U.S. Army Corps
Of Engineers
Galveston District

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

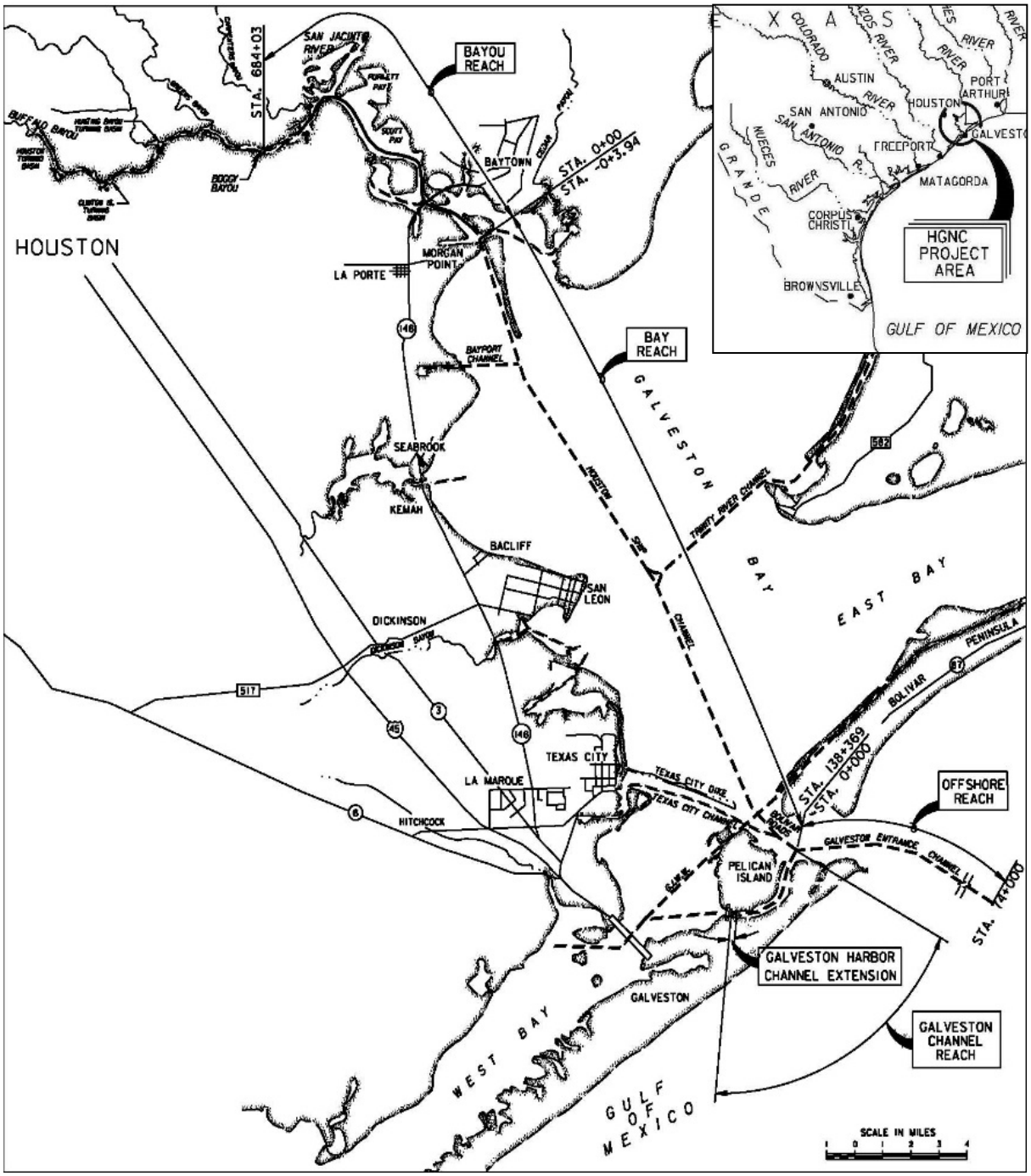

FIGURE 1: Houston-Galveston Navigation Channels Reach Designations and Project Area.

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

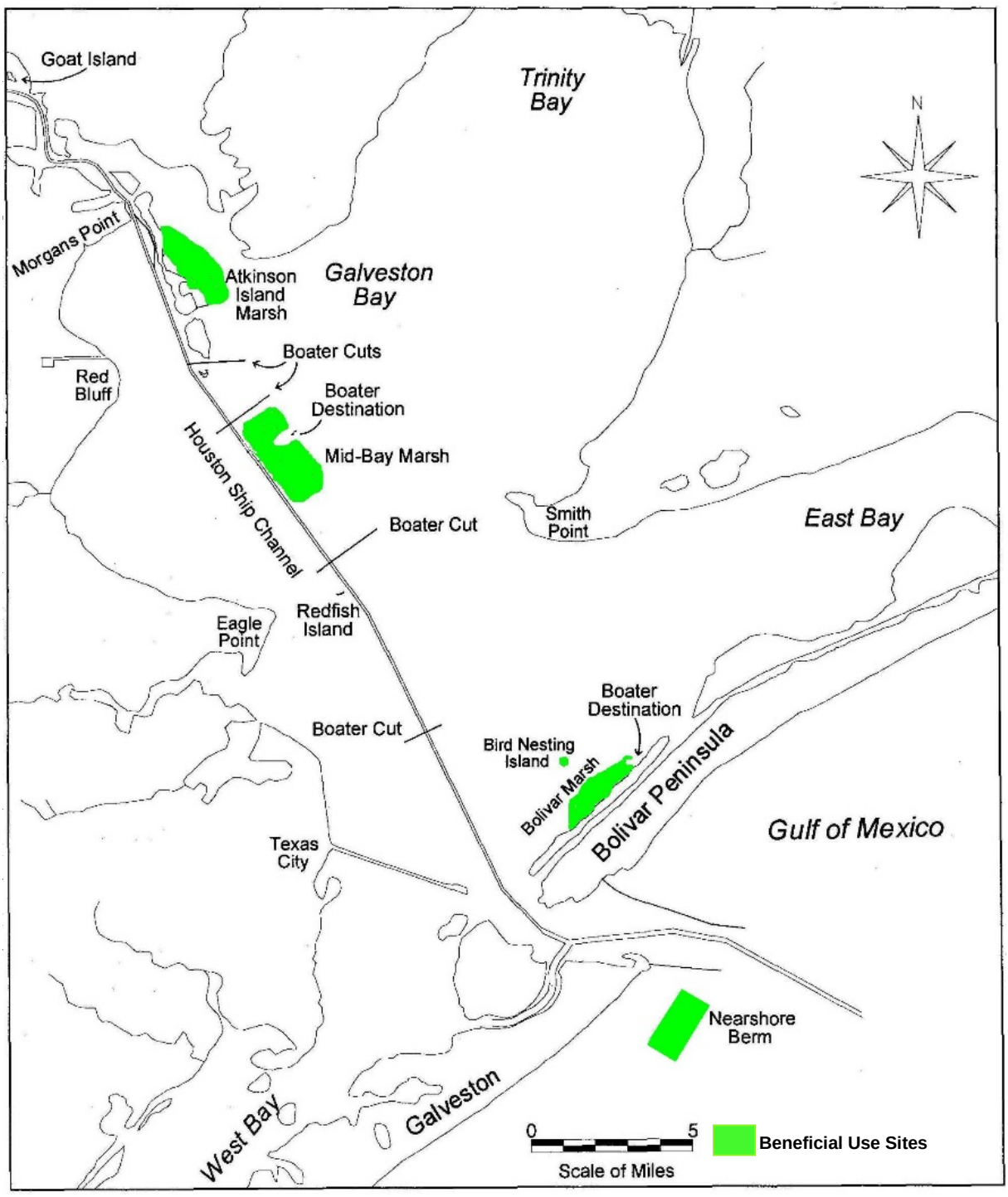

FIGURE 2: Houston-Galveston Navigation Channels Authorized Beneficial Use Sites

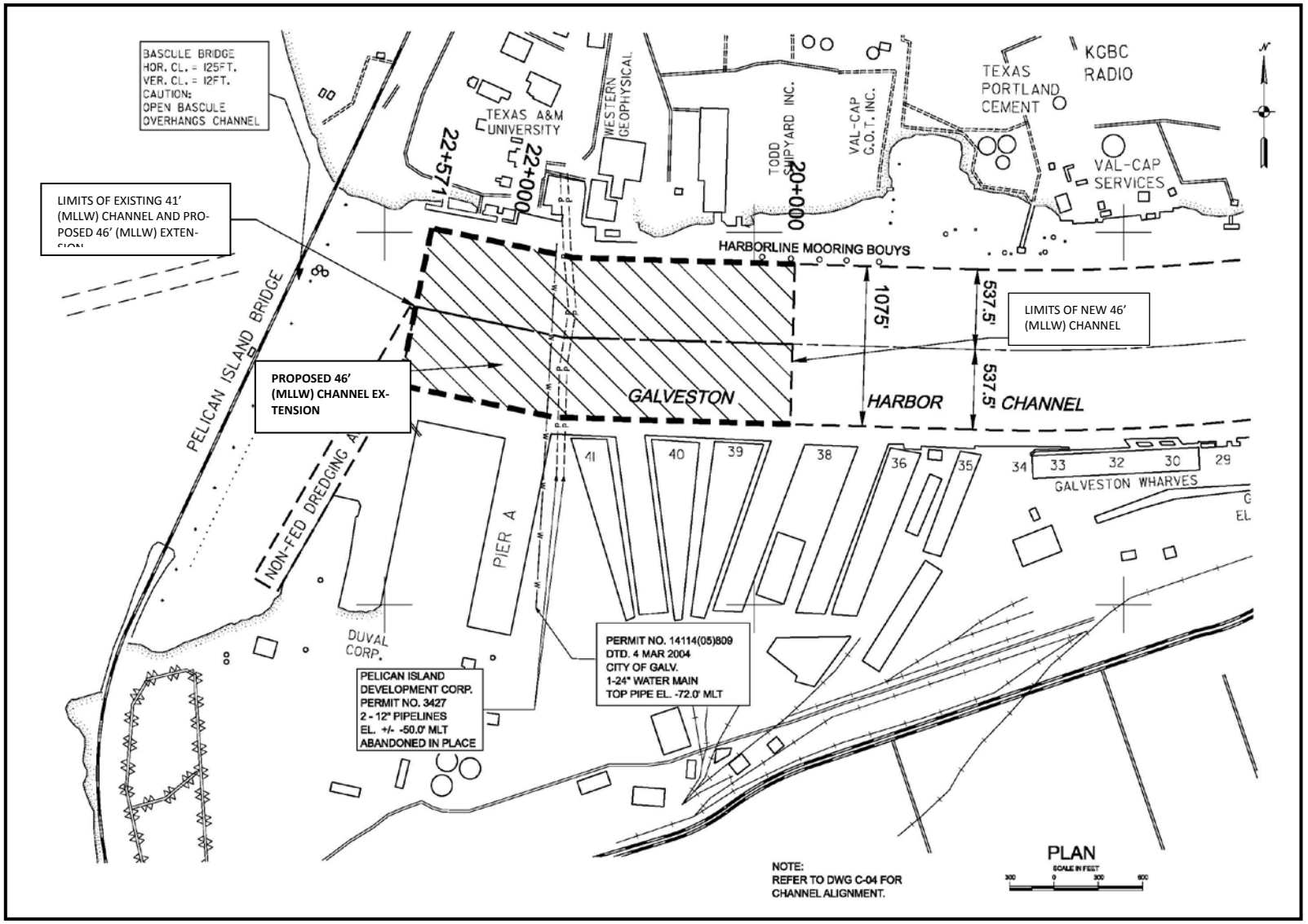

FIGURE 3: Footprint of the Recommended 46-foot Depth Extension of the Galveston Harbor Channel

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.

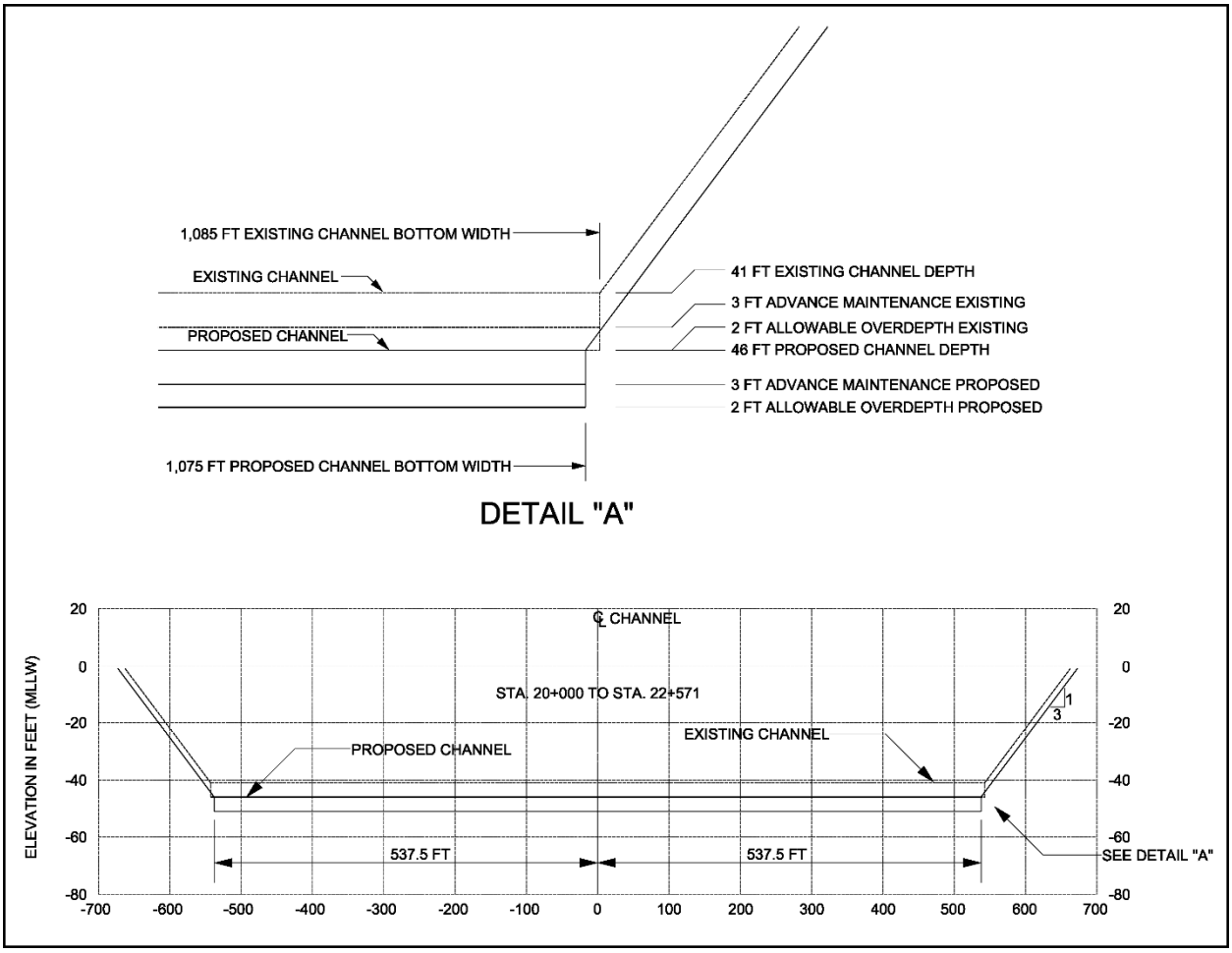

FIGURE 4: Typical Cross Section of Recommended 46-foot Depth Extension within Galveston Harbor Channel

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).

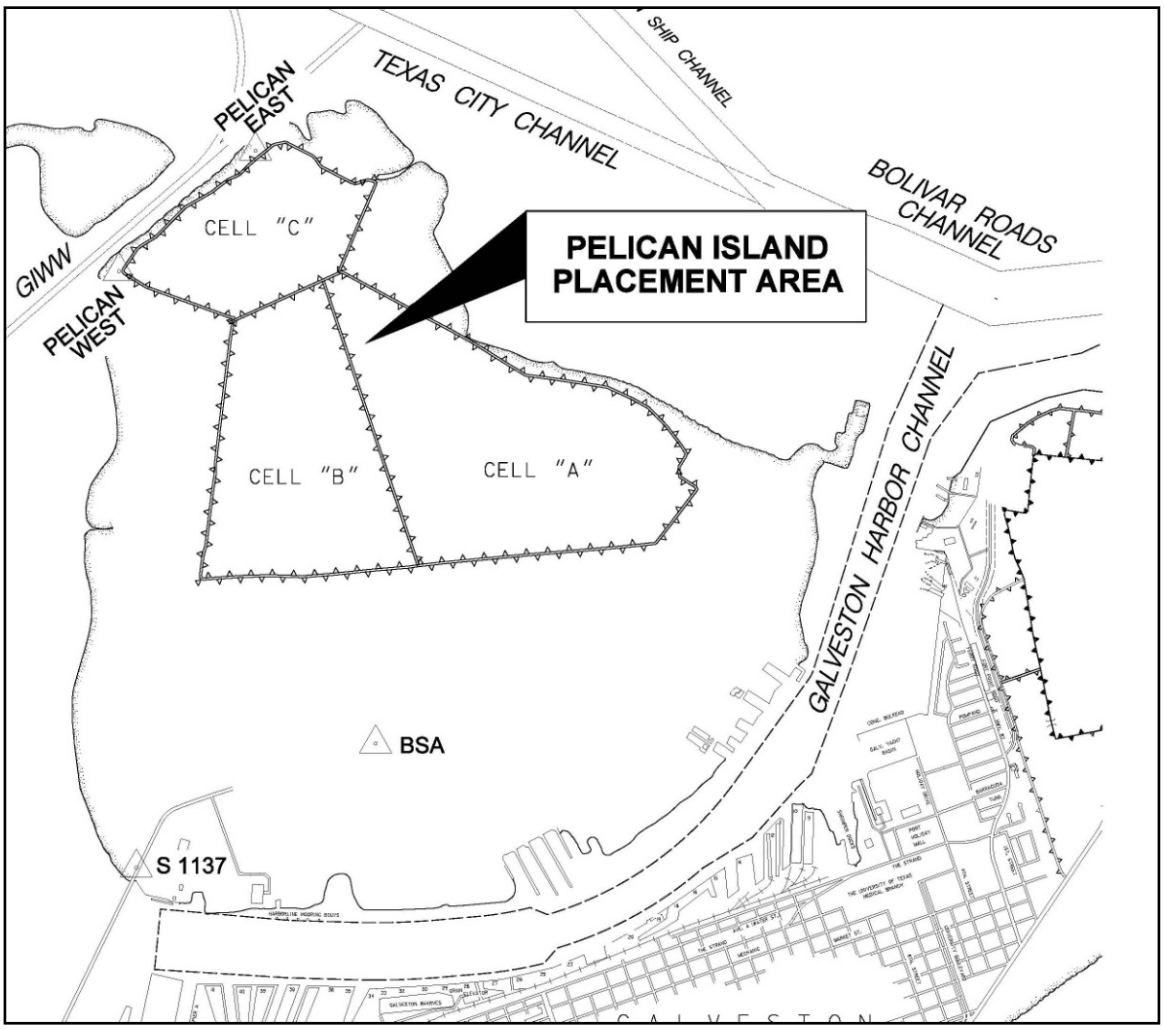

FIGURE 5: Pelican Island Placement Area

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

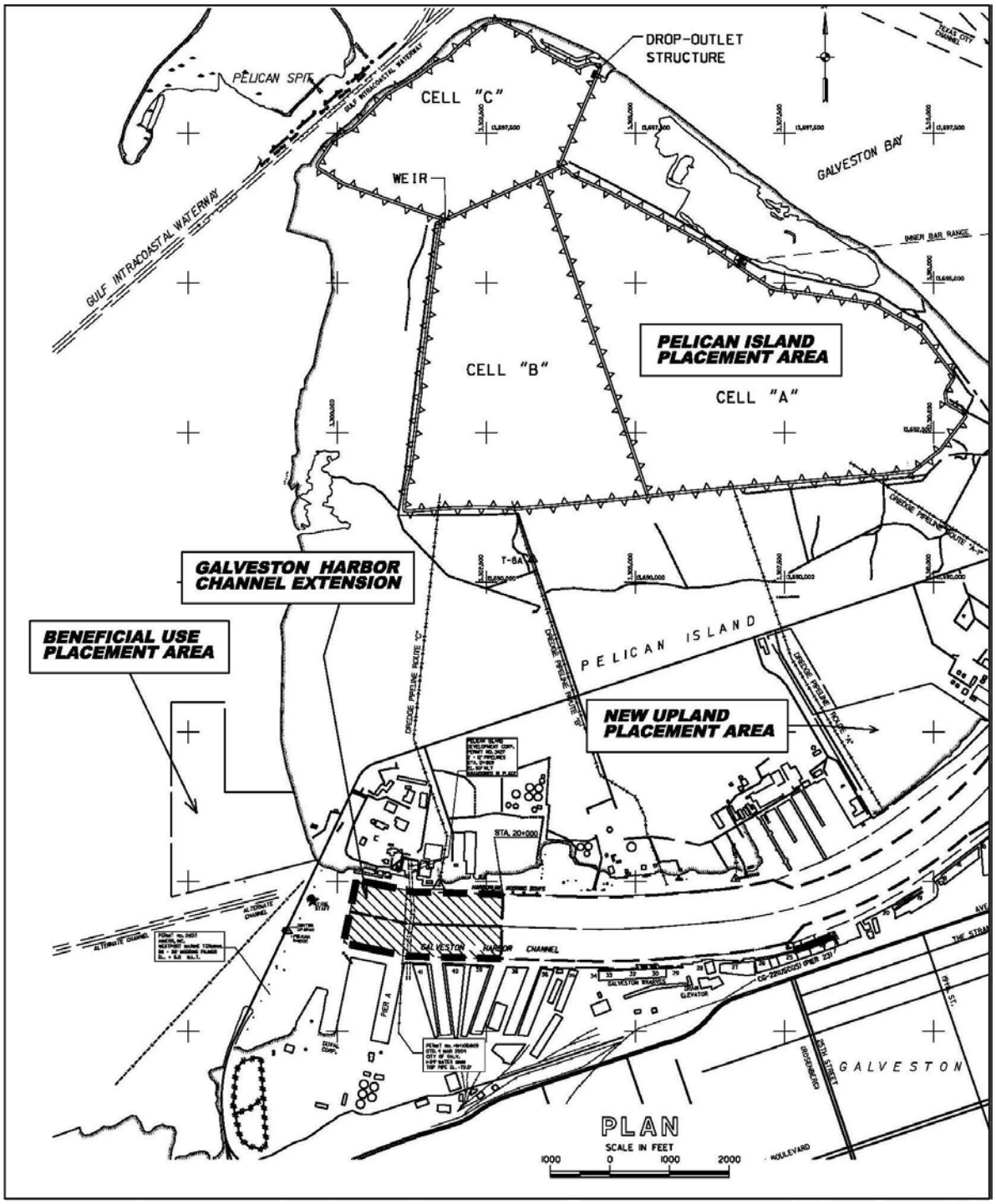

FIGURE 6: Dredged Material Placement Alternatives Considered

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.

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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. O. 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 fisheries 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 of EFH consultation and that the Service review the enclosed information 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,

Carolyn Murphy
Chief, Environmental Section

Encls

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. 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, please contact George Dabney at (409) 766-6345.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Enclosures

Identical letter sent to:
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. O. 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

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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://www.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 the Service is necessary. However, if the project changes or additional information on the distribution of listed 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

Stephen D. Parris
Field Supervisor, Clear Lake Field Office

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

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

Ms. Edith Erfling
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 threatened 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,

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 existing 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.

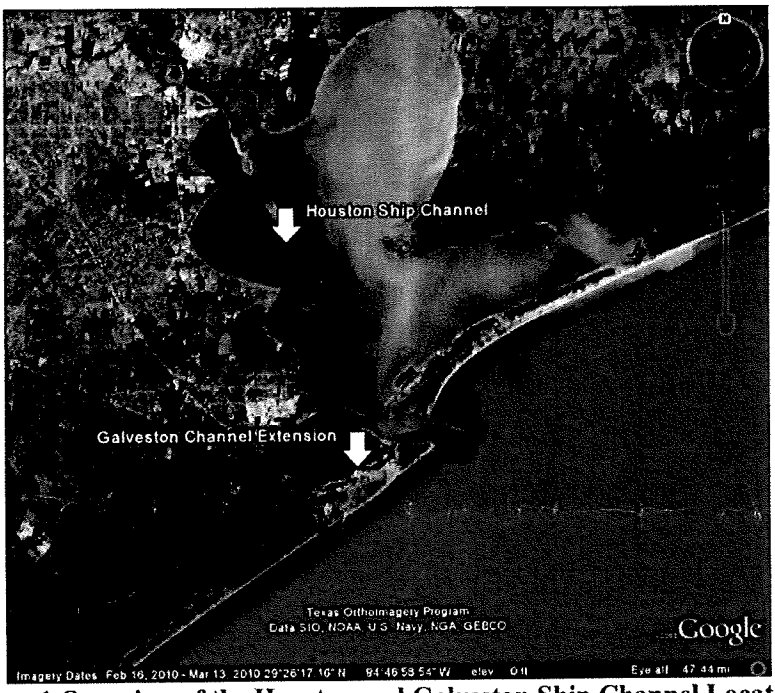

Figure 1 Overview of the Houston and Galveston Ship Channel Locations

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 Port 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 importance 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 natural 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 north of the Channel, is approximately 1,100 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 waterway. 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 (*Farfantepenaeus 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

Sport fish potentially occurring 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 (*Leiostomus xanthurus*). Other common fishes include gafftopsial catfish (*Bagre marinus*), striped mullet (*Mugil cephalus*), sheepshead (*Archosargus probatocephalus*), Atlantic croaker (*Micropogonia undulates*), hardhead catfish (*Arius felis*) 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, territoriality, and homing behaviors can all be affected by increased suspended sediments and turbid waters. Wilber and Clarke

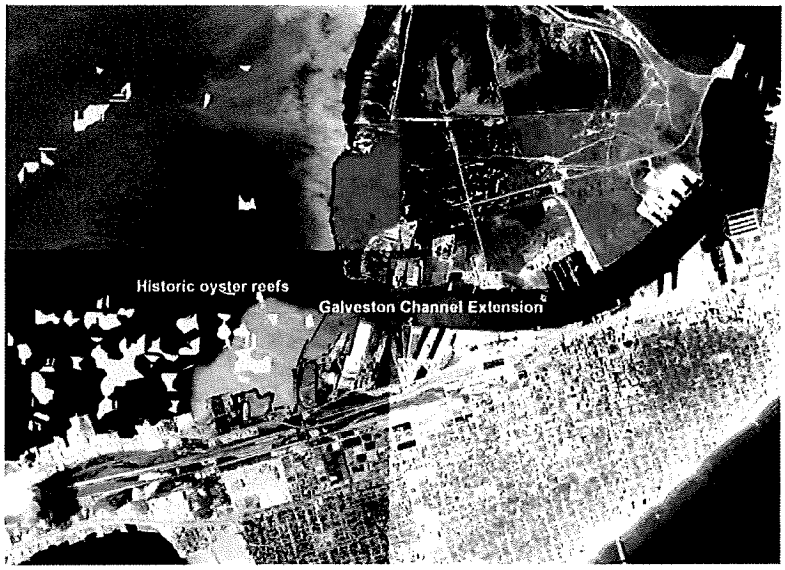

Figure 4 Galveston Channel Extension and historic oyster reefs in Galveston Bay

(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 important 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 turtle (*Eretmochelys imbricata*) - E
Kemp's Ridley sea turtle (*Lepidochelys kempii*) - E
Leatherback sea turtle (*Dermochelys coriacea*) - E
Loggerhead sea turtle (*Caretta caretta*) – T
Piping Plover (*Charadrius 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 turtles 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 turtles rarely nest in the southeastern U.S., however offshore waters are important 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 turtle nesting season begins March 15 and ends October 1 each year and there is no designation of critical habitat for sea turtles in Texas. Sea turtles 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 arriving 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 of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas to provide sufficient wintering habitat to support 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 reported 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 Preferred 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 supported 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. Current restoration efforts are focused along the eroding western shoreline of Pelican Island north of the Pelican Island Causeway. At this location, local partners 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 inadvertently 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

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

REPLY TO
ATTENTION OF

May 7, 2013

Environmental Section

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

Dear Ms. Hensley:

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 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 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

Encls

TEXAS PARKS & WILDLIFE

Life's better outside.®

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Chairman
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Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

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
1	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
The State Agency for Historic Preservation

RICK PERRY, GOVERNOR
JOHN L. NAU, III, CHAIRMAN
F. LAWERENCE OAKS, EXECUTIVE 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

Dear 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 determination 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) much 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 access to the survey area).

We further note that 1) the proposed project design involves only deepening the existing channel from 40 feet to 45 feet with no corresponding widening and 2) this area has been dredged many times in the past to achieve and maintain this depth. We are also aware that the area is heavily developed along both shores of the ship channel, which precludes the effective magnetometer survey 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 forward 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 of 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,

Steven D. Hoyt

for F. Lawerence Oaks, 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. O. 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.

Sincerely,

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

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,

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.

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.

Sincerely,

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. 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+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.

Sincerely,

Carolyn Murphy
Chief, Environmental Section

Encls

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 6
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.

Sincerely,

Rhonda Smith
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:

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 unrestricted 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

Ms. Rhonda Smith
Chief, Office of Planning and Coordination
Environmental Protection Agency, Region 6
(continued)

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.
10	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 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).
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 of required 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

Protecting Texas by Reducing and Preventing Pollution

June 12, 2013

District Engineer
U.S. Army Engineer District, Galveston
ATTN: 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.

In support 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 (NO_X) emissions instead of lowest price; and/or
- purchase and permanently retire surplus NO_X 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. O. BOX 1229
GALVESTON, TEXAS 77553-1229

REPLY TO
ATTENTION OF

Environmental Section

May 7, 2013

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 vessels 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)(1) 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 Texas 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 QUALITY

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-13-01 issued 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 Quality Division 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
ATTN: 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. O. 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 questions 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.

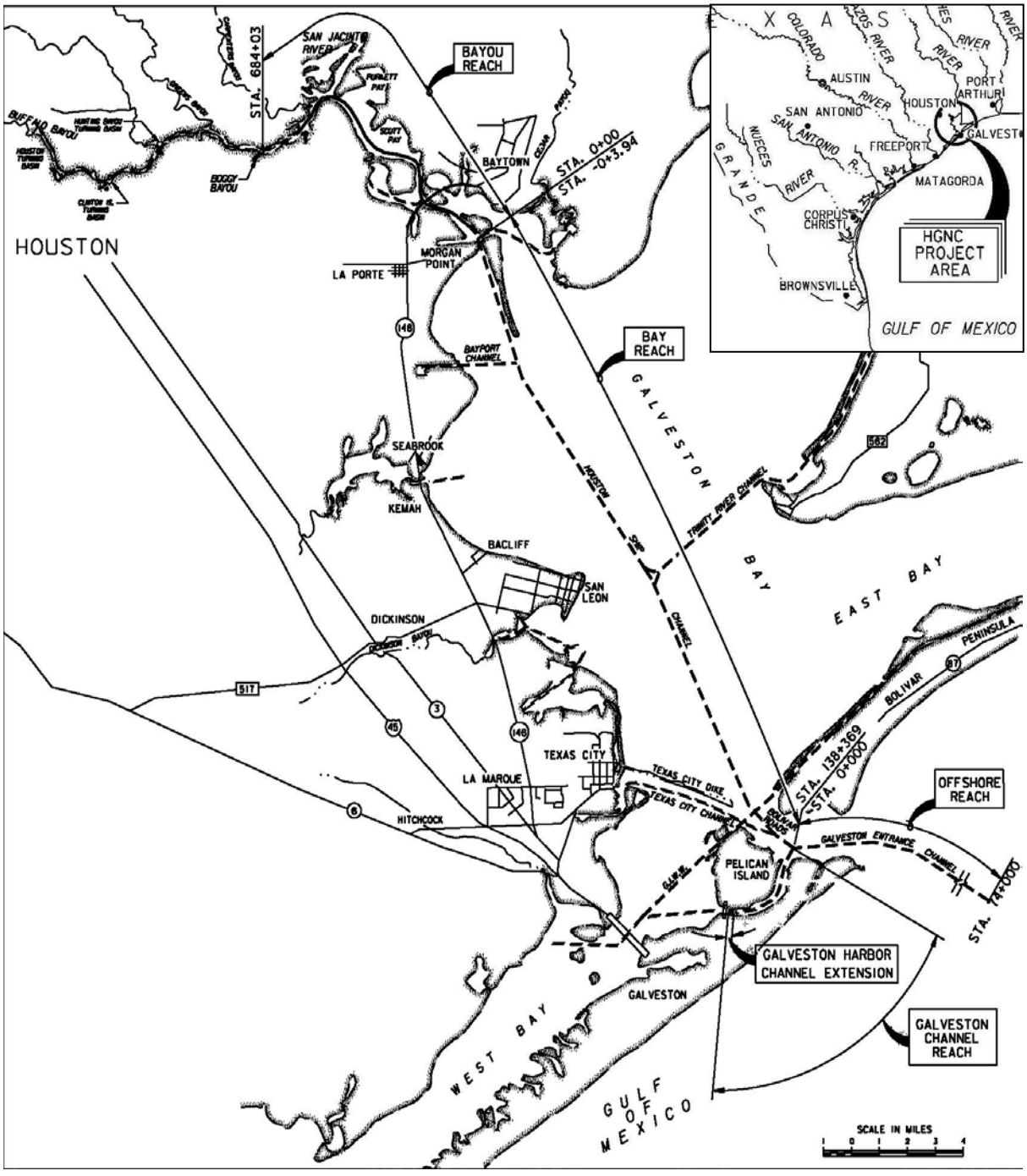


FIGURE 1: Houston-Galveston Navigation Channels Reach Designations and Project Area.

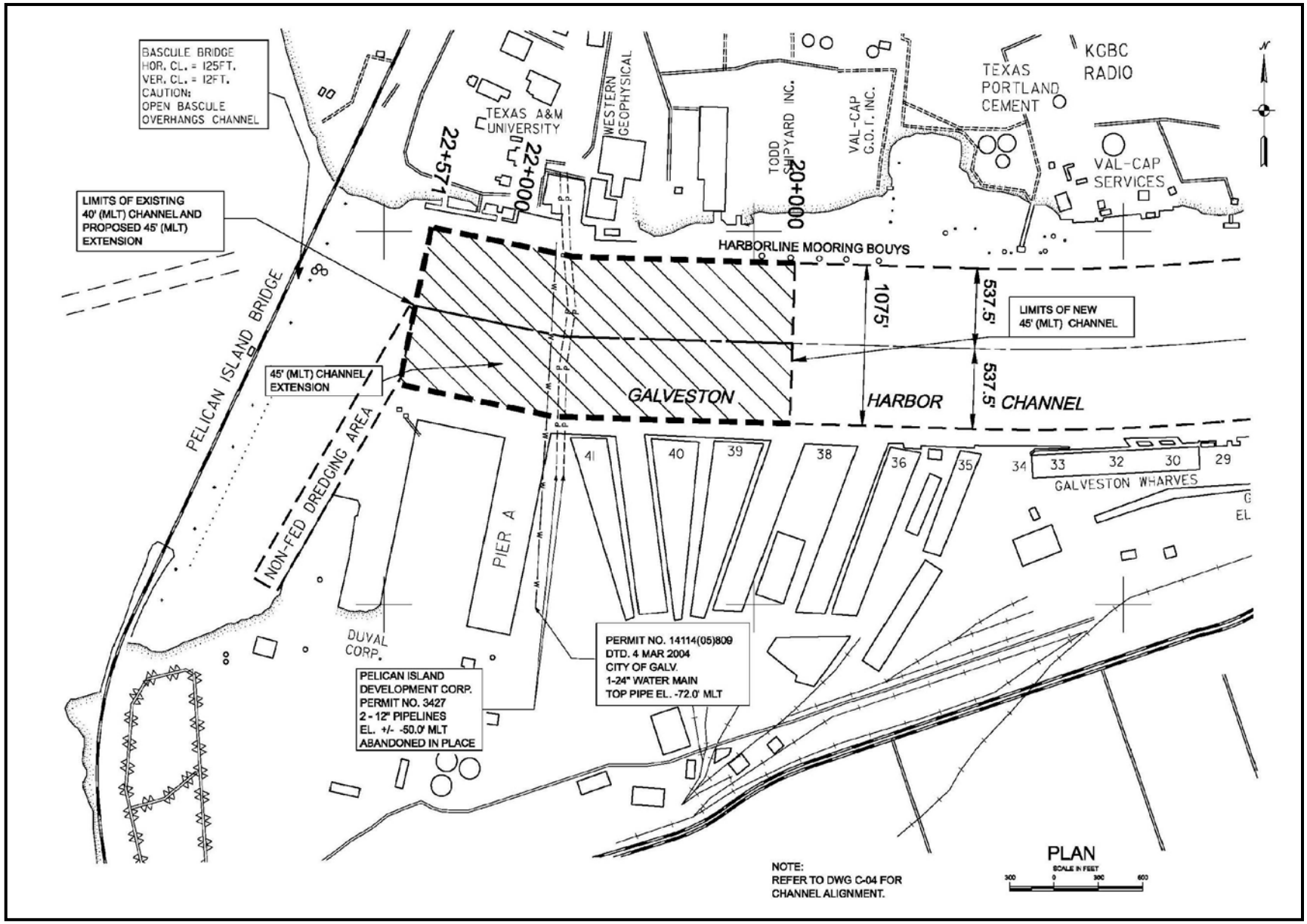


FIGURE 2: Footprint of the Recommended 46-foot Depth Extension of the Galveston Harbor Channel

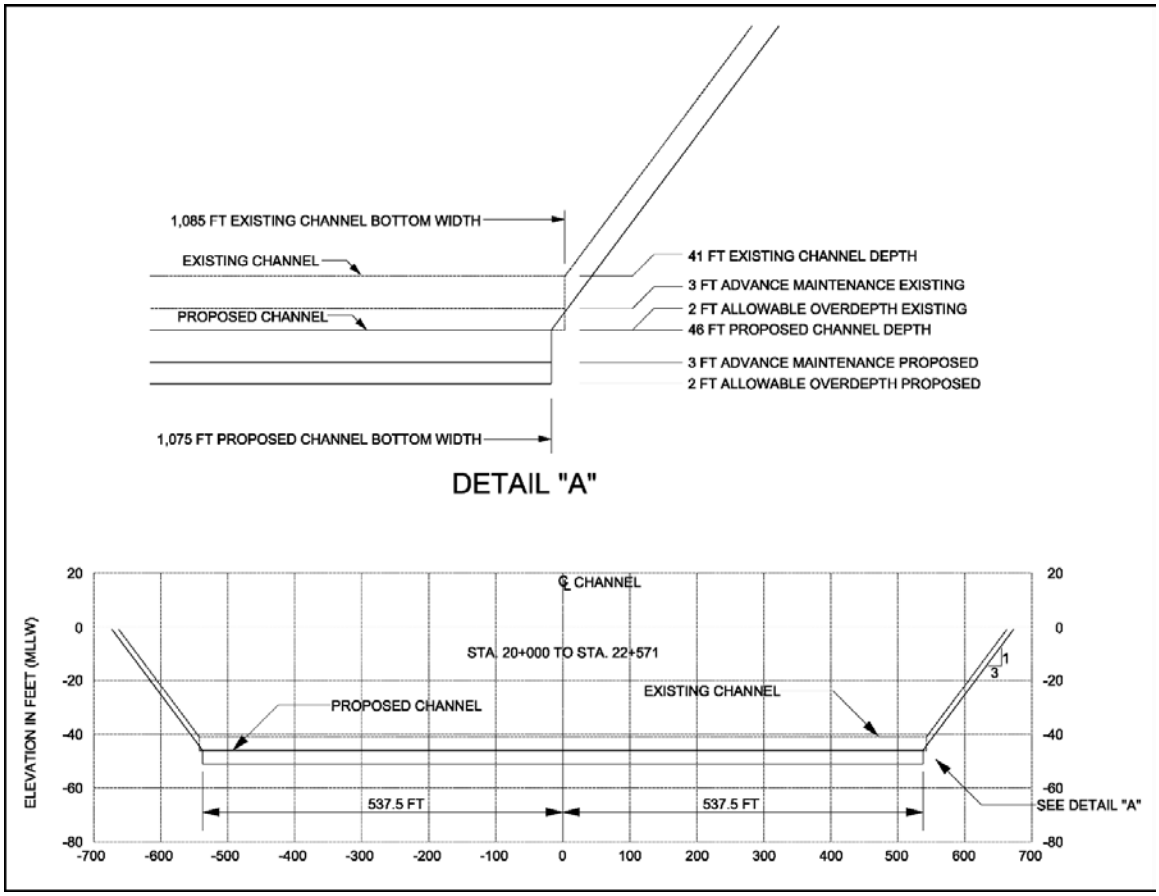


FIGURE 3: Typical Cross Section of Recommended 46-foot Depth Extension within Galveston Harbor Channel.

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 information on listed species please visit:
http://www.nmfs.noaa.gov/pr/species/esa/listed.htm
http://sero.nmfs.noaa.gov/protected_resources/index.html

Marine Mammal Species	Scientific Name	Status
fin whale	*Balaenoptera physalus*	Endangered
humpback whale	*Megaptera novaeangliae*	Endangered
sei whale	*Balaenoptera borealis*	Endangered
sperm whale	*Physeter macrocephalus*	Endangered
Sea Turtle Species		
green sea turtle	*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*	Threatened[2]
Invertebrate Species		
lobed star coral	*Orbicella annularis*	Threatened
mountainous star coral	*Orbicella faveolata*	Threatened
boulder star coral	*Orbicella franksi*	Threatened
elkhorn 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/critical_habitat/index.html

Loggerhead sea turtle: There 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.
[3] Colonies located at Flower Garden Banks National Marine Sanctuary.

NOAA FISHERIES
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 formally 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 information 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

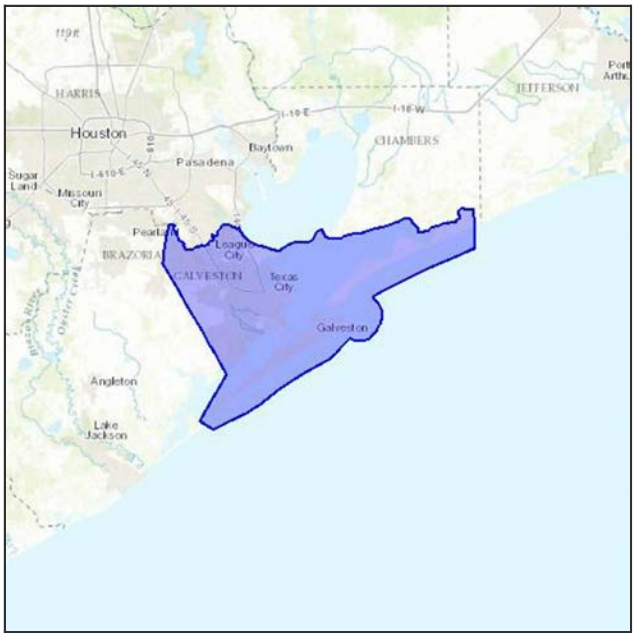
GHCE

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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

CRITICAL HABITAT

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:

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Galveston District
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March 2013

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PROFESSIONAL ENGINEER STATEMENT

This 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. This preliminary document is not to be used for construction, bidding, or permitting purposes.

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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_x	nitrogen oxides
PM_{10}	particulate matter with an aerodynamic diameter equal to or less than 10 microns
PACR	Post Authorization Change Report
SIP	Texas State Implementation Plan
SO_2	sulfur oxides
TCEQ	Texas Commission on Environmental Quality
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 Extension Project is located on the upper Texas coast at the mouth of Galveston Bay in Galveston County, Texas. The project includes the Offshore Reach (the common Entrance Channel) and the area between the Bolivar Peninsula and Pelican Island through Galveston Harbor to the Gulf Intracoastal Waterway. Galveston Harbor Channel is the separable channel branching off the Houston Ship Channel, providing entry to the Port 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 Assessment (EA) to describe the environmental impacts associated with deepening a portion 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 advantage of fully loaded vessels alleviating the current practices of light-loading. The project sponsor is the Port of Galveston.

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 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 the Draft General Conformity Determination prepared on behalf of the USACE, Galveston District, to assess whether air contaminant emissions that would result from the proposed Galveston Harbor Channel Extension Project are in conformity with the SIP for the Houston/Galveston/Brazoria (HGB) ozone nonattainment area.

Figure 1, Project Study Area

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 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 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 SIP emissions budget. 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."

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 expeditious 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; e.g., 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. For the HGB nonattainment area, the threshold level is 100 tons per year (tpy) for either NO_x or VOC. In addition, even if the total emissions of VOC or NO_x do not exceed the 100 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 be 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 in this General Conformity Determination.

3.0 APPLICABILITY

The proposed Galveston Harbor Channel Extension Project will be located in Galveston County, Texas. This county is included in the eight county HGB ozone nonattainment area which is classified as "marginal" in terms of its degree of compliance with the current 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 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 this project. The emissions inventory included emissions associated with dredging of the channel and from land-based mobile sources that will be used during excavation of the dredged material placement area, including off-road earth-moving equipment and on-road construction equipment. 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 for NO_x emissions would be required for this project as emissions of NO_x are estimated to exceed the 100 tons per year applicability threshold for general conformity. Emissions of VOC from the proposed project are exempt from a General Conformity Determination because they are below the 100 ton per 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 Extension 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 tons 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. 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 an emission factor algorithm used to calculated air contaminant emission rates for these emission sources. The emission factor 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 construction equipment used for on-shore excavation were estimated based on the anticipated type of equipment, activity, horsepower, and anticipated hours of operation. The 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. The operation of construction vehicles (e.g., dozer, dragline, excavator, etc.) would generate air emissions typical of vehicles powered by diesel-fueled internal combustion engines. The 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, state, 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 trucks 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 trip multiplied by the total number of days of construction activity times the number of vehicles.

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 Galveston Harbor Channel Extension 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_x AND VOC EMISSIONS
(tons per year)

	2012
NO_x	106.4
VOC	1.62

The estimate of VOC emissions for the Galveston Harbor Channel Extension Project would not exceed the conformity threshold of 100 tpy for either of these years. Therefore, a General Conformity Determination for VOC emissions would not be required for this project.

The estimate of NO_X emissions for the Galveston Harbor Channel Extension Project would exceed General Conformity threshold (100 tpy) in 2012 and would require a General Conformity Determination.

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 has occurred 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 (tons/year)
CO	0.90
NO_X	7.90
$PM_{2.5}$	0.18
PM_{10}	0.19
SO_2	1.31
VOC	0.09

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, a General Conformity 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 that exceeds the threshold rates (100 tpy of NO_x 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, Subpart B, "Determining Conformity of General Federal Actions to State 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 can meet 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 specified in the SIP."

The 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.

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 2004 Mid-Course Review SIP (TCEQ, 2004), based on attainment of the 1-hour ozone standard, and associated emissions trading programs approved by the EPA on 6 September 2006 (EPA, 2006). In this SIP, the emissions budgets for NO_x 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_x and 50.62 tons per day of VOC (TCEQ, 2004). The Nonroad Mobile emissions inventory 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.

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_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 as shown on Table 3.

TABLE 2
GALVESTON HARBOR CHANNEL EXTENSION PROJECT – NO_x EMISSIONS COMPARED TO SIP 2007
WEEKDAY NONROAD MOBILE SOURCE EMISSIONS BUDGET[1]

	2012
Tons per Year	106.4
Tons per Day	1.2
% of Nonroad Mobile Emissions Budget (64.53 tons per day)	1.9%

[1]TCEQ, 2004.

As shown on Table 2, NO_x emissions for the Galveston Harbor Channel Extension Project non-road mobile equipment emissions would represent less than two percent of the SIP 2007 Non-road Emissions Budget for NO_x.

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 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 will 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 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 General 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 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 make a determination 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 emissions budgets specified in the SIP. Therefore, it is requested that the TCEQ review this draft and provide a formal determination and confirmation. Once written confirmation is received, this information will be relied upon by the USACE as a basis for making a Final General Conformity Determination for the proposed Galveston Harbor Channel Extension Project.

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."

———. 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. Environmental 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 Support Document, "Median Life, Annual Activity, and Load Factor Values for Nonroad 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. 172, Page 52670.

Attachment

Tabular Summaries of Estimated Air Emissions

APPENDIX A

List of Tables
Galveston Channel Extension Project

Table B-2. Dredge Equipment Engine Horsepower and Hours of Operation
Galveston Channel Extension Project

Contract No.	Reach	Horsepower (hp)													
		Dredge Type	Engine Type					Survey Boat		Trawler		Floating Booster	Tug	Spill Barge	Crew Boat
			Total	Propulsion	Pump	Generator	Generator at Idling	Main Engine	Idling	Main Engine	Idling	Pumping	Propulsion	Main Engine	Propulsion
1	Dredge 45 Ft Channel - New Extension	30" Dredge	9,000				3,000						500	165	400

Operating Hours													
Dredge						Survey Boat		Trawler		Floating Booster	Tug	Spill Barge	Crew Boat
Dredge Type	Total Dredging	Propelling	Pumping	Power Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling
30" Dredge	1,500				675						3,600	300	300

Dredging time is based on 660,000 cubic yards of dredged material.

Table B-3. Maintenance Dredge Equipment Engine Horsepower and Hours of Operation
Galveston Channel Extension Project

Contract No.	Reach	Horsepower (hp)													
		Dredge Type	Engine Type					Survey Boat		Trawler		Floating Booster	Tug	Spill Barge	Crew Boat
			Total	Propulsion	Pump	Generator	Generator at Idling	Main Engine	Idling	Main Engine	Idling	Pumping	Propulsion	Main Engine	Propulsion
1	45 Ft Channel - Maintenance Dredging	30" Dredge	9,000				3,000						500	165	400

Operating Hours													
Dredge						Survey Boat		Trawler		Floating Booster	Tug	Spill Barge	Crew Boat
Dredge Type	Total Dredging	Propelling	Pumping	Power Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling
30" Dredge	113				51						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
NO_X	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
SO_X	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 Flow in g/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

	Dredge					Crew Boat		Trawler		Floating Booster	Tug	Spill Barge	Crew Boat
Operating Mode	Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling
Load Factor	0.8	0.8	0.8	0.8	0.2	0.4	0.2	0.4	0.2	0.8	0.4	0.4	0.4
EF (Gram/hp-hr)													
CO	0.780934	0.780934	0.780934	0.780934	3.123737	1.561869	3.123737	1.561869	3.123737	0.780934	1.561869	1.561869	1.561869
NO_X	7.923056	7.923056	7.923056	7.923056	8.838583	8.162195	8.838583	8.162195	8.838583	7.923056	8.162195	8.162195	8.162195
PM	0.196377	0.196377	0.196377	0.196377	0.239417	0.207619	0.239417	0.207619	0.239417	0.196377	0.207619	0.207619	0.207619
PM2.5	0.178703	0.178703	0.178703	0.178703	0.217870	0.188933	0.217870	0.188933	0.217870	0.178703	0.188933	0.188933	0.188933
PM10	0.188522	0.188522	0.188522	0.188522	0.229841	0.199314	0.229841	0.199314	0.229841	0.188522	0.199314	0.199314	0.199314
SO_X	1.304627	1.304627	1.304627	1.304627	1.613894	1.407716	1.613894	1.407716	1.613894	1.304627	1.407716	1.407716	1.407716
VOC (HC)	0.069511	0.069511	0.069511	0.069511	0.556090	0.196607	0.556090	0.196607	0.556090	0.069511	0.196607	0.196607	0.196607

Notes:

1.) The dredge type, engine type, horsepower, and fuel type were based on information provided by project sponsors.

2.) The engine load factors for the dredges and support equipment were determined from Table 5-2 of the EPA Report "Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data", February 2000.
A survey of dredge engine sizes along with input from project sponsors was used to determine which operating mode and hence which load factor applied to each engine. The following assumptions applied to the load factor determination:
A.) The main engines on the dredges were assumed to operate at full power (e.g. 0.8 "cruise" load factor from Table 5-2 of EPA report) for all hours of operation.
B.) The generators on the dredges were assumed to operate at 0.2 load factor during idling.
C.) The main engines or propulsion engines on the support equipment were assumed to operate at intermittent times during the dredging operations and were also determined to operate at the 0.4 "slow cruise" load factor.
D.) The auxiliary engines, if any, on the support equipment were assumed to operate sparingly during idling and were determined to operate at the 0.2 "maneuvering" load factor.

3.) The emission factors were calculated according to the algorithm table and formulas detailed on page 5-3 of the EPA report. The emissions Rate formula and algorithm table are also shown on Table A-4, "Marine Engine Emission Factor and Fuel Consumption Data", February 2000.

4.) The Emission Rate in tons/hr is based on the following formula: Emission Rate = hp*LF*EF*(0.0022046 lbs/gram)*(1 ton/2000 lbs).

Table C-3. Dredgin Equipment Emissions
Galveston Channel Extension Project

CO (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	9.30				1.39						1.24	0.03	0.08	**12.05**

NO_x (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	94.32				3.95						6.48	0.18	0.43	**105.36**

PM (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	2.34				0.11						0.16	0.00	0.01	**2.63**

$PM_{2.5}$ (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	2.13				0.10						0.15	0.00	0.01	**2.39**

PM_{10} (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	2.24				0.10						0.16	0.00	0.01	**2.52**

SO_2 (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	15.53				0.72						1.12	0.03	0.07	**17.47**

VOC (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	Dredge 45 Ft Channel - New Extension	30" Dredge	0.83				0.25						0.16	0.00	0.01	**1.25**

Table C-4. Dredging Equipment Emissions - Maintenance Dredging
Galveston Channel Extension Project

CO (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	0.70				0.10						0.09	0.00	0.01	**0.90**

NO_x (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	7.07				0.30						0.49	0.01	0.03	**7.90**

PM (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	0.18				0.01						0.01	0.00	0.00	**0.20**

$PM_{2.5}$ (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	0.16				0.01						0.01	0.00	0.00	**0.18**

PM_{10} (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	0.17				0.01						0.01	0.00	0.00	**0.19**

SO_2 (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	1.16				0.05						0.08	0.00	0.01	**1.31**

VOC (tpy)			Dredge					Survey Boat		Trawler		Floating	Tug	Spill Barge	Crew Boat	
			Dredging	Propelling	Pumping	Generating	Idling	Propelling	Idling	Propelling	Idling	Pumping	Propelling	Main Engine	Propelling	TOTALS
YEAR 2012																
Contract No.	Reach	Dredge														
1	45 Ft Channel - Maintenance Dredging	30" Dredge	0.06				0.02						0.01	0.00	0.00	**0.09**

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	0.009615871	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	1.098357572	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

SCC Code	Equipment	Load Factor[1]	
		Diesel	Gasoline
22xx003010	Aerial Lifts	21%	46%
22xx005015	Agricultural 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	Chippers/Stump Grinders	43%	78%
22xx002039	Concrete/Industrial Saws	59%	78%
22xx002045	Cranes	43%	47%
22xx002066	Crawler Dozers/Tractor	59%	80%
22xx002054	Crushing/Procesing Equipment	43%	85%
22xx002078	Dumpers/Tenders	21%	41%
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-Highway Truck	59%	80%
22xx002075	Off-Highway Tractor	59%	70%
22xx004056	Other Agricultural Equipment	59%	55%
22xx002081	Other Construction Equipment	59%	48%
22xx003040	Other General Industrial	43%	54%
22xx003050	Other Material Handling	21%	53%
22xx002003	Pavers	59%	66%
22xx002021	Paving Equipment	59%	59%
22xx002009	Plate Compactors	43%	55%
22xx006030	Pressure Washer	43%	85%
22xx006010	Pumps	43%	69%
22xx003060	Refrigeration/AC	43%	46%
22xx002015	Rollers	59%	62%
22xx002057	Rough Terrain Forklifts	59%	63%
22xx002063	Rubber Tire Dozer	59%	75%
22xx002060	Rubber Tire Loader	59%	71%
22xx002018	Scrapers	59%	70%
22xx002072	Skid Steer Loader	21%	58%
22xx001060	Specialty Vehicle/Carts	21%	58%
22xx002024	Surfacing Equipment	59%	49%
22xx003030	Sweepers/Scrubbers	43%	71%
22xx002006	Tampers/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	21%	48%
22xx002030	Trenchers	59%	66%
22xx006025	Welders	21%	68%

1. Load Factors from Appendix A of *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

Table D-3. Construction Equipment Emissions
Galveston Channel Extension Project

Equipment Type	Description	Fuel Type	HP	Typical Load Factor	Hours of Operation	Emission Factors (grams/horsepower-hour)								Estimated Emission Rates (tpy)							
						VOC	PM10	PM2.5	CO	NOx	CO2	SO2	PM	VOC	PM_{10}	PM2.5	CO	NOx	CO2	SO_2	PM
EP B25PL017 BKT,ORANGE PEEL, 4 CY HVY DTY	BUCKET	-			1									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EP M10MZ010 MARINE EQUIPMENT, BOATS & LAUNCHES, TRUCKABLE WORKBOAT W/PILOT HOUSE & PUSH KNEES, INBOARD, 20.25' X 8' X 3'	WORKBOAT	DIESEL	140	59%	3	0.32078452	0.32057014	0.31095304	1.492965	3.87712523	535.877577	0.00961567	0.32057014	0.0001	0.0001	0.0001	0.0004	0.0011	0.1464	0.0000	0.0001
EP T45XX015 TRUCK TRAILER, LOWBOY, 40 TON, 3 AXLE (ADD TOWING TRUCK)	TRUCK TRAILER	-			1									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
EP T50FO019 TRK,HWY, 43,000 GVW, 6X4, 3 AXLE	HIGHWAY TRUCK	DIESEL	305	80%	2	0.5			15.5	2.5			0.1	0.0003	0.0000	0.0000	0.0083	0.0013	0.0000	0.0000	0.0001
EP T50GM009 TRK,HWY,10,000GVW,4X4, 1T-PICKUP	HIGHWAY TRUCK	DIESEL	180	80%	1	0.5			15.5	2.5			0.1	0.0001	0.0000	0.0000	0.0025	0.0004	0.0000	0.0000	0.0000
EP T50XX011 TRUCK, HIGHWAY, CREW, 3/4 TON PICKUP, 4X4	HIGHWAY TRUCK	GASOLINE	180	80%	34	0.5			14.4	2.5				0.0027	0.0000	0.0000	0.0777	0.0135	0.0000	0.0000	0.0000
GEN T1SZ6480 TRACTOR, CRAWLER (DOZER), 101-135 HP (75-101 KW), POWERSHIFT, W/ UNIVERSAL BLADE	CRAWLER DOZERS/TRACTOR	DIESEL	135	59%	51	0.26470655	0.29942169	0.29043904	1.2819148	3.14319747	536.043865	0.00951376	0.29942169	0.0012	0.0013	0.0013	0.0057	0.0141	2.4003	0.0000	0.0013
GEN T1SZ6520 TRACTOR, CRAWLER (DOZER), 181-250 HP (135-186 KW), POWERSHIFT, LGP, W/UNIVERSAL BLADE	CRAWLER DOZERS/TRACTOR	DIESEL	250	59%	244	0.23231536	0.1931397	0.18734551	0.97247535	2.86740123	536.139077	0.00918719	0.1931397	0.0092	0.0077	0.0074	0.0386	0.1138	21.2699	0.0004	0.0077
GEN T4QZ7015 TRUCK OPTION, FLATBED, 8' (2.4 M) x 24' (7.3 M) (ADD 25,000 LB (11,340 KG) GVW TRUCK)	TRUCK BED	-			1									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN T4QZ7050 TRUCK OPTION, HOIST, 2 TON (1.8 MT), 16'-24' (4.9 M-7.3 M) BOOM (ADD 25,000 LB (11,340 KG) GVW TRUCK & FLAT BED)	HOIST	-			1									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRUCK, HIGHWAY, 25,000 LBS GVW, 2 AXLE, 4X2 (CHASSIS ONLY-ADD OPTIONS)	HIGHWAY TRUCK	GASOLINE	210	59%	2	0.5			37.1	2.5				0.0001	0.0000	0.0000	0.0101	0.0007	0.0000	0.0000	0.0000
GEN XX0Z9720 TUG BOAT, 150-400 HP (112-298 KW)	TUG BOAT	DIESEL	400	59%	1	0.31202293	0.2937274	0.2849156	2.1326034	4.5722034	535.90321	0.0095135	0.2937274	0.0001	0.0001	0.0001	0.0008	0.0012	0.1394	0.0000	0.0001
MAP B35HE023 BUCKET, DRAGLINE, 3.0 CY, MEDIUM WEIGHT	BUCKET DRAGLINE	-			167									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAP C85AM003 CRANE,DRAG/CLAM, 4.5CY / 95'BOOM	CRANE	DIESEL	300	43%	1	0.2516986	0.15247	0.1478659	0.706243	3.3541777	530.29401	0.0092126	0.15247	0.0000	0.0000	0.0000	0.0001	0.0005	0.0754	0.0000	0.0000
MAP C85MA001 CRANES, MECHANICAL, LATTICE BOOM, CRAWLER, DRAGLINE/CLAMSHELL, 3.5 CY, 80' BOOM (ADD BUCKET)	CRANE	DIESEL	350	43%	167	0.24308972	0.2228474	0.2384739	1.0983576	4.2198098	530.32057	0.0093663	0.1775358	0.0067	0.0062	0.0066	0.0304	0.1169	14.6926	0.0003	0.0049
MAP H25BS005 HYDRAULIC EXCAVATOR, ATTACHMENT, MATERIAL HANDLING, 3.25 CY BUCKET, W/TIPS (ADD 50,000-75,000 LB HYDRAULIC EXCAVATOR)	HYDRAULIC EXCAVATOR ATTACHMENT	-			1									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAP H25CA020 HYDRAULIC EXCAVATOR, CRAWLER, 24,640 LBS, 0.60 CY BUCKET, 16.50' MAX DIGGING DEPTH	EXCAVATOR	DIESEL	79	59%	1	0.3040015	0.4499873	0.4364877	3.4227618	3.5816761	595.25336	0.0105139	0.4499873	0.0000	0.0000	0.0000	0.0002	0.0002	0.0306	0.0000	0.0000
MAP L35CA005 LOADER, FRONT END, CRAWLER, 2.25 CY BUCKET	TRACTOR/LOADER/BACKHOE	DIESEL	121	21%	1	0.92114671	0.636718	0.6176165	3.5191138	5.564499	623.80773	0.0112681	0.636718	0.0000	0.0000	0.0000	0.0001	0.0002	0.0175	0.0000	0.0000
MAP T15CA002 TRACTOR, CRAWLER (DOZER), 70 HP, LOW GROUND PRESSURE, W/2.0 CY SEMI-U BLADE (ADD ATTACHMENTS)	CRAWLER DOZERS/TRACTOR	DIESEL	70	59%	1	0.33020345	0.3621387	0.3512746	3.171077	3.8536687	595.17034	0.0109425	0.3621387	0.0000	0.0000	0.0000	0.0001	0.0002	0.0271	0.0000	0.0000
MAP T15CA014 TRACTOR, CRAWLER (DOZER), 240 HP, LOW GROUND PRESSURE, W/7.70 CY STRAIGHT BLADE (ADD ATTACHMENTS)	CRAWLER DOZERS/TRACTOR	DIESEL	240	59%	72	0.23231536	0.1931397	0.18734551	0.97247535	2.86740123	536.139077	0.00918719	0.1931397	0.0026	0.0022	0.0021	0.0109	0.0322	6.0253	0.0001	0.0022
MAP T50FC003 TRK,HWY, 8,600GVW,4X2, 3/4T-PKUP	HIGHWAY TRUCK	GASOLINE	130	80%	34	0.5			14.4	2.5				0.0019	0.0000	0.0000	0.0561	0.0097	0.0000	0.0000	0.0000
MAP T50FO017 TRK, FUEL & LUBE, 6X4, 3 AXLE	HIGHWAY TRUCK	DIESEL	305	80%	1	0.5			15.5	2.5			0.1	0.0001	0.0000	0.0000	0.0042	0.0007	0.0000	0.0000	0.0000
MIL COEB34B Hauling,12 CY, 1 mi round trip @	HIGHWAY TRUCK	DIESEL	265	59%	611	0.5			15.5	2.5			0.1	0.0527	0.0000	0.0000	1.6322	0.2633	0.0000	0.0000	0.0105
MIL UOEHB12V Excav & load on truck,bucket	EXCAVATOR	DIESEL	238	59%	531	0.21860636	0.1867319	0.18113	0.94443	2.6731554	536.17951	0.0090984	0.1867319	0.0180	0.0153	0.0149	0.0776	0.2197	44.0697	0.0007	0.0153

Table D-3. Construction Equipment Emissions
Galveston Channel Extension Project

Equipment Type	Description	Fuel Type	HP	Typical Load Factor	Hours of Operation	Emission Factors (grams/horsepower-hour)								Estimated Emission Rates (tpy)							
						VOC	PM10	PM2.5	CO	NOx	CO2	SO2	PM	VOC	PM_{10}	PM2.5	CO	NOx	CO2	SO_2	PM
Grass Contractor																					
GEN T45Z7280 TRUCK TRAILER, WATER TANKER, 5,000 GAL (18,927 L) (ADD 50,000 LB (22,680 KG) GVW TRUCK)	TRUCK TRAILER/WATER TANKER	-			5									0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GEN T50Z7520 TRUCK, HIGHWAY, 55,000 LB (24,948 KG) GVW, 6X4, 3 AXLE (ADD ACCESSORIES)	HIGHWAY TRUCK	DIESEL	310	59%	5	0.5			15.5	2.5			0.1	0.0005	0.0000	0.0000	0.0156	0.0025	0.0000	0.0000	0.0001
MAP L50JC001 LOADER / BACKHOE, WHEEL, 0.80 CY FRONT END BUCKET, 24" DIP, 4.3 CF, 12' DIGGING DEPTH, 4X4	TRACTOR/LOADER/BACKHOE	DIESEL	121	21%	2	0.92114671	0.636718	0.6176165	3.5191138	5.564499	623.80773	0.0112681	0.636718	0.0001	0.0000	0.0000	0.0002	0.0003	0.0349	0.0000	0.0000
MAP XMEZ0025 HELICOPTER, 1250 LB. LIFT CAP. W/ VFR INSTRUMENTS,PILOT & OH&P	HELICOPTER	Aviation Fuel	1470	80%	2	0.3	0.4	0	2.4	3.1	0	0.3	0	0.0008	0.0010	0.0000	0.0062	0.0080	0.0000	0.0008	0.0000
													TOTALS	**0.0972**	**0.0340**	**0.0326**	**1.9780**	**0.8004**	**88.9291**	**0.0023**	**0.0424**

Table E-1. Crew Size per Equipment
Galveston County Extension Project

	Cutterhead Dredge		
	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[1]	Emisson Factor (g/mile)		
			CO[2]	NOx[2]	VOC[2]
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 vehicle weight (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.tx.us/pub/OEPAA/TAD/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 (tpy)		
							CO	NO_x	VOC
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

Notes:
1. Total VMT is assumed to be 50 miles/day round trip.
2. Annual travel = Daily vehicles * Total VMT * Travel days/yr.
3. Annual emissions = Emission factor * Annual travel * 1lb/453.6 grams * 1ton/2000lb

Table A-1. Annual Project Emissions Summary
Galveston Channel Extension Project

Year 2012	TONS PER YEAR					
	CO	NO_X	$PM_{2.5}$	PM_{10}	SO_2	VOC
Dredge & Support Equipment	12.05	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**

Annual Maintenance Dredging

Year 2012	TONS PER YEAR					
	CO	NO_X	$PM_{2.5}$	PM_{10}	SO_2	VOC
Dredge & 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	NO_X	$PM_{2.5}$	PM_{10}	SO_2	VOC
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**	**NO_X**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOC**
Year 2012	**17.63**	**106.41**	**2.42**	**2.55**	**17.48**	**1.62**
% of HGA	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 Conformity Emissions By Source
Galveston Channel Extension Project

Year	NO_X (tpy)				VOC (tpy)			
	Dredge & Support Equipment	Construction Equipment	Employee Vehicles	NO_X Total	Dredge & Support Equipment	Construction Equipment	Employee Vehicles	VOC Total
2012	105.36	0.80	0.25	**106.41**	1.25	0.10	0.28	**1.62**

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	Dredge 45 Ft Channel - 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. O. 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 feet 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 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(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 -50 feet MLT. 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 -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)(1) 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 nonattainment area for ozone. An analysis of estimated emissions associated with the proposed project indicates that there 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 100 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 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 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 Department
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 required. 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 Environmental Quality, Attention: Water Quality Division, MC-150, P.O. Box 13087, Austin, Texas 78711-3087. The public comment period extends 30 days from the date of publication of this notice. A copy of the public notice with a description of work is made available for review in the TCEQ's Austin office.

The TCEQ may conduct a public meeting to consider all comments concerning water quality if requested in writing. A request for 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 the requester, or of persons represented by the requester; and a brief description of how the project would adversely affect such interest.

EVALUATION 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 as public 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 Environmental Impact Statement (EIS) is not required. This preliminary determination of EIS requirement will be changed if information brought forth in the coordination process is of a significant nature. Based on this determination, a DEA has been prepared. The DEA assesses potential impacts to the human and natural environment that would result from the proposed project. The document is available online at http://www.swg.usace.army.mil/BusinessWithUs/PlanningEnvironmentalBranch/DocumentsforPublicReview.aspx.

PUBLIC COMMENT: The USACE is soliciting comments from the public, Federal, state, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Comments will be considered in 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 interest of the proposed activity.

Persons desiring to express their views or provide information to be considered 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 District, Galveston
ATTN: CESWG-PE-PR
P.O. Box 1229
Galveston, Texas 77553-1229

The comments should make specific reference to Public Notice No. HGNC-13-01. The USACE, Galveston District will accept written public comments on the DEA and the DGCD from May 10, 2013 through June 10, 2013. Comments on the DEA and the DGCD must be postmarked by June 10, 2013.

Any person who has an interest that may be affected by this action may request a public hearing. The request must be submitted in writing within 30 days of the date of this notice and must clearly set forth the interest that may be affected and the manner in which the interest may be affected by this activity.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and the DEA may be referred to Ms. Andrea Catanzaro at (409) 766-6346, or by email at andrea.catanzaro@usace.army.mil.

Dolan Dunn
Chief, Planning, Environmental
and Regulatory 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 2013 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.

<u>Compliance</u>: 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,

<u>Compliance</u>: 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 currently 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.

6 JUN 18
(date)

Lars N. Zetterstrom, P.E.
Colonel, U.S. Army
Commanding