



**US Army Corps
of Engineers**

GALVESTON, TEXAS
OCEAN DREDGED MATERIAL DISPOSAL SITE

SITE MANAGEMENT & MONITORING PLAN

AS REQUIRED BY
SECTION 102 OF THE
MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT

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The following Site Management and Monitoring Plan (SMMP) for the Galveston Ocean Dredged Material Disposal Site (ODMDS) complies with Section 102(c)(3) of the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. Section 1401, et seq.) as amended by Section 506 of the Water Resources Development Act (WRDA) Amendments of 1992 (Public Law 102-580), and has been approved by the following officials of the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE), Southwestern Division, Galveston District.

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Date

Richard P. Pannell
Colonel, Corps of Engineers
Galveston District
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Date

This plan goes into effect upon the date of the last signature for a period not to exceed ten years. The plan shall be reviewed and revised more frequently if site use and conditions at site indicate a need for revision.

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**GALVESTON, TEXAS
OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)
SITE MANAGEMENT AND MONITORING PLAN**

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ADDAMS	Automated Dredging and Disposal Alternatives Management System
CFR	Code of Federal Regulations
CY	Cubic yards
D50	Value of Median Particle Size Distribution
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA R6	Environmental Protection Agency – Region 6
ERL	Effects Range – Low
ESA	Endangered Species Act
ETS	Electronic Tracking System
FR	Federal Register
ft	Feet
GBC	Galveston Bay Complex
GH&C	Galveston Harbor & Channel
HSC	Houston Ship Channel
HGNC	Houston-Galveston Navigation Channel System
ITM	Inland Testing Manual
m	Meters
MCY	1,000,000 cubic yards
MLLW	NOAA Mean Lower Low Water datum
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
μ	Micron
NMFS	National Marine Fisheries Service
ODMDS	Ocean Dredged Material Disposal Site
PA	Placement Area
RIA	Regional Implementation Agreement
SMMP	Site Management and Monitoring Plan
SPI	Sediment Profile Imaging
STFATE	Short-Term Fate of Dredged Material Model
SWG	U. S. Army Corps of Engineers – Southwestern Division, Galveston District
USACE	U. S. Army Corps of Engineers
USC	U.S. Code
USEPA	U. S. Environmental Protection Agency
WRDA	Water Resources Development Act of 1992
XML	eXtensible Markup Language

Galveston, Texas Ocean Dredged Material Disposal Sites Site Management and Monitoring Plan

1. INTRODUCTION

It is the responsibility of the USEPA and the USACE under the MPRSA of 1972 to manage and monitor each of the ODMDSs designated by the USEPA pursuant to Section 102 of MPRSA. Section 102(c)(3) of the MPRSA requires development of a (SMMP) for each ODMDS and review and revision of the SMMP not less frequently than every 10 years. The 1996 document, Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites (USEPA/USACE, 1996) and the EPA R6 and SWG ODMDS Regional Implementation Agreement (RIA) (USEPA/USACE, 2003) have been used as guidance in developing this SMMP.

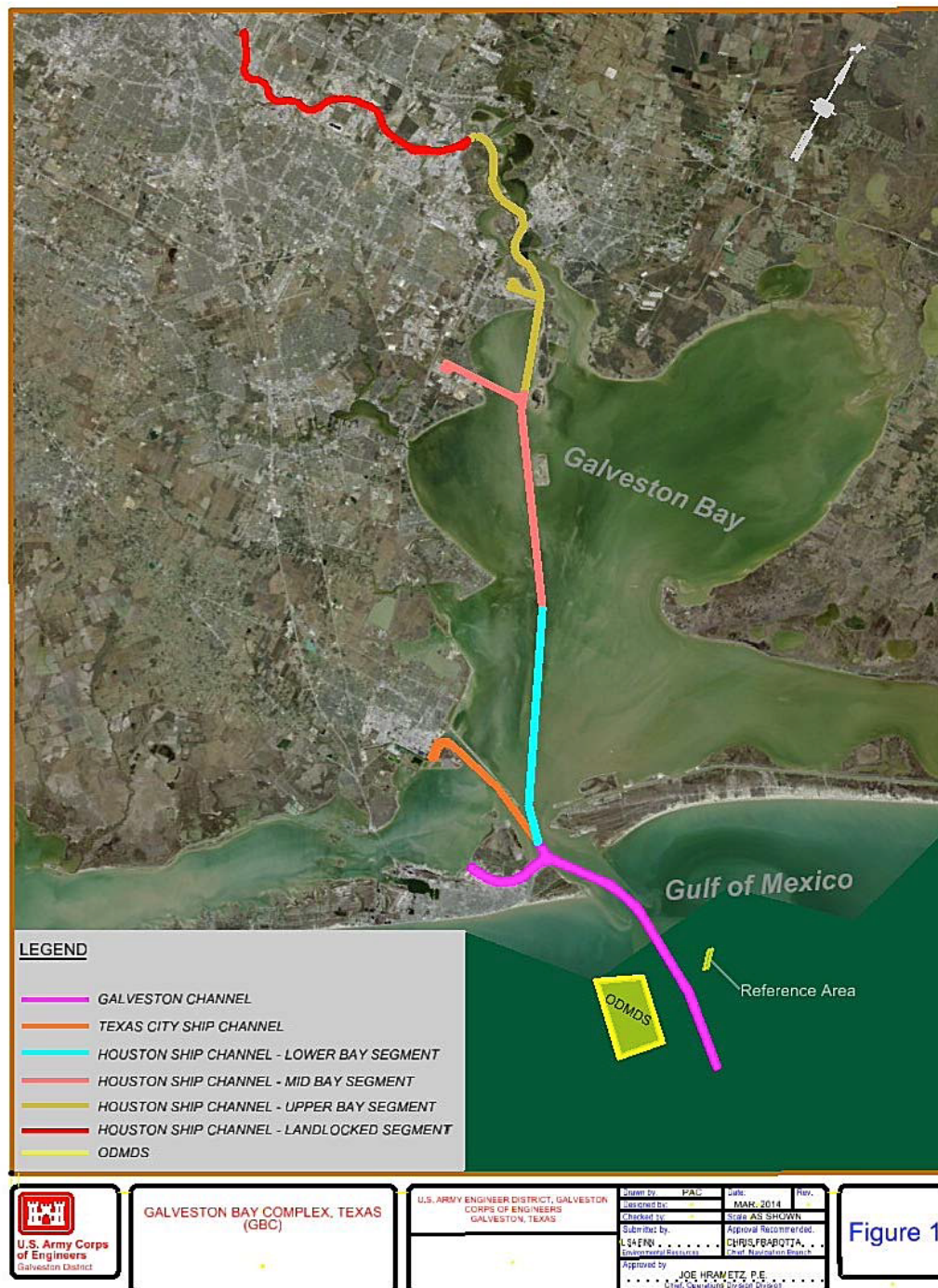
This SMMP is intended to provide management and monitoring strategies for the disposal of suitable dredged material from the greater Houston-Galveston, Texas vicinity. The purpose of this plan is to alleviate critical capacity issues throughout the Galveston Bay Complex for improvement and maintenance dredging projects. Collectively, these projects incorporate several smaller dredging segments; (1) Galveston Channel; (2) Texas City Ship Channel; (3) Houston Ship Channel (HSC) – Lower Bay Reach; (4) HSC – Mid Bay Reach; (5) HSC – Upper Bay Reach and (6) HSC – Landlocked Reach. For the purposes of this SMMP, these dredging reaches will be collectively referred to as the Galveston Bay Complex or the GBC (Figure 1). The Galveston ODMDS would provide an alternative disposal site in addition to existing Placement Areas (PA) thereby extending the life of those sites by allowing time for management between dredging cycles to include activities such as dewatering, damping and levee raises.

Final designation of the Galveston ODMDS was first sought in 1982 with the release of the draft Environmental Impact Statement (EIS). After review, the draft was approved as final and the Final Rule for designation was published in the Federal Register August 31, 1984 (49 FR 171). A modification to the use restriction of the Galveston ODMDS was sought to include suitable dredged material from the greater Houston-Galveston, Texas vicinity. No comments were received on the proposed rule published June 18, 2015 (80 FR 117). A Final Rule was published in the Federal Register September 18, 2015 (80 FR 181). The use restriction became effective October 19, 2015.

A SMMP was first developed for the Galveston ODMDS in September 1996 and revised in December 2008. The current revision to the Galveston ODMDS follows the use restriction modification expanding the use of the site to include suitable improvement (construction) and maintenance dredged material from all reaches of the Houston Ship Channel and the Texas City Ship Channel collectively referred to as the Galveston Bay Complex or GBC (Figure 1). SMMP provisions shall be requirements for all dredged material disposal activities at the site. All MPRSA Section 103 ocean disposal permits or contract specifications shall be conditioned as necessary to assure consistency with the SMMP.

This revision to the Galveston ODMDS SMMP supersedes all previous SMMPs. The SMMP itself, however, does not authorize the use of any ODMDS for ocean disposal of dredged materials. Use of any ODMDS for ocean disposal of dredged materials is regulated under a permit (or contract specification) under MPRSA Section 103.

Figure 1: Galveston Bay Complex (GBC), Texas



2. SITE MANAGEMENT

The MPRSA of 1972 (33 U.S.C. Section 1401, et seq.) provides the legislative authority to regulate the disposal of dredged material into ocean waters, including the territorial sea. The transportation of dredged material for the purpose of placement into ocean waters is permitted by the USACE or, in the case of Federal projects, authorized for disposal under MPRSA Section 103(e), applying environmental criteria established by the USEPA in the Ocean Dumping Regulations (40 CFR Parts 220-229). This plan may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process.

This SMMP for the Galveston ODMDS was developed jointly by EPA R6 and SWG, in accordance with Section 102(c)(3) of the MPRSA, as amended by WRDA 92. At a minimum the SMMP shall include but not be limited to:

- A baseline assessment of conditions;
- A program for monitoring;
- Special management conditions or practices to be implemented that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical characteristics of dredged materials to be disposed of;
- Consideration of the anticipated use over the long-term; and,
- A schedule for review and revision of the plan.

2.1 Site Management Objectives

ODMDS management is intended to assure that disposal activities will not unreasonably degrade or endanger human health, and welfare, the marine environment, or economic potential (MPRSA section 103(a)). The primary objectives in the management of the Galveston ODMDS are:

1. Protection of the marine environment;
 - a. Ocean discharge of only that dredged material that satisfies the criteria set forth in 40 CFR Part 227 Subparts B, C, D, E, and G and 40 CFR Part 228.4(e) and is suitable for unrestricted placement at the ODMDS;
 - b. Avoidance of excessive mounding either within the site boundaries or in areas adjacent to the site, as a direct result of disposal operations.
2. Documentation of disposal activities and compliance; and,
3. Maintenance of a long term disposal alternative for dredged material generated in the Houston-Galveston, Texas vicinity.

These objectives will be achieved through the following measures:

1. Regulation and administration of ocean dumping permits;
2. Development and maintenance of a site monitoring program; and,
3. Evaluation of permit compliance and monitoring results.

The following sections provide the framework for meeting these objectives.

2.2 Roles and Responsibilities

Development of SMMPs for ODMDs within SWG's area of operation is the joint responsibility of EPA R6 and SWG. Both agencies are responsible for assuring that all components of the SMMP are implementable, practical, and applicable to site management decision-making.

Specific responsibilities of EPA R6 and SWG are:

- In accordance with Section 102(c) of the MPRSA, EPA R6 is responsible for designation/de-designation of ODMDs, for evaluating environmental effects of disposal of dredged material at these sites and for reviewing and concurring on dredged material suitability determinations.
- SWG is responsible for evaluating dredged material suitability and issuing MPRSA Section 103 permits, regulating site use, and developing and implementing disposal-monitoring programs.

2.3 Funding

Physical, chemical, and biological effects-based testing shall be undertaken on sediments to be deposited at the ODMD. This testing will be conducted at five year intervals, or as necessary to address contaminant concerns due to unanticipated events, and will be funded by the permittee if the project is permitted or SWG for Federal projects. The permittee or SWG, as appropriate, shall also be responsible for costs associated with placement site hydrographic monitoring. Should this monitoring conclude that additional studies and/or tests are needed at the ODMD, the scope and cost-sharing of such work would be discussed and agreed upon, between the permittee and SWG and/or EPA R6. Physical, chemical, and biological effects-based testing at the ODMD or in the site environs after discharge that is not required as a result of hydrographic monitoring shall be funded by EPA R6. Federal funding of all aspects of this SMMP is contingent on availability of appropriated funds.

2.4 Disposal and Reference Site Characteristics

2.4.1 Disposal Site Characterization

The Galveston ODMD is located approximately 3.7 nautical miles offshore, and 1.3 to 1.9 nautical miles southwest of the centerline of the Entrance Channel (Figure 1). This disposal site occupies an area of approximately 6.6 square nautical miles, with depths ranging from 10 to 15.5 m (33 to 51 ft.). The site is trapezoidal in shape with vertex coordinates located at:

Table 1. Galveston ODMDS Coordinates

Vertices	Geographic NAD27		Geographic NAD83	
	Latitude	Longitude	Latitude	Longitude
N	29°18'00"N	94°39'30"W	29°18'00.85"N	94°39'30.69"W
E	29°15'54"N	94°37'06"W	29°15'54.86"N	94°37'06.69"W
S	29°14'24"N	94°38'42"W	29°14'24.86"N	94°38'42.69"W
W	29°16'54"N	94°41'30"W	29°16'54.86"N	94°41'30.69"W

Baseline conditions at the Galveston ODMDS were assessed during the disposal site designation process. Details of baseline conditions, including descriptions of the marine environment in the site vicinity and the physical, chemical and biological characteristics of the sediments and the water column at the site, are contained in the Draft Environmental Impact Statement (EIS) for the Galveston, Texas Dredged Material Disposal Site Designation prepared by USEPA, Criteria and Standards Division, in May 1982. In 1995 (Trulli 1996) and 2002 (Tetra Tech 2002) USEPA collected and characterized sediment and biological samples at the Galveston ODMDS. This information updates the EIS baseline conditions at the disposal site. In 2012 EPA R6 conducted a status and trend assessment survey collecting sediment profile images and biological samples.

Overall grain size characteristic of the sediment are indicated by the D50, which represents the median value of the particle size distribution. The ODMDS sediment can be characterized as fine sand (61%) with similar percentages of silt (22.5%) and clay (16.4%) (Table 2).

Table 2. Particle Size Distribution for the GBC Reaches, ODMDS & Reference Area

GBC Reach, ODMDS & Reference Area	Physical Parameter			
	% Sand	% Silt	% Clay	D50(μ)
Galveston Entrance Channel*	39.0	32.0	29.0	0.093
Galveston Inner Harbor*	14.0	41.7	44.3	0.026
Texas City Ship Channel	11.6	42.5	45.9	0.02
Houston Ship Channel – Lower Bay Reach*	56.0	19.0	25.0	0.111
Houston Ship Channel – Mid Bay Reach	27.2	35.1	37.7	0.042
Houston Ship Channel – Upper Bay Reach	19.0	35.4	45.6	0.03
Houston Ship Channel – Landlocked Reach	19.3	55.1	25.7	0.025
Galveston ODMDS	61.1	22.5	16.4	0.117
Reference Area	15.2	42.4	42.4	0.016

Source: Long term average of SWG data

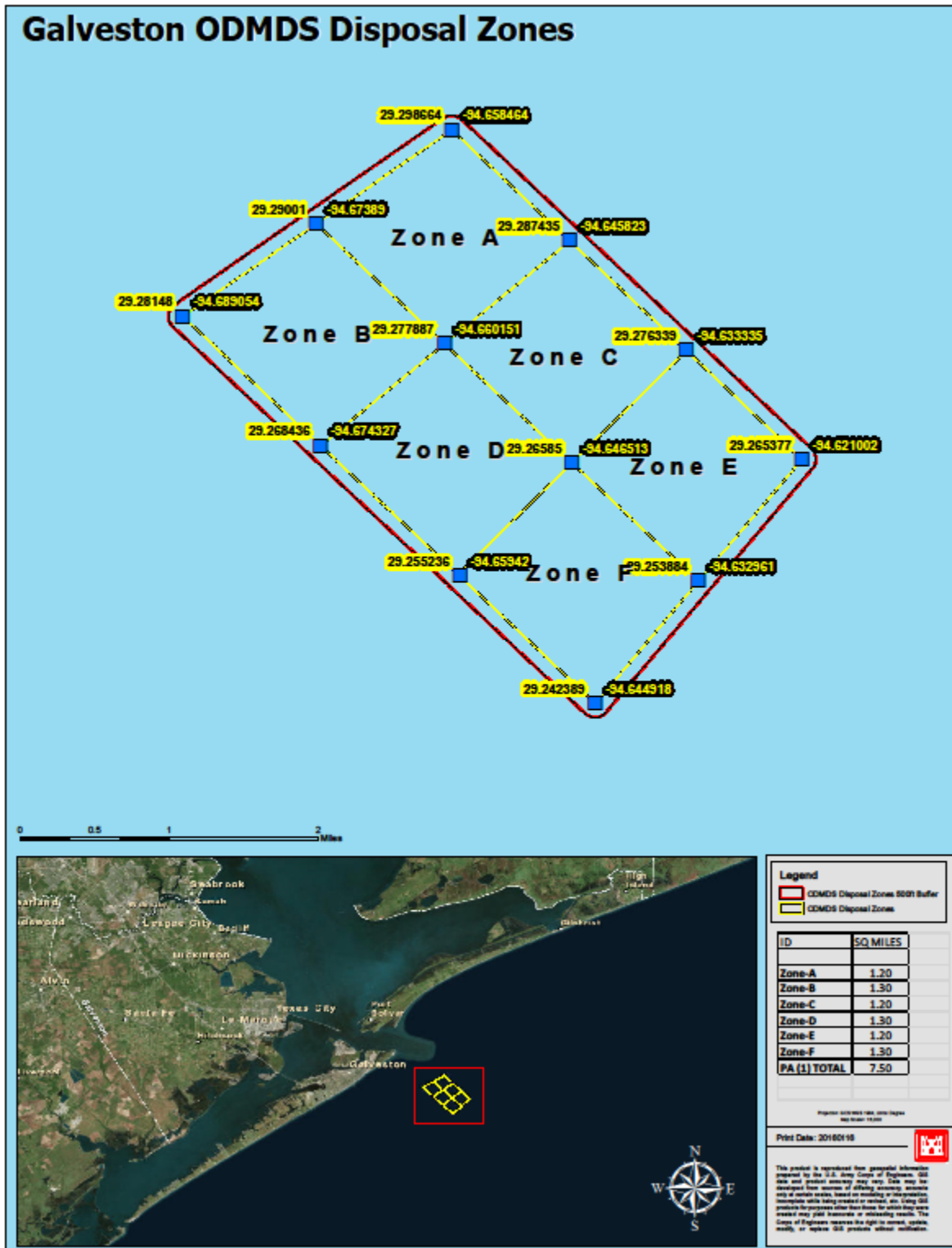
As described in the site designation EIS, the existing interim-designated ODMDS was evaluated as an alternative for final designation, as were other mid-shelf and deep water areas. Although no specific analyses were conducted to determine optimal size for the placement area, the existing site was determined to be the preferred alternative for final designation. Primary considerations

f or selecting this site were as follows:

- The vicinity of the Interim Site has received material dredged from the Bolivar Roads, inner bar channel, outer bar channel, entrance channel and Anchorage Basin since at least 1931. Past studies have not determined any significant adverse impacts from disposal at the site;
- Past studies have determined that this is a high-energy erosional zone and can generally accept large volumes of dredged material with little apparent net change to the bottom;
- The site is within the inlet zone and is adjacent to the channel, providing easy access for dredged material placement operations, and reduced costs; and,
- Studies have shown that there are no unique fisheries in the area.

The irregular shape of the area is a result of its location. The northeast boundary roughly corresponds with the limit of the traffic lane safety fairway. Similarly, the northwest boundary approximates the shoreward limit of the fairway anchorage. The SWG, in consultation with EPA R6, has designated six (6) sediment management zones within the Galveston ODMDs for dredged material placement (Figure 2). These disposal zones serve to maximize site capacity, reduce multiple user conflicts, and facilitate monitoring and management, and reduce potential adverse impacts to the marine environment.

Figure 2: Galveston ODMDS Disposal Zones



2.4.2 Reference Site Characterization

The Reference site area (Figure 1) was established based on the Area Approach. It is located northeast of the Entrance Channel at the following coordinates (NAD 1983) in Table 3,

Table 3: Galveston Reference Site Coordinates

Vertices	Geographic NAD83	
	Latitude	Longitude
N	29°20'22"N	94°37'11"W
E	29°19'32"N	94°36'56"W
S	29°19'23"N	94°37'06"W
W	29°20'13"N	94°37'21"W

The reference sediment can be characterized as fine sand (15.2%) with equal percentages of silt (42.4%) and clay (42.4%) (Table 2).

2.5 Disposal History and Dredged Material Volumes

The Galveston ODMDS has been used for the ocean disposal of dredged material since 1966. The present configuration of this site was established in 1973. It received interim designation in 1977 (42 FR 7), and was historically used throughout this period for placement of dredged material from the Galveston Harbor and Channel, Inner Bar Channel, Outer Bar Channel, Entrance Channel, Bolivar Roads reach and Anchorage Area. The interim site designation was cancelled by the final designation of the Galveston Harbor and Channel ODMDS on August 31, 1984 (49 FR 171). Historically, the dredging frequency for this navigation project is approximately 1.5 years, with an average of about 1.9 million cubic yards (MCY) of material excavated per dredging contract.

Estimated dredging volumes per contract and frequency of dredged material proposed for disposal at the Galveston ODMDS from the reaches of the GBC are provided in Appendix A.

2.5.1 Site Use Modification Justification

Prior to September 18, 2015, 40 CFR Part 228.15(j)(12)(vi) stated that the Galveston ODMDS is restricted to receiving “dredged material from the Galveston, TX area.” Traditionally, this has been interpreted as limiting use of the Galveston ODMDS to disposal of dredged material from the Galveston Harbor and Channel, Inner Bar Channel, Outer Bar Channel, Entrance Channel, Bolivar Roads reach and Anchorage Area as described in the site designation EIS. However, there has been a demonstrated need to expand the use of the Galveston ODMDS to include dredged material from the Houston Ship Channel and the Texas City Channel.

To alleviate critical capacity issues along the GBC, four other segments have been identified for future disposal at the Galveston ODMDS. These include the HSC: Mid Bay Segment which runs approximately from Redfish Reef to the Bayport Flare; the HSC: Upper Bay Segment which

starts in the vicinity north of Bayport Channel to the confluence of Carpenter's Bayou; and the HSC: Landlocked Segment which extends from about Carpenter's Bayou and to the terminus of the federally maintained channel at the Turning Basin. Therefore, the Galveston ODMDS will provide an alternative disposal site in addition to existing PAs thereby allowing time for management between dredging cycles.

Lastly, the Texas City Ship Channel is included in the GBC with potential disposal into the Galveston ODMDS because of its configuration, deep draft channel and proximity to the site. The Texas City Ship Channel currently utilizes several upland confined PAs and beneficial use areas for routine maintenance dredging along the entire channel; however, capacity and future levee raises are considerations for the two upland confined PAs. In addition, the beneficial use areas will eventually reach target elevation and cease to be used as placement areas. It is not anticipated that scheduled routine suitable maintenance dredging material for the entire channel would be regularly placed into the Galveston ODMDS; but rather 'hot spot' shoaling may be added to a dredging contract for the Galveston Channel or the HSC - Lower Bay Segment. This ability to clear relatively low volume critical shoals in between normal dredge cycles would maximize regional dredge plant availability and extend the life of the PAs.

Based on the need described in the preceding paragraphs, a use restriction modification was proposed to allow for the ocean disposal of suitable dredged material from the greater Houston-Galveston vicinity into the Galveston ODMDS. The final rule was published in the Federal Register on September 18, 2015 and became effective on October 19, 2015.

The use restriction modification to the Galveston ODMDS expands the use of the Galveston ODMDS to include the placement of suitable dredged material from both maintenance and new work projects from within the greater Houston-Galveston, Texas vicinity. The primary user of the Galveston ODMDS is the USACE for the GBC (Figure 1). Secondary users of the Galveston ODMDS would consist of non-federal entities for the placement of suitable dredged material to maintain port slips, berthing areas, etc.

2.6 Dredged Material Characteristics

2.6.1 Previously Placed Materials

Materials historically placed in the Galveston ODMDS (marked with an asterisk (*) in Table 2) have consisted of sand, silt, and clay in varying proportions depending upon which channel the material originated from.

2.6.2 Anticipated Materials for Placement

Suitable dredged material from channel improvement and maintenance dredging projects is anticipated from the GBC reaches south of HSC-Mid Bay reach. Maintenance dredged material from these reaches consists of mixtures of sand, silt and clay in varying percentages as shown in Table 2.

2.6.3 Dredge Material Quality Verification

The suitability of dredged material for ocean disposal must be verified by the USACE and agreed to via written concurrence from USEPA prior to disposal. Verification will be valid for three years from permit date. For civil works projects, verification is required every five years.

Verification process:

- Case-specific evaluation against the Exclusion Criteria (40 CFR Part 227.13(b));
- Determination of testing requirements for non-excluded material based on the potential of sediment contamination since last verification; and,
- When applicable, execute testing and determination of suitability of non-excluded material for ocean disposal.

Verification documentation for suitability will be completed prior to use of the Galveston ODMDS. Documentation will be in the form of a MPRSA Section 103 Evaluation. Potential testing and the Evaluation will follow the procedures outlined in the 1991 USEPA/USACE Dredged Material Testing Manual and 2003 Regional Implementation Agreement or the appropriate updated versions. Water Quality Compliance determinations will be made using the STFATE model (ADDAMS). Only material determined to be suitable through the verification process by the USACE and USEPA will be placed at the Galveston ODMDS.

2.6.4 Time of Disposal

A seasonal hopper dredging restriction has been recommended by the National Marine Fisheries Service (NMFS, 2007) during formal consultation undertaken pursuant to Section 7 of the Endangered Species Act (ESA). This restriction was based on potential impacts of hopper dredging operations on several species of threatened and endangered sea turtles. The recommendation is to restrict hopper dredging to the period from December 1 through March 31, during which sea turtle abundance is at a minimum in the Gulf of Mexico. This recommendation pertains only to actual hopper dredging operations and not placement of the material into the ODMDS. Hopper dredging should be conducted in accordance with all reasonable and prudent measures and implementing terms and conditions described in the 2007 Gulf of Mexico hopper dredging regional biological opinion (NMFS, 2007). While it may not be practical to observe this restriction for all dredging cycles, it will be practiced when feasible.

2.6.5 Disposal Technique

No specific disposal technique is required for this site. Disposal shall take place within the specified disposal release zones (Figure 2) and shall be completed (doors closed) prior to departing the ODMDS. Standard surveillance and evasive measures to protect sea turtles and marine mammals shall be employed during all disposal operations at the Galveston ODMDS.

2.6.6 Disposal Location

40 CFR Part 227.28 requires that disposal occur no less than 330 feet (100 meters) inside the designated site boundaries. A 500-foot buffer no discharge zone has been established to satisfy this

criterion and will continue to be used as a means of preventing the short-term transport of material beyond the Galveston ODMDS boundary during disposal operations. All operations shall be conducted such that the dredged material remains within the bounds of the specified disposal release zone immediately following descent to the ocean floor (Figure 2; Table 4).

In addition to the no discharge zone, further discussion between EPA R6 and SWG suggested the need for further amendment to disposal operations that would result in cost savings related to bathymetric monitoring. The Galveston ODMDS is by far the largest in Texas, and transect spacing often suffers at the expense of the increased area to be monitored. To compensate for this need, the Galveston ODMDS has been divided into six disposal zones (Figure 2). Coordinates for each disposal zone are provided in Table 4. To reduce the monitoring footprint, SWG will select which disposal zone(s) to use for the current dredging cycle or permitted project; bathymetric monitoring will focus only on those zones used since the last survey.

2.7 Permit and Contract Conditions

The disposal monitoring and post disposal monitoring requirements described under 3.0 SITE MONITORING will be incorporated into the contract language for all federal projects. Special conditions may be included on MPRSA Section 103 permits on a case by case basis.

2.7.1 Permit Process

All disposal of dredged material in the ocean, with the exception of Federal Civil Works projects, requires an ocean dumping permit issued by the USACE pursuant to MPRSA Section 103.

2.8 Special Management Conditions or Practices

Special management conditions or practices related to placement of dredged material into the designated ODMDS are addressed in Section 2.6.

Table 4. Galveston ODMDS Disposal Release Zones

Zone	Vertices	Geographic NAD83	
		Latitude	Longitude
A	N	29.298664	-94.658464
	E	29.287435	-94.645823
	S	29.277887	-94.660151
	W	29.29001	-94.67389
B	N	29.29001	-94.67389
	E	29.277887	-94.660151

	S	29.268436	-94.674327
	W	29.28148	-94.689054
C	N	29.287435	-94.645823
	E	29.276494	-94.633509
	S	29.26585	-94.646513
	W	29.277887	-94.660151
D	N	29.277887	-94.660151
	E	29.26585	-94.646513
	S	29.255236	-94.65942
	W	29.268436	-94.674327
E	N	29.276494	-94.633509
	E	29.265377	-94.621002
	S	29.253884	-94.632961
	W	29.26585	-94.646513
F	N	29.26585	-94.646513
	E	29.253884	-94.632961
	S	29.255236	-94.65942
	W	29.242389	-94.644918

3. SITE MONITORING

The MPRSA Section 102(c)(3)(B) requires that SMMPs include a program for monitoring the site. Site monitoring is conducted to ensure the environmental integrity of a disposal site and the areas surrounding the site and to verify compliance with the site designation criteria, any special management conditions, and with permit or federal authorization requirements. Guidance for SMMP monitoring programs indicates that they should be flexible, cost effective, and based on scientifically sound procedures and methods to meet site-specific monitoring needs.

The monitoring program should provide the following:

1. Information indicating whether the disposal activities are occurring in compliance with the permit and site restrictions;
2. Information indicating short-term and long-term fate of materials disposed of in the marine environment; and,
3. Information concerning the short-term and long-term environmental impacts of the disposal.

The primary purpose of the SMMP is to determine whether dredged material site management practices and disposal operations at the site need to be changed to avoid unreasonable degradation or endangerment of human health and welfare and the marine environment. Monitoring programs should be structured to address specific questions (null hypotheses) and measure the conditions of key indicators and endpoints, particularly those identified during site designation, or major project-specific issues that arise.

Monitoring results will be used for making decisions, preventing unacceptable adverse effects beyond each site's boundary and ensuring regulatory compliance over the life of the ODMDS. Testing of dredged material is conducted based on the Green Book, Inland Testing Manual (ITM) and RIA procedures; however it is necessary to verify that the decisions made regarding the suitability of the dredged material are correct and that the material is not having an adverse impact to the environment.

The size and location of the Galveston ODMDS were determined pursuant to the General Criteria as listed in 40 CFR Part 228.5, and the Specific Criteria at 40 CFR Part 228.6(a). There are no significant environmental resources delineated within or immediately outside of the Galveston ODMDS. The primary concern regarding ODMDS use is the potential for short-term buildup of dredged material, such that a hazard to navigation is presented. Since the Galveston ODMDS is dispersive in nature, it is expected that material will eventually be transported outside of the site boundaries. It is also expected that this material will not move in distinct mounds, but instead will blend with the surrounding environment causing a progressive transition to sediment containing a higher percentage of silt and clay.

Discharges of dredged material outside of the Galveston ODMDS boundaries will be treated as "unauthorized discharges". Such discharges may occur as a result of dredging equipment malfunction during dredging operations with spillage of material outside of the ODMDS boundaries, or discharge of dredged material in close proximity to an ODMDS boundary such that it falls outside of the site during descent to the seafloor. While significant environmental resources were not identified immediately outside of the Galveston ODMDS during site designation evaluations, unauthorized discharges may be detrimental to immobile or slow moving benthic organisms. A laboratory study conducted by Maurer et al (1978) suggested that benthic organisms can burrow through 6-9 inches of dredged material without significant impacts to the benthic community. The formation and persistence of mounds detected above this 6-9 inch threshold, as a direct result of unauthorized discharges outside of the ODMDS boundaries, warrants additional investigation to determine if benthic communities have been adversely impacted.

Monitoring activities at the Galveston ODMDS are divided into three categories: (1) compilation of past monitoring studies to document baseline conditions (Section 3.1); (2) routine (short term) monitoring of the placement of dredge materials conducted by the site-user (Section 3.2 and Section 3.3); and (3) long term monitoring, typically done by the USEPA, but which can be jointly executed by the USEPA and USACE (Section 3.4).

3.1 Baseline Monitoring

Appendix B summarizes various site characterization surveys of the Galveston ODMDS conducted by the USACE, USEPA, and others as part of the designation process and subsequent monitoring to evaluate the dredge material management effectiveness for the Galveston ODMDS. These existing data include but are not limited to water and sediment chemistry, sediment mapping, bathymetry, physical oceanographic conditions and biological studies related to benthic macroinvertebrates and fisheries. These data, as well as data from future surveys that will be added to the database, will serve to define baseline conditions for comparative purposes for evaluation of placement and potential impacts associated with the use of the Galveston ODMDS.

3.2 Routine Monitoring for the ODMDS Site-User

Routine (short term) monitoring activities for the site-user at an ODMDS fall into three categories: (1) monitoring of the placement of dredged materials for the evaluation of navigational safety; (2) deposition of dredged material at the ODMDS boundaries, and (3) permit/civil works project compliance monitoring. The final component of routine monitoring is the compilation of the results in a post disposal summary report.

Bathymetric surveys will be used to monitor for mounding to ensure a navigation hazard is not produced, to assist in verification of material placement, and to monitor bathymetry changes and trends. Bathymetric surveys shall be obtained using a USACE or contract survey vessel equipped with electronic surveying capabilities. The vessel must be equipped with positioning equipment with a horizontal precision of one (1) foot. The fathometer, which shall display real-time depth on real-time location, must have a precision of approximately 0.5 feet. All data shall be collected using methodology described in Engineer Manual EM 1110-2-1003, dated 30 November 2013 [http://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-1003.pdf].

Bathymetric surveys for each maintenance or new work dredging contract will be obtained before the start of disposal operations and within 45 days of completion of disposal operations. Bathymetric surveys shall be conducted by SWG or the site user along transects within the ODMDS. For routine surveys, bathymetry may be limited to one or several of the six disposal zones selected for the current disposal contract (Figure 2). Transects will be taken perpendicular to the channel at a spacing of approximately 500 feet. These transects will cover all disposal zones used during the contract as well as the 500-foot buffer zone on the outer boundary of the disposal zone(s) and 500 feet outside of the Galveston ODMDS boundary.

The minimum performance standards for bathymetric surveys are:

- Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing a differential global positioning system;
- Vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum; NAVD (88)
- Horizontal datum should be referenced to the local State Plane Coordinate System

- (SPCS) for that area or in Geographical Coordinates (latitude-longitude);
- Horizontal reference datum should be the North American Datum of 1983 (NAD 83).

Results from post and pre dredge bathymetry shall be provided to EPA R6 when completed as part of the summary report.

3.2.1 Navigational Safety

The ODMDS is located outside of the safety fairway for large vessel traffic, therefore, the mounding will be considered only in regard to shallow-draft vessels. Significant mounding is not expected from discharge operations when the grain-size characteristics of typical maintenance dredged material from the GBC are considered. The rationale, frequency, action thresholds and management options are summarized in Appendix C.

3.2.1(i) Routine Bathymetric Survey

Routine bathymetry for navigational safety looks at the height of the mound from placing the material pre and post (45 days) placement. If deposited dredged material is not mounding to heights greater than the 10-foot threshold height above the existing bottom elevation, the management objectives are met, and no further post-disposal monitoring will be required. If there is mounding to heights greater than the 10-foot threshold height above existing bottom elevation, the monitoring shall proceed to the Advanced Bathymetric Surveys.

3.2.1(ii) Advanced Bathymetric Survey

Advanced bathymetric surveys are conducted semi-annually to determine changes in mound height until impacts are no longer observed.

If at six (6) months the deposited dredged material is mounding to elevations above the 10-foot threshold height, but less than 15 feet above the existing bottom elevation, then bathymetric surveys shall be continued and a notice to mariners will be issued. Additionally, disposal/placement procedures will be reviewed to determine if they need to be modified and/or disposal operators will be directed to avoid areas shallower than the depth determined by bathymetry.

If deposited dredged material is mounding to elevations greater than 15 feet, SWG together with EPA R6 will consider various management options to rectify the situation. Such options may include but are not limited to modification of disposal method/placement, restricting disposal volumes, physically leveling the mounds, and institution of Environmental Effects Monitoring.

3.2.2 Bathymetric Surveys Conducted for Unauthorized Discharges

Discharges of dredged material outside of the Galveston ODMDS boundaries will be treated as “unauthorized discharges”. Such discharges may occur as a result of dredging equipment malfunction during dredging operations with spillage of material outside of the ODMDS

boundaries, or discharge of dredged material in close proximity to an ODMDS boundary such that it falls outside of the site during descent to the seafloor. In the event of an unauthorized discharge outside of the ODMDS, bathymetric surveys will be conducted to identify the extent of the affected area or estimate the quantity of dredged material associated with the discharge. In such situation, joint discussions between EPA R6 and SWG will determine management action appropriate to resolve the unauthorized discharge.

3.2.2(i) Routine Bathymetric Survey – ODMDS Boundaries

Routine bathymetry of the ODMDS boundaries and 500-foot area outside of the site (pre and post) is used to determine whether or not placement beyond the ODMDS boundaries has occurred as a result of the disposal event. If sedimentation along and beyond the boundary limits of the ODMDS is not greater than 1 foot, then the management objectives are met, and no further post-disposal monitoring will be required. If sedimentation along and beyond the ODMDS boundary limits is greater than 1 foot, as determined by the post dredging survey, then the monitoring shall proceed to the Advanced Bathymetric Surveys.

3.2.2(ii) Advanced Bathymetric Survey – ODMDS Boundaries

Advanced bathymetric surveys are performed semi-annually. Results are used to determine changes in transport of material from the site is resulting in persistent accumulations of greater than 1 foot of sedimentation beyond the ODMDS boundary. If at six months the material transported outside of the ODMDS has dispersed such that the sedimentation beyond the ODMDS boundary is less than 1 foot, then no further monitoring is needed. If at six months the material transported outside the ODMDS has not dispersed such that the sedimentation beyond the ODMDS boundary is persistently greater than 1 foot (has not improved), various management options should be considered e.g. modification of disposal method/placement, restriction of disposal volumes, expansion of the ODMDS or relocation of ODMDS.

3.3 Project Disposal Compliance Monitoring

For all disposal activities, an electronic tracking system (ETS) must be utilized. The ETS will provide surveillance of the transportation and disposal of dredged material. The ETS will be maintained and operated to continuously track the horizontal location and draft condition (accuracy ± 1 foot) of the disposal vessel (i.e. hopper dredge or disposal scow) from the point of dredging to the disposal site and return to the point of dredging. Data shall be collected at least every 0.25 nautical mile or every 4 minutes during travel to and from the ODMDS and twelve seconds or every 30 feet of travel, while the hull status is open within the ODMDS. In addition to the continuous tracking data, the following trip information shall be electronically recorded for each disposal cycle:

- a) Load number
- b) Disposal vessel name and type (e.g. scow)
- c) Estimated volume of load
- d) Description of material disposed
- e) Source of dredged material and,

- f) Date, time and location at initiation and completion of disposal event.

It is expected that disposal monitoring will be conducted utilizing the Dredge Quality Management (DQM) system for Civil Works projects (see specifics at <http://dqm.usace.army.mil/Specifications/Index.aspx>), although other systems are acceptable. Disposal monitoring and ETS data will be reported to EPA R6 on a weekly basis utilizing the eXtensible Markup Language (XML) specification and protocol. EPA R6 and the SWG shall be notified within 24 hours if discharge of dredged material occurs outside of the ODMDS or authorized release zone or if excessive leakage occurs. Excessive leakage is defined as any change in draft exceeding 2.0 feet from the point of departure from the dredging site to the disposal site. If the event occurs on the weekend or holiday, notification will take place the following business day.

A post disposal summary report is due 90 days after completion of the project. If reports are not submitted or are incomplete a request for an extension must be made to EPA R6.

3.4 EPA R6 Tiered Long-Term Monitoring

Monitoring of USEPA's ODMDS is required under 40 CFR Part 228.9. The primary purpose of the monitoring program is to evaluate the impact of disposal on the marine environment by referencing the monitoring results to a set of baseline conditions. Monitoring can be trend assessment surveys, which are the responsibility of the federal government (40 CFR Part 228.9(a)(1)) or special studies (40 CFR Part 228.9(a)(2)) conducted by the permittee. A component of USEPA's monitoring strategy is the routine (approximately 10 year) assessment of the trends at the ODMDSs based on the requirements in 40 CFR Part 228.13. This includes monitoring for any changes in the physical, chemical and biological characteristics of the seafloor in and around the ODMDSs as well as any changes in the properties of the water column.

Trend assessment monitoring, environmental effects monitoring, and advanced environmental effects monitoring represent the tiered monitoring approach for the ODMDS sites (Appendix D). In general, specifications for such long term monitoring are decided on a case-by-case basis by collectively considering the characteristics of a site and any past issues that need to be examined for long term impacts. The objectives as well as the design and performance criteria for the monitoring are part of a QAPP that would be site-specific when it is designed, and will depend upon many factors. The action thresholds for the trend assessment monitoring are based in part on 40 CFR Part 228.10(b)(3-5) and the environmental effects monitoring on Part 228.10(1)(i-v). Monitoring to be conducted in the advanced environmental effects monitoring will depend in large part upon what the environmental concern is that was observed or identified in the earlier tiers.

Periodic trend assessment monitoring characterizes water and sediment quality and the benthic community. The action thresholds for the trend assessment monitoring are 1) the absence from the ODMDS of pollution sensitive biota and/or 2) progressive non-seasonal changes in water or sediment quality. Exceedance of these action thresholds would trigger the next level of monitoring. The Environment Effects monitoring focuses on sediment chemical monitoring within and outside of the ODMDS boundaries. The action threshold for the environmental effects

monitoring is defined as “Concentrations above the range of contaminant levels in dredged sediments that the Regional Administrator and the District Engineer found to be suitable for disposal at the ODMDS.” The acceptable level is what was approved for ocean disposal; therefore, anything higher would exceed the threshold and trigger the next level of monitoring. The advanced environmental effects monitoring includes tissue chemical analysis and benthic monitoring. The action thresholds for the advanced environmental effects monitoring are 1) benthic body burdens and risk assessment models indicate potential for food chain impacts and/or 2) unacceptable sub-lethal effects to benthic organisms.

3.5 Future Monitoring Efforts

Changes in bathymetry at the Galveston ODMDS will continue to be monitored in accordance with Section 3.2. Additionally, trend assessment surveys of the sediment, benthos and water column will continue to be performed periodically (approximately every 10 years) by EPA R6 as budgets allow. Should future disposal at the Galveston ODMDS result in unacceptable adverse impacts, further studies may be required to determine the persistence of these impacts, the extent of the impacts within the marine system, and/or possible means of mitigation. In addition, the management plan presented may require revision based on the outcome of any monitoring program.

4.0 REPORTING AND DATA FORMATTING

4.1 Project Initiation and Unauthorized Discharge Reporting

SWG or the permittee shall complete and submit to EPA R6 a Project Set-Up Form a minimum of 15 days prior to the beginning of a dredging cycle or project disposal. The Project Set-Up Form can be obtained from EPA R6. The user is also required to notify the SWG and the EPA R6 within 24 hours if a violation of the permit and/or contract conditions related to MPRSA Section 103 or SMMP requirements occur during disposal operations. If the event occurs on the weekend or holiday, notification shall take place the following business day.

4.2 Disposal Monitoring Data

Disposal monitoring data shall be provided to EPA R6 electronically on a weekly basis. Data shall be provided and delivered as an attachment to an email to DisposalData.R4@epa.gov. The XML format is available from EPA R6.

4.3 Post Disposal Summary Report

A Post Disposal Summary Report shall be provided to EPA R6 within 90 days after project completion. An extension can be requested for extenuating circumstances. The report should include:

- a) dredging project title
- b) permit number and expiration date (if applicable)
- c) contract number

- d) name of contractor(s) conducting the work
- e) name and type of vessel(s)
- f) disposal timeframes for each vessel
- g) dredged material volumes placed within the ODMDS
- h) number of loads to the ODMDS
- i) type of material disposed at the ODMDS
- j) dates of pre and post disposal bathymetric surveys of the ODMDS
- k) identification by load number of any misplaced material
- l) narrative discussing any violation(s) of the MPRSA 103 concurrency and/or permit (if applicable).

The report will be in the form of a narrative with the following sections: 1) introduction, 2) description of dredging and disposal operations, 3) description of pre- and post-disposal bathymetry including synopsis of findings, and 4) a summary. The summary will include a table with the following columns: ID (row identifier), ODMDS, date of Disposal, Gross Cubic Yards Placed, and Discharge Location (Latitude (North) and Longitude (West)). An example of a Post Disposal Summary Report is provided in Appendix E.

If applicable, the report should also include a description of any violation(s), indicate the time it occurred and when it was reported to the EPA R6 and SWG, discuss the circumstances surrounding the violation, and identify specific measures taken to prevent reoccurrence.

The Post Disposal Summary Report should be accompanied by the bathymetry survey results (plot and X, Y, Z ASCII data file), a summary scatter plot of all disposal start locations, and a summary table of the trip information required by Section 3.3. If all data is provided in the required XML format, scatter plots and summary tables will not be necessary.

4.4 Environmental Monitoring Reporting

Other federal and state agencies, academia, and non-government organizations conduct research in GBC and vicinity. EPA R6 and SWG will periodically review the findings of these groups or request data that are relevant to the navigation channel, ODMDS, and project area to improve our understanding of site environs. Conversely, EPA R6 and SWG should make every effort to provide project reports and data to interested parties upon request. New or existing information that is relevant to management of the ODMDS should be incorporated into future versions of this SMMP.

5.0 SITE MANAGEMENT PLAN REVIEW AND REVISION

Pursuant to Section 102(c) of the MPRSA, as amended by WRDA 1992, the SMMP for the ODMDS will be reviewed not less frequently than ten years after adoption and every ten years, thereafter.

Modifications or updates to the SMMP may be necessary, based on scheduled reviews, as specific needs are identified for the project, and/or if results from monitoring surveys or reports indicate that continued use of the ODMDS would lead to unacceptable environmental impacts.

Modifications or updates to the SMMP may be proposed by SWG or EPA R6. Following a 30-day review period of the proposed changes(s), the modifications may be incorporated into the plan by mutual consent of both agencies.

6.0 IMPLEMENTATION

This plan is effective from the date of signature for a period not to exceed ten years.

7.0 REFERENCES

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Appendix A – GBC Estimated Volumes and Frequency

Major Channel	Channel Segments	Dredge Area Station Nos	Est. Volume (CY) per contract	Dredging rate (years)
Galveston Channel				
	Entrance, Jetty, Inner/Outer Harbor	0+000 to 76+000	5,000,000	1.5
	Galveston Harbor Channel	0+000 to 22+570		
Texas City Ship Channel				
	HSC @ Bolivar Roads to Main Channel	0+000 to 36+200	1,000,000	1.5
	Main Turning Basin	0+00 to 44+78		
	Industrial Canal	0+00 to 99+64	300,000	2
HSC - Lower Bay				
	Bolivar Roads	0+000 to 4+062	500,000	1.5
	Redfish Reef	78+000 to 138+000		
HSC - Mid Bay				
	Redfish Reef to Beacon 78	78+000 to 23+000	5,000,000	3
	Bayport Ship Channel	239+10 to 25+58	1,000,000	3
	Bayport Flare portion of Redfish Reef to Beacon 78	??	1,000,000	1.5
HSC - Upper Bay				
	Beacon 78 to Morgans Point	23+000 to -0+004	5,000,000	3
	Morgans Point to Exxon	0+00 to 295+00		
	Barbour's Cut	9+83 to 91+98		
	Exxon to Carpenters	295+00 to 520+00		
HSC - Landlocked				
	Carpenters to Greens Bayou	520+00 to 835+00	7,500,000	4
	Greens Bayou	0+000 to 108+24		
	Greens Bayou to Sims Bayou	835+00 to 1110+77	5,500,000	5
	Sims Bayou to Upper Turning Basin	1110+77 to 14+-5A	6,000,000	3
	Brandy Island Channel	7+74 to 51+00	200,000	6

Appendix B – Surveys Conducted at the Galveston ODMDS

Survey/Study	Date	Conducted by	Objectives	Reference
Final Report – Galveston Winter Series. Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from Galveston Harbor and Texas City Channels, Texas	May-78	NUS Corp	Bioassays, chemistry	N/A
Final Report – Texas City Winter Series. Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from Galveston Harbor and Texas City Channels, Texas	May-78	NUS Corp	Bioassays, chemistry	N/A
Final Report – Galveston Summer Series. Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from Galveston Harbor and Texas City Channels, Texas	August-78	NUS Corp	Bioassays, chemistry	N/A
Final Report – Texas City Summer Series. Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from Galveston Harbor and Texas City Channels, Texas	August-78	NUS Corp	Bioassays, chemistry	N/A
Final Report – Galveston Winter Series. Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from Galveston Harbor, Texas	December-79	NUS Corp	Sediment, water, and elutriate chemistry, bioassays, bioaccumulation	Horne and Swirsky 1979
Houston Ship Channel, Redfish Reef to Morgan Point, Biological Services, Final Report (new work material)	October-80		Bioassays	N/A
Houston Ship Channel, Bolivar Roads to Redfish Reef, Biological Services, Final Report (new work material)	October-80		Bioassays	N/A
Redfish Reef to Morgan Point, Biological Service, Final Report (maintenance material)	December-82		Bioassays	N/A
Bolivar Road to Redfish Reef, Biological Service, Final Report (maintenance material)	December-82		Bioassays	N/A
Bioassay, Chemical Analyses, and Statistical Analyses of Samples Obtained from the Galveston Harbor and Channel, Texas	August-84	NUS Corp	Sediment, water, and elutriate chemistry, grain size, bioassays, bioaccumulation	NUS 1984
Bathymetry	February-86	USACE-SWG	Channel and ODMDS soundings for maintenance dredging	4/18/1986 Letter
Final Feasibility Report and Environmental Impact Statement, Galveston Bay Area Navigation Study	Jul 1987 (Revised Jul 1988)	USACE-SWG	Sediment, water, and elutriate chemistry	USACE 1987
Bathymetry	April-88	USACE-SWG	Channel and ODMDS soundings for maintenance dredging	7/17/1988 Letter

Survey/Study	Date	Conducted by	Objectives	Reference
Raw Data	April-88		Sediment, water, and elutriate chemistry, grain size	
Raw Data	June-90		Sediment, water, and elutriate chemistry, grain size	
Raw Data	Jul/Aug - 91	Anacon	Sediment chemistry	Anacon 1991
Bathymetry	January-93	USACE-SWG	Channel and ODMDS soundings for maintenance dredging	6/30/1995 Letter
Galveston Entrance Channel Contaminant Assessment	September-94	Espey, Huston, & Associates	Bioassays & Bioaccumulation	EH&A 1994a
Galveston Inner and Outer Bar Channels Contaminant Assessment	October-94	Espey, Huston, & Associates	Bioassay & Bioaccumulation	EH&A 1994b
Galveston Harbor and Channel, TX, Entrance Channel & Anchorage Area – Raw Data (EH&A Job #16045)	September-96	Anacon	Sediment, water, and elutriate chemistry, grain size	Anacon 1996
Bathymetry	September-96	USACE-SWG	Channel and ODMDS soundings for maintenance dredging	11/20/1996 Letter
Region VI Contaminated Sediment Study – Phase III	July-95	Battelle	Bulk sediment, toxicology, benthics, fish community, and tissue analysis in ODMDS and Reference site	Trulli 1996
Environmental Assessment, Houston-Galveston Navigation Channels, Texas, Project for changes in Bolivar beneficial use placement area, safety zone construction, changes in the offshore placement area, centerline offset, Lower Bay reach	February-99	USACE-SWG	Bathymetry for Placement Area #2 and portions of ODMDS	USACE 1999
Characterization of Ocean Dredged Material Disposal Site, Galveston Harbor and Channel, Galveston, Texas – Interpretive Report	May-02	Tetra Tech	Bathymetry, sediment physical, toxicological, and bioaccumulation analyses at ODMDS and Reference site	Tetra Tech 2002
Bathymetry	October-02	USACE-SWG	Channel and ODMDS soundings for maintenance dredging (also includes soundings for Corpus Christi (CCSC) ODMDS project)	11/6/2002 Letter

Survey/Study	Date	Conducted by	Objectives	Reference
Bathymetry	March-04	USACE-SWG	Channel and ODMDS soundings for maintenance dredging (also includes detailed soundings for Placement Area #2)	4/5/2004 Letter
Bathymetry	April-06	USACE-SWG	Channel and ODMDS soundings for maintenance dredging	5/15/2006 Letter
Galveston Harbor and Channel Contaminant Assessment, Galveston, Texas	March-07	PBS&J	Sediment, water, and elutriate chemistry, grain size, bioassays, and bioaccumulation	PBS&J 2007
Houston Ship Channel, Entrance Channel Contaminant Assessment	November-07	PBS&J	Sediment, water, and elutriate chemistry, grain size, bioassays, and bioaccumulation	PBS&J 2008a
Bayport Ship Channel – Bayport Flare, Houston Ship Channel – Redfish North, Chambers & Galveston Counties, Texas	October-08	PBS&J	Sediment, water, and elutriate chemistry, bioassays & bioaccumulation	
Characterization of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzo-Furans Contaminants in Sediment of the Houston Ship Channel Between Morgan's Point and Galveston Island in Galveston Bay, Texas	2009	BES	Dioxins/Furans analysis	BES 2009
Galveston Harbor and Channel and Houston Ship Channel Contaminant Assessment	September-11	SOL/Atkins	Sediment physical, toxicological, and bioaccumulation analyses, including in-depth dioxin/furan analysis	USACE 2012
Galveston ODMDS Sediment Testing and Analysis Interpretive Report	May-12	GEC/CEC	Dioxins/furans, metals, and PAH concentrations at ODMDS and PA2	GEC 2012

Appendix C – Site User Monitoring Requirements

MONITORING CATEGORY	TECHNIQUE	SPONSOR	RATIONALE	FREQUENCY	ACTION THRESHOLD	MANAGEMENT OPTIONS	
						THRESHOLD NOT EXCEEDED	THRESHOLD EXCEEDED
Monitor Bathymetric Trends	Routine Bathymetric Survey	Site User	Determine the height and extent of the disposal mound	Pre and post disposal (45 days) for significant projects (>50,000 CY)	Mound height >10 ft above existing bottom	Continue monitoring	Initiate Advanced Bathymetric Surveys of the affected area
	Advanced Bathymetric Survey	Site User	Determine changes in mound height until impacts are no longer observed	Semi-annually	(1) Mounding > 10 ft above existing bottom (2) Persistence of a mound (limited or no dispersion observed between surveys)	Continue monitoring until mound height <10 ft, then resume routine bathymetric monitoring	(1) Modify disposal method/placement; (2) Direct disposal operators to avoid areas shallower than the depth determined by bathymetry; (3) Physically level material to 10 ft or less; (4) Notify mariners of mound location and depth
ODMDS Boundaries	Routine Bathymetric Survey	Site User	Determine if placement beyond assigned disposal zone and/or ODMDS boundaries has occurred.	Pre and post disposal (45 days)	Sedimentation > 1 ft along and beyond site boundaries(2) Evidence of an unauthorized discharge outside of ODMDS boundary	Continue Monitoring	Initiate Advanced Bathymetric Surveys of the affected area
	Advanced Bathymetric Survey	Site User	Determine changes in dispersion of material until impacts are no longer observed	Semi-annually	Persistence of sedimentation > 1 ft along and beyond site boundaries	Continue monitoring until sedimentation < 1 ft. along and beyond site boundaries, then resume routine monitoring	(1) Modify disposal method/placement; (2) Restrict disposal volumes; (3) Expansion of ODMDS; (4) Relocation of ODMDS
Project Disposal	Post Disposal Summary Report	Site User	(1) Ensure management requirements are being met; (2) to assist in site monitoring	90 days after project completion	Disposal records required by SMMP are not submitted or are incomplete	Continue monitoring	Request extension from EPA R6

Appendix D – Galveston ODMDS Monitoring Requirements

MONITORING CATEGORY	TECHNIQUE	SPONSOR	RATIONALE	FREQUENCY	ACTION THRESHOLD	MANAGEMENT OPTIONS	
						THRESHOLD NOT EXCEEDED	THRESHOLD EXCEEDED
ODMDS Trend Assessment	Water and Sediment Quality, Benthic Community Analysis (40CFR228.13)	EPA	Periodically evaluate the impact of disposal on the marine environment (40CFR 228.9)	Approximately every 10 years as funding allows	(1) Absence from the site of pollution sensitive biota (2) Progressive non-seasonal changes in water or sediment quality	Continue Monitoring	(1) Conduct Environmental Effects Monitoring or Advanced Environmental Effects Monitoring (2) Review dredged material evaluation procedures
Environmental Effects Monitoring	Chemical Monitoring	EPA	Determine if chemical contaminants are significantly elevated ¹ within and outside of site boundaries	Implement if (1) disposal footprint extends significantly beyond the site boundaries (2) Trend Assessment results warrant	Contaminants are found to be elevated ² .	Discontinue monitoring	(1) Institute Advanced Environmental Effects Monitoring (2) Implement case specific management options (i.e. Remediation, limits on quantities or types of material)
	Benthic Monitoring		Determine whether there are adverse changes in the benthic populations outside of the site and evaluate recovery rates		Adverse changes observed outside of the site that may endanger the marine environment.		
Advanced Environmental Effects Monitoring	Tissue Chemical Analysis	EPA	Determine if site is a source of adverse bioaccumulation which may endanger the marine environment	Implement if Environmental Effects Monitoring warrants	Benthic body burdens and risk assessment models indicate potential for food chain impacts	Discontinue monitoring	(1) Discontinue site use
	Benthic Monitoring		Determine if site is a source of adverse sub-lethal ² changes in benthic organisms which may endanger the marine environment		Sub-lethal effects are unacceptable		(2) Implement case specific management options (i.e. Remediation, limits on quantities or types of material)

Appendix E – EPA R6 Post Disposal Summary Report Template

Project: *Enter Project name*

Contract: *Enter Contract number*

ITEM	INFORMATION
1. DOA Permit Number Expiration Date 2. Section 103 Concurrence	Civil Work project. No DOA permit. <i>Enter date</i>
3. Contract Number	<i>Enter contract number</i>
4. Contract Title	<i>Enter contract title</i>
5. Prime Contractor Tracking System	<i>Enter name of contractor tracking system</i>
6. Vessel Name (type)	<i>Name of Dredge (type of dredge)</i>
7. Disposal Timeframes	<i>Enter dates of disposal</i>
8. Volume disposal at ODMDS	Enter volume placed CY
9. Number of loads to ODMDS	<i>Enter number</i>
10. Material Type	<i>Enter type of material (e.g. Silty Sand)</i>
11. Misplaced Material	<i>Enter quantity of misplaced material</i>
12. Date of pre-disposal survey	<i>Enter month/day/year and (survey #)</i>
13. Date of post-disposal survey	<i>Enter month/day/year and (survey #)</i>

Supporting Narrative:

Isopach Map with 1-Foot Color Contours Showing Post Disposal Elevation Change

