Template for Deepening between Sta. 20+000 and 22+571

Table 2 shows a comparison of the No Action alternative and the Proposed Modified RP.

Table 2. Comparison of the RP to the Modified RP

Change	RP/No Action	Proposed Modified RP	± Change in Impact
Channel Extension	Deepen to -46 feet MLLW between Sta 20+000 and 22+571. The channel template extends a 1v:3h slope from elevation -46 with a vertical cut for 3 ft of advanced maintenance and an additional 2 ft for allowable overdepth. The design would generate 609,500 cy of new work dredge material.	No change in stationing; however, the channel template would extend the 1v:3h slope with a vertical cut for 4 ft of advanced maintenance and an additional 1 ft for allowable overdepth. The design would generate 457,400 cy of new work dredged material.	-152,100 cy of new work material
Additional Channel	Not included in RP	Deepen 505 ft of channel to -46 ft between Sta. 22+571 and 23+076 with a varying bottom width. New work dredging would generate 143,100 cy of material to be placed at the Pelican Island PA.	+124,100 cy of new work material
Pelican Island PA Modifications	Mechanically raise the dike of cell B approximately 2 ft to an elevation of +30 ft with 1v:3h sides slopes and a crest width of approximately 10 ft wide.	Removed from project since dike raising is no longer necessary.	-1 month of construction noise, vibration, emission impacts
Maintenance Dredging (Extension and Additional Channel)	Every 4 years generating 648,000 cy of material	Every 4 years generating X cy of material	+648,000 cy of material every 4 years
Construction Duration (Extension and Additional Channel)	~4 months, including 1 month to prepare the placement area and 3 months to construct the channel extension of which 62.5 days is dredging time.	~3 months, including 2.5 months to construct the channel extension and 0.5 month to construct the Additional Channel, of which 43 days is dredging time.	-1 month of total construction duration (-19.5 days of dredging time)
Footprint (Extension and Additional Channel)	81.8 acres	92.8 acres	+11 acres

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The design modifications to the RP were reviewed to determine impacts to the natural and human environment. This section provides a description of the affected environment and the impacts that could result from implementation of the Proposed Modified RP alternative. Effects can be either beneficial or adverse and are considered over a 50-year period of analysis.

3.1 OVERVIEW

The project area includes the eastern end of Galveston Island and all of Pelican Island. Galveston Island is a low-lying barrier island two miles off the Texas coast, approximately 50 miles southeast of Houston, Texas. Texas City, an important Gulf port city and producer of refined petroleum products, is located approximately seven miles from the project area.

Galveston Island was formed as an offshore bar at the beginning of the present sea level stand and grew by accretion of sand from littoral drift. Pelican Island was a natural sandspit that has been expanded substantially through years of regular and ongoing dredged material disposal from the GHC and Texas City Channels maintenance actions.

Galveston Island, the GHC and the Pelican Island PA are located in highly disturbed areas, associated with previous and ongoing maintenance and construction activities related to the existing authorized project. The GHC is a very active shipping lane providing deep-draft vessel access to the Port of Galveston, an important Texas deep water port. The channel is highly developed with various wharfs, docks and commercial and industrial facilities associated with Port operations and other users, as well as the presence of the Texas A&M University of Galveston (TAMUG) campus and the Pelican Island Bridge.

Because of human disturbance over many decades, habitat types in the project area have been disturbed to the point where original species composition and diversity found prior to major development and industrialization, no longer exist. Only one small 4-acre remnant tidal salt marsh occurs along the northwestern edge of the project area between the Pelican Island Bridge and TAMUG. The marsh occurs behind a berm of shell hash along the shoreline and is connected to bay waters through a small tidal inlet channel.

Although oyster habitat can be found in the adjacent Galveston Bay estuary, no oyster reef habitat is present in the project are. Likewise, seagrasses historically flourished in the Galveston Bay System but have nearly disappeared from the bay system and are not present in the project area. The quality and productivity of the benthic marine habitat within and immediately adjacent to the Galveston Harbor is considered low compared to the overall bay system since the benthic substrate along the channel is highly disturbed due to the frequency of maintenance dredging and the effects of ship traffic.

The Port of Galveston is equipped with facilities to handle various cargo types including containers, dry and liquid bulk, break bulk, RO/RO (roll-on/roll-off of cargo), refrigerated and project cargoes. The principal cargoes are agricultural products such as grains, vegetables, fruit, and commercial cargoes to include sulfur, timber, and various other building materials. The

Port also has a cruise-liner passenger terminal and is the year-round homeport to two Carnival Cruise Line vessels.

The Galveston community has a diversified income base, but jobs are predominantly dependent upon tourism, the Port, commercial fishing, the University of Texas Medical Branch (UTMB), and the American National Insurance Company. Tourism is a major contributor to the project area economy. Development of the area as a recreational area relates to its proximity to the population of the Houston-Galveston metropolitan area, its many miles of beaches, and favorable climate. Fishing and boating are the most important recreational activities in the project area. Other forms of recreation common to the area are water and jet skiing, surfing, bird watching, swimming, and beach combing (among others). Many charter vessels are available along the docks in Galveston for those desiring deep sea or bay fishing, and several private and public marinas, boat launching ramps, bait camps, and yacht and sailing clubs are located in the vicinity of the project area.

Major roadways within the project area include State Highway 87 (SH-87) and Highway 275, which directly service the Port. SH-87 is a major local artery providing mainland access to the Port, the State Marine Highway Ferry system, and to communities such as Bolivar, Anauhac, and Beaumont via the ferry system. Both roadways are used by commercial, tourist, and local traffic, and connect to Interstate Highway-45, a major corridor connecting Galveston Island directly to the City of Houston and to the Interstate system. Vehicular traffic consists of a mixture of local area and urban residents, commercial and industrial vehicles associated with the Port industries, and tourism. Various railway connections also serve the Port of Galveston and the City of Galveston.

3.1.1 No Action Alternative Impacts

The 2016 EA addresses the environmental consequences of the GHCE RP. Overall environmental impacts resulting from deepening the 41-foot channel to 46 feet are expected to be negligible because construction would occur within the existing project footprint and an existing PA will be used. The following very briefly summarizes the key points of the analysis:

- Negligible impacts to very low quality bay bottom habitat comparable in type and magnitude to those experienced during routine maintenance that occurs for the existing channel template.
- No special aquatic sites, including wetlands, would be impacted. Therefore, no mitigation would be required for this project
- Only minor, temporary increases in turbidity, noise and navigation traffic are anticipated. However, such effects would not be “new,” but would be among the cyclical recurring impacts that occur during maintenance of the channel.
- Deeper draft vessels accessing bulk cargo facilities at the far west end of the channel would not be constrained by channel depth resulting in more efficient movement of commodities.
- All affected resources are expected to recover to pre-project conditions after construction is complete.

The proposed project is expected to contribute beneficially to navigation efficiency and is not expected to contribute negative cumulative impacts to the area.

3.2 RESOURCES CONSIDERED FOR ANALYIS

Table 3 identifies resources considered for impact analysis in the 2016 EA and identifies any changes to the affected environment since 2016 as well as potential impacts from the Proposed Modified RP. Not all resources present in the project area would be affected by the proposed modifications because there would either be no impact, insignificant/negligible impact, or no change in impact on the resource from that described in the 2016 EA. Resources in which any of these criteria apply have not been evaluated further and the discussion of impacts of the dredging as described in the 2016 EA are incorporated by reference. The cumulative impacts of the Proposed Modified RP are expected to be the same as the 2016 EA.

The following resources may be affected by the Proposed Modified RP: Marine Aquatic Resources, Threatened and Endangered Species, Air Quality, and Environmental Justice (EJ). Sections 3.3 through 0 address these resources further.

3.3 MARINE AQUATIC RESOURCES

3.3.1 Affected Environment

Benthic marine organisms are an ecologically important component of the marine resources, serving as a major source of food for many species of fish and shellfish of commercial and recreational importance. Benthic organisms are also primary consumers, feeding on microalgae and plant detritus, providing an important link in the marine food chain. The most abundant benthic organisms in the project area include annelid worms (polychaetes and oligochaetes), peracarid crustaceans (amphipods and tanaidaceans), and mollusks (bivalves and gastropods).

The quality and productivity of the benthic marine habitat within and immediately adjacent to the Galveston Harbor is considered low compared to the overall bay system since the benthic substrate along the channel is highly disturbed due to the frequency of maintenance dredging of the Federal channel and private berths and docks, as well as the effects of ship traffic (USACE 1987). Small free-swimming and benthic marine organisms in the immediate vicinity of maintenance dredging work are caught by the dredge cutter head or pulled into the pipeline by the pump and removed. Recolonization of the benthic community between maintenance cycles is dependent on salinity and temperature as well as the nature of the channel substrate and other environmental parameters related to sediment distribution (White et al. 1985). Since sediment quality does not differ greatly between maintenance cycles, recolonization of the benthic habitat within the channel is more likely due to overall environmental parameters within the bay.

Although oyster habitat can be found in the adjacent Galveston Bay estuary, no oyster reef habitat is present in the project area as confirmed by an oyster survey completed in April 2022. Seagrass beds are also not present in the project area as the level of human disturbance, turbidity, and depth of water have created conditions unsuitable for establishment and sustainment of seagrass beds.

Table 3. Resources Considered in the 2016 EA

Resource	Changes to the Affected Environment Since the 2016 EA	Potential Impacts to Resource Areas from the Proposed Modified RP	Considered Further
Sea Level Change/ Local (Relative) Sea Level Change (RSLC)	No change	Modifications would not change water levels and RSLC is not expected to have significant impacts on dredging frequency, shoaling or ship handling. No additional impacts beyond those previously analyzed are anticipated.	No
Tides and Salinity	No change	Modifications would not change water levels and salinity variation that may occur due to deepening is likely to relatively small. No additional impacts beyond those previously analyzed are anticipated.	No
Vegetation	No change	All ground-disturbing modifications are proposed in the water. No additional impacts beyond those previously analyzed are anticipated.	No
Aquatic Nuisance Species	No change	Modifications would not result in an increase in the number of vessels that could introduce invasive aquatic species. No additional impacts beyond those previously analyzed are anticipated.	No
Wetland Resources	No change	The one marsh site remains outside the project footprint resulting in no impacts beyond those previously analyzed.	No
Marine Aquatic Resources	No change	New surveys were conducted to determine if oyster or seagrass habitats were present in new project footprint, there were no signs of habitat. Impacts are further dicussed in Section 3.3.1	Yes
Wildlife	No change	Modifications would cause temporary, minor disturbances to wildlife in the project area; however, the construction duration for all phase of work would be reduced by approximately 1 month over the No Action and as analyzed in the 2016 EA, resulting in impacts similar to those previously analyzed, but over a shorter period of time.	No
Essential Fish Habitat			No
Threatened and Endangered Species	Species have been listed and species presence/absence has changed in the project area since 2016.	Impacts are further disclosed in Section 3.4.	Yes
Cultural Resources	Resource not present	Resource not present -- Existing surveys cover the additional 11 acres and indicate no cultural resources listed on, eligible for listing, or currently unevaluated for listing on the National Register of Historic Places.	No

Air Quality	National Ambient Air Quality Standards (NAAQS) have been lowered for ozone.	Impacts are further disclosed in Section 3.5.	Yes
Noise	No change	Noise impacts from dredging are expected to be reduced by approximately 19.5 days as compared to the No Action. Additionally, no dike raising is required so noise impacts associated with that work would not occur. General impacts would be similar to those previously analyzed, but over a shorter period of time.	No
Water Quality	No change – 2021 water quality samples and elutriate sampling indicate water quality is generally good and all detected contaminant levels in all ambient water samples were below applicable EPA Water Quality Criteria and Texas Surface Water Quality Standards. Additionally, no significant spills have been reported since 2016	Dredged material from the additional channel would be placed into the existing PA and not require any modifications to the discharge location or decanting process. The duration of decanting and discharge of effluent would be increased by a couple of weeks over the No Action due to the increased sediment placed into the PA from addition of the additional channel. However, the increase would not result in any exceedance of water quality standards and is therefore expected to have negligible impacts beyond those previously analyzed.	No
Sediment Quality	No change	Modifications would be dredging into virgin material; however, based on sampling there is no indication that sediment quality would be different than under the No Action	No
Hazardous, Toxic, and Radioactive Waste	No change	The 2016 EA HTRW assessment included a buffer of 0.25 miles around the RP which included the additional channel. No additional impacts beyond those previously analyzed are anticipated.	No
Socioeconomics	Additional docks and wharves have been constructed or redeveloped along the channel shoreline; however, the socioeconomics of the project area have not changed.	Modifications allow deep-draft vessels to access berthing areas on the far western end of the channel but is not expected to induce dockside infrastructure or cargo handling facility changes because the commodities will remain the same. No additional impacts beyond those previously analyzed are anticipated.	No
Environmental Justice (EJ)	Updates to EJ mapping and environmental exposure have been completed since 2016.	Impacts are further disclosed in Section 0.	Yes
Prime and Unique Farmlands	Resource not present	Resource not present	No

Recreational Resources	No change.	Modifications would have no impact on tourism. Temporary impacts to small recreational fishing vessels would be reduced by approximately 19.5 days over the No Action, resulting in impacts similar to those previously analyzed, but over a shorter period of time.	No
Roadways and Traffic	No change.	Modifications are not expected to increase the number of construction workers needed or the number of vehicles beyond what was previously analyzed resulting in negligible to no additional impacts.	No
Aircraft Wildlife Strikes	No change	Elimination of the dike raising would reduce the potential for a higher structure to impede flight paths. No additional impacts beyond those previously analyzed are anticipated.	No

3.3.2 Environmental Consequences

3.3.2.1 No Action

During dredging, temporary disturbances and impacts to all life-stages of fisheries, benthic organisms, plankton, and nekton assemblages would occur. Fish within the project vicinity would be expected to swim out of the area avoid direct being injured or killed by dredging equipment. Disturbances to fisheries would be expected to only last as long as dredging operations are active (approximately 1500 hours or 62.5 days) There would be direct impacts to limited benthic organisms present in the channel from being buried or removed during dredging. Recolonization of the area is expected to occur in the same manner as occurs after maintenance dredging occurs.

Indirect effects to marine aquatic organisms from temporary turbidity are expected as a result of the release of sediment in the water column during dredging. The extent of turbidity created by the sediment plume is determined by the direction and strength of the currents, and the sizes of particles (Wilber and Clarke, 2001). Increased concentrations of suspended sediment can temporarily impact benthic macroinvertebrates and juvenile and adult finfish and shellfish by disrupting foraging patterns, reducing feeding rates and effectiveness, burying habitat for feeding and reproduction, and reducing respiration rates by coating gills with sediment (Newcombe and Jensen, 1996; Clarke and Wilber, 2000; Wilber and Clarke, 2001). Finfish and shellfish can avoid highly turbid areas and under most conditions are only exposed to localized suspended-sediment plumes for short durations (minutes to hours) (Newcombe and Jensen, 1996; Clarke and Wilber, 2000; Wilber and Clarke, 2001). Shrimp and crabs are less impacted by elevated suspended sediments since these organisms reside on or near the bottom where sedimentation naturally occurs (Wilber and Clark, 2001; Wilber et al., 2005). Furthermore, turbid waters may actually provide a refuge for these species from predation (Wilber and Clarke, 2001). Research has shown that more-sensitive species and life stages (i.e., eggs, larvae, and fry) are more negatively impacted by longer exposure to suspended sediments than less sensitive species and older life stages (Newcombe and Jensen, 1996; Wilber and Clark, 2001; Germano and Cary, 2005; Wilber et al., 2005). Effects of elevated suspended solids on the adult stages of various filter feeding organisms such as oysters, copepods, zooplankton and other species include reduced filtering rates, and clogging of filtering mechanisms, interfering with ingestion, respiration, and abrasion; however, effects tend to be more pronounced when concentrations are greater than 100 mg/L but are reversible once turbidities return to ambient levels (Armstrong et al., 1987; Newcombe and Jensen, 1996; Wilber and Clarke, 2001). These impacts would be localized around the immediate area of dredging and turbidities would be expected to return to near ambient conditions within a few hours after dredging ceases in a given area, thus, no long-term effects are anticipated.

Maintenance dredging of the existing -41-foot MLLW portion of the GHC routinely displaces approximately 81 acres of marine benthic channel bottom and affects marine resources present in this area. Based on cross sections of the existing channel template, deepening the project by 5 feet to a maximum depth of -46 feet MLLW would result in a reduction in the channel bottom width to 1,075 feet, consistent with the remainder of the authorized channel project. Most of the new work dredging would occur at the toe of the channel slope and would only increase the top width on each side by a maximum of 7 feet. This increase in top width translates to around 0.8 acre of impact to bay bottom that hasn’t been previously disturbed. However, given variations in

conditions of channel and elevations of the top of slope dredging will likely widen the side slopes between 4 and 7 feet, or between 0.5 and 0.8 acre. Thus, any impacts to bay bottoms from construction would not be “new,” but would be among the cyclical recurring impacts that occur during maintenance of the channel and adjacent berths under the existing condition.

Since, no new permanent effects to aquatic marine resources would occur as a result of the project, no mitigation would be required for this alternative.

3.3.2.2 Proposed Modified RP

The same direct and indirect impacts described for the No Action would also apply to the Proposed Modified RP. The only difference is in the footprint that would be disturbed and the duration of disturbance. Under the Proposed Modified RP, up to 92.8 acres of bay bottom would be dredged, which is anticipated to take approximately 1,032 hours (43 days) to dredge the channel extension and the additional channel. The addition of the t additional channel increased the dredging duration by approximately 14 days; however, the change in the template profile and reduction in sediment quantities is expected to reduce the dredging duration to 29 days for the extension portion of the project, resulting in a net decrease in total disturbance over the No Action.

3.4 THREATENED AND ENDANGERED SPECIES

Wildlife species may be classified as threatened or endangered under the Endangered Species Act (ESA) of 1973 (16 USC § 1531 et seq.). USFWS oversees protection of non-marine species or marine species while they are on land (e.g. sea turtles) and National Marine Fisheries Service (NMFS) oversees protection of marine species while in the water. The ESA ensures that federal agencies and departments use their authorities to protect and conserve endangered and threatened species. Section 7 of ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are “likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species.”

3.4.1 Affected Environment

Seventeen species listed as endangered, threatened, or candidate were identified and considered in the 2016 Biological Assessment (BA). Since then, six additional species have been identified as potentially occurring in the project area, while eight species are no longer identified as potentially occurring in the project area as indicated in the USFWS Official Species List dated [Date], and/or on the most recent NMFS Texas’ Threatened and Endangered Species List dated November 03, 2021 (Table 4, Appendix B). There is no designated critical habitat in the project area.

Of the 16 identified species, only the West Indian manatee, Kemp’s ridley sea turtle, and loggerhead sea turtle have the potential to occur in the project area. The project area does not support habitat for the remaining 13 species and/or is outside the species known range. The shorelines along the GHC in the vicinity of the RP and Proposed Modified RP predominantly consist of bulkheads and dock facilities with only very small, short stretches of shorelines having shell hash substrates found at the TAMUG Clipper dock area. Additionally, one small wetland is found outside the 500-foot buffer of the project area.

For additional information on each of the species' habitat needs and the likelihood of the species occurring in the project area, refer to the supplemental Biological Assessment (BA) (Appendix B).

3.4.2 Environmental Consequences – No Action and Proposed Modified RP

The No Action and Proposed Modified RP would have the same effects to ESA-listed species, since the assessment needs to be updated for the No Action to account for changes in species identified by USFWS and NMFS, so they are discussed together for this resource.

The Supplemental BA documents the impacts of implementing the Proposed Modified RP on listed species (Appendix B). Based upon the findings of the BA, the USACE determined that the two alternatives would have no effect on Attwater's greater prairie-chicken, piping plover, rufa red knot, eastern black rail, whooping crane, oceanic whitetip shark, giant manta ray, sperm whale, rice's whale, green sea turtle, hawksbill sea turtle, and leatherback sea turtle due to the lack of suitable habitat in the project area. The following effects determination for species that were identified as occurring or potentially occurring in the action area were made:

- **West Indian manatee**: Due to the rarity of the manatee in the project area and the conservation measures that would be implemented, implementation of the action ***may affect, but not adversely affect*** the West Indian manatee.

- **Kemp's Ridley and loggerhead sea turtles**: Temporary (~3 months) avoidance and disturbance would occur during construction and maintenance dredging. A hydraulic pipeline dredge would be utilized, which move at sufficiently slow speeds to avoid take. Implementation of the No Action or Proposed Modified RP ***may affect, but not adversely affect*** these sea turtle species, especially with the conservation measures that would be implemented.

Construction and placement activities would occur within the footprint of the existing channel project. The project area is continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas generally unsuitable or undesirable for use by any listed species. Any noise, vibration, ship wakes, decreased water quality, or other impacts induced by dredging operations, vessel movement, or placement activities from implementing the No Action or the Proposed Modified RP would be of the same type and magnitude as experienced with the periodic maintenance dredging and placement into the Pelican Island PA associated with the authorized Federal project. All impacts would cease after construction is complete.

Table 5 shows the effects determinations for each species.

Table 4. ESA-listed Species Identified as Potentially Occurring in the Project Area

Species	Agency	Status (2016)	Status (2022)	Habitat Needs	Occurrence In or Near the Project Area
Birds					
Attwater's Greater Prairie-Chicken *Tympanuchus cupido attwateri*	USFWS	E	E	Only known to occur in the wild at three locations. Prefer open prairies without any wood cover and avoid areas with more than 25% shrub cover. Knolls and ridges with minor variations in topography and soils resulting in a variety of vegetation types are characteristic of preferred habitat.	No – Outside known range
Piping Plover *Charadrius melodus*	USFWS	T	T	Wintering habitat broadly characterized as emergent tidal or washover areas that are unvegetated to sparsely vegetated with wet to saturated soils near water. Use coastal areas on the mainland and barrier islands, with bay side habitats (bayshore tidal sand and algal flats) serving as the primary habitat unless submerged, then they transition to oceanside beaches, washover passes, and mainland tidal mud flats.	No – No suitable habitat
Rufa Red Knot *Calidris canutus rufa*	USFWS	E	E	Migrating and wintering knots use sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey.	No – No suitable habitat
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis*	USFWS	NR	T	Use tidally or non-tidally influenced wetlands ranging in salinity from salt to brackish to fresh. Require dense vegetation, moist soils, and areas of topographic change where molting birds can escape when areas are flooded.	No – No suitable habitat
Whooping Crane *Grus americana*	USFWS	NR	E	Winters along the Gulf Coast and breeds in Canada. On wintering grounds in Texas, they use estuarine marshes, shallow bays, and tidal flats, sometimes using nearby farms. Salt grass, saltwort, smooth cordgrass, glasswort, and sea oxeye dominate marshes, with Gulf cordgrass on the margins	No – No suitable habitat
Fish					
Ocean whitetip shark *Carcharhinus longimanus*	NMFS	NR	T	Pelagic, generally remaining offshore in the open ocean, on the outer continental shelf, or around oceanic islands in water depths greater than 184 m (~604 feet). They have a strong preference for the surface mixed layer in warm waters above 20°C (68°F).	No – Outside known range

Species	Agency	Status (2016)	Status (2022)	Habitat Needs	Occurrence In or Near the Project Area
Giant manta ray *Manta birostris*	NMFS	NR	T	Commonly found offshore, in oceanic waters and near productive coastlines. Can be found in cool water (>19°C). Observed using estuarine waters near oceanic inlets as nursery grounds. Closest known nursery to the Texas coast is >100 miles offshore at NOAA's Flower Garden Sanctuary.	No – Outside known range
Insects					
Monarch Butterfly *Danaus plexippus*	USFWS	NR	C	Mainly found in prairies, meadows, grasslands and along roadsides, across most of North America, where milkweed, their host plant, is prominent.	No – No suitable habitat
Invertebrates					
Elkhorn coral *Acropora palmata*	NMFS	T	NR	--	--
Lobed star coral *Orbicella annularis*	NMFS	T	NR	--	--
Mountainous star coral *Orbicella faveolata*	NMFS	T	NR	--	--
Boulder star coral *Orbicella franski*	NMFS	T	NR	--	--
Mammals					
West Indian Manatee *Trichechus manatus*	UFWS	E	E	Inhabit marine, brackish, and freshwater systems in coastal and riverine areas. Preferred habitat include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They feed along grass bed margins with access to deep water channels, where they flee when threatened.	Yes –Records in the Bay
Fin whale *Balaenoptera physalus*	NMFS	E	NR	--	--
Humpback whale *Megaptera novaengliae*	NMFS	E	NR	--	--
Sei whale *Balaenoptera borealis*	NMFS	E	NR	--	--

Species	Agency	Status (2016)	Status (2022)	Habitat Needs	Occurrence In or Near the Project Area
Sperm whale *Physeter macrocephalus*	NMFS	E	E	Each of these whales can be found in the warmer waters of the Gulf of Mexico on the continental shelf edge and slope. They are usually observed in deeper waters of oceanic areas far from the coastline.	No – Outside known range
Rice's Whale *Balaenoptera ricei*	NMFS	NR	E		No – Outside known range
Reptiles					
Green sea turtle *Chelonia mydas*	USFWS NMFS	T	T	Primarily found in the Gulf of Mexico, and sub-adults occasionally found feeding in shallow bays and estuaries where marine sea grasses grow. Nest on beaches but nesting not recorded from the upper coast.	No – Outside known range
Hawksbill sea turtle *Eretmochelys imbricata*	USFWS NMFS	E	E	Prefer clear offshore waters of mainland and island shelves and are most common where coral reef formations are present. Nest on beaches but nesting not recorded from upper coast.	No – Outside known range
Kemp's Ridley sea turtle *Lepidochelys kempii*	USFWS NMFS	E	E	Migrates along the Texas coast and generally remains in near shore waters less than 165 feet deep to feed on shrimp, crab, and other invertebrates. Nest on beaches of Galveston Island.	Yes –Records in the Bay
Leatherback sea turtle *Dermochelys coriacea*	USFWS NMFS	E	E	Mainly pelagic, inhabiting the upper reaches of the ocean where deep water comes to the surface (upwelling areas). Nest on beaches but nesting not recorded from upper coast.	No – Outside known range
Loggerhead sea turtle *Caretta caretta*	USFWS NMFS	T	T	Prefer shallow inner continental shelf waters and occur only very infrequently in the bays and estuaries. Often occurs near offshore oil rig platforms, reefs, and jetties. Nests on open, sandy beaches. No nesting recorded from the upper coast.	Yes –Records in the Bay

T= Threatened E= Endangered C= Candidate Species NR= Not on IPaC/Texas NMFS Report

Table 5. Effects Determination for ESA-listed Species

Species	Agency	Status (2016)	Effect Determination (2016)	Status (2022)	Effect Determination (2022)
Birds					
Attwater's Greater Prairie-Chicken	USFWS	E	No effect	E	No effect
Piping Plover	USFWS	T	No effect	T	No effect
Rufa Red Knot	USFWS	E	No effect	E	No effect
Eastern black rail	USFWS	NR	--	T	No Effect
Whooping Crane	USFWS	NR	--	E	No Effect
Fish					
Ocean whitetip shark	NMFS	NR	--	T	No effect
Giant manta ray	NMFS	NR	--	T	No effect
Insects					
Monarch Butterfly	USFWS	NR	--	C	No effect
Invertebrates					
Elkhorn coral	NMFS	T	No effect	NR	--
Lobed star coral	NMFS	T	No effect	NR	--
Mountainous star coral	NMFS	T	No effect	NR	--
Boulder star coral	NMFS	T	No effect	NR	--
Mammals					
West Indian manatee	USFWS	E	No effect	E	NLAA
Fin whale	NMFS	E	No effect	NR	--
Humpback whale	NMFS	E	No effect	NR	--
Sei whale	NMFS	E	No effect	NR	--
Sperm whale	NFMS	E	No effect	E	No effect
Rice's Whale	NMFS	NR	--	E	No effect
Reptiles—In Water					
Green sea turtle	NMFS	T	No effect	T	No effect
Hawksbill sea turtle	NMFS	E	No effect	E	No effect
Kemp's Ridley sea turtle	NMFS	E	No effect	E	NLAA
Leatherback sea turtle	NMFS	E	No effect	E	No effect
Loggerhead sea turtle	NMFS	T	No effect	T	NLAA
Reptiles – On Land					

Species	Agency	Status (2016)	Effect Determination (2016)	Status (2022)	Effect Determination (2022)
Green sea turtle	NMFS	T	No effect	T	No effect
Hawksbill sea turtle	NMFS	E	No effect	E	No effect
Kemp's Ridley sea turtle	NMFS	E	No effect	E	No effect
Leatherback sea turtle	NMFS	E	No effect	E	No effect
Loggerhead sea turtle	NMFS	T	No effect	T	No effect

NLAA = Not likely to adversely affect

3.5 AIR QUALITY

The Clean Air Act (CAA), as amended in 1990, regulates air emissions from area, stationary, and mobile sources, and requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. Currently, there are air quality standards for six "criteria" pollutants designated by EPA; ozone, lead (Pb), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), and inhalable and fine airborne particulate matter ($PM_{2.5}$ and PM_{10}).

3.5.1 Affected Environment

Galveston county is within the Houston-Galveston-Brazoria (HGB) air quality region, which has been classified as in non-attainment (NAA) for ozone, but in attainment for all other criteria pollutants. HGB is designated as being in serious nonattainment for ozone. The current designation of serious nonattainment changed in September 2019 for the 2008 Eight-hour Ozone Standard.

The existing air quality in the study area, although improving, is still impaired for ozone. The nitrous oxide (NOx) and volatile organic compounds (VOC) emissions that produce ozone come from many different sources in an urban and industrial environment. These sources include vehicle traffic, power generation, construction activity, and transportation (i.e. aircraft, truck, rail, and marine cargo), oil and gas production, refining and industrial processes, recreational equipment, and lawn and garden equipment. There are currently 13 air monitoring stations managed by the Texas Commission on Environmental Quality (TCEQ) used to monitor for air quality in the HGB. Monitoring stations are located around industrial facilities and large population centers. There is one air quality monitoring station located on Galveston Island, seven monitoring stations located around Texas City, one monitoring stations located on Smith Point, two monitors near Seabrook, and three monitoring stations located near La Porte-Baytown.

To comply with the CAA, the State of Texas developed a State Implementation Plans (SIP) that contains emissions inventories and comprehensively estimates emissions from all pollutant sources in the HGB NAA to aid in demonstrating how compliance with the NAAQS will be achieved.

3.5.2 Environmental Consequences

The CAA contains provisions under the General Conformity (GC) Rule (GCR) to ensure that actions taken by Federal agencies in air quality NAA and maintenance areas do not interfere with a state's plans to meet national standards for air quality. Under the GCR, Federal agencies must work with state, Tribal and local governments in a NAA or maintenance area to ensure Federal actions conform to the air quality plans established in the applicable SIP.

Under the GCR, certain actions are exempted from conformity determinations, while others are presumed to be in conformity if total project emissions (including direct and indirect emissions controlled by the agency) are below *de minimis* levels as established under 40 CFR Section 93.153. *De minimis*, emission levels for a project are established and expressed in tons per year (tpy) based on the severity of an area's air quality problem. Before any action can be taken, Federal agencies must perform an applicability analysis to determine the relationship of total project emissions to *de minimis* thresholds. Exceedance of a *de minimis* threshold requires preparation of General Conformity Determination (GCD) for that pollutant. If the emissions are below all the *de minimis* levels, the project is presumed to conform under the regulation. For actions that are otherwise exempt (such as maintenance dredging), the agency does not have to conduct a conformity determination.

Because the HGB NAA ozone classification changed in 2019, the *de minimis* threshold of 100 tpy for VOCs considered in the 2016 EA needs to be revised and total project emissions now need to be compared to 50 tpy established for serious NAA. The following is a summary of the conclusions drawn from the air emissions analysis completed for the project. Appendix D-3 contains detailed information including assumptions and modeling spreadsheets.

3.5.2.1 No Action

New work dredging would produce construction emissions from main and auxiliary engines of the dredge and its support equipment (e.g. tugs and tenders). Dredged material placement emissions would be produced by earthmoving equipment.

Construction of this alternative is anticipated to begin in 2023 and is expected to continue for approximately 4 months. Construction would be considered a one-time activity and baseline conditions would be expected to resume when construction is complete. Maintenance dredging would continue to produce emissions at the same frequency and magnitude as current maintenance dredging operations since deepening is not expected to increase the amount of material removed during maintenance dredging.

The No Action is not expected to increase the number of vessels using the channel, as the project is only intended to improve navigational efficiencies. With the elimination of light loading practices, fewer trips by smaller vessels would offset the emissions of a larger vessel traveling further down the channel resulting in negligible change in long-term operational emissions.

The emissions for the No Action were estimated to determine the applicability of the GC rules in the 2016 EA. Emission estimates for each engine type have been calculated by multiplying horsepower by load factor by operating hours, multiplied by emission factors in units of grams per horsepower hour (g/hp hr). Emission factors have been chosen for marine and other nonroad engines to be relatively conservative as to calculate a maximum emission scenario.

The 2016 analysis indicated that short-term project construction emissions of both ozone precursors, NO_x and VOC, would amount to 106.4 and 1.62 tons per year, respectively. When compared to the updated *de minimis* thresholds of 50 tpy the No Action would exceed those thresholds and require a GCD. However, since the 2016 EA deferred compliance to PED, these values needed to be updated to coincide with more precise dredging quantities and duration. As a result, the updated No Action annual project emissions for NOx and VOC is estimated at 37.11 tpy and 0.51 tpy (Table 6).

Table 6. Updated No Action Annual Project Emissions

	Annual Emissions (tpy)					
Emitter	**CO**	**NO_x**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOC**
Dredge & Support Equipment	4.55	37.11	0.84	0.89	6.18	0.49
Construction Equipment	0.206	0.108	0.005	0.005	0.001	0.011
Employee Vehicles	0.196	0.014	--	--	--	0.015
Total	4.95	37.23	0.85	0.89	6.18	0.51

3.5.2.2 Proposed Modified RP

The Proposed Modified RP would have the same general impacts on air quality except that the emissions produced are slightly higher due to the addition of the additional channel. The NOx emissions are estimated at 59.06 tpy, which exceeds the *de minimis* threshold of 50 tpy, while VOC is far below the *de minimis* threshold at 0.69 tpy (Table 7). Nearly all of the emissions comes from the dredging operation. While emissions of CO, SO_2, and PM would be generated during implementation, the amount produced is not expected to cause the area to exceed NAAQS for any of these pollutants or cause the area to not be in attainment.

Table 7. Emissions Produced by the Proposed Modified RP

	Annual Emissions (tpy)					
Emitter	**CO**	**NO_x**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOC**
Dredge & Support Equipment	6.70	59.06	1.34	1.41	9.80	0.66
Construction Equipment	0.206	0.108	0.005	0.005	0.001	0.011
Employee Vehicles	0.196	0.014	-	-	-	0.015
Total	7.11	59.18	1.34	1.42	9.80	0.69

For comparison to the SIP Area Source Emissions budget, the annual NOx emission rates estimated for the Proposed Modified RP may be summarized in terms of tons per day and compared to the SIP emissions budget. The Proposed Modified RP non-road mobile equipment

emissions represent less than one percent (0.12% and 0.04%) of the SIP 2017 Non-road Emissions Budget for NOx and VOC, respectively (Table 8). Based on this evaluation, the project is expected to result in emissions that are well within the 2017 Non-road Mobile Emissions Budget in the most recently approved SIP revision. Since dredging and this level of effort is not unusual in scope for this area, it is anticipated that emissions for the project would be less than an increase of 10 percent of the NOx and VOC inventories for the entire HGB NAA. Therefore, emissions from the activities subject to USACE action are not considered regionally significant for purposes of GCR. Additionally, emissions from the project are not expected to:

- Cause or contribute to new violations of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or interim emission reductions or other milestones in any area.

Table 8. Comparison of Project Emission to the SIP

	NO_x	**VOC**
HGB 2017 Non-Road Mobile Annual Emissions Budget	31,766	1,184
Modified RP Annual Emissions	59.18	0.69
% of 2017 HGB	0.12	0.04

3.6 ENVIRONMENTAL JUSTICE

Environmental justice (EJ) is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, to develop, implement, and enforce environmental laws, regulations, and policies. This goal will be achieved when everyone enjoys the same degree of protection from environmental and health hazards, and equal access to the decision-making process to live, learn, and work in a healthy environment.

Economically disadvantaged community. The term “economically disadvantaged community” is defined in the Assistant Secretary of the Army for Civil Works (ASA(CW)) memorandum, Implementation Guidance for Section 160 of the Water Resources Development Act of 2020, Definition of Economically Disadvantaged Community, dated 14 March 2023.

3.6.1 Affected Environment

The project area is within the Census Blockgroup 48167724001, which has a population of 1,036 people and an area of 21.36 mi^2 (7.09 mi^2 land and 14.27 mi^2 water). Of the 1,036 people, 879 people (85%) are reporting as white, 55 people (5%) are reporting as black, 75 people (7%) are reporting as Asian, 7 people (1%) are reporting as Other Race, and 20 people (2%) are reporting two or more races, with no individuals reporting as American Indian or Pacific Islander. A total of 299 individuals (29%) are reporting as Hispanic. A total of 1,011 individuals (98%) are

between the ages of 18 and 64, while 17 (2%) individuals are between the ages of 0 and 4, 25 individuals (2%) are between 0 and 17, and 7 individuals (1%) are 65 or older. Of the 121 households in the census tract, 5 households are linguistically isolated (Spanish). The census block would not be considered a minority population because minorities do not represent more than 50 percent of the community.

The ACS data did not report number of households classified as low income, so the Department of Human Health and Services' 2022 average poverty level threshold of $26,500 (total annual income) for a family of four was used. Seventy-seven households (64%) have a total household income of $25,000 or less, making this census block a low-income community because it is significantly higher than the State of Texas poverty level of 13.4 percent and the Galveston County poverty level of 9.9 percent. All demographic information has been captured from the American Communities Survey (ACS) 2015-2019 (Census Bureau 2020).

The EPA EJSCREEN tool (v2.0) was used to identify EJ populations in or near the project area. The EPA issued guidance in 2016 that indicates when using EJSCREEN, any geographic areas at or above the 80th percentile nationally for any EJ indexes should be considered for further review and/or outreach (EPAb 2016). The demographic index of the census block is in the 84th percentile of the US (Figure 8), 71st percentile of the state, and 75th percentile of the EPA region. Six additional EJ Indices were at or above the 80th percentile of the US including: low-income in the 98th percentile, unemployment rate in the 92nd percentile (Figure 9), diesel particulate matter in the 83rd percentile, lead paint in the 80th percentile, proximity to a superfund site in the 82nd percentile, and proximity to an RMP facility (facilities that use extremely hazardous substances) in the 85th percentile (Figure 10).

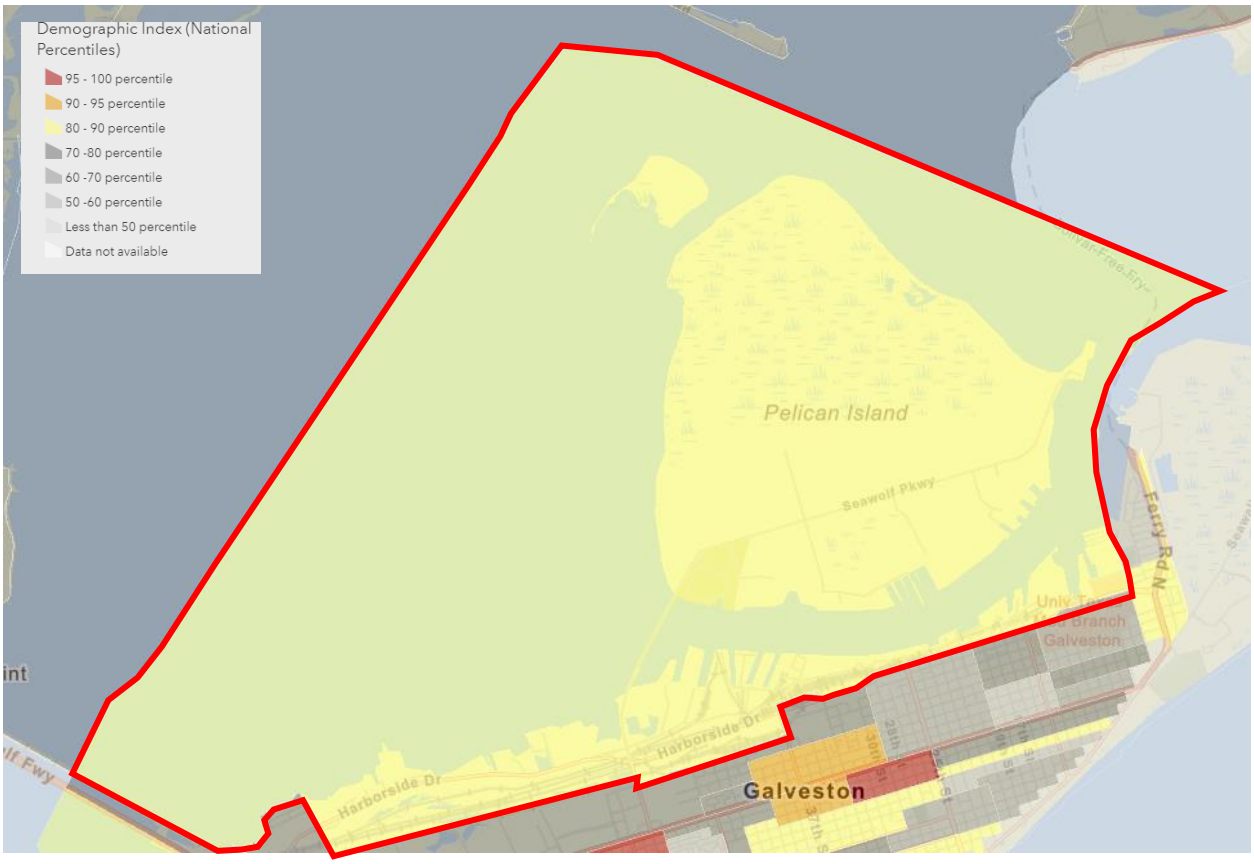

Figure 8. Demographic Index of the Census Block Encompassing the Project Area (Red outline is census block)

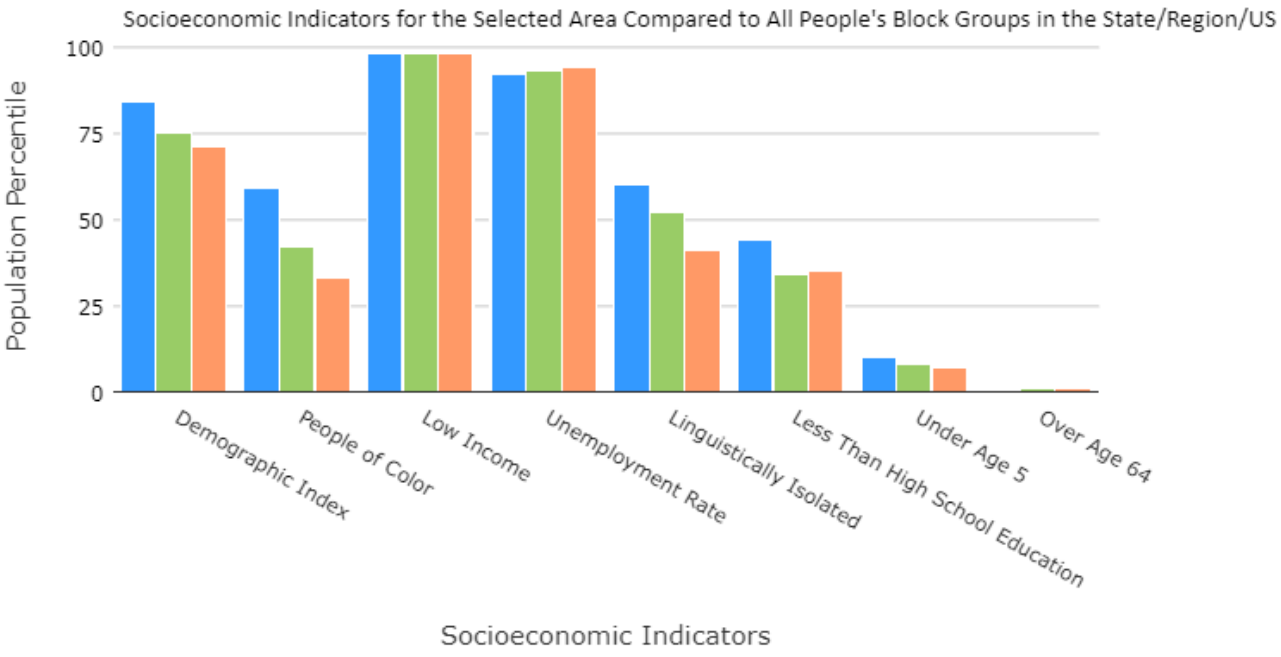

Figure 9. Socioeconomic Indicators for the Census Block of the Project Area

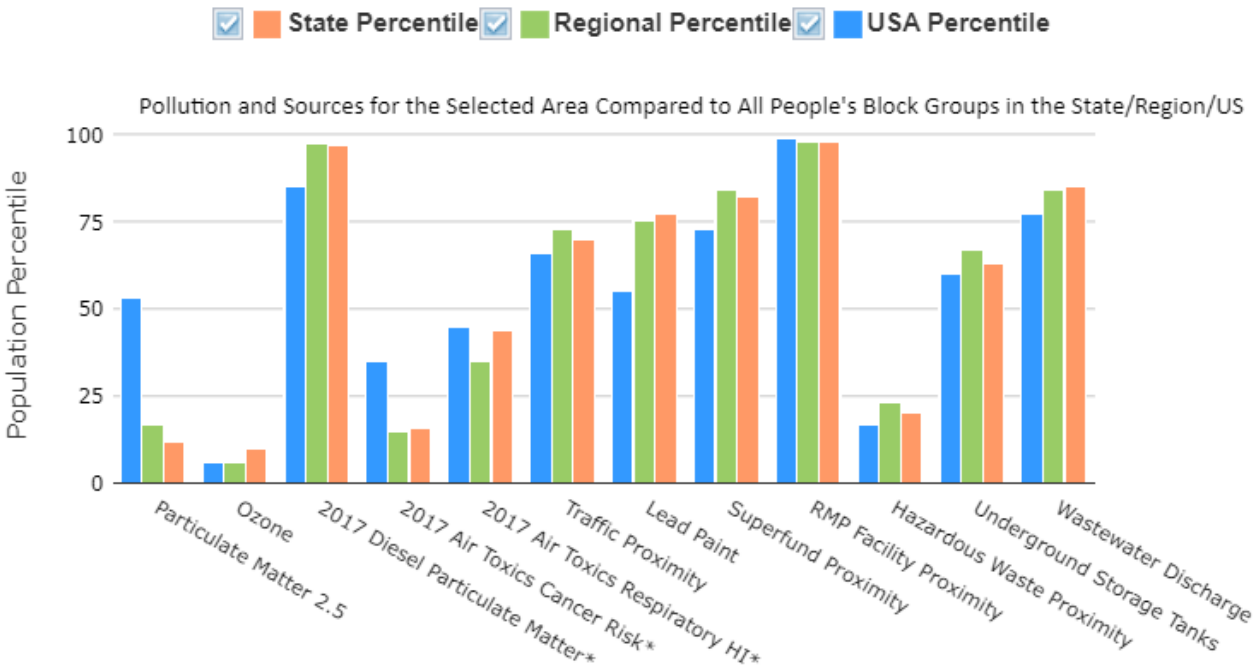

Figure 10. Pollution and Sources Indicators for the Census Block of the Project Area

3.6.2 Environmental Consequences

3.6.2.1 No Action

Because this area routinely experiences dredging operations in the project area and the No Action would have a very small increase in dredging duration and sediment removed over maintenance dredging actions, impacts greater than those experienced under the existing conditions would be negligible. Additionally, channel deepening would not increase the number of vessels using the channels, change the commodities being handled at the Port and private facilities, induce development along the shoreline, or displace residents. Minor, temporary increases in noise would be experienced within 1,000 feet of the channel as a result of operating the dredge; however, the increase is expected to be similar in magnitude and scope as the existing condition. Therefore, the No Action is not expected to change the socioeconomics, job opportunities (unemployment rate), or cohesion of the low-income communities in and near the census block and project area.

When considering the other EJ Indices specifically related to chemical and other adverse factors, only temporary increases in emissions of diesel particulate matter could potentially affect low-income communities; however, as stated previously, dredging would negligibly increase the duration of dredging and therefore emittance of diesel particulate matter over the No Action. With the elimination of light-loading practices, fewer trips by smaller vessels would

offset the amount of diesel particulate matter emitted by a larger vessel traveling further down the channel and may even result in communities being exposed to less diesel particulate matter over the long-term under operational conditions.

There would be no change in commodities or shoreline development or re-development of structures potentially painted with or handling lead based paint, so the No Action would not increase the exposure of low-income communities to lead paint. Regarding the proximity to a superfund site, the nearest facility is over 5 miles away and would not be in any way affected by the project. Multiple RMP facilities are located within 5 miles of the project area; however, the project would not create a situation in which the facilities are more vulnerable to damage as each are well beyond the footprint of the channel dredging and placement activities; therefore, implementation of the No Action would also have no effect on these facilities.

The No Action is not anticipated to cause a disproportionately high and adverse impact on the EJ community near the project area.

3.6.2.2 Proposed Modified RP

The impacts described for the No Action would also apply to the Proposed Modified RP; however, this alternative would result in a longer dredging duration to account for the additional footprint.

The Proposed modified RP is not anticipated to cause a disproportionately high and adverse impact on the EJ community near the project area.

4.0 ENVIRONMENTAL COMPLIANCE

The 2016 EA was prepared to satisfy the requirements of and compliant with all applicable environmental laws and regulations. Compliance with the following environmental laws and regulations is not necessary because of lack of the regulated resource in the project area or no effect to the regulated resource: National Historic Preservation Act (NHPA), Coastal Barrier Resources Act (CBRA), Executive Order (EO) 11990 – Protection of Wetlands, Farmland Protection Policy Act (referred to as CEQ Memorandum Dated August 11, 1980 – Prime or Unique Farmlands in the 2016 EA), and Memorandum of Agreement Between the Federal Aviation Administration - Aircraft Wildlife Strikes.

Implementation of the Proposed Modified RP would not change the conclusions and compliance status described in the 2016 EA for the following laws: Magnuson-Stevens Fishery Conservation Management Act (MSFCMA), Coastal Zone Management Act (CZMA), Clean Water Act (CWA) Section 401 and 404, EO 11988 Floodplain Management, Migratory Bird Treaty Act (MBTA), and EO 13112 – Invasive Species. Letters were sent to NMFS, the Texas General Land Office (GLO), and the Texas Commission on Environmental Quality (TCEQ) to notify them that the project design as described in the original compliance document has been modified but that the design changes do not trigger re-initiation of consultation under MSFCMA, CZMA, and CWA Section 401, respectively (Appendix D). Each of the agencies were coordinated with prior to sending the letters present the design changes and to confirm re-initiation of consultation would not be triggered.

Three additional laws required additional review and coordination with the appropriate regulatory agency, as applicable, because the existing condition changed, the regulations were revised since 2016 or the Proposed Modified RP would have impacts different than those described in the 2016 EA.

4.1 NATIONAL ENVIRONMENTAL POLICY ACT

This SEA has been prepared in accordance with CEQ regulations for implementing NEPA and discloses the environmental and social consequences of the No Action and Proposed Modified RP. Based on this analysis and other pertinent information informing to the Proposed Modified RP (e.g. DDR, engineering surveys, etc.), the alternative is not expected to have significant effects on the quality of the natural and human environment and preparation of an Environmental Impact Statement (EIS) is not warranted under the provisions of NEPA and other applicable regulations of the USACE. A Finding of No Significant Impact (FONSI) has been prepared to document this determination.

The 2016 EA relied on public involvement completed during the 2013 Galveston Harbor Channel Extension, Post-Authorization Change Report (PACR) Draft EA that was published 10 May 2013 for a 30-day public comment period that ended 10 June 2013. Comments received during that comment period were from Federal, State, and local agencies. Comments on the 2013 PACR Draft EA were used to evaluate impacts of alternatives and identify a plan that was socially and environmentally acceptable. No additional public involvement was coordinated during that period because it was determined that the GHCE was very limited in scope, non-controversial, and affects only a previously deepened and regularly maintained channel.

Because of the significant amount of time that has passed since the last time the public was able to comment on this project, this SEA will be circulated for a new public review period. Additionally, each of the resource agencies have been updated on the status of the project including the proposed design modifications and were able to verbally provide concerns during the coordination meeting. A Resource agency meeting was held in April 2022 where agencies were informed on the change of design. No concerns were raised. Letters will be sent to agencies to inform of final report availability and need for re-initiation of consultation. Additional agency coordination efforts can be found in section 6.2 of the main report.

4.2 ENDANGERED SPECIES ACT

The ESA provides a program to conserve threatened and endangered plants and animals, and the habitats in which they are found. The Act requires Federal agencies to consult with the USFWS and NMFS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of designated critical habitat of listed species. The Act also prohibits any action that causes an avoidable "taking" of any listed species of endangered fish or wildlife.

Compliance with the ESA (7 U.S.C. 136; 16 U.S.C. 460 et seq.) has been coordinated with the USFWS and the NMFS for those species under their respective jurisdictions. A draft supplemental BA covering the design changes associated with the Proposed Modified RP was included with the public release of the EA. The USACE provided a copy of the draft supplemental BA to the USFWS and NMFS and requested the initiation of informal consultation with USFWS on potential impacts to the endangered West Indian manatee and with NMFS on potential impacts to the endangered loggerhead and Kemp’s Ridley sea turtles. ESA consultation is expected to be completed prior to the signing of the FONSI

4.3 CLEAN AIR ACT

In accordance with the GCR promulgated under the Clean Air Act in 40 CFR Part 93 Subpart B, Determining Conformity of Federal Actions to State or Federal Implementation Plans (EPA 2010a), a Draft General Conformity Determination (GCD) will not be needed due to the emissions for NOx and VOC being below de minimis threshold values of 25 tons per year (tpy). Instead and Aim Emissions Inventory will be included in appendix D-3 to provide a detailed breakdown.

4.4 EXECUTIVE ORDER 12898 – ENVIRONMENTAL JUSTICE

This EO directs Federal agencies to determine whether their programs, policies, and activities would have a disproportionately high or adverse effect on minority or low-income population groups within the Project Area to identify potential EJ issues. The proposed project would not have a disproportionate adverse impact on minority or low-income population groups within the project area (See section 3.6).

4.5 EXECUTIVE ORDER 13985 – ENVIRONMENTAL JUSTICE

This EO, dated January 20, 2021 acknowledges the increasing inequities attributable to the

converging economic, health, and climate crises, and directs federal agencies to pursue a comprehensive approach to advancing equity for all.

4.6 EXECUTIVE ORDER 14008 – ENVIRONMENTAL JUSTICE

This EO focuses on tackling the Climate Crises at Home and Abroad, Section 219: Executive Order 14008, dated January 27, 2021, directs Federal agencies to take a Government-wide coordinated approach, coupled with substantive engagement by community stakeholders, to combat the climate crisis by reducing climate pollution in every sector of the economy; to increase resilience to the impacts of climate change; to protect public health; to conserve our lands, waters, and biodiversity; to deliver environmental justice to disadvantaged communities; and to spur well-paying union jobs and economic growth. Section 219 of this EO requires Federal agencies, among other things, to "[develop] programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities.

5.0 REFERENCES

Armstrong, N.E., M. Brody, and N. Funicelli. 1987. The ecology of open-bay bottoms of Texas: a community profile. U.S. Department of the Interior Fish and Wildlife Service. Biological Report 85(7.12). 104 pp.

Clarke, D.G., and D.H. Wilber. 2000. Assessment of potential impacts of dredging operations due to sediment resuspension. DOER Technical Notes Collection. ERDCTN-DOER-E9. U.S. Army Engineer Research and Development Center, Vicksburg, Mississippi.

Environmental Protection Agency (EPA). 2016a. Environmental Justice (EJ) Interagency Working Group (IWG) Promising Practices for EJ Methodologies in NEPA Reviews. EPA Pub. No: 300-B-16-001. Available at: https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf.

EPA. 2016b. Technical Guidance for Assessing Environmental Justice in Regulatory Analysis. Available at: https://www.epa.gov/sites/ production/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf.

Newcombe, C.P., and J.O.T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16:693–727.

U.S. Army Corps of Engineers (USACE). 2022. Galveston Harbor Channel Extension Civil Design Documentation Report. Galveston District. Galveston, TX.

USACE. 2018. Final Statement of Findings and Finding of No Significant Impact for Galveston Harbor Channel Extension Post-Authorization Change Report, Galveston County, Texas. Galveston District, Galveston, TX.

USACE. 2017. Galveston Harbor Channel Extension Feasibility Study and Report to the Chief of Engineers, Houston-Galveston Navigation Channels, Texas. Galveston District. Galveston, TX. Available at: https://www.swg.usace.army.mil/Portals/26/docs/PAO/TC/GHCE%20Feasibility%20Main%20Report.pdf?ver=2017-04-21-125724-227 and https://planning.erdc.dren.mil/toolbox/library/ChiefReports/GalvestonExtension_Aug2017.pdf, respectively.

USACE. 2016. Final Environmental Assessment Galveston Harbor Channel Extension Feasibility Study, Houston-Galveston Navigation Channels, Texas. Galveston District. Galveston, TX.

USACE. 1995 Houston-Galveston Navigation Channels, Texas, Limited Reevaluation Report and Final Supplemental Environmental Impact Statement. Galveston District, Galveston, Texas.

USACE 1987. Final Feasibility Report and Environmental Impact Statement, Galveston Bay Area Navigation Study. Volume I, Main Report. U.S. Army Corps of Engineers, Galveston District. Galveston, Texas.

U.S. Census Bureau. 2020. 2015-2019 American Community Survey. Data accessed from the EPA EJSCREEN ACS Summary Report for Blockgroup 481677240001. Available at: https://ejscreen.epa.gov/mapper/demogreportpdf.aspx?report=acs2019.

White, W.A., T.R. Calnan, R.A. Morton, R.S. Kimble, T.G. Littleton, J.H. McGowen, H.S. Nance, and K.E. Schmedes. 1985. Submerged Lands of Texas, Galveston-Houston Area: Sediments, Geochemistry, Benthic Macroinvertebrates, and Associated Wetlands. Bureau of Economic Geology. Austin, Texas.

Wilber, D.H., and D.G. Clarke. 2001. Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. North American Journal of Fisheries Management 21:855–875.

Appendix D-1 – Engineering Templates

Galveston Harbor Channel Extension, TX

Section 216
Draft Validation Report

July 2023

US Army Corps of Engineers
Galveston District

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Proposed Extension Channel and Additional Channel

Recommended Plan:

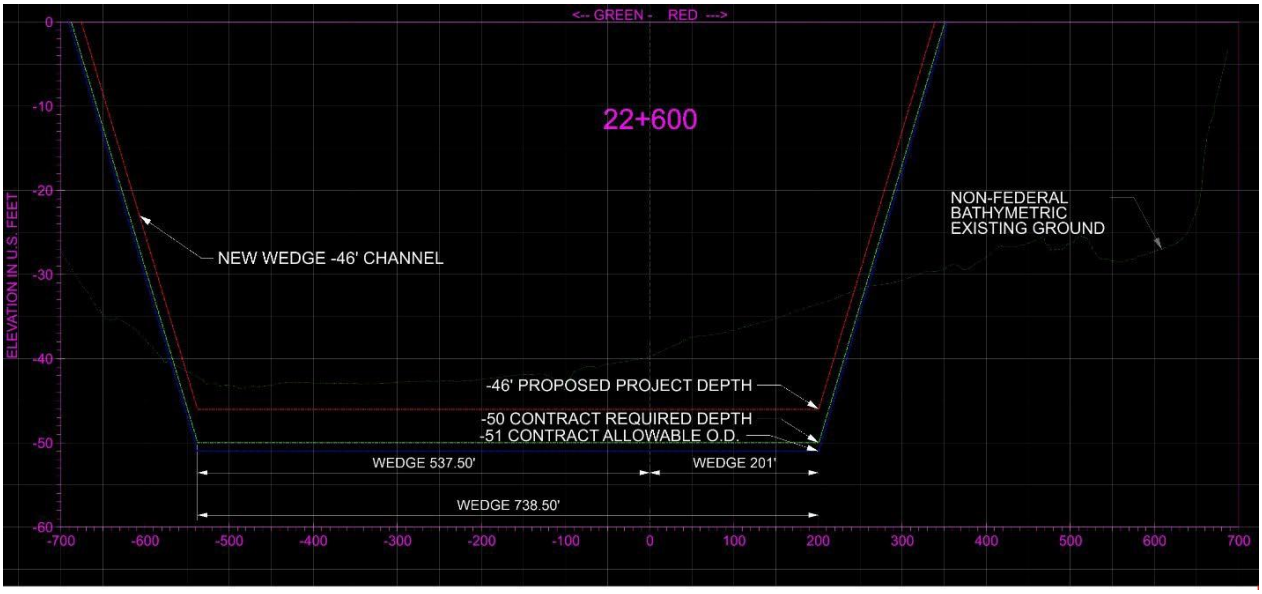
The proposed channel centerline alignment extends westward from Station 20+000 to the end of the existing 41-foot channel at Station 22+571. The channel would have side slopes of 1V:3H and a bottom width of 1,075 feet. The template depths were updated to Figure 1 and 2 based on the memo titled "District policy on setting dredging templates for studies, new work construction projects, and channel maintenance" dated April 2019. The memo is included in Attachment C and further explained below in "New Work Dredging".

Additional Channel:

The proposed channel centerline alignment would continue to extend from Station 20+000 to Station 23+076.27. The additional channel would also have the side slopes of 1V:3H with varying bottom widths from 744.45 feet to 384.50 feet. At the westerly limit of dredging for the additional channel there is an additional 150-foot end slope to facilitate dredging operations. The templates show 46-foot proposed project depth, 3-foot advanced maintenance, 1-foot additional over depth and 1-foot allowable overdepth.

See Figure 1 and 2 for the proposed channel cross sections.

1 Cross-Section Template Sample of Recommended Plan



2 Cross-section Template Sample of Additional Channel

Additional Channel:

Information was received from Texas A&M at Galveston, located on the north side and at the west end of the proposed GHC Extension of their fishing dock so that the dredging safety envelope could be calculated. This is discussed more in Section 7 of appendix A.

Appendix D-2 – Supplemental Biological Assessment

Galveston Harbor Channel Extension, TX

Section 216
Draft Validation Report

July 2023

US Army Corps of Engineers
Galveston District

Galveston Harbor Channel Extension Feasibility Study

Updated Supplemental Biological Assessment

June 2022

Prepared by:

United States Army Corps of Engineers
Regional Planning and Environmental Center

US Army Corps of Engineers ®
Galveston District

1 CONTENTS

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1 INTRODUCTION

This Supplemental Biological Assessment (BA) updates the evaluation of potential effects to the Federally listed threatened and endangered species potentially impacted form the Galveston Harbor Channel Extension Feasibility Study. Galveston County, Texas (GHCE) ; as required by Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended. This information supplements the *USFWS Biological Assessment for the Galveston Harbor Channel Extension Feasibility Study, Galveston County, Texas* dated June 2022 and submitted under the administrative record for Consultation 2022-0034255. The intent of the Supplemental BA is not to replace the 2016 BAs, but to provide information on the changes influencing the consultation since the 2016 BAs were completed; hence it is not intended to be a stand-alone document. Unless otherwise stated herein, the elements of the proposed action remain unchanged from their description in the 2016 BAs. Likewise, the analysis of effects of the proposed modifications to the proposed action described in the Supplemental BA focuses on changes from the analysis of effects in the 2016 BAs.

This Supplemental BA demonstrates the proposed action, with proposed modifications, remains in compliance with Section 7 of the ESA, which assures that, through consultation with the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS; collectively referred to as the Services), Federal actions do not jeopardize the continued existence of any threatened, endangered or proposed species, or result in the destruction or adverse modification of critical habitat.

1.1 STUDY BACKGROUND

1.1.1 Purpose and Need

The GHCE is currently in the PED phase and the USACE team has prepared a Design Documentation Report (DDR) (USACE 2022) for this project. The DDR examines the design requirements for the channel deepening and has revised as needed based on the collection and analysis of data outlined in the DDRs, as well as taking into consideration of changed conditions. As a result, an adjustment was identified as being needed between Stations 22+571 to Station 23+076 to increase channel efficiency and maneuverability into the docks on the far western end of the channel.

The authorized RP design limits deeper draft vessels from calling at the most western docks in the channel. The design did not consider the turning needs for accessing the berthing areas, so vessels continue to be constrained by channel depth. If the GHCE RP were constructed as authorized, current light loading to access and depart these facilities would continue resulting in inefficient transportation practices and higher costs.

1.1.2 Scope of Study

The 2016 EA analyzed the recommended plan and the no action alternative. The scope of this Supplemental study is to identify and evaluate the environmental effects that could result from implementation of the proposed modification to the recommended plan. The proposed modification

consist of an additional 505 feet and dredging it to the depth of -46 feet mean lower low water (MLLW) to match the previously authorized depth.

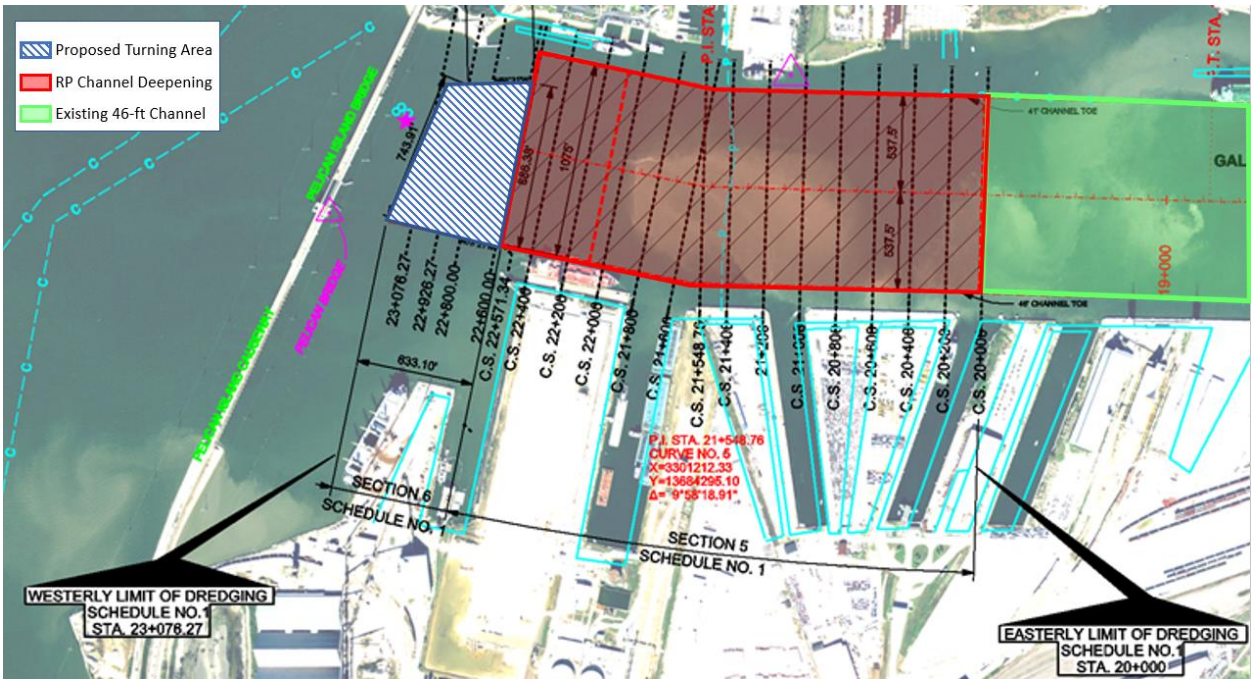

Figure 1 Proposed Additional Channel

1.2 Consultation History

2 Description of the Proposed Modifications to the Proposed Action

This chapter describes the proposed action, a brief description of the potentially affected biological communities, and the potential adverse and beneficial impacts of the proposed action.

2.1 Description of the Proposed Action Prior to Modifications

consists of deepening the existing channel from -41 feet MLLW to -46 feet MLLW, plus three feet of advanced maintenance and two feet of allowable overdepth, such that the maximum channel depth following periodic maintenance will not exceed -50 feet MLLW. Deepening would begin near Port of Galveston (POG) Pier 38 at Station 20+000, continue westward towards Pelican Island Bridge and end at Station 22+571 (Figure 2) for approximately 2,571 feet. The RP does not include any channel widening, so the bottom width will remain at 1,075 feet or less and the channel top-of-cut will remain consistent with the template of the existing project. Figure 3 shows the channel template.

Channel deepening will be accomplished using a cutterhead, hydraulic pipeline dredge. The project will generate 600,500 cubic yards (cy) of new work material, consisting primarily of firm clays with low

plasticity. The new work dredged material will be placed in the Pelican Island Placement Area (PA), a 1,100-acre upland site located approximately 1.25 miles north of the channel (Figure 4). Deepening the channel is not anticipated to change the frequency or quantity of material from the 41-foot-deep project. Maintenance dredging will still be required every four years and generate approximately 648,000 cy and could be placed in the Pelican Island PA, the Galveston Ocean Dredged Material Disposal Site (ODMDS), consistent with existing maintenance dredging.

The RP also involves mechanically raising the dikes at Pelican Island PA prior to deepening the channel to sufficient height to allow for the containment of the new work material and any initial maintenance material that may be encountered above the new work material during the channel deepening. No modification to the existing weir structures located at the northwest corner of Cell B or the drop-outlet structure located in Cell C would be needed as a result of the dike raising.

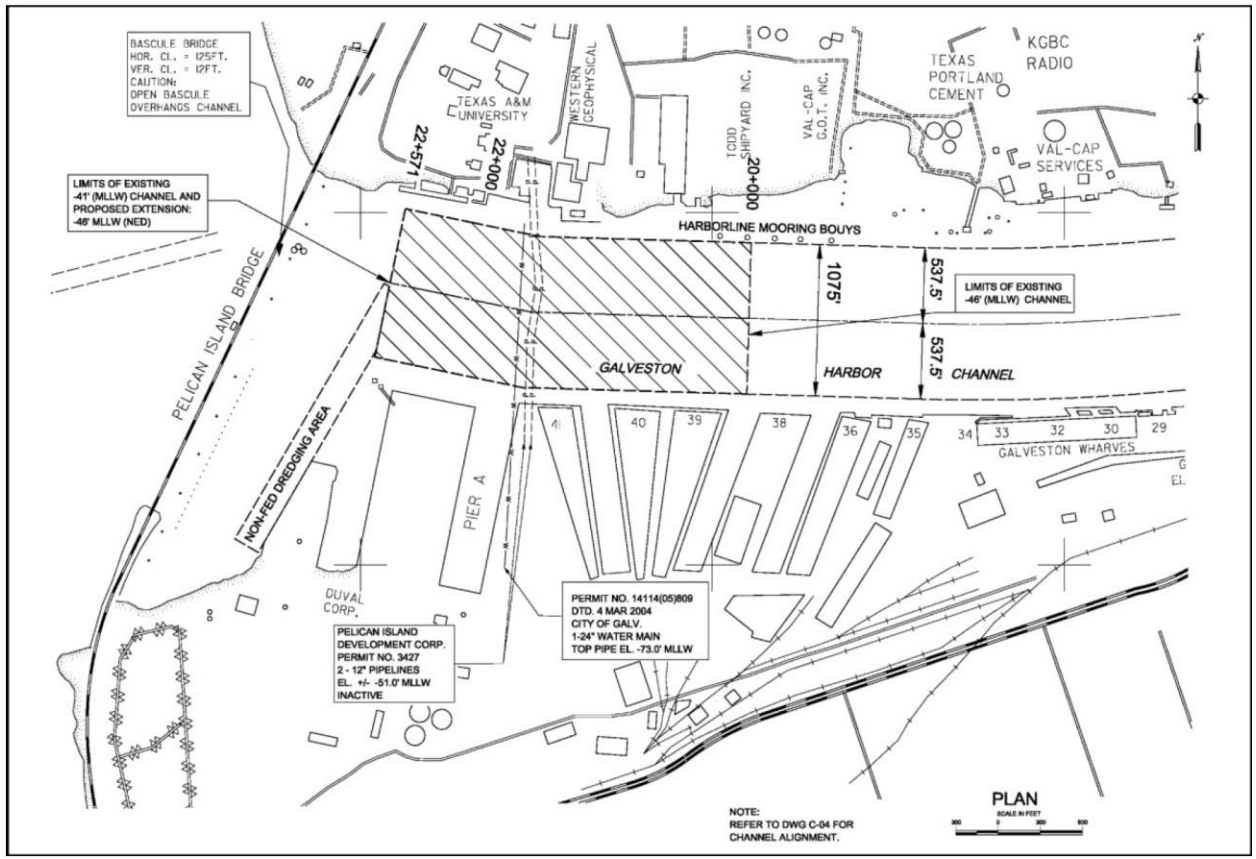

Figure 2 GHCE Channel Deepening Limits Pre-Modification

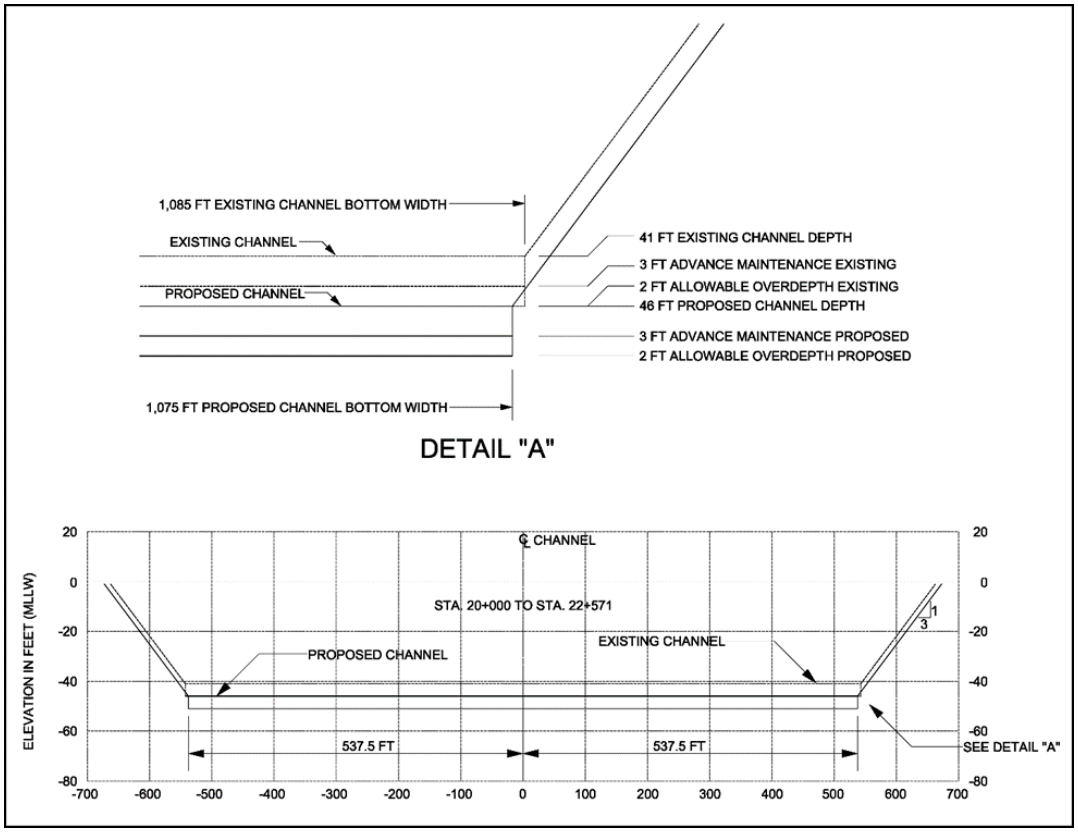

Figure 3 GHCE Pre-Modification Channel Template

Figure 4 GHCE Original Plan

2.2 MODIFICATION TO THE RECOMMENDED PLAN

Once the GHCE feasibility study phase concluded, the PED phase began with the design team and the Board of Trustees of the Galveston Wharves (the non-Federal sponsor for the project) working to refine the design of project elements. Proposed modifications were based on a concern raised by the NFS regarding maneuverability and access to berthing areas at the most western end of the channel. Other modifications were the result of more detailed information available or greater certainty of the information, such as the quantity of dredge material anticipated. As a result, the design was revised to resolve the concern and incorporate the new information.

To address the maneuverability and access concerns, additional channel was incorporated into the design between stations 22+571 and 23+076 (Figure 1). The additional channel would involve deepening an additional 505 feet of channel from the existing ground level to a depth of -46 feet, plus four feet of advanced maintenance and one foot of allowable overdepth (Figure 5). The channel bottom width would vary between 385 feet and 738.5 feet. A cutterhead, hydraulic pipeline dredge would be used to remove all material. The additional channel is expected to generate approximately 124,700 cy of new work material. New work and maintenance material would be placed into the Pelican Island PA. Construction of the additional channel is expected to add an estimated 14 days to the total construction

Other design modifications include:

- change in sediment quantities as a result of updated bathymetric surveys;
- change in channel template design that incorporates new policies regarding advanced maintenance and allowable overdepth (Figure 7); and
- elimination of the Pelican Island PA dike raising. duration.

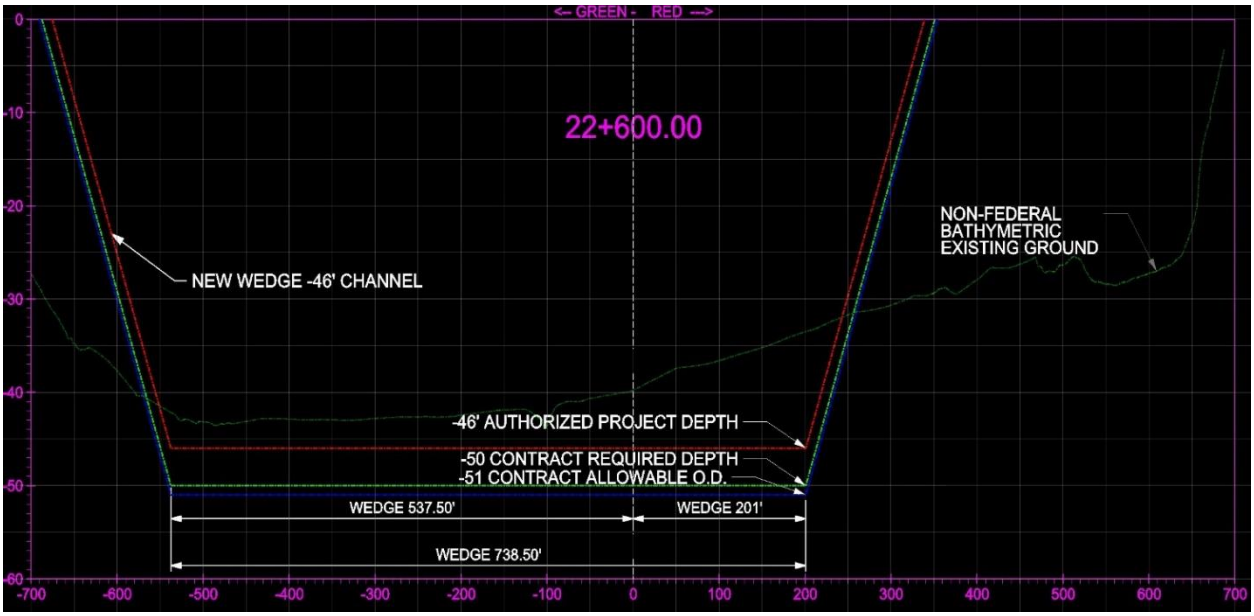

Figure 5 Proposed Additional Channel Template

Figure 6 Refined Channel Template for Deepening Between Sta. 20+000 and 22+571

Table 1 Comparison of Pre and Post Modification

Change	***RP/No Action***	***Proposed Modified RP***	***± Change in Impact***
Channel Extension	*Deepen to -46 feet MLLW between Sta 20+000 and 22+571. The channel template extends a 1v:3h slope from elevation -46 with a vertical cut for 3 ft of advanced maintenance and an additional 2 ft for allowable overdepth. The design would generate 609,500 cy of new work dredge material.*	*No change in stationing; however, the channel template would extend the 1v:3h slope with a vertical cut for 4 ft of advanced maintenance and an additional 1 ft for allowable overdepth. The design would generate 457,400 cy of mew work dredged material.*	*-152,100 cy of new work material*
Additional Channel	*Not included in RP*	*Deepen 505 ft of channel to -46 ft between Sta. 22+571 and 23+076 with a varying bottom width. New work dredging would generate 143,100 cy of material to be placed at the Pelican Island PA.*	*+124,700 cy of new work material*
Pelican Island PA Modifications	*Mechanically raise the dike of cell B approximately 2 ft to an elevation of +30 ft with 1v:3h sides slopes and a crest width of approximately 10 ft wide.*	*Removed from project since dike raising is no longer necessary.*	*-1 month of construction noise, vibration, emission impacts*
Maintenance Dredging (Extension and Additional Channel)	*Every 4 years generating 648,000 cy of material*	*Every 4 years generating X cy of material*	*648,000 cy of material every 4 years*
Construction Duration *(Extension and Additional Channel)*	*~4 months, including 1 month to prepare the placement area and 3 months to construct the channel extension of which 62.5 days is dredging time.*	*~3 months, including 2.5 months to construct the channel extension and 0.5 month to construct the additional channel, of which 43 days is dredging time.*	*-1 month of total construction duration (-19.5 days of dredging time)*
Footprint *(Extension and Additional Channel)*	*81.8 acres*	*92.8 acres*	*+11 acres*

2.3 DESCRIPTION OF PROJECT AREA

The Galveston Channel Navigation Project is located on the upper Texas coast at the mouth of Galveston Bay in Galveston County, Texas. Galveston Channel is part of a complex of navigation channels running from offshore through Galveston Bay known as the Houston Galveston Navigation Channels (HGNC). Major channels include the Galveston Bay Entrance Channel from offshore, Bolivar Roads between Bolivar Peninsula and Galveston Island, the Houston Ship, Texas City, and Galveston Harbor Channels, and the Gulf Intracoastal Waterway. The Galveston Harbor Channel branches off the Galveston Bay Entrance Channel providing entry to the Port of Galveston. It extends in an east-west direction from Bolivar Roads between Galveston and Pelican Islands for about four miles. The project area includes the eastern end of Galveston Island and Pelican Island adjacent to the channel. Galveston Island is a low-lying barrier island two miles off the Texas coast, approximately 50 miles southeast of Houston, Texas.

2.3.1 Habitats

The project area is located in the Gulf Coast Prairies and Marshes Region that borders the Gulf of Mexico from the Sabine River to Corpus Christi Bay. The existing Galveston Harbor Channel reach and the Pelican Island disposal area are located in highly disturbed areas, associated with previous and ongoing maintenance and construction activities related to the existing authorized project. Seagrasses historically flourished in Galveston Bay, but seagrass beds have nearly disappeared entirely from the area due to human disturbances, hurricane activity, and their limited tolerances to turbidity, deep water, and wave energy. Oyster Reefs are also relevant in Galveston Bay, however, a survey conducted in the project area found no potential reefs.

Although the Pelican Island PA is an active confined upland PA, scattered terrestrial vegetation assemblages exist in the vicinity. Typical species include hackberry (*Celtis laevigata*), Bermuda grass (*Cynodon dactylon*), red mulberry (*Morus rubra L*.), palm trees (*Sabal Mexicana, S. texana*), and honey suckle (*Lonicera albiflora*). Invasive species such as Chinese tallow trees (*Sapium sabiferum*), Brazilian pepper (*Schinus terebinthifolius*), salt cedar (*Tamarisk sp*.), and giant reed (*Phragmites communis*) also occur in the vicinity of the PA. However, the current frequency of dredged material placement and related maintenance activities on Pelican Island PA deter the successful establishment and proliferation of these invasive species in the PA.

2.3.2 Wetlands

No wetlands or submerged aquatic vegetation occur within the existing footprint of Galveston Harbor Channel, which is a very active shipping lane that supports the POG and its numerous industrial and commercial activities. The Pelican Island PA is an existing active upland confined PA. As a result of the consistent periodic placement of maintenance dredged material into the PA as well as other maintenance activities associated with management of the PA, no persistent stands of wetlands or submerged aquatic vegetation occur within the cells of the PA. The immediate shoreline located outside of the channel footprint is highly developed with the Texas A&M University at Galveston (TAMUG) campus, commercial dock facilities, and the Pelican Island Bridge surrounding it to the north, south and west. Because of this extensive 30 commercial development, only a small remnant tidal salt marsh wetland occurs well outside the project footprint, along the northwestern edge of the project area between the Pelican Island Bridge and TAMUG. This small, approximately 4-acre wetland occurs behind a berm of shell hash along the shoreline, but is connected to bay waters through a small tidal inlet

channel. The wetland is dominated by saltmarsh cordgrass (*Spartina alterniflora*), saltmeadow cordgrass (*S. patens*), saltwort (*Batis maritima*), sea-ox eye daisy (*Borrichia frutescens*), big leaf sumpweed (*Iva frutescens*) and gulf cordgrass (*S. spartinae*).

3 Assessment of Listed Species and Critical Habitat in the Action Area

Seventeen species listed as endangered, threatened, or candidate were identified and considered in the 2016 Biological Assessment (BA). Since then, six additional species have been identified as potentially occurring in the project area, while eight species are no longer identified as potentially occurring in the project area as indicated in the USFWS Official Species List, and/or on the most recent NMFS Texas' Threatened and Endangered Species List dated November 03, 2021.There is no designated critical habitat in the project area.

Of the 16 identified species, only the West Indian manatee, Kemp's ridley sea turtle, and loggerhead sea turtle have the potential to occur in the project area. The project area does not support habitat for the remaining 13 species and/or is outside the species known range. The shorelines along the GHC in the vicinity of the RP and Proposed Modified RP predominantly consist of bulkheads and dock facilities with only very small, short stretches of shorelines having shell hash substrates found at the TAMUG Clipper dock area. Additionally, one small wetland is found outside the 500-foot buffer of the project area.

To assess the status of species in the action area and potential impacts of the action on ESA-listed species, several sources were consulted including: literature review of scientific data; interview of recognized experts on listed species including local and regional authorities and Federal (USFWS and NMFS) and State (TPWD) wildlife personnel; on-site inspections; and compiled lists of ESA-listed species. Significant literature sources consulted include the USFWS and NMFS species specific webpages, Federal status reports and recovery plans, TPWD species occurrence and monitoring reports, peer-reviewed journals, and other standard references.

Table 2 ESA-listed Species Identified as Potentially Occurring in the Project Area

Species	***Agency***	***Status (2016)***	***Status (2022)***	***Habitat Needs***	***Occurrence In or Near the Project Area***
Birds					
Attwater's Greater Prairie-Chicken *Tympanuchus cupido attwateri*	*USFWS*	*E*	*E*	*Only known to occur in the wild at three locations. Prefer open prairies without any wood cover and avoid areas with more than 25% shrub cover. Knolls and ridges with minor variations in topography and soils resulting in a variety of vegetation types are characteristic of preferred habitat.*	*No – Outside known range*
Piping Plover *Charadrius melodus*	*USFWS*	*T*	*T*	*Wintering habitat broadly characterized as emergent tidal or washover areas that are unvegetated to sparsely vegetated with wet to saturated soils near water. Use coastal areas on the mainland and barrier islands, with bay side habitats (bayshore tidal sand and algal flats) serving as the primary habitat unless submerged, then they transition to oceanside beaches, washover passes, and mainland tidal mud flats.*	*No – No suitable habitat*
Rufa Red Knot *Calidris canutus rufa*	*USFWS*	*E*	*E*	*Migrating and wintering knots use sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey.*	*No – No suitable habitat*
Eastern Black Rail *Laterallus jamaicensis ssp. jamaicensis*	*USFWS*	*NR*	*T*	*Use tidally or non-tidally influenced wetlands ranging in salinity from salt to brackish to fresh. Require dense vegetation, moist soils, and areas of topographic change where molting birds can escape when areas are flooded.*	*No – No suitable habitat*
Whooping Crane *Grus americana*	*USFWS*	*NR*	*E*	*Winters along the Gulf Coast and breeds in Canada. On wintering grounds in Texas, they use estuarine marshes, shallow bays, and tidal flats, sometimes using nearby farms. Salt grass, saltwort, smooth cordgrass, glasswort, and sea oxeye dominate marshes, with Gulf cordgrass on the margins*	*No – No suitable habitat*
Fish					
Ocean whitetip shark *Carcharhinus longimanus*	*NMFS*	*NR*	*T*	*Pelagic, generally remaining offshore in the open ocean, on the outer continental shelf, or around oceanic islands in water depths greater than 184 m (~604 feet). They have a strong preference for the surface mixed layer in warm waters above 20°C (68°F).*	*No – Outside known range*

Species	***Agency***	***Status (2016)***	***Status (2022)***	***Habitat Needs***	***Occurrence In or Near the Project Area***
Giant manta ray *Manta birostris*	*NMFS*	*NR*	*T*	*Commonly found offshore, in oceanic waters and near productive coastlines. Can be found in cool water (>19°C). Observed using estuarine waters near oceanic inlets as nursery grounds. Closest known nursery to the Texas coast is >100 miles offshore at NOAA's Flower Garden Sanctuary.*	*No – Outside known range*
Insects					
Monarch Butterfly *Danaus plexippus*	*USFWS*	*NR*	*C*	*Mainly found in prairies, meadows, grasslands and along roadsides, across most of North America, where milkweed, their host plant, is prominent.*	*No – No suitable habitat*
Invertebrates					
Elkhorn coral *Acropora palmata*	*NMFS*	*T*	*NR*	--	--
Lobed star coral *Orbicella annularis*	*NMFS*	*T*	*NR*	--	--
Mountainous star coral *Orbicella faveolata*	*NMFS*	*T*	*NR*	--	--
Boulder star coral *Orbicella franski*	*NMFS*	*T*	*NR*	--	--
Mammals					
West Indian Manatee *Trichechus manatus*	*UFWS*	*E*	*E*	*Inhabit marine, brackish, and freshwater systems in coastal and riverine areas. Preferred habitat include areas near the shore featuring underwater vegetation like seagrass and eelgrass. They feed along grass bed margins with access to deep water channels, where they flee when threatened.*	*Yes –Records in the Bay*

Species	*Agency*	*Status (2016)*	*Status (2022)*	*Habitat Needs*	*Occurrence In or Near the Project Area*
Fin whale *Balaenoptera physalus*	*NMFS*	*E*	*NR*	--	--
Humpback whale *Megaptera novaengliae*	*NMFS*	*E*	*NR*	--	--
Sei whale *Balaenoptera borealis*	*NMFS*	*E*	*NR*	--	--
Sperm whale *Physeter macrocephalus*	*NMFS*	*E*	*E*	*Each of these whales can be found in the warmer waters of the Gulf of Mexico on the continental shelf edge and slope. They are usually observed in deeper waters of oceanic areas far from the coastline.*	*No – Outside known range*
Rice's Whale *Balaenoptera ricei*	*NMFS*	*NR*	*E*		*No – Outside known range*
Reptiles					
Green sea turtle *Chelonia mydas*	*USFWS* *NMFS*	*T*	*T*	*Primarily found in the Gulf of Mexico, and sub-adults occasionally found feeding in shallow bays and estuaries where marine sea grasses grow. Nest on beaches but nesting not recorded from the upper coast.*	*No – Outside known range*
Hawksbill sea turtle *Eretmochelys imbricata*	*USFWS* *NMFS*	*E*	*E*	*Prefer clear offshore waters of mainland and island shelves and are most common where coral reef formations are present. Nest on beaches but nesting not recorded from upper coast.*	*No – Outside known range*
Kemp's Ridley sea turtle *Lepidochelys kempii*	*USFWS* *NMFS*	*E*	*E*	*Migrates along the Texas coast and generally remains in near shore waters less than 165 feet deep to feed on shrimp, crab, and other invertebrates. Nest on beaches of Galveston Island.*	*Yes –Records in the Bay*
Leatherback sea turtle *Dermochelys coriacea*	*USFWS* *NMFS*	*E*	*E*	*Mainly pelagic, inhabiting the upper reaches of the ocean where deep water comes to the surface (upwelling areas). Nest on beaches but nesting not recorded from upper coast.*	*No – Outside known range*

Species	*Agency*	*Status (2016)*	*Status (2022)*	*Habitat Needs*	*Occurrence In or Near the Project Area*
Loggerhead sea turtle *Caretta caretta*	*USFWS* *NMFS*	*T*	*T*	*Prefer shallow inner continental shelf waters and occur only very infrequently in the bays and estuaries. Often occurs near offshore oil rig platforms, reefs, and jetties. Nests on open, sandy beaches. No nesting recorded from the upper coast.*	*Yes –Records in the Bay*

T= Threatened E= Endangered C= Candidate Species NR= Not on IPaC/Texas NMFS Report

3.1 SPECIES OF CONCERN

- **West Indian manatee**: Due to the rarity of the manatee in the project area implementation of the action ***may affect, but not adversely affect*** the West Indian manatee.

- **Kemp's Ridley and loggerhead sea turtles**: Temporary (~3 months) avoidance and disturbance would occur during construction and maintenance dredging. A hydraulic pipeline dredge would be utilized, which move at sufficiently slow speeds to avoid take. Implementation of the No Action or Proposed Modified RP ***may affect, but not adversely affect*** these sea turtle species, especially with the conservation measures that would be implemented.

4 CONCLUSION

This Supplemental BA updates the conclusions presented regarding the potential effects of implementing the HSC ECIP. It accounts for modifications to several project elements not originally described in the 2016 BA and incorporates new available information

Based upon the findings of this supplemental BA, USACE has determined that the effects determination have not changed for any species previously considered in the 2016 BA and for which concurrence was provided. Table 3 provides a summary of the effects determination from the 2016 BA and this Supplemental BA.

Table 3 Effects Determination For ESA-listed Species

Species	Agency	Status (2016)	Effect Determination (2016)	Status (2022)	Effect Determination (2022)
Birds					
Attwater's Greater Prairie-Chicken	USFWS	E	No effect	E	No effect
Piping Plover	USFWS	T	No effect	T	No effect
Rufa Red Knot	USFWS	E	No effect	E	No effect
Eastern black rail	USFWS	NR	--	T	No Effect
Whooping Crane	USFWS	NR	--	E	No Effect
Fish					
Ocean whitetip shark	NMFS	NR	--	T	No effect
Giant manta ray	NMFS	NR	--	T	No effect
Insects					

Species	Agency	Status (2016)	Effect Determination (2016)	Status (2022)	Effect Determination (2022)
Monarch Butterfly	USFWS	NR	--	C	No effect
Invertebrates					
Elkhorn coral	NMFS	T	No effect	NR	--
Lobed star coral	NMFS	T	No effect	NR	--
Mountainous star coral	NMFS	T	No effect	NR	--
Boulder star coral	NMFS	T	No effect	NR	--
Mammals					
West Indian manatee	USFWS	E	No effect	E	NLAA
Fin whale	NMFS	E	No effect	NR	--
Humpback whale	NMFS	E	No effect	NR	--
Sei whale	NMFS	E	No effect	NR	--
Sperm whale	NFMS	E	No effect	E	No effect
Rice's Whale	NMFS	NR	--	E	No effect
Reptiles—In Water					
Green sea turtle	NMFS	T	No effect	T	No effect
Hawksbill sea turtle	NMFS	E	No effect	E	No effect
Kemp's Ridley sea turtle	NMFS	E	No effect	E	NLAA
Leatherback sea turtle	NMFS	E	No effect	E	No effect
Loggerhead sea turtle	NMFS	T	No effect	T	NLAA
Reptiles – On Land					
Green sea turtle	NMFS	T	No effect	T	No effect
Hawksbill sea turtle	NMFS	E	No effect	E	No effect
Kemp's Ridley sea turtle	NMFS	E	No effect	E	No effect
Leatherback sea turtle	NMFS	E	No effect	E	No effect
Loggerhead sea turtle	NMFS	T	No effect	T	No effect

NLAA = Not likely to adversely affect

Appendix D-3 – AIR EMISSIONS INVENTORY

Galveston Harbor Channel Extension, TX

Section 216
Draft Validation Report

July 2023

US Army Corps of Engineers
Galveston District

AIR EMISSIONS INVENTORY
GALVESTON HARBOR CHANNEL EXTENSION
POST-AUTHORIZATION CHANGE REPORT
GALVESTON COUNTY, TEXAS

Prepared by:
U.S. Army Corps of Engineers
Regional Planning and Environmental Center
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Acronyms and Abbreviations

CAA	Federal Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CY	cubic yards
DEIS	Draft Environmental Impact Statement
DOT	U.S. Department of Transportation
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
GHC	Galveston Harbor Channel
GHCE	Galveston Harbor Channel Extension
GRP	General Re-evaluation Plan
HGB	Houston/Galveston/Brazoria
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_x	nitrogen oxides
PM_{10}	particulate matter with an aerodynamic diameter equal to or less than 10 microns
PACR	Post Authorization Change Report
RP	Recommended Plan
SEA	Supplemental Environmental Assessment
SIP	Texas State Implementation Plan
SO_2	sulfur oxides
TCEQ	Texas Commission on Environmental Quality
tpd	tons per day
tpy	tons per year
U.S.	United States
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

1.0 INTRODUCTION

The Galveston Harbor Channel (GHC) is located on the upper Texas coast at the mouth of Galveston Bay in Galveston County, Texas. The approximately four-mile-long GHC is included in the Offshore Reach (the common Entrance Channel) of the Houston-Galveston Navigation Channels, Texas, Project and provides entry to the Port of Galveston, Texas. The GHC extends in an east-west direction from Bolivar Roads between Galveston and Pelican Islands (**Figure 1**). In 2016, the USACE signed a FONSI and published a Final EA for the recommended plan (RP) authorized by Congress. The Galveston Harbor Channel Extension (GHCE) Project was approved in 2017 to extend the depth to 46 feet below mean lower low water for 2,571 feet of the channel length and the project moved into the pre-construction, engineering, and design (PED) phase. This channel improvement would increase navigation efficiency from deep draft vessels enabling maximum loading and would allow users at the far end of Galveston Harbor Channel to take advantage of fully loaded vessels alleviating the current practices of light-loading. The project sponsor is the Galveston Wharves.

During PED, the design team identified revisions to the recommended plan (RP), one which incorporated additional deepening at the most western end of the GHC, thus extending the deepening an additional 505 feet (Figure 2). In addition, updated geotechnical surveys determined that the amount of sediment that needs to be dredged is less than projected, so that a net decrease in sediment dredged and a shorter construction duration (about one month) has resulted. The project will incorporate advanced maintenance dredging as a part of the same contract. While this increases the amount of material to be dredged, the capacity of the proposed placement area at Pelican Island has been determined to be adequate and no work will be conducted at the placement area. The U.S. Army Corps of Engineers (USACE) has prepared this emissions inventory to describe the environmental impacts of air emissions associated with the revisions to the RP, subsequent to the published Final EA for the RP authorized by Congress in 2017.

This project, as a Federal action, is subject to the General Conformity Rule promulgated by the U.S. Environmental Protection Agency (EPA) pursuant to the Clean Air Act (CAA), Section 176(c)(1). The rule mandates that the Federal government does not engage in, support, or provide financial assistance for licensing or permitting, or approving any activity not conforming to an approved state implementation plan. In Texas, the applicable plan is the Texas State

Implementation Plan (SIP), an EPA-approved plan for the regulation and enforcement of the National Ambient Air Quality Standards (NAAQS) in each air quality region within the state.

This document represents an air emissions inventory prepared by the USACE, Regional Planning and Environmental Center, to assess whether air contaminant emissions that would result from the proposed GHCE Project are in conformance with the SIP for the Houston/Galveston/Brazoria (HGB) ozone nonattainment area.

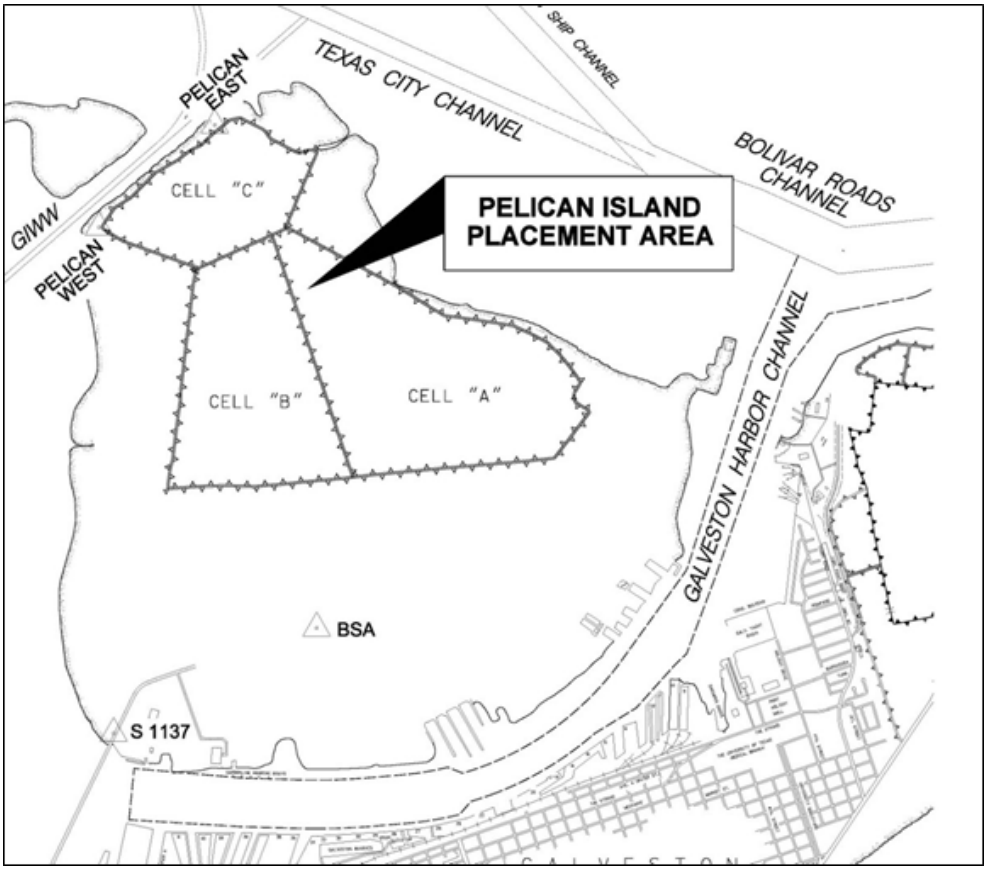

Figure 1. Project Study Area

Figure 2. GHCE Project template as approved in 2017 (blue polygon) and as proposed in 2022 (yellow shaded polygon)

2.0 REGULATORY BACKGROUND – GENERAL CONFORMITY

General Conformity refers to the process of evaluating plans, programs, and projects to determine and demonstrate they meet the requirements of the CAA and the SIP. The General Conformity Rule establishes conformity in coordination with and as part of the NEPA process. The General Conformity Rule is promulgated by the EPA and mandates that the Federal government does not engage in, support, or provide financial assistance for licensing or permitting, or approving any activity not conforming to an approved SIP. In Texas, the applicable plan is the Texas SIP, an EPA-approved plan for the regulation and enforcement of the NAAQS in each air quality region within the state.

The purpose of the General Conformity requirement is to ensure Federal agencies consult with state and local air quality districts so they become aware of the project and the expected air emissions, and would consider these expected emissions in their SIP emissions inventory. The General Conformity Rule is codified at Title 40 Code of Federal Regulations (CFR) Part 51, Subpart W, and Title 40 CFR Part 93, “Determining Conformity of Federal Actions to State or Federal Implementation Plans.” This document presents the results of a study to determine the proposed project air emissions and determine if they exceed the *de minimis* values or would

comprise more than 10% of the emissions inventory for the attainment year and thereby require a General Conformity Determination.

The CAA defines conformity to an implementation plan as the upholding of "an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditions attainment of such standards." Conforming activities or actions should not, through additional air pollutant emissions, result in the following:

- cause or contribute to new violation of any NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS in any area, or;
- delay timely attainment of any NAAQS or interim emission reductions or other milestones in any area.

Pursuant to the General Conformity Rule, a Federal agency such as the USACE must make a General Conformity Determination for all Federal actions in nonattainment areas where the total emissions of a nonattainment pollutant or its precursors exceeds levels established by the regulations. The HGB area is moderate nonattainment under the 2015 ozone NAAQS and severe under the 2008 ozone NAAQS. The general conformity *de minimis* threshold is 25 tons per year (tpy) for either nitrogen oxides (NO_X) or volatile organic compounds (VOC). In addition, even if the total emissions of VOC or NO_X do not exceed the 25 tpy threshold levels, when the total emissions of any pollutant from the Federal action represents 10 percent or more of a nonattainment or maintenance area's total emissions of those pollutants, then the action is defined as a regionally significant action and a conformity determination would still be applicable. Only those air emissions of NO_x and VOC related to the Federal action, *i.e.*, those considered to be implemented by the USACE, should be considered when evaluating the project with regard to the *de minimis threshold* and compliance with the General Conformity Rule.

The General Conformity Determination is based on the 8-hour ozone standard and the corresponding attainment dates and *de minimis* levels. For the HGB nonattainment area, the most recently approved SIP revision is the HGB portion of the *Dallas-Fort Worth and Houston-Galveston-Brazoria Serious Classification Reasonable Further Progress State Implementation Plan Revision For The 2008 Eight-Hour Ozone National Ambient Air Quality Standard* (TCEQ, 2020), adopted on March 4, 2020. On May 10, 2021, the EPA published partial final approval of the serious classification RFP SIP revision for the HGB nonattainment area including the RFP demonstration, associated motor vehicle emission budgets (MVEB), and revised 2011 base year

emissions inventory (EI) for the HGB area (86 FR 24717). In this SIP, the attainment year inventory for NO_x and VOC ozone precursors are based on emission inventories for 2011 and future year 2020 Anthropogenic Modeling Emissions for the HGB Area l.

As discussed in the 2020 SIP revision, several emissions sources are estimated. The On-Road Mobile emissions (weekday, summer) estimate for 2020 is 79.48 tons per day (tpd) of NO_x (29,030 tpy) and 52.21 tpd of VOC (19,070 tpy) (TCEQ, 2020). The Eight County HGB total of 318.02 tpd NO_x and 479.91 tpd VOC (116,157 tpy-NO_x and 175,287 tpy-VOC) includes emissions from equipment associated with agricultural, aircraft, commercial, construction, ground support (airport), industrial, lawn and garden, railroad maintenance, logging, locomotives, oil and gas, recreational, and recreational marine equipment, in addition to the on-road Mobile emissions.

3.0 APPLICABILITY

The proposed GHCE Project is located in Galveston County, Texas. This county is included in the eight county HGB ozone nonattainment area which is classified as “serious” in terms of its degree of compliance with the 2008 8-hour ozone standard. This classification affects facilities that generate the ozone precursors, oxides of NO_x and VOC. As such, the project is subject to the General Conformity Rule which applies to all nonattainment and maintenance areas.

The proposed GHCE Project was evaluated based on the anticipated equipment to be used and identification of expected air contaminants and estimated emission rates for this project. The emissions inventory included emissions associated with dredging of the channel including worker vehicle emissions. Air contaminant emissions associated with this equipment will be primarily combustion products from fuel burned in the engines powering this equipment.

Based on this evaluation, it has been determined that a General Conformity Determination would not be required for this project, as emissions of NO_X and VOC are not estimated to exceed the 25 tpy threshold for general conformity. Because the estimated emissions of the proposed project are below the *de minimis* threshold values, the project is exempt from a General Conformity Determination with regard to the air emissions.

4.0 AIR EMISSIONS INVENTORY

To determine if a General Conformity Determination is required, an air emissions inventory was prepared for project-related activities for the GHCE Project based on the schedule and other assumptions as developed by the USACE. Air emissions estimates were calculated using techniques appropriate for a specific emission generating activity or source. The basis, emissions factors, and summary of emissions are attached to this document in Appendix A.

4.1 Project Emissions

It is anticipated that the project construction activities will begin and be completed in 2024. Project air contaminant emissions were estimated based on projected equipment use for the dredging activities. The project air emissions inventory included emissions associated with dredging vessels and equipment and on-road, mobile sources as follows:

- Dredging vessels and equipment – included dredges and support marine vessels
- On-road mobile sources – included employee commuter vehicles

Air contaminant emissions were estimated in tpy for each piece of equipment based on the equipment horsepower, fuel type, and expected operating hours in 2024. Because maintenance dredging is already considered as a part of the state SIP inventory, no emissions associated with the maintenance dredging activity were included in this emission inventory. Detailed emission calculations are shown in Appendix A of this document.

4.1.1 Dredging Vessels and Equipment

Dredging emissions included those that would be expected to result from the use of tug boats and miscellaneous marine vessels in support of the dredging activities. Air emissions directly related with the dredging equipment were calculated on an annual basis based on the anticipated type of engine, activity, horsepower, and anticipated hours of operation. Estimated emissions were based on the emissions factor algorithms referenced from EPA's technical report "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement, Mobile Source Emissions," EPA 420-B-22-011, April 2022. This technical report is a compilation of engine and fuel usage test data from various types of marine vessels including bulk carriers, container ships, dredges, tankers, and tugboats. Emission factors were determined based on emission factor tables provided as appendices to the EPA technical report for the proposed

project emission sources. The emission factor tables contain data for applicable engine classes, tiers, and installed power for Harbor Craft.

4.1.2 On-road Mobile Sources

Mobile source emissions associated with the GHCE Project construction would be generated from employee (crew) commuter vehicles. Mobile on-road emissions associated with employee vehicles were calculated using EPA MOVES3.0, a mobile source emissions model. A mix of light duty gasoline passenger vehicles and light duty gasoline passenger trucks was assumed for the makeup of the employee vehicle population. An average commute of 50 miles round trip (VMT) was assumed for each vehicle. The total number of miles traveled equaled the VMT multiplied by the total number of days of construction activity times the number of vehicles. Local data for the HGB area were obtained from TCEQ and used in the MOVES3.0 model that include fuel type, meteorological data, where a summer weekday was assumed to generate the emissions factors used to estimate the total emissions from on-road mobile sources.

4.2 Galveston Harbor Channel Extension Project – Summary of NO_x and VOC Emissions

For comparison with the thresholds defined in the General Conformity Rule, the estimated annual emissions of NO_X and VOC for the GHCE Project are summarized in Table 1. Emissions of carbon monoxide, sulfur dioxide, and particulate matter are not considered in the General Conformity evaluation, as this area is in attainment with the relevant NAAQS for each of these pollutants but are provided in the appendices.

Table 1. GHCE project summary of NO_x and VOC emissions compared with the 2020 Attainment Year for the HGB Area (TCEQ, 2020).

Relevant NAAQS	2020	GHCE project (2024)
NO_X (tpy)	28,285	13.77
VOC (tpy)	11,502	0.50

The estimate of NO_X and VOC emissions for the GHCE Project would not exceed the conformity threshold of 25 tpy and, thus, a General Conformity Determination for air emissions would not be required for this project based on this requirement of the General Conformity Rule.

4.3 Maintenance Dredging

After the extension of the channel is completed, the USACE anticipates the need to perform maintenance dredging of the channel to remove any shoaling that will occur after the construction period in advance, termed advanced maintenance dredging. This work will be performed under the same contract. The General Conformity rules specifically exclude from applicability maintenance dredging where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site. Therefore, the air emissions inventory prepared for this project does not include emissions from the anticipated maintenance dredging activities.

4.3 Allowable Overdepth

During dredging operations, it is recognized that a contractor may dredge deeper than planned to ensure that the resulting channel meets the required minimum depth. This additional dredge material is termed “Allowable Overdepth” and could be as much as 1-foot in depth. Overdepth dredging was assumed to occur half the time, resulting in 0.5-foot overdepth uniformly over the project area and the air emissions inventory includes the emissions resulting from this work.

5.0 COMPLIANCE WITH GENERAL CONFORMITY RULE

The proposed GHCE Project would conform to the applicable SIP if, for each pollutant that exceeds the threshold rates (25 tpy of NO_x or VOC), total emissions from the action comply, or are consistent with all relevant requirements and milestones contained in the applicable SIP. Under 40 CFR Part 93, Subpart B, “Determining Conformity of General Federal Actions to Sate or Federal Implementation Plans,” a Federal action required to have a conformity determination for a specific pollutant would be determined to conform to the SIP if it meets one of several requirements in 40 CFR §93.158, “Criteria for Determining Conformity of General Federal Actions.”

Based on evaluation of the proposed project description and the estimated air quality emissions, it is believed that project emissions are exempted from meeting the requirements of 40 CFR §93.158(a)(5)(i)(A). This section of the Federal General Conformity Rule applies to an ozone nonattainment area, where the EPA has approved a revision to an area’s attainment demonstration after 1990, and the state makes a determination that “the total of direct and indirect

emissions from the action, or portion thereof, is determined by the State agency responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment area, would not exceed the emissions budgets (*sic.* attainment year inventory) specified in the SIP."

5.1 Galveston Harbor Channel Extension Project Emissions Compared to SIP Attainment Year Inventory Emissions

The annual NO_x and VOC emission rates estimated for the GHCE Project may be summarized in terms of tons per year and compared to the SIP on-road mobile source attainment year emissions inventory for HGB as shown on **Error! Reference source not found.**. The estimated GHCE Project emissions are also compared to the total, eight-county attainment year emission inventory for 2020

Table 2. GHCE Project estimated NO_x and VOC emissions compared to 2020 HGB weekday (August) on-road mobile source attainment year inventory emissions (TCEQ, 2020).

	NO_x	**VOC**
GHCE Project On-Road mobile(tpy)	0.015	0.002
HGB 2020 On-Road mobile (tpy)	29,030	19,070
Percentage of On-road Mobile	0.00005%	0.00001%
GHCE Project total (tpy)	13.8	0.50
HGB 2020 Eight County total (tpy)	116,157	175,287
Percentage of HGB 2020 total	0.01185%	0.00028%

As shown in **Error! Reference source not found.**, emissions for the GHCE Project emissions would represent less than 2/100 of one percent of the SIP 2020 total emissions for NO_x from all sources and less than 1/1000th of one percent of the total VOC emissions from all sources within the eight counties that comprise the HGB area.

5.2 Preliminary General Conformity Determination

Based on an evaluation of the proposed GHCE Project emissions, it is believed that the total emissions of NO_x and VOC would result in levels that are below the *de minimis* threshold values

and less than 10% of the values for the most recently approved SIP revision (2020). As the GHCE Project is not unusual in scope for an area like the HGB, it is anticipated that emissions from the project will be less than an increase of 1% of the VOC and NO_x emissions for the entire HGB nonattainment area. Therefore, emissions form the activities subject to the USACE action are not considered regionally significant for purposes of General Conformity. Because of this, it is expected that emissions from the project construction will not:

- cause or contribute to new violation of any NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS in any area or;
- delay timely attainment of any NAAQS or interim emissions reduction or other milestones in any area.

Pursuant to the General Conformity Rule (40 CFR Part 93, Subpart B), this air emissions inventory was prepared to demonstrate that the proposed GHCE Project will comply with the requirements of the General Conformity Rule and will be in conformity with the SIP. As specified in the Federal General Conformity Rules, 40 CFR §93.158(a)(5)(i)(A), the state must decide that the total emissions of NO_x or VOC from the action, or portion thereof, would result in a level of emissions which, together with all other emissions in the HGB nonattainment area, would not exceed the attainment year emissions inventory specified in the SIP and a General Conformity Determination will not be required.

6.0 REFERENCES

40 Code of Federal Regulations (CFR) Part 93, Subpart, B, “Determining Conformity of General Federal Actions to State and Federal Implementation Plans.”

TCEQ. 2020. “Dallas-Fort Worth and Houston-Galveston-Brazoria Serious Classification Reasonable Further Progress State Implementation Plan Revision for the 2008 Eight-Hour Ozone Standard Nonattainment Area”, 2019-079-SIP-NR Adoption March 4, 2020.

TCEQ. 2004. “Nonroad Emissions Model Draft NONROAD 2002 Support Document, ‘Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling’” April 2004.

TexN2.2 “Utility Updates for Compatibility with the US EPA MOVES3 Model, TexN2.2 User’s Guide Final”, April 2021.

U.S. Environmental Protection Agency (EPA). 2000. “Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions” EPA-420-B-22-011, April 2022.

U.S. Environmental Protection Agency (EPA). 2002. “Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling”, EPA Office of Air and Radiation Report Number NR-005b, December 2002

EPA. 2006. “Approval and Promulgation of Air Quality Implementation Plans; Texas; Revisions to the Ozone Attainment Plan for the Houston/Galveston/Brazoria Nonattainment Area,” 6 September 2006. *Federal Register*, Volume 71, No. 172, Page 52670.

Apppendix A: Air Emissions Inventory Details

Tables A-1 through A-7

7.0 APPENDIX A

Table A-1. Annual GHCE Project Emissions Summary in Tons Per Year

Year 2024	**CO**	**NO_x**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOC**
Dredge & Support Equipment	2.10	13.75	0.39	0.30	0.01	0.49
Employee Vehicles	0.116	0.015	-	-	-	0.002
Total	**2.21**	**13.77**	**0.39**	**0.30**	**0.01**	**0.50**

Note: no construction planned at the placement area; existing embankments adequate to contain estimated volumes, including adv. Maintenance and overdepth.

Table A - 2. Dredge Equipment Engine Horsepower and Hours of Operation, GHCE Project

	Dredge Barge*				**Survey**	**Tugs (3)**	**Crew Boat**
	Pumps (2)	Propulsion**	Generator	Idling***	Main Engine	Propulsion	Propulsion
Horsepower	6,000	-	2,700	2,700	350	1,500	400
Duration (hours)	563	-	563	253	36	450	113

Notes:

-Information is for Channel Harbor Extension and additional channel; 30" Dredge
-Dredge time based on 264,081 cubic yards (CY) including new work and half overdepth volumes, no maintenance dredging

* dredging operation requires 2 pumps and generator; ** = propelling by tug, no pumping; *** = Idling requires generator only

-Tug = 3 @ 500 HP each

-Survey Boat assumed to operate for 3 days after dredge is completed; estimated to be 350 HP and 12 hrs/day

-Crew boat assumed to operate 20% of total dredging time

Table A - 3. Marine Equipment Load Factors and Emission Factors

	Dredge Barge*				Survey	Tug	Crew
Operating Mode	Pumping	Generating	Propelling**	Idling***	Propelling	Propelling	Propelling
Load Factor	0.43	0.43	N/A	0.2	0.45	0.5	0.45
	EF (grams/kW-hr)						
CO	0.9	0.9	N/A	0.9	1.6	1.1	0.9
NO_x	6.1	6.1	N/A	6.1	5.7	6	4.54
PM	0.201961	0.201961	N/A	0.2019611	0.233201	0.126607995	0.06502198
$PM_{2.5}$	0.183785	0.183785	N/A	0.1837846	0.212213	0.115213275	0.05917
PM_{10}	0.134613	0.134613	N/A	0.1346133	0.218777	0.118776572	0.061
SO_2	0.006246	0.006246	N/A	0.0062464	0.006246	0.006246417	0.00624642
VOC	0.22113	0.22113	N/A	0.221130	0.43173	0.20007	0.1053

Notes:

* = dredging operation requires 2 pumps and generator; ** = propelling by tug, no pumping; *** = Idling requires generator only

-C1 and C2 marine vessels are assumed to be using ultra low sulfur diesel (ULSD)

-Load factors for the dredge auxiliary engines and support vessels were determined from Table 4-4 of the EPA Report "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions", February 2022.

-Emission factors for diesel C1 and C2 propulsion engine(s), which comprise most harbor craft and the auxiliary engines, are presented in Appendix H of the EPA Report (2022).

Table A - 4. Dredging Equipment Emissions in tons per year (tpy)

NAAQS (tpy)	Dredge Barge				Survey	Tugs (3)	Crew Boat	TOTALS
	Pumps (2)	Propulsion	Generator	Idling	Propelling	Propelling	Propelling	
CO	1.068	N/A	0.482	0.217	0.0074	0.3069	0.0151	2.097
NO_x	7.237	N/A	3.269	1.471	0.0265	1.6741	0.0760	13.754
$PM_{2.5}$	0.218	N/A	0.098	0.044	0.0010	0.0321	0.0010	0.395
PM_{10}	0.160	N/A	0.072	0.032	0.0010	0.0331	0.0010	0.299
SO_2	0.007	N/A	0.003	0.002	0.0000	0.0017	0.0001	0.014
VOC	0.262	N/A	0.119	0.053	0.0020	0.0558	0.0018	0.494

Notes:

* = dredging operation requires 2 pumps and generator; ** = propelling by tug, no pumping; *** = Idling requires generator only

-The Emission Rate in tons/year is based on the following formula:

Emission Rate = HP*LF*EF*Duration*(0.0022046 lbs/grams)*(1 ton/2,000 lbs).

Table A - 5. Crew Size per Equipment, Galveston Harbor Channel Extension and Additional Channel Project

	Cutter Dredge Crew	Shore Crew	Other Construction Equipment
Employees	31	0	0

Table A - 6. Emission Factors for Employee Vehicles, Galveston Harbor Channel Extension and Additional Channel Project

County	Vehicle Type	EPA Category [a]	Emission Factor (g/mile)[b]			Emission Factor (g/vehicle)[c]		
			CO	NO_x	VOC	CO	NO_x	VOC
Galveston	Cars	LDGV	1.36	0.009	0.0084	0.368	0.021	0.032
Galveston	Pickups	$LDGT_1$	2.88	0.550	0.0473	0.428	0.031	0.042

Notes: All rate-per-distance emission factors are for model years 2013-2023; rural restricted road type 2, speed bins 1-8, include running exhaust (1), crankcase running exhaust (15), and may also include evap permeation (11), evap fuel vapor venting (12), evap fuel leaks (13), crankcase start exhaust (16), crankcase extended idle exhaust (17), refueling displacement vapor loss (18), and refueling spillage loss (19) when appropriate for the pollutant.

a. LDGV = light duty gasoline-fueled vehicles, passenger, SCC = 220x21xxxx

$LDGT_1$ = light duty gasoline-fueled trucks, passenger, SCC = 220x31xxxx

b. rate per distance emission factors for CO, NO_x, and VOC are from MOVES3.0 run using Galveston County input files for fuel, meteorology, etc. obtained from the TCEQ

c. rate per vehicle use for start exhaust (2) only, also obtained from MOVES3.0 run for Galveston County

Table A - 7. Galveston Harbor Channel Extension and Additional Channel Project - Employee vehicle emissions

Project Year	Vehicle Type	EPA Category	Daily Vehicles (No./Days)	Total (VMT)	Travel Days (Days/Year)	Annual Travel (VMT/Year)	Annual Emmissions (tpy)		
							CO	NO_x	VOC
2024	Cars	LDGV	15.5	50	31.5	24,412.50	0.0374	0.0003	0.0003
2024	Pickups	LDGT1	15.5	50	31.5	24,412.50	0.0783	0.0149	0.0014
						Totals	**0.1157**	**0.0151**	**0.0017**

Notes:

1. Total VMT is assumed to be 50 miles/day roundtrip; travel days includes new work and half overdepth, no adv. maintenance.
2. Annual travel = Daily vehicles * Total VMT * Travel daysr
3. Annual emissions = Emissions Factor * Annual Travel * 1 lb/453.6 grams * 1 ton/2,000 lb

U.S. Army Corps
Of Engineers
Galveston District

Appendix D-5

FINAL

ENVIRONMENTAL ASSESSMENT

GALVESTON HARBOR CHANNEL EXTENSION FEASIBILITY STUDY HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

U.S. Army Corps of Engineers
Southwestern Division
Galveston District
JULY 2016

Environmental Assessment
Galveston Harbor Channel
Extension Feasibility Study
Houston-Galveston Navigation
Channels, Texas

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1.0 PROPOSED PLAN

1.1 Introduction

This U.S. Army Corps of Engineers (USACE) Environmental Assessment (EA) describes the environmental impacts associated with extending the limits of the existing authorized 46-foot deep Galveston Harbor Channel for a distance of 2,571 feet to reach the end of the limits of the authorized and currently maintained 41-foot portion of the channel. The project is located on the upper Texas coast at the mouth of Galveston Bay in Galveston County, Texas. The approximate 4-mile-long Galveston Harbor Channel is included in the Galveston Channel Reach of the Houston-Galveston Navigation Channels (HGNC), Texas, Project and provides entry to the Port of Galveston, Texas (Figure 1).

The recommended channel improvement would increase navigation efficiency for deep draft vessels using this portion of the Galveston Harbor Channel as it would enable maximum vessel loading and allow users of dock facilities at the far end of Galveston Harbor Channel to take advantage of fully loaded vessels alleviating the current practices of light-loading. The project sponsor is the Port of Galveston (POG).

1.2 Project Background and Authority

The Galveston Harbor Channel Project was part of an earlier study for improving the deep-draft navigation channels within the Galveston Bay area authorized by a resolution of the House Committee on Public Works in October, 1967. This resolution authorized a review of previous reports on the Houston Ship Channel, the Galveston Harbor Channel, and the Texas City Channel. The Reconnaissance Report for this study was completed in January 1980. The report

demonstrated that channel modifications necessary to improve the efficiency and safety of Galveston Bay channels were feasible and recommended that studies continue into the feasibility phase.

The Galveston Bay Area Navigation Study (GBANS), Feasibility Report and Environmental Impact Statement for improving the Houston and Galveston Channels, was completed in 1987. The GBANS recommended that the Galveston Harbor Channel be deepened to 50 feet and

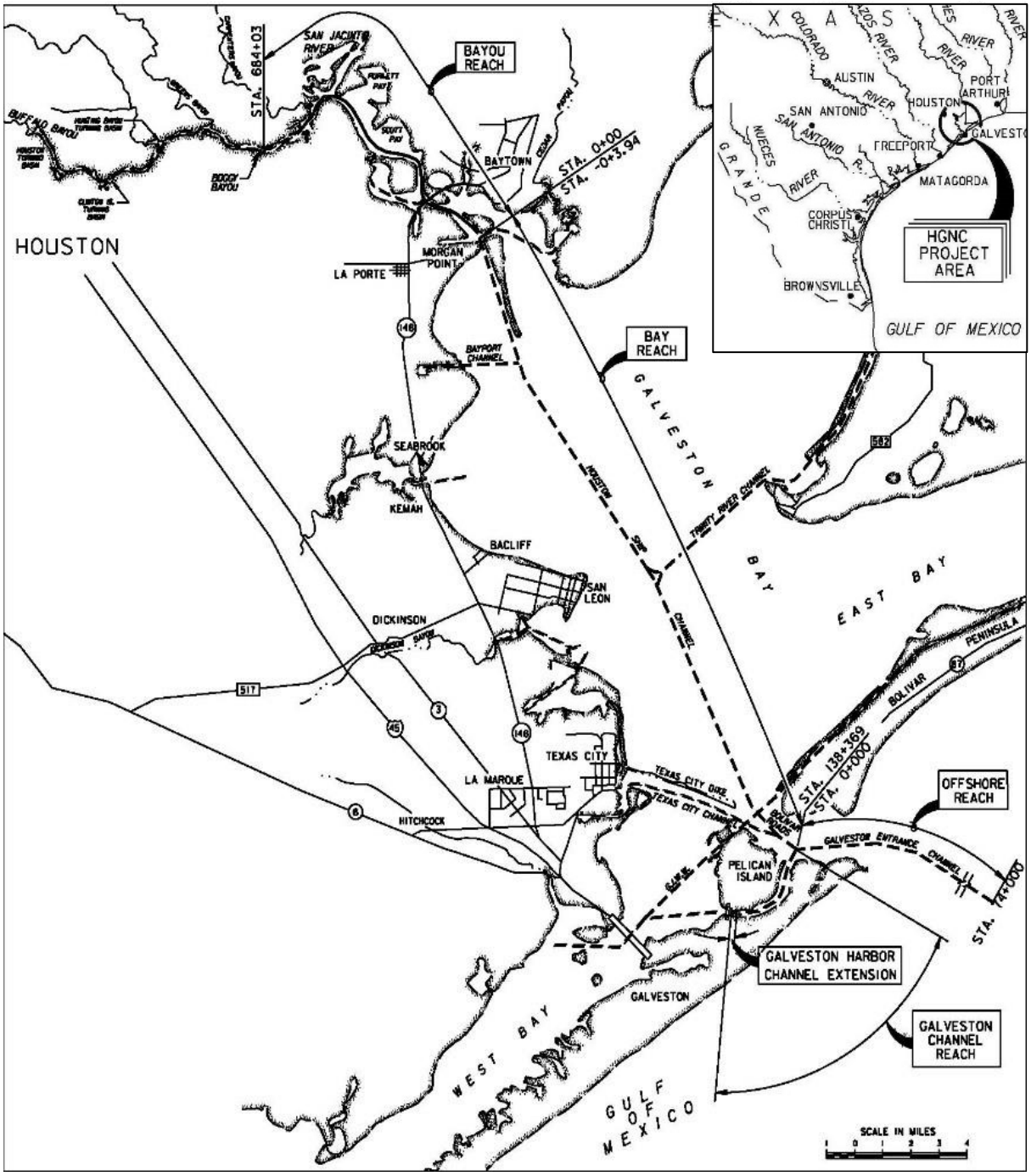

FIGURE 1: Houston-Galveston Navigation Channels Reach Designations and Project Area.

widened to 450 feet to provide access to deeper water in the Gulf of Mexico. Issues raised during the Washington review of the 1987 GBANS resulted in a decision by the Assistant Secretary of the Army for Civil Works that a reevaluation study would be performed.

The Houston-Galveston Navigation Channels, Texas, Limited Reevaluation Report (LRR) and Final Supplemental Environmental Impact Statement (SEIS) was completed in November 1995 and made recommendations for project implementation. A copy of the Record of Decision for the SEIS is included in Appendix A. The HGNC Project was authorized under Section 101(a)(30) of the Water Resources Development Act (WRDA) of 1996 and Section 1(a)(2) of the Energy and Water Development Appropriations Act of 2001 (Public Law 106-377).

The authorized navigation portion of the 46-foot HGNC Project consists of an Offshore Reach, which includes the Galveston Entrance and Extended Entrance Channels; the Outer Bar and Inner Bar Channels; Bolivar Roads; Bay and Bayou Reaches, which include the Houston Ship Channel; and the Galveston Channel Reach, which includes the Galveston Harbor Channel. Additional information on the specific authorized limits, depths and widths for each of these reaches is presented in Table 1.

TABLE 1: Approximate Channel Reach Designations for the HGNC Project.

Reach	Reach Elements and Station Numbers	Depth *(Feet below MLLW)*	Bottom Width *(feet)*	Channel Length *(feet)*	Channel Length *(miles)*
Galveston Harbor and Channel portion of the HGNC Project					
Offshore Reach	Outer Bar, Entrance and Extended Entrance Channels Offshore Station (Sta.) 21+753 0 to 76+000	48	800	54,248	10
	Bolivar Roads and Inner Bar Channels Offshore Sta. 0+000 to 21+753	46	800	21,752	4
Galveston Channel Reach	Galveston Harbor Channel (Bolivar Roads to Pier 38) Galveston Channel Sta. 0+000 to 20+000	46	1,133 (max)	20,000	6.1
	Galveston Harbor Channel (Pier 38 to 43rd Street) † Galveston Channel Sta. 20+000 to 22+571	41	1,075	2,571	0.5
Houston Ship Channel portion of the HGNC Project					
Bay Reach	Bolivar Roads to Morgans Point Bay Sta. -0+3.94 to 138+369 ††	46	530	138,373	26
Bayou Reach	Morgans Point to Boggy Bayou Bayou Sta. 0+00 to 684+03	46	530	68,600	13
Approximate Channel Length Authorized for Deepening Under the HGNC Project				302,973	59.6

†This section of Galveston Harbor Channel referred to in this document as the Galveston Harbor Channel Extension was not recommended for deepening in the 1995 LRR project/HGNC Project.

††Bay Sta. -0+3.94 is the same location as Bayou Sta. 0+00; Bay Sta. 138+369 is the same location as Offshore Sta. 0+000

The environmental restoration portion of the authorized HGNC Project consists of the initial construction of tidal marsh habitat and a colonial water bird nesting island through the beneficial use of new work dredged material, and incremental development (deferred construction) of additional marsh habitat over the life of the navigation project through the beneficial use of maintenance materials dredged from Galveston Bay (Figure 2). The Port of Houston Authority (PHA) and the POG are the current non-Federal sponsors. The Bay and Bayou Reaches are the responsibility of the PHA and the Galveston Channel Reach is the responsibility of the POG. Responsibility for the Offshore Reach is shared by both the PHA and POG.

1.3 Purpose and Need

Deepening and widening of the Offshore (48-foot) and Bay and Bayou Reaches (46-foot) of the HGNC Project was completed in 2005; deepening of the Galveston Channel Reach was deferred as the City of Galveston, the non-Federal sponsor at that time, lacked matching funds to perform the work. Environmental restoration features associated with the project that have been completed or are under contract to be completed before the end of 2012 include the colonial water bird nesting island known as Evia Island and over 2,800 acres of tidal marsh that have been built through the beneficial use of new work and maintenance dredged material.

The Port of Galveston assumed the role of non-Federal sponsor from the City of Galveston in 2006 and requested that the deepening project be resumed. The Houston-Galveston Navigation Channels, Texas, Galveston Channel Project LRR, dated May 31, 2007, was prepared to update the economic analysis of the previously recommended and authorized plan. The LRR recommended that the Galveston Harbor Channel be deepened to 46 feet and widened between 650 and 1,133 feet between Bolivar Roads and Pier 38 (Galveston Harbor Channel Sta. 0+000 to 20+000). Deepening of the Galveston Channel was completed in January 2011. The terminal 2,571 foot-long section of Galveston Harbor Channel referred to in this document as the Galveston Harbor Channel Extension was not recommended for deepening in the 1995 LRR project/HGNC Project; the depth of this section remains at -41 feet Mean Lower Low Water (MLLW). At the time of the 1996 WRDA authorization, this remaining 2,571 feet had been evaluated for deepening to 46 feet in the 1995 LRR but was determined to be not economically justified at the time since no portside facilities were in place. In the intervening years, conditions changed and beginning in 2006 portside service facilities began operating and utilizing the 41 foot channel.

1.4 Recommended Plan

The Galveston Harbor Channel portion of the HGNC Project is authorized to a project depth of -46 feet deep MLLW from Station 0+000 to Station 20+000 (generally from Bolivar Roads to the vicinity of POG Pier-38) and -41 feet MLLW from Station 20+000 to Station 22+571

(vicinity of POG Pier-38 west to vicinity of Pelican Island Bridge) (see Table 1); additional dredging below these depths for advance maintenance and allowable over-depth is 3 feet and

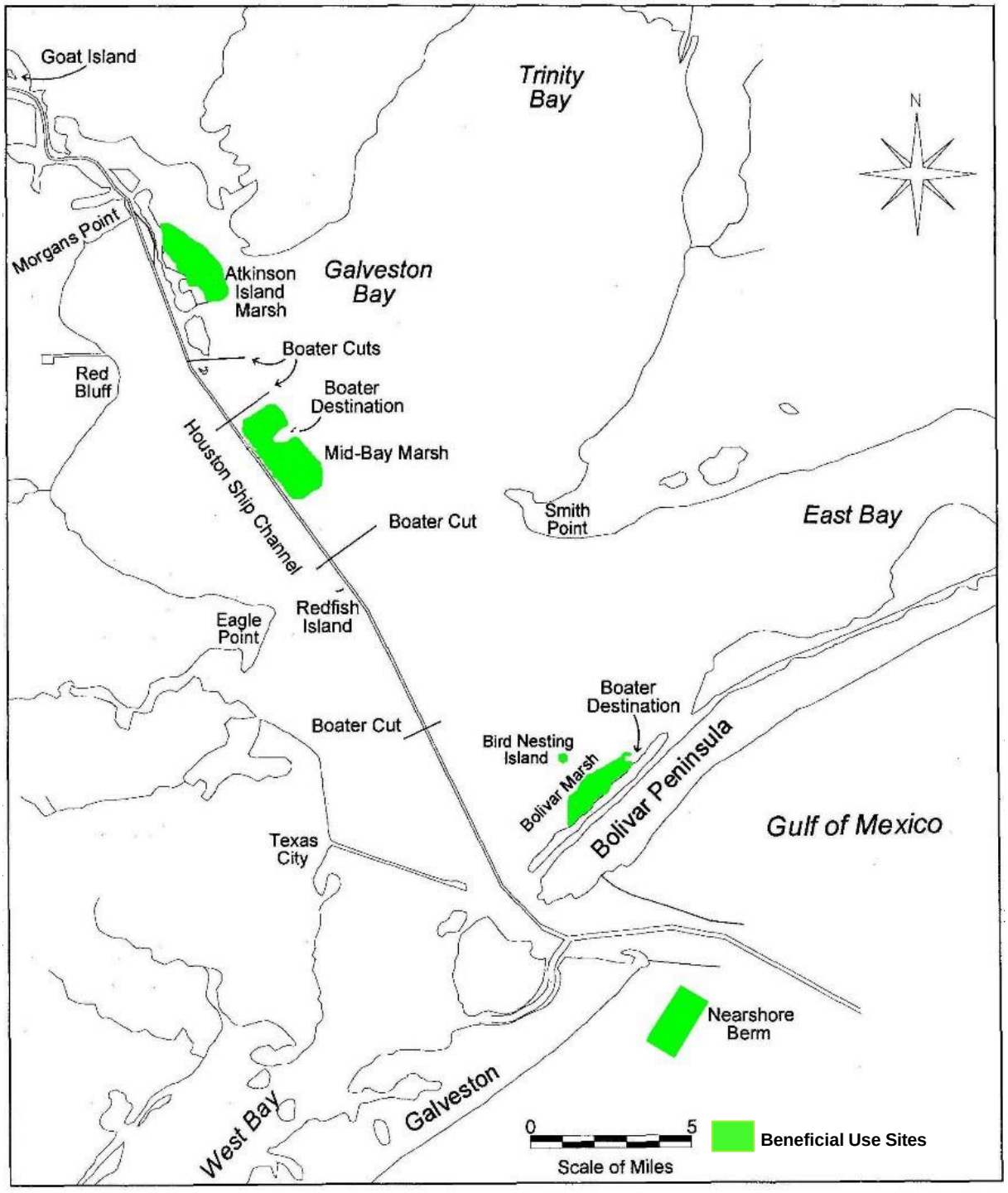

FIGURE 2: Houston-Galveston Navigation Channels Authorized Beneficial Use Sites

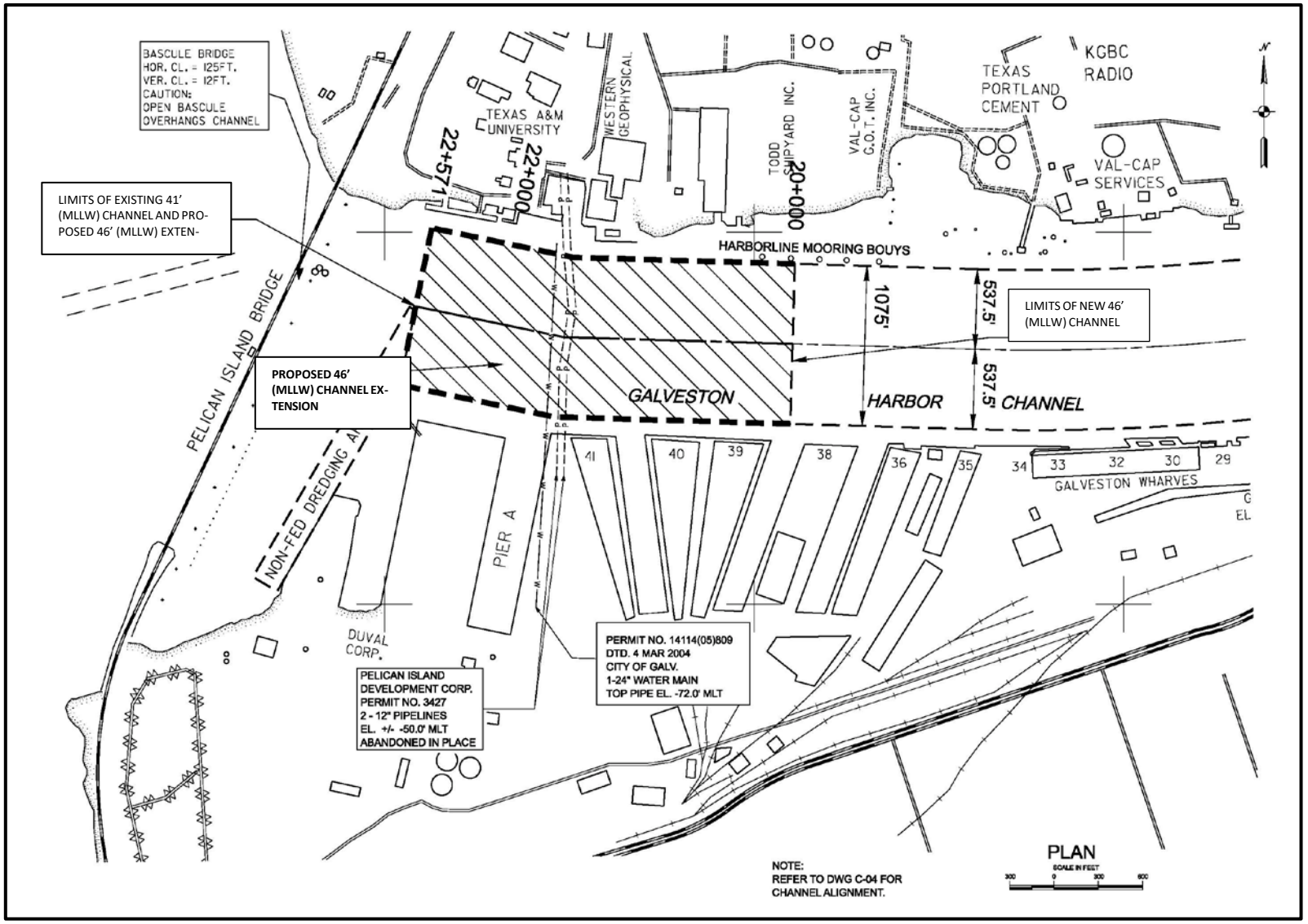

FIGURE 3: Footprint of the Recommended 46-foot Depth Extension of the Galveston Harbor Channel

Channel improvements would be constructed using a cutter head, hydraulic pipeline dredge, from its existing depth of -41-foot MLLW to a depth of -46 feet MLLW to be consistent with the rest of the channel (Figure 4). Advanced maintenance and allowable over-depth would remain at the current requirement of 3 feet and 2 feet, respectively, such that the maximum channel depth following periodic maintenance would not exceed -50 feet MLLW. Side slopes would be constructed at a slope of 1V:3H (1 foot vertical to 3 foot horizontal) and maintained at 1V:2H, which is consistent with maintenance of the remainder of the existing -46-foot MLLW project.

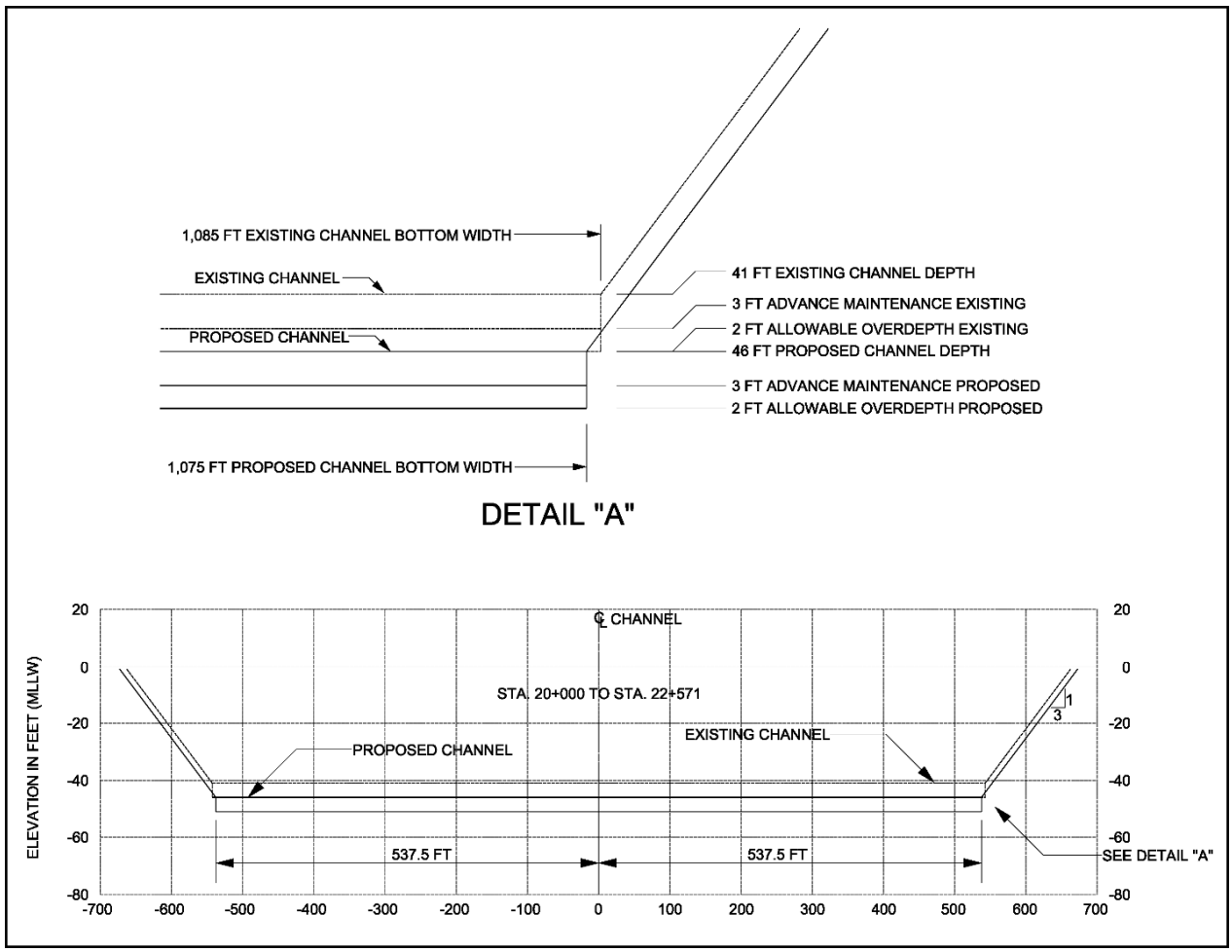

FIGURE 4: Typical Cross Section of Recommended 46-foot Depth Extension within Galveston Harbor Channel

Channel dredging to construct the -46-foot MLLW project would generate 513,800 cubic yards (cy) of new work material, consisting of primarily firm to stiff clays of high plasticity. The dredged material would be placed in the upland confined Pelican Island Placement Area (PA) (Figure 5).

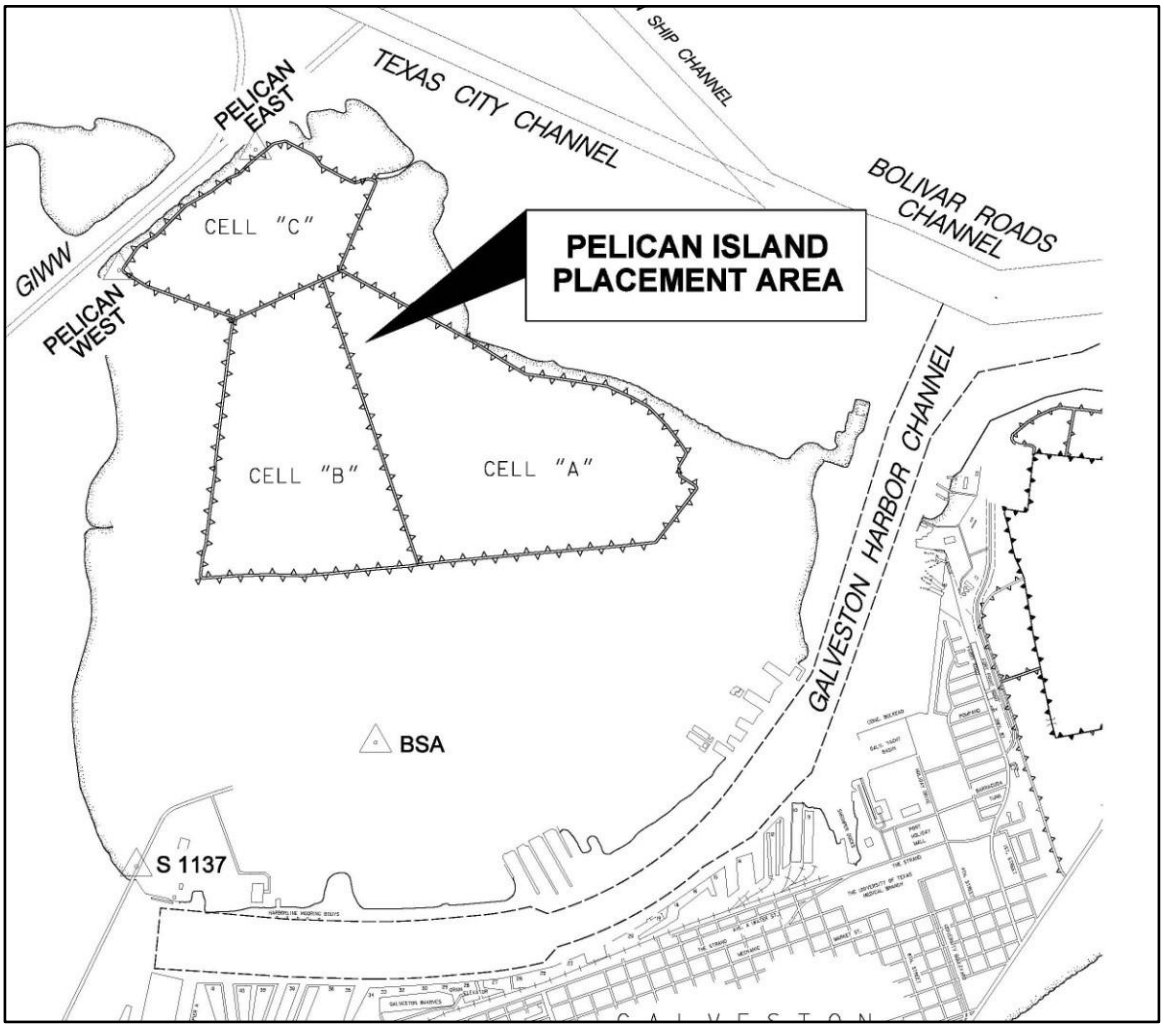

FIGURE 5: Pelican Island Placement Area

Maintenance quantity and frequency from constructing the proposed -46-foot MLLW Galveston Harbor Channel Extension project would be 648,000 cy of material about every four years, which is the same as for the existing -41-foot MLLW portion of the Galveston Harbor Channel. Maintenance material from the channel is primarily stiff clays and silts with lesser amounts of sands. All maintenance material would be placed in the existing upland confined Pelican Island PA, consistent with current practices. Opportunities for beneficial use of dredged material similar to those pursued for the Houston Ship Channel portion of the HGNC Project were considered (see Section 1.1). However, beneficial use was not determined economically feasible for the Galveston Harbor Channel Extension Project because of the high cost and the lack of a non-Federal cost-sharing partner. Therefore, beneficial use will not be implemented. No ocean disposal would be performed for new work dredged material placement.

The construction period for the new work dredging and placement would be approximately 6 months, which includes three months to prepare the PA for placement (i.e. provides for one month of work to prepare the PA and two months for soil settlement) followed by three months to dredge the channel extension and place the material in the PA.

Impacts resulting from project construction would involve only minor temporary impacts to bay bottom comparable in type and magnitude to those experienced during routine maintenance that occurs for the existing channel template. No mitigation would be required for the Recommended Plan.

2.0 ALTERNATIVES CONSIDERED

Both non-structural and structural alternatives were formulated and evaluated to identify the Recommended Plan in accordance with the following planning objectives and constraints:

Planning Objectives:

- Identify an environmentally acceptable project;
- Increase deep-draft navigation efficiency for Galveston Harbor Channel over the 50-year period of analysis; and ,
- Maximize benefits over costs for the period of analysis.

Planning Constraints:

- The study process and plans must comply with Federal and State laws and policies;
- Fish and wildlife habitat affected by a project should be minimized as much as possible and preserved, if possible;
- Alternative plans that resolve problems in one area should not create or amplify problems in other areas; and,
- Project depths in excess of the existing adjacent 46 feet are not necessary or practical.

The following project alternatives, including the No-Action Alternative, were considered for addressing project need and planning objectives:

1. No-Action Alternative (i.e. Future Without-Project Condition)
2. Non-Structural Alternatives
3. Structural Alternatives

The No-Action Alternative is synonymous with the Future Without-Project Condition described in the GHCE PACR and is developed for comparison with all other alternatives. For the structural plans, a variety of channel depths and dredged material placement alternatives were developed, evaluated and screened. A discussion of each alternative is presented in more detail in the following sections.

2.1 No-Action Alternative

The No-Action Alternative is the continued maintenance of the existing 41-foot deep by 1085-foot wide channel segment extending a distance of 2,571 feet between Station 20+000 and Station 22+571. Maintenance dredging of this section is typically performed every four years, to maintain project depth. During each four-year maintenance cycle, approximately 648,000 cy of material is dredged and placed in the existing designated upland confined Pelican Island PA.

Under the No-Action Alternative, deeper draft vessels seeking access to the bulk cargo facilities at the far west end of the channel would continue to be constrained by channel depth, and would continue current practices of light-loading to access and depart these facilities.

2.2 Non-Structural Alternatives

Light-loading of vessels is the only viable non-structural alternative. This alternative is already in use as the No-Action Alternative. Each alternative also assumes some amount of light loading continues to occur.

2.3 Structural Alternatives

The following Structural Alternatives were considered:

1. 43-foot Deep Channel;
2. 44-foot Deep Channel;
3. 45-foot Deep Channel, and
4. 46-foot Deep Channel.

Construction of the 42-, 43-, 44- and 46-foot deep MLLW channel alternatives would involve dredging the bottom width of the existing channel only. The existing channel width is 1,085 feet, whereas, the new bottom widths under each of the deepening scenarios would be smaller, with the minimum bottom width of 1,075 feet occurring under the 46-foot deep MLLW alternative. Project design elements (e.g. channel width, side slopes, advanced maintenance and allowable overdepth), annual maintenance quantities and impacts for all channel deepening alternatives being considered are the same or assumed to be similar. Only the initial dredged quantities generated from the construction of each of the alternatives would vary (Table 2).

TABLE 2: Initial Estimated Construction Dredged Quantities Generated from the Project Alternatives

Channel Alternative	Total Estimated New Work Volume *(cubic yards)*	New Work Federal Channel Dredge Volume *(cubic yards)*	Third-Party Facilities *(cubic yards)*
43-foot Deep Channel Project	255,100	200,400	54,700
44-foot Deep Channel Project	373,233	304,867	68,367
45-foot Deep Channel Project	491,367	409,333	82,033
46-foot Deep Channel Project	609,500	513,800	95,700

For all channel project alternatives considered, deepening of the channel and future maintenance would be performed using a hydraulic pipeline dredge. Side slopes would be constructed 1V:3H (1 foot vertical to 3 foot horizontal) and maintained 1V:2H, which is consistent with maintenance of the remainder of the existing -46-foot MLLW project. The channel bottom widths for all proposed depths would be maintained less than the existing 1085-foot project bottom width. Since shoaling rates at the project location are assumed to be the same as the No-Action Alternative for any of the proposed channel depths, estimated maintenance dredging for each of the proposed channel alternatives would be 648,000 cy every 4 years.

Impacts resulting from implementation of any of the proposed channel deepening alternatives would involve negligible impacts to bay bottom comparable in type and magnitude to those experienced during routine maintenance that occurs for the existing channel template. Based on cross sections of the existing channel template, deepening the project to 46 feet MLLW would result in a channel bottom width of 1,075 feet which would be consistent with the dimensions of the remainder of the authorized Galveston Harbor Channel. Most of the new work dredging would occur across the bottom width channel and toe slope; the maximum increase of the top width on each side would be 7 feet. This increase in top width translates to around 0.8 acre of impact to bay bottom. However, given variations in conditions of channel and elevations of the top of slope dredging will likely widen the side slopes between 4 and 7 feet, or between 0.5 and 0.8 acre. In addition, the current dock owners along the channel routinely dredge their berths, thus the bay bottom adjacent to the channel is also undergoing routine disturbance from channel maintenance and ship traffic as well as maintenance activities to keep the adjacent private berths at required depths. Therefore, any impacts to bay bottom as a result of construction would not be "new", but would be among the cyclical recurring impacts that occur during maintenance of the channel and adjacent berths.

Impacts from the deepening of the Houston Ship Channel to -46-feet MLLW and widening to 460 feet, as well as deepening of the Galveston Harbor Channel to -46-feet MLLW (no widening) have

been described in the 1995 SEIS and 2007 LRR. These reports for the now completed projects included documentation of National Environmental Policy Act (NEPA) compliance; the NEPA documentation concluded that impacts to bay bottom (benthic habitat) that did not support oyster reef were negligible and required no mitigation. The Galveston Harbor Channel Extension involves deepening of only 2,571 feet linear feet of channel to be consistent with the bottom depth of the recently constructed -46-foot MLLW project depth of the Galveston Harbor Channel. The total area of impact for the Galveston Harbor Channel Extension is less than 1 percent of the entire HGNC impact footprint, and no oyster reef is present in this extension. Furthermore, no mitigation was recommended by the U.S. Fish and Wildlife Service (USFWS) in the 2011 Planning Aid Letter (PAL) for this project (included in Appendix B). Therefore, based on past NEPA documentation and coordination, no mitigation would be required for any of the proposed channel deepening alternatives.

2.4 Dredged Material Placement Alternatives

Several dredged material placement alternatives were considered for placing the new work dredged material from the proposed project, including the existing upland confined PA (i.e., Pelican Island PA), a new upland confined PA on Pelican Island, and a new beneficial use site (marsh) located off the west end of Pelican Island (Figure 6).

2.4.1 Upland Confined Placement Alternative – Pelican Island PA

For upland placement, new work material would be placed in the Pelican Island PA, and would be used for raising and repairing levees. Maintenance material from this extension would continue to be placed in the Pelican Island PA.

2.4.2 New Upland PA on Pelican Island

An 81.76-acre tract, located on the north edge of the Galveston Harbor Channel was explored for consideration as a new dredged material upland confined PA. This placement alternative was dropped from consideration due to the high cost to develop the site compared to the relative small placement capacity of the completed PA.

2.4.3 Beneficial Use of Dredged Material Alternatives

Beneficially used new work dredged material would be placed on the west side of Pelican Island for open water marsh creation. Depending on the channel depth alternative considered, between

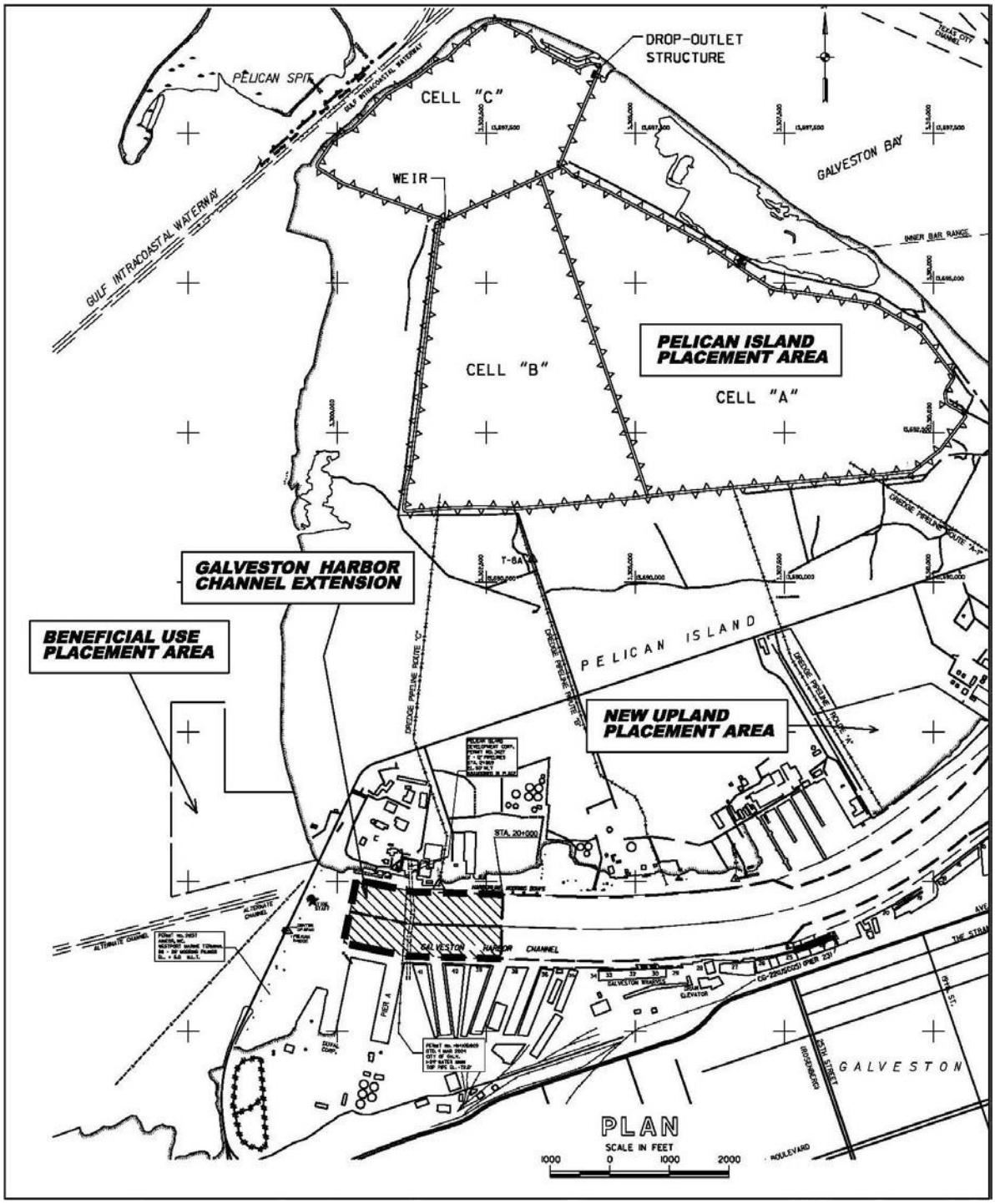

FIGURE 6: Dredged Material Placement Alternatives Considered

200,400 and 513,800 cy of new work dredged material would be generated from project construction and used to create an estimated 48 to 103 acres of open water marsh (Table 3). Maintenance material from the 46-foot deep project channel would continue to be placed in the Pelican Island PA consistent with current practice.

The construction process and design for marsh creation is similar regardless of beneficial use quantity and corresponding marsh size. Marsh construction would entail hydraulically placing new work dredged material from channel deepening to construct a perimeter levee around the north, west and south borders of the beneficial use site to an elevation of +7 feet above the water level at low tide, assuming the average depth to bay bottom along the west side of Pelican Island is around -5 feet MLLW. Construction of a perimeter levee along the east shoreline of the BU site would not be necessary as the site would tie into the existing Pelican Island shoreline. Prior to hydraulically placing material for levee construction, a small quantity of borrow material from bay bottom adjacent to the proposed levee would be excavated to construct the initial levee lift to replace unsuitable soft foundation soils in the levee footprint. Once placed, the perimeter levee slopes would be armored using a combination of geotextile, blanket stone and riprap shoreline protection. This was included in the design of the BU placement alternatives under consideration as the location of the beneficial use marsh has considerable fetch length and water depth which, based on experience with other BU projects in Galveston Bay, would increase erosion potential and threaten success of a newly constructed marsh if shoreline protection was not included. The new work material from the construction of the channel deepening project would be pumped into the marsh site and amphibious equipment would be used to guide the dredge discharge for fairly even placement across the site. Future maintenance material would be added as needed, to manage the target elevations of the marsh design**.** As a follow up measure, 5-foot deep circulation channels would be constructed inside the marsh cell. Excavated material from construction of the circulation channels would be placed in the eastern area of the marsh near the Pelican Island shoreline. Outlet structures would also be put into place to facilitate dewatering of the site; once target elevations were met, these structures would be removed to establish tidal flow and circulation within the site.

2.5 Screening of Channel and Placement Alternatives

The following screening criteria were identified as important in the formulation and evaluation of possible project alternatives. The Recommended Plan should:

- Identify an environmentally acceptable project;
- Increase deep-draft navigation efficiency for the Galveston Harbor Channel over the 50-year period of analysis; and ; and,
- Maximize benefits over costs for the 50-year period of analysis.

Each alternative was evaluated with respect to meeting the aforementioned screening criteria (Table 4).

The No-Action Alternative is considered environmentally acceptable since it would continue to involve only minor temporary impacts to bay bottom experienced during routine maintenance activities. However, deeper draft vessels attempting ingress and egress to the bulk cargo facilities at the far west end of the channel would continue to be constrained by existing channel depth, and would continue current practices of light-loading to access and depart the bulk cargo facilities. Because of these practices, navigation efficiency and shipping economies of scale would continue to be hampered by insufficient channel depth.

TABLE 3: Construction Elements and Dredged Material Quantities for Beneficial Use Alternatives

Beneficial Use Alternative Marsh Size (acres)	Corresponding Channel Alternative	New Work Dredge Quantity (cy)	Perimeter Levee Borrow Material (cy)	Levee Armoring			5-foot Deep Circulation Channels				Outlet Structure(s)
				Geotextile (square yards)	Blanket Stone (tons)	Rip Rap (tons)	20-foot Bottom Width (lf)	60-foot Bottom Width (lf)	90-foot Bottom Width (lf)	Excavated Volume (cy)	
48	43-foot Deep Channel Project	200,400	121,000	27,000	13,000	35,000	2,600	700	700	50,000	2
66	44-foot Deep Channel Project	304,867	163,438	33,888	16,238	43,066	3,575	960	960	68,750	2
86	45-foot Deep Channel Project	409,333	208,219	40,944	19,619	52,033	4,660	1250	1250	89,600	3
103	46-foot Deep Channel	513,800	253,000	48,000	23,000	61,000	5,200	1,400	1,400	100,000	3

TABLE 4: Alternatives Screening Matrix

Screening Criteria / Channel Alternative[1]	Increase deep-draft navigation efficiency	Be environmentally acceptable	Maximize benefits (BCR)
No-Action Alternative (41-foot Deep Channel)		✓	
43-foot Deep Channel Alternative	✓	✓	
44-foot Deep Channel Alternative	✓	✓	
45-foot Deep Channel Alternative	✓	✓	
46-foot Deep Channel Alternative (NED/ Recommended Plan)	✓	✓	✓

[1] The channel width for all alternatives, including the No-Action Alternative, is the existing authorized width of 1,085 feet associated with the currently authorized -41 feet MLLW depth of this channel segment.

Impacts resulting from any of the proposed channel deepening alternatives would involve only minor temporary impacts to bay bottom habitat comparable in type and magnitude to those experienced in the project footprint during routine maintenance that occurs under the No-Action Alternative to maintain the existing channel template. Therefore, all proposed channel alternatives are considered environmentally acceptable and no mitigation would be required for any of the alternatives.

All channel deepening alternatives would increase navigation efficiency since deeper channels allow larger volumes of goods to be transported with each vessel movement, as light-loaded vessels can be more fully loaded or smaller vessels can be replaced with larger, deeper-draft vessels. However, only the 46-foot Deep Channel Alternative would accommodate fully-loaded deep draft vessel ingress and egress of the Port's bulk terminal facilities located at the end of the channel.

Upon examination of project costs and benefits, it was determined that it would be more cost effective to pump the material to Pelican Island PA than to construct an open water marsh, unless USACE could feasibly cost share marsh creation with the local sponsor or other interested entity. Because pumping to Pelican Island PA is the least cost option, beneficial use of the material will not be pursued unless cost-sharing is feasible. The46-foot channel with the utilization of the existing Pelican Island PA reasonably maximizes economic benefits with the planning objectives and constraints, and is environmentally acceptable; as such it is the NED. From an environmental perspective, the types of impacts and the footprint would essentially remain the same for any of the structural alternatives considered during screening. Therefore the impact analysis in Section 4 of this EA is limited to two alternatives – the No Action and Recommended Plans – as the impacts associated with the smaller plans have been addressed in the analysis of the 46-foot plan.

3.0 AFFECTED ENVIRONMENT

3.1 Description of the Project Area

The project area includes the eastern end of Galveston Island and Pelican Island**.** Galveston Island is a low-lying barrier island two miles off the Texas coast, approximately 50 miles southeast of Houston, Texas. It was formed as an offshore bar at the beginning of the present sea-level stand, and grew by accretion of sand from littoral drift. Pelican Island was a natural sand-spit that has been expanded substantially by years of disposal of dredged material from the Galveston Harbor and Texas City Channels continuing to the present. The Galveston Harbor Channel is a very active shipping lane providing deep draft vessel access to the POG, an important Texas deepwater port. The channel, including the portion that would be deepened, is lined with various wharfs, docks and commercial and industrial facilities associated with POG operations and other users. Texas City, an important Gulf port city and producer of refined petroleum products, is located approximately seven miles from the project area. The Galveston community has a diversified income base, but jobs are predominantly dependent upon tourism, the POG, commercial fishing, the University of Texas Medical Branch (UTMB), and the American National Insurance Company.

3.2 Climate

The climate of the study area is humid subtropical with warm to hot summers and mild winters. The average annual high temperature is about 76 degrees Fahrenheit, with an average summer high of about 88 degrees for the months of June, July, and August, and an average annual winter low temperature of 66 degrees. Periods of freezing temperatures are infrequent and rainfall averages about 44 inches annually (National Weather Service, 2010). Severe weather occurs periodically in the form of thunderstorms, tornadoes, tropical storms and hurricanes.

3.3 Sea Level Change

3.3.1 Local (Relative) Sea Level Change

Current USACE guidance was used to assess relative sea level change (RSLC) for this GHCE Feasibility Report. USACE guidance (ER 1100-2-8162, December 2014 and Engineer Technical Letter (ETL) 1100-2-1, June 2014) specify the procedures for evaluating and incorporating climate change and relative sea level change into USACE planning studies and engineering design projects.

USACE guidance recommend that projects be evaluated using three different projections of future sea level change, i.e., "low, intermediate, and high," as follows:

- Low – Use the historic rate of local mean sea level change as the "low" rate. The guidance further states that historic rates of sea level change are best determined by local tide records (preferably with at least a 40 year data record).
- Intermediate – Estimate the "intermediate" rate of local mean sea level change using the modified NRC Curve I. The modified curve corrects for the local rate of vertical land movement.
- High – Estimate the "high" rate of local mean sea level change using the modified NRC Curve III. The modified curve corrects for the local rate of vertical land movement.

Additionally, USACE guidance also recommend that RSLC be evaluated at planning horizons other than the one used in the economic analysis, recommending at a minimum, RSLC analysis at 20, 50 and 100 years post-construction.

The recent historic rate of local sea level change can be obtained from local tide records. The tide gage nearest the GCHE is located at Pier 21 in Galveston, Texas (NOAA gage 8771450). The NOAA mean sea level trend at this site (from 1908 to 2013) is equal to 6.35 millimeters (mm)/year with a 95 percent confidence interval of ± 0.25 mm/year. This equates to a rise of 0.42 feet in 20 years. If the estimated historic eustatic (global) rate equals that given for the Modified NRC curves (1.7 mm/year), this results in an observed subsidence rate of 6.35 – 1.7 = 4.65 mm/year.

Utilizing the online sea level calculator referenced in ER 1100-2-8162, estimates of future RSLC were determined. The computed future rates of RSLC in the table below give the predicted low, intermediate, and high estimates of sea level change at the 20-, 50- and 100-year planning horizons.

TABLE 5: Estimated Change in Relative Sea Level over the 100-year (2016-2116) period of analysis for the Low, Intermediate and High Rate Scenarios

	Year		
Scenario	2036	2066	2116
	Sea Level Rise in feet		
Low Rate	0.42	1.05	2.10
Intermediate Rate	0.54	1.48	3.41
High Rate	0.00	2.86	7.58

3.4 Tides and Salinity

The normal daily mean tidal range in the channel is about 1.4 feet, with larger variations dependent upon the wind. During winter, weather fronts out of the northwest are usually accompanied by strong winds that may depress the water surface as much as 4 feet below mean sea level. At other times of the year, predominantly southerly winds, when coupled with higher than normal tides (i.e. spring tides), may occasionally and temporarily raise surface water elevations of the bay; this effect. Large fluctuations in water surface elevation may also occur during tropical storms and hurricanes (USACE, 1975).

Salinities in the project area averages about 25.5 parts per thousand (ppt), compared to 25 to 30 ppt near Bolivar Roads, which is located approximately 3.5 miles due east of the project area near the Galveston Entrance Channel.

3.5 Vegetation

The project area is located in the Gulf Coast Prairies and Marshes Region that borders the Gulf of Mexico from the Sabine River to Corpus Christi Bay (Gould, 1975). The existing Galveston Harbor Channel reach and the Pelican Island disposal area are located in highly disturbed areas, associated with previous and ongoing maintenance and construction activities related to the existing authorized project.

Because of human disturbance over many decades, habitat types in the project area have been disturbed to the point where original species composition and diversity found prior to major development and industrialization, no longer exist. The channel portion of the project footprint is part of a very active shipping lane that supports numerous industrial and commercial activities, and is devoid of vegetation.

Although the Pelican Island PA is an active confined upland PA, scattered terrestrial vegetation assemblages exist in the vicinity. Typical species include hackberry (*Celtis laevigata*), Bermuda grass (*Cynodon dactylon*), red mulberry (*Morus rubra L.*), palm trees (*Sabal Mexicana, S. texana*), and honey suckle (*Lonicera albiflora*). Invasive species such as Chinese tallow trees (*Sapium sabiferum*), Brazilian pepper (*Schinus terebinthifolius*), salt cedar (*Tamarisk sp.*), and giant reed (*Phragmites communis*) also occur in the vicinity of the PA. However, the current frequency of dredged material placement and related maintenance activities on Pelican Island PA deter the successful establishment and proliferation of these invasive species in the PA.

3.6 Aquatic Nuisance Species

Ballast water discharged from ships may contribute to the introduction and spread of aquatic nuisance species (ANS) from distant ports of call into U.S. waters. ANS are invasive, non-native or exotic species that may displace native species, degrade native habitats, spread disease, and disrupt human social and economic activities that depend on water resources (U.S. Coast Guard (USCG), 2011a). ANS that are known to occur within the study area that may have been introduced as a result of ballast water discharge or boat hull fouling include the Australian jellyfish (*Phylloriza punctata*), the Pacific white shrimp (*Litopenaeus vannamei*), the white crust tunicate (*Didenum perlicidum*), and sauerkraut grass (*Zoobotryon vertcillatum*). Additional information on these ANS species as well as other species of concern for Galveston Bay may be found at http://www.galvbayinvasives.org (Galveston Bay Estuary Program, 2010).

In response to national concerns, the National Invasive Species Act of 1996 (NISA) was reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA). Initially a voluntary program beginning in 1998, the USCG established a national mandatory ballast water management program in 2004 to comply with the NISA to prevent the introduction of ANS. The implementing regulations for the program may be found at 33 Code of Federal Regulations (CFR) 151 Subparts C and D. (USCG, 2011b).

The program applies to all vessels equipped with ballast water tanks and requires mandatory ballast water management plans and practices for all vessels that operate in U.S. waters or are bound for ports or places in the United States. Ballast water management practices may include conducting mid-ocean ballast water exchanges, retaining ballast water onboard, or using an alternative environmentally sound ballast water management method approved by the USCG. The program also established requirements for vessels to keep records on all ballasting operations and provide reports records pertaining to ballast water management to the USCG. (USCG, 2011a)

The USCG officer designated as the Captain of the Port (COTP), or a person designated by that officer, for the Port Zone of Houston-Galveston is responsible for ensuring compliance monitoring under the ballast water management program for vessels calling on the POG. To assess compliance of any vessel subject to the ballast water regulations, the COPT may take samples of ballast water and sediment, examine documents, and make other appropriate inquiries. In addition, the master, owner, operator, or person in charge of a vessel, is required to make available to the COTP, upon request, all records pertaining to ballast water management as required by the regulation.

3.7 Wetlands and Aquatic Resources

3.7.1 Wetland Resources

No wetlands or submerged aquatic vegetation occur within the existing footprint of Galveston Harbor Channel, which is a very active shipping lane that supports the POG and its numerous industrial and commercial activities. The Pelican Island PA is an existing active upland confined PA. As a result of the consistent periodic placement of maintenance dredged material into the PA as well as other maintenance activities associated with management of the PA, no persistent stands of wetlands or submerged aquatic vegetation occur within the cells of the PA.

The immediate shoreline located outside of the channel footprint is highly developed with the Texas A&M University at Galveston (TAMUG) campus, commercial dock facilities, and the Pelican Island Bridge surrounding it to the north, south and west. Because of this extensive

commercial development, only a small remnant tidal salt marsh wetland occurs well outside the project footprint, along the northwestern edge of the project area between the Pelican Island Bridge and TAMUG. This small, approximately 4-acre wetland occurs behind a berm of shell hash along the shoreline, but is connected to bay waters through a small tidal inlet channel. The wetland is dominated by saltmarsh cordgrass (*Spartina alterniflora*), saltmeadow cordgrass (*S. patens*), saltwort (*Batis maritima*), sea-ox eye daisy (*Borrichia frutescens*), big leaf sumpweed (*Iva frutescens*) and gulf cordgrass (*S. spartinae*).

3.7.2 Marine Aquatic Resources

Benthic marine organisms are an ecologically important component of the marine resources, serving as a major source of food for many species of fish and shellfish of commercial and recreational importance. Benthic organisms are also primary consumers, feeding on micro-algae and plant detritus, providing an important link in the marine food chain. The most abundant benthic organisms in the project area include annelid worms (polychaetes and oligochaetes), peracarid crustaceans (amphipods and tanaidaceans), and mollusks (bivalves and gastropods) (GBNEP, 1992). Although oyster habitat can be found in the adjacent Galveston Bay estuary, no oyster reef habitat is present in the project footprint. The quality and productivity of the benthic marine habitat within and immediately adjacent to the Galveston Harbor is considered low compared to the overall bay system since the benthic substrate along the channel is highly disturbed due to the frequency of maintenance dredging and the effects of ship traffic (USACE, 1975; USACE 1987). Small free-swimming and benthic marine organisms in the immediate vicinity of maintenance dredging work are caught by the dredge cutter head or pulled into the pipeline by the pump and removed. Recolonization of the benthic community between maintenance cycles is dependent on salinity and temperature as well as the nature of the channel substrate and other environmental parameters related to sediment distribution (Sanders, 1958; Purdy, 1964; White et al. 1985). Since sediment quality does not differ greatly between maintenance cycles, recolonization of the benthic habitat within the channel is more likely due to overall environmental parameters within the bay.

While seagrasses have typically historically flourished in the Galveston Bay System, seagrass beds have nearly disappeared entirely from the area due to human disturbances, hurricane activity, and their limited tolerances to turbidity, deep water, and wave energy. The only remaining natural seagrass beds in the Galveston Bay system occur in Christmas Bay, located over 20 miles west of the project (Sheridan, 2002).

3.8 Wildlife

The project area is located in the Texan Biotic Province (Blair, 1950), and provides some food and shelter for wintering and migrating grassland songbirds. Birds occasionally found in the area include a variety of waterfowl, shorebirds and wading birds, a variety of gulls and terns (*Laridae* family), and herons and egrets (*Ardeidae* family). Other birds that may be found in the area include the brown pelican (*Pelecanus occidentalis)*, white-faced ibis (*Plegadis chihi*), black rail (*Laterallus jamaicensis)*, red-winged blackbird (*Agelaius phoeniceus*), and the marsh hawk (*Circus cyaneus*) (The Nature Conservancy of Texas, 2009).

In addition, Little Pelican Island, which is separated from Pelican Island by the Gulf Intracoastal Waterway (GIWW), has colonial water bird nesting sites that are used by as many as 12 to 15 species of birds, including the brown pelican (CEC Environmental Exchange, 2004). Piping plover (*Charadrius melodus*) are also known to winter along the Texas Gulf Coast on beaches and bayside mud or sand flats.

Mammals potentially found within terrestrial areas in and adjacent to the project area include the hispid cotton rat (*Siomodon hispidus*), the eastern cottontail (*Svlvilaous floridanus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and feral dogs and cats (The Nature Conservancy of Texas, 2009). The common bottlenose dolphin (*Tursiops truncatus)* is the most abundant, year-round marine mammal inhabiting the waters of project area.

The most common marine reptiles inhabiting bay waters of the project area are the Kemp's ridley sea turtle (*Lepidochelys kempii)* and loggerhead sea turtles (*Caretta caretta*).

3.9 Fisheries and Essential Fish Habitat

In the Gulf of Mexico, essential fish habitat (EFH) consists of those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity of species that are federally managed by the Gulf of Mexico Fishery Management Council (GMFMC) and by the National Marine Fisheries Service (NMFS), pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). By definition, EFH includes those waters and substrate necessary for fish and shellfish spawning, breeding, feeding, and growth through maturity. "Waters" include aquatic areas and associated physical, chemical, and biological properties currently or historically utilized by the fisheries. "Substrate" includes any sediment, hard bottom, structures underlying the waters, and associated biological communities (U.S. Department of Commerce 2007). Those activities potentially impacting EFH may result in either direct (e.g.,

physical disruption) or indirect (e.g., loss of prey species) effects, and can be site-specific, habitat-wide, cumulative, and/or synergistic effects.

The project area is located in Ecoregion 4 and includes EFH designated by the GMFMC for red drum (*Sciaenops ocellatus*), white shrimp (*Litopenaeus setiferus)*, brown shrimp (*Farfantepenaeus aztecus,)* and Spanish mackerel (*Scomberomorus maculatus*). Details regarding specific habitat requirements for each of these species follow in Table 4. The project area also includes EFH for highly migratory species managed by NMFS including: scalloped hammerhead sharks, blacktip sharks (*Carcharhinus limbatus*), bull sharks (*Carcharhinus leucas*), lemon sharks (*Negaprion brevirostris*), spinner sharks (*Carcharhinus brevipinna*), bonnethead sharks (*Sphyrna tiburo*), Atlantic sharpnose sharks (*Rizoprionodon terraenovae*), and finetooth sharks (*Carcharhinus isodon*). EFH in the project vicinity includes estuarine emergent marsh, estuarine mud, sand and shell substrates, and the estuarine water column.

TABLE 6: Habitat Requirements of Species with EFH in the Project Study Area

Species	Location/Distribution
Red Drum	Red drum commonly occur in all of the Gulf's estuaries, but also occur in a variety of habitats, ranging from depths of about 130 feet offshore to very shallow estuarine waters; the GMRMC considers all estuaries to be EFH for the red drum. Estuaries are important for both habitat requirements and for dependence on prey species which include shrimp, blue crab, striped mullet, and pinfish. Schools are common in the deep Gulf waters, with spawning occurring in deeper water near the mouths of bays and inlets and on the Gulf side of the barrier islands. Red drum are associated with a variety of substrate types including sand, mud, and oyster reefs. (GMFMC 2010).
Brown Shrimp	Brown shrimp are most abundant in central and western Gulf of Mexico and found in estuaries and offshore waters to 360 feet with the post-larval individuals typically occurring within estuaries. Post-larval individuals and juveniles are associated with shallow vegetated habitats, but are also found over silty-sand; non-vegetated mud bottoms are preferred. Adults typically occur outside of bay areas in marine waters extending from mean low tide to the edge of the continental shelf and areas associated with silt, sand, and sandy substrates. (GMFMC 2010).
Spanish Mackerel	Pelagic species are found in neritic waters and along coastal areas, inhabiting the estuarine areas; especially higher salinity areas, during seasonal migrations. Spanish mackerel are rare and infrequent inhabitants of Gulf estuaries, where spawning occurs offshore from May to October. Nursery areas are in estuaries and coastal waters year-round. Larvae are found offshore over the inner continental shelf, most commonly in water depths less than 150 feet. Juveniles are found offshore, in beach surf, and occasionally in estuarine habitat; juveniles prefer marine salinity and clean sand substrate. (GMFMC 2010).
White Shrimp	White shrimp are offshore and estuarine dwellers; pelagic or demersal depending on their life stage. Eggs are demersal and larval stages are planktonic, and both occur in nearshore marine waters. Post-larvae become benthic upon reaching the nursery areas of estuaries, seeking shallow water with muddy sand bottoms that are high in organic detritus. Juveniles move from the estuarine areas to coastal waters as they mature. The adults are demersal and generally inhabit nearshore Gulf of Mexico waters in depths less than 100 feet on soft mud or silty bottoms. (GMFMC 2010).
Scalloped Hammerhead Sharks,	Common, large, schooling sharks of warmer waters, migrating seasonally north-south along the eastern coastal and offshore waters of the United States, including the Gulf of Mexico. Neonates may occur in nearshore coastal waters, bays and estuaries of the Gulf of Mexico from Texas to the southern west coast of Florida; Juveniles can be found in coastal areas in the Gulf of Mexico from southern mid-coast of Texas, eastern Louisiana to the southern west coast of Florida and the Florida Keys, and in offshore waters from the mid-coast of Texas to eastern Louisiana. Adults may occur in Coastal areas in the Gulf of Mexico along the southern Texas coast, and eastern Louisiana through the Florida Keys, as well as offshore from southern Texas to eastern Louisiana.
Blacktip Sharks	Blacktips are fast-moving sharks, occurring in shallow waters and offshore surface waters of the continental shelf. Blacktips are viviparous, and young are born in bay systems in late May and early

Species	Location/Distribution
	June after a year-long gestation period. The reproductive cycle occurs every 2 years. Juveniles are found in all Texas bay systems in a variety of habitats and shallow coastal waters from the shore to the 82 foot isobath (NMFS, 2006a). They feed mainly on pelagic and benthic fishes, cephalopods and crustaceans, and small rays and sharks (Froese and Pauly, 2012). Juvenile blacktip sharks occur in the Gulf and estuarine portions of the study area and adults in the Gulf portions of the study area.
Bull Sharks	Bull sharks are coastal and freshwater sharks that inhabit shallow waters, especially in bays, estuaries, rivers, and lakes. They frequently move between fresh and brackish water and are capable of covering great distances. Adults are often found near estuaries and freshwater inflows to the sea (Froese and Pauly, 2012). Bull sharks are viviparous, have a gestation period of a little less than 1 year, and it is assumed the reproductive cycle occurs every 2 years. Juveniles are found in waters less than 82 feet deep in shallow coastal waters, inlets, and estuaries (NMFS, 2006a). They feed on bony fishes, sharks, rays, shrimp, crabs, squid, sea urchins, and sea turtles (Froese and Pauly, 2012). Juvenile bull sharks occur in the Gulf and estuarine portions of the study area.
Lemon Sharks	Feeds mainly on fish but also takes crustaceans and mollusks. (Froese and Pauly, 2012). Occurs on continental and insular shelves, frequenting mangrove fringes, coral keys, docks, sand or coral mud bottoms, saline creeks, enclosed bays or sounds, and river mouths. May enter fresh water. Occasionally moves into the open ocean, near or at the surface, apparently for purposes of migration.
Spinner Sharks	Found on the continental and insular shelves from close inshore to offshore. Makes vertical spinning leaps out of the water as a feeding technique in which the sharks spins through a school of small fish with an open mouth and then breaks the surface. Feeds mainly on pelagic bony fishes, also small sharks, cuttlefish, squids, and octopi. Viviparous. Forms schools. Highly migratory off Florida and Louisiana and in the Gulf of Mexico.
Bonnethead Sharks	Bonnethead sharks can be found on sand or mud bottoms in shallow coastal waters. The bonnethead shark is viviparous, reaching sexual maturity at about 30 inches. The pups are born in late summer and early fall, measuring 12 to 13 inches (Froese and Pauly, 2012). Both juveniles and adults inhabit shallow coastal waters up to 82 feet deep, inlets, and estuaries over sand and mud bottoms (Froese and Pauly, 2012; NMFS, 2006a). They feed mainly on small fish, bivalves, crustaceans, and octopi (Froese and Pauly, 2012). Juveniles and adults occur year-round in the Gulf and estuarine portion of the study area.
Atlantic Sharpnose Sharks	Atlantic sharpnose shark inhabits intertidal to deeper waters, often in the surf zone off sandy beaches, bays, estuaries, and river mouths (Froese and Pauly, 2012). They are viviparous, and mating occurs in June, with a gestation period of about a year (NMFS, 2006a). They feed on fish, shrimp, crab, mollusks, and segmented worms (Froese and Pauly, 2012). Juvenile Atlantic sharpnose shark occur in the Gulf and estuarine portions of the study area.

The MSFCMA established procedures for identifying EFH and required interagency coordination to further the conservation of federally managed fisheries. Any Federal agency that authorizes, funds or undertakes, or proposes to authorize, fund, or undertake an activity that could adversely affect EFH is subject to the consultation provisions of the above-mentioned Act. This EA serves to initiate EFH consultation under the MSFCMA.

The Gulf of Mexico and Galveston Bay also support extensive commercial and recreational fisheries. The Gulf waters in the vicinity of the project support a variety of species of commercial and recreational importance that are typically found within Galveston Bay. Leading commercial fisheries include gulf menhaden (*Brevoortia patronus*), and shrimp, and shellfish fisheries. Galveston Bay is the state's largest estuarine source of seafood, and is one of the major oyster producing areas in the country (GBEP, 2008).

Other commercial and recreational species in the project vicinity may include Atlantic croaker (*Micropogonias undulatus*), black drum (*Pogonias cromis*), southern flounder (*Paralichtys*

lethostigma), spot (*Leiostomus xanthurus*), sea trout (*Cynoscion nebulosus*), sand trout (*Cynoscion arenerius*) and striped mullet (*Mugil cephalus*). These species are ubiquitous along the Texas coast with seasonal differences in abundance.

3.10 Threatened and Endangered Species

The USFWS and the NMFS identified the threatened or endangered species in Table 8 as possibly occurring in Galveston County. The bald eagle has been recently delisted but the protections provided by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act remain in effect.

A Biological Assessment (BA) has been prepared that includes information on the distribution and habitat requirements of these species, as well as their occurrence within the project area (see Appendix C). This BA also addresses the proposed project's potential impact on federally listed threatened and endangered species and species of concern. Of these species listed in Table 9, only the brown pelican and the Kemp's ridley and loggerhead sea turtles are known to occur in the project area; however, no nesting sites for brown pelicans or sea turtles are located in the project area. Other species listed in Table 9 that are known to occur in Galveston County are not likely to occur in the vicinity of the project due to lack of suitable habitat or known range limits. There is no designated critical habitat for any of the listed species within the project area.

While suitable habitat for piping plover and red knot occurs along the sandy beach shorelines of the Gulf of Mexico and some dredged material islands along the GIWW in Galveston County, these species are not likely to occur in the vicinity of the project due to lack of suitable habitat. The shorelines along the Galveston Harbor Channel in the vicinity of the proposed deepening of the Galveston Harbor Channel Extension predominantly consist of bulkheads and dock facilities; very small, short stretches of shorelines having shell hash substrates occur to a lesser extent in the project area in areas such as that found at TAMUG Clipper dock area. These areas are continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas unsuitable for piping plover.

Table 7
Federally-Listed Threatened and Endangered Species for Galveston County, Texas

Common Name	Scientific Name	Listing Status[1]	
		USFWS[2]	NMFS[3]
INVERTEBRATES			
elkhorn coral	*Acropora palmata*	NA	T
lobed star coral	*Orbicella annularis*	NA	T
mountainous star coral	*Orbicella faveolata*	NA	T
boulder star coral	*Orbicella franksi*	NA	T
REPTILES			
green sea turtle	*Chelonia mydas*	T	T
hawksbill sea turtle	*Eretmochelys imbricata*	E	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	E
leatherback sea turtle	*Dermochelys coriacea*	E	E
loggerhead sea turtle	*Caretta caretta*	T	T
BIRDS			
Attwater's greater prairie-chicken	*Tympanuchus cupido attwateri*	E	NA
red knot	*Calidris canutus rufa*	T	NA
piping plover	*Charadrius melodus*	T w/ CH	NA
MAMMALS			
West Indian manatee	*Trichechus manatus*	E w/ CH	NA
finback whale	*Balaenoptera physalus*	NA	E
humpback whale	*Megaptera novaengliae*	NA	E
sei whale	*Balaenoptera borealis*	NA	E
sperm whale	*Physeter macrocephalus*	NA	E

[1]E = Endangered; T = Threatened; w/ CH = with Federally Designated Critical Habitat; NA = Not Applicable

[2]USFWS, 2016. http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=48167

[3]NOAA/NMFS, 2016. http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/texas.pdf

3.11 Cultural Resources

The channel deepening portion of the project was previously surveyed as described in the report titled *Underwater Investigations, Houston-Galveston Navigation Channels, Texas Project; Galveston, Harris, Liberty, and Chambers Counties, Texas,* prepared by Espey, Huston, and Associates, and dated 1992. This survey did not identify any significant anomalies within the area of potential effect for this project. Furthermore, the dredging and maintenance of the 41-foot channel depth would have resulted in the destruction of any cultural resource had they been present. The upland PA occurs in an area that was created in modern times. The area of potential effect for the proposed project does not include any cultural resources listed on, eligible for listing on, or currently unevaluated for listing on the National Register of Historic Places.

3.12 Air Quality and Noise

3.12.1 Air Quality

To comply with the 1970 Clean Air Act (CAA) and the 1990 Amendments, the U.S. Environmental Protection Agency (EPA) has promulgated National Ambient Air Quality Standards (NAAQS) for the protection of the public health and welfare with the allowance of an adequate margin of safety. The EPA has set NAAQS for six criteria pollutants: lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matter. Achieving and maintaining compliance with the NAAQS incorporates the effects of population and industrial growth, technology changes, and national or statewide control measures, including state implementation plans (SIP) for complying with NAAQS.

The project area is located within Galveston County, Texas, and is part of an area designated as the Houston-Galveston-Brazoria (HGB) Intrastate Air Control Region (EPA 2007). The HGB was classified as a "severe" nonattainment area for the 1-hour and 8-hour NAAQS for ozone, with an attainment deadline of 2019, and a conformity determination threshold level of 25 tons per year (tpy) for either nitrogen oxides (NO_x) or volatile organic compounds (VOC), which are precursors to ozone formation.

With the promulgation of a new 8-hour ozone standard in 2012, the HGB is designated a "marginal" nonattainment area. Under the new 8-hour ozone standard, a General Conformity Determination would be required for projects emitting more than 100 tpy for NO_x or VOC.

A preliminary air conformity analysis to determine the proposed project's conformity with current air quality standards analysis is provided in Appendix D. The results are summarized in Section 4.12.1.2 of this document.

3.12.2 Noise

Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise in terms of day-night average sound level (DNL) (U.S. Department of Transportation, 1980). It is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 decibels (dBA). The DNL is the energy average A-weighted acoustical level for a 24-hour period with a 10-decible upward industrial uses area considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, the EPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (EPA, 1974). Noise-sensitive receptors are facilities or areas where excessive noise may disrupt normal activity, cause annoyance, or loss of business. Land uses such as residential, religious, educational, recreational, and medical facilities are more sensitive to increased noise levels than are commercial and industrial land uses. Noise levels in the study area are elevated, ranging between 58-66 dBA compared to undeveloped areas along the coast, and are affected by bulk facility operations, vessel navigation, and vehicular traffic in the Galveston and Pelican Island areas.

Sensitive receptors within approximately one mile of the project area include TAMUG, Central Middle School, and various churches, businesses (including hotels), and residential neighborhoods.

3.13 Water and Sediment Quality

3.13.1 Water Quality

The Galveston Harbor Channel is situated in West Galveston Bay, which is a classified water body designated Segment 2424 in the Bays and Estuaries category. Water body uses of this segment are: High Aquatic Life Use; Contact Recreation Use; General Use; Fish Consumption Use, and Oyster Waters Use. Inventory data from 2008 indicate the quality of water in the vicinity of the project is generally considered to be good; Aquatic Life Use, Fish Consumption Use, Contact Recreation Use and General Use are fully supported or of no concern for the West Galveston Bay water segment (Texas Commission on Environmental Quality (TCEQ) 2008a). Only Oyster Waters Use was non-supporting as a result of high levels of bacteria (TCEQ, 2008a), which were also attributed to non-point sources associated with urban runoff and storm sewers (TCEQ 2008b), resulting in restrictions on shellfish harvesting in an area adjacent to the Texas City Ship Channel and Moses Lake. (DSHS, 2010 a and b).

Due to concerns regarding the presence of dioxin and polychlorinated biphenyls (PCBs) in fish sampled in Trinity Bay and Upper and Lower Galveston Bays in Chambers, Galveston and Harris Counties, at concentrations exceeding established health assessment guidelines, the Texas Department of State Health Services (DSHS) issued an advisory in July 2008 regarding the consumption of catfish species and spotted seatrout from Galveston Bay, which includes the project area (DSHS, 2008). The DSHS advisory recommends that adults should limit consumption of all catfish species and spotted seatrout caught from these waters to no more than one 8-ounce meal per month; women who are nursing, pregnant, or who may become pregnant and children should not consume catfish or spotted seatrout from these waters.

The most recent USACE water quality data were obtained on samples collected from the Galveston Harbor Channel in the vicinity of the proposed extension in December 2006. Chemical analyses were conducted for a variety of metals, pesticides, polycyclic aromatic hydrocarbons, and other organic compounds. These data indicate that, in general, the water quality is good. The 2006 data show that detected contaminant levels in all ambient water samples were below applicable EPA Water Quality Criteria, and Texas Surface Water Quality Standards (PBS&J, 2007).

A review of the National Response Center web page (NRC, 2009) was also conducted. Records for the past three years did not reveal any reports of significant chemical or petroleum spills in the project vicinity. But there were several incidences of minor spills of hydraulic oil, diesel fuel, drilling mud, or unknown sheens. These releases were either secured or left to dissipate, as appropriate.

Elutriate data were also acquired in 2006. The elutriate test was designed to simulate the process of hydraulic dredging and is used to predict any potential for resuspension of contaminants (e.g. heavy metals, polycyclic aromatic hydrocarbons, PCBs, pesticides and other organics) into the water column during dredging. The elutriate is prepared by creating a slurry, which is then agitated to determine if contaminants associated with the sediment particles are re-suspended into the water column. These data show that detected contaminant levels in elutriate samples were below all applicable Texas Surface Water Quality Standards and EPA Water Quality Criteria.

3.13.2 Sediment Quality

The most recent USACE sediment quality data were obtained on samples collected from the Galveston Harbor Channel in the vicinity of the proposed extension in December 2006. The sediment quality data are based on analyses of composite samples comprised of subsamples collected perpendicular to the centerline of the channel. There are no EPA quality criteria for

sediments, so comparisons with sediment quality screening guidelines (Buchman, 1999) were made. Based on these comparisons, the channel sediments in the Galveston Harbor Channel are considered to be non-hazardous. Additionally, suspended particulate phase bioassays, solid phase bioassays, and bioaccumulation assessments were conducted on these sediments. This testing confirms that there is no reason to believe that contaminant issues would arise because of sediment quality (PBS&J, 2007).

Sediments that collect in the Galveston Harbor Channel Project between dredging cycles have been regularly sampled for grain-size characteristics since the early 1990's. The historical average sediment grain size is given in Table 10 below. The sediments in these channel reaches are primarily stiff to hard plasticity clays and silts with a small sand fraction. The D_{50}, which gives the median grain size, indicates an overall particle size characteristic of medium silt.

TABLE 8: Sediment and Grain Size Analysis

Project Segment	Average Composition (%)			D_{50} (mm)
	Sand	Silt	Clay	
Galveston Harbor Channel	14.4	42.6	43.0	0.029

3.14 Hazardous, Toxic, and Radioactive Waste

A Hazardous, Toxic, and Radioactive Waste (HTRW) assessment of lands and water resources in and adjacent to the project area was performed by USACE Galveston District in June, 2010. The objective of this assessment was to identify the existence of potentially hazardous sites or facilities, hazardous contamination, and materials of concern that could impact or be impacted by the proposed project. The HTRW assessment was conducted in general accordance with procedures described in the USACE guidance document ER 1165-2-132, "Water Resources Policies and Authorities-Hazardous, Toxic and Radioactive Waste Guidance for Civil Works Projects", ASTM E 1527-05 Standard Practice for Environmental Site Assessments: Phase I ESA Process, and EPA Standards and Practices for All Appropriate Inquires, 2005. Findings and recommendations presented in this assessment are based on field reconnaissance, interviews, a regulatory agency review, historic archives, and a review of site history through examination of historic aerial photographs. Aerial photographs show project area changes such as: shifting and filling in of docks, numerous finger-pier additions and removals, modifications to Port access roads, all consistent with a growing Port industrial complex. One of the most

notable changes within the project area was the construction of Pelican Island PA, and its changing configurations. Aerial photographs did not reveal any additional sites of interest, beyond those identified by the regulatory agency review.

As part of this assessment, a site visit was conducted within the project area. No visual signs of environmental contamination or recognized environmental conditions, including spills or illegal waste disposal, were observed during the site inspection.

The regulatory agency review examined the following databases: National Priority List (NPL); Comprehensive Environmental Response Compensation, and Liability Information System (CERCLIS); No Further Remedial Action Planned (NFRAP); Resource Conservation and Recovery Information System - Treatment, Storage and Disposal Facilities (RCRA TSD); Resource Conservation and Recovery Information System – Corrective Action Sites (RCRA COR); Resource Conservation and Recovery Information System - Large and Small Quantity Generators (RCRA GEN); Emergency Response Notification System (ERNS); State Sites (e.g., Texas Commission on Environmental Quality Voluntary Cleanup Program Site Listing [TXVOL], Innocent Owner/Operator Program [IOP] and State Superfund Sites); City/County Solid Waste Landfills (SWL); Texas Spills Incident Information System (TXSPILL); Texas Industrial Hazardous Waste Notice of Registration (IHW NOR); Registered Above Ground/Underground Storage Tanks (AST/UST); and, Leaking Underground Storage Tanks (LUST).

A supplemental regulatory agency review was conducted by the Galveston District, which examined the following databases: Texas National Resource Information System (TNRIS), which includes oil/gas well and pipeline data from the Texas Railroad Commission, EPA's Envirofacts Data Warehouse, and other in-house data archives from the USACE Information Management Office. Although the assessment of oil/gas wells and associated pipelines are not required by USACE guidance (ER 1165-2-132), these sites were investigated in exercising due diligence and prudence regarding potential environmental impacts, relocation issues, or impacts to engineering design and construction activities. The regulatory review identified the following sites and environmental incidents, within the project area vicinity.

Regulatory records indicated 85 ERNS incidents (or spills) had occurred within a 0.25-mile of TAMUG, Galveston Terminals Inc, and other marine terminals and marina facilities along or within the vicinity of the Galveston Harbor Channel. These releases ranged from known and unknown sheens, a cup of paint, petroleum spills up to 30 barrels, and individual releases of fogging agents approaching 25 gallons. Media affected by these releases included air, land, and harbor and waterway areas.

One LUST, which previously stored unspecified petroleum products at Magcobar Minerals Division; two LUSTs for gasoline storage currently removed from the ground at TAMUG; and two ASTs, one that stored gasoline and the other diesel were identified. These sites were located within 0.43, 0.25, and 0.25 miles, respectively, of the project area. Releases from the ASTs were captured by concrete secondary containment structures and no media was impacted.

Eight TXSPILL releases were identified within 0.25 mile of the project area. Six of these incidents are associated with Vulcan Machine and Boiler Works (Vulcan). Vulcan released 0.5 gallons of hydraulic fluid and one gallon of diesel fuel to the water, 50 gallons of fogging spray to land and water media, and produced an oil sheen. All releases except the hydraulic fluid, fogging agent, and sheen were reported as having a completed cleanup status. The remaining two releases occurred at the Galveston Terminals. The terminals spilled five gallons of diesel and 30 barrels of #5-fuel oil to the water. The cleanup for all spills has been completed.

No oil/gas wells or petroleum pipelines were identified in the project area. However, one water and one sewer pipeline line were identified in the vicinity of Stations 21+500 and 21+550. No other sites of concern were identified by the regulatory review.

3.15 Socioeconomics

The City of Galveston's economy is characterized by a predominance of jobs in the retail and service sectors, a large in-commuting population, and an important tourism industry. Although Hurricane Ike took a heavy toll on Galveston in 2008, economic activities for the City of Galveston are still highly dependent on the POG, the University of Texas Medical Branch (UTMB), American National Insurance Company Headquarters, Federal agencies, and the tourist industry. Interest in tourism activities is still a growing trend in the Galveston area (Galveston Chamber of Commerce, 2010). Over the last two decades the tourism industry has seen the largest increase from 7 percent in 1990 to 20 percent in 2008 (CDM, 2010).

The POG is equipped with facilities to handle various cargo types including containers, dry and liquid bulk, break bulk, RO/RO (roll-on/roll-off of cargo), refrigerated and project cargoes. The principal cargoes at the POG are agricultural products such as grains, vegetables, fruit, and commercial cargoes to include sulfur, timber, and various other building materials. The Port also has a cruise-liner passenger terminal, and is the year-round homeport to two Carnival Cruise Line vessels.

Prior to Hurricane Ike in 2008, U.S. Census estimates showed the City's population was around 52,821 people, though more current data from the 2008 Texas State Demographer shows the population was around 59,000 (CDM, 2010). As a result of the storm, as much as 20 percent of

the population was displaced reducing the number of persons living in the City to an estimated 48,410 people. The City had been growing at a slow annual rate of 0.4 percent from 2000 to 2008; however, this growth has been largely outpaced by the rest of Galveston County whose annual growth rate was 5.5 times greater during the same period. There are 22,695 households living in the City of Galveston. The City's average household size is 2.2 and the average family size is 2.9. These are slightly lower than the average household and family sizes of Galveston County, which are 2.6 and 3.2, respectively. The 2008 median age of persons living in the City of Galveston and Galveston County was 36.5 and 36.2 years, respectively, compared to a median household income of $46,846 and $69,016.

In the months preceding Hurricane Ike the unemployment rate had been steadily increasing due to broader economic conditions. Immediately following the storm, unemployment spiked to 9.7 percent. The damage forced many businesses to close and some employers have not returned to pre-storm capacity. As of February 2010, 24,210 persons living in the City of Galveston were employed, which is an employment gain of 470 persons since 2005. Despite this, an increasing unemployment rate, currently around 8.1 percent, persists due to the labor force increasing faster than employment. In addition, the City of Galveston currently supports an estimated 35,000 jobs indicating that a significant number of jobs are being filled by people who do not live in the City.

3.16 Environmental Justice (EJ)

In compliance with Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority and Low-Income Populations, an analysis was performed to determine whether the proposed project would have a disproportionately adverse impact on minority or low-income population groups in the vicinity of the project area. Low-income persons are defined as "a person whose household income is at or below the Department of Health and Human Services (HHS) poverty guidelines." The 2008 HHS poverty guideline for a family of three is $17,163. This analysis consisted of determining characteristics of residential populations in the project area.

The socio-economic characteristics of the City of Galveston compared to Galveston County are presented in Table 11. Prior to Hurricane Ike in 2008, the City of Galveston had a population of 52,821 living in 22,695 households. The racial makeup of the city was 67.5 percent White, 20.3 percent African American, 0.9 percent Native American, 3.1 percent Asian, 6.1 percent other, and 2.1 percent from two or more races. Of the total population, 28.0 percent were of Hispanic or Latino origin. With the 2008 poverty threshold for a family of three at $17,163, the median family income in the City was 2.65 times the poverty threshold while in the County

was four times the poverty threshold. Approximately 18 percent of families in the City live below the poverty line compared to 10 percent in the County (CDM, 2010).

TABLE 9: Socio-Economic Characteristics in the City of Galveston and Galveston County from 1990 to 2008

	City of Galveston			Galveston County		
	1990	2000	2006-2008	1990	2000	2006-2008
Population	59,070	57,247	52,281	158,329	192,911	230,541
Median Age	---	35.5	36.5	---	35.9	36.2
Households	24,157	23,842	22,695	57,294	70,941	84,225
Average Household Size	2.4	2.3	2.2	2.6	2.6	2.6
Median Family Income	$25,559	$34,049	$46,485	$35,413	$51,435	$69,016
Families Below Poverty Level	20.0%	17.8%	18.4%	12.5%	10.1%	9.8%
High School Graduate	9,448	9,249	9,143	29,127	33,389	41,042
Bachelor's Degree	4,331	4,897	5,518	12,670	18,827	25,849

Source: CDM (2010)

3.17 Prime and Unique Farmlands

Prime farmland soils are defined by the Secretary of Agriculture in 7 CFR, Part 657 (Federal Register, Vol. 43, No. 21) as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. The soil quality, growing season, and moisture supply are available to economically produce sustained high yield of crops when treated and managed, including water management, according to acceptable farming methods. Some soils are considered prime farmland in their native state, and others are considered prime farmland only if they are drained or watered well enough to grow the main crops in the area.

The project area consists of a deep-water navigation channel and adjacent marine industrial and commercial industries. The proposed footprint of the channel deepening project does not include land or soil suitable for agricultural activities. Based on the Soil Survey of Galveston County, Texas (Soil Conservation Service, 1988), soils within the Pelican Island PA are classified in the Ijam soil series, which consists of soils formed in materials dredged from bay and canals. According Soil Survey Geographic Database (SSURGO) information acquired from the Natural Resources Conservation Service (NRCS) (2011), soils within the Ijam series are not considered prime farmlands. Furthermore, Ijam soils are not suitable for crop production or pasture due to salinity (Soil Conservation Service, 1988).

3.18 Recreational Resources

Tourism is a major contributor to the project area economy. Development of the area as a recreational area relates to its proximity to the population of the Houston-Galveston metropolitan area, its many miles of beaches, and favorable climate. Fishing and boating are the most important recreational activities in the project area. Other forms of recreation common to the area are water and jet skiing, surfing, bird watching, swimming, and beach combing (among others). Many charter vessels are available along the docks in Galveston for those desiring deep sea or bay fishing, and several private and public marinas, boat launching ramps, bait camps, and yacht and sailing clubs are located in the vicinity of the project area. Major public recreational facilities include county parks, public beaches, Galveston Island State Park, and Seawolf Park on Pelican Island. In 2007 alone, an estimated 5.4 million tourists visited the City of Galveston. Through purchases on such travel-related expenses as lodging, dining, and entertainment, tourists were directly responsible for spending more than $561 million in the City of Galveston in 2007, and tourism was directly responsible for approximately 9,300 jobs in the city (Angelou Economics, 2008).

3.19 Roadways and Traffic

Major roadways within the project area include State Highway 87 (SH-87) and Highway 275, which directly service the POG. SH-87 is a major local artery providing mainland access to the POG, the State Marine Highway Ferry system, and to communities such as Bolivar, Anauhac, and Beaumont via the ferry system. Both roadways are used by commercial, tourist, and local traffic, and connect to Interstate Highway-46, a major corridor connecting Galveston Island directly to the City of Houston some 50 miles to the north, and to the Interstate system.

Vehicular traffic consists of a mixture of local area and urban residents, commercial and industrial vehicles associated with the Port industries, and tourism. Various railway connections also serve the POG and the City of Galveston.

3.20 Aircraft Wildlife Strikes

A Memorandum of Agreement (MOA) was executed among the Federal Aviation Administration (FAA), the U.S. Air Force, the U.S. Army, EPA, USFWS, and the U.S. Department of Agriculture (USDA) to address the potential for aircraft-wildlife strikes throughout the United States, when considering proposed projects that may become an attractant to wildlife deemed hazardous to aircraft. In accordance with the FAA Advisory Circular 150/5200-33B and the MOA with the FAA to address aircraft-wildlife strikes, the USACE must take into account whether features of a proposed project (e.g. dredged material placement, BU features, or mitigation) could increase these wildlife hazards. The FAA recommends minimum separation criteria for land-use practices that attract hazardous wildlife to the vicinity of airports. These criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or air operations area (AOA).

These separation criteria include:

Perimeter A: For airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest AOA.

Perimeter B: For airport serving turbine-powered aircraft, hazardous wildlife attractants must be 10,000 feet from the nearest AOA.

Perimeter C: Five-mile range to protect approach, departure and circling airspace.

The only airport in the near vicinity of the study area is the Scholes International Airport. The study area and the existing Pelican Island PA meet the standard minimum separation criteria for Perimeters A and B surrounding the AOA of Scholes International Airport. However, the study area and Pelican Island PA are both located within the 5-mile radius of the Scholes International Airport approach, departure and circling airspace (Perimeter C). While the Pelican

Island PA could pose potential attractant to wildlife deemed hazardous to aircraft (i.e. waterfowl), it has been a long-time existing active upland confined PA used on a reoccurring basis for the placement of dredged material during routine maintenance dredging of the existing Galveston Harbor Channel.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Project Area

This section provides a discussion of the environmental impacts associated with both the No-Action and the Recommended Plan. From an economic perspective, there are differences among the channel depths considered in the economic analysis in terms of the amount of material to be placed. However, from an environmental perspective, the types of impacts and the footprint would essentially remain the same. Therefore, the impact analysis is limited to two alternatives, as all of the impacts are covered by the analysis of the 46-foot plan (the preferred plan).

4.1.1 No-Action Alternative

No construction activities would be associated with the No-Action Alternative. The No-Action Alternative is the continued maintenance of the existing -41-foot MLLW by 1085-foot wide channel segment extending between Station 20+000 and Station 22+571. Maintenance dredging would continue to be approximately 648,000 cy about every 4 years. Maintenance material would continue to be placed in the existing, designated upland confined Pelican Island PA.

Under the No-Action Alternative, deeper draft vessels seeking access to the bulk cargo facilities at the far west end of the channel would continue to be constrained by channel depth, and would continue current practices of light-loading to access and depart these facilities.

4.1.2 Recommended Plan

The Recommended Plan would involve deepening of the -41-foot MLLW portion of the currently authorized Galveston Harbor Channel between Station 20+000 and 22+571 to a depth of -46-feet MLLW plus two-feet of allowable over-depth and three-feet of advanced maintenance; all material will be placed into the Pelican Island PA. The bottom width of the proposed channel extension would be reduced to 1,075 feet, consistent with the remainder of the existing -46-foot MLLW portion of the Galveston Harbor Channel. The estimated maintenance dredging for the Recommended Plan would be the same as the No-Action Alternative (i.e. 648,000 cy every 4 years) since shoaling rates at the project location are assumed to be the same.

Under the Recommended Plan, deeper draft vessels accessing bulk cargo facilities at the far west end of the channel would not be constrained by channel depth; as such the vessels could be more fully-loaded. Thus, the Recommended Plan would provide for more efficient movement of deep-draft vessels transporting commodities along the waterway to and from these facilities.

4.2 Sea Level Rise

Current USACE guidance was used to assess relative sea level change (RSLC) for this GHCE Feasibility Report. USACE guidance (ER 1100-2-8162, December 2014 and Engineer Technical Letter (ETL) 1100-2-1, June 2014) specify the procedures for evaluating and incorporating climate change and relative sea level change into USACE planning studies and engineering design projects. Utilizing the online sea level calculator referenced in ER 1100-2-8162, estimates of future RSLC were determined (Table 6, section 3.3.1).

4.2.1 No-Action Alternative

The affects of RSLC (relative sea level change) would occur nearly uniformly throughout the bay, as the average sea level rise would be the same at various locations. However, tidal amplitude would be altered, increasing over existing conditions in the upper reaches of Galveston Bay. This is likely due to the decrease in energy lost to bottom friction caused by the increased water depth in the bay as sea level rises.

If the highest rate of sea level rise occurs, much of the shoreline habitat of Galveston Bay may be altered. Some of the potential impacts may include:

- Present wetland areas would be largely inundated;
- New wetlands would only occur in areas where the shoreline is unaltered by bulkheads or development;
- Increased tidal amplitude may result in increased current velocities, resulting in increased erosion at the shoreline fringe;
- The increased depth may reduce the wind-wave shear at the bay bottom, and hence reduce the re-suspension of fine sediment.

Thus, under conditions of the highest rates of predicted RSLC, there would likely be considerable impacts to the bay-wide environment. However, if the eustatic rate of sea level rise is lower than the highest predicted rate, or if the rate of subsidence is decelerating relative to the historic rates observed at the tide gage, then many of the potential effects of RSLC discussed here would likely be mitigated.

Although the bay environment may be affected, RSLC will not contribute any significant impacts on the actual project. Potential impacts include increased currents within the navigation channel and less re-suspension of sediment which could increase shoaling within the channel. However, these impacts will be minimal and there will be no significant difference between the No Action and the Recommended Plan.

4.2.2 Recommended Plan

No difference in water levels between the No Action and Recommended Plans is likely. Thus, the impacts of RSLC would be similar in nature and scope to those described for the No Action Plan. RCLC is not expected to have a significant impact on dredging frequency, shoaling or ship handling.

4.3 Tides and Salinity

4.3.1 No-Action Alternative

Under the No-Action alternative, tidal amplitude may increase in the bay as a result of increase overall water depth associated with RSLC (refer to Section 4.1). With respect to salinity, hydrodynamic salinity studies show that the water column within the project area is well mixed, indicating that any salinity variation that may occur due to channel deepening is likely to be relatively small.

4.3.2 Recommended Plan

As stated under conditions of RSLC (Section 4.2.2), there would be relatively no difference in water levels between the No Action and Recommended Plans. Thus, tidal amplitude would remain unchanged under the Recommended Plan. With respect to salinity, hydrodynamic salinity studies show that the water column within the project area is well mixed, indicating that any salinity variation that may occur due to channel deepening is likely to be relatively small.

4.4 Vegetation

4.4.1 No-Action Alternative

Pelican Island Cell B is part of an active upland confined PA, While terrestrial plants, including invasive species like Chinese tallow and Brazilian pepper, tend to occur on disturbed lands such as PAs, the high salinity of dredged material sediments and the frequency of dredged material

placement on Pelican Island PA and related maintenance activities are deterrents to successful establishment of terrestrial vegetation.

4.4.2 Recommended Plan

No changes in the nature of dredged material, the frequency of dredged material placement, and the related maintenance activities will result from the implementation of the Recommended Plan. Therefore, no impacts to terrestrial vegetation are anticipated.

4.5 Aquatic Nuisance Species

4.5.1 No-Action Alternative

Vessel ballast water discharges or exchanges in coastal waters have the potential to introduce ANS. To minimize this potential threat, all vessels calling on the POG must comply with established USCG regulations that: (1) require mandatory ballast water management practices for all vessels that operate in U.S. waters, (2) establish additional practices for vessels entering U.S. waters after operating beyond the extraterritorial economic zone, and (3) require the reporting and recordkeeping of ballasting operations by all vessels.

4.5.2 Recommended Plan

Deepening the existing channel would not result in an increase in the number of vessels, but would allow vessel operators and shippers already using the channel to fully realize the economies of scale of fully loaded vessels instead of light-loading cargo in response to channel depth constraints. Therefore, the threat of introducing invasive aquatic species as a result of the channel deepening project is minimal.

4.6 Wetlands and Aquatic Resources

No wetlands or submerged aquatic vegetation exists in the project area. Therefore, these resources would not be impacted.

4.6.1 No-Action Alternative

No wetlands or submerged aquatic vegetation exists within the existing Galveston Harbor Channel. The Pelican Island PA is an existing active upland confined PA. As a result of the consistent periodic placement of maintenance dredged material into the PA as well as other maintenance activities associated with management of the PA, no persistent stands of wetlands or submerged aquatic vegetation occur or are expected to establish within the cells of the PA.

4.6.2 Recommended Plan

The No wetlands or submerged aquatic vegetation exists within the footprint of the propose Alternative. The frequency of dredged material placement and the related maintenance activities for the Recommended Plan would be the same as under the No Action Alternative. Therefore, no impacts to wetlands or aquatic resources are anticipated.

4.7 Marine Aquatic Resources

4.7.1 No-Action Alternative

Maintenance dredging of the existing -41-foot MLLW portion of the Galveston Harbor Channel routinely displaces approximately 81 acres of marine benthic channel bottom. The benthic habitat within and adjacent to the channel is highly disturbed due to the frequency of maintenance dredging operations and ship traffic. Therefore, it is expected that productivity of bottom dwelling organisms in this area is quite low compared to the overall bay system (USACE, 1975; USACE 1987), as maintenance activities may disturb and remove small free-swimming and benthic marine organisms in the immediate vicinity of the dredging work that are caught by the dredge cutter head or pulled into the pipeline by the pump. Most free-swimming organisms will not be impacted, since they are able to avoid the slow moving cutter head. Limited recolonization of the benthic community between maintenance cycles is expected to occur since the substrate and other environmental parameters related to sediment distribution that in turn affect invertebrate distribution do not differ greatly between maintenance cycles. As such, impacts to the existing low quality marine benthic population that occurs during maintenance dredging is minor and temporary.

4.7.2 Recommended Plan

Based on cross sections of the existing channel template, deepening the project by 5 feet to a maximum depth of 46 feet MLLW would result in a reduction in the channel bottom width to 1,075 feet, consistent with the remainder of the authorized channel project. Most of the new work dredging would occur at the toe of the channel slope and would only increase the top width on each side by a maximum of 7 feet. This increase in top width translates to around 0.8 acre of impact to bay bottom. However, given variations in conditions of channel and elevations of the top of slope dredging will likely widen the side slopes between 4 and 7 feet, or between 0.5 and 0.8 acre. In addition, the current dock owners along the channel routinely dredge the berths adjacent to the channels, thus the bay bottom adjacent to the channel is also undergoing routine disturbance from channel maintenance and ship traffic as well as maintenance activities to keep the adjacent private berths at required depths. Thus any impacts to bay bottom as a result of construction would not be “new”, but would be among the cyclical recurring impacts that occur during maintenance of the channel and adjacent berths under the No-Action scenario.

Since, no new permanent effects to invertebrates and benthos would occur as a result of the project, no mitigation would be required for this alternative.

4.8 Wildlife

4.8.1 No-Action Alternative

The existing navigation channel is located in a highly disturbed commercial port. Maintenance dredging of the existing channel results in temporary, minor disturbances to wildlife that may occur in the project area. Channel deepening would occur within the footprint of the existing project, which undergoes periodic maintenance dredging activities. Maintenance dredging produces disturbances similar to those expected from the work being proposed. Any temporarily displaced wildlife would have suitable habitat immediately available to them in the project vicinity. For these reasons, the proposed action is not expected to adversely affect wildlife.

4.8.2 Recommended Plan

Proposed dredging to deepen the channel would be undertaken in a highly disturbed commercial area of an existing navigation channel. The proposed project would result in temporary, minor disturbances to wildlife in the project area during construction. The channel deepening would occur within the footprint of the existing project, which undergoes periodic maintenance dredging, and would produce disturbances similar to wildlife resources similar to those incurred by wildlife during maintenance dredging activities. Temporarily displaced wildlife would relocate to available suitable habitat located immediately in the project vicinity as they do during routine maintenance dredging of the existing channel. For these reasons, the proposed action is not expected to adversely affect wildlife.

4.9 Fisheries and Essential Fish Habitat

4.9.1 No-Action Alternative

Fish within the project vicinity would continue to avoid direct dredging impacts from continued maintenance dredging of the exiting channel by swimming away from the disturbance. While maintenance dredging would periodically increase turbidity levels in the estuarine water column, these impacts would be minor in nature and of short duration, resulting in no adverse effects to EFH or fisheries.

4.9.2 Recommended Plan

The impacts of construction dredging on fish would be similar to those experienced under the No-Action Alternative. Fish within the project vicinity would swim out of the area avoid direct dredging impacts. Construction dredging to deepen the channel would result in temporarily increases in turbidity levels in the estuarine water column similar to levels experience during routine maintenance dredging. These impacts would be minor in nature and of short duration, resulting in no adverse effects to EFH or fisheries.

4.10 Threatened and Endangered Species

4.10.1 No-Action Alternative

Under the No-Action Alternative, no construction activities would occur and threatened and endangered species would not be affected. Routine channel maintenance activities and placement of dredged maintenance material within the existing active upland confined Pelican Island PA would continue to be where no suitable habitat exists for potential nesting sea turtles and piping plover. Brown pelicans feeding or resting in or near the vicinity of the project are highly mobile and would relocate to nearby areas to avoid disturbance from maintenance activities.

4.10.2 Recommended Plan

Construction and placement activities for the proposed channel extension project are short-term (approximately 4 months) and would occur within the footprint of the existing channel project, which undergoes routine maintenance dredging and placement. The routine maintenance activities produce disturbances similar to those expected from the construction dredging and placement being proposed. Construction dredging would be accomplished by hydraulic pipeline dredge, as opposed to hopper dredges that have the potential to impact sea turtles. Placement of dredged material would continue to be within the existing active upland confined Pelican Island PA. Brown pelicans feeding or resting in or near the vicinity of the project are highly mobile and would be able to relocate to nearby areas to avoid disturbance from construction activities.

For these reasons, the Recommended Plan is not expected to impact any listed species or their critical habitat. Therefore, no effect on any of the federally-listed species or their critical habitat is anticipated.

4.11 Cultural Resources

The proposed work was coordinated with the Texas State Historic Preservation Officer (SHPO). The SHPO concurred that the proposed channel deepening portion of the project would have

no effect on historic properties and that the proposed upland PA has no potential to effect historic properties. The construction contractor shall immediately stop all work in that area and notify the USACE Staff Archeologist should any cultural resources be discovered during construction. The USACE Staff Archeologist will coordinate any unanticipated discoveries with the SHPO, as necessary.

4.12 Air Quality and Noise

4.12.1 Air Quality

4.12.1.1 No-Action Alternative

No construction or new operating emission sources are associated with the No-Action Alternative.

4.12.1.2 Recommended Plan

Since the project is within an area classified as a "marginal" non-attainment area for ozone, an analysis was conducted based on the established criteria to determine if a formal air conformity analysis would be required. The analysis focused on short-term direct emission impacts resulting from project construction.

The analysis results indicate that short-term project construction emissions of both ozone precursors, NO_x and VOC, would amount to 106.4 and 1.62 tons per year, respectively. Emissions of VOC from the proposed project construction are below the 100 ton per year *de minimis* emissions threshold and are thus exempt from a General Conformity Determination. However, the NO_x emissions generated from project construction would exceed the applicable *de minimis* threshold level of 100 tons per year. As such, a Draft General Conformity Determination for NO_x emissions has been prepared pursuant to General Conformity Rule (41 CFR 93, Subpart B) to demonstrate that the proposed Galveston Harbor Channel Extension Project would comply with the requirements of the General Conformity Rule and would be in conformity with the SIP (Appendix D). The General Conformity Determination will be completed during Preconstruction Engineering and Design (PED) when the timing and design of the project is known.

It is estimated that emissions from dredging and material placement activities would produce short-term impacts to air quality in the immediate vicinity of the project. The duration of construction activities, including dredging and placement of dredged material, would not exceed 4 months. For comparison to the SIP Area Source Emissions budget, the annual NO_x emission rates estimated for the Galveston Harbor Channel Extension Project may be summarized in terms of tons per day and compared to the SIP emissions budget. The daily NO_x emissions for the Galveston Harbor Channel Extension Project non-road mobile equipment emissions would

be 1.2 tons per day, which represents less than two percent of the 64.53 tons per day SIP 2007 daily Non-road Emissions Budget for NO_x.

Based on an evaluation of the proposed Galveston Harbor Channel Extension Project emissions, it is believed that the total emissions of NO_x would result in a level of emissions that are well within the 2007 Non-road Mobile Emissions Budget in the most recently approved SIP revision. As the Galveston Harbor Channel Extension Project is not unusual in scope for an area like the HGB, it is anticipated that emissions from the project would be less than an increase of 10 percent of the VOC and NO_x emissions inventories for the entire HGB nonattainment area. Therefore, emissions from the activities subject to the USACE action are not considered regionally significant for purposes of General Conformity. Because of this, it is expected that emissions from the project construction would not:

- Cause or contribute to new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or,
- Delay timely attainment of any NAAQS or interim emission reductions or other milestones in any area.

4.12.2 Noise

4.12.2.1 No-Action Alternative

Under the No-Action Alternative, impacts related to noise would continue to be associated with periodic maintenance dredging and placement activities for the existing channel, primarily from the use of a cutterhead dredge (68 dBA). These impacts would continue to be short term, lasting only the duration of the maintenance dredging event.

4.12.2.2 Recommended Plan

Noise impacts associated with proposed dredging and placement activities are expected to be short term and would be very similar to noise levels during current maintenance dredging by cutterhead dredge (68 dBA) for the existing channel. No adverse impacts are anticipated for sensitive receptors in the project area vicinity.

4.13 WATER AND SEDIMENT QUALITY

4.13.1 Water Quality

4.13.1.1 No-Action Alternative

Under the No-Action Alternative, periodic maintenance dredging and placement activities for the existing Galveston Harbor Channel Project may result in elevated levels of suspended solids (TSS). However these levels are expected to be similar to levels experienced at times in Galveston Bay, which is often naturally turbid due to wind-induced re-suspension of bay sediments. Consequently, aquatic organisms are adapted to this type of disturbance. Therefore, any such impacts from continued dredged material placement operations are expected to be minor and would be temporary, occurring only during the dredging period, which occurs about every four years for the existing project. These impacts would continue to be short term, lasting only the duration of the maintenance dredging event.

Elutriate data do not indicate that re-suspension of contaminants (e.g. heavy metals, polycyclic aromatic hydrocarbons, PCBs, pesticides and other organics) into the water column would result in water quality problems during maintenance dredging operations of the existing channel.

4.13.1.2 Recommended Plan

Dredged material from the proposed extension would be placed in Pelican Island, an upland confined PA. The PA effluent would be decanted over a drop outlet structure, thereby controlling the release of suspended solids. Discharge operations may result in elevated levels of TSS; however these levels are expected to be similar to levels experienced under the No-Action Alternative during routine maintenance dredging of existing Galveston Harbor Channel Project. Any impacts from dredged material placement operations during project construction are expected to be minor and temporary, occurring only during the dredging period, which is expected to be about three months for the proposed project.

As with the No-Action Alternative, any re-suspension of contaminants (e.g. heavy metals, polycyclic aromatic hydrocarbons, PCBs, pesticides and other organics) into the water column would not result in water quality problems during dredging operations in this project.

The proposed dredged material placement plan has been evaluated with regard to the requirements of Section 404(b)(1) of the Clean Water Act (CWA)(Appendix F). Water quality certification was requested and was received in a letter from the TCEQ in a letter dated 9 July 2013 (Appendix B).

4.13.2 Sediment Quality

A comparison of sediment quality data with sediment quality screening guidelines together with toxicity and bioaccumulation assessments indicate that the sediments in the project vicinity have been and continue to remain suitable for discharge. Furthermore, the dredged material would be discharged into an upland confined PA. Therefore, unacceptable adverse

impacts on sediment quality are not expected to result from dredged material discharge operations.

4.14 Hazardous, Toxic, and Radioactive Waste

Based on the findings of the HTRW survey, the probability of encountering contaminated sites or toxic substances during project construction is considered low. Information compiled by this assessment indicates additional investigations are not warranted at this time.

4.15 Socioeconomics

4.15.1 No-Action Alternative

Activities associated with the proposed project have the potential to create additional waterborne commerce and temporary construction jobs, and jobs in related industries. Benefits associated with job creation could be manifested in increased economic output, and could increase revenues for supplementing the local tax base within the City.

4.15.2 Recommended Plan

Proposed deepening of this Galveston Harbor Channel Extension to 46-feet to be consistent with the dimensions of the remainder of the channel would allow the POG to more efficiently serve its tenants and customers by allowing the same number of existing vessels calling on the port facilities along the extension to be more efficiently (fully) loaded with cargo. However, since only a few commodities are affected (e.g. barite and cement) no increase in infrastructure and cargo handling facilities is anticipated.

4.16 Environmental Justice (EJ)

The minority and low-income populations living within the project area vicinity would not likely experience any adverse changes to the demographic, economic, or community cohesion characteristics within their neighborhoods, as a result of the proposed project. Increased spending in the area generated by construction and related activities could temporarily boost the local economy, resulting in temporary job creation or preservation of jobs in the construction and service sectors. Any newly created jobs would potentially be distributed among all groups equally.

Therefore, proposed project activities are not expected to present a disproportionately adverse effect on EJ populations within the study area vicinity. It is possible that proposed activities could positively impact EJ populations and other residents by increasing employment opportunities.

4.17 Prime and Unique Farmlands

Prime or unique farmlands are not present in the project area; therefore, no impacts would occur to these resources.

4.18 Recreational Resources

Tourism and recreation, both large contributors to the economy, would not be impacted by the proposed channel deepening. However, small recreational fishing vessels may be temporarily impacted due to temporary increases in turbidity levels and the presence of the dredge platform in the channel.

4.19 Roadways And Traffic

4.19.1 No-Action Alternative

Under the No-Action Alternative, roadway and railway infrastructure servicing the existing POG facilities is not planned, although period maintenance will likely occur. Vehicular traffic would continue to consist of a mixture of local area and urban residents, commercial and industrial vehicles associated with the Port industries, and tourists.

4.19.2 Recommended Plan

Temporary increases in vehicular traffic resulting from commuting construction workers could occur. These effects would be minor in nature. No other infrastructure improvements related to roadways or traffic are planned as a result of the proposed project.

4.20 Aircraft Wildlife Strikes

The Pelican Island PA was evaluated to determine if the proposed action could increase wildlife hazards to aircraft using Galveston Scholes Field International Airport, which is the only public use airport with a five-mile approach, departure, and circling radius of the project study area.

Though the Pelican Island PA is a designated upland confined PA, at times during placement activities during the maintenance dredging cycle may provide shallow open water habitat for birds and wildlife species that pose a strike hazard to aircraft. Proposed project would involve the use of Pelican Island PA for the one-time placement of construction material and the continued placement of maintenance dredged material from the Galveston Harbor Channel Extension, which would not result in a change in land use of the PA. Therefore, the proposed

action is not expected to increase wildlife hazards to aircraft using the Galveston Scholes Field International Airport

5.0 MITIGATION

No impacts are expected to occur to natural resources or cultural resources as a result of the proposed project. Therefore, no mitigation is needed for the proposed project activities. This determination is consistent with the recommendations of the January 14, 2011 USFWS PAL for the Galveston Harbor Channel Extension (Appendix B).

Impacts resulting from implementation of the Recommended Plan (i.e. -46-foot MLLW channel) would involve negligible impacts to very low quality bay bottom habitat comparable in type and magnitude to those experienced during routine maintenance that occurs for the existing channel template. Based on cross sections of the existing channel template, deepening the project to -46 feet MLLW would result in a reduced channel bottom width of 1,075 feet that is consistent with the remainder of the authorized Galveston Harbor Channel, which is currently at -46 feet MLLW. Most of the new work dredging would occur across the bottom width channel and toe slope; the maximum increase the top width on each side would be 7 feet. This increase in top width translates to around 0.8 acre of impact to bay bottom. However, given variations in conditions of channel and elevations of the top of slope dredging will likely widen the side slopes between 4 and 7 feet, or between 0.5 and 0.8 acre. In addition, the current dock owners along the channel routinely dredge their berths, thus the bay bottom adjacent to the channel is also undergoing routine disturbance from channel maintenance and ship traffic as well as maintenance activities to keep the adjacent private berths at required depths. Therefore, any impacts to bay bottom as a result of construction would not be "new", but would be among the cyclical recurring impacts that occur during maintenance of the channel and adjacent berths.

Similar impacts from the deepening of the Houston Ship Channel to 46-feet MLLW and widening to 460 feet, as well as deepening of the Galveston Harbor Channel to 46-feet MLLW (no widening) were discussed in the 1995 SEIS and 2007 LRR. The NEPA documents for the now completed projects recognized that the bay bottom substrates (benthic habitat) within the footprint of the existing maintained channels that did not support oyster reef was of very low quality compared to natural bay bottom; as such, impacts to bay bottom within the existing channels were determined to be negligible and required no mitigation. The Galveston Harbor Channel Extension involves deepening of only 2,571 feet linear feet of channel to be consistent with the bottom depth and dimensions of the recently constructed 46-foot MLLW project depth of the Galveston Harbor Channel. The total area of impact for the Galveston Harbor Channel Extension is less than percent of the entire HGNC impact footprint, and no oyster reef is present in this extension.

6.0 CUMULATIVE IMPACTS

Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Impacts include both direct effects (caused by the action and occurring at the same time and place as the action), and indirect effects (caused by the action but removed in distance and later in time, and reasonably foreseeable).

The economy of port city of Galveston, Texas, is deeply rooted in tourism, commercial fishing, and marine commerce. As a result of a long history of continuing urbanization, industrialization, and commercialization, both land and water resources in the project vicinity have been extensively altered. Past and present projects involving alterations of land and water within the vicinity Galveston Harbor Channel Project include extensive development and ongoing modification of private, commercial and POG docking facilities, rail yards and shipyards; development of cruise terminal facilities; construction and expansion of Texas A&M University at Galveston; and improvements to numerous restaurant and retail businesses along the waterfront. Past alterations of the bay environment include the original construction and subsequent deepening of the Galveston Harbor Channel (Bolivar Roads to POG Pier 38) to -46-feet MLLW as well as the construction, modification and maintenance of the nearby GIWW and Texas City and Houston Ship Channels.

Reasonably foreseeable future projects in the vicinity of the project include improvements to infrastructure and the existing navigation channel, as well as expansion of commercial and industrial facilities along the navigation channel. A few representative projects are listed below.

1) Galveston Harbor Channel Extension
2) POG Dock Improvements (fill in slips at Pier 12 and 14 (Year 2011)
3) Containership Terminal on Pelican Island
4) Pelican Island Storage Terminal Expansion (Year 2011)
5) Texas City Shoal Point Container Facility
6) GIWW maintenance and modifications

As a result of past and present activities, the proposed project template is within previously disturbed areas of the authorized Galveston Harbor Channel project and associated docks. From a NEPA standpoint, proposed project improvements would occur within an area that has undergone

extensive channel construction and maintenance dredging in the past as well as urban, industrial and commercial development. As such, the area is considered a disturbed area with little to no vegetated shoreline and poor quality benthic and open water habitats compared to other areas of the open bay.

Dredged material generated from the construction and maintenance of the Galveston Harbor Channel Extension project would be placed in the Pelican Island PA (see Figure 5), an existing upland confined placement area, and would not involve impacts to terrestrial and aquatic resources. Maintenance dredging frequency and volume requirements for the project remain unchanged from the existing authorized project. Any impacts associated with the proposed Galveston Harbor Channel Extension would involve only minor, temporary or short-term impacts during the duration of project construction as discussed in Section 4.0 of this EA.

The effects described are similar in nature and magnitude to the effects these resources have experienced during the recent deepening of 3.8 miles (Sta. 0+000 to 20+000) of the Galveston Harbor Channel from -41 feet MLLW to -46 feet MLLW, and to the effects they routinely experience and will continue to experience in association with ongoing routine maintenance dredging of the authorized Galveston Harbor Channel project and adjacent dock facilities. The project would temporarily displace fish and wildlife species and marine benthic organisms during construction activities. Mobile fish and wildlife species would relocate to nearby suitable habitat. Much of the benthic substrate in the project footprint is poor quality disturbed habitat due to the construction and recurring maintenance dredging of the exiting Galveston Harbor Channel and docking facilities and ship traffic. As such, impacts to the benthic population from construction of the project are considered negligible.

The water column and water quality would be temporarily affected by turbidity during construction activities, but no more than has occurred during construction of the existing -46-foot MLLW channel or its periodic maintenance. While emissions from construction activities would exceed air quality standards, they are expected to conform to the SIP for air quality compliance (see Appendix D). The Galveston Harbor Channel Extension would have long-term beneficial impacts on the socioeconomics of tenants and customers in the project area by increasing cargo loading efficiency of the existing vessels calling on the port facilities along the extension.

In conclusion, the anticipated adverse impacts of the proposed project to human health and the environment are minimal and would not significantly contribute to the cumulative effects of past, present and future projects within the project vicinity. The result of the project would benefit the POG and its tenants and customers by increasing cargo loading efficiency of the existing vessels calling on the port facilities along the waterway.

7.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

This EA has been prepared to satisfy the requirements of all applicable environmental laws and regulations, and has been prepared in accordance with the Council on Environmental Quality's (CEQ) implementing regulations for the National Environmental Policy Act, 41 CFR Parts 1500 – 1508, and USACE Regulation ER 200-2-2, *Environmental Quality: Procedures for Implementing NEPA.* Following is a list of applicable environmental laws and regulations that were considered in the planning of this project and the status of compliance with each:

7.1 National Environmental Policy Act

This EA has been prepared in accordance with CEQ regulations for implementing NEPA. The environmental and social consequences of the recommended plan have been analyzed in accordance with NEPA and disclosed in this document.

7.2 Fish and Wildlife Coordination Act of 1958, as Amended

The Recommended Plan is being coordinated with the USFWS and the Texas Parks and Wildlife Department. During the coordination process, the agencies provided information on fish and wildlife resources and planning input that was considered in the development of the project. In accordance with the Fish and Wildlife Coordination Act, the USFWS provided comments and recommendations on the Recommended Plan in a Planning Aid Letter dated January 14, 2011 (Appendix B), which the District considered in formulating plans for avoiding and minimizing impacts to fish and wildlife.

7.3 National Historic Preservation Act of 1966, as Amended

Compliance with the National Historic Preservation Act of 1966, as amended, requires identification of all National Register of Historic Places (NRHP)-listed or NRHP-eligible properties/resources in the project area and development of mitigation measures for those adversely affected in coordination with the SHPO and the Advisory Council on Historic Preservation. This Recommended Plan was determined to be of such limited nature that it does not have the potential to cause effect on historic properties. The SHPO concurred with this determination by letter dated April 16, 2008 (Appendix B). This project is in compliance with the National Historic Preservation Act pursuant to 36 CFR 800.3(a).

7.4 Coastal Barrier Improvement Act of 1990

The Coastal Barrier Resources Act of 1982 established the John H. Chaffee Coastal Barrier Resources System to minimize the loss of human life, wasteful Federal expenditures, and damage to fish, wildlife, and other natural resources associated with coastal barriers. The Coast Barrier Improvement Act of 1990 was enacted to reauthorize the Coastal Barrier Resources Act (CRBA) of 1982. The act defines coastal barriers as "bay barriers, barrier islands, and other geological features composed of sediment that protect landward aquatic habitats from direct wind and waves." As part of the program, the Federal government discourages development on designated undeveloped coastal barriers by restricting certain Federal financial assistance, including USACE development projects. The nearest CBRA zones are TX-03A and TX03AP located on Bolivar Peninsula approximately 3 miles southeast of the southern limit of the HSC, and TX-04 located on the mainland shoreline of Galveston Bay between the Texas City Dike and the Galveston Island Causeway. The Recommended Plan is in compliance with the Coastal Barrier Improvement Act of 1990 as the project would not encourage coastal barrier development and would only support previously existing development in areas outside of these designated resource areas.

7.5 Magnuson-Stevens Fishery Conservation Management Act (MSFCMA)

Congress enacted amendments to the MSFCMA in 1996 that established procedures for identifying EFH and required interagency coordination to further the conservation of federally-managed fisheries. Rules published by the NMFS (50 CFR 600.805 through 600.930) specify that any Federal agency that authorizes, funds or undertakes, or proposes to authorize, fund or undertake an activity that could adversely affect EFH be subject to the consultation provisions of the MSFCMA. No significant impacts to living marine resources or EFH would occur as a result of implementing the Recommended Plan, therefore no mitigation is required.

7.6 Coastal Zone Management Act of 1972 (CZMA)

The CZMA requires that all land-use changes in the project area be conducted in accordance with approved state coastal zone management programs. Any project that is located in, or that may affect land and water resources in the Texas coastal zone and that requires a Federal license or permit, or is a direct activity of a Federal agency, or is federally funded must be reviewed for consistency with the Texas Coastal Management Program (TCMP). The proposed action is within the coastal boundary defined by the TCMP. The District has determined that the proposed project would not adversely impact these resource areas and that the proposed activities are consistent with the goals and policies of the TCMP to the maximum extent practicable. The District's consistency review is included in Appendix G.

7.7 Endangered Species Act of 1973, as Amended

The District coordinated this project with the USFWS and the NMFS under Section 7 of the ESA, regarding federally-listed threatened and endangered species or their habitat, of potential occurrence in the project area. In the PAL dated January 14, 2011 (see Appendix B), the USFWS recommended that presence/absence surveys be conducted in suitable areas adjacent to Pelican Island and any necessary consultation procedures initiated with the USFWS pursuant to Section 7 of the ESA to ensure that Piping plover are not inadvertently disturbed or harassed.

The shorelines along the ship channel in the vicinity of the proposed deepening of the Galveston Harbor Channel Extension project are predominantly bulk-headed and used by dock facilities short stretches of shorelines having shell hash substrates occur to a lesser extent in the project area in areas such as that found at TAMUG Clipper dock area. These areas are continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas unsuitable for piping plover. Any disturbance to the channel shorelines caused by the proposed deepening of the Galveston Harbor Channel Extension project would be of the same type and magnitude as experienced with the periodic maintenance dredging and placement into the Pelican Island PA associated with the authorized Federal project. Therefore, the USACE has determined that proposed project will have no effect on piping plover and presence/absence surveys will not be necessary.

Available information, investigations, and informal consultation with USFWS and NMFS have determined that the proposed project would not result in adverse impacts to any federally listed threatened or endangered species and no critical habitat is present in the project area. A Biological Assessment (BA) was prepared describing potential impacts on these listed species (attached as Appendix C). The BA was coordinated with the USFWS and the NMFS for concurrence with the USACE finding that proposed project activities will have no effect on any federally-listed threatened or endangered species, or critical habitat.

7.8 Clean Air Act of 1972, as Amended

As required by the CAA, the EPA has promulgated the General Conformity Rule, which requires that Federal agencies consult with State and local air quality regions to inform them of expected impacts of a Federal action and associated effects on their SIP emissions budget. The project is located in Galveston County, Texas, which is a severe non-attainment area for the 8-hour ozone standard. An analysis was conducted to determine if a formal air conformity analysis would be required. The results indicated that short-term construction emissions of both ozone precursors, NO_x and VOC, would amount to 106.4 and 1.62 tons per year, respectively.

This indicates that NO_x emissions exceed the threshold level of 25 tons per year. As such, a Draft General Conformity Determination for NO_x emissions has been prepared pursuant to General Conformity Rule (41 CFR 51.855) to demonstrate that the proposed Galveston Harbor Channel Extension Project would comply with the requirements of the General Conformity Rule and would be in conformity with the SIP (Appendix D). A Final General Conformity Determination will be completed during PED when project timing and design are known.

7.9 Clean Water Act of 1977, as Amended (CWA)

The District evaluated the proposed action pursuant to Section 404(b)(1) of the CWA and this analysis is included in Appendix F. A Joint Public Notice was issued with the TCEQ (Appendix B). The TCEQ is the state agency for issuing state water quality certifications pursuant to Section 401 of the CWA. A copy of the state water quality certification is included in Appendix B.

7.10 Executive Order 11990 – Protection of Wetlands

The proposed action has been analyzed for compliance with EO 11990. The project area does not contain wetlands, nor would wetlands outside the project area be affected by the project. Therefore, the proposed project is in compliance with this EO.

7.11 Executive Order 12898 – Environmental Justice

This Order directs Federal agencies to achieve EJ to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review. Agencies are required to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The proposed project would not have a disproportionate adverse impact on minority or low-income population groups within the project area.

7.12 CEQ Memorandum Dated August 11, 1980 – Prime or Unique Farmlands

Prime or Unique farmlands are not present in this project area.

7.13 Executive Order 11988 Floodplain Management

EO 11988 directs Federal agencies to evaluate the potential effects of proposed actions on floodplains. Such actions should not be undertaken that directly or indirectly induce growth in the floodplain unless there is no practical alternative. The recommended plan would not induce

increased flooding in developed areas and would not contribute to increased future flood damages, and would not induce further development.

7.14 Migratory Bird Treaty Act (MBTA)

This EO directs Federal agencies to increase their efforts under the MBTA, Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, the ESA of 1973, NEPA of 1969 and other pertinent statutes as they pertain to migratory birds to avoid measurably negative take of migratory bird populations. Channel deepening and placement activities would not impact migratory bird populations.

7.15 Memorandum of Agreement Between the Federal Aviation Administration - Aircraft Wildlife Strikes

A MOA was executed among the FAA, the U.S. Air Force, the U.S. Army, EPA, USFWS, and the USDA, with the intention to minimize wildlife risks to aviation and human safety, while protecting the Nation's valuable environmental resources. Pursuant to this MOA, Agencies should not construct projects within a specified distance of airports that may become an attractant to wildlife deemed hazardous to aircraft. Scholes International Airport on Galveston Island is located within a 5-mile radius of the proposed project area. However, channel deepening and placement activities would not become an attractant to wildlife or migratory bird populations that would impact aircraft.

7.16 Invasive Species, Executive Order 13112

EO 13112 directs Federal Agencies to, within Administration budgetary limits, prevent the introduction of invasive species; detect and respond rapidly to and control populations of such species in a cost-effective manner; monitor invasive species populations accurately and reliably; provide for restoration of native species and habitat condition in ecosystems that have been invaded; conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and promote public education on invasive species and the means to address them. Because of the frequency of dredged material placement on Pelican Island PA and the containment and treatment of ship's ballast water, the threat of proliferating the introduction or establishment of invasive species in land or water areas of the project vicinity is minimal.

8.0 CONCLUSIONS

The proposed project would not result in significant impacts to the human environment; therefore, preparation of an EIS is not required. The following specific conclusions summarize the findings of the EA, as detailed in the environmental analyses in Section 4.0:

- Aquatic habitat would be temporarily affected during the construction activities; these impacts represent minor impacts to the environment.
- No terrestrial habitats would be affected by the recommended modifications to the channel, though terrestrial areas within the confined upland PA would be affected.
- Fish and invertebrates may be affected locally in the project area during construction activities, but the impacts would be minor and temporary.
- The project would have no effect on threatened or endangered species.
- Historic properties or recorded archeological sites would not be affected by the proposed action.
- Emissions from construction activities exceed air quality standards but are expected to conform to the SIP for air quality compliance.
- Implementation of the proposed action would not result in any permanent noise impacts; noise levels produced during construction would be similar to those experienced during regular channel maintenance.
- There would be no long-term impacts to water quality from the proposed activities.
- There would be no hazardous and/or toxic waste impacts from the proposed action.
- There would be minor, temporary impacts to recreational resources during the construction period, but no long-term impacts.
- No significant or adverse impacts to environmental resources are expected to occur as a result of implementation of the proposed project. No adverse cumulative impacts to environmental resources are expected as a result of project implementation.
- The USACE finds that the proposed action is in compliance with the TCMP.

9.0 PUBLIC INVOLVEMENT, REVIEW, AND COORDINATION

A Notice of Availability (NOA) for the Environmental Assessment, Galveston Harbor Channel Extension, Post-Authorization Change Report was released on 10 May, 2013. This public notice was made available to solicit public views and concerns regarding the tentatively recommended channel improvements and the Draft General Conformity Determination (DGCD). Documents were made available for review and comment for a period of 30 days from 10 May to 10 June, 2013. The PACR was never finalized due to the Houston-Galveston Navigation Channel 902 limit exceedance. However, in February 2016 a new Federal Cost

Share Agreement (FCSA) was signed and the study was resumed under Section 216 of the Flood Control Act (FCA) of 1970. Comments on the DEA were used to evaluate the impacts of alterna-tives and to identify a plan that is socially and environmentally acceptable.

The Environmental Assessment (EA) was coordinated with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and other Federal, state, and local agencies. A list of agencies with whom activities were coordinated is provided in the NOA in Appendix E. Comments were received only from EPA, NMFS, and TPWD. Agency correspondence and USACE response to comments is found in Appendix B. The Galveston Harbor Channel Extension Project is very limited in scope, non-controversial, and affects only a previously deepened and regularly maintained channel. No further public review is planned.

10.0 LITERATURE CITED

Angelou Economics. 2008. Galveston Island Tourism Economic Impact Analysis.

Berger, R. C., R. T. McAdory, W. D. Martin, and J. H. Schmidt. 1995a. Houston- Galveston Navigation Channels, Texas Project, Report 3, Three-Dimensional Hydrodynamic Model Verification. Technical Report HL-92-7. Vicksburg, MS: U.S. Army Engineer, Waterways Experiment Station.

Berger, R.C, R. T. McAdory, J. H. Schmidt, W. D. Martin, and L. H. Hauck. 1995b. Houston-Galveston Navigation Channels, Texas Project, Report 4, Three- Dimensional Numerical Modeling of Hydrodynamics and Salinity. Technical Report HL-92-7. Vicksburg, MS: U.S. Army Engineer, Waterways Experiment Station.

Blair, W.F. 1950. The biotic provinces of Texas. Texas Journal of Science 2:93–117.

Buchman, M. F. 1999. NOAA Screening Quick Reference Tables, NOAA HAXMAT Report 99-1. Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, Seattle WA. 12pp.

CDM. 2010. City of Galveston Comprehensive Housing Market Study, Final Report.

CEC Environmental Exchange. 2004. Research to begin on wind farm and bird collisions: CEC News Letter, February 2004. http://www.cechouston.org/newsletter/2004/nl_02-04/windfarm.html. Accessed July 15, 2010.

Espey Houston Associates. 1992. Underwater Investigations, Houston-Galveston Navigation Channels, Texas Project; Galveston, Harris, Liberty, and Chambers Counties, Texas.

Galveston Bay National Estuary Program. 2008. Seafood Safety for Galveston Bay, Galveston Bay National Estuary Program, Fish and Shellfish Consumption Advisory for Galveston Bay: ADV-35. http://www.gbep.state.tx.us/hot-topics/seafood-safety.asp. Accessed July 15, 2010.

Galveston Bay Estuary Program. 2011. The Quiet Invasion: A Guide to Invasive Species of the Galveston Bay Area. http://www.galvbayinvasives.org/. Accessed June 1, 2011.

_____. 1992.

Gould, F.W. 1975. The Grasses of Texas. Texas A&M University Press, College Station.

Intergovernmental Panel on Climate Change (IPCC) 2007 Climate Change 2007: Synthesis Report, Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team Pachauri, R.K and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland, 104 p.

National Oceanic and Atmospheric Administration (NOAA). 2010. Mean Sea Level Trend 8771460 Galveston Pleasure Pier 21, Texas. http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8771460. Accessed January 5, 2011

National Marine Fisheries Service. 2013. Endangered and Threatened Species and Critical Habitats under the Jurisdiction of the NOAA Fisheries Service – Texas. http://sero.nmfs.noaa.gov/pr/endangered%20species/specieslist/PDF2012/Gulf%20of%20Mexico.pdf. Accessed April 2, 2013.

National Response Center (NRC). 2008. http://www.nrc.uscg.mil. Accessed April 7, 2009.

National Research Council (NRC) 1987. Responding to changes in sea level: engineering implications. Commission of Engineering and Technical Systems, National Research Council, National Academy Press, Washington, D.C.

Natural Resources Conservation Service (NRCS). 2011. SSURGO (Soil Survey Geographic Database) for Galveston County, Texas, Natural Resources Conservation Service, U.S. Dept. of Agriculture. http://soildatamart.nrcs.usda.gov/. Accessed January 5, 2011.

Nelson, D. A. and E. J. Pullen. 1988. Environmental Considerations in Using Beach Nourishment for Dredged Material Placement. Pages 113-128 in Lazor, R. L. and R. Medina, eds. 1990. Beneficial Uses of Dredged Material: Proceedings of the Gulf Coast Regional Workshop, U. S. Army Corps of Engineers, Washington, D.C. Technical Report D-90-3.

Pattillo, M.E., T.E. Czapla, D.M. Nelson, and M.E. Monaco. 1997. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries, Volume II: Species life history summaries. ELMR Rep. No. 11. NOAA/NOS SEA Division, Silver Spring, MD. 377 p.

PBS&J. 2007. Galveston Harbor and Channel, Contaminant Assessment, Galveston County, Texas. PBS&J Document No. 070067. Austin, Texas.

Purdy, E.G. 1964. Sediments as Substrates, in Approaches to Paleoecology, John Wiley Publishers, New York, N.Y.

Sanders, H.L. 1958. Benthic Studies in Buzzards Bay, Animal-Sediment Relationships, Limnology and Oceanography, vol. 3, no. 3, pp. 246-258.

Sheridan, P. 2000. Seagrass Restoration in the Galveston Bay Estuary. National Marine Fisheries Service, Galveston, Texas. http://gbep.tamug.tamu.edu/mysearchx.html. Accessed September 24, 2011.

Soil Conservation Service (SCS) (now the NRCS). 1988. Soil Survey Map of Galveston, County, Texas.

Texas Commission on Environmental Quality. 2008a. www.tceq.state.tx.us/assets/public/complilance/monops/water/08twqi/2008_basin24.pdf. Accessed December 21, 2010.

_____. 2008b. www.tceq.state.tx.us/assets/public/complilance/monops/water/08twqi/2008_sources.pdf. Accessed December 21, 2010.

_____. 2008c. www.tceq.state.tx.us/assets/public/complilance/monops/water/08twqi/2008_303d.pdf. Accessed December 21, 2010.

Texas Department of State Health Services. 2010a. Classification of Shellfish Harvesting Areas of Galveston Bay. http://www.dshs.state.tx.us/seafood/MapsPDF/ShellfishClassificationMaps/Galveston10.pdf Accessed December 21, 2010.

_____. 2010b. Classification of Shellfish Harvesting Areas of West Galveston Bay. http://www.dshs.state.tx.us/seafood/MapsPDF/ShellfishClassificationMaps/West%20Galveston10.pdf. Accessed December 21, 2010.

_____. 2008. Fish and Shellfish Consumption Advisory ADV-35. http://www.dshs.state.tx.us/seafood/PDF2/FishConsumptionAdvisoryBaNNews/ADV-35_signed.pdf. Accessed July 8, 2008.

Texas Parks and Wildlife Department. 2011. Texas Parks and Wildlife Department Endangered Species List – Chambers County, Texas. http://gis2.tpwd.state.tx.us/ReportServer$GIS_EPASDE_SQL/Pages/ReportViewer.aspx?%2fReport+Project2%2fReport5&rs:Command=Render&county=Galveston. Accessed January 17, 2013.

The Nature Conservancy of Texas. 2009. Texas City Prairie Preserve. http://www.nature.org/wherewework/northamerica/states/texas/preserves/texascity.html. Accessed February 18, 2009.

Törnqvist, T.E., Bick, S.J., van der Borg, K., and de Jong, A.F.M., 2006, How stable is the Mississippi Delta?: Geology, v. 34, p. 697–700, doi: 10.1130/G22624.1.

United States Coast Guard (USCG). 2011a. Aquatic Nuisance Species. http://www.uscg.mil/hq/cg5/cg522/cg5224/ans.asp. Accessed February 7, 2011.

_____. 2011b. Ballast Water Management. http://www.uscg.mil/hq/cg5/cg522/cg5224/bwm.asp Accessed February 7, 2011.

USACE. 2008. USACE Sea Turtle Data Warehouse http://www.el.erdc.usace.army.mil/seaturtles/species.cfm. Accessed July 15, 2010.

USACE 1987. Final Feasibility Report and Environmental Impact Statement, Galveston Bay Area Navigation Study. Volume I, Main Report. U.S. Army Corps of Engineers, Galveston District, Galveston, Texas.

_____. 1975. Final Environmental Statement, Maintenance Dredging, Gulf Intracoastal Waterway, Texas Section, Main Channel and Tributaries. U.S. Army Engineer District, Galveston, Texas

U.S. Fish and Wildlife Service. 2013. U.S. Fish and Wildlife Service Endangered Species List – Galveston County, Texas. http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm Accessed January 17, 2013.

United States Environmental Protection Agency (USEPA). 2007. Approval and Promulgation of State Implementation Plans; Texas; Discrete Emission Credit Banking and Trading Program. http://www.epa.gov/fedrgstr/EPA-AIR/2006/September/Day-06/a7414.htm. Accessed December 21, 2010.

Ward, G.E., and N.E. Armstrong. 1992. Ambient Water and Sediment Quality of Galveston Bay: Present Status and Historical Trends. Prepared for the Galveston Bay National Estuary Program, Publication GBNEP-22. Center for Research in Water Resources. University of Texas at Austin. August.

White, W.A., T.R. Calnan, R.A. Morton, R.S. Kimble, T.G. Littleton, J.H. McGowen, H.S. Nance, and K.E. Schmedes. 1985. Submerged Lands of Texas, Galveston-Houston Area: Sediments, Geochemistry, Benthic Macroinvertebrates, and Associated Wetlands, Bureau of Economic Geology, Austin, Texas.

Appendix A

Houston-Galveston Navigation Channels Supplemental Environmental Impact Statement Record of Decision

US Army Corps
of Engineers

Galveston District
Southwestern Division

Houston-Galveston Navigation Channels, Texas

Limited Reevaluation Report
and
Final Supplemental Environmental Impact Statement

November 1995

RECORD OF DECISION

HOUSTON-GALVESTON NAVIGATION CHANNELS, TEXAS

This Record of Decision to the Supplemental Environmental Impact Statement (SEIS), presents the basis for my decision to recommend deepening the channel entrance from its present depth of 42 feet to 47 feet, deepening and widening the Houston Ship Channel from 40 feet deep by 400 feet wide to 45 feet deep by 530 feet wide for most of it length, and deepening the Galveston Channel from 40 feet to 45 feet. The project includes an Environmental Restoration Plan that incorporates environmental navigation design measures and the beneficial use of dredged material to initially construct 690 acres of marsh habitat (wetlands) and a 12-acre colonial waterbird nesting island using new work dredged material, incrementally develop an additional 3,560 acres of marsh over a 50-year period using maintenance dredged material, and construct other island restoration features using the initial and future maintenance dredged material. The project is economically and environmentally justified, and in the public interest.

A wide array of structural and nonstructural alternatives was evaluated in the Environmental Impact Statement for the Galveston Bay Area Navigation Study that was completed in July 1988. The alternatives are described and discussed on pages 60 through 85 in the Galveston Bay Area Navigation Study Final Feasibility Report and Environmental Impact Statement, Volume 1, Main Report, and are hereby incorporated by reference. Although the Galveston Bay Area Navigation Study developed a well defined plan that sufficiently addressed National Economic Development benefits, the adequacy and the assessment of project impacts were questioned by state and Federal resources agencies. Due to the environmental concerns, a Limited Reevaluation Report and the SEIS were prepared to reevaluate the project and assess the environmental aspects with a focus on optimizing environmental channel design features and beneficial uses of dredged material to form the Environmental Restoration Plan. Alternatives considered in the SEIS included no action, upland disposal, ocean disposal, open bay disposal, and navigation improvements (enlargement of channels). The recommended plan, navigation improvements incorporating the Environmental Restoration Plan, is the environmentally preferable plan.

The findings of the SEIS are based on numerous environmental and engineering studies recommended by an Interagency Coordination Team. The Interagency Coordination Team was composed of the U.S. Army Corps of Engineers, the project sponsors, and several state and Federal environmental agencies. As a result of this unparalleled coordination and cooperation, the recommended plan is considered the environmentally preferable plan. The only mitigation necessary for this enormous dredging project is the construction of 118 acres of artificial oyster reef to replace direct losses of natural reef. After completion of project construction, the Port of Houston Authority, one of the project sponsors, has agreed to monitor and maintain all beneficial use sites at no expense to the Federal government.

Technical and economic criteria specified in the Water Resources Council's Principles and Guidelines were used to formulate alternative channel designs. All applicable laws, executive orders, and regulations were considered in evaluating design alternatives. All practicable means to avoid or minimize environmental damage by the selected alternative have been adopted.

I have reviewed and evaluated all documents concerning the Galveston District Engineer's recommendation, including the views of other interested agencies and the general public, and have considered prevailing administrative policies, and the resolutions by the Committee on Public Works of the United States House of Representatives, dated October 19, 1967, and December 9, 1975. Based upon these factors, I find that the plan recommended in the Final Limited Revaluation Report and SEIS, and authorized by Congress in Public Law 104-303, Section 101(a)(30), is suitable for implementation for navigation improvements and environmental restoration. I further conclude that the Houston-Galveston Navigation Channels project should be implemented as soon as practicable.

Based on the conditions set forth in the Galveston District Engineer's finding and the added conditions set forth herein, I conclude that the public interest is best served by the decisions as set forth herein.

RUSSELL L. FUHRMAN
Major General, USA
Director of Civil Works

29 Jan 98
DATE

APPENDIX B

Agency Coordination

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

Mr. Rusty Swafford
National Marine Fisheries Service
Environmental Assessment Branch
4700 Avenue U
Galveston, TX 77550

Dear Mr. Swafford:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is explained in the attached Notice of Availability and described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

Sections 3.9 and 4.9 of the Draft EA include discussions of marine fi heries and Essential Fish Habit (EFH) in the project area, as well as the proposed project's potential impacts on these resources. The District has determined that the proposed project would have minimal and temporary impacts on fisheries and EFH. Pursuant to regulations published by the National Marine Fisheries Service (50 CFR 600.805 through 600.930) under the Magnuson-Stevens Fishery Conservation and Management Act, we request initiation ofEFH consultation and that the Service review the enclosed informatio,tn and provide written comments and concurrence with this determination.

If you or your staff have any questions regarding this project, please contact Andrea Catanzaro at (409) 766-6346, or by email at andrea.catanzaro@usace.army.mil.

Sincerely,

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car:l rphy
Chief, Environmental Section

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DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

Environmental Section

December 18. 2009

Mr. David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Bernhart:

This letter is in regard to a proposed 2,571 foot extension of the Galveston Harbor Channel. The Galveston Harbor Channel branches off the Galveston Bay Entrance Channel at the Bolivar Roads junction, and proceeds westerly between Galveston Island and Pelican Island, in Galveston County Texas (see enclosed figures).

The proposed project would improve navigation efficiency by deepening a portion of the existing 40-ft deep x 1,075-ft wide channel to 45 feet depth, starting near the Port of Galveston's Pier-38, and proceeding westward towards the Pelican Island Bridge (from Station 20+000 to Station 22+571), extending the existing channel an additional 2,571 feet. No widening is proposed and the existing bottom width of 1,075 feet would be retained, for both the existing and extended channel. Channel dredging would generate 609,500 cubic yards of new work dredged material which would be placed in the existing Pelican Island Placement Area (Cell "B").

To ensure compliance with the requirements of Section 7(a)(2) of the Endangered Species Act, a list is requested of any species which are listed or proposed to be listed, as well as any critical habitat that may be present in the area of the proposed action.

If you or your staff has any questions regarding this activity, ph:asc contact Ceorge Dabney at (409) 766-6345.

Sincerely,

y

Enclosures

Chief, Environmental Section

Identical letter sent lo:
Mr. Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058-3051

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

December 18, 2009

Environmental Section

Mr. Steve Parris
Field Supervisor
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058-3051

Dear Mr. Parris:

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If you or your staff has any questions regarding this activity, please contact George Dabney at (409) 766-6345.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosures

Identical letter sent to:

Mr. David M. Bernhart
Assistant RA for Protected Resources
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051

January 2010

Thank you for your request for threatened and endangered species information in the Clear Lake Ecological Services Field Office's area of responsibility. According to Section 7(a)(2) of the Endangered Species Act and the implementing regulations, it is the responsibility of each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species.

Please note that while a Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment, the Federal agency must notify the U.S. Fish and Wildlife Service (Service) in writing of such designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

A county by county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://vV\VW.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm. You should use the county by county listing and other current species information to determine whether suitable habitat for a listed species is present at your project site. If suitable habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present.

After completing a habitat evaluation and/or any necessary surveys, you should evaluate the project for potential effects to listed species and make one of the following determinations:

- **No effect** - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with theService is necessary. However, if the project changes or additional information on the distribution oflisted or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

- **Is not likely to adversely affect** - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

- **Is likely to adversely affect** - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal Section 7 consultation with this office.

Regardless of your determination, the Service recommends that you maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Endangered Species Act requirements for your projects at http://endangered.fws.gov/consultations/s7hndbk/s7hndbk.htm.

If we can further assist you in understanding a federal agency's obligations under the Endangered Species Act, please contact Moni Belton, David Hoth, Charrish Stevens, Arturo Vale or Catherine Yeargan at 281/286-8282.

Sincerely,

Stephen D. Parris
Field Supervisor, Clear Lake Field Office

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

Ms. Edith Edling
Field Supervisor
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Dear Ms. Erfling:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is explained in the enclosed Notice of Availability and described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

The District is requesting that the U. S. Fish and Wildlife Department review the enclosed Draft EA and provide any comments your agency may have regarding this proposed project pursuant to the Fish and Wildlife Coordination Act. We are also requesting your concurrence with the enclosed Biological Assessment (BA), which is included as Appendix D of the EA. The BA addresses the project's potential to affect federally-listed threatened and endangered species and species of concern. The overall conclusion of the BA is that the project will have no effect on federally-listed threltened or endangered species, nor will it impact critical habitat.

We appreciate your continued cooperation in coordinating the proposed project. If you or your staff has any questions regarding this project, please contact Andrea Catanzaro at (409) 766-6346, or by email at andrea.catanzaro@usace.army.mil.

Sincerely,

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Carolyn Murphy
Chief, Environmental Section

Encls

United States Department of the Interior
FISH AND WILDLIFE SERVICE

Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 FAX: 281/488-5882

January 14, 2011

Colonel Christopher Sallese
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Colonel Sallese:

This planning aid letter serves to provide the U.S. Fish and Wildlife Service's (Service) comments and recommendations regarding the U.S. Army Corps of Engineers, Galveston District (Corps) Houston-Galveston Navigation Channels (HGNC), Texas, Galveston Channel (Channel) Extension Project. The proposed Channel project will extend the length of the existing 40-foot deep by 1075 foot wide channel by an additional 2,571 feet, beginning at approximately Pier 38 (Station 20+000) and proceeding westward toward the Pelican Island Bridge (Station 22+571). This extension requires the Channel to be deepened to a depth of 45 feet resulting in the placement of an estimated 609,500 cubic yards of dredged material and future dredge maintenance material (160,000 cubic yards/year) in the existin.g Pelican Island Placement Area (PA).

Through this planning aid letter, the Service identifies and describes existing fish and wildlife resources within the proposed project area; evaluates and compares proposed alternatives; identifies potentially significant impacts; identifies modifications or alternatives which address fish and wildlife related problems, opportunities, or planning objectives; and recommends measures for resource protection early in the project planning process. Our comments are provided in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. 661-667(e)), with the provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), and are intended to assist in the preparation of any further project assessments. This information does not represent a final report of the Secretary of the Interior within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act.

Project Background

Galveston Bay, the largest inland bay on the Texas coast, is a relatively shallow estuary that connects with the Gulf of Mexico. Several deep-water channels traverse Galveston Bay to provide access to the deepwater ports of Houston, Texas City, Bayport, and Galveston (Figure 1). The 1987 Galveston Bay Area Navigation Study is a feasibility study for improving the Houston and Galveston ship channels, which recommended that Galveston Harbor and Channel

be deepened to 50 feet and widened to 450 feet to provide access for larger ships in the Gulf of Mexico. The project, reviewed by the Assistant Secretary of the Army, resulted in a limited reevaluation report (LRR). The LRR was completed in November 1995 and recommended the Channel be deepened to 45 feet and widened to between 650 and 1,112 feet. However, the City of Galveston (the non-federal sponsor) lacked the funds to complete the project and subsequently transferred project responsibilities to the Port of Galveston (POG) in 2006.

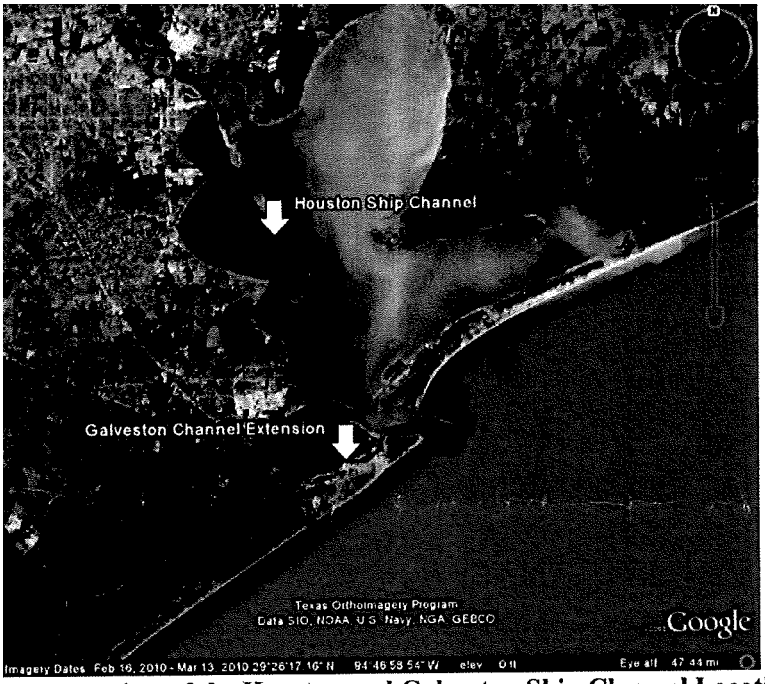

Figure 1 Overview of the Houston and Galveston Ship Channel Locations

Due to the recent availability of funds, the POG requested that the Corps deepen and maintain the Channel at a depth of 45 feet. Dredging continues today with the majority of the Channel depth at 45 feet except for the portion outlined in this planning aid letter. The entire Channel includes the off-shores reach and the area between Bolivar Peninsula and Pelican Island through Galveston Harbor to the Gulf Intracoastal Waterway (Figures 2 and 3).

In 1825, the Congress of Mexico established the P011 of Galveston, which later served as the capital for the Republic of Texas. By the end of the 19th century, Galveston was one of the largest cotton ports in the nation rivaling New Orleans; however, the City was devastated by a hurricane in 1900. Unfortunately, Galveston never fully returned to its previous levels of national impmiance or prosperity despite attempts to draw new investment after the hurricane. Development was also hindered by the construction of the Houston Ship Channel, which brought the Port of Houston into direct competition with the nah1ral harbor of the Port of Galveston for sea traffic.

Today, the POG facilities include more than 850 acres and supports commercial and recreational ships. The POG facilities handle various types of cargo including container, dry and liquid bulk, break-bulk, refrigerated, project cargos, and cruise passengers. The bay portion of the Channel is approximately 4.27 miles long and is maintenance dredged every 4 years. The entire Channel has a shoaling rate of 1,425,500 cubic yards per year; however, the 2,571-foot extension will contribute 160,000 cubic yards of maintenance material annually. The PA is located 1101th of the Channel, is approximately I,100 acres in size and is divided into three cells.

Alternatives Under Consideration

No Action Alternative

This Alternative presumes there would not be an extension or deepening of the Channel. Under this alternative, the Channel would retain the 40-foot depth, the 1,150 foot width and could limit the efficient movement of commodities by vessels traveling the waterway.

Preferred Alternative

Under this alternative, the Corps proposes to extend the Channel from approximately Pier 38 2,571 feet westward towards the Pelican Island Bridge (Station 20+000 to 22+571). Additionally, the proposed depth of the channel extension is 45 feet. No widening is proposed at this time and the channel top-of-cut will remain within the wate1way. The Corps prefers to place the estimated 609,000 cubic yards of new work dredge material and future dredge maintenance material (estimated 160,000 cubic yards yearly) in upland confinement at the existing PA. The new work dredge material is expected to consist of firm clay of low plasticity. Existing levees at the PA will be mechanically raised to allow sufficient capacity to contain both new work and maintenance dredge materials. The Preferred Alternative best meets the goals and objectives of the POG and the 1995 LRR.

The Corps does not expect an increase in sedimentation as a result of this project and no changes are proposed to the existing maintenance dredging cycle to accommodate the Preferred Alternative.

Project Impacts on Fish and Wildlife Resources

Galveston Bay has some of the most productive marsh habitat along the Gulf Coast, providing habitat for many important commercial and recreational fish species. In addition, marsh sites provide nesting areas for over 20 different colonial waterbird species. Historically, marshes were abundant along southern reaches of Galveston Bay; however, increases in ship wakes, subsidence, and increased salinity have affected marsh habitat over the last 40 years at Pelican Island. Pelican Island has supported fringe marsh habitat, however development, erosion, intense weather events, and sea level rise have contributed to the diminishing marsh habitat available for fish and wildlife. However, fish and wildlife utilize these remaining marshes for foraging, nesting, and breeding and some species are year round residents.

The Supplemental Fish and Wildlife Coordination Act Report - Houston-Galveston Ship Channels (Service 1995), the Supplemental Fish and Wildlife Coordination Act Report - Houston Galveston Ship Channels Barge Lane Widening (Service 2002) and the Houston-Galveston Navigation Channels Texas Galveston Channel Project (Corps 2007) detail the important natural resource communities (oysters, marshes, bay bottom, colonial waterbirds and other wildlife) of Galveston Bay and estimate the negative and positive environmental impacts of HGNC deepening and widening projects.

Habitat Types

The Service used Geographic Information System (GIS) technology and aerial photos to identify habitat cover-types in and around the project area. The following habitats types were identified:

Open Bay - This cover type consists of open water with a muddy substrate and submerged aquatic vegetation. Open bay habitat supports a variety of aquatic species such as brown shrimp *(Fa,:fantepenaeus aztecus),* white shrimp *(Litopenaeus setiferus),* spotted sea trout *(Cynoscion nebulosus),* red drum *(Sciaenops ocellatus),* and menhaden *(Brevoortia patronus).* In addition to aquatic species, the open bay provides foraging opportunities for colonial waterbirds such as the brown pelican *(Pelecanus occidentalis),* great egret *(Ardea alba),* and great blue heron *(Ardea Herodias).* Impacts of dredge activities can be referenced in Service documents mentioned above.

Oyster Reef - Living oyster reefs are made up of fish, plants, invertebrates and can be a good indicator of the overall health of a system. Oyster reefs are very productive estuarine habitat and are used by different species of fish and decapod crustaceans compared to salt marsh (Zimmerman et. al 1989). Oysters provide a basic ecological function of filtering the bay water in which they live and filter rates range from 5 to 30 quarts of water per hour of feeding time (Hoffstetter 1990). Review of historic documentation reveals the presence of oyster reefs adjacent to the Galveston Channel. In addition, recent communications with Texas Parks and Wildlife biologists (2010) indicate that historic consolidate reefs and scattered shell substrates are located outside of the project area (Figure 4). No oyster reef impacts are anticipated with this project.

Fisheries

Spo1t fish potentially occun-ing within the open bays of the project area include red drum, spotted seatrout, black drum *(Pogonias cromis),* southern flounder *(Paralichthys lethostigma),* star drum *(Stellifer lanceolatus)* and spot *(Leioslomus xanthurus).* Other common fishes include gafftopsial catfish *(Bagre marinus),* striped mullet *(Mugil cephalus),* sheepshead *(Archosargus probatocephalus),* Atlantic croaker *(Micropogonia undulates),* hardhead catfish *(Arius fe!is)* and bay anchovy *(Anchoa mitchilli).* Shellfish include blue crab *(Callinectes sapidus),* American oyster *(Crassostrea virginica)* and several shrimp species. Dredging activities cause suspension of sediments and increased turbidity in the water column, and can cause temporary impacts to fish that inhabit the area. Changes in feeding, avoidance, ten-itoriality, and homing behaviors can all be affected by increased suspended sediments and turbid waters. Wilber and Clarke

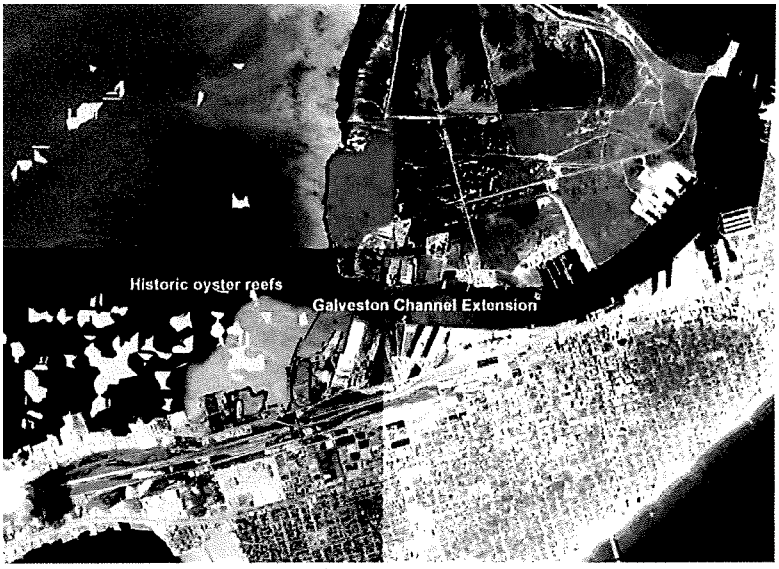

Figure 4 Galveston Channel Extension and historic oyster reefs in Galveston Bay

(2001) noted that changes in fish cough reflex, erratic swimming, and pronounced gill flaring can occur due to suspended sediments. These impacts are usually temporary, as fish have the capability to leave the area and return when impacts have subsided.

Essential Fish Habitat

Fish require healthy surroundings to survive and reproduce. Impacts from certain fishing practices as well as coastal and marine development threaten to alter, damage, or destroy fish habitats. Through the Magnuson-Stevens Fishery Conservation and Management Act, as amended through 1996, the National Ocean and Atmospheric Administration (NOAA), the regional fishery management council, and other federal agencies work together to minimize these threats and identify essential habitat for every life stage of each federally managed species. Essential fish habitat (EFH) includes all types of aquatic habitat-wetlands, coral reefs, seagrasses, rivers-where fish spawn, breed, feed, or grow to maturity. Productive commercial and recreational fisheries are inextricably linked to healthy marine habitats; protecting and restoring them will help support fishing communities now and for generations to come.

The muddy substrate and aquatic vegetation found in and along the Channel and shoreline of Pelican Island provide EFH for all life stages of shrimp, stoney crab, and red drum. The Channel bay bottom surface, while subject to recurrent dredging activities, provides the necessary habitats for these commercial and recreational impotiant species. Physical disturbance to existing natural bay bottoms from the dredging process was previously addressed in detail during the original HGNC studies. The Galveston NOAA office has extensively studied the causes of salt-water intrusion, marsh erosion, the effects of marsh creation using dredge material on fisheries production, and overall productivity of wetlands in Galveston Bay.

Threatened and Endangered Species

Our records indicate that the following delisted (DL), endangered (E), threatened (T) are species known to occur in Galveston County:

Brown pelican *(Pelecanus occidentalis)* - DL
Green sea turtle *(Chelonia mydas* - E and T
Hawksbill sea tmtle *(Eretmochelys imbricata)* - E
Kemp's Ridley sea tmtle *(Lepidochelys kempii)* - E
Leatherback sea turtle *(Dermochelys coriacea)* - E
Loggerhead sea tmile *(Carella care/la)* - T
Piping Plover *(Charadrlus melodus)* - E and T

Brown Pelican

The brown pelican, listed in 1970, recovered and was removed from the federal endangered species list in November 2009. The brown pelican is a year round resident of the Gulf of Mexico, feeds in Galveston Bay, adjacent ship channels and bayous and is expected to occur in the project area. Although removed from the protection of the Endangered Species Act, the brown pelican remains protected under the Migratory Bird Treaty Act and populations are monitored by federal and state agencies to ensure recovery status.

Sea Turtles

Five species of sea tmiles are found in U.S. waters and nest on U.S. beaches: leatherback, hawksbill, loggerhead, green, and Kemp's ridley. The leatherback, hawksbill and green sea tmiles rarely nest in the southeastern U.S., however offshore waters are impottant feeding, resting, and migratory corridors. All are known to nest in Texas, however the Kemps's ridley and loggerhead turtles are more common along the Texas coast. The Texas sea tmtle nesting season begins March 15 and ends October l each year and there is no designation of critical habitat for sea turtles in Texas. Sea tmtles are not expected to be nesting within the project area; however, turtles may be encountered in the Channel during deepening and routine maintenance dredging.

Piping Plover

The piping plover was federally listed as endangered in the Great Lakes watershed and as threatened elsewhere in its range on January 10, 1986 (50 FR 50726). The piping plover is a regular winter resident along the upper Texas coast (Haig and Oring 1985, Haig and Plissner 1993). They arrive in July, with some late-nesting birds aniving in September. A few individuals can be found throughout the year but sightings are rare in late May, June, and early July. The wintering grounds along the Texas coast support populations from the Great Lakes, Northern Great Plains, Atlantic Coast and Canada, and play a crucial role in supporting the survival of this species. While the Galveston Ship Channel itself does not provide the habitat necessary to support wintering piping plovers, plovers may use the exposed sandy beaches and mud flat areas along the shoreline of the adjacent Pelican Island.

Critical habitat on the wintering grounds was designated July 10, 2001 (66 FR 36038). That designation included 137 areas along the coasts ofN01ih Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas to provide sufficient wintering habitat to suppoti the piping plover at the population level and geographic distribution necessary for recovery of that species. A total of approximately 165,211 acres (66,881 hectares) and/or 1,798.3 miles (2,891.7 kilometers) were designated. There were 37 critical habitat units [approximately 62,454 acres (25,285 hectares), 797.3 miles (1,283.8 kilometers)] designated in Texas. These areas were believed to contain the essential physical and biological elements for the conservation of wintering piping plovers, and the physical features necessary for maintaining the natural processes that provide appropriate foraging, roosting, and sheltering habitat components. However, there is no designated critical habitat within the project area.

Cumulative Impacts

A cumulative impact analysis was completed and presented in the HGNC Final Environmental Impact Statement (FEIS). Impacts related to this project remain unchanged from those reporied in the FEIS.

Summary and Recommendations

The Corps and the POG propose to extend the Channel 2,571 feet westward toward the Pelican Island Bridge and dredge this area to a depth of 45 feet to be consistent with the configuration of the existing of the Channel. New work dredge material and future dredge maintenance material from the project area are proposed to be placed in upland confinement in the Pelican Island Placement Area.

Review of the Corps' project documentation, aerial photographs and Service files indicate the project area is heavily altered by ship traffic (commercial and recreational) and dredging activities. The Service believes the Prefened Alternative will have minimal impacts on fish and wildlife resources in the immediate project area. Although no mitigation is proposed due to the temporary nature of the impacts, the Service recommends the beneficial use of dredge material over the upland confinement at Pelican Island. As identified in the *Galveston Bay Habitat Conservation Blueprint, Sites, A Plan to restore the Habitats and Heritage of Galveston Bay* (1998), both east and west shorelines and marshes of Pelican Island as well as the Pelican Spit (Little Pelican Island) have experienced significant erosion due to increased ship wakes and recent storm events. Both Pelican and Little Pelican Islands have supp01ied a variety of wildlife and were considered large bird rookeries for Galveston Bay. Little Pelican Island supported large numbers of brown pelicans, gulls and terns until 2006 and Pelican Island had 3300 nesting laughing gulls *(Larus atricilla)* in 2005; however, human disturbance and predation may explain the lack of nesting activity at either island. CmTent restoration efforts are focused along the eroding western shoreline of Pelican Island north of the Pelican Island Causeway. At this location, local patiners propose to construct a breakwater structure, pump dredge material behind the structure, and plant the area to create a beneficial marsh project. Likewise, the new work and future maintenance dredge material from the proposed Galveston Channel Extension project could be used beneficially to provide erosion protection from increased ship wakes, sea level rise and high water storm events to both sides of Pelican Island. Should the Corps decide to utilize

the dredged material beneficially, the Service can provide assistance in identifying suitable areas for the placement of that material.

While sea turtles are not expected to nest in the project area, they do feed in the bay system and may be encountered during dredging activities. Therefore, the National Oceanic and Atmospheric Administration, Protected Resource Division (David Bernhart, 727/551-5767) should be contacted for additional information on listed marine species under their jurisdiction.

No critical habitat for the piping plover is found within the project area, however; the birds can be located throughout the bay system on tidally exposed mud and sand flats. The Service recommends that presence/absence surveys be conducted in suitable areas adjacent to Pelican Island and any necessary consultation procedures initiated with the Service pursuant to Section 7 of the Endangered Species Act to ensure that the birds are not inadve11ently disturbed or harassed.

Should the scope of the project change, impacts to fish and wildlife resources should be re-evaluated and coordination with the Service re-initiated. We appreciate the opportunity to participate in the planning of the Houston-Galveston Navigation Channels, Texas, Galveston Channel Extension Project. If you have any questions or comments concerning this planning aid letter, please contact staff biologist Donna Anderson at 281/286-8282.

Sincerely,

Edith Erfling

Edith Erfling
Field Supervisor

cc:
Carolyn Murphy, U.S. Army Corps of Engineers, Galveston, TX
Jaime Schubert, Texas Parks and Wildlife Department, Dickinson, TX
Jeanene Peckham, U.S. Environmental Protection Agency, Dallas, TX
Rusty Swafford, National Marine Fisheries Service, Galveston, TX
Ray Newby, Texas General land Office, Austin, TX
Scott Alford, National Resource Conservation Service, Baytown, Texas

REFERENCES

Galveston Bay Foundation. Galveston Bay Habitat Conservation Blueprint, A Plan to Restore the Habitats and Heritage of Galveston Bay.n.p., 1998. 118-119.

Haig, S.M. and L.W. Oring. 1985. The distribution and status of the piping plover throughout the annual cycle. Journal of Field Ornithology 56:334-345.

Haig, S.M.. and J.H. Plissner. I993. Distribution and abundance of Piping Plovers: results and implications of the 1991 international census. Condor 95:145-156.

Hofstetter, R.P. and C.E. Bryan. 1990. The Texas oyster fishery. Bulletin No. 40, Texas Parks and Wildlife Depat1ment, Austin. Third revision: 21p.

U.S. Anny Corps of Engineers. 2007. Houston-Galveston Navigation Channels, Texas Galveston Channel Project, Final Limited Reevaluation Report. Galveston District Corps of Engineers, Galveston, Texas 24p.

U.S. Fish and Wildlife Service. 1995. Supplemental Fish and Wildlife Coordination Act Report - Houston-Galveston ship channels, Texas. U.S. Fish and Wildlife Service. Houston, TX: 47p +app.

U.S. Fish and Wildlife Service. 2002. Supplemental Fish and Wildlife Coordination Act Report Houston-Galveston Navigation Channels, Texas - Barge Lane Widening. U.S. Fish and Wildlife Service. Houston, TX: 1p

Wilber, D.H., and Clarke, D.G. 2001. "Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries," *Norlh American .Journal <!f Fisheries Managemenl* 21(4):855-875.

Zimmennan, R., T. J. Minello, T. Baumer, and M. Castiglione. 1989. Oyster reef as habitat for estuarine macrofauna. NOAA Tech. Memo. NMFS-SEFC-249. 16 p.

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

Environmental Section

May 7, 2013

Ms. Rebecca Hensley
Texas Parks & Wildlife Department
1502 FM 517East
Dickinson, TX 77539

Dear Ms. Hensley:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 2o+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is explained in the enclosed Notice of Availability and described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

Under the Fish and Wildlife Coordination Act, we are required to consider potential impacts to fish and wildlife resources in planning civil works projects and coordinate with the Texas Parks & Wildlife Department (TPWD). Pursuant to the Act, the District is requesting that TPWD review the enclosed Draft EA and provide any comments your agency may have regarding the proposed project. We appreciate your continued cooperation in allowing us to fulfill our obligations under the Act.

If you or. your staff have any q'hestions regarding this project, please contact Andrea Catanzaro at (409) 766-6346, orby email at andrea.catanzaro@usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Encls

TEXAS PARKS & WILDLIFE

Life's better outside.®

June 10, 2013

District Engineer
U.S. Army Engineer District, Galveston
ATTN: CESWG-PE-PR
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Public Notice No. HGNC-13-01
Draft Environmental Assessment for Galveston Harbor Channel Extension

Texas Parks and Wildlife Department (TPWD) has reviewed the Draft Environmental Assessment (DEA) for the extension of the currently authorized 45-foot deep Galveston Harbor Channel for a distance of 2,571 feet, located adjacent to Pelican Island in Galveston County, Texas. The project area is currently authorized and maintained at a depth of 40 feet. The proposed dredging would deepen the channel an additional five feet to be consistent with the Houston-Galveston Navigation Channels. Approximately 514,000 cubic yards of new work dredged material is proposed to be placed at the Pelican Island placement area (PA). The channel extension would generate 648,000 cubic yards of maintenance material every four years to be placed at the Pelican Island PA.

Section 2.3.2 of the DEA explains that a beneficial use site along the west side of Pelican Island was identified as an alternative for material placement. This alternative included construction of a perimeter levee to +7 feet mean low tide. The levee would be constructed through excavating on-site borrow material adjacent to the levee alignment. The new work dredged material from the extension of the channel would then be placed within the perimeter levee at marsh elevations. The DEA states that this beneficial use alternative would not be implemented due to cost of construction. However, TPWD recommends that the U.S. Army Corps of Engineers further investigate the beneficial use alternative with a different project design that may reduce costs to beneficially utilize the dredge material. The new work dredge material is composed of mostly clays; therefore, the perimeter levees at the beneficial use site could be constructed with the new work dredge material from the channel instead of constructing perimeter levees with on-site borrow material. Future maintenance dredge material could be placed at the beneficial use site within the constructed perimeter levees. This alternate beneficial use site plan could reduce project costs and result in a project that would assist in restoring marsh habitat that supports fish and wildlife species. Additional analysis would ensure that all alternatives for beneficially utilizing material have been thoroughly explored.

Questions can be directed to Ms. Ashley Thompson at (281) 534-0139 in the Dickinson Marine Lab.

Sincerely,

Rebecca Hensley

Rebecca Hensley
Regional Director, Ecosystem Resources Program
Coastal Fisheries Division

RH:WD:AT

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800

www.tpwd.state.tx.us

Ms. Rebecca Hensley
Texas Parks & Wildlife Department
1502 FM 517 East
Dickinson, TX 77539

RESPONSE TO COMMENTS

Comment No.	Response
	The Beneficial Use (BU) construction alternative described in the Draft Environmental Assessment was bed on an initial design evaluated during early plan formulation. The description will be corrected to describe the most recent construction methods illustrated in the Engineering Appendix to the main Post-Authorization Change Report. Only a small quantity of borrow material from bay bottom adjacent to the proposed levee would be excavated to replace unsuitable soft foundation soils in the levee footprint. The levee would then be constructed from hydraulically placed new work material from proposed channel deepening.
2	The major cost difference, by far, between placing the new work material within the upland confined Pelican Island placement area and constructing a new BU site is the added cost of shore protection, new outlet box, and the requirement to remove and replace unsuitable foundation soils beneath the new levee template prior to building the levee. Shoreline protection was included in the design of the BU placement alternatives under consideration as it was determined to be a critical design component. The proposed location of the site selected for design and analysis of the BU alternatives has considerable fetch length which would increase erosion potential and threaten success of a newly constructed marsh if shoreline protection was not included.

TEXAS HISTORICAL COMMISSION

'I'be State Agency for Historic Preservation

RICKPERRY,GOVBRNOR

JOHN L. NAU, ID, CHAiltMAN

F. LAWERENCll OAKS, EXECUI'IVll DIRECTOR

April 16, 2008

Ms. Carolyn Murphy
Chief, Environmental Section
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, TX 77553-1229

RE: Project review under Section 106 of the National Historic Preservation Act of 1966 and the Antiquities Code of Texas

Deepening of the Galveston Ship Channel, stations 20+000 to 22+571, and development of upland placement area on Pelican Island, Galveston County, Texas.
COE-VD

:pear ;Ms. Murphy:

Thank you for your correspondence describing the above referenced project: This_letter serves as. comment from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission. As the state agency responsible for administering the Antiquities Code of Texas, these comments also provide recommendations on compliance with state antiquities laws and regulations. • .

You have requested that we concur with your detennination of no historic properties affected for the section of the.Galveston Ship Channel proposed for modification because this area was surveyed in 1991 by EH&A under Texas Antiquities Permit#1128. Reviewing the publication on that work dated April 1992, we note that 1) the survey was conducted at a lane spacing of 47 meters which is not acceptable under more recent survey standards requiring a maximum 30 meter lane spacing, 2) the survey in that area, by design, was conducted only south of the channel centerline, and 3) muc of the area designated for survey in that section was not surveyed for reasons not stated by the author (we suspect obstructions present at the time prevented full acces to the survey area).

.We further note that 1) the proposed project design involves only deepening the existing channel fron:i 40 f t to'45 feet with ho corresponding widenjng and 2) this area has been dl'.edged many times in the·past to achieve mid maintain this depth.. Wear also aware that the area is heavily develop_ed along both shores of the ship channel, which precludes the effective magnetometer suhrefy along the periphery of the existing channel, the area most likely to contained preserved historic resources. For these reasons, we feel that additional archeological survey for the proposed channel deepening would be unproductive and do not recommend such survey.

Additionally, we concur that the proposed upland containment area, for the reasons stated by you, has no potential to effect historic resources.

We look foiward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal and state review_process, and for your efforts to preserve the irreplaceable heritage *9f* Texas. If **you have any questions concerning our review or if we can be of further assistance, please contact Steve Hoyt at 512/463-7188.**

Sincerely,

eoak,, State Historic Preservation Officer

State Historic Preservation Officer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

RESPONSE TO COMMENTS

Comment No.	Response
1	Thank you for your comment.

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

May 7, 2013

REPLY TO THE ATTENTION OF
Environmental Section

Mr. Mike Jansky
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Mail Code 6 ENXP
Dallas, Texas 75202-2733

Dear Mr. Jansky:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is explained in the enclosed Notice of Availability and described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

This Draft EA was prepared in accordance with the National Environmental Policy Act of 1969, as amended, and as implemented by the Council on Environmental Quality (40 CFR Parts 1500-1508). The results of your review are requested by October 24,.2012.

I would appreciate your timely review of these documents. If you have any questions, or if you would like additional copies, please contact Ms. Andrea Catanzaro at the letterhead address, by telephone at 409-766-6346, or by email at andrea.catanzaro@usace.army.mil.

lf

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Encls

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

May 7, 2013

REPLY TO THE ATTENTION OF
Environmental Section

Susana M. Hildebrande, P.E.
Texas Commission on Environmental Quality
P.O. Box 13087, Mail Code 168
Austin, Texas 78711-3087

Dear Ms. Hildebrande:

Enclosed please find a copy of the Draft Post-Authorization Change Report (PACR) and Draft Environmental Assessment (EA) for the Galveston Harbor Channel Extension Project, Galveston County, Texas. This draft report is provided for your agency review of the Draft General Conformity Determination (GCD) in accordance with the Clean Air Act. The Draft GCD and air emission estimates are provided in Appendix E of the Draft EA.

A Notice of Availability for the Draft PACR, Draft EA and Draft GCD (enclosed) has been issued to the public for review and comment. The U.S. Army Corps of Engineers, Galveston District will accept written public comments on the Draft EA and the Draft GCD from April 4, 2013 through May 6, 2013.

The results of your review are requested by May 6, 2013. I would appreciate your timely review of these documents. If you have any questions, or if you would like additional copies, please contact Ms. Andrea Catanzaro at the letterhead address, by telephone at 409-766-6346, or by email at andrea.catanzaro@usace.army.mil.•

Sincerely,

fdr Aktf'/

Carolyn Murphy
Chief, Environmental Section

Encls

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1229
GALVESTON, TEXAS 77553-1229

May 7, 2013

REPLY TO THE ATTENTION OF
Environmental Section

Ms. Barbara Keeler
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Ms. Keeler:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel· Extension, is located in Galveston County, Texas.

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I would appreciate your timely review of these documents. If you have any questions, or if you would like additional copies, please contact Ms. Andrea Catanzaro at the letterhead address, by telephone at 409-766-6346, or by email at andrea.catanzaro@usace.army.mil.

Sincerely,

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Encls

Chief, Environmental Section

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

May 7, 2013

REPLY TO THE ATTENTION OF

Environmental Section

Ms. Karen McCormick
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200

Dallas, Texas 75202-2733

Dear Ms. McCormick:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+o00 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

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This Draft EA was prepared in accordance with the National Environmental Policy Act of 1969, as amended, and as implemented by the Council on Environmental Quality (40 CPR Parts 1500-1508). The results of your review are requested by October 24, 2012.

I would appreciate your timely review of these documents. If you have any questions, or if you would like additional copies, please contact Ms. Andrea Catanzaro at the letterhead address, by telephone at 409-766-6346, or by email at andrea.catanzaro@usace.army.mil.

Lf

Sincerely,

,cj),_;JJiAJ /l--------t

Carolyn K1:urphy /
Chief, Environmental Section

Encls

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

June 10, 2013

District Engineer
U.S. Army Engineer District, Galveston
Attn: CESWG-PE-PR
P.O. Box 1229
Galveston, TX 77553-1229

In accordance with our responsibilities under Section 309 of the Clean Air Act (CAA) and the National Environmental Policy Act (NEPA), the U.S. Environmental Protection Agency (EPA) Region 6 has reviewed the Draft Environmental Assessment (EA) for the Galveston Harbor Channel Extension Post-Authorization Change Report (Galveston Harbor) in Galveston County, Texas. The proposed action will deepen the Galveston Harbor Ship Channel from a current depth of 40 to a depth of 45 feet; for a distance of 2,571 feet. This will allow more heavily loaded barges to dock at the far end of the Galveston Harbor and result in increased navigational efficiency. Attached are specific comments for your consideration in preparation of the Final EA.

We appreciate the opportunity to provide comments for the Draft EA. Please send the Final EA to my attention. Should you have any questions or concerns regarding this letter, do not hesitate to call me at 214-665-8006, or contact Keith Hayden of my staff, at 214-665-2133 or hayden.keith@epa.gov for assistance.

Sincerel

Rhondai
Chief, Office of Planning
and Coordination

2.0 Alternatives Considered; Page 10

The EA states implementation of the tentatively proposed action alternative would result in a change in bottom width from 1,085 feet to 1,075 feet. The side slopes would have a constructed 1V:3H slope, and will be maintained at a 1V:2H slope. With a 5-foot increase in depth from 40 feet to 45 feet the 1V:3H slope would result in a total decrease in channel width of 30 feet at the channel bottom. The maintenance slope of 1V:2H would result in a decrease in channel width of 20 feet. This would reduce the overall channel width to 1,055 feet for the 1:3 slopes and 1,065 feet for the 1:2 slopes.

Recommendation:

- Clarify if any changes to project dimensions will occur to account for the discrepancy in bottom width. If no changes are to take place, please describe how the bottom widths were derived using the stated slopes.

2.3.2 Beneficial Use of Dredged Material Alternatives; Page 14

Marsh Construction Levee

The EA states the open water marsh creation alternative would construct a levee and armor it with a mixture of riprap, geotextile, and blanket stone.

Recommendation:

- Clarify if the entire extent of the marsh creation levee will be armored. If so, describe what analysis or modeling was performed, or what conditions exist in proximity of the potential beneficial use area to demonstrate a need to armor the entire levee.

Tidal Connectivity

Given the relative permanence of the suggested containment option, tidal connectivity may quickly become an issue with regards to maintaining marsh health and overall ecological function. However, the incorporation of circulation channels and outlet structures indicate that an effort will be made to restore this connectivity within the constructed marsh.

Recommendation:

- Once de-watering and consolidation has taken place, EPA recommends that the follow-up measures mentioned in the EA, outlet structures in particular, be implemented at the maximum extent practicable to maximize tidal connectivity.

Placement of Dredged Material

There is wide variation in projected amounts of dredge material to be used in marsh creation depending on the final depth of channel dredging. It is also unclear if beneficial use of

Recommendation:

- Clarify if these construction-related emissions did occur during 2012, or if the timeframe for project implementation has changed.

General Air Quality Concerns

Because of the air quality concerns of significant population centers within the EA study area, EPA recommends that in order to reduce potential short-term air quality impacts associated with construction activities, the agencies responsible for the project should include a Construction Emissions Mitigation Plan and adopt this plan in the Record of Decision (ROD). In addition to all applicable local, state, or federal requirements, the EPA recommends that the following mitigation measures be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of NOx, CO, PM, SO_2, and other pollutants from construction-related activities: [1]

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate at active and inactive sites during workdays, weekends, holidays, and windy conditions;
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions; and
- Prevent spillage when hauling material and operating non-earthmoving equipment and limit speeds to 15 miles per hour. Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Plan construction scheduling to minimize vehicle trips;
- Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections;
- Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed;
- Consider use of construction equipment meeting EPA's Tier 4 engine standards. However, lacking availability of such non-road construction equipment that meets these standards, we would suggest use of EPA-verified particulate traps, oxidation catalysts and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site; and
- Consider alternative fuels and energy sources such as natural gas and electricity (plug-in or battery).

7.7 Endangered Species Act Consultation; Page 60

In the Planning and Aid Letter (PAL) dated January 14, 2011, the USFWS recommended that presence/absence surveys be conducted in suitable areas adjacent to Pelican Island and any

Ms. Rhonda Smith
Chief, Office of Planning and Coordination
Environmental Protection Agency, Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

RESPONSE TO COMMENTS

Comment No.	Response
1	Figure 2 will be updated to reflect the discontinuance of the nearshore berm as a beneficial use (BU) placement site.
2	As indicated in the last paragraph on page 11 (Section 2.3), project dimensions would change. At the deepest depth of 45 feet MLT, the bottom width of the channel would decrease by 10 feet in width (from 1,085 feet to 1,075 feet). The top of cut, however could increase by as much as 7 feet on each side, depending upon the existing depth of the bay bottom in a given location. This is shown in Figure 4 on page 7. The EA will refer the reader back to Figure 4 for added clarity.
3	The EA will clarify that the conceptual BU alternatives were evaluated during plan formulation, but were not selected due to costs. The EA will further clarify that the conceptual BU alternatives evaluated included armoring of the perimeter levees occurring along the north, west and south sides of the BU site. Since the Pelican Island shoreline occurs to the east of the BU site evaluated, no levees would be require to be built on that side of the site. Armoring of the levees would be necessary as site conditions in proximity of proposed BU alternatives include extensive fetch (distance traveled by wind and waves with no obstruction) and water depth that, based on experience with other projects, would lead to shoreline erosion of the site if proper levee protection was not included in the conceptual designs.
4	The discussion of the assumptions for construction of the BU alternatives considered during plan formulation will be clarified. Circulations channels and out let structures are discussed in the last paragraph of Section 2.3 of the EA. The wording will be clarified to state that the "5-foot deep circulation channels would be constructed inside the marsh cell to facilitate tidal flow through the site". In addition, the last sentence of the paragraph will be changed to indicate that once target elevations at the BU site are met, the outlet structures would be removed provide umestricted tidal flow and circulation within the site.
5	The beginning of the last paragraph in Section 2.3 of the EA explains the various BU alternatives considered during plan formulation would have been constructed using new work material from channel deepening. The third from the last sentence of the last paragraph in Section 2.3 will be reworded to clarify the potential future use of maintenance material as follows: "Future maintenance material would be added, as needed, to meet and/or manage the target elevations of the marsh design."
6	For the various BU placement alternatives considered during plan formulation, new work material would be used to construct the site and fill the marsh to achieve target elevation. The third from the last sentence of the last paragraph in Section 2.3 will be reworded to clarify the potential future use of maintenance material as follows: "Future maintenance material would be added, as needed, to meet and/or manage the target elevations of the marsh design."
7	Subsequent to the initial preparation of the Draft EA, additional sediment testing of the Galveston Harbor Channel was perform and analyzed in February 2012. This will be indicated in the Final EA. This testing confirmed that the sediments were non-hazardous. The EA will reiterate that all dredged material generated from the proposed project would be placed in the upland confined Pelican Island Placement Area. For these reasons, there is no reason to believe that contaminant issues would arise because of sediment quality

Comment No.	Response
8	By letter dated June 12, 2013, the Texas Commission on Environmental Quality (TCEQ) provided general conformity concurrence that emission from the Galveston Harbor Channel Extension Project will not exceed the emissions budgets in the most recent state implementation plan revision approved on March 29, 2010 by the EPA. A copy of TCEQ's concurrence letter is included in the Final EA.
9	Construction-related emissions would occur during 2014.
	EPA recommends that the following mitigation measures be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of NOx, CO, PM, S02, and other pollutants from construction-related activities: Fugitive Dust Source Controls: • Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate at active and inactive sites during workdays, weekends, holidays, and windy conditions; • Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions; and • Prevent spillage when hauling material and operating non-earthmoving equipment and limit speeds to 15 miles per hour. Limit speed of earth-moving equipment to IO mph. Mobile and Stationary Source Controls: • Plan construction scheduling to minimize vehicle trips; • Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections; • Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed; • Consider use of construction equipment meeting EPA's Tier 4 engine standards. However, lacking availability of such non-road construction equipment that meets these standards, we would suggest use of EPA-verified particulate traps, oxidation catalysts and other appropriate controls where suitable to reduce emissions of diesel particulate matter and other pollutants at the construction site; and • Consider alternative fuels and energy sources such as natural gas and electricity (plug-in or batte1y).
11	Presence/absence surveys for piping plover are unnecessary for this project. The project area is continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas unsuitable for piping plover. The proposed action of deepening the channel from 40 feet to 45 feet Mean Low Tide would have the same affects as the on going maintenance dredging of this section of channel; the dredging would likely be timed to occur during a regularly scheduled maintenance cycle for the channel. The shorelines along the existing Galveston Harbor Channel in the vicinity of the proposed deepening of the Galveston Harbor Channel Extension predominantly consist of bulkheads and dock facilities; very small, short stretches of shorelines having shell hash substrates occur to a lesser extent in the project area in areas such as that found at TAMUG Clipper dock area. These areas are continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas highly unsuitable for piping plover. While suitable habitat for piping plover occurs along the sandy beach shorelines of the Gulf of Mexico and some dredged material islands along the GIWW in Galveston County, these species are not likely to occur in the vicinity of the project due to lack of suitable or preferred habitat.

12	Documentation ofrequired consultation and issued certifications for the proposed GHCE project will be cited in relevant locations in the text and included in the appropriate sections and/or appendices of the Final EA.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Pl'otecting Texas by Reducing and Preventing Pollution

June 12, 2013

District Engineer
U.S. Army Engineer District, Galveston
ATIN: CESWG-PE-PR
P.O. Box 1229
Galveston, Texas 77553-1229

Re: United States Army Corps of Engineers' (USACE) Galveston Harbor Channel Extension Project Post-Authorization Change Report; Draft General Conformity Determination

To Whom it My Concern:

This letter provides general conformity concurrence for the Galveston Harbor Channel Extension Project Post-Authorization Change Report; Draft General Conformity Determination. The Texas Commission on Environmental Quality (TCEQ) reviewed the project in accordance with Title 40 Code of Federal Regulations Part 93. The proposed project is located in the Houston-Galveston-Brazoria (HGB) area, which is classified as severe nonattainment for the 1997 eight-hour ozone standard. Emissions are expected to be above the 25 tons per year *de minimis* threshold; therefore, a general conformity analysis is required.

The TCEQ has determined that emissions from the proposed project will not exceed the emissions budgets specified in the most recent state implementation plan (SIP) revision approved by the United States Environmental Protection Agency (EPA). The most recently approved SIP revision, the HGB Reasonable Further Progress SIP adopted by the Commission on May 23, 2007, was approved by the EPA on March 29, 2010.

Insupport of the ozone National Ambient Air Quality Standard, the TCEQ suggests the USACE adopt pollution prevention and/or reduction measures in conjunction with this and future projects, such as the following:

- encourage construction contractors to apply for Texas Emission Reduction Plan grants;
- establish bidding conditions that give preference to clean contractors;
- direct construction contractors to exercise air quality best management practices;
- direct contractors that will use tugboats during construction to use clean fuels;
- direct operators of the assist tugboats used in maneuvering dredge vessels to use clean fuels;
- select assist tugs based on lowest nitrogen oxides (NOx) emissions instead oflowest price; and/or
- purchase and permanently retire surplus NOx offsets prior to commencement of operations.

Thank you for providing the necessary information and staff assistance for our review. We would also appreciate updates, as appropriate, as this project moves forward. I look forward to working with you in the future on any upcoming projects you may have that affect air quality in your district. If you require further assistance on this matter, please contact Holly Ferguson at (512) 239-4905 or holly.ferguson@tceq.texas.gov.

Sincerely,

David Brymer, Director
Air Quality Division
Texas Commission on Environmental Quality

DB/HB/kb

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

Mr. Charles Maguire
Water Quality Director
Texas Commission on Environmental Quality
TCEQ-MC150
2100 Park 35 Circle
Austin, TX 78753

Dear Mr. Maguire:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vess.els transporting commodities.to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

Under the Clean Water Act (CWA) of 1977, a State Water Quality Certificate for the• discharge activity is required prior to construction. A Joint Public Notice for the proposed project is enclosed. A CWA Section 404(b)(l) evaluation is included in Appendix G of the Draft EA. Our analysis of relevant data determined that Texas Surface Water Quality Standards will not be exceeded by the proposed action.

The District is requesting that the]exas Commission on Environmental Quality review the enclosed information and take appropriate action regarding the issuance of a State Water Quality Certificate for the proposed action. If you or your staff have any questions regarding this project, please contact Andrea Catanzaro at (409) 766-6346, or by email at andrea.catanzaro@usace.army.mil.

Sincerely,

Carolyn Murphy

Carolyn Murphy
Chief, Environmental Section

Encl

TEXAS COMMISSION ON ENVIRONMENTAL QUALI1Y

Protecting Texas by Reducing and Preventing Pollution

July 9, 2013

Ms. Andrea Catanzaro
Galveston District CESWG-PE-RE
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Re: Galveston Harbor Channel Extension, HGNC-13-01

Dear Ms. Catanzaro:

This letter is in response to the U.S. Army Corps of Engineers (Corps) Draft Environmental Assessment (DEA) dated March 2013 for the Galveston Harbor Channel Extension. The DEA was provided to the Texas Commission on Environmental Quality (TCEQ) on May 13, 2013. The project is described in the Joint Public Notice HGNC-13-01issued on May 10, 2013. The extension project is located within the Galveston Harbor Channel in Galveston County, Texas.

The proposed work would deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep MLT. The proposed work would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The dredged material from the proposed extension would be placed in the upland confined Pelican Island Placement Area.

The TCEQ has reviewed the DEA. Based on our evaluation of the information contained in these 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.

If you require additional information or further assistance, please contact Mr. John Trevino, Water Quality Assessment Section, Water Quality Division (MC-150), by email at John.Trevino@tceq.texas.gov, or by phone at (512) 239-4600.

Sincerely,

David W. Galindo
Water Qmtlity Divislon Director
Texas Commission on Environmental Quality

DWG/JT/gg

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 21, 2013

District Engineer
U.S. Army Engineer District, Galveston
ATIN: CESWG-PE-PR
P.O. Box 1229
Galveston, Texas 77553

Re: TCEQ Grant and Texas Review and Comment System (TRACS) #2013-274, Galveston County, Project Harbor Channel Extenstion

To Whom it May Concern:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

We have no comment on this project.

Thank you for the opportunity to review this project. If you have any questions, please contact Ms. Melanie Trimble at (512) 239-1622 or melanie.trimble@tceq.texas.gov.

Sincerely,

Minor B. Hibbs, P.E.
Special Assistant to Chief Engineer

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. 0. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

Ms. Sheri Land
Coastal Coordination Council
P.O. Box 12873
Austin, Texas 78711-2873

Dear Ms. Land:

The Galveston District is developing plans to deepen the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) from 40 feet mean low tide (MLT) to 45 feet deep (MLT). The proposed project, referred to as the Galveston Harbor Channel Extension, is located in Galveston County, Texas.

The proposed channel modifications would be consistent with the newly deepened -45 feet MLT Galveston Harbor Channel dimensions and would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel. The proposed work is explained in the enclosed Notice of Availability and described in detail in Section 1.4 of the enclosed Draft Environmental Assessment (EA).

Under the Coastal Zone Management Act (CZMA) of 1972, Federal actions are required to be consistent, to the extent practicable, with approved state coastal management plans. The District' s consistency determination is included in Appendix H of the Draft EA. The District is requests that you review the enclosed information to ensure that the proposed project is consistent with the Texas Coastal Management Plan.

If you or your staff have any questjons regarding this project, please contact Andrea Catanzaro at (409) 766-6346, or by email at andrea.catanzaro@usace.army.mil.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Encls

APPENDIX C

Biological Assessment

BIOLOGICAL ASSESSMENT
FOR
GALVESTON HARBOR CHANNEL EXTENSION
FEASIBILITY STUDY
HOUSTON-GALVESTON NAVIGATION
CHANNELS, TEXAS

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
GALVESTON, TEXAS

JUNE 2016

1.0 INTRODUCTION

1.1 PURPOSE OF THE BIOLOGICAL ASSESSMENT

This Biological Assessment (BA) has been prepared to fulfill the U.S. Army Corps of Engineers' (USACE), Galveston District requirements as outlined under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. The Federal action requiring this assessment is the proposed deepening improvements to the Galveston Harbor Channel, Galveston County, Texas. The Galveston Channel Navigation Project was part of an earlier study for improving the deep-draft navigation channels within the Galveston Bay area, authorized by a resolution of the House Committee on Public Works in October, 1967. The project sponsor is the Port of Galveston.

This BA evaluates the potential impacts of proposed deepening improvements to federally-listed threatened and endangered species identified by NMFS and the USFWS. Species included in this BA (Table 1) were identified from lists obtained from databases managed by the USFWS and NMFS (USFWS, 2016; NMFS, 2016). Additional protected species are listed by the Texas Parks and Wildlife Department as potentially occurring in Galveston County. However, these additional species are not covered in this BA as they are not federally-listed species.

The bald eagle was removed from the Federal list of threatened and endangered species. However, this species maintains Federal protection under the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act (64 Federal Register [FR] 164:46542–46558; 72 FR 130:37346– 37372). The brown pelican was also delisted (50 CFR 1759443-59472) and is protected under the Migratory Bird Treaty Act and the Lacey Act.

1.2 DESCRIPTION OF THE PROPOSED PROJECT AND HABITATS

The Galveston Channel Navigation Project is located on the upper Texas coast at the mouth of Galveston Bay in Galveston County, Texas. Galveston Channel is part of a complex of navigation channels running from offshore through Galveston Bay known as the Houston Galveston Navigation Channels (HGNC). Major channels include the Galveston Bay Entrance Channel from offshore, Bolivar Roads between Bolivar Peninsula and Galveston Island, the Houston Ship, Texas City, and Galveston Harbor Channels, and the Gulf Intracoastal Waterway. The Galveston Harbor Channel branches off the Galveston Bay Entrance Channel providing entry to the Port of Galveston. It extends in an east-west direction from Bolivar Roads between Galveston and Pelican Islands for about four miles (Figure 1). The project area includes the eastern end of Galveston Island and Pelican Island adjacent to the channel. Galveston Island is a low-lying barrier island two miles off the Texas coast, approximately 50 miles southeast of Houston, Texas.

The current depth of the terminal 2,571 feet of the Galveston Harbor Channel is -41 feet mean low tide (MLLW), and its width is 1,085 feet. Proposed channel improvements to this terminal section of the channel would consist of deepening the channel to a depth of 46-feet MLLW; channel side slopes would continue remain at the existing to be 1V:3H (1 foot vertical and 3 feet horizontal) so that the associated width of the terminal section of the channel would be reduced to 1,075 feet (Figures 2 and 3). The proposed modifications to this terminal segment of the channel would then be consistent existing dimensions of the remainder of the Galveston Harbor Channel, which was recently deepened to -46 feet MLLW in early 2011. The deepening would originate near Port of Galveston Pier-38 at Station 20+000, continuing westward towards Pelican island Bridge and ending at Station 22+571. Advanced maintenance and allowable over-depth would remain at the current requirement of 3 feet and 2 feet, respectively, such that the maximum channel depth following periodic maintenance would not exceed -51 feet MLLW.

Channel dredging to 46 feet deep would generate 513,800 cubic yards of new work material, consisting of primarily firm to stiff clays of high plasticity, which would be placed along the north perimeter of Cell B of the existing upland, confined Pelican Island placement area (PA). The potential for beneficial use was examined but it was not the least cost placement option, compared to upland placement. Therefore, it was not considered economically feasible and will not be utilized.

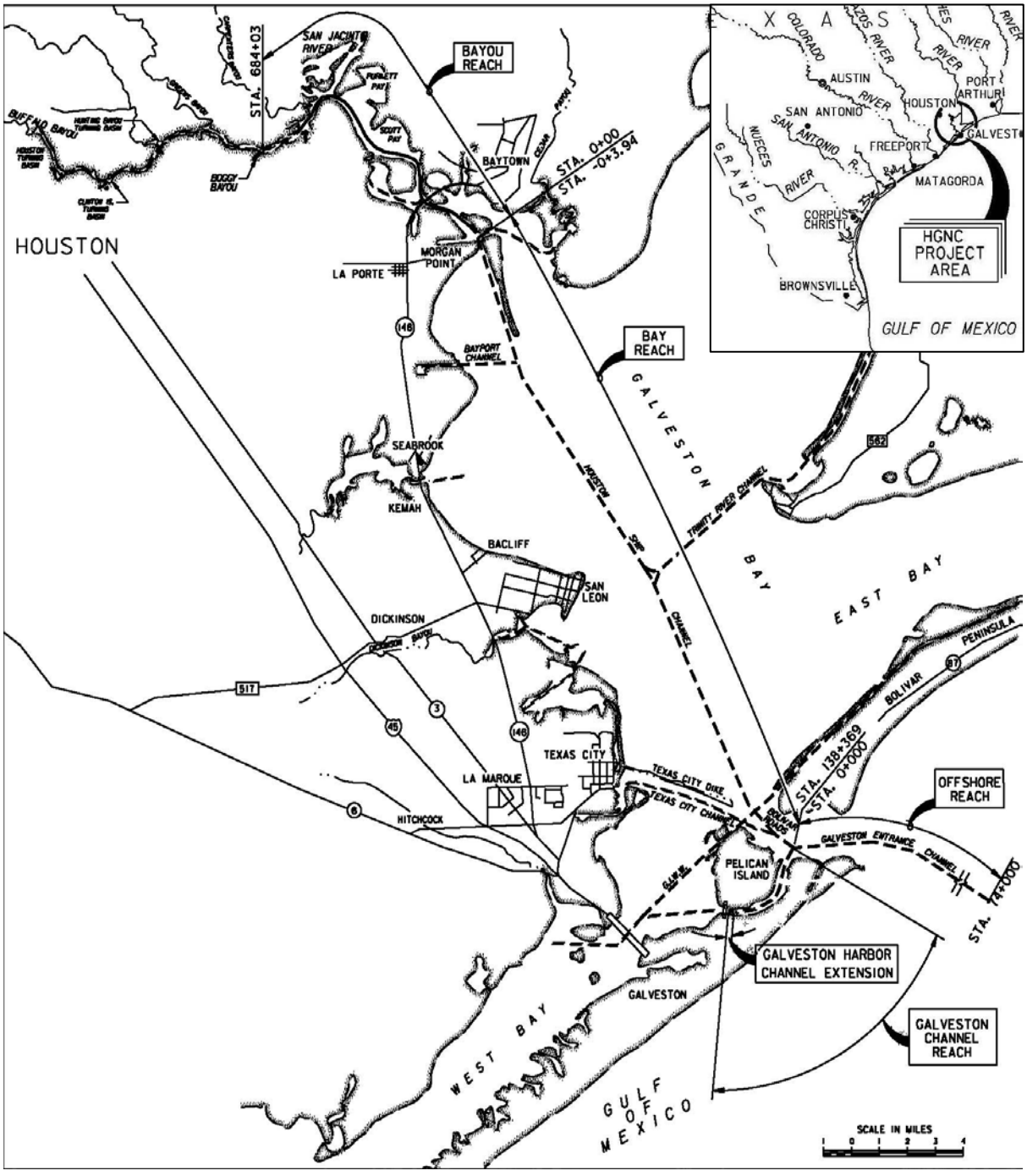


FIGURE 1: Houston-Galveston Navigation Channels Reach Designations and Project Area.

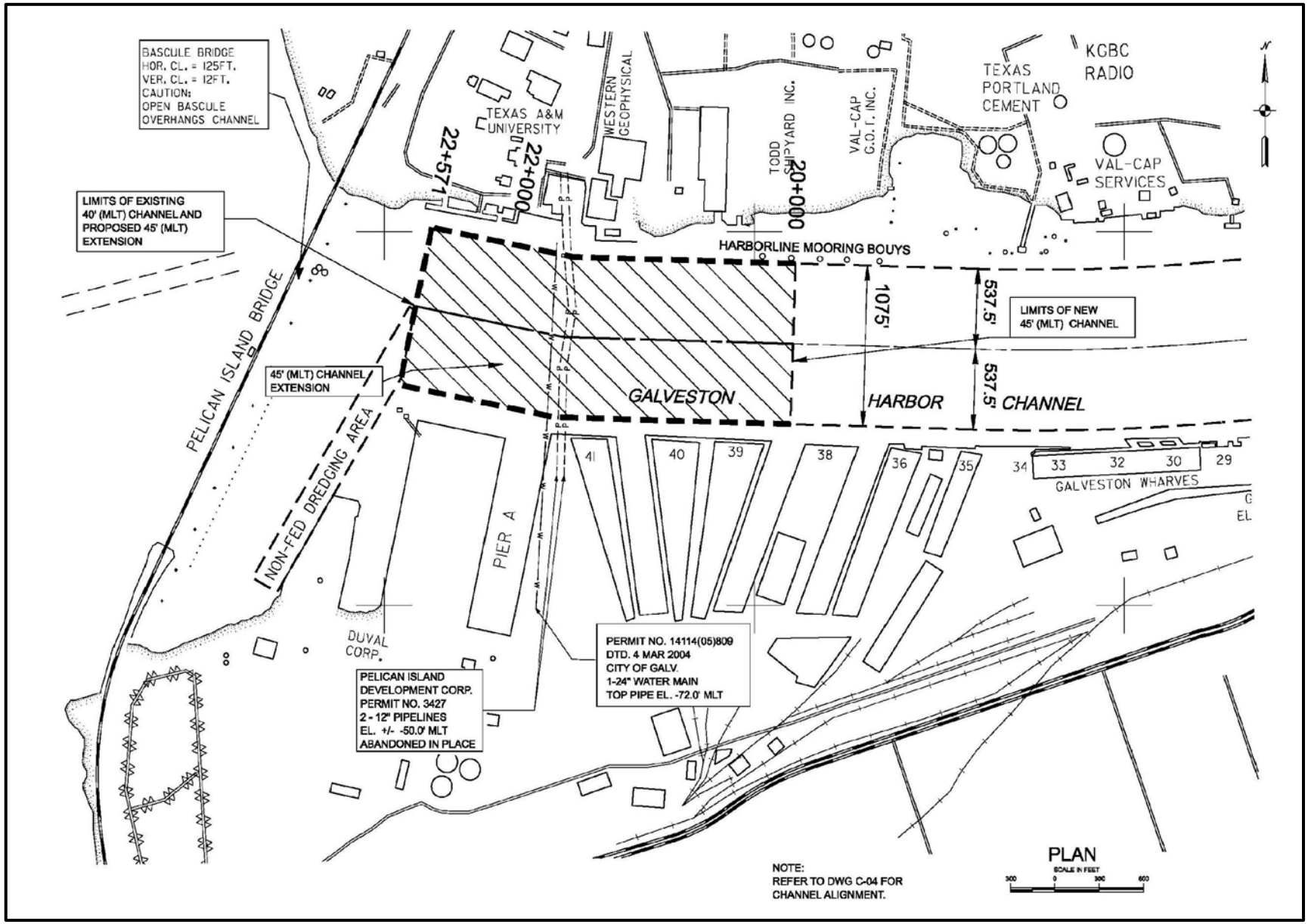


FIGURE 2: Footprint of the Recommended 46-foot Depth Extension of the Galveston Harbor Channel

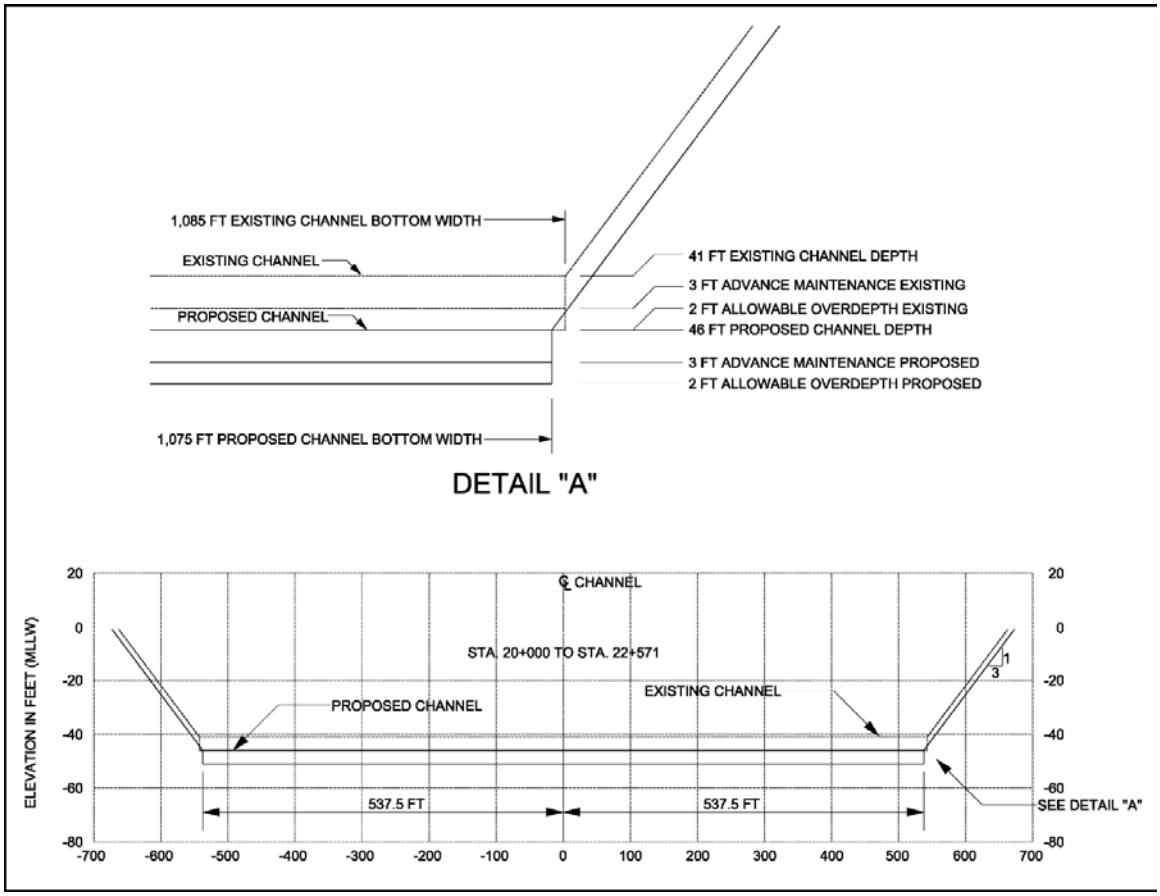


FIGURE 3: Typical Cross Section of Recommended 46-foot Depth Extension within Galveston Harbor Channel.

No ocean disposal is proposed for new work dredged material placement. Future maintenance material from the proposed project would also be placed in the existing Pelican Island PA. The construction period for the new work dredging and placement would be approximately 4 months.

2.0 SPECIES DESCRIPTIONS

Of the species listed in Table 1, only the brown pelican, and the loggerhead and Kemp's Ridley sea turtles are likely to occur in the vicinity of, or in areas adjacent to, the project. While suitable habitat for piping plover and red knot occurs along the sandy beach shore-

lines of the Gulf of Mexico and some dredged material islands along the GIWW in Galveston County, these species are not likely to occur in the vicinity of the project due to lack of suitable habitat. The shorelines along the Galveston Harbor Channel in the vicinity of the proposed deepening of the Galveston Harbor Channel Extension project predominantly consist of bulkheads and dock facilities; very small, short stretches of shorelines having shell hash substrates occur to a lesser extent in the project area in areas such as that found at TAMUG Clipper dock area. These areas are continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas unsuitable for piping plover and red knot. Any disturbance to the channel shorelines caused by the proposed deepening of the Galveston Harbor Channel Extension project would be of the same type and magnitude as experienced with the periodic maintenance dredging and placement into the Pelican Island PA associated with the authorized Federal project. Other species listed on Table 1 are not likely to occur in the vicinity of the project due to lack of suitable habitat or known range limits. There is no designated critical habitat for any of the listed species within the project area. Of the protected species, only the brown pelican is known to have regular occurrence in the project area vicinity. Species descriptions follow below.

2.1 BROWN PELICAN

The brown pelican is a common bird of Texas coastal and near-shore areas and they occur in the project area. Foraging or resting area in bay waters in the vicinity of the project may become less attractive during construction because of increased noise and human activity, but the habitat would not be destroyed.

2.2 SEA TURTLES

Green sea turtle. The green sea turtle was historically the most abundant sea turtle in Texas. Over harvesting and destruction of nesting habitat brought about a rapid decline, although this species can still be found on the seagrass meadows of the lower Laguna Madre. This species is most likely to occur in the southern bays of Texas where clear water and seagrass and algal beds are more abundant. It is not likely to occur along the upper Texas coast or in the project area.

Hawksbill sea turtle. This turtle is extremely rare in Texas coastal waters and is not expected to be present in the project area.

Kemp's ridley sea turtle. The Kemp’s ridley sea turtle migrates along the coast of Texas and is probably the most common sea turtle in Texas bays. It frequently enters bays to feed on shrimp, crab, and other invertebrates. This species is found in Galveston Bay and may be present in waters in the vicinity of the project.

Leatherback sea turtle. The leatherback turtle is rare along the Texas coast. It is a pelagic species that tends to keep to deeper offshore waters where it feeds primarily on jellyfish. There are no known aggregation sites or feeding areas in the project area and the species is not expected to be present.

Loggerhead sea turtle. The loggerhead sea turtle frequents the temperate waters of the continental shelf along the Atlantic coast and Gulf of Mexico, where it forages around rocks, coral reefs, and shellfish beds. Sub-adults also commonly enter Texas bays, lagoons, and estuaries. This species may be present in bay waters in the vicinity of the project.

3.0 EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

The following sections provide the findings of Galveston District and species-specific avoidance, minimization, and conservation measures that support the effect determinations presented. Effect determinations are presented using the language of the ESA:

- *No effect* - the proposed action will not affect a federally-listed species or critical habitat;

- *May effect, but not likely to adversely affect* - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial; or

- *Likely to adversely affect* - adverse effects to listed species and/or critical habitat may occur as a direct result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or completely beneficial. Under this determination, an additional determination is made whether the action is likely to jeopardize the continued survival and eventual recovery of the species.

Table 1
Federally-Listed Threatened and Endangered Species for
Galveston County, Texas

Common Name	Scientific Name	Listing Status[1]	
		USFWS[2]	NMFS[3]
INVERTEBRATES			
elkhorn coral	*Acropora palmata*	NA	T
lobed star coral	*Orbicella annularis*	NA	T
mountainous star coral	*Orbicella faveolata*	NA	T
boulder star coral	*Orbicella franksi*	NA	T
REPTILES			
green sea turtle	*Chelonia mydas*	T	T
hawksbill sea turtle	*Eretmochelys imbricata*	E	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	E
leatherback sea turtle	*Dermochelys coriacea*	E	E
loggerhead sea turtle	*Caretta caretta*	T	T
BIRDS			
Attwater's greater prairie-chicken	*Tympanuchus cupido attwateri*	E	NA
red knot	*Calidris canutus rufa*	T	NA
piping plover	*Charadrius melodus*	T w/ CH	NA
MAMMALS			
West Indian manatee	*Trichechus manatus*	E w/ CH	NA
finback whale	*Balaenoptera physalus*	NA	E
humpback whale	*Megaptera novaengliae*	NA	E
sei whale	*Balaenoptera borealis*	NA	E
sperm whale	*Physeter macrocephalus*	NA	E

[1]E = Endangered; T = Threatened; w/ CH = with Federally Designated Critical Habitat; NA = Not Applicable

[2]USFWS, 2016. http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?fips=48167

[3]NOAA/NMFS, 2016. http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/texas.pdf

3.1 BROWN PELICAN

Foraging brown pelicans are common along the Texas coast and may be found in the project area. However, no nesting sites are located in the project area. Although the waters surrounding the project area may be used by pelicans for feeding or resting, these birds are highly mobile and are able to relocate to avoid disturbance from construction activities. Although there may be disturbance of feeding and displacement during construction, these are localized activities that would not negatively affect this species' feeding, nesting, or resting activities overall. We conclude that the project will have no effect on the brown pelican.

3.2 SEA TURTLES

It is unlikely that leatherback and hawksbill sea turtles would occur in the project area due to their scarcity. Green sea turtles most likely occur in the southern bays of Texas where clear water and seagrass and algal beds are more abundant. Turtles that may occur in bay waters near the project area include the Kemp's ridley and loggerhead sea turtles. The proposed project involves dredging activities within the Galveston Harbor Channel. However, these activities would be accomplished by hydraulic pipeline dredge, as opposed to hopper dredges that may impact sea turtles. Placement of dredged material would be in an existing upland confined PA where no suitable habitat exists for potential nesting turtles. Therefore, the project will have no effect on sea turtles.

4.0 COORDINATION

Information provided on fish and wildlife resources has been considered in the development of the project, through a USFWS Planning Aid Letter (PAL) dated January 14, 2011 (Appendix B). In the PAL, the USFWS recommended that presence/absence surveys be conducted in suitable areas adjacent to Pelican Island and any necessary consultation procedures initiated with the Service pursuant to Section 7 of the Endangered Species Act to ensure that Piping plover are not inadvertently disturbed or harassed.

The shorelines along the ship channel in the vicinity of the proposed deepening of the Galveston Harbor Channel Extension project are predominantly bulk-headed and used by dock facilities, though they may occur to a lesser extent as shell hash substrates in a few areas such as that found at TAMUG Clipper dock area. These areas are continuously disturbed by ongoing maintenance dredging activities, commercial shipping and recreational vessel traffic and other human activities making these areas unsuitable for piping plover. Any disturbance to the channel shorelines caused by the proposed deepening of the Galveston Harbor Channel Extension project would be of the same type and magnitude as experienced with the periodic maintenance dredging and placement into the Pelican Island PA associated with the authorized Federal project. Therefore, the USACE has determined that proposed project will have no effect on piping plover and presence/absence surveys will not be necessary.

5.0 CONCLUSIONS

Construction and placement activities for the proposed channel extension project are short-term (approximately 4 months) and would occur within the footprint of the existing channel project, which undergoes routine maintenance dredging and placement. The routine maintenance activities produce disturbances similar to those expected from the construction dredging and placement being proposed. For these reasons, the proposed action is not expected to impact any listed species or their critical habitat identified in this BA. Therefore, no effect on any of the federally-listed species or their critical habitat is anticipated.

6.0 LITERATURE CITED

National Marine Fisheries Service. 2016. NOAA Fisheries Southeast Region Protected Resources Division, Texas' Threatened and Endangered Species and Critical Habitat Designations. http://sero.nmfs.noaa.gov/protected_resources/section_7/threatened_endangered/Documents/texas.pdf. Accessed 22 June, 2016.

U.S. Fish and Wildlife Service. 2016. U.S. Fish and Wildlife Service Endangered Species List – Galveston County, Texas. IPaC Trust Resources Report. https://ecos.fws.gov/ipac/project/HR6NP24EJNBIRJRA3OJIBFZCBU/overview Accessed 13 June, 2016.

NOAA FISHERIES

Southeast Region
Protected Resources Division

Texas' Threatened and Endangered Species

For more infomiation on listed species please visit:
http://www.nmfs. noaa.gov/pr/species/esa/1isted.htm
http://sero.nmfs.noaa.gov/protected_resources/index.htm I

Marine Mammal Species	Scientific Name	Status
fin whale	*Balaenoptera physalus*	Endangered
humpback whale	*Megaptera novaeangliae*	Endangered
sei whale	*Balaenoptera borealis*	Endangered
spem1 whale	*Physeter macrocephalus*	Endangered
Sea Turtle Species		
green sea tmtle	*Chelonia mydas*	Threatened[1]
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
leatherback sea turtle	*Dermochelys coriacea*	Endangered
loggerhead sea turtle	*Caretta caretta*	Tlu·eatened[2]
Invertebrate Species		
lobed star coral	*Orbicella annularis*	Threatened
mountainous star coral	*Orbicella faveolata*	Threatened
boulder star coral	*Orbicella franksi*	Tlu·eatened
elk.horn coral	*Acropora palmata*	Threatened[3]

Critical Habitat Designations

For final rules, maps, and GIS data please visit:
http://sero.nmfs.noaa.gov/maps_gis_data/protected_resources/criticaI_habital/index.html

Loggerhead sea turtle: 1·11ere are 38 designated marine areas that occur throughout the Southeast Region.

---

[1] Florida's breeding population is listed as endangered.
[2] Northwest Atlantic distinct population segment.
1 Colonies located at Flower Garden Banks National Marine Sanctuary.

OAAFISHERIES

Southeast Region

Protected Resources Division

Species Proposed for Listing Under the Endangered Species Act

Federal action agencies are encouraged to include species proposed for listing under the Endangered Species Act (ESA) in their Section 7 consultation requests. Species that are proposed for listing are those which have been found to warrant federal protection under the ESA, but a final rule fonnally listing the species has not yet published. By including these species in your Section 7 consultation, reinitiating consultation after the ESA listing is finalized may not be necessary.

For more infonnation on species proposed for listing under the ESA, please visit: http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm#proposed

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

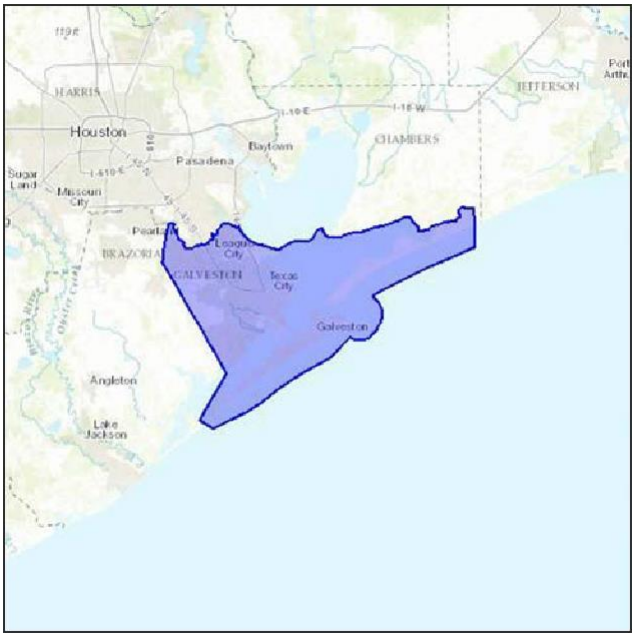
GHCE

LOCATION

Galveston County, Texas

IPAC LINK

https://ecos.fws.gov/ipac/project/CSLQP-KBZYN-FCHMI-CM7A7-PG44ZQ



U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Texas Coastal Ecological Services Field Office

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Attwater's Greater Prairie-chicken Tympanuchus cupido attwateri Endangered

CRITICALHABITAT

No critical habitat has been designated for this species. http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B00O

Piping Plover Charadrius melodus Threatened

CRITICALHABITAT

There is **final** critical habitat designated for this species.
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa Threatened

CRITICALHABITAT

No critical habitat has been designated for this species.
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Mammals

West Indian Manatee Trichechus manatus — Endangered

CRITICALHABITAT

There is **final** critical habitat designated for this species. http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A007

Reptiles

Hawksbill Sea Turtle Eretmochelys imbricate — Endangered

CRITICALHABITAT

There is **final** critical habitat designated for this species. http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00E

Kemp's Ridley Sea Turtle Lepidochelys kempii — Endangered

CRITICALHABITAT

No critical habitat has been designated for this species. http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00O

Leatherback Sea Turtle Dermochelys coriacea — Endangered

CRITICALHABITAT

There is **final** critical habitat designated for this species. http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00F

Loggerhead Sea Turtle Caretta caretta — Threatened

CRITICALHABITAT

There are both **final** and **proposed** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C00U

Critical Habitats

This location overlaps all or part of the critical habitat for the following species:

Piping Plover Charadrius melodus

Final designated critical habitat http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079#crithab

APPENDIX D

Draft General Air Conformity Determination

Draft
General *Conformity Determination*
Galveston Harbor Channel Extension
Post Authorization Change Report
Galveston County, Texas

DRAFT

GENERAL CONFORMITY DETERMINATION
GALVESTON HARBOR CHANNEL EXTENSION
POST AUTHORIZATION CHANGE REPORT
GALVESTON COUNTY, TEXAS

Prepared for:

U.S. Army Corps of Engineers
Galveston District
P.O. Box 1229
Galveston, Texas 77553-1229

Prepared by:

PBS&J
6504 Bridge Point Parkway
Suite 200
Austin, Texas 78730

March 2013

ATKINS
TBPE REG. #F-474

Printed on recycled paper

PROFESSIONAL ENGINEER STATEMENT

·n1is Draft General Conformity Determination Document and estimate of air contaminant emissions (attachment) is released on _____ __, 2013, under the authority of Ruben I. Velasquez, P.E., Registration No. 69126, for the purpose of evaluation and discussion. 11iis preliminary document is not to be used for construction, bidding, or permitting purposes.

Contents

Figures

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Acronyms and Abbreviations

CAA	Federal Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CY	cubic yards
DEIS	Draft Environmental Impact Statement
DOT	U.S. Department of Transportation
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
GRP	General Reevaluation Plan
HGB	Houston/Galveston/Brazoria
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO.	nitrogen oxides
PM_{10}	particulate matter with an aerodynamic diameter equal to or less than10 microns
PACR	Post Authorization Change Report
SIP	Texas State Implementation Plan
SO_2	sulfur oxides
TCEQ	Texas Commission on Environmental Quality
tpy	Ions per year
U.S.	United States
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

1.0 INTRODUCTION

The Galveston Harbor Channel Extension Project is located on the upper Texas coast al the mouth of Galveston Bay in Galveston County, Texas. ·me project includes the Offshore Reach (the common Entrance Oiannel) and the area between the Bolivar Peninsula and Peljcan Island tluough Galveston Harbor to the Gulf lntracoastal Wate1way. Galveston Harbor Channel is the separable channel branclting off the Houston Ship Channel, providing entry to the Po,t of Galveston, Texas. The Galveston Harbor Channel extends in an east-west direction from Bolivar Roads between Galveston and Pelican Islands for about four miles (Figure 1).

The U.S. Army Corps of Engineers (USACE) has prepared a Draft Environmental A sessment (EA) lo describe the enviromnental impacts associated witl1 deepening a pottion of the existing Galveston Harbor Channel from 40 feet to 45 feet mean low tide. This channel improvement would increase navigation efficiently for deep draft vessels enabling maximum loading, and would allow users at the far end of Galveston Harbor Channel to take advant.sge of fully loaded vessels alleviating the current practices of light-loading. The project sponsor is tl1e Pmt of Galveston.

11us project, as a Federal action, is subject lo the General Confomuty Rule promulgated by the U.S. Environmental Protection Agency (EPA) pursuant to the Clean Air Act (CAA), Section 176(c)(l). ll1e rule mandates that the Federal govertunent not engage in, suppo,t, or provide financial assistance for licensing or permitting, or approving any activity not confonning to an approved state implementation plan. ln Texas, the applicable plan is tl1e Texas State Implementation Plan (SIP), an EPA-approved plan for the regulation and enforcement of the National Ambient Air Quality Standards (NMQS) in each air quality region within the state.

TI1is document represents the Draft General Conformity Determination prepared on behalf ofU1e USACE, Galveston Disttict, to assess whether air contaminant emissions that would result from the proposed Galveston Harbor Channel Extension Project are in confo1mity with the STP for the Houston/Galveston/Brazoria (HGB) ozone nonattaitunent area.

Figure l, Project Study Area

2.0 REGULATORY BACKGROUND - GENERAL CONFORMITY

General Confo1mity refers to the process of evaluating plans, programs, and projects to determine and demonstrate they meet the requirements of the CAA and the SfP. ll1e General Conformity Rule establishes conformity in coordination with and as part of the NEPA process. The General Conformity Rule is promulgated by the EPA and mandates that the Federal govermnent not engage in, support, or provide financial assistance for licensing or permitting, or approving any activity not confom1ing to an approved SrP. In Texas, the applicable plan is the Texas SrP, an EPA-approved plan for the regulation and enforcement of the NAAQS in each air quality region within the state.

The purpose of this General Conformity requirement is to ensure Federal agencies consult with state and local air quality districts so they become aware of the project and its expected air emissions and would consider these expected emissions in their SfP emissions budget. 1l1e General Conformity Rule is codified at Title 40 Code of Federal Regulations (CFR) Pa11 51, Subpart W, and Title 40 CFR Patt 93, "Determining Conformjty of Federal Actions to State or Federal Implementation Plans."

ll1e CAAdefines confonruty to an implementation plan as the upholding of "an implementation plan's purpose of elimmating or reducing the severity and number of violations of the National Ambient fur Quality Standards and achieving expeditious attainment of such standards." Conforming activities or actions should not, through additional air pollutant emissions, result in the following:

- Cause or conllibute to new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or interim emission reductions or other milestones in any area.

Pursuant to the General Confonnity Rule, a Federal agency; e.g., the USACE, must make a General Conformity Detennination for all Federal actions in nonattainrnent areas where the total e1russions of a nonattainment pollutant or its precursors exceeds levels established by the regulations. For the HGB nonattaimuent area, the threshold level is 100 tons per year (tpy) for either NO,or VOC. In addition, even if the total emissions ofVOC or NOxdo not exceed the JOO tpy threshold levels, when Ute total emissions of any pollutant from the Federal action represents JO percent or more of a nonattainrnent or maintenance area's total emissions of those pollutants, then the action is defined as a regionally significant action and a confonnity determination would be still be applicable. Only those air emissions of NOx and VOC related to the Federal action; i.e., those considered to be implemented by the USACE, should be considered in this General Conformjty Determination.

3.0 APPLICABILITY

The proposed Galveston Harbor Channel Extension Project will be located in Galveston County, Texas. ·n1is county is included in the eight county HGB ozone nonattainment area which is classified as "marginal" in teims of its degree of compliance with the current 8-hour ozone standard. This classification affects facilities that generate the ozone precursors, oxides of NOx, and VOC. As such, tlte project is subject to the General Conformity Rule which applies to all nonattainment and maintenance areas.

The proposed Galveston Harbor Channel Extension Project was evaluated based on the anticipated equipment to be used and identification of expected air contaminants and estimated emission rates for Utis project. 11te emissions inventory included emissions associated with dredging of Ute channel and from land-based mobile sources U,at will be used during exc.wation of the d,·edged material placement area, including off-road earth-moving equipment and on-road constmction ec1uipment. Air contaminant emissions associated with this equipment will be prima,ily combustion products from fuel burned in tl,e engines powering this equipment.

Based on U,is evaluation, it has been determined U,at a General Confonnity Determination for NOx emissions would be required for this project as emissions of NOx are estimated to exceed the I00 tons per year applicability threshold for general confo,mity. Emissions of VOC from the proposed project are exempt from a General Conformity Detennination because they are below tlte JOO ton pe,· year emissions threshold requiring such an analysis.

4.0 AIR EMISSIONS INVENTORY

For the General Conformity Determination, an air emissions inventory was prepared for project-related activities for the Galveston Harbor Channel faiension Project based on the schedule and other assumptions as developed by the USACE. Air emissions estimates were calculated using techniques appropriate for a specific emissions generating activity or source. The basis, emission factors, and summary of emissions are attached to this document.

4.1 Project Emissions

It is anticipated that the project construction activities will begin and be completed in 2012. Project air contaminant emissions were estimated based on projected equipment use and scheduling of on-shore and near-shore construction activities. The project air emissions inventory included emissions associated with dredging vessels and equipment, nonroad construction equipment, and on-road mobile sources, as follows:

- Dredging vessels and equipment - included dredges and support marine vessels
- Nonroad construction equipment - included dozers, dragline, excavators, etc.
- On-road mobile sources - included employee commuter vehicles

Air contaminant emissions were estimated in Ions per year for each piece of equipment based on the equipment horsepower, fuel type, and expected operating hours in 2012. Detailed emission calculations are attached to this document.

4.1.1 Dredging Vessels and Equipment

Dredging emissions included those that would be expected to result from the use of tug boats and miscellaneous marine vessels in support of the dredging activities. Air emissions directly related with the dredging equipment were calculated on an annual basis based on the anticipated type of engine, activity, horsepower, and anticipated hours of operation. Estimated emissions were based on the emission factor algorithms referenced from EPA's technical report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data," EPA 420-R-00-002, February 2000. 'I11is technical report is a compilation of engine and fuel usage test data from various types of marine vessels including bulk carriers, container ships, dredges, tankers, and tugboats. Emission factors were determined based on an emission factor algoritlun used to calculated air contaminant emission rates for tl1ese emission sources. 111e emission foe.tor algorithm is applicable to all engine sizes since, according to the EPA's document, the emissions data showed no statistically significant difference across engine sizes.

4.1.2 Nonroad Construction Equipment

Air contaminant emissions from nonroad constmction equipment used for on-shore excavation were estimated based on the anticipated type of equipment, activity, horsepower, and anticipated hours of operation·.n1e estimated nonroad construction emissions included those that would be expected to result from equipment used for onshore activities; i.e., filling, working, and compacting of dredged material. ·n1e operation of constmction vehicles (e.g.,dozer, dragline, excavator, etc.) would generate air emissions typical of vehicles powered by diesel-fueled internal combustion engines. '!lie estimate of emissions for this equipment was based on emission factors generated using the EPA's NONROAD2005. This computer model may be used to calculate emissions for many nonroad equipment types, categorizing them by horsepower rating and fuel type available for specific years, for a specific geographic area, stale, or county.

4.1.3 On-road Mobile Sources

Mobile source emissions associated with the Galveston Harbor Channel Extension Project construction would be generated from employee commuter vehicles. Mobile on-road emissions associated with employee vehicles were calculated using EPA MOBILE6, a mobile source emissions model. A mix of light duty gasoline vehicles and light duty gasoline tmcks was assumed for the makeup of the employee vehicles. An average commute of 25 miles each way was assumed for each vehicle. The total number of miles traveled equaled the number of miles per tripmultiplied by the total number of days of construction activity times the number ofveh.icles.

4.2 GALVESTON HARBOR CHANNEL EXTENSION PROJECT - SUMMARY OF NOx AND VOC EMISSIONS

For comparison with the thresholds defined in the General Confo1mity Rule, the estimated annual emissions of NOx and VOC for the Galveston Harbor 01annel fa1ension Project are summarized in Table 1. Emissions of carbon monoxide, sulfur dioxide, and particulate matter are not considered in the General Conformity evaluation as this area is in attainment with the NAAQS for each of those pollutants.

TABLE 1
GALVESTON HARBOR CHANNEL EXTENSION PROJECT
SUMMARY OF NO, AND VOC EMISSIONS
(tons per year)

	2012
NO,	106.4
VOC	1.62

TI1e estimate of VOC emissions for the Galveston Harbor Channel Extension Project would not exceed the conformity threshold of JOO tpy for either of these years. TI1erefore, a General Conforntity Determination for VOC emissions would not be required for this project.

11,e estimate of NOx emissions for the Galveston Harbor Cha11J1el Extension Project would exceed General Conformity threshold (100 tpy) in 2012 and would require a General Confo1mity Determination.

4.3 MAINTENANCE DREDGING

After the extension of the cha11J1el is completed, the USACE anticipates the need to pe1form maintenance dredging of the cha11J1el to remove any shoaling that has occmred after the construction period. It is anticipated that there will be no increase in the maintenance quantities from the existing amounts; the maintenance quantity is estimated to be about 648,000 cubic yards every 4 years based on dredging of about 162,000 cubic yards per year.

A summary of the estimated emissions in tons per year resulting from the additional maintenance dredging equipment is shown on Table 2. A detailed summary of emissions can be found in the attached emission summary tables.

TABLE 2
MAINTENANCE DREDGING - TOTAL ESTIMATED EMISSIONS

Air Contaminant	Dredging Equipment Emissions (Ions/year)
CO	0.90
NOx	7.90
$PM_{2.5}$	0.18
PM,o	0.19
S	1.31
voe	o.o9

·n,e General Conformity rules specifically exclude from applicability maintenance dredging where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site. Therefore, a General Confonnity Determination for this project would not include emissions from the anticipated maintenance dredging activities.

5.0 PRELIMINARY GENERAL CONFORMITY DETERMINATION

The proposed Galveston Harbor Channel Extension Project would conform to the applicable SIP if, for each pollutant tliat exceeds the threshold rates (100 tpy of NO, or VOC), the total emissions from the action is in compliance or consistent with all relevant requirements and milestones contained in the applicable SIP. Under 40 CFR Part 93, Subpat1 B, "Detennining Conformity of General Federal Actions to State or Federal Implementation Plans," a Federal action required to have a confonnity determination for a specific pollutant would be determined to conform to the SIP if it meets one of several requirements in 40 CFR §93.158, "Criteria for Deteimining Conformity of General Federal Actions."

Based on evaluation of the proposed project description and the estimated air quality emissions, it is believed that project emissions can meet the requirements of 40 CFR §93.158(a)(5)(i)(A). This section of the Fedel'al General Confonnity Rule applies to an ozone nonattainment a,·ea, where the EPA has approved a revision to an area's attainment demonstration aft.er 1990, and the state makes a detennination that "the total of direct and indi,·ect emissions from the action, 01· portion thet'eof, is detennined by the State agency responsible for the applicable SIP to result in a level of emissions which, together with all other emissions in the nonattainment area, would not exceed the emissions budgets specified in the SIP."

·n1e emissions budget for General Conformity purposes is defined in 40 CFR §93.152. In summary, the emissions budget is that portion of the total allowable emissions used as a basis for the latest approved revision of the SIP that is allocated to mobile sources; any stationary source or class of stationary sources; to any federal action or class of actions; to any class of area sources; or to any subcategory of the emissions inventory.

111e General Conformity Determination is based on the 8-hour ozone standard and the corresponding attainment dates and de minimis levels. For the HGB nonallainment area, the most recently approved SIP revision is the 2004 Mid-Course Review SIP (TCEQ, 2004), based on attainment of the I-hour ozone standard, and associated emissions trading programs approved by the EPA on 6 September 2006 (EPA, 2006). In this SfP, the emissions budgets for NO, and VOC are based on emissions inventories for 1999 updated for the year 2000, where appropriate, and projected to 2007.

As discussed in the 2004 SIP revision, nonroad mobile sources include a very broad category of nonroad equipment that includes engines mounted on construction equipment. The Nonroad Mobile emissions weekday budget for 2007 is 64.53 tons per day of NO, and 50.62 tons per day of VOC (TCEQ, 2004). 11,e Nonroad Mobile einissions inventory includes einissions from e<1uipment associated with agricultural, aircraft, commercial, construction, ground support (airport), industrial, lawn and garden, railroad maintenance, logging, locomotives, oil and gas, recreational, and recreational marine equipment.

5.1 GALVESTON HARBOR CHANNEL EXTENSION PROJECT EMISSIONS COMPARED TO SIP EMISSIONS BUDGETS

For comparison to the SIP Area Source Emissions budget, the annual NO, emission rates estimated for the Galveston Harbor Channel Extension Project may be summarized in tentlS of tons per day and compared to the SIP emissions budget as shown on Table 3.

TABLE 2
GALVESTON HARBOR CHANNEL EXTENSION PROJECT - NOx EMISSIONS COMPARED TO SIP 2007
WEEKDAY NONROAD MOBILE SOURCE EMISSIONS BUDGET'

	2012
Tons per Year	106.4
Tons per Day	1.2
% of Nonroad Mobile Emissjons Budget (64.53 tonsper day)	1.9%

'TCEQ, 2004.

As shown on Table 2, NO, emissions for the Galveston Harbor Channel Extension Project non-road mobile equipment emjssions would ,·epresent less than two percent of the SlP 2007 Non-road Emjssions Budget for NOx.

5.2 PRELIMINARY GENERAL CONFORMITY DETERMINATION

Based on an evaluation of the proposed Galveston Harbor Channel Extension Project emissions, it is believed that the total emissions of NOx would result in a level of emissions that are well within the 2007 Non-road Mobile Emissions Budget in the most recently approved SIP revision. As the Galveston Harbor Channel Extension Project is not unusual in scope for an area like the HGB, it is anticipated that emissions from the project will be less than an increase of JO percent of the VOC and NO, emissions inventories for the entire HGB nonatlainment area. Therefore, missions from the activities subject to the USACE action are not considered regionally significant for purposes of General Confo,mity. BecatLse of this, it is expected that emissions from the project construction will not:

- Cause or contribute to new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or interim emission reductions or other milestones in any area.

Pursuant to the Gen Tal Conformity Rule (40 CFR Part 93, Subpart B), this Draft General Conformity Determination is being provided to demonstrate that the proposed Galveston Harbor Channel Extension Project will comply with tl1e requirements of the General Conformity Rule and will be in conformity with

the SIP. A5 specified i.n the Federal General Confo1mity Rules, 40 CFR §93.1S8(a)(S)(i)(A), the state must make a determination that the total emissions of NO, or VOC from the action, or portion thereof, would result in a level of missions wllich, togctl1er with all other emissions in the HGB nonallaimn "lll area, would not exceed the emissions budgeL5 specified in the SIP. Therefore, it is requested that the TCEQ review this draft and provide a fonnal determination and confirmation. Once written confinnation is received, this infonnation will be relied upon by the USACE as a basis for making a Final General Confonnity Detetmination for the proposed Galveston Harbor Channel Extension Project.

6.0 REFERENCES

40 Code of Federal Regulations (CFR) Part 93, Subpart B, "Determining Confonnity of General Federal Actions to State and Federal Implementation Plans."

---. 2004. "Revisions to the State Implementation Plan (SIP) for the Control of Ozone Air Pollution, Houston/Galveston/Brazoria Ozone Nonattainment Area," Adopted 1 December 2004.

U.S. Environ.mental Protection Agency (EPA). 2000. "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data," EPA320-R-00-002, February 2000.

———. 2004 "Nonroad Emissions Model Draft NONROAD 2002 Suppo,t Document, "Median Life, Annual Activity, and Load Factor Values for Noru·oad Engine Emissions Modeling," April 2004.

---. 2006. "Approval and Promulgation of Air Quality Implementation Plans; Texas; Revisions to the Ozone Attainment Plan for the Houston/Galveston/Brazoria Nonattainment Area," 6 September 2006. *Federal Register*, Volume 71, No. I72, Page 52670.

Attachment

Tabular Summaries of Estimated Air Emissions

APPENDIX A

List of Tables
Galveston Channel Extension Project

Table 8-2. Orodge Equipment Engine Horsepower and Hours of Oporallon
Galveston Channel Extension Protect

C(H'tlfact		Dred; Type	ling:ln11TyP1 Total	Propol51on	Pump	GelM!nllo•	O::;-::r	surv,ayi-011 e::e	111[1]	TfllWliE!f 11Jllng	Flo.iting BtHl$tltl Pumping	T.. PrOP'Jlilon	Main	CntwBo.rl Pr l Of
1	C r 4 RCNYIIII-NIW	x,-O,-												<00

•,•_					•1- Hour,: S11Nil-)'B.6M		Ttawhl!r		Floatlng Boo&tK	Tug	CrewBo;rt		
Dredge Type	DrlTjdogtonl g,	Propelling	Pumping	Gi.iti•ating	Idling	Propelling	Idling	Propellingl	Idlng	Pumping	Propelling	En gl 1'11 r	mg
												,oo	1 300

Dredglfll Lme balied cn&SO,OCO clbc y.ar{ffl ct ctli!dged matenal

Table B-3. Ma Intenance Dredge- Equipment Engine Horsepow&r anel Hours of Operation
Ga.lveston Channel E:Ktenslon Prciject

		Dr«lg•Typa	lEngln•Typ,l Total	Propulsion	Pump	GH1til11101	Gllll-,.::r	urv-,,Bo.at e'::. !	11111111	Tr.1Wl11r ::.lldllng	Flotltlng Bi,c1tt1 Pumping	TUO Propuklon	Main	Crew Boat Prop11lsi01
1	lCnbr'1rtl•MBlr'CtflI!IrU													<00

•,•_					•1- Hour,: Survey!.OIII		T1awle1		Floating BOO K	Tug	CrowBo;rt		
DrridgeTyPrl	DrTe od b rl g	r•,,•••,11•9 1,,um	ng	Gefleratl11'1lt	ld i ng	Prop,11Hlng	Idll119	Profl4'1ll1191	tdllng	Pumping	Pr llng	r,biln IINI 1,,,.,,.,,.	ng
											270	23	23

Dredging time is based on 162,000 cubic yards per year of maintenance dredging at a rate of 1,440 cubic yards per hour.

Table C-1. Marine Engine Emission Factors and Fuel Consumption Algorithms

(in g/kW-hr, for all marine engines)

Galveston Channel Extension Project

Statistical Parameter	Exponent (x)	Intercept (b)	Coefficient (a)
CO	1	0	0.8378
NOx	1.5	10.4496	0.1255
PM	1.5	0.2551	0.0059
PM2.5	1.5	0.2551	0.0059
PM10	1.5	0.2551	0.0059
SOx	n/a	0	2.3735
VOC(HC)	1.5	0	0.0667

Notes:

1.) All regressions but SO_2 are in the form of:

Emissions Rate (g/hp-hr) = (a•(Fractional Load)"x + b) • 0.7457
where the conversion factor of 0.7457 kW/hp is used to calculate the emission factor in g/hp-hr

2.) Fractional Load is equal to actual engine output divided by rated engine output.

3.) The SO_2 regression is the form of:

Emissions Rate (g/hp-hr) = a*(Fuel Sulfur Flowing/hp-hr)+ b
where Fuel Sulfur Flow is the Fuel Consumption times the sulfur content of the fuel;
The sulfur content for the fuel consumption regression was set to 3300 parts per million (0.33 wt%)

4.) **Fuel Consumption (g/hp-hr) = (14.12 / (Fractional Load)+ 205.717) * 0.7457**

5.) n/a is not applicable, n/s is not statistically significant.

6.) All information shown above is detailed in Table 5-1 of the EPA technical report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data", EPA 420-R-00-002, February 2000.

Table C-2. Marine Equipment Load Factors and Emission Factors
Galveston Channel Extension Project

	Dritdge					CfWWBoal		TUIWll!lr		FIO-illing Booster	Tug	Spill Barca	Crew Boat
Operating Mode	0r•0::1gir-g	Propellirg	P1...-.-.:iing	Genetii.ing	Idling	Propellil il	kjlif'G	Propelling	Idlir"G	Purl)i",	Pr ling	Main Ertine	PropellirG
Lo21d Factor	0.8	08	0.8	0.8	02	04	0.2	0.4	0.2	08	0.4	0.4	04
EF jGramthp-hr)													
CO	0.780934	D 780934	078093'1	0 780934	3.123737	1 56Ul69	:3 123737	1 561,869	3 123737	D 7009:JA	1.561869	1 561869	1 561689
NO,	7.923056	7.9Zl056	7.923056	i.9ZXJ56	8.838583	-8-.162195	8.838583	8.16'2195	8 838583	7.923056	8.162196	8 162196	8.1621
PM	0.196377	D.1963n	0.196377	0.196377	0.23,9,.417	0.207619	0.239A17	0.207619	0 239-417	D.19B3n	0.207619	0 207619	0.207619
PM2.5	0.178703	0.178703	0.178700	0.17871)3	0.217870	0.188933	0.217870	0 188933	0 217870	0178700	0.188933	0 188933	0.188933
PM10	0.188522	D.18El522	0188:522	0.188:522	0.229841	0.199:314	0.229841	0 199314	0 229841	D18B522	0.100314	0 199314	0 199314
SO,	1.30"827	1.304627	1.30<!827	1.304627	1.e1:l894	1.-,on1e	1.'613894	1.40me	1.'613894	1.304627	1.407716	1.407716	1...:m16
VOC(MCI	0.069511	D.OS9511	OJJ69511	0.069511	0.556090	0.196607	0.556J90	0.196607	0"""6090	D.069511	0.196607	0 196607	0.196607

I!llii;

1.) The ctedge type, ergt'I!!- type, harsepcmer, and fUl:!I type were based on 1rtaurmion provi:je;j I)J projf!C-t sp::insors

2) The ergme li:iar::j f:;1etors , the edge$ s,"M;l "5-UPIX)rt Eq1,Jif;ffle(1 -were ,i;h.:!termined lrOTI Table 5-2 c:/ theEF='A ept;n "A tysls of Commer,c:1:;11 M1:mne Ves-sets Emissions arwj Fuet ConwmfXiorl O:;ita"', Fel:lfl.ely 2COO

A Sl.l'IIO:')' of Cl'OOge ine sizes alCn{I wilh ifl'ul frcim prOj«l S.pctrlSCl"'S was used kl determine wf"licl"l operating r'r'ICll'.J@: an:! henc whicl"l IOad factcir a lo -e l"l er-gina The fC!!loMtg a!jS-UmptlOl15 a to the lai:ld factof determina1ioo·

A.) The mam engines en the ci"edgee -were as l,l'l'Ed tD eat ftA fXM"el" (e.9, O a "'cruise" bad fa:tor from Tst:te >2 of EPA rep:xt) for al hOJ!'i of operation,

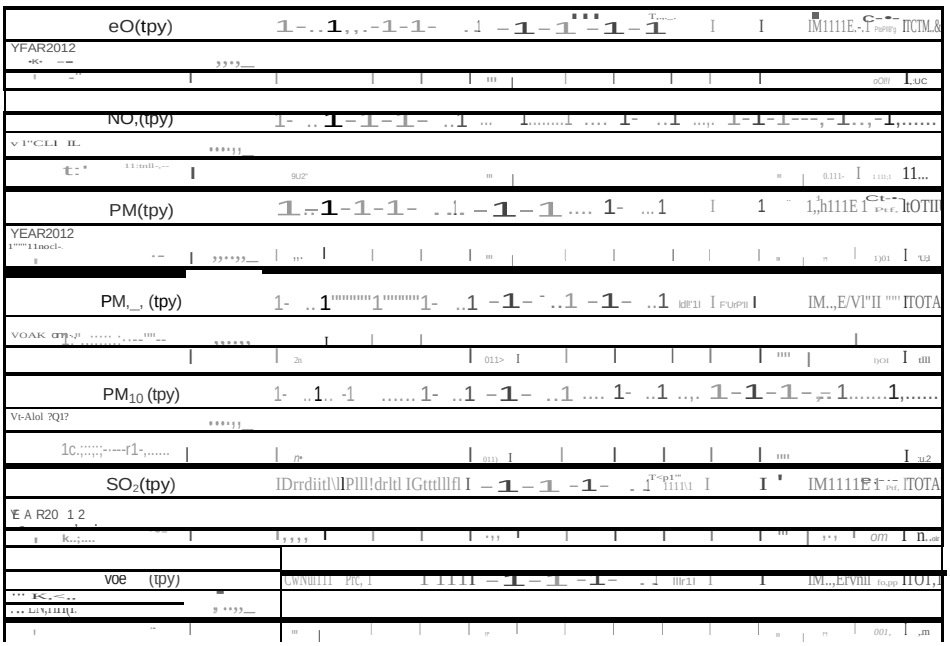
9.) The general.Ort, on the Clre:1geS Wft"e as.Ml'Tl!ed to opel?lte a 0.2 IO&<I f&etOr Clu IClkf'lll

C) Tl"le main ergmes or prq:,ulsD"l ent1Ines an the s rt equipment y,ere, cl6SL.anied la operaie .at Irierm11en1: times during the dred_Jng opera1lorrs. and were also dellemaied 1oopera1.eat the O 4 "'sbvc:ru1se"' load factor.

D l rne aw1liary ien(Jnes., if atr/. cin th9 s.u t e,qulpm@nt were- as. med tci operi?lt@ sparingly Cll.lir"G 1dlil'J.:a'.inl d wtlf@ detem"ined to operate at 11"19 a 2 "mar'lf!'We1'i0g" bad r ci

3.) Tne emulCf'l factors were eaJcuUne<l eccc:tdIng to lJ"e algorlthm table and fomuas detelled on pe:ge- 5-3 ol the EF='A rep::rt. The emt1SIons Rate fOOTIUl3 and algorithm 18 are 81$0 sh()l,.m en T!!t:te A·4,. '"M;ir-1neEngine Erisslon Faeta- !Ind Fuel Con D.818", Fetruary 2000.

4) The emis,ioriR1;1te In ▬ ▪ ≤ on 1he follo. ng formuls Emiss1011 Raie • rt:i·LF ei: (o 002:2046 lt;aigramt(1 tcio'2000 lbs)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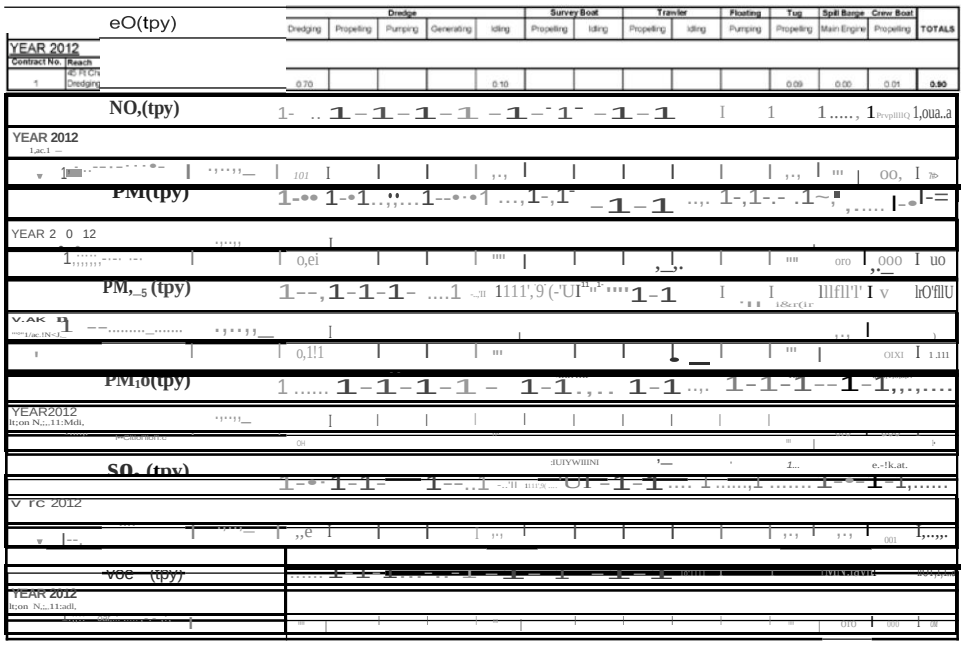
Dredge
Survey Boat
Trawler
Floating
Tug
Spill Barge
Crew Boat
Dredging
Propelling
Pumping
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voe (tpy)

Table D-1. NONROAD Equipment Emission Factors
Galveston Channel Extension Project

(grams per horsepower-hour)

Range	HP	SCC	EQUIP	CLASSIFICATION	Engine Type	Fuel Type	VOC exhaust	PM10 exhaust	PM25 exhaust	VOCCrankcase	CO exhaust	NOx exhaust	CO2 exhaust	SO2 exhaust	PM exhaust
50 < HP <= 75	75	2270002069	Crawler Tractor/Dozers	Construction and Mining Equipment	Diesel	Diesel	0.325752193	0.362138748	0.351274586	0.004451253	3.17107704	3.853668713	595.1703367	0.010942471	0.362138748
75 < HP <= 100	100	2270002036	Excavators	Construction and Mining Equipment	Diesel	Diesel	0.298413099	0.449987272	0.436487653	0.005588397	3.422761787	3.581676083	595.253359	0.010513857	0.449987272
100 < HP <= 175	175	2270002066	Tractors/Loaders/Backhoes	Construction and Mining Equipment	Diesel	Diesel	0.903249529	0.636718042	0.617616501	0.017897181	3.519113791	5.564499038	623.8077258	0.011268071	0.636718042
100 < HP <= 175	175	2270002069	Crawler Tractor/Dozers	Construction and Mining Equipment	Diesel	Diesel	0.259846516	0.299421689	0.290439039	0.004862036	1.281914603	3.143197471	536.043865	0.009513759	0.299421689
100 < HP <= 175	175	2270002081	Other Construction Equipment	Construction and Mining Equipment	Diesel	Diesel	0.314721577	0.320570142	0.310953038	0.006062945	1.492964998	3.877125229	535.677577	0.009615671	0.320570142
175 < HP <= 300	300	2270002036	Excavators	Construction and Mining Equipment	Diesel	Diesel	0.215051539	0.186731945	0.181129987	0.003554818	0.94443003	2.673155385	536.1795103	0.009098437	0.186731945
175 < HP <= 300	300	2270002045	Cranes	Construction and Mining Equipment	Diesel	Diesel	0.247285365	0.152470041	0.14789594	0.004413209	0.706243025	3.354177736	530.2940128	0.009212558	0.152470041
175 < HP <= 300	300	2270002069	Crawler Tractor/Dozers	Construction and Mining Equipment	Diesel	Diesel	0.228405014	0.193139698	0.187345507	0.003910346	0.972475354	2.867401234	536.1390772	0.009187187	0.193139698
300 < HP <= 600	600	2270002045	Cranes	Construction and Mining Equipment	Diesel	Diesel	0.238473869	0.177535845	0.17220977	0.004389384	1.096357572	4.219809796	530.3205664	0.009366339	0.177535845
300 < HP <= 600	600	2270002081	Other Construction Equipment	Construction and Mining Equipment	Diesel	Diesel	0.306230491	0.293727438	0.284915615	0.005792439	2.132603394	4.572203408	535.9032139	0.009513511	0.293727438

Table D-2. Load Factors For Equipment Using Diesel or Gasoline

SCCCode	Equipment	Load Factor[1] Diesel	Gasoline
22xx003010	Aerial Lifts	21%	46%
22xx005015	Aoricultural Tractor	59%	62%
22xx006015	Air Compressors	43%	56%
22xx001030	All Terrain Vehicles	42%	100%
22xx002033	Bore/Drill Rigs	43%	79%
22xx002042	Cement & Motar Mixers	43%	59%
22xx004066	Chiooers/Stump Grinders	43%	78%
22xx002039	Concrete/Industrial Saws	59%	78%
22xx002045	Cranes	43%	47%
22xx002066	Crawler Dozers/Tractor	59%	80%
22xx002054	CrushinQ/ProcesinQ Equipment	43%	85%
22xx002078	Dumoers/Tenders	21o/o	41o/o
22xx002036	Excavators	59%	53%
22xx007015	Fellers/Bunchers/Skidders	59%	70%
22xx003020	Forklifts	59%	30%
22xx006020	Gas Compressors	43%	85%
22xx006005	Generator Sets	43%	68%
22xx002048	Graders	59%	64%
22xx005050	Hydro Power Units	43%	56%
22xx004056	Lawn and Garden Tractor	43%	44%
22xx002051	Off-Hiahwav Truck	59%	80%
22xx002075	Off-Highway Tractor	59%	70%
22xx004056	Other Agricultural Equipment	59%	55%
22xx002081	Other Construction Equipment	59%	48%
22xx0D3040	other General Industrial	43%	54%
22xx003050	Other Material Handlina	21%	53%
22xx002003	Pavers	59%	66%
22xx002021	Pavinq Equipment	59%	59%
22xx002009	Plate Compactors	43%	55%
22xx006030	Pressure Washer	43%	85%
22xx006010	Pumps	43%	69%
22xx003060	Refriqeration/AC	43%	46%
22xx002015	Rollers	59%	62%
22xx002057	Rough Terrain Forklifts	59%	63%
22xx002063	Rubber Tire Dozer	59%	75%
22xx002060	Rubber Tire Loader	59%	71o/o
22xx002018	Scraoers	59%	70%
22xx002072	Skid Steer Loader	21%	58%
22xx001060	Soecialtv Vehicle/Carts	21%	58%
22xx002024	Surfacinq Equipment	59%	49%
22xx003030	SWeepers/Scrubbers	43%	71%
22xx002006	Tamoers/Rammers	43%	55%
22xx003070	Terminal Tractors	59%	78%
22xx005040	Tillers> 6 hp	59%	71%
22xx004026	Timmer/Edger/Brush Cutter	43%	91%
22xx002066	Tractor/Loader/Backhoe	21o/o	48%
22xx002030	Trenchers	59%	66%
22xx006025	Welders	21%	68%

I. Load Factors from Appendi.'< Aof *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA* Office of Air and Radiation Repo1t Number NR-005b, December 2002

Table 0-3.ConstructkNIEquipment Emissions

GalYeston ChannelE:dension Profecl

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,E.NT1 TftM:'TC!llt,otAWI.£R (002ER), 111.fflHP 1315-iNI(W) POWER9-IFt.IGP. W.vNI\IEIISALEI.ACE	WL(Aoc:ttA OA	,,''',_	'''	''	,••	Om!!	01011:wt	o 1an.ss	om•	2,-,.0,23;	_'»«''	0000111,	0103,.. .	•	00,,,	!!!!!!	0-	01,,e.		0-	0'''
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T;abl,e 0-1. Construcilon Equipment EmlHlons
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													TOTALS	O.ot72	0.0340	0.0326	1.9780	0.8004	81.t I	0.0023	0.0<124

Table E-1. Crew Size per Equipment
Galveston County Extension Project

	Cutterhead Dredae		
	Cutterhead Dredge Crew	Shore Crew	other Construction Equipment
Employees	46	6	29

Table E-2. Emission Factors for Employee Vehicles
Galveston County Extension Project

County	Type of Vehicle	EPA Category'	Emisson Factor (g/mile)		
			CO'	NOx'	VOC'
Galveston	Cars	LDGV	6.17	0.395	0.486
	Pickups	LDGT1	6.65	0.506	0.504

Notes:
1 LDGV=light duty gasoline-fueled vehicles designated for transport of up to 12 people
LDGT1=light duty gasoline-fueled trucks with a gross vehicleweight (GVW) rating of 6000 pounds or less
2. Emission factors for CO, NOx, and VOC are from MOBILE6.2 run using Galveston County input file,"09gl830a.in", which can be found on the TCEQ FTP site:
ftp //ftp.tceq.state.Ix.us/pub/OEPANT AD/Modeling/Mobile_EI/HGB/m62/2009/

Table E-3. Summary of Employee Vehicles Emissions
Galveston County Extension Project
NED Alternative

Project Year	Type of Vehicle	EPA Category	Daily Vehicles (/day)	Total (VMT)	Travel Days (days/yr)	Annual Travel (VMT/yr)	Annual Emissions (tovl		
							CO	NO,	voe
2012	Cars	LDGV	26	50.0	196	254 800	1.7329	0.1109	0.1365
	Pickups	LDGT1	26	50.0	196	254,800	1.8677	0.1421	0.1416
						Totals	3.6007	0.2531	0.2781

No1es:
1. Tolal VMT is assumed to be 50 mile dayround trip.
2. Arnmal travel◦ Daily vehicles *Total VMT *Travel days/yr.
3. Arnmal emissicois◦ Emi sim factor• Annual travel• llbl453.6granis • Itonl2000lb

Table A-1. Annual Project Emissions Summary
Galveston Channel Extension Project

Year 2012	TONS PER YEAR					
	CO	NOx	PM:z.5	PM10	SO2	voe
Dredqe & Suooort Equipment	1205	105.36	2.39	2.52	17.47	1.25
Construction Equipment	1.98	0.80	0.03	0.03	0.0023	0.097
Employee Vehicles	3.60	0.25	-	-	-	0.28
TOTAL	**17.63**	**106.41**	**2.42**	**2.55**	**17.48**	**1.62**

AnnualMa"mtenance Dred1!:!*InC

Year 2012	TONS PER YEAR					
	CO	NOx	PM;z_5	PM10	SO2	voe
Dredqe & Support Equipment	0.90	7.90	0.18	0.19	1.31	0.09

Table A-2. Summary of Project Emissions Compared to 2002 Emissions Inventory
Galveston Channel Extension Project

2002 EMISSION INVENTORY	TONS PER YEAR					
	CO	NOx	PM2.5	PM10	SO2	voe
HGA	**1,101,693**	**357,353**	**59,155**	**325,353**	**152,017**	**214,128**
Brazoria County	**61,140**	**51,453**	**5,020**	**16,351**	**16,314**	**17,591**
ANNUAL PROJECT EMISSIONS	**CO**	**NOx**	**PM2.5**	**PM10**	**SO_2**	**voe**
Year 2012	**17.63**	**106.41**	**2.42**	**2.55**	**17.48**	**1.62**
% ofHGA	0.002%	0.03%	0.004%	0.001%	0.01%	0.001%
% of Brazoria County	0.03%	0.21%	0.05%	0.02%	0.11%	0.01%

Table **A-3.** General Conforrntty Emissions By Source
Galveston Channel Extension Project

Year	NO,(lpyl				VOC(tpyj			
	Dredge & Support Equipment	Construction Equipment	Employee Vehicles	NO:,i:Total	Dredge & Support Equipment	Construction Equipment	Employu Vehicles	voe Tol&l
2012	105.36	0.80	025	106.41	1.25	0.10	028	1.82

Table B-1. Dredging Contract Schedule - Days per Year
Galveston Channel Extension Project

Contract No.	Reach	Dredging Duration Months	Dredging Duration Days	Contract Start	Contract Finish	Year 2012 days
1	ureage 4b rt .._,nanne1 - New Extension	3	90	1/1/2012	10/1/2012	196
					TOTAL	196

APPENDIX E

Notice of Availability for the Environmental Assessment, Galveston Harbor Channel Extension, Post-Authorization Change Report, Galveston County, Texas

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P_ 0- BOX 1229
GALVESTON, TEXAS 77553-1229

May 10, 2013

DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Notice of Availability for the Environmental Assessment, Galveston Harbor Channel Extension, Post-Authorization Change Report, Galveston County, Texas

AGENCY: Department of the Army, U.S. Army Corps of Engineers, Department of Defense; Texas Commission on Environmental Quality

ACTION: Notice of Availability and Joint Public Notice

SUMMARY: The U.S. Army Corps of Engineers (USACE), Galveston District announces the release of the Draft Post-Authorization Change Report (DPACR), the Draft Environmental Assessment (DEA), and the Draft General Conformity Determination (DGCD), and their public comment periods, for the Galveston Harbor Channel Extension Project, Post-Authorization Change Report.

PURPOSE: This public notice is to inform interested parties that the U.S. Army Corps of Engineers (USACE), Galveston District (the District) has prepared a Draft Environmental Assessment (DEA) in accordance with the National Environmental Policy Act (NEPA), Public Law 91-190, and regulations for implementing the Procedural Provisions of the NEPA, 40 Code of Federal Regulations 1500-1508. This notice is being distributed to interested State, Federal, and local agencies, private organizations, and individuals in order to assist in collecting facts and recommendations concerning the tentatively recommended channel improvements to extend the limits of the existing authorized 45-foot deep Galveston Harbor Channel for a distance of 2,571 feet to reach the end of the limits of the authorized and currently maintained 40-foot portion of the channel.

PROJECT LOCATION: The approximately 4-mile-long Galveston Harbor Channel is included in the Galveston Channel Reach of the Houston-Galveston Navigation Channels (HGNC), Texas, Project, and provides entry to the Port of Galveston located on the upper Texas coast near the mouth of Galveston Bay in Galveston County, Texas.

PROJECT DESCRIPTION: Tentatively recommended channel improvements would deepen the 40-foot deep by 1,085-foot wide segment of the Galveston Harbor Channel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) to a 45-foot deep by 1,075-foot wide channel. The proposed project, referred to as the Galveston Harbor Channel Extension, would be consistent with the newly deepened -45 feet mean low tide (MLT) Galveston Harbor Channel dimensions. The channel modifications would increase efficient movement of deep-draft vessels transporting commodities to dock facilities located along this terminal section of the Galveston Harbor Channel.

NEED FOR WORK: The tentatively recommended channel improvement would address the navigation inefficiency that exists within last 2,571 feet of the Galveston Harbor Channel by deepening the -40 foot MLT section of channel to be consistent with the rest of the existing -45 feel MLT Galveston Harbor Channel. Deepening the channel would allow vessel operators and shippers to fully realize the economies of scale of fully loaded vessels that are currently light-loaded inbound and outbound due to channel depth constraints. Vessel operators and shippers would be able to transport larger volumes of goods on more fully loaded or deeper draft vessels, which would improve shipping productivity by moving cargo faster, safer, and more efficiently with less energy expended and producing less pollution.

PROPOSED WORK: The Tentatively Recommended Plan consists of channel improvements to deepen the 40-foot deep by 1085-foot wide segment of the Galveston Harbor C'"hannel from Station 20+000 (near POG Pier 38) to Station 22+571 (near the Pelican Island Bridge) to a 45-foot deep by 1,075-foot wide channel(Figure 3). Channel improvements would be constructed using a cutter head, hydraulic pipeline dredge, from its existing depth of -40-foot MLT to a depth of -45 feet MLT to be consistent with the rest of the channel. Advanced maintenance and allowable over-depth would remain at the current requirement of 3 feet and 2 feet, respectively, such that the maximum channel depth following periodic maintenance would not exceed -SO feet MLT. Side slopes w9uld be constructed at a slope of 1V:3H (1 foot vertical to 3 foot horizontal) and maintained at l V:2H, which is consistent with maintenance of the remainder of the existing -45-foot MLT project. Channel dredging to construct the -45-foot MLT project would generate 513,800 cubic yards (cy) of new work material, consisting of primarily firm to stiff clays of high plasticity. The dredged material would be placed in the upland confined Pelican Island Placement Area (PA).

COMPLIANCE WITH LAWS AND REGULATIONS: This proposed plan is being coordinated with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and other Federal, state, and local agencies. Informal consultation procedures have begun with the USFWS and NMFS in compliance with the Endangered Species Act, as amended. Our initial determination is that the proposed action will not have any adverse impacts on threatened or endangered species.

Essential Fish Habitat: This notice initiates Essential Fish Habitat consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Our initial determination is that the proposed action will not have a substantial adverse impact on Essential Fish Habitat or federally-managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the NMFS.

Texas Council on Environmental Quality (TCEQ) Water Quality Certification: The proposed dredged material placement plan will also be evaluated with regard to the requirements of Section 404(b)(l) of the Clean Water Act Water quality certification has been requested from the Texas Commission on Environmental Quality (TCEQ).

Draft General Conformity: As required by the Clean Air Act, the Environmental Protection Agency (EPA) has promulgated rules to ensure that Federal actions conform to the appropriate State Implementation Plan (SIP). The General Conformity Rule (40 CFR Part 51, Subpart W)

applies to Federal actions, within maintenance or nonattainment areas. Pursuant to Section 176 of the Clean Air Act Amendments of 1990, the USACE has prepared a document- entitled, "Draft General Conformity Determination, Galveston Harbor Channel Extension, Post Authorization Change Report, Galveston, Texas" (Appendix E of the DEA). This document is hereby noticed for public comment and will be submitted by the USACE to the TCEQ and EPA concurrently with this DEA. As part of the General Conformity process, the USACE is making this document available to the public for review and comment for a period of 30 days. During this time, the USACE will consult with the TCEQ and the EPA seeking concurrence that emissions from the Tentatively Recommended Plan are conformant with the SIP for the Houston-Galveston-Brazoria ozone nonattainment area. Once written confirmation is received from the TCEQ and the EPA, the USACE will prepare a Final General Conformity Determination for the proposed project. The Tentatively Recommended Plan is expected to increase air emissions in the Houston-Galveston Air Quality Control Region, which is currently classified as a marginal nonattainm!,':nt area for ozone. An analysis of estimated emissions associated with the proposed project indicates thatthere may be short-term impacts on air quality in the immediate vicinity of the project area; but no long-term impacts are expected. However, the estimated project emissions of nitrous oxides (NOx) are expected to exceed the conformity threshold of I 00 tons per year.

Other Agency Authorizations: It is also our preliminary determination that the proposed action is consistent with the Texas Coastal Management Program (TCMP) to the maximum extent practicable. The proposed work was coordinated with the Texas State llistoric Preservation Officer (SHPO). The SHPO concurred that the proposed channel deepening portion of the project would have no effect on historic properties and that the proposed upland PA has no potential to effect historic properties.

The following is a list of Federal, State, and local agencies with which these activities are being coordinated:

U.S. Environmental Protection Agency, Region 6
U.S. Department of Commerce
U.S. Department of the Interior
Eighth Coast Guard District
Budget and Planning Office, Office of the Governor of Texas
Texas Historical Commission
Texas Parks and Wildlife Depatiment
Texas Commission on Environmental Quality
Texas General Land Office
The Texas Office of State-Federal Relations
Texas Department of Transportation
Texas Water Development Board
Port of Galveston

STATE WATER QUALITY CERTIFICATION: TCEQ certification is r uired. The TCEQ is reviewing the proposed project under Section 401 of the Clean Water Act and in accordance with Title 31, Texas Administrative Code Section 279.1-13 to determine if the work would comply with State water quality standards. By virtue of an agreement between the U.S. Army

known interested persons that there is pending before the TCEQ a decision on water quality certification under such act. Any comments concerning this work may_be submitted to the Texas Commission on EnvironmentaJ Quality, Attention: Water Quality Division, MC iso, P.O. Bol(13087, Austin, Texas 78711-3087; The public comment period extends 30 days froni the.date of publication of. this notic_e-. A copy of the public notice with a description of work is made available for review in the TCEQ'sAustin office.

The TCEQ may conduct a public meeting to consider all comments c.oncerning·water quality if requested in writing. A request foi: a public meeting must contain the following information: the. name, mailing address, .and• telephone number of the person making the request; a brief description of the.interest of_thetequester, or of persons represented by the requester; and a brief description of how the projecfwould adversely affect such int rest.

EVALUATJO 'FACTORS: The decision whether to proceed with the proposed action will be based on·an evaluation of the probable impact of the proposed activity on·the public interest. That decision will reflect the national. concern for both.protection.and·utilization of important resources as well aSpublic and environmental safety and economic concerns.

ENVIRONMENTAL DOCUMENTATION: The work described in this notice represents a change to the existing project. .A preliminary review of this proposed plan·indicates that an Environmenta.l Impact Statement (EIS) is not required. This preliminary deterinination of EIS requirement will be changed if information brought forth in the coordin<1tion process is of a significant nature. Based on this determination, a DEA has been prepared. Tbe DEA assesses potential impacts to the·human and natural environment that would·result from the proposed project. The document is av<1ilable online at
http://www.swg.usace.army.mil/BusinessWithUs/PlanningEnvironmentalBranch/DocumentsforPublicReview.aspx.

PUBLIC COMMENT: The USACE is soliciting comments from the,publk, Federal, state, and local agencies and official , Indian tribes, and other interested parties in order to consider and evaluate the impacts oi'this proposed activity. Comments will be consideredm the evaluation of· impacts on endangered species/-historic properties, water quality, general environmental effects, and other public interest factors. Comments will be used in preparation of the Final EA pursuant to NEPA Comments are also used to determine the overall public intc.::rest of the proposed activity.

Persons desiring to express their views or provide information to be considere1 in evaluating the impact of this Work and the future maintenance operations are requested to mail their comments to:

District Engineer
U.S. Army Engineer Di trict, Galveston
ATTN: CESWG PE-PR.
P.O. Box 1229
Galveston, Texas 77553I229

The cornrtierits shouid make specific reference to Public Notice No." HGNC .13-0.1. /rhe USA:CE, Galvestpg DJstricf wil_l a¢cept written public comments on the DEA and the D{JCD from May 10; io13 tliro gh J une 1. 0, 2_013: Co_mments on the DEA and tlw DGCI;J'.m st b_epostqiarked by June 10,: 20i3:'

Anypersohwho has interestthat may be affected by this action may'reqU;es tpublk bearing. The ri;q1.1 t mus(be subll).itt :;in writing .withm 30 days of the date,,_of tbii/n9tice and must clearly set:J6rH,t1he iriterest thaay be affected and the manne rin 'Yniqh thejriterest may be affect bf !his activitf

FOR FURTHERINFORMA'{;iON CONTACT: Questions about th ,'p_ropose<i8Gtion and the DEA.: may;l,e refetred to M_s/Anclre Cataiizaro at(4())-766:6346;0} _by eirtaiht andrea.cataniar6@usace ,il ,my_,Illil.'

Dol -Dunn

Chief,:-Planning>EnvirpnmeQtal and Regulat<>ry Division Galveston District

APPENDIX F

Evaluation of Section 404(b)(1) Guidelines

EVALUATION OF SECTION 404(b)(1) GUIDELINES (SHORT FORM)

PROPOSED PROJECT: Galveston Harbor Channel Extension Project, Feasibility Study, Galveston County, Texas.

	Yes	No*
1. Review of Compliance (230.10(a)-(d))		
A review of the proposed project indicates that:		
a. The placement represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with the placement must have direct access or proximity to, or be located in the aquatic ecosystem, to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative).	**X**	
b. The activity does not appear to:		
1) Violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act;	**X**	
2) Jeopardize the existence of federally-listed endangered or threatened species or their habitat; and	**X**	
3) Violate requirements of any federally-designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies).	**X**	
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, an economic values (if no, see values, Section 2)	**X**	
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see Section 5)	**X**	

	Not Applicable	Not Significant	Significant*
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below.)			
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C)			
1) Substrate impacts		**X**	
2) Suspended particulates/turbidity impacts		**X**	
3) Water column impacts		**X**	
4) Alteration of current patterns and water circulation		**X**	
5) Alteration of normal water fluctuation/hydroperiod		**X**	
6) Alteration of salinity gradients		**X**	
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D)			
1) Effect on threatened/endangered species and their habitat		**X**	
2) Effect on the aquatic food web		**X**	
3) Effect on other wildlife (mammals, birds, reptiles and amphibians)		**X**	

	Not Applicable	Not Significant	Significant*
2. Technical Evaluation Factors (Subparts C-F) (where a 'Significant' category is checked, add explanation below.)			
c. Special Aquatic Sites (Subpart E)			
1) Sanctuaries and refuges	**X**		
2) Wetlands	**X**		
3) Mud flats	**X**		
4) Vegetated shallows	**X**		
5) Coral reefs	**X**		
6) Riffle and pool complexes	**X**		
d. Human Use Characteristics (Subpart F)			
1) Effects on municipal and private water supplies	**X**		
2) Recreational and Commercial fisheries impacts		**X**	
3) Effects on water-related recreation		**X**	
4) Aesthetic impacts		**X**	
5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves	**X**		

3. Evaluation of Dredged or Fill Material (Subpart G)	
a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material (check only those appropriate):	
1) Physical characteristics	**X**
2) Hydrography in relation to known or anticipated sources of contaminants	
3) Results from previous testing of the material or similar material in the vicinity of the project	**X**
4) Known, significant sources of persistent pesticides from land runoff or percolation	
5) Spill records for petroleum products or designated (Section 311 of Clean Water Act) hazardous substances	**X**
6) Other public records of significant introduction of contaminants from industries, municipalities or other sources	**X**
7) Known existence of substantial material deposits of substances that could be released in harmful quantities to the aquatic environment by man-induced discharge activities	**X**
8) The material to be placed in the water consists of sand and rock. The material is considered to be exempt from contaminant testing.	

List appropriate references:

	Yes	No
b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and placement sites and not likely to degrade the placement sites, or the material meets the testing exclusion criteria.	**X**	

4. Placement Site Delineation (230.11(f))
a. The following factors as appropriate, have been considered in evaluating the placement site (check only those appropriate):

1) Depth of water at placement site	
2) Current velocity, direction, and variability at placement site	
3) Degree of turbulence	
4) Water column stratification	
5) Discharge vessel speed and direction	
6) Rate of discharge	**X**
7) Fill material characteristics (constituents, amount, and type of material, settling velocities)	**X**
8) Number of discharges per unit of time	**X**
9) Other factors affecting rates and patterns of mixing (specify)	

List appropriate references:

1) not applicable

	Yes	No
b. An evaluation of the appropriate factors in 4a above indicates that the placement site and/or size of mixing zone are acceptable.	**X**	

	Yes	No
5. Actions to Minimize Adverse Effects (Subpart H)		
All appropriate and practicable steps have been taken, through application of recommendations of 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	**X**	

List actions taken:

1) The placement area (PA) to be used is an existing upland confined PA disposal site that has been used previously for dredged material discharge for the Galveston Harbor Channel.

	Yes	No*
6. Factual Determination (230.11)		
A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:		
a. Physical substrate at the placement site (review Sections 2a. 3, 4, and 5 above)	**X**	
b. Water circulation, fluctuation and salinity (review Sections 2a. 3, 4, and 5)	**X**	
c. Suspended particulates/turbidity (review Sections 2a. 3, 4, and 5)	**X**	
d. Contaminant availability (review Sections 2a. 3, and 4)	**X**	
e. Aquatic ecosystem structure and function (review Sections 2b and c, 3, and 5)	**X**	
f. Placement site (review Sections 2, 4, and 5)	**X**	
g. Cumulative impacts on the aquatic ecosystem	**X**	
h. Secondary impacts on the aquatic ecosystem	**X**	

7. Evaluation Responsibility	
a. This evaluation was prepared by:	Andrea Catanzaro
Position:	Environmental Lead/Biologist

8. Findings (check only those appropriate)	
a. The proposed placement site for discharge of or fill material complies with the Section 404(b)(1) Guidelines.	X
b. The proposed placement site for discharge of dredged or fill material complies with the Section 404(b)(1) Guidelines with the inclusion of the following conditions:	

List of conditions:

1) **Not Applicable**

c. The proposed placement site for discharge of dredged or fill material does not comply with the Section 404(b)(1) Guidelines for the following reason(s):	
1) There is a less damaging practicable alternative	
2) The proposed discharge will result in significant degradation of the aquatic ecosystem	
3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem	

13 Sept 2012 Date	CAROLYN MURPHY Chief, Environmental Section

NOTES:

* A negative, significant, or unknown response indicates that the permit application may not be in compliance with the Section 404(b)(1) Guidelines.

Negative responses to three or more of the compliance criteria at the preliminary stage indicate that the proposed projects may not be evaluated using this "short form" procedure. Care should be used in assessing pertinent portions of the technical information of items 2a-e before completing the final review of compliance.

Negative response to one of the compliance criteria at the final stage indicates that the proposed project does not comply with the Guidelines. If the economics

APPENDIX G

Texas Coastal Management Program Consistency Determination

COMPLIANCE WITH GOALS AND POLICIES - SECTION 501.25(a)-(f)
DREDGING AND DREDGED MATERIAL DISPOSAL AND PLACEMENT

GALVESTON HARBOR CHANNEL EXTENSION
GALVESTON COUNTY, TEXAS

Section 501.25 Dredging and Dredged Material Disposal and Placement

(a) Dredging and the disposal and placement of dredged material shall avoid and otherwise minimize adverse effects to coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches to the greatest extent practicable. The policies of this subsection are supplemental to any further restrictions or requirements relating to the beach access and use rights of the public. In implementing this subsection, cumulative and secondary adverse effects of dredging and the disposal and placement of dredged material and the unique characteristics of affected sites shall be considered.

Compliance: Material dredged from the Galveston Harbor Channel Extension will be taken from the existing channel footprint. Dredged material will be pumped by pipeline and hydraulic pipeline dredge to Pelican Island Placement Area (PA), an existing confined, upland PA. All critical areas, shore areas, and Gulf beaches are avoided.

(1) Dredging and dredged material disposal and placement shall not cause or contribute, after consideration of dilution and dispersions, to violation of any applicable surface water quality standards established under subsection (f) of this section.

Compliance: There are no contaminants in the project area based analysis of water and sediment quality data as presented in Sections 3.13 and 4.8 of the Environmental Assessment for this project. No water quality standards will be violated by this project.

(2) Except as otherwise provided in subparagraph (D) of this paragraph, adverse effects on critical areas from dredging and dredged material disposal or placement shall be avoided and otherwise minimized, and appropriate and practicable compensatory mitigation shall be required, in accordance with subsection (h) of this section.

Compliance: Material dredged from the Galveston Harbor Channel Extension will be performed within the existing channel footprint. Dredged material will be pumped by pipeline and hydraulic pipeline dredge to Pelican Island PA, an existing confined, upland PA. All critical areas will be avoided.

(3) Except as provided in subparagraph (D) of this paragraph, dredging and the disposal and placement of dredged material shall not be authorized if:

(A) there is a practicable alternative that would have fewer adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches, so long as that alternative does not have other significant adverse effects;

Compliance: All channel deepening alternatives fall within the existing federally-maintained channel footprint, and, thus, involve the same degree of minor temporary impacts to affected resources. Placement alternatives involving beneficial use (BU) of dredged material to create tidal marsh were considered, but costs for implementing BU alternatives were several times in excess of the base placement plan.

(B) all appropriate and practicable steps have not been taken to minimize adverse effects on coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches; or

Compliance: All practicable steps, including upland placement to the extent practicable, utilization of existing PAs, and minimum channel footprint to meet the project needs have been taken to minimize adverse affects on these resources.

(C) significant degradation of critical areas under subsection (h)(1)(G)(v) of this section would result.

Compliance: Critical areas are avoided and degradation of such areas is not anticipated as a result of the proposed project.

(4) A dredging or dredged material disposal or placement project that would be prohibited solely by application of subparagraph (C) of this paragraph may be allowed if it is determined to be of overriding importance to the public and national interest in light of economic impacts on navigation and maintenance of commercially navigable waterways.

Compliance: Dredging and placement is not precluded by paragraph (C), as noted above.

(b) Adverse effects from dredging and dredged material disposal and placement shall be minimized as required in paragraph (1) of this subsection. Adverse effects can be minimized by employing the techniques in this paragraph where appropriate and practicable.

Compliance: Adverse effects of dredging and dredged material placement as described in this EA have been minimized as described under "Compliance" for paragraph (1) of this subsection. The project has been cited and sized to optimize plan performance while minimizing environmental impacts and cost.

(1) Adverse effects from dredging and dredged material disposal and placement can be minimized by controlling the location and dimensions of the activity. Some of the ways to accomplish this include:

(A) locating and confining discharges to minimize smothering of organisms;

(B) locating and designing projects to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes;

(C) using existing or natural channels and basins instead of dredging new channels or basins, and discharging materials in areas that have been previously disturbed or used for disposal or placement of dredged material;

(D) limiting the dimensions of channels, basins, and disposal and placement sites to the minimum reasonably required to serve the project purpose, including allowing for reasonable overdredging of channels and basins, and taking into account the need for capacity to accommodate future expansion without causing additional adverse effects;

(E) discharging materials at sites where the substrate is composed of material similar to that being discharged;

(F) locating and designing discharges to minimize the extent of any plume and otherwise control dispersion of material; and

(G)avoiding the impoundment or drainage of critical areas.

Compliance: Construction and maintenance dredging for the deepening project will be performed within the existing footprint of the federally-maintained channel. All construction and maintenance material will be discharged directly into the Pelican Island PA, which is an existing confined, upland PA used for maintenance dredging of the existing project. Impacts to benthic marine organisms during construction and maintenance will be minor and temporary. No impoundment or drainage of critical areas will occur. No new channel are required to access the existing PA.

(2) Dredging and disposal and placement of material to be dredged shall comply with applicable standards for sediment toxicity. Adverse effects from constituents contained in materials discharged can be minimized by treatment of or limitations on the material itself. Some ways to accomplish this include:

(A) disposal or placement of dredged material in a manner that maintains physicochemical conditions at discharge sites and limits or reduces the potency and availability of pollutants;

(B) limiting the solid, liquid, and gaseous components of material discharged;

(C) adding treatment substances to the discharged material; and

(D) adding chemical flocculants to enhance the deposition of suspended particulates in confined disposal areas,

Compliance: There are no contaminants in the project area based analysis of water and sediment quality data as presented in Sections 3.13 and 4.8 of the Environmental Assessment for this project.

(3) Adverse effects from dredging and dredged material disposal or placement can be minimized through control of the materials discharged. Some ways of accomplishing this include:

(A) use of containment levees and sediment basins designed, constructed, and maintained to resist breaches, erosion, slumping, or leaching;

(B) use of lined containment areas to reduce leaching where leaching of chemical constituents from the material is expected to be a problem;

(C) capping in-place contaminated material or, selectively discharging the most contaminated material first and then capping it with the remaining material;

(D) properly containing discharged material and maintaining discharge sites to prevent point and nonpoint pollution; and

(E) timing the discharge to minimize adverse effects from unusually high water flows, wind, wave, and tidal actions.

<u>Compliance</u>: Dredged material will be placed in an existing confined upland PA (Pelican Island PA) with properly maintained levees, that is currently used for maintenance material placement for the existing Federal project.

(4) Adverse effects from dredging and dredged material disposal or placement can be minimized by controlling the manner in which material is dispersed. Some ways of accomplishing this include:

(A) where environmentally desirable, distributing the material in a thin layer;

(B) orienting material to minimize undesirable obstruction of the water current or circulation patterns;

(C) using silt screens or other appropriate methods to confine suspended particulates or turbidity to a small area where settling or removal can occur;

(D) using currents and circulation patterns to mix, disperse, dilute, or otherwise control the discharge;

(E) minimizing turbidity by using a diffuser system or releasing material near the bottom;

(F) selecting sites or managing discharges to confine and minimize the release of suspended particulates and turbidity and maintain light penetration for organisms; and

(G) setting limits on the amount of material to be discharged per unit of time or volume of receiving waters.

<u>Compliance</u>: Dredged material will be placed in an existing confined upland PA (Pelican Island PA) with properly maintained levees, that is currently used for maintenance material placement for the existing Federal project. Any effluent from Pelican Island PA will be controlled to minimize the introduction of Total Suspended Solids (TSS) into the receiving water.

(5) Adverse effects from dredging and dredged material disposal or placement operations can be minimized by adopting technology to the needs of each site. Some ways of accomplishing this include:

(A) using appropriate equipment, machinery, and operating techniques for access to sites and transport of material, including those designed to reduce damage to critical areas;

(B) having personnel on site adequately trained in avoidance and minimization techniques and requirements; and

(C) designing temporary and permanent access roads and channel spanning structures using culverts, open channels, and diversions that will pass both low and high water flows, accommodate fluctuating water levels, and maintain circulation and faunal movement.

Compliance: All dredging will be accomplished by a hydraulic pipeline dredge from the water. Dredged material will be placed in the Pelican Island PA, an existing confined upland PA with properly maintained levees that is currently used for maintenance material placement for the existing Federal project. The Pelican Island PA can be accessed by land-based equipment without damaging critical areas.

(6) Adverse effects on plant and animal populations from dredging and dredged material disposal or placement can be minimized by:

(A) avoiding changes in water current and circulation patterns that would interfere with the movement of animals;

(B) selecting sites or managing discharges to prevent or avoid creating habitat conducive to the development of undesirable predators or species that have a competitive edge ecologically over indigenous plants or animals;

(C) avoiding sites having unique habitat or other values including habitat of endangered species;

(D) using planning and construction practices to institute habitat development and restoration to produce a new or modified environmental state of higher ecological value by displacement of some or all of the existing environmental characteristics;

(E) using techniques that have been demonstrated to be effective in circumstances similar to those under consideration whenever possible and, when proposed development and restoration techniques have not yet advanced to the pilot demonstration stage, initiating their use on a small scale to allow corrective action if unanticipated adverse effects occur;

(F) timing dredging and dredged material disposal or placement activities to avoid spawning or migration seasons and other biologically critical time periods; and

(G) avoiding the destruction of remnant natural sites within areas already affected by development.

Compliance: Construction and maintenance dredging for the deepening project will be performed within the existing footprint of the federally-maintained channel. All construction and maintenance material will be discharged directly into the Pelican Island PA, which is an existing confined, upland PA used for maintenance dredging of the existing Federal project. Coordination with the U.S. Fish and Wildlife Service (USFWS) under the Fish and Wildlife Coordination Act, and the USFWS and the National Marine Fisheries Service, under the requirements of the Endangered Species Act, was implemented. No impacts to endangered species or their critical habitats are anticipated. Impacts to benthic marine organisms during construction and maintenance will be minor and temporary.

(7) Adverse effects on human use potential from dredging and dredged material disposal or placement can be minimized by:

(A) selecting sites and following procedures to prevent or minimize any potential damage to the aesthetically pleasing features of the site, particularly with respect to water quality;

(B) selecting sites which are not valuable as natural aquatic areas;

(C) timing dredging and dredged material disposal or placement activities to avoid the seasons or periods when human recreational activity associated with the site is most important; and

(D) selecting sites that will not increase incompatible human activity or require frequent dredge or fill maintenance activity in remote fish and wildlife areas.

Compliance: No new PAs are proposed. All construction and maintenance material will be discharged directly into the Pelican Island PA, which is an existing confined, upland PA used for maintenance dredging of the existing Federal project.

(8) Adverse effects from new channels and basins can be minimized by locating them at sites:

(A) that ensure adequate flushing and avoid stagnant pockets; or

(B) that will create the fewest practicable adverse effects on CNRAs from additional infrastructure such as roads, bridges, causeways, piers, docks, wharves, transmission line crossings, and ancillary channels reasonably likely to be constructed as a result of the project; or

(C) with the least practicable risk that increased vessel traffic could result in navigation hazards, spills, or other forms of contamination which could adversely affect CNRAs;

(D) provided that, for any dredging of new channels or basins subject to the requirements of §501.15 of this title (relating to Policy for Major Actions), data and information on minimization of secondary adverse effects need not be produced or evaluated to comply with this subparagraph if such data and information is produced and evaluated in compliance with §501.15(b)(1) of this title (relating to Policy for Major Actions).

Compliance: Construction and maintenance dredging for the deepening project will be performed within the existing footprint of the federally-maintained channel. All construction and maintenance material will be discharged directly into the Pelican Island PA, which is an existing confined, upland PA used for maintenance dredging of the existing Federal project. No new PAs are being proposed.

(c) Disposal or placement of dredged material in existing contained dredge disposal sites identified and actively used as described in an environmental assessment or environmental impact statement issued prior to the effective date of this chapter shall be presumed to comply with the requirements of paragraph (a) of this subsection unless modified in design, size, use, or function.

Compliance: Pelican Island PA, which will receive dredged material from the project will not be modified in design, size, use, or function and, therefore, complies with the requirements of paragraph (a) of this subsection.

(d) Dredged material from dredging projects in commercially navigable waterways is a potentially reusable resource and must be used beneficially in accordance with this policy.

(1) If the costs of the beneficial use of dredged material are reasonably comparable to the costs of disposal in a non-beneficial manner, the material shall be used beneficially.

(2) If the costs of the beneficial use of dredged material are significantly greater than the costs of disposal in a non-beneficial manner, the material shall be used beneficially unless it is demonstrated that the costs of using the material beneficially are not reasonably proportionate to the costs of the project and benefits that will result. Factors that shall be considered in determining whether the costs of the beneficial use are not reasonably proportionate to the benefits include, but are not limited to:

(A) environmental benefits, recreational benefits, flood or storm protection benefits, erosion prevention benefits, and economic development benefits;
(B) the proximity of the beneficial use site to the dredge site; and
(C) the quantity and quality of the dredged material and its suitability for beneficial use.

(3) Examples of the beneficial use of dredged material include, but are not limited to:

(A) projects designed to reduce or minimize erosion or provide shoreline protection;
(B) projects designed to create or enhance public beaches or recreational areas;
(C) projects designed to benefit the sediment budget or littoral system;
(D) projects designed to improve or maintain terrestrial or aquatic wildlife habitat;
(E) projects designed to create new terrestrial or aquatic wildlife habitat, including the construction of marshlands, coastal wetlands, or other critical areas;
(F) projects designed and demonstrated to benefit benthic communities or aquatic vegetation;
(G) projects designed to create wildlife management areas, parks, airports, or other public facilities;
(H) projects designed to cap landfills or other waste disposal areas;
(I) projects designed to fill private property or upgrade agricultural land, if cost-effective public beneficial uses are not available; and
(J) projects designed to remediate past adverse impacts on the coastal zone.

Compliance: New work and future maintenance dredged material to be generated by the project consists predominantly of almost equal percentages (approximately 43 percent each) of silt and clay. Several BU alternatives were considered during project planning. These are discussed in Section 2.4 of this EA. The costs of implementing the BU alternatives considered were nearly as much as three times the cost of traditional

placement in the existing upland confined Pelican Island PA. As such, these BUs were considered cost prohibitive without the identification and assistance of an additional project cost-share sponsor.

(e) If dredged material cannot be used beneficially as provided in paragraph (4) (B) of this subsection, to avoid and otherwise minimize adverse effects as required in paragraph (1) of this subsection, preference will be given to the greatest extent practicable to disposal in:

(1) contained upland sites;

(2) other contained sites; and

(3) open water areas of relatively low productivity or low biological value.

Compliance: Pelican Island PA is fully confined and meets the requirements above.

(f) For new sites, dredged materials shall not be disposed of or placed directly on the boundaries of submerged lands or at such location so as to slump or migrate across the boundaries of submerged lands in the absence of an agreement between the affected public owner and the adjoining private owner or owners that defines the location of the boundary or boundaries affected by the deposition of the dredged material.

Compliance: All construction and maintenance material will be discharged directly into the Pelican Island PA, which is an existing confined, upland PA used for maintenance dredging of the existing Federal project. No new PAs are being proposed.

FINAL
STATEMENT OF FINDINGS
AND
FINDING OF NO SIGNIFICANT IMPACT

FOR

GALVESTON HARBOR CHANNEL EXTENSION
POST-AUTHORIZATION CHANGE REPORT

GALVESTON COUNTY, TEXAS

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
GALVESTON, TEXAS

1. Purpose. This document addresses the proposed deepening of the Galveston Harbor Channel from -41 feet mean lower low water (MLLW) to -46 feet MLLW for a distance of 2,571 feet, beginning at the Port of Galveston (POG) Pier-38 (Station 20+000) and continuing westward ending near the Pelican Island Bridge (Station 22+571). The project is located in Galveston Bay between Pelican and Galveston Islands, in Galveston, Galveston County, Texas.

The Galveston Harbor Channel portion of the Houston-Galveston Navigation Channels (HGNC) Project is authorized to a project depth of 46 feet deep (plus 3 feet of advance maintenance and 2 feet of allowable overdepth) from Station 0+000 to Sta- tion 20+000 (generally from Bolivar Roads to the vicinity of POG Pier-38), and to a project depth of only 41 feet (plus 3 feet of advance maintenance and 2 feet of allowable overdepth) from Station 20+000 to Station 22+571 (vicinity of POG Pier-38 west to vicinity of Pelican Island Bridge). The last 41-foot deep portion of the Galveston Harbor Channel limits efficient movement of deep-draft vessels transporting commodities along the waterway.

Deep draft vessels transiting the 41-foot deep portion of the Galveston Harbor Channel must arrive and depart light-loaded in order to utilize bulk facilities docks handling cement, barite ore, bio-diesel, and coal, located along the far western end of the 41-foot channel segment. Deepening the channel would allow vessel operators and shippers to fully realize the economies of scale of fully loaded vessels that are currently light-loaded inbound and outbound due to channel depth constraints. This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) regulations to document findings concerning the environmental impacts of the proposed action.

2. Proposed Action. Proposed channel improvements consist of deepening a segment of the existing 41-foot deep by 1075-foot wide channel from -41 feet MLLW to -46 feet MLLW, along a distance of 2,571 feet. The deepening will originate near POG Pier-38 at Station 20+000, continuing westward towards Pelican Island Bridge and ending at Station 22+571.

Channel deepening will be accomplished using a cutter head, hydraulic pipeline dredge. Advanced maintenance and allowable overdepth will remain at the current requirement of 3 feet and 2 feet, respectively, such that the maximum channel depth following periodic maintenance will not exceed -50 feet MLLW. No widening is proposed; the bottom width would remain at 1,075 feet or less and the channel top-of-cut will remain in the template of the existing project.

The project will generate 609,500 cubic yards (cy) of new work material (Federal and third party), consisting of primarily firm to stiff clays of low plasticity. The dredged material will be placed in the upland confined Pelican Island Placement Area (PA).

Maintenance quantity and frequency from the proposed 46-foot channel deepening project will remain at 648,000 cy every 4 years which cmTently dredged from the existing 41-foot deep channel project. No ocean disposal will be performed for new work dredged material placement. Beneficial use was not considered economically feasible and will not be implemented for this project. All maintenance material will be placed in the existing upland confined Pelican Island PA consistent with current practices.

The construction period for the new work dredging and placement would be approximately four months, including one month to prepare the placement area and three months to construct the channel extension and place the material.

3. Coordination. A Notice of Availability was issued to interested parties including Federal and state agencies on September 19, 2012, which described the proposed action and announced the availability of the Draft EA. Comments on the Notice of Availability and Draft EA and the District's responses, are included in Appendix E of the Final EA.

4. Environmental Effects. Galveston District has taken every reasonable measure to evaluate the environmental, social and economic impacts of the proposed project. Based on information provided in the EA and coordination with Federal, state, and local agencies, temporary and permanent effects resulting from the proposed project have been identified and can be found in Section 4 of the Final EA. The deepening of Galveston Harbor Extension would have negligible impacts to very low quality bay bottom habitat comparable in type and magnitude to those experienced during routine maintenance that occurs for the existing channel template. No special aquatic sites, including wetlands, would be impacted. Therefore, no mitigation would be required for this project. Only minor, temporary increases in turbidity, noise and navigation traffic are anticipated. However, such effects would not be "new", but would be among the cyclical recurring impacts that occur during maintenance of the channel. All affected resources are expected to recover to pre-project conditions after the work is completed. The proposed project is expected to contribute beneficially to navigation efficiency and is not expected to contribute negative cumulative impacts to the area.

The District has determined that the project is consistent with the Texas Coastal Management Plan and compliant with Essential Fish Habitat (EFH). A Section 404(b)(1) Evaluation (short form) of project impacts to water quality indicates the project will not adversely affect water quality. The District has received water quality certification from the Texas Commission on Environmental Quality and requested a consistency determination from the Texas General Land Office. It is the District's conclusion that the proposed project will not have a significant impact on the environment or to the surrounding human population.

5. Determinations. The analysis of the environmental impacts of the proposed project is based on the accompanying Final EA. Factors considered in the review were impacts to sea level rise, vegetation, wildlife, aquatic resources including EFH, threatened and endangered species and piping plover critical habitat, cultural resources, socioeconomic resources, Environmental Justice, Prime and Unique Farmlands, Hazardous, Toxic, and Radioactive Wastes, air, noise, water quality, as well as alternative courses of action and cumulative impacts. The proposed project was found to be compliant with the Endangered Species Act, Clean Air Act, Clean Water Act, EFH, and the Texas Coastal Management Plan (TCMP).

6. Findings. Based on my analysis of the Final EA and other information pertaining to the proposed project, I find that the Galveston Channel Extension Project will not have a significant effect on the quality of the human environment. Galveston District reviewed the project for consistency with the goals and policies of the TCMP. Based on this analysis, I find that the proposed plan is consistent with the goals and policies of the TCMP. After consideration of the information presented in the Final EA, I have determined that an environmental impact statement is not required under the provisions of NEPA, and other applicable regulations of the U.S. Army Corps of Engineers, and that the proposed project may be constructed.

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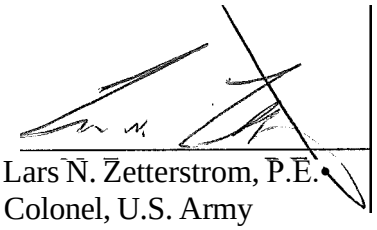
(date)



Lars N. Zetterstrom, P.E.
Colonel, U.S. Army
Commanding