Appendix F

Ocean Dredged Material Disposal Sites Analysis

Brazos Island Harbor, Texas Channel Improvement Project Cameron County, Texas

U.S. Army Corps of Engineers, Galveston District
2000 Fort Point Road
Galveston, Texas 77550

December 2013

BRAZOS ISLAND HARBOR OCEAN DREDGED MATERIAL DISPOSAL SITE ANALYSIS

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) and the Brownsville Navigation District (BND), the non-Federal sponsor, are examining the feasibility of proposed improvements to the existing Brazos Island Harbor (BIH) Navigation Channel. This site analysis report reviews possible environmental impacts associated with the use of Ocean Dredged Material Disposal Sites (ODMDS) designated by the U.S. Environmental Protection Agency (EPA) under Section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA) (EPA 1990; 1991; 2006).

The BIH Navigation Project is a deep-draft navigation channel located in Cameron County, Texas, approximately 3 miles from the Texas-Mexico border. Due to its close proximity to Mexico, the BIH not only serves coastal towns in the Lower Rio Grande Valley, like Brownsville and Port Isabel, but the waterway also serves communities in northeastern Mexico. It allows 42-foot-deep navigation on the inland portion of the channel and has a 44-foot-deep offshore Entrance Channel. The 17-mile-long Main Channel is generally straight without bridges or other obstructions; the entire channel, which also includes the Entrance and Jetty Channels, is 19.4 miles in length and is operated for one-way traffic only.

The tentatively selected plan (TSP) would deepen (and thus extend) the channel to 54 feet in the Entrance Channel and 52 feet in the Main Channel, while maintaining existing widths. The proposed plan of improvement for the TSP is called the 52-x-250-foot project. The deepening and 0.75-mile Entrance Channel Extension would require the opening of an existing ODMDS for new work (construction) material and additional maintenance material could be placed in the existing Maintenance ODMDS (EPA 1990, 1991, 2006). The period of use for both sites is indefinite. While the preferable placement site for material from a portion of the Main Channel (11+000 to 0+000), the Jetty Channel (0+000 to -6+000), the existing Entrance Channel (-6+000 to -13+000) and the Entrance Channel Extension (-13+000 to -17+000) would be the nearshore Feeder Berm, this site analysis assumes that TSP maintenance material from the Jetty and Entrance channels (-17+000 to 0+000) would be placed in the Maintenance ODMDS. This analysis, therefore, analyzes the greatest amount of material that would be placed at the site.

1.1 HISTORY AND DESCRIPTION OF EXISTING PROJECT

The Rivers and Harbors Acts (RHA) of 1880 and 1881 permitted deepening the natural channel through Brazos Santiago Pass to 10 feet, widening it to 70 feet, and constructing two parallel jetties at the pass. Construction of the south jetty began in 1882 and continued until 1884, when operations were suspended due to a lack of funds. The RHA of 1919 authorized enlarging the channel to 18 feet deep and 400 feet wide through the pass. Two short stone jetties were constructed and some channel dredging was performed.

In 1928, BND was created to govern the Port of Brownsville. As authorized in the RHA of 1930, jetties at the Brazos Santiago Pass were constructed in 1935 in conjunction with the construction of a navigation channel to Port Isabel. More channel improvements were completed in 1936 when the Main Channel to the Brownsville Turning Basin was dug through the Rio Grande deltaic plain to provide a navigation channel and turning basin for the City of Brownsville.

Several subsequent authorizations provided for progressive deepening and widening of the Brownsville channel, and other modifications, with the last project authorization in 1986 bringing it to the current authorized 42 feet deep by 300 feet wide project (USACE, 1988, 1990). The width of some portions of the Brownsville Ship Channel are less than the 300-foot authorized width, and some areas of the Turning Basin Extension are wider to provide for passing zones and safe navigation.

The existing waterway consists of the Entrance Channel in the Gulf of Mexico, Jetty Channel, Main Channel, Turning Basin Extension, and Turning Basin. The Entrance and Jetty channels extend from the east to west for approximately 2.5 miles, from the Gulf of Mexico, through the jetties to the Laguna Madre. The flared North and South Jetties are 6,330 feet long and 5,092 feet long, respectively. They lie 1,200 feet apart, flanking Brazos Santiago Pass, which connects the Gulf with the Laguna Madre. The Main Channel begins at the Laguna Madre and extends westward 17.0 miles to its terminus at the Brownsville Turning Basin. The majority of the inland portion (Main Channel) of the channel is 250 feet wide; however, sections of the Main Channel range from 325 to 400 feet in width (Figure 1 and Table 1).

Table 1: Dimensions of Existing BIH

Channel Reach Constructed Channel	Constructed Depth (feet)	Bottom Width (feet)	Length (miles)
Entrance Channel (Gulf of Mexico to offshore end of jetties)	44	300	1.3
Jetty Channel (Gulf of Mexico to Laguna Madre)	44	300_A	1.1
Main Channel (Laguna Madre to Turning Basin Extension)	42	250_B	15.1
Turning Basin Extension	Transitions from 42 to 36	Transitions from 400 to 325	1.3
Turning Basin	36	Transitions from 325 - 1,200	0.6

Note: A – includes 0.2-mile transition to 400-foot width to Main Channel

B – includes 0.4-mile transition from 400-foot width from Jetty Channel and 3.2-mile transition to 400-foot width to Turning Basin

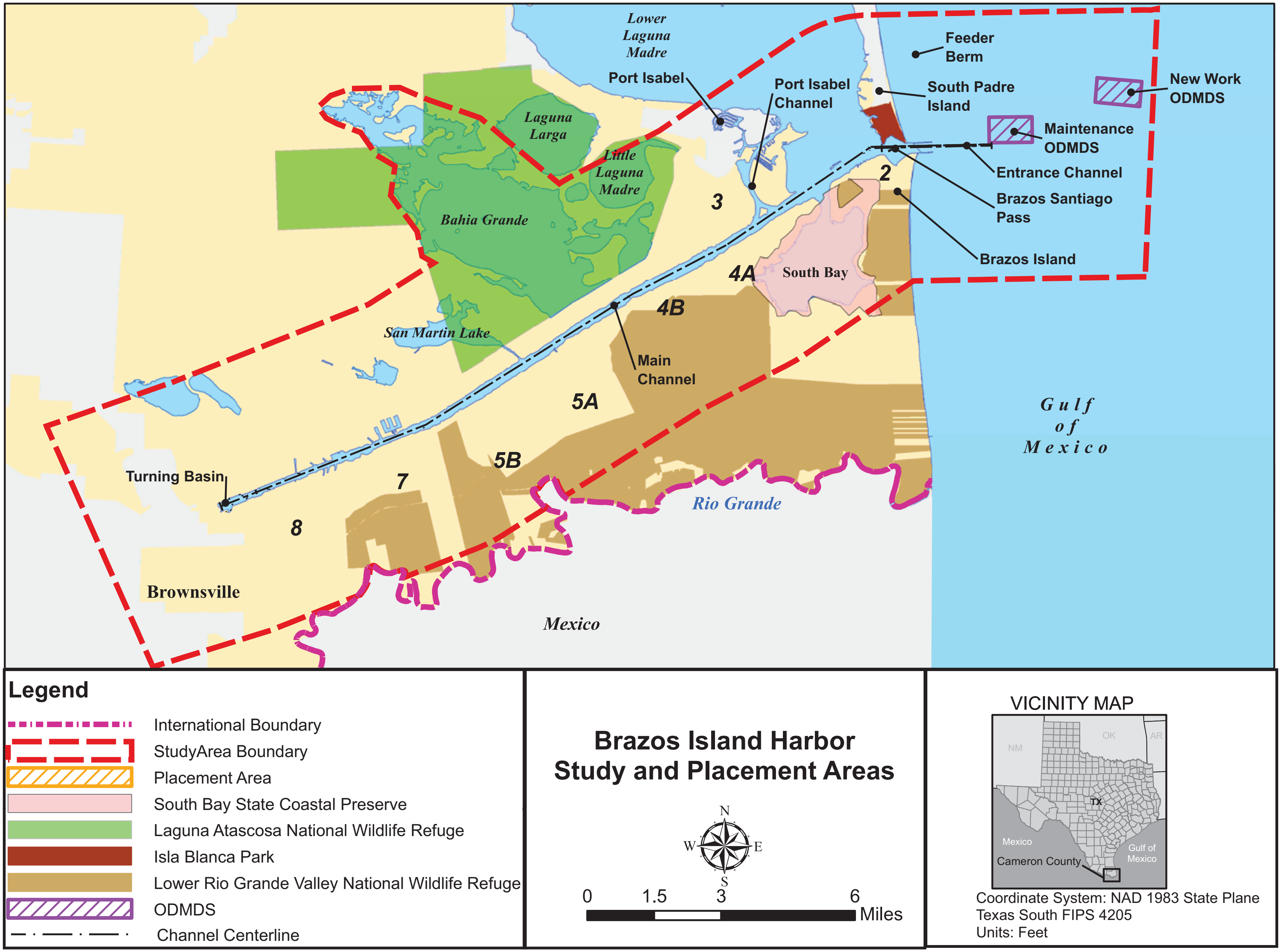

Figure 1. Brazos Island Harbor Study Area

There are 10 placement areas (PAs) available for placement of dredged material from the BIH Project including two ODMDSs, one nearshore Feeder Berm, which can receive maintenance dredged material from the Entrance Channel, and seven upland, confined PAs for containment of material from the Main Channel (USACE, 1975, 1999). The ODMDSs and the nearshore Feeder Berm are all dispersive and therefore have unlimited capacity.

Offshore disposal of dredged material began prior to 1964 with records of disposal beginning that year (USACE, 1981). After 1964, 0.2 to 0.4 million cubic yards (mcy) per year of dredged material were placed at an interim disposal site where only minor accumulation of dredged material was observed.

1.2 PROPOSED BRAZOS ISLAND HARBOR CHANNEL IMPROVEMENT PROJECT

The Port of Brownsville is primarily a bulk commodity port for liquid and dry cargo handling. Commodity traffic increased to meet industrial needs in Mexico resulting from the North American Free Trade Agreement (NAFTA). Current and predicted future activities at the Port of Brownsville include:

- Construction and maintenance of offshore rigs,
- Ship repair and dismantling,
- Steel fabrication,
- Liquid petroleum gas storage and distribution,
- Bulk terminals for petroleum, chemical and miscellaneous liquid,
- Steel products and ore minerals offloading, and
- Grain handling and storage.

Navigation improvements in the BIH that could be facilitated by deepening and widening the channel include:

- Increased navigational efficiency of vessels using the channel, and
- Increased ability of the channel to accommodate offshore rigs for maintenance and repair as well as fabrication of new rigs.

One-way traffic limitations do not appear to be an issue with the existing channel and are not expected to become a concern in the future.

The feasibility study has resulted in the identification of the 52-x-250-foot alternative as the TSP. Proposed BIH channel improvements would:

- Extend the BIH Entrance Channel 0.75 mile farther east into the Gulf of Mexico (station -17+000 to -13+000) at a depth of 54 feet below mean lower low water (MLLW) and width of 300 feet;

- Deepen the existing BIH Entrance Channel from station -13+000 to -6+000 to 54 feet below MLLW at the existing width of 300 feet;
- Deepen the BIH Jetty Channel to 54 feet below MLLW from station -6+000 to -1+026 at the existing width of 300 feet, transitioning to the existing 400 feet width through station 0+000;
- Deepen the Brownsville Main Channel to a depth of 52 feet below MLLW at the existing 400-foot width from station 0+000 to 1+517, transitioning to the existing 250-foot width at station 2+329;
- Deepen 15.5 miles of the Brownsville Main Channel to 52 feet below MLLW at existing widths ranging from 250 to 400 feet from station 2+239 to station 84+200; and
- Maintain existing depths of 42 feet below MLLW and width of 325 feet from station 84+200 to 86+000, and 36 feet below MLLW and width ranging from 325 to 1200 feet from station 86+000 through the end of the channel and turning basin at station 89+500.

New work material from channel deepening would be distributed among the existing New Work ODMDS and PAs (Table 2). Under the first construction contract, a hopper dredge would deepen the Entrance and Jetty channels. The total length of these channels (after extension of the Entrance Channel) would be 3.2 miles. Although the authorized depth of the offshore channels would be 54 feet below MLLW, the potential dredging depth of the Entrance and Jetty channels could actually be 58 feet below MLLW, after accounting for removal of 2 feet of advance maintenance and 2 feet of allowable overdepth. One hopper dredge would operate continuously for seven months to remove approximately 2,066,000 cubic yards (CY) of new work material. All material would be placed at the existing New Work ODMDS (EPA, 1991) located approximately 4.4 miles from shore in 60 to 67 feet of water. The 350-acre New Work ODMDS could contain all new work material placed there during construction.

An estimated six subsequent contracts would be awarded for cutterhead suction dredging of the Brownsville Main Channel through station 84+200 for a total length of 15.9 miles. The remainder of the channel (the Turning Basin Extension and Turning Basin) would remain at existing depths. Although the authorized depth for the inland Main Channel would be 52 feet below MLLW, it could be deepened to 55 feet below MLLW, after removing 2 feet of advance maintenance and 1 foot of allowable overdepth. New work material from the Brownsville Main Channel (stations 0+000 through 84+200) would be pumped from the dredges into existing PAs managed by BND. In addition, new work material may be placed in PA 3, a PA managed by the San Benito Navigation District and generally used for Port Isabel Channel material. None of the existing PAs would need to be expanded and no new PAs would be needed.

Table 2: BIH Proposed Project - New Work Quantities

Channel Stations		Placement Area (PA)	Current PA Acreage	Deepening Dredged Material Quantity (CY)
-17+000	00+000	New Work ODMDS	350	2,066,000
00+000	07+000	2	71	937,000
07+000	25+000	4B	243	2,689,000
25+000	50+000	5A	704	3,612,000
50+000	70+000	5B	1020	2,599,000
70+000	82+000	7	257	1,804,000
82+000	89+500	8	288	386,000
			Total CY	14,093,000

Maintenance dredging would generally be conducted by hopper and cutterhead dredges, with material being distributed among the nearshore Feeder Berm or the existing Maintenance ODMDS, and PAs (Table 3). Dredging of the Entrance and Jetty channels and the first 11,000 feet of the Main Channel (+11+000 to -17+000) would generally be performed by a hopper dredge, and material would be placed in the nearshore Feeder Berm (Site 1A), located between 1.5 and 2.5 miles from the north jetty and from 0.4 to 0.9 mile from shore (USACE, 1988). Sediment removed by maintenance dredging would therefore be regularly placed back into the littoral system, available for cross-shore and longshore sediment transport to the beaches of South Padre Island. Monitoring of material placed at the Feeder Berm demonstrated it moves toward the beach and disperses with the major movement in the alongshore direction (Aidala et al., 1992). If the Feeder Berm cannot be used, maintenance material from the Entrance and Jetty channels (station -17+000 to 0+000) could be placed in the Maintenance ODMDS located approximately 1.9 statute miles from shore and just north of the navigation channel (USACE, 1975, 1999). The site analysis provided by this document evaluates the potential impacts of this use of the Maintenance ODMDS.

Maintenance material from the remainder of the Main Channel (stations 11+000 through 89+500) would be placed in existing PAs which are sized to accommodate total quantities over the 50-year period of analysis. Following completion of the proposed project, future maintenance of the Entrance Channel from -17.000 to +11.000 is expected to move 0.47 mcy of maintenance material every 1.5 years to the Feeder Berm, and an additional .16 mcy every 4.5 years. The existing Maintenance ODMDS designated by EPA for placement of maintenance material could continue to be used for placement of future maintenance dredged material from the Entrance Channels, only, provided EPA agrees the designation criteria are still being met. If the Maintenance ODMDS were to be used, material from the first 11,000 feet of the Main Channel would need to be placed in the Feeder Berm, as the site designation for the Maintenance ODMDS restricts its use to material from the Entrance Channel only. Table 3 illustrates the quantities that would be placed in the each of these sites should both be used, and assumes that 2.35 mcy would be placed every 5 years into the maintenance ODMDS. Subsequent to the modeling reported here, dredging cycles for the Entrance Channel were revised to 0.7 mcy every 1.5 years, with the 50 year total quantity remaining nearly the same. The revised placement cycle would place a much smaller amount of material into the Maintenance ODMDS at one time, and thus the modeled scenario represents a conservative analysis of the sizing analysis.

Table 3: BIH Proposed Project – O&M Quantities for ODMDSs

Stations		Shoaling Rate in Cubic Yards/ Year (CY/YR)	Placement Area	Dredge Cycle (years)	Number of Cycles in 50 years	Quantity per Cycle (CY/Cycle)	Total O&M Quantity in 50 Years (CY)
-17+000	0+00	470,630	Maintenance ODMDS	5	10	2,353,150	23,531,500
0+00	11+000	161,595	Nearshore Feeder Berm Site 1A	3	16	484,785	7,756,600

1.2.1 Project Purpose and Need

The Port of Brownsville has experienced strong growth from the mid-1990s to present. Total tonnage on BIH has more than doubled from 1,829,000 short tons in 1992 to 4,617,000 short tons in 2010. Foreign imports, including petroleum products, iron, and steel products, have been the primary area of growth. In addition to traditional vessel traffic, increased channel dimensions are needed to serve offshore rigs operating along the U.S. Gulf Coast. Keppel-AmFELS is an example of one company fabricating, maintaining, and repairing rigs on the BIH. Several oil companies have leased Outer Continental Shelf (OCS) blocks in part because of their proximity to services available from the BIH. The operational draft of the newer rigs ranges from 45 to 63 feet.

Current dimensions of BIH limit the ability of shipyard repair operations to bring in these newer, larger oil rigs. Based on recent economic evaluations, up to 5,000 jobs are attributed to these operations. Without channel improvements, oil rig repair operations and jobs would likely be relocated to Mexico. Lack of channel modifications to the BIH would discourage long-range industrial growth and eventually reduce the volume of imports and exports at the Port of Brownsville. A gradual loss of economic operating efficiency of the port would impact the economy in South Texas and the nation.

Dredged maintenance material can be beneficially used to decrease shoreline erosion and nourish beaches. Maintenance material from certain reaches of the channel is appropriate for placement in an existing underwater Feeder Berm located offshore of South Padre Island. Sandy material deposited in this nearshore berm is transported by cross-shore currents to the shoreline of South Padre Island and along the beaches fronting the City of South Padre Island. These beaches provide nesting habitat for sea turtles and are important economic and recreational resources for the City of South Padre Island and Cameron County. No opportunities to beneficially utilize new work material have been identified in the study area.

1.2.2 Project Alternatives

The final array of alternatives consisted of a no action alternative, and three action alternatives: no widening; 50-foot widening; and 100-foot widening. Four depth scales were also evaluated for each action alternative - 45, 48, 50, and 52 feet MLLW. USACE must consider the "No Action" alternative as one option in order to comply with ER 1105-2-100 and National Environmental Policy Act (NEPA) requirements. The "No Action" or Future Without Project (FWOP) alternative would retain the existing 42-foot deep by mostly 250-foot wide BIH along the waterway and continue one-way traffic operations. It assumes no project would be implemented to achieve planning objectives. The FWOP alternative is a baseline against which benefits and impacts of action alternatives may be measured and is required by NEPA to be included among the alternative plans in the final array of alternatives.

For the final array of alternatives, three width alternatives, including no widening, widening by 50 feet, and widening by 100 feet, were screened with a variety of depth options. Alternatives included:

- F-1a Deepen (only) entire existing channel to 45 feet;
- F-1b Deepen (only) entire existing channel to 48 feet;
- F-1c Deepen (only) entire existing channel to 50 feet;
- F-1d Deepen (only) entire existing channel 52 feet;
- F-2a Deepen existing channel to 45-foot and widen channel by 50 feet;
- F-2b Deepen existing channel to 48-foot and widen channel by 50 feet;
- F-2c Deepen existing channel to 50-foot and widen channel by 50 feet;
- F-2d Deepen existing channel to 52-foot and widen channel by 50 feet;
- F-3a Deepen existing channel to 45-foot and widen channel by 100 feet;
- F-3b Deepen existing channel to 48-foot and widen channel by 100 feet;
- F-3c Deepen existing channel to 50-foot and widen channel by 100 feet;
- F-3 Deepen existing channel to 52-foot and widen channel by 100 feet; and
- F-4 No Action alternative.

For the final array of alternatives, all channel depth alternatives are economically justified at either the current 250-foot or the 300-foot width alternative, but not at the 350-foot width alternative. Oil rigs contribute most to economic benefits because they are the largest vessels that would use the channel. Deepening alternatives with no widening have the greatest benefit-to-cost ratios and net excess benefits compare to those with any widening. In comparing the deepening-only alternatives, net excess benefits increase as channel depths increase.

1.3 ODMDS AUTHORIZATION

MPRSA and the Federal Water Pollution Control Act (FWPCA), later amended by the Clean Water Act of 1977, both passed in 1972 and specifically addressed waste disposal in the aquatic and the marine environment. The FWPCA and the Water Quality Improvement Act of 1970 set up specific water-quality criteria as guidelines for controlling discharges into marine and aquatic environments. These water-quality criteria applied to placement of dredged material only in cases where fixed pipelines were used to transport and discharge dredged material into the environment at discrete points. The MPRSA, however, specifically regulates the transport and ultimate disposal of waste materials in the ocean. Under Title I of the MPRSA, the primary regulatory vehicle of the Act, a permit program for the disposal of dredged and nondredged materials, required determination of impacts and provided for enforcement of permit conditions.

The August 1975 London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter is the principal international agreement governing ocean dumping. The Convention requires contracting nations to regulate disposal in the marine environment within their jurisdiction and disallows all disposal without permits. It also requires the nature and quantities of all waste material and circumstances of disposal to be periodically reported to the International Maritime Organization which administers the Convention.

In October 1973, EPA issued the final Ocean Dumping Regulations and Criteria (the Regulations or Ocean Dumping Regulations) revised in January 1977 (40 CFR Parts 220 to 229). These regulations established procedures and criteria for review of ocean disposal permit applications (Part 227); assessment of impacts of ocean disposal and alternative disposal methods; enforcement of permits; and designation and management of ocean disposal sites (Part 228). They also established procedures EPA uses to designate ODMDSs, set times for ocean disposal of acceptable materials under Section 102(c) of the MPRSA, and identify criteria for site designation, including general and specific criteria for site selection.

EPA is authorized by Congress as stated specifically in 40 CFR 228.4(e)(1) to regulate ocean dumping through site designation, monitoring, and management. Site designation by EPA does not authorize any dredging project nor does it permit disposal of any dredged material. Sites are designated where ocean disposal is needed based on past dredging demands and projected demands associated with new or expanded projects. However, site designation does not preclude consideration of other placement options, including beneficial use options or the “No Action” alternative. Once an approved ocean disposal site is designated, appropriateness of ocean disposal at the site is determined on a case-by-case basis in accordance with ocean dumping criteria.

Although EPA designates ocean dumping sites necessary for construction and maintenance of a proposed improvement project according to Section 102 of the MPRSA, the USACE may, with concurrence of EPA, authorize a site in accordance with MPRSA 103(b).

For the purpose of the proposed BIH project, the USACE seeks concurrence from EPA to place the new work material dredged from the Entrance Channel within the existing New Work ODMDS and to continue to place future maintenance dredged material in the beneficial use feeder berm and the existing Maintenance ODMDS. Dredged material placement would be implemented by the USACE under authority of MPRSA Section 103, provided EPA concurs that Section 102 (MPRSA) requirements to evaluate criteria and the site continue to be met.

The existing designated Maintenance ODMDS is bounded by:

26° 04′ 32″ N, 97° 07′ 26″ W (northwest corner);
26° 04′ 32″ N, 97° 06′ 30″ W (northeast corner);
26° 04′ 02″ N, 97° 06′ 30″ W (southeast corner); and
26° 04′ 02″ N, 97° 07′ 26″ W (southwest corner).

Water depth is about 44 feet and the site is 1.9 miles from shore at its closest point (Figure 2). The site covers 0.56 square statute mile. Depths may exceed 44 feet in this area, however, the conservative shallower depth of 44 feet was used for this analysis and modeling purposes.

The existing designated New Work ODMDS, designated for the construction material from the 42-foot Project in 1991, is bounded by:

26° 05′ 16″ N, 97° 05′ 04″ W (northwest corner);
26° 05′ 10″ N, 97° 04′ 06″ W (northeast corner);
26° 04′ 42″ N, 97° 04′ 09″ W (southeast corner): and
26° 04′ 47″ N, 97° 05′ 07″ W (southwest corner).

Water depth ranges from 60 to 67 feet, and the site is 4.4 miles from shore at its closest point (Figure 2). The area of the site is 0.56 square statute mile. Depths may exceed 67 feet in this area but, for the reasons noted above, the shallower depths of 60–67 feet were used for this analysis.

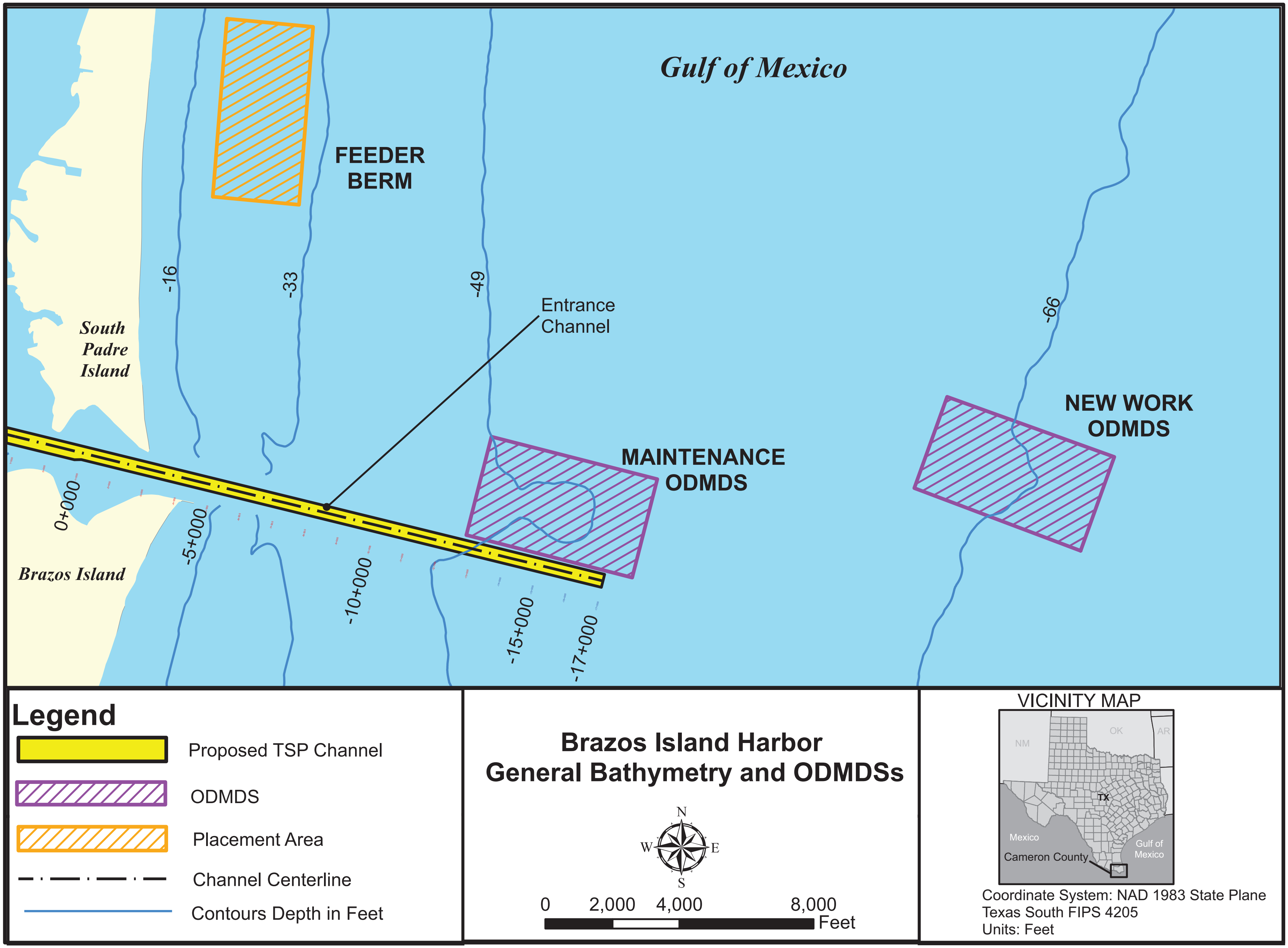

Figure 2. General Bathymetry and ODMDSs

1.3.1 ODMDS Authorization Purpose and Need

Predominantly northward, longshore transport causes shoaling of the existing Jetty and Entrance channel. Periodic removal of the sediment, primarily sand, which enters the existing channel, is required for continued navigation along the channel. Placing dredged material offshore under the authority of MPRSA Section 103(b) is environmentally acceptable and economically and physically feasible for disposal of new construction dredged material generated from deepening the BIH Jetty and Entrance channels. It is also appropriate for placement of future maintenance material from those channels.

A Maintenance ODMDS was used prior to 1964; however, records are not available indicating use of the site prior to that year. Proposed use of the site in accordance with the MPRSA of 1972 was approved by EPA in 1975 with additional conditions intended to protect water quality during dredging and disposal (USACE, 1975). EPA's Ocean Dumping Regulations revised in January 1977 authorized EPA to designate all existing ODMDSs as interim sites. The BIH Maintenance ODMDS was designated as an interim site at that time (EPA, 1990). The Maintenance ODMDS was designated by EPA in 1990 for the continued placement of dredged maintenance material removed from the BIH Jetty and Entrance channels (EPA, 1990). Based on information provided by the USACE, Table 4 provides dredging dates and volumes dredged from the BIH Jetty and Entrance channels from 1958 through 2012. For that period, the average time between the beginning of each dredging operation was approximately 17 months, and the average amount of maintenance material dredged was approximately 0.37 mcy or 0.25 mcy per year. This did not mean the entire Entrance and Jetty channels were dredged every 17 months but it indicates the average frequency of maintenance dredging.

Table 4: Maintenance Dredging History for Entrance and Jetty Channels

Start	Completed	Quantity Dredged (CY)
26-May-58	30-Jun-58	355,901
14-Jun-59	12-Jul-59	344,300
5-Jun-60	25-Jun-60	253,000
29-May-61	19-Jun-61	244,073
28-May-62	18-Jun-62	208,428
16-Apr-63	28-Apr-63	175,528
10-Feb-65	28-Feb-65	112,089
3-Oct-65	24-Nov-67	337,870
18-Apr-66	8-May-66	247,903
14-Jun-68	30-Jun-68	228,103
6-Aug-68	17-Aug-68	167,520
4-Jul-69	31-Jul-69	217,940
27-Jul-70	30-Aug-70	341,593
9-Aug-71	19-Sep-71	394,387

Start	Completed	Quantity Dredged (CY)
5-Jun-72	17-Jul-72	616,500
14-Jun-73	16-Jul-73	502,451
1-Jul-74	31-Aug-74	160,361
26-Mar-75	9-Apr-75	303,438
1-Jun-76	30-Jun-76	156,366
26-Mar-77	19-Apr-77	360,061
22-Nov-77	13-Mar-78	761,523
25-Oct-81	16-Feb-82	1,016,000
2-Aug-83	8-Sep-83	886,343
4-Apr-86	14-May-86	333,692
30-Nov-88	16-Jan-89	731,545
21-Mar-91	21-Apr-91	576,931
24-Jan-95	26-Feb-95	755,307
30-Mar-97	14-Jun-97	350,907
31-Jan-99	3-Mar-99	186,571
10-Mar-02	20-Mar-02	207,338
13-Dec-02	19-Dec-02	121,549
1-Dec-03	18-Dec-03	355,957
23-Feb-06	11-Mar-06	332,721
20-Feb-07	15-Mar-07	443,000
*	10-Mar-10	237,000
4-Feb-11	17-Mar-11	200,000
*	9-Dec-12	347,000
Total		13,571,196
Average		366,789

* Start date not available

In order to meet future navigational requirements of the BIH, it has been determined the BIH should be deepened. Deepening the channel would require dredging virgin sediment underlying the layer of sand on the ocean bottom. This virgin sediment is predominantly clay.

During consideration of the project, which deepened the Entrance and Jetty channels to 44 feet, EPA decided disposal of virgin material at the Maintenance ODMDS was not appropriate because the virgin material is more than 80 percent clay and silt while sediment at the Maintenance ODMDS is over 60 percent sand. A Final Environmental Impact Statement (FEIS) for use of the 42-foot project New Work ODMDS for 1.33 mcy of new construction material dredged from the BIH was prepared by EPA

(1991) under the authority of MPRSA Section 103(b). This authorization was for a one-time disposal of virgin material.

1.3.2 ODMDS Authorization Alternatives

EPA (1991) examined a suite of alternatives for the location of the New Work ODMDS and the Maintenance ODMDS (EPA, 1990, 1991). These included the "No Action" Alternative, upland placement, beneficial use, and offshore disposal. The offshore alternatives included disposal at mid-continental shelf, continental slope, and nearshore sites, including at the interim-designated, historically used ODMDS. The alternative analysis concluded the only feasible alternatives were nearshore disposal, and the most appropriate sites were selected by eliminating locations near beaches and recreational areas, cultural and historical areas, and living and nonliving resources, including sensitive biota. The BIH New Work and Maintenance ODMDSs were determined appropriate for virgin dredged material and maintenance material, respectively, from the BIH Entrance and Jetty channels.

2.0 PROPOSED USE OF THE ODMDSs

The New Work ODMDS can accommodate a one-time disposal of 2.066 mcy of virgin material that would be dredged from the Jetty and Entrance channels for the preferred deepening alternative. The proposed use of the existing Maintenance ODMDS is for future maintenance material. Maintenance material would be placed in the Feeder Berm off the South Padre Island beach whenever possible and appropriate. If maintenance material could not be placed in the Feeder Berm, all maintenance material from the Entrance and Jetty channels would be placed in the Maintenance ODMDS.

3.0 CHARACTERIZATION OF THE ODMDSs

Sediment, water, and biota were sampled in 1980 in the Entrance Channel and the proposed ODMDS (Espey, Huston & Associates, Inc., 1981). Analyses for 11 organic pesticides and total PCBs were conducted in water and sediment, but none were present at detectable concentrations. Water and sediment were also tested for arsenic, cadmium, total chromium, copper, lead, mercury, nickel, and zinc. Mercury was not detected in water samples. Sediments were 66 to 74 percent fine sand.

TerEco (1980) sampled water and sediment for selected metals, pesticides, and PCBs at three sites in the Entrance and Jetty channel and at a proposed ODMDS and concluded there were no apparent water quality problems. Toxicity of the suspended particulate phase (SPP) was tested with *Acartia tonsa* (copepod), *Palaemonetes pugio* (grass shrimp), and *Cyprinodon variegatus* (sheepshead minnow). The SPP is sometimes referred to as "elutriate" and SPP analysis identifies substances which might move into the water column during dredging and open-water placement. Sediment toxicity was tested with *Mercenaria mercenaria* (quahog clam), *Nereis succinea* (polychaete), and *P. pugio*. TerEco (1980) found no difference in survival between test sediments and SPP and those from a reference location.

A similar study was conducted in 1985 (Espey, Huston & Associates, Inc., 1985). Three Entrance Channel locations were sampled and the same organisms were used for toxicity bioassays with the exception that the mysid shrimp, *Americamysis bahia*, was tested in the SPP instead of *A. tonsa*, and the polychaete, *Nereis virens*, was tested in the sediment instead of *N. succinea*. Most metals for which analyses were conducted in water were below detectable levels. Arsenic and copper were above detectable levels. Arsenic, chromium, copper, lead, nickel, and zinc were detected in sediment samples. All seven synthetic organic pesticides and total PCBs for which testing was conducted were below detectable levels in water and sediment. Sand dominated grain size analysis.

In December 1990, 1994, and 2000, sites in the Entrance and Jetty Channel were sampled for metals and organic compounds in water, SPP, and sediments. None of the analytes were found in 1990 water or SPP samples. Chromium and zinc were detected in sediment samples. Three sites in the Entrance and Jetty Channel and in Feeder Berm (PA 1A) were sampled in 1994. The only metals detected in water and SPP samples were barium and chromium. Barium, chromium, copper, lead, nickel, and zinc were found in sediments. Arsenic, barium, chromium, copper, and zinc were detected in year 2000 water and SPP samples. These metals and cadmium, lead, and selenium were detected in sediments in 2000. None of the organic compounds were found in water, sediment, or SPP samples in the three studies. Sediment grain size analysis showed sand made up from 41 to 97 percent of the sediments in the Feeder Berm. These data were provided by the USACE as raw data to Atkins in 2011.

In February 1998, 10 locations in the Main Channel were sampled for water, SPP, and sediment. Arsenic, barium, chromium, and zinc were the only metals detected in water and SPP samples. In addition to those metals, cadmium, copper, lead, and nickel were also found in sediment samples. None of the organic compounds were detected in water, SPP, or sediment. In 1998, no substances were found at concentrations above EPA acute marine Water Quality Criteria (WQC). Fifty-six to 86 percent of the sediment was sand. These data were provided by the USACE as raw data to Atkins in 2011.

In 1998 (Espey, Huston & Associates, Inc., 1998), water, SPP, and sediment samples were tested along with sediment toxicity at three Entrance Channel locations. Sediment toxicity was tested on the amphipod, *Ampelisca abdita*, and the grass shrimp, *P. pugio* but SPP toxicity was not tested. Toxicity bioassays results indicated no significant toxic effect from sediments or the SPP.

Water and sediment samples were collected in some years between 2002 and 2011 from the Entrance and Jetty channels and the Maintenance ODMDS. Sample data were compared to (1) effects range low (ERLs), obtained from NOAA (Buchman, 2008) for sediment, (2) EPA acute WQC for the protection of aquatic life (EPA, 2011), and (3) Texas acute surface water quality standards (WQS) (Texas Commission on Environmental Quality [TCEQ], 2011) and screening values for sediment (TCEQ, 2010). Thirteen different metals were detected in water samples however none exceeded WQC or screening values.

The only pesticides detected were endrin aldehyde, endrin ketone, and heptachlor epoxide and none of these compounds were detected in samples after 2002. WQC and WQS have not been established for endrin aldehyde (found in all SPP samples and a water sample in 2002) or endrin ketone (found in three water samples and one SPP sample in 2002). Heptachlor epoxide was found in four water samples and two SPP samples in 2002, and all but one value were higher than the WQC for dissolved heptachlor epoxide of 0.053 µg/l. PCBs were not detected.

The only semivolatile organic compound detected in samples collected after 2002 was bis(2-ethylhexyl)phthalate, which was measured in one 2006 SPP sample. Six other semivolatile organic compounds were detected in 2002 samples including diethyl phthalate, di-n-butyl phthalate, phenol, butyl benzyl phthalate, dimethyl phthalate, and n-nitrosodimethylamine. Concentrations in SPP samples were generally higher than water sample concentrations collected at the same site. There are no WQC or WQS for these semivolatile organic compounds.

Ammonia was detected in all SPP samples and six water samples. Ammonia toxicity to aquatic life increases with increasing temperature and pH. Compared to the recommended chronic criteria for marine life (EPA, 1999), ammonia toxicity is not expected at the concentrations measured which are less than or equal to 2.8 milligrams per liter (mg/L). Cyanide was not detected in any water samples at or above 0.10 µg/l. The WQC for cyanide is 1 µg/l (as free cyanide) and therefore no samples contained cyanide at potentially toxic levels.

There are no sediment quality criteria with which to compare concentrations in sediments; however, several different guidelines are used to identify possible levels of concern. One of these guidelines is the effects range low (ERL), which has been used in the past to examine sediments destined for beneficial use or ocean disposal in the Gulf. ERLs were developed by assembling a large group of sediment data for which there was both sediment chemistry and toxicity data. For each chemical in the data set, concentrations were ranked in ascending order, and the ERL was calculated as the lower 10th percentile of the concentrations. However, this approach demonstrates no cause and effect from the chemicals in the data set since the fact that a chemical was detected does not demonstrate it was responsible for any of the toxicity exhibited by the sediment.

When ERLs derived from sets of data from different areas are compared, the results are inconsistent (USACE, 1998). For example, when the ERLs of a number of chemicals were compared using a northern California data set versus a southern California data set, the ERLs differed by a factor of three for total polychlorinated biphenyls (PCBs) to a factor of 2,689 for p,p'dichlorodiphenyldichloroethylene, a breakdown product of the pesticide DDT (DDE). Since the ERLs are not based on cause and effect data, they exhibit low predictive ability and give a high number of false positives (USACE, 1998). Also used, on occasion, is the Effects Range Medium (ERM), similar to the ERLs but representing the median range of concentrations, and thus, higher concentrations. The NOAA screening criteria used here represent ERL values (Buchman, 2008) while the TCEQ sediment screening levels use primarily ERMs (TCEQ, 2010).

Pesticides and PCBs were not detected in any of the sediment samples. The only semivolatile organic compound detected in sediments was di-n-butylphthalate found in a 2002 sediment sample. There are no screening criteria for this compound in marine sediments. All metals were detected in at least one or more sediment samples; however, no values exceeded their respective ERLs. Arsenic, beryllium, chromium, copper, lead, nickel, and zinc were detected in all samples while mercury was only detected in one sample. Sediments in the Entrance Channel are dominated by sand which is two-thirds of the sediment followed by silt, averaging slightly less than 20 percent of the sediment.

4.0 CHARACTERIZATION OF THE MATERIAL EXPECTED TO BE DREDGED

In June 2012, the USACE's Galveston District awarded Task Order 0011 of Contract No. W912HY-11-D-0003. The Task Order required testing of maintenance material from the BIH Entrance Channel. The purpose was to determine potential environmental impact from the dredging and/or placement of material to be dredged from the Entrance Channel. Sediments characteristic of typical maintenance material that would be dredged, new work material, and sediments in the both ODMDSs were sampled. The results of this study (SOL and Atkins, 2013) are summarized here.

Values did not exceed any acute Texas Water Quality Standards (TWQS), EPA acute WQC, or Criteria Maximum Concentrations (CMC) for the channel stations, except for cyanide at all channel and PA stations. Based on the Regional Implementation Agreement (RIA), analyses were for total cyanide, while the CMC and TWQS are for free cyanide because only free cyanide is considered to be a biologically meaningful expression of cyanide toxicity (Eisler, 1991). The relationship between total cyanide and free cyanide in natural waters varies with water quality, types of cyanide compounds present, degree of exposure to daylight, and presence of other chemical compounds. Comparing total cyanide values to free cyanide benchmarks is a very conservative approach and even if all of the cyanide were present as free cyanide, the TWQS would not be exceeded. Given the low levels present, the oxygenated (dissolved oxygen above 5 mg/L) and high electrolyte marine environment, and lack of industrial sources, the detection of total cyanide is not considered significant (Cheryl Montgomery, personal communication, 2013).

SPP samples were prepared from test sediment and channel water for chemical analysis. There were no results exceeding acute TWQS or CMC for the channel stations, with the exception of total cyanide for the CMC at all channel and PA stations. Total cyanide concentrations in the SPP samples were equivalent to those is the water samples. As with the water analysis, detection of total cyanide in SPP samples is not considered a significant indication of risk from cyanide.

Concentrations of antimony, arsenic, nickel, selenium, and ammonia were higher in SPP samples than in ambient water. These increases are not considered significant from a risk perspective since none of the SPP concentrations exceeded acute TWQS or CMC.

ODMDS stations had high sand concentrations and relatively low metals concentrations. All organic compounds except total organic carbon (TOC) were below detection limits. No significant differences were noted between channel, ODMDS, and reference stations for ammonia, TOC, phthalates, or total solids.

Several tests were conducted to determine the possible toxicity and bioaccumulation potential of contaminants in water and sediment samples. The SPP survival bioassays indicated no toxicity to sensitive marine organisms is expected during dredging and/or placement. Survival data from the solid phase bioassay indicated no potential environmentally unacceptable toxic impacts to benthic organisms from the placement of sediments from the BIH Entrance and Jetty channels. In bioaccumulation tests, no organic chemicals were found above detection limits in test organisms, except for two phthalate esters and a few isolated instances of polyaromatic hydrocarbons (PAHs) and other organic compounds. Arsenic, total chromium, copper, lead, mercury, nickel, selenium, silver, and zinc were found in polychaete tissue samples above detection limits. Nickel and copper bioaccumulated in test organisms, however concentrations were not considered significant from an ecological or human health perspective.

4.1 PARTICLE SIZE OF MATERIAL

Maintenance material from the Entrance Channel is predominantly sand, averaging 62 percent sand for samples collected in 2012 (Table 5). New work material is expected to be dominated by clay, making up 84 percent of virgin material.

Table 5: Sediment Grain Size for Maintenance and New Work Material. Samples collected August 2012 (SOL and Atkins, 2013).

	Maintenance Material				New Work
Percent	Minimum	Maximum	Average	Sample Size	Material
Gravel	0	55.1	12.6	4	0
Sand	41.5	81.7	61.6	4	11.2
Silt	0.8	16.9	7.6	4	4.7
Clay	2.6	28.5	18.2	4	84.1
D50	0.111	5.752	1.258	4	<0.0011

5.0 MODELING OF DREDGED MATERIAL DISTRIBUTION

The placement of dredged material was simulated using an updated version (Multiple Dump Fate [MDFATE]; USACE/EPA, 1991) of a 1976 model, Dredged Material Fate (DMF), developed for the USACE through the Dredged Material Research Program by Tetra Tech., Inc. (Brandsma and Divoky, 1976). Modeling was done to determine whether the New Work ODMDS and the Maintenance ODMDS were large enough to contain the new work and future maintenance dredged material.

This program models the behavior of dredged material placed at the ODMDS through the doors of a hopper dredge. The MDFATE model assumes this procedure may be broken into three phases: (1) convective descent, during which the discharge of dredged material falls under the influence of gravity; (2) dynamic collapse, occurring when the descending dredged material impacts the bottom or arrives at a level of neutral buoyancy, at which point the descent is retarded and horizontal spreading dominates; and (3) long-term passive dispersion, beginning when material transport and spreading are determined more by ambient currents and turbulence than by dynamics of the disposal operation (Johnson and Holliday, 1978). The model also includes the settling of suspended solids.

The model was run for the size of hopper dredge expected to be used for this project, a 3,818-CY hopper dredge for New Work and 3,316-CY hopper dredge for maintenance work (28.0-foot loaded draft, 15.0-foot light draft, 1.9 knots during discharge, 2.58 minutes to empty hoppers). Model runs were made for both ODMDSs. A 0.059 knot to the north current was used.

5.1 NEW WORK MATERIAL

Based on recent sampling, the percentage of the various soil particle types used in the model for new work sediment to be dredged is to be 0.0 percent gravel, 15.8 percent sand, 9.9 percent silt, and 74.3 percent clay. Output from the MDFATE model simulates the results of randomly depositing the entire amount of dredged material on the ocean floor at predetermined grid points. For a dredged material volume of 2.066 mcy, MDFATE simulated the mound height at its highest peak within the New Work ODMDS as 14.3 feet. As can be seen in Attachment A, all new work material should remain within the boundaries of the New Work ODMDS boundaries and consequently there should not be adverse impacts to the benthic community outside of the ODMDS boundaries (EPA/USACE, 1996). Given the upslope ambient depth at the site is 60 feet, there should not be any interference to navigation associated with formation of the new work dredged material disposal mound. It has been safely assumed that the maximum disposal mound height within the New Work ODMDS will not exceed 14.3 feet, nor will the material build up more than 0.5 foot outside the boundaries of the ODMDS within the first month after placement of all material.

5.2 MAINTENANCE MATERIAL

The MDFATE model program was also run on the maintenance material using a 3,316-CY hopper dredge. The percentages of grain sizes expected in maintenance material to be dredged from the extended Entrance and Jetty channels and used in the MDFATE model are 68.3 percent sand, 21.3 percent silt, and 10.4 percent clay using analyses of maintenance material from the existing channel from USACE Galveston District Dredging Histories Data Base. The total volume of maintenance material modeled for placement was 2.353 mcy. As with the new work simulation, all maintenance material should remain within the boundaries of the maintenance ODMDS boundaries. Consequently adverse impacts to the benthic community outside of the ODMDS boundaries should not be experienced (EPA/USACE, 1996). Attachment A shows the simulated maximum mound height one month after completion of material placement within the boundaries of the Maintenance ODMDS is approximately 16.2 feet. Given the ambient water depths within the Maintenance ODMDS are about 44 feet or greater, there should be sufficient clearance with the disposal mound in place for the hopper dredge and larger supply boats (15-foot draft) that may cross the area.

6.0 ENVIRONMENTAL CONSEQUENCES

As required by the Ocean Dumping Regulations (40 CFR 220–229) promulgated to apply requirements of the MPRSA, the previously designated New Work ODMDS was examined relative to the 5 general criteria and the 11 specific evaluation factors (40 CFR 228.5 and 40 CFR 228.6(a), respectively). Since the maintenance material to be dredged from the TSP channel should be the same as existing maintenance material, except for volume, the existing Maintenance ODMDS has been examined to determine whether it is of sufficient size to receive the greater quantity of material. This information will be included in the examination relative to the 5 general criteria and the 11 specific factors where pertinent. In the following section, the criteria and factors are presented in italics, followed by the statement indicating compliance.

Other environmental regulations, which are pertinent to ODMDS designation, are addressed in the BIH Draft Integrated Feasibility Report (DIFR)environmental assessment for channel improvements of the BIH to which this ODMDS analysis is attached: Coastal Zone Management (Appendix H), Endangered Species Act (Appendix I), Section 404(b)(1) Water Quality Certification (Appendix G), Magnuson-Stevens Fishery Conservation and Management Act or Essential Fish Habitat (Section 7.4 of the DIFR) and cultural and historic resources (Section 7.9 of the DIFR).

6.1 REGULATORY CHARACTERIZATION

6.1.1 Five General Criteria

6.1.1.1 40 CFR 228.5(a)

The dumping of materials into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation.

The New Work and Maintenance ODMDSs avoid artificial reefs (Texas Parks and Wildlife Department, 2013), navigation channels, sensitive ecological features identified by the Texas General Land Office (GLO) Oil Spill Response program (GLO, 2013), and known shipwrecks. The New Work ODMDS is outside the navigation fairway while the Maintenance ODMDS is outside the navigation fairway except for its far east end. Both avoid known navigational obstructions.

6.1.1.2 40 CFR 228.5(b)

Locations and boundaries of disposal sites will be so chosen that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery.

The results of the analyses and studies discussed in this report indicate the New Work material and material to be dredged for Entrance and Jetty channel maintenance are acceptable for ocean disposal under 40 CFR 227. Over 60 percent of the maintenance material is sand and should fall to the bottom with relatively minor perturbations of water quality during initial mixing. Concentrations of oxygen-demanding materials and potentially toxic materials are below levels expected to cause toxicity to marine organisms. Consequently there should be little impact on water quality beyond the boundary of the Maintenance ODMDS, which is 1.9 miles east of the nearest beach. Additionally maintenance material is usually placed at the Feeder Berm which is closer to the City of South Padre Island and where the material beneficially builds the beach. The repeated beneficial use of maintenance material discharged within a mile from the beach without known water quality or sediment impacts further suggests placement of maintenance material at the Maintenance ODMDS should not significantly impact nearby important ecological, cultural, navigational, or commercial features.

New work material is predominantly clay and silt, which settles relatively slowly compared to sand. A substantial portion of the new material will be dredged and placed as relatively firm, large pieces of clay, which should settle in the New Work ODMDS without contributing significantly to increased turbidity. However turbidity might be higher when dredged material is disposed of at the New Work ODMDS than at the Maintenance ODMDS because of the slower rate at which clay settles than the settling rate for sand. As with the maintenance material, concentrations of oxygen-demanding and potentially toxic materials in new work sediments are below levels expected to cause toxicity to marine organisms. Consequently there should be little impact on water quality beyond the boundary of the New Work ODMDS, which is 4.4 miles to the east of the nearest beach.

Both ODMDSs are over 1.9 miles east of the nearest shore and prevailing currents are to the north. Therefore turbidity plumes and contaminants will usually be transported to the north parallel to the shore, further diminishing the possibility placement will affect significant features. Modeling indicates no impact inside the ODMDS beyond 4 hours after placement and at no time outside the ODMDS.

Recent modeling with MDFATE indicates movement of sediments out of the ODMDSs will be minimal over the short-term. Both locations are considered dispersive and sediments would be expected to generally disperse to the north along the bottom without impacting significant features.

6.1.1.3 40 CFR 228.5(c)

If at any time during or after disposal site evaluation studies, it is determined that existing disposal sites presently approved on an interim basis for ocean dumping do not meet the criteria for site selection set forth in 228.5–228.6, the use of such sites will be terminated as soon as suitable alternative disposal sites can be designated.

The Maintenance ODMDS was designated in 1990 and the New Work ODMDS was designated in 1991. The process of designating both sites considered criteria for site selection set forth in 40 CFR 228.5-

228.6. Neither site is therefore approved on an interim basis, and this criterion is not applicable to the ODMDSs.

6.1.1.4 40 CFR 228.5(d)

The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and to permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation study.

The size of the New Work ODMDS, 0.56 square statute miles (0.42 square nautical mile), was as small as possible to reasonably meet the criteria stated at 40 CFR 228.5 and 228.6(a) for the 42-foot Project. The designated Maintenance ODMDS is also 0.56 square statute miles (0.42 square nautical mile) in area. Both ODMDSs are rectangular in size with a length to width ratio less than 1.9 and are within 4.4 miles of Brazos Santiago Pass. Both ODMDSs are in water less than 70 feet deep. Proximity of the ODMDSs to boat ramps, their depths, and dimensions facilitate sampling them to monitor possible impacts on water or sediment quality, benthos, or other marine organisms.

6.1.1.5 40 CFR 228.5(e)

EPA will, wherever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used.

EPA (1991) decided cost, safety, and time factors, plus difficulties with monitoring and surveillance, indicated the distance to the edge of the continental shelf (over 50 statute miles) near the BIH precluded the use of any ODMDS off the continental shelf. Additionally, lack of resilience of the deep-ocean benthic community and the grain-size disparity between the material to be discharged and the deep-ocean sediments off Brownsville indicated an off-shelf disposal site may cause severe impacts to the off-shelf benthic community. No advantage to an off-shelf site was noted.

6.1.2 Eleven Specific Factors

40 CFR 228.6(a) requires the factors included below as sections 6.1.2.1 through 6.1.2.11 will be considered in the selection process for site designation.

6.1.2.1 40 CFR 228.6(a)(1)

Geographical position, depth of water, bottom topography, and distance from coast.

The preferred site for construction (new work) material disposal, as proposed in EPA (1991), is bounded by the following coordinates (see Figure 2):

26° 04′ 47″ N, 97° 05′ 07″ W;

26° 05′ 16″ N, 97° 05′ 04″ W;

26° 05′ 10″ N, 97° 04′ 06″ W; and

26° 04′ 42″ N, 97° 04′ 09″ W.

The water depth at the preferred site ranges from 60 to 67 feet (see Figure 2), the bottom topography is relatively flat, and the New Work ODMDS is 4.4 statute miles from the coast at its closest point.

The existing Maintenance ODMDS, as determined in EPA (1990), is bounded by the following coordinates (see Figure 2):

26° 04′ 32″ N, 97° 07′ 26″ W;

26° 04′ 32″ N, 97° 06′ 30″ W;

26° 04′ 02″ N, 97° 06′ 30″ W; and

26° 04′ 02″ N, 97° 07′ 26″ W.

The water depth at the maintenance ODMDS is about 44 feet, and the site is 1.9 miles from shore at its closest point (see Figure 2).

6.1.2.2 40 CFR 228.6 (a)(2)

Location in relation to breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases.

Brown, and white shrimp and blue crabs spawn in the Gulf of Mexico in the vicinity of the ODMDSs (Berger/EA, 2008). Fishes and invertebrates characteristic of the northwestern Gulf of Mexico use this portion of the Gulf for breeding, spawning, feeding, and passage. Sea turtles also use this area for passage and nest on South Padre Island beaches. Habitat in the ODMDSs is not unique in this portion of the Gulf and not critical to the survival of any species of fish, invertebrates, or sea turtles.

Limited interference with nearshore fisheries may occur during dredging and placement of maintenance and new work material. Active dredging and placement may impede movement/migration of some marine organisms. These impacts on the movement/migration of marine organism populations affected would be relatively small and probably undetectable. The stress and possible mortality of individual organisms encountering adverse conditions during dredging and placement operations in the ODMDSs would be negligible compared to the passage of the far greater majority of individuals crossing into or out of the Laguna Madre and at other locations.

Placement of material at the proposed ODMDSs would have negligible effects on endangered and threatened species. Occurrences of whales in the area are rare because they generally inhabit waters far deeper than those in the proposed ODMDS. Dredging operations might affect sea turtles through incidental take. Hopper dredging has been identified as a source of mortality to sea turtles in inshore waters (Dickerson et al., 2004); however, placement operations are not known to cause sea turtle mortality. Hopper dredging of maintenance material would be conducted in accordance with all reasonable and prudent measures and terms and conditions required by the National Marine Fisheries Service (NMFS) in its 2007 Biological Opinion (NMFS, 2007). Hopper dredging of new work material would be conducted in accordance with reasonable and prudent measures of a Biological Opinion for the 52 by 250-foot project (TSP) currently under preparation by NMFS.

6.1.2.3 40 CFR 228.6(a)(3)

Location in relation to beaches or other amenity areas.

The New Work ODMDS and the Maintenance ODMDS are roughly 4.4 and 2 miles, respectively, from beaches and other amenity areas. Maintenance material from the Entrance and Jetty channels is however used in a Feeder Berm less than a statute mile from the beach and from which it nourishes beaches along South Padre Island and in the City of South Padre Island. Maintenance material is considered beneficial to area beaches. New Work clay will be placed at least 4.4 miles from the recreational beach, and transport of clays is expected to be to the north parallel to the beach.

6.1.2.4 40 CFR 228.6(a)(4)

Types and quantities of wastes proposed to be disposed of and proposed methods of release, including methods of packaging the waste, if any.

New work material (2.066 mcy) which is predominantly clay and silt from the Entrance and Jetty channels will be discharged into the New Work ODMDS. Material will be discharged from the hopper dredge over the New Work ODMDS. The new work material is considered virgin material and sediment sampling indicates nontoxic concentrations of any possible contaminants. Dredging will occur over a period of 7 months and the site is projected to be used only once. There will not be any waste contained or disposed of with new work material.

Maintenance dredging will occur at a rate of about 0.47 mcy per year and will be conducted with a hopper dredge. Most maintenance material will be discharged at the beneficial use feeder berm and the remainder will be discharged into the Maintenance ODMDS. There will not be any waste contained or disposed of with maintenance material.

6.1.2.5 40 CFR 228.6(a)(5)

Feasibility of surveillance and monitoring.

Both the New Work ODMDS and Maintenance ODMDS are amenable to surveillance and monitoring, as is evidenced by sampling described in SOL and Atkins (2013) and by their relative proximity to boat ramps.

6.1.2.6 40 CFR 228.6(a)(6)

Dispersal, horizontal transport, and vertical mixing characteristics of the area, including prevailing current velocity, if any.

Predominant longshore currents, and thus predominant longshore transport, are to the north. Steady longshore transport and occasional storms, including hurricanes, should move the placed material from the site. The size of the ODMDSs was evaluated using MDFATE, which includes vertical mixing, to ensure they were large enough to prevent significant mounding (Section 5.0).

6.1.2.7 40 CFR 228.6(a)(7)

Existence and effects of current and previous discharges and dumping in the area (including cumulative effects).

There is no indication benthic or nekton communities have substantially changed as a result of maintenance or new work material disposal in the area. Information from SOL and Atkins (2013) plus chemical analyses of water from the area indicate there has not been water or sediment quality contamination resulting from maintenance material disposal in the Maintenance ODMDS. There has not been any disposal of maintenance material at the New Work ODMDS.

6.1.2.8 40 CFR 228.6(a)(8)

Interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance, and other legitimate uses of the ocean.

The locations of the ODMDSs were selected so their use would not interfere with other legitimate uses of the ocean (EPA, 1990, 1991). Placement of maintenance or new work material in the past has not been known to interfere with other uses.

6.1.2.9 40 CFR 228.6(a)(9)

Existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys.

Water and sediment chemistry data collected in 2012 indicate there is not degraded water or sediment quality in the ODMDSs. Water and sediment chemistry sampling since 1980 showed there were not significant water quality issues and no significant trends in water quality resulting from dredged material placement. There is not recent sampling of benthic macroinvertebrates in the ODMDSs and there is very little sampling of nekton in the area. Biological data are not specific to the ODMDSs and not frequent enough to elucidate trends in ecological health in the vicinity of the ODMDSs. There is not indirect evidence of degraded water quality or ecological health in the vicinity of the ODMDSs. Indirect evidence if present might have consisted of complaints about water quality, major fish kills or die-offs of benthos.

Some benthic macroinvertebrates colonizing sediments in the ODMDSs may be killed by disposal of new work or maintenance dredged material. Recovery should be relatively rapid after disposal of dredged material ceases and chemical testing (SOL and Atkins, 2013) indicated no impacts to organisms outside the ODMDS can be expected from chemical contaminants. Although there may be some ecological impacts from dredged material placement these impacts are expected to be limited to the immediate area of the ODMDSs and to be temporary in nature. Sampling of coastal fish communities where dredging and dredged material placement was occurring indicated some fish and benthic communities demonstrated no effects while some fish and benthos exhibited temporary avoidance of these areas (ECORP, 2009).

6.1.2.10 40 CFR 228.6(a)(10)

Potential for the development or recruitment of nuisance species in the disposal site.

With a disturbance to any benthic community, initial colonization after disturbance will be by opportunistic species. However, these species are not nuisance species in the sense that they would interfere with other legitimate uses of the ocean or that they are human pathogens. There is no evidence of nuisance species being recruited to disturbed bottoms in this part of the Gulf of Mexico. The time when dredging and dredged material placement will occur will be relatively short, perhaps up to 7 months, and is not expected to support colonization of open waters by nuisance species.

6.1.2.11 40 CFR 228.6(a)(11)

Existence of or in close proximity to the site of significant natural or cultural features of historical importance.

The nearest natural feature of historical importance is the Laguna Madre which is one of the few large hypersaline lagoons in the world. The Laguna Madre is known for its transparency and the extensive seagrass beds associated with its relatively shallow, transparent waters. The Maintenance ODMDS is over 2 miles and the New Work ODMDS is more than 4.4 miles from the Laguna Madre. Both sites are north of the Brazos-Santiago Pass where currents exchange water between the Gulf and the Laguna Madre. Since the primary currents are along shore towards the north, sediments and turbidity from disposal of dredged material at the ODMDSs are not likely transported into the Laguna Madre. Additionally, dredging and dredged material disposal are expected to be temporary and less likely to result in sediment transport into the Laguna than if dredging and dredged material were ongoing.

There are no significant cultural resources known from the Gulf of Mexico in the vicinity of the ODMDSs. A number of ship wrecks may be present near Brazos Santiago Pass; however, since the proposed project will not involve widening the channel, no cultural features should be disturbed by either dredging or dredged material disposal.

7.0 SITE MONITORING AND MANAGEMENT PLAN

One of the ODMDS management responsibilities cited in 40 CFR 228.3 is “developing and maintaining effective ambient monitoring programs,” although this is tempered somewhat by 40 CFR 228.9(a), which states, “The monitoring program, if deemed necessary by the Regional Administrator or the District Engineer, as appropriate, may include baseline or trend assessment surveys. . . .” Since 40 CFR 229(c) states that “EPA will require the full participation of permittees . . . in the development and implementation of disposal monitoring programs,” a monitoring program and draft Site Monitoring and Management Plan (SMMP) are under development. There are two approaches that may be applied to determining unfavorable trends. One is to conduct monitoring surveys on the ecosystem at and near the ODMDSs at regular intervals. The other approach is to determine the quality of the material to be discharged at the site, from a chemical and biological perspective, and thereby determine expected impacts. The testing requirements specified in 40 CFR 227.13, as applied by the USACE, Galveston District, satisfy parts of both of the above-mentioned approaches.

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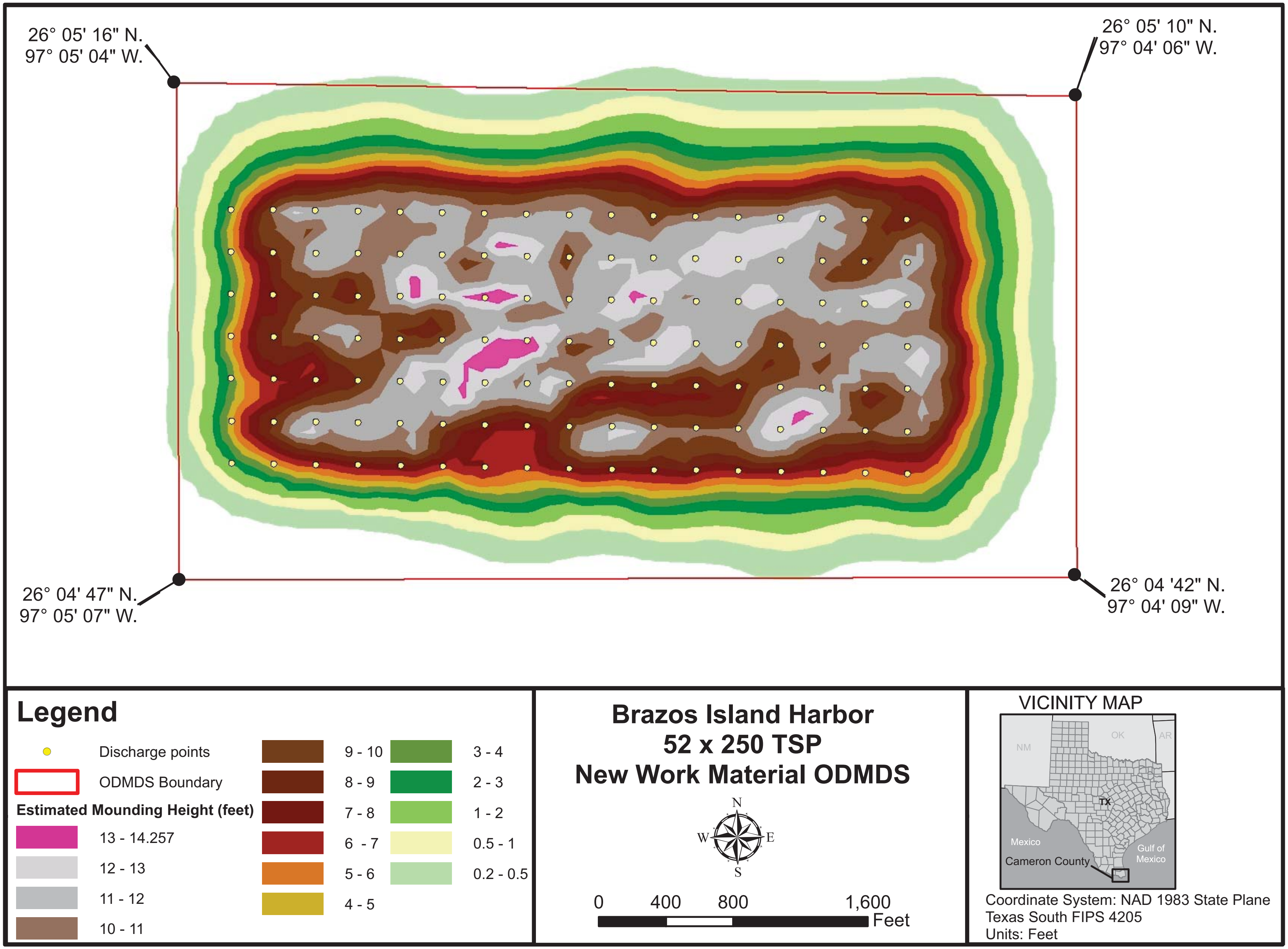
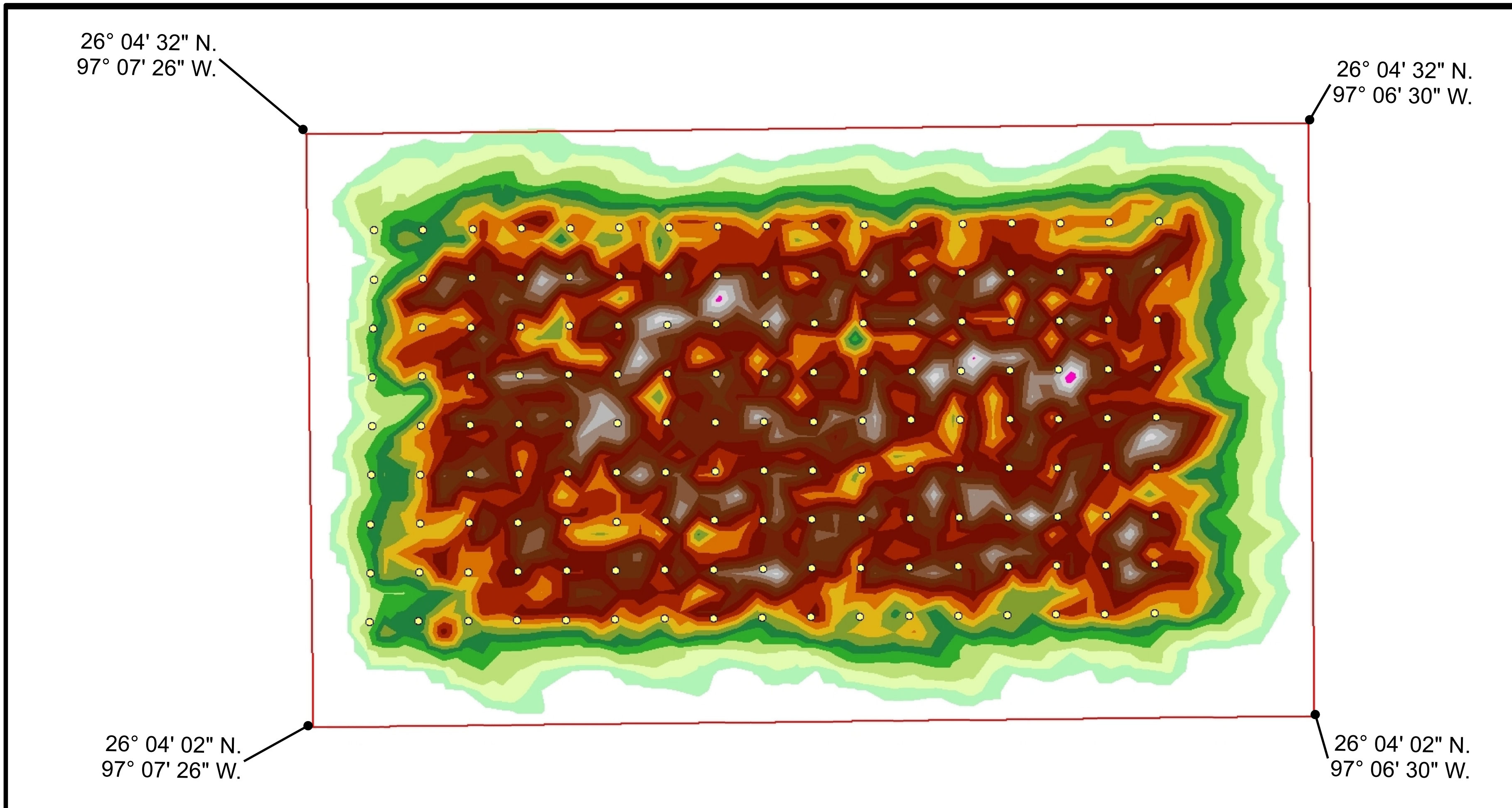
Attachment A

MDFATE Modeling Results


26° 05' 16" N.
97° 05' 04" W.
26° 05' 10" N.
97° 04' 06" W.
26° 04' 47" N.
97° 05' 07" W.
26° 04 '42" N.
97° 04' 09" W.
Legend
Discharge points
ODMDS Boundary
Estimated Mounding Height (feet)
13 - 14.257
12 - 13
11 - 12
10 - 11
9 - 10
8 - 9
7 - 8
6 - 7
5 - 6
4 - 5
3 - 4
2 - 3
1 - 2
0.5 - 1
0.2 - 0.5
Brazos Island Harbor
52 x 250 TSP
New Work Material ODMDS
N
W
E
S
0
400
800
1,600
Feet
VICINITY MAP
NM
OK
AR
TX
Mexico
Cameron County
Gulf of Mexico
Coordinate System: NAD 1983 State Plane
Texas South FIPS 4205
Units: Feet



Legend

- Discharge points
- ODMDS Boundary

Estimated Mound Height (feet)

- 15 - 16.203
- 14 - 15
- 13 - 14
- 12 - 13
- 11 - 12
- 10 - 11
- 9 - 10
- 8 - 9
- 7 - 8
- 6 - 7
- 5 - 6
- 4 - 5
- 3 - 4
- 2 - 3
- 1 - 2
- 0.5 - 1
- 0.2 - 0.5

Brazos Island Harbor 52 x 250 TSP, Maintenance Material ODMDS

N
W E
S

0 400 800 1,600 Feet

VICINITY MAP

Coordinate System: NAD 1983 State Plan Texas South FIPS 4205
Units: Feet