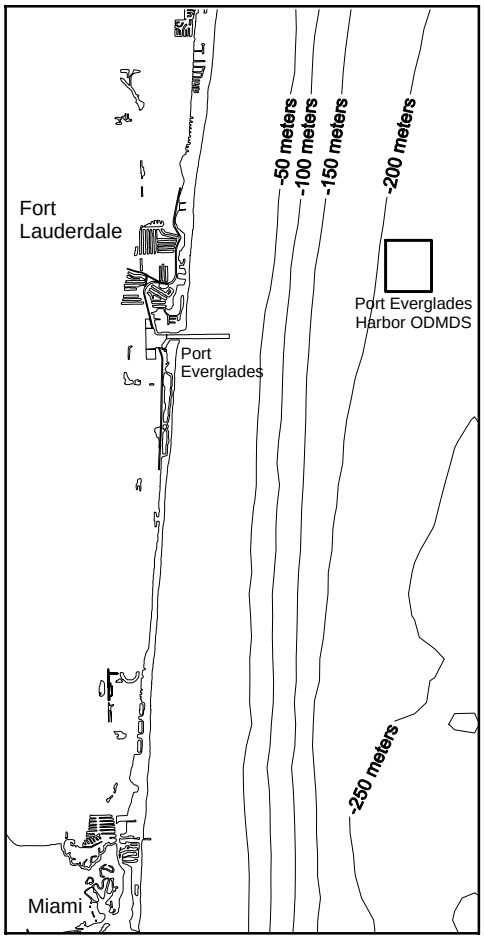
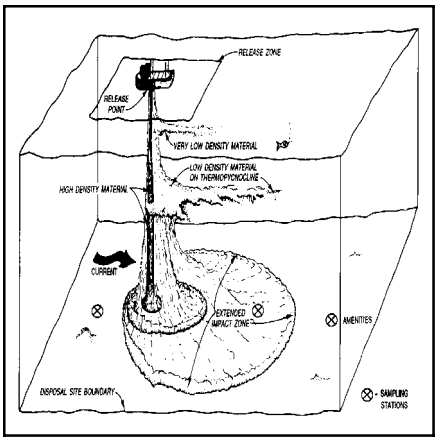
November 2004

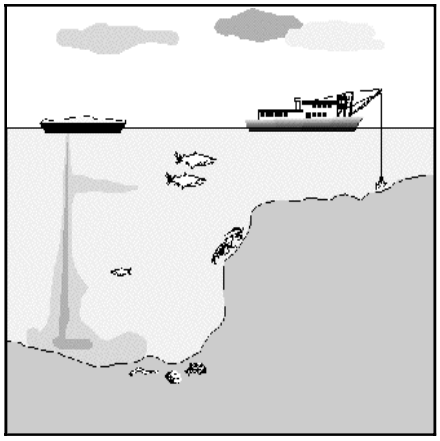
PORT EVERGLADES HARBOR
OCEAN DREDGED MATERIAL DISPOSAL SITE

U.S. Army Corps
of Engineers

SITE MANAGEMENT AND MONITORING PLAN







This page intentionally left blank

The following Site Management and Monitoring Plan for the Port Everglades Harbor ODMDS has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) to the Marine Protection, Research, and Sanctuaries Act of 1972 for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers.

FOR 30 NOV 04

Robert M. Carpenter
Colonel, U.S. Army
District Engineer
Jacksonville District
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida

Date

James D. Giattina
Director
Water Management Division
U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia

Date

This plan is effective from the date of signature for a period not to exceed 10 years. The plan shall be reviewed and revised more frequently if site use and conditions at site indicate a need for revision.

This page intentionally left blank

PORT EVERGLADES HARBOR OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)
SITE MANAGEMENT AND MONITORING PLAN

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Port Everglades Harbor ODMDS
Site Management and Monitoring Plan

INTRODUCTION

It is the responsibility of the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) under the Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 to manage and monitor each of the Ocean Dredged Material Disposal Sites (ODMDSs) designated by the EPA pursuant to Section 102 of MPRSA. The MPRSA, the Water Resources Development Act (WRDA) of 1992, and a Memorandum of Agreement between EPA and COE require the development of a site management and monitoring plan (SMMP) to specifically address the disposal of dredged material at the Port Everglades Harbor ODMDS. SMMP provisions shall establish requirements for all dredged material disposal activities at the site. All Section 103 (MPRSA) ocean disposal permits or evaluations shall be conditioned as necessary to assure consistency with the SMMP.

Site Management and Monitoring Plan Team. An interagency SMMP team has been established to assist EPA and COE in finalizing this SMMP. The team consists of the following agencies and their respective representatives:

Jacksonville District Corps of Engineers

State of Florida

EPA Region 4

Port of Port Everglades

NOAA

Other agencies such as the National Marine Fisheries Service (NMFS) and the Fish and Wildlife Service (FWS) will be asked to participate where appropriate. The SMMP team will assist EPA in evaluating existing monitoring data, the type of disposal (i.e., O&M vs. construction), the type of material (i.e., sand vs. mud), location of placement within the ODMDS and quantity of material. The team will assist EPA and COE on deciding on appropriate monitoring techniques, the level of monitoring, the significance of results and potential management options.

SITE MANAGEMENT

Section 228.3 of the Ocean Dumping Regulations (40 CFR 220-229) states: "Management of a site consists of regulating times, rates, and methods of disposal and quantities and types of materials disposed of; developing and maintaining effective ambient monitoring programs for the site; conducting disposal site evaluation studies; and recommending modifications in site use and/or designation." This plan may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process.

Disposal Site Characteristics

The Port Everglades Harbor ODMDS is a 1 nmi by 1 nmi square area centered at the coordinates 26º 07.00'N latitude and 80º 01.50'W longitude (NAD83) or state plane coordinates 649292.4 N and 976098.2 E (NAD83). The corner coordinates are as follows:

Geographic (NAD83)		**State Plane (Florida East 0901 U.S. Feet NAD83)**	
26º07.50'N	80º02.00'W	652301.1 N	973341.1 E
26º07.50'N	80º01.00'W	652342.1 N	978810.0 E
26º06.50'N	80º02.00'W	646242.9 N	973386.1 E
26º06.50'N	80º01.00'W	646283.9 N	978855.7 E

The site is 4 nmi offshore, has a depth range of 195 to 215 meters (640 to 705 feet), and an area of 1 nmi^2.

Management Objectives. There are three primary objectives in the management of each ODMDS. These are:

- Protection of the marine environment;
- Beneficial use of dredged material whenever practical; and
- Documentation of disposal activities at the ODMDS.

The following sections provide the framework for meeting these objectives to the extent possible.

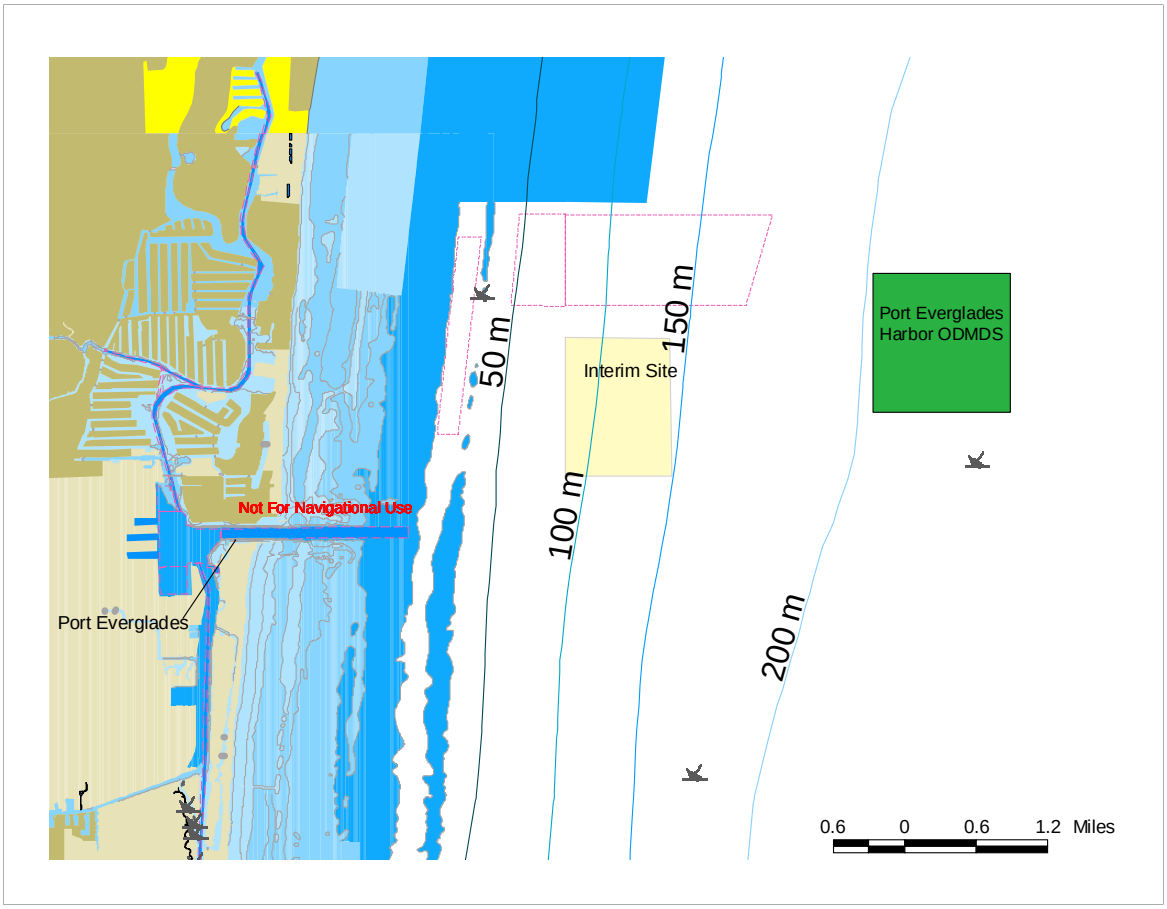


Figure 1: Port Everglades Harbor ODMDS Location Map

Material Volumes. It is intended that the Port Everglades Harbor ODMDS will be used for disposal of dredged material (both maintenance and construction or new work material) from the Port Everglades Harbor and vicinity. The primary user of the ODMDS will be the U.S. Army Corps of Engineers for maintenance of the Port Everglades Harbor Federal Project. The Port Everglades Harbor ODMDS has not been previously used for disposal of dredged material. The interim site located approximately 1.6 nautical miles from shore was previously used for ocean disposal of dredged material from Port Everglades Harbor. 219,000 cubic yards of dredged material had been disposed at the Interim site since 1976 with the last disposal of 16,400 cubic yards occurring in 1982 (WES, 1999).

The Jacksonville District Corps of Engineers has projected annual average disposal rates of 30,000 cubic yards. However, annual disposal events are unlikely. Maintenance dredging project sizes have ranged from 26,000 cubic yards to 144,000 cubic yards including portions used for beneficial uses (Brodehl, 2003). Maintenance disposal volumes at the ODMDS will likely fall within or less than these ranges. Future potential additional projects include a

construction project at Port Everglades Harbor. Dredged material volumes from this project have been estimated at 7 million cubic yards. The COE is in the process of developing a Draft General Re-Evaluation Report which will provide disposal volumes and evaluate alternatives.

The capacity of the Port Everglades Harbor ODMDS has not been determined. Modeling conducted by the Coastal Engineering Research Center (CERC) was conducted for a single project volume up to 500,000 cubic yards. Therefore, use of the ODMDS will be restricted to 500,000 cubic yards of dredged material per project. Projects in excess of 500,000 cubic yards of dredged material will require additional capacity studies prior to utilization of the ODMDS.

Material Suitability. Material from Port Everglades Harbor is variable depending on location. Sampling in the basin in 1997 showed that the material from the bay was 38% fines by weight. Material from the inlet was only 5% fines. The disposition of any significant quantities of beach compatible sand from future projects will be determined during permitting activities for any such projects. It is expected that the State of Florida will exercise its authority and responsibility, regarding beach nourishment, to the full extent during any future permitting activities. Utilization of any significant quantities of beach compatible dredged material for beach nourishment is strongly encouraged and supported by EPA.

The suitability of dredged material for ocean disposal must be verified by the COE and agreed to (concurred) by EPA prior to disposal. Verification will be valid for three years from the time last verified. Verification will involve: 1) a case-specific evaluation against the exclusion criteria (40 CFR 227.13(b)), 2) a determination of the necessity for testing including bioassay (toxicity and bioaccumulation) testing for non-excluded material based on the potential for contamination of the sediment since last tested, and 3) carrying out the testing (where needed) and determining that the non-excluded, tested material is suitable for ocean disposal.

Documentation of verification will be completed prior to use of the site. Documentation will be in the form of a MPRSA Section 103 Evaluation. The Evaluation and any testing will follow the procedures outlined in the 1991 EPA/COE Dredged Material Testing Manual and 1993 Regional Implementation Manual (RIM) or the appropriate updated versions. This includes how dredging projects will be subdivided into project segments for sampling and analysis. The MPRSA Section 103 Evaluation will be in the form outlined in Appendix B of the RIM. Only material determined to be suitable through the verification process by the COE and EPA will be placed at the Port Everglades Harbor ODMDS.

Time of disposal. At present no restrictions have been determined to be necessary for disposal related to seasonal variations in ocean current or biotic activity. As monitoring results are compiled, should any such restrictions appear necessary, disposal activities will be scheduled so as to avoid adverse impacts. Additionally, if new information indicates that endangered or threatened species are being adversely impacted, restrictions may be imposed.

Disposal Technique. No specific disposal technique is required for this site. Standard surveillance and evasive measures to protect sea turtles and marine mammals shall be employed during all disposal operations at the ODMDS.

Disposal Location. Based on modeling efforts, disposal should occur within 600 feet of the center of the Port Everglades Harbor ODMDS to prevent the disposal mound from exceeding site boundaries (EPA, 1999). This release zone can be modified based on results from any capacity study and post-disposal bathymetric surveys.

Permit and Contract Conditions. The disposal monitoring and post-disposal monitoring requirements described under Site Monitoring will be included with the management requirements described in this section as permit conditions on all MPRSA Section 103 permits and will be incorporated in the contract language for all federal projects. A summary of the management and monitoring requirements to be included are listed in Table 1. Appendix B contains a template for standard permit conditions for MPRSA 103 permits for the Port Everglades Harbor ODMDS and Appendix C contains a template for standard contract conditions for civil works project use of the ODMDS.

Table 1. Summary of Permit and Contract Conditions

Condition	Reference
Dredged Material Suitability and Term of Verification	Port Everglades Harbor ODMDS SMMP page 4 Regional Implementation Manual
Disposal Zone	Port Everglades Harbor ODMDS SMMP page 5
Pre and Post Bathymetric Surveys	Port Everglades Harbor ODMDS SMMP page 8 and 11
Disposal Monitoring	Port Everglades Harbor ODMDS SMMP page 11
Reporting Requirements	Port Everglades Harbor ODMDS SMMP page 16

Permit Process. The permit process is outlined in Figure 2 and consists of 10 main steps:

1. **Preapplication Consultation**: Includes discussion of alternatives and the qualitative and quantitative information required by the District Engineer for use in evaluating the proposed dredged material.
2. **Evaluation of Dredged Material Proposed for Ocean Disposal**: Includes development, approval and implementation of sampling and analysis plan (see Section on Material Suitability). This step should include close coordination between EPA Region 4, the Jacksonville District Corps of Engineers and the applicant.
3. **Permit Application**: According to 33 CFR 325.1, a permit application must include the following:
   a. A complete description of the proposed activity, including necessary drawings, sketches, or plans.

b. The location, purpose, and need for the proposed activity; scheduling of the activity; names and addresses of adjoining property owners; location and dimension of adjacent structures
c. A list of authorizations required by other Federal, interstate, State, or local agencies for the work, including all approvals received or denials already made
d. The source of the material; the purpose of the disposal and a description of the type, composition, and quantity of the material (this includes information necessary to determine if the material is in compliance with the criteria); the method of transportation and disposal of the material; and the location of the disposal site.

4. **Review of Application for Completeness**: Additional information is requested if the application is incomplete.
5. **Public Notice**: Per 33 CFR 325.3, Public Notices issued by the USACE for dredged material disposal must include all of the information in 40 CFR 225.2(a) (see RIM). A supplemental, revised or corrected Public Notice will be issued if the District Engineer believes that the new information affects the review of the proposal.
6. **EPA MPRSA Review**: Independent review of the information to determine whether the disposal activity complies with the criteria found in 40 CFR 227 and 228.
7. **District Engineer Completes Evaluation**: The District Engineer addresses comments and holds public meeting if needed.
8. **USACE Public Interest Review**: The USACE must consider all comments, suggestions, and concerns provided by all commenters and incorporate their comments into the administrative record of the application.
9. **Permit Issued**: A decision to issue or deny a permit is discussed in either a Statement of Findings or Record of Decision.
10. **Permit Public Notice**: A list of permit decisions is published and distributed to all interested parties each month.

Information Management of Dredged Material Placement Activities. As discussed in the following sections, a substantial amount of diverse data regarding use of the Port Everglades Harbor ODMDS and effects of disposal is required from many sources (EPA, COE, Port Authority or other site user). If this information is readily available and in a useable format it can be used to answer many questions typically asked about a disposal site:

- What is being dredged?
- How much is being dredged?
- Where did the dredged material come from?
- Where was the dredged material placed?
- Was dredged material dredged correctly? placed correctly?
- What will happen to the environment at the disposal site?

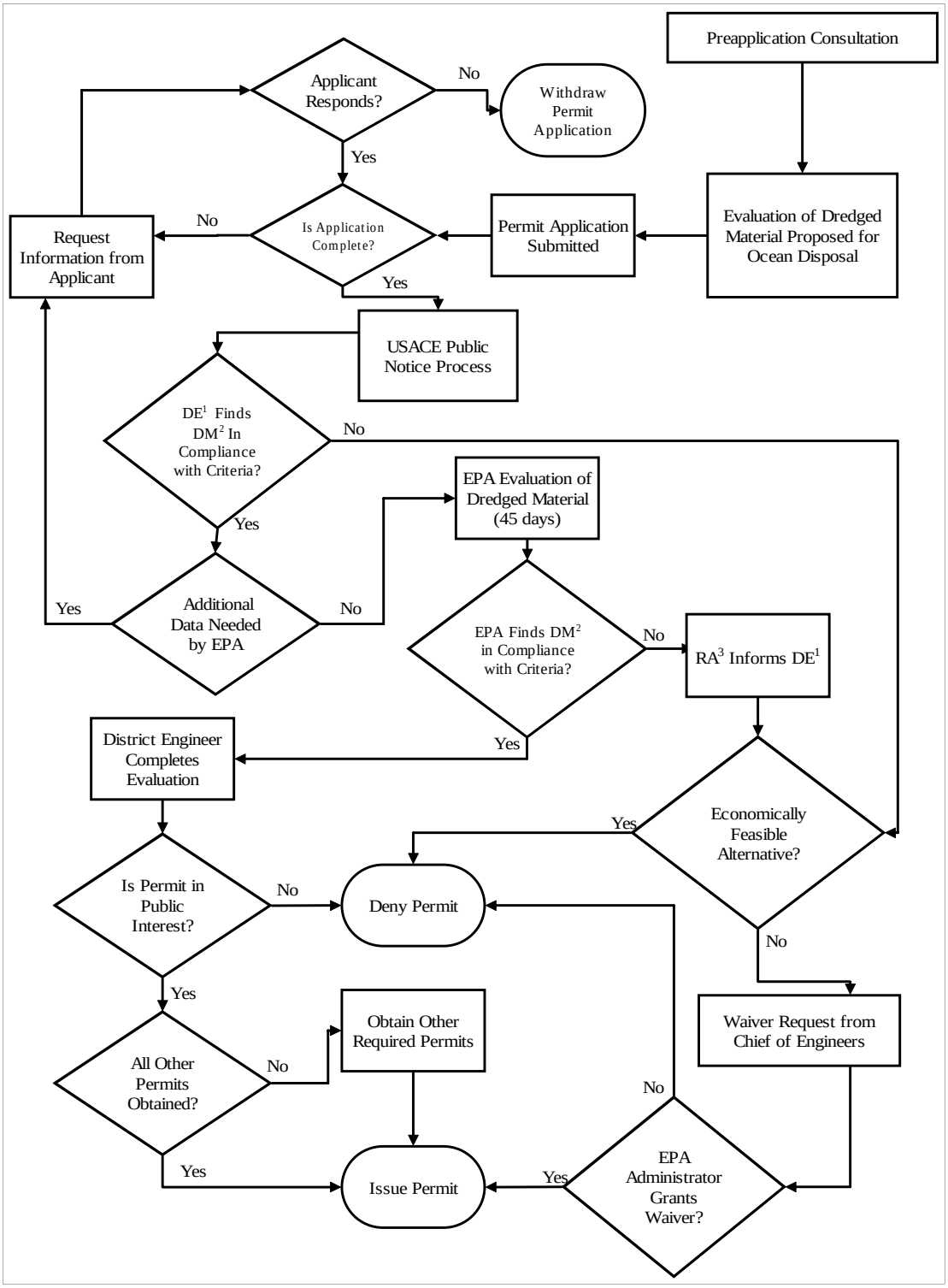


Figure 2: Permit Application/Evaluation Procedure
[1]District Engineer; [2]Dredged Material; [3]Regional Administrator

As part of site management, EPA and the COE will investigate alternatives for appropriate data management.

SITE MONITORING

The MPRSA establishes the need for including a monitoring program as part of the Site Management Plan. 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 requirements. Monitoring programs should be flexible, cost effective, and based on scientifically sound procedures and methods to meet site-specific monitoring needs. A monitoring program should have the ability to detect environmental change as a result of disposal activities and assist in determining regulatory and permit compliance. The intent of the program is to provide the following:

(1) Information indicating whether the disposal activities are occurring in compliance with the permit and site restrictions; and/or

(2) Information concerning the short-term and long-term environmental impacts of the disposal; and/or

(3) Information indicating the short-term and long-term fate of materials disposed of in the marine environment.

The main purpose of a disposal site monitoring program is to determine whether dredged material site management practices, including disposal operations, at the site need to be changed to avoid significant adverse impacts.

Baseline Monitoring. Site characterization surveys of the ODMDS have been conducted by EPA and the COE as part of the designation process. These are summarized in Table 2. Results from these surveys can be used in part as baseline data for the monitoring of impacts associated with use of the Port Everglades Harbor ODMDS.

A high resolution bathymetric survey will be conducted by the COE or site user within three (3) months prior to initial use of the ODMDS. For subsequent projects, the need for pre-disposal bathymetric surveys will depend on project volumes. Pre-disposal surveys will be required within (3) months prior to dredging cycle or project disposal for projects greater than 100,000 cubic yards. Bathymetric surveys will be used to monitor the disposal mound to assist in verification of material placement, to monitor bathymetry changes and trends and to insure that the site capacity is not exceeded, ie., the mound does not exceed the site boundaries. Surveys will conform to the minimum performance standards for Corps of Engineers Hydrographic Surveys for navigation and dredging support surveys-soft bottom as described in the COE Engineering Manual, EM1110-2-1003, "Hydrographic Surveying" dated January 1, 2002 to the

extent practicable. The number and length of transects required will be sufficient to encompass the ODMDS and a 500 foot wide area around the site. The surveys will be taken along lines spaced at 500-foot intervals or less (200 feet for high resolution survey) with a depth recording density of 20 to 70 feet (less than 20 feet for high resolution survey). Depth precision of the surveys will be $\pm$ 0.1 feet and an accuracy of $\pm$ 2.0 feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either a microwave line of sight system or differential global positioning system. The vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum. The horizontal datum will be Florida State Plane (zone 0901 FL East) or Geographic (NAD 1983). Horizontal positioning accuracy will be 6 feet. Copies of these surveys shall be provided to EPA Region 4 when completed. No additional pre-disposal monitoring at this site is required.

Table 2. Surveys Conducted at the Port Everglades Harbor ODMDS

Survey Title	Conducted by	Date	Purpose	Conclusion
Benthic Macroinfaunal Analysis of the Port Everglades and Palm Beach, Florida ODMDS Surveys	Battelle for EPA	1984	Characterization (sediment analysis, benthic biota) Survey	Characterization of benthos for February & November 1984
Field Studies in Nearshore Areas at Port Everglades, Palm Beach County, and Brevard County, Florida	Continental Shelf Associates for EPA	1986	Benthic characterization of one square mile candidate site (4 mile candidate site) through sidescan and bathymetry.	No high relief ledges, rock outcrops or steep slopes detected. Occasional rubble or cobbles and some low relief rock outcrop
Video, Still Camera, and Side-Scan Sonar Survey of the Seafloor Within and Downcurrent of a Tentative Alternative ODMDS off Port Everglades, Florida.	Continental Shelf Associates for EPA	1986	Look for presence of natural resources (critical habitats) and presence of man made obstructions on the bottom and. down current of site.	Data showed a predominately fine-to-coarse sediment covered bottom with scattered rocks, areas of rock rubble and sand ripples.
Sediment & Water Quality of Candidate Ocean Dredged Material Disposal Sites for Port Evergades and Palm Beach, Florida	U.S. EPA Region 4	1999	Characterization (water column profiles, water quality, sediment characteristics, benthic bioata) survey	Conditions at the site are relatively pristine. Water column is clear with low suspended sediment concentrations (2-20mg/l). Sediments consists of mostly fine sand (70%) and have low level of contaminants.
Sidescan Survey of Candidate Ocean Dredged Material Disposal Sites for Port Evergades and Palm Beach, Florida	U.S. EPA Region 4	1999	Look for presence of natural resources (critical habitats) and presence of man made obstructions on the bottom.	The side-scan sonar data indicated a fine sandy bottom with scattered rouble zones throughout the site and areas 2 miles to the north and 2 miles south of the site. No areas of rock outcrops or potential wrecks were identified through the side-scan record within the site or north or south of the site.

Disposal Monitoring. For all disposal activities, the dredging contractor will be required to prepare and operate under an approved electronic verification plan for all disposal operations. As part of this plan, the contractor will provide an automated system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition (vertical) of the disposal vessel from the point of dredging to the disposal area, and return to the point of dredging. Required digital data are as follows:

(a) Date;

(b) Time;

(c) Vessel Name;

(d) Dump Number;

(e) Map Number on which dump is plotted (if appropriate);

(f) Beginning and ending coordinates of the dredging area for each load (source of dredged material);

(g) Actual location (in degrees and minutes of longitude and latitude) at points of initiation and completion of disposal event;

(h) Brief description of material disposed;

(I) Volume of material disposed; and

(j) Disposal technique used.

The user will be required to prepare and submit to the COE daily reports of operations and a monthly report of operations for each month or partial month's work. The user is also required to notify the COE and the EPA if a violation of the permit and/or contract conditions occur during disposal operations.

Post Discharge Monitoring. As a follow-up to the pre-disposal bathymetric survey, the COE or other site user will conduct a bathymetric survey within 30 days after disposal project completion. The number of transects required will be the same as in the pre-disposal survey. Bathymetric survey results will be used to insure that unacceptable mounding is not occurring and to aid in environmental effects monitoring.

The post-disposal bathymetric survey will be required for the initial use of the ODMDS and for each project greater than 100,000 cubic yards.

Potential Environmental Impacts. The main environmental concerns regarding disposal of dredged material at the Port Everglades Harbor ODMDS are: (1) disposal of sediments that may cause significant mortality or bioaccumulation of contaminants within the disposal site or adjacent to the site boundaries, and (2) adverse ecological changes to the ODMDS and the surrounding sea floor. The first concern is addressed through the permitting/evaluation process in which the sediments are evaluated (see Material Suitability under Site Management). The second concern is addressed through monitoring of the ODMDS. Changes in the benthic community inside the ODMDS are expected because different grain size characteristics in the dredged material may promote colonization of the site by different benthic species. If dredged material is detected outside of the ODMDS, benthic community changes adjacent to the site may be evaluated to determine whether these changes are acceptable. Additionally, at the Port Everglades Harbor ODMDS there are concerns about potiential impacts to nearshore living coral and coralline algal reef systems along the coastline to the west of the site.

Monitoring Strategy. Monitoring of the Palm Beach Harbor ODMDS will follow a tiered approach utilizing management action thresholds. These thresholds will trigger either additional monitoring following the tiered approach or management actions. Monitoring will consist of physical, chemical and biological monitoring. Physical monitoring will provide information about the plume behavior in the water column and dredged material footprint on the bottom. Chemical monitoring provides data on sediment quality and will evaluate bioaccumulation of contaminants in benthic organisms if threshold concentrations of contaminants in sediments are exceeded. Biological monitoring will provide information on the effects of dredged material disposal on the benthic invertebrate communities and on the nearshore living coral and coralline algal reef systems. In the event that the physical monitoring shows that the dredged material footprint extends outside of the designated ODMDS, impacts on the benthos will be investigated. In the event that the physical monitoring shows that the dredged material disposal plume reaches the reef systems, then impacts on the reef systems will be investigated. Some of the monitoring activities will be applied at one or more of the three southeast Florida deepwater ODMDSs (Palm Beach Harbor, Port Everglades Harbor, Miami). Results of those studies will be applied to the Palm Beach Harbor ODMDS where applicable. In addition, 40 CFR 228.9(a) recommends trend assessment surveys be conducted at disposal sites used on a continuing basis.

A summary of the monitoring strategies for the Port Everglades Harbor ODMDS and thresholds for management actions are presented in Table 3. Should future disposal at the Port Everglades Harbor 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.

Table 3. Port Everglades Harbor ODMDS Monitoring Strategies and Thresholds for Action

Goal	Technique	Sponsor	Rationale	Frequency	Threshold for Action	Management Options	
						Threshold Not Exceeded	Threshold Exceeded
Measure Extent of Disposal Mound Footprint	Bathymetric Surveys	COE/ Site User	Determine areal influence of dredged material and potential for effects outside of boundaries	Initial site use and for significant projects (>100,000cy)	Disposal mound footprint occurs outside ODMDS boundaries	Continue to use site without restrictions	-Restrict disposal volumes -Modify disposal method/placement -Institute Chemical and Biological Monitoring to determine impact (Environmental Effects).
	Sediment Profile Imaging	COE/ EPA	Determine extent of disposal mound 'apron'	following significant project at one of the SE FL ODMDSs	Disposal mound footprint occurs outside ODMDS boundaries (5cm)	Continue to use site without restrictions	-Restrict disposal volumes -Modify disposal method/placement -Institute Chemical and Biological Monitoring to determine impact (Environmental Effects).
Determine Likelihood of Disposal Plume Reaching Reefs	DiPRiS[1]	EPA/ NOAA	Determine potential for impact to nearshore reefs	In progress	Suspended sediment concentrations at reefs are elevated[2] due to dredged material disposal	Continue monitoring with unrestricted disposal	-Restrict disposal during onshore current events -Implement Reef Impact Study
Environmental Effects Monitoring	Chemical Monitoring	EPA/ COE	Determine if chemical contaminants are significantly elevated[2] within and outside of site boundaries	Implement if disposal mounds extends beyond site boundaries	Contaminants are found to be elevated[3]	Discontinue monitoring unless disposal quantities, type of material or frequency of use significantly changes	-Institue Advanced Chemical and/or Biological Monitoring to determine impact. (Advanced Environmental Effects) -Restrict Disposal
	Benthic Monitoring & Sediment Profile Imaging	EPA/ COE	Determine whether there are adverse changes in the benthic populations outside of the site and evaluate recovery rates		Adverse changes observed outside of site that may endanger the marine environement		-Limit quantity of dredged material to prevent impacts outside boundaries -Create berms to restrict dredged material movement -Cease site use

Table 3 (Continued). Port Everglades Harbor ODMDS Monitoring Strategies and Thresholds for Action

Goal	Technique	Sponsor	Rationale	Frequency	Threshold for Action	Management Options	
						Threshold Not Exceeded	Threshold Exceeded
Advanced Environmental Effects Monitoring	Chemical Tissue Analysis	EPA/ COE	Determine if site is source of adverse bioaccumulation which may endanger the marine environment	Implement if environmental effects monitoring warrants.	Benthic body burdens greater within footprint than outside	Discontinue monitoring unless disposal quantities, type of material or frequency of use significantly changes	-Discontinue site use -Implement case specific management options (ie. remediation,limits on quantities or types of material).
	Benthic Monitoring	EPA/ COE	Determine if site is source of adverse sub-lethal[4] changes in benthic organisms which may endanger the marine environment		Sub-lethal effects are unacceptable		
Compliance	Disposal Site Use Records	Site User	-Insure management requirements are being met -To assist in site monitoring	Daily during any project	Disposal records required by SMMP are not submitted or are incomplete	Continue Monitoring	-Restrict site use until requirements are met
					Review of records indicates a dump occurred outside ODMDS boundary	Continue Monitoring	-Notify EPA Region 4/COE, and investigate why egregious dump(s) occurred. Take appropriate enforcement action.
					Review of records indicates a dump occurred in the ODMDS but not in target area	Continue Monitoring	-Direct placement to occur as specified.

Table 3 (Continued). Port Everglades Harbor ODMDS Monitoring Strategies and Thresholds for Action

Goal	Technique	Sponsor	Rationale	Frequency	Threshold for Action	Management Options	
						Threshold Not Exceeded	Threshold Exceeded
Trend Assessment Survey	Chemical and/or Biological Measurements (40CFR 228.13)	EPA/ COE	Document and assess changes at the disposal site	As funding allows. Goal is once every 10 years.	Not applicable	Not applicable	Not applicable

[1.] Disposal Plume Reef Impact Study: This study is currently being conducted at the Miami ODMDS. Results are expected to be applicable to the Port Everglades ODMDS.

[2] Elevated: Beyond the natural limits in terms of intensity, duration, and frequency (McArthur et. al, 2002).

[3.] Significantly elevated: 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.

[4] Examples of sub-lethal effects include without limitation the development of lesions, tumors, developmental abnormality, decreased fecundity.

Reporting and Data Formatting. The user will be required to prepare daily reports of operations and submit to the COE a monthly report of operations for each month or partial month's work. Disposal monitoring data shall be delivered to the COE on a weekly basis. The user is also required to notify the COE and the EPA 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.

Disposal summary reports shall be provided by the COE to EPA within 90 days after project completion. These should consist of dates of disposal, volume of disposal, approximate location of disposal (summary plot) and pre and post disposal bathymetric survey results in both hard and electronic formats. Other disposal monitoring data shall be made available upon request. In addition, EPA should be notified by the Corps of Engineers 15 days prior to the beginning of a dredging cycle or project disposal.

Material tracking, disposal effects monitoring and any other data collected shall be coordinated with and be provided to SMMP team members and federal and state agencies as appropriate. Data will be provided to other interested parties requesting such data to the extent possible. Data will be provided for all surveys in a report generated by the action agency. The report should indicate how the survey relates to the SMMP and previous surveys at the Port Everglades Harbor ODMDS and should provide data interpretations, conclusions, and recommendations, and should project the next phase of the SMMP.

MODIFICATION OF THE Port Everglades Harbor ODMDS SMMP

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, then the ODMDS SMMP will be modified to mitigate the adverse impacts. The SMMP will be reviewed and revised if appropriate at a minimum of every ten years. The SMMP will be reviewed and updated as necessary if site use changes significantly. For example, the SMMP will be reviewed if the quantity or type of dredged material placed at the site changes significantly or if conditions at the site indicate a need for revision. Modification will be preceded by contact of all participating team members regarding issues and proposed changes. If any member requests a meeting, a meeting or conference call will be held to discuss issues and proposed changes. Significant changes to the SMMP will be noticed in a local paper for public comment.

REFERENCES

Brodehl, Brian. 2003. November 14 email from Brian Brodehl, USACE Jacksonville District to Christopher McArthur, USEPA Region 4.

Fredette, Thomas J., Nelson, David A., Clausner, James E., and Anders, Fred J. 1990. *Guidelines for Physical and Biological Monitoring of Aquatic Dredged Material Disposal Sites,* Technical Report D-90-12, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

McArthur, C., Ferry, R. and Proni, J. 2002. *Development of Guidelines for Dredged Material Disposal Based on Abiotic Determinants of Coral Reef Community Structure.* In. Dredging '02 Proceedings of the Third Speciality Conference on Dredging and Dredged Material Disposal. Coasts, Harbors, Ports and Rivers Institute (COPRI) of the ASCE. May, 2002, Orlando, FL.

Pequegnat, Willis E., Gallaway, Benny J., and Wright, Thomas D., 1990. *Revised Procedural Guide for Designation Surveys of Ocean Dredged Material Disposal Sites*, Technical Report D-90-8, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

U.S. Army Corps of Engineers Coastal Engineering Research Center. *Port Everglades/Palm Beach Dredged Material Fate Studies.* 2001

U.S. Army Waterways Experiment Station Ocean Disposal Database version 2.21, 1999.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal (Testing Manual),* February 1991. Prepared by Environmental Protection Agency Office of Marine and Estuarine Protection and Department of Army United States Army Corps of Engineers under EPA Contract No. 68-C8-0105.

U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, 1996. *Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites*, February 1996. Prepared by Environmental Protection Agency Office of Water and Department of Army United States Army Corps of Engineers.

U.S. Environmental Protection Agency Region 4 and U.S. Army Corps of Engineers South Atlantic Division, 1993. *Regional Implementation Manual Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Material in Southeastern Atlantic and Gulf Coastal Waters*, May 1993.

U.S. Environmental Protection Agency Region 4. "*Preliminary Port Everglades ODMDS Size Estimate.* 1999. (unpublished)

This page intentionally left blank

PORT EVERGLADES HARBOR ODMDS SMMP
APPENDIX A

WATER COLUMN EVALUATIONS
NUMERICAL MODEL (STFATE) INPUT PARAMETERS

This page intentionally left blank

Water Column Evaluations
Numerical Model (STFATE) Input Parameters
Port Everglades Harbor ODMDS

SITE DESCRIPTION

Parameter	Value	Units
Number of Grid Points (left to right)	40	
Number of Grid Points (top to bottom)	40	
Spacing Between Grid Points (left to right)	500	ft
Spacing Between Grid Points (top to bottom)	500	ft
Constant Water Depth	645	ft
Roughness Height at Bottom of Disposal Site	.005[1]	ft
Slope of Bottom in X-Direction	0.0	Deg.
Slope of Bottom in Z-Direction	1.0	Deg.
Number of Points in Ambient Density Profile[2] Point	5	
Ambient Density at Depth = 0 ft	1.0246	g/cc
Ambient Density at Depth = 65 ft	1.0248	g/cc
Ambient Density at Depth = 328 ft	1.0272	g/cc
Ambient Density at Depth = 492 ft	1.0280	g/cc
Ambient Density at Depth = 645 ft	1.0282	g/cc

AMBIENT VELOCITY DATA[3]

Parameter	Value	Units
Profile	2-Point	
X-Direction Velocity at Depth of 33 feet	- 2.7	ft/sec
Z-Direction Velocity at Depth of 33 feet	+1.1	ft/sec
X-Direction Velocity at Depth of 197 feet	- 2.2	ft/sec
Z-Direction Velocity at Depth of 197 feet	+0.9	ft/sec

DISPOSAL OPERATION DATA

Parameter	Value	Units
Location of Disposal Point from Top of Grid	14,000	ft
Location of Disposal Point from Left Edge of Grid	10,000	ft
Dumping Over Depression	0	

INPUT, EXCECUTION AND OUTPUT

Parameter	Value	Units
Location of the Upper Left Corner of the Disposal Site - Distance from Top Edge	11,000	ft
Location of the Upper Left Corner of the Disposal Site - Distance from Left Edge	7,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Top Edge	17,000	ft
Location of the Lower Right Corner of the Disposal Site - Distance from Left Edge	13,000	ft
Duration of Simulation	14,400	sec
Long Term Time Step	600	sec

COEFFICIENTS

Parameter	Keyword	Value
Settling Coefficient	BETA	0.000[1]
Apparant Mass Coefficient	CM	1.000[1]
Drag Coefficient	CD	0.500[1]
Form Drag for Collapsing Cloud	CDRAG	1.000[1]
Skin Friction for Collapsing Cloud	CFRIC	0.010[1]
Drag for an Ellipsoidal Wedge	CD3	0.100[1]
Drag for a Plate	CD4	1.000[1]
Friction Between Cloud and Bottom	FRICTN	0.010[1]
4/3 Law Horizontal Diffusion Dissipation Factor	ALAMDA	0.001[1]

Parameter	Keyword	Value
Unstratified Water Vertical Diffusion Coefficient	AKYO	Pritchard Expression
Cloud/Ambient Density Gradient Ratio	GAMA	0.250[1]
Turbulent Thermal Entrainment	ALPHAO	0.39[4]
Entrainment in Collapse	ALPHAC	0.100[1]
Stripping Factor	CSTRIP	0.003[1]

[1]Model Default Value
[2]Profiles from EPA 1998 measurements
[3]Velocity data represents average conditions. Determined from WES 1998 analysis of ADCP data offshore Ft. Lauderdale, FL.
[4]Calculated from NOAA Field Work at Miami (1991)

Dilution Rates for Generic Material:
Minimum dilution outside disposal site: 6,600 to 1
Minimum dilution after 4 hours: 15,700 to 1

This page intentionally left blank

Port Everglades HARBOR ODMDS SMMP
APPENDIX B

TEMPLATE FOR MPRSA 103 STANDARD PERMIT CONDITIONS

This page intentionally left blank

TEMPLATE

GENERIC SPECIAL CONDITIONS
FOR MPRSA SECTION 103 PERMITS
Port Everglades HARBOR, FL ODMDS

I. DISPOSAL OPERATIONS

A. For this permit, the term disposal operations shall mean: navigation of any vessel used in disposal of operations, transportation of dredged material from the dredging site to the Port Everglades Harbor, FL ODMDS, proper disposal of dredged material at the disposal area within the Port Everglades Harbor, FL ODMDS, and transportation of the hopper dredge or disposal barge or scow back to the dredging site.

B. The Port Everglades Harbor, FL ODMDS is defined as the rectangle with center coordinates of 26º 07.00'N latitude and 80º 01.50'W longitude (NAD83) or state plane coordinates 649292.4 N and 976098.2 E (NAD83). The corner coordinates are as follows:

Geographic (NAD83)		**State Plane (Florida East 0901 U.S. Feet NAD83)**	
26º07.50'N	80º02.00'W	652301.1 N	973341.1 E
26º07.50'N	80º01.00'W	652342.1 N	978810.0 E
26º06.50'N	80º02.00'W	646242.9 N	973386.1 E
26º06.50'N	80º01.00'W	646283.9 N	978855.7 E

C. No more than [NUMBER] cubic yards of dredged material excavated at the location defined in [REFERENCE LOCATION IN PERMIT] are authorized for disposal at the Port Everglades Harbor, FL ODMDS.

D. The permittee shall use an electronic positioning system to navigate to and from the Port Everglades Harbor, FL ODMDS. For this section of the permit, the electronic positioning system is defined as: a differential global positioning system or a microwave line of site system. Use of LORAN-C alone is not an acceptable electronic positioning system for disposal operations at the Port Everglades Harbor, FL ODMDS. If the electronic positioning system fails or navigation problems are detected, all disposal operations shall cease until the failure or navigation problems are corrected.

E. The permittee shall certify the accuracy of the electronic positioning system proposed for use during disposal operations at the Port Everglades Harbor, FL ODMDS. The certification shall be accomplished by direct comparison of the electronic positioning system's accuracy with a known fixed point.

F. The permittee shall not allow any water or dredged material placed in a hopper dredge or disposal barge or scow to flow over the sides or leak from such vessels during transportation to the Port Everglades Harbor, FL ODMDS.

G. A disposal operations inspector and/or captain of any tug boat, hopper dredge or other vessel used to transport dredged material to the Port Everglades Harbor, FL ODMDS shall insure compliance with disposal operation conditions defined in this permit.

1. If the disposal operations inspector or the captain detects a violation, he shall report the violation to the permittee immediately.

2. The permittee shall contact the U.S. Army Corps of Engineers, Jacksonville District's Regulatory Branch [TELEPHONE NUMBER] and EPA Region 4 at (404) 562-9391 to report the violation within twenty-four (24) hours after the violation occurs. A complete written explanation of any permit violation shall be included in the post-dredging report.

H. When dredged material is disposed, no portion of the hopper dredge or disposal barge or scow shall be outside of the boundaries of the Port Everglades ODMDS as defined in Special Condition B. Additionally, disposal shall occur within the disposal zone defined as a 600 foot radius with center at:

26º 07.00'N latitude and 80º 01.50'W longitude (NAD83)

or

state plane coordinates 649292.4 N and 976098.2 E (NAD83)

I. The permittee shall use an automated disposal verification system that will continuously track (1 to 5 minute intervals) the horizontal location and draft condition of the disposal vessel (hopper dredge or disposal barge or scow) to and from the Port Everglades Harbor ODMDS. This information shall be available in electronic format to the Jacksonville District Corps of Engineers and EPA Region 4 upon request.

1. Required digitally recorded data are: date, time, vessel name, captain of vessel, beginning and ending coordinates of the dredging area for each load, location at points of initiation and completion of disposal, description of material disposed (sand, clay or silt), volume of load, and disposal technique. This information will be available to the Jacksonville District Corps of Engineers on a daily basis.

2. The permittee shall use Florida State Plane or latitude and longitude coordinates (North American Datum 1983 or 1927). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

J. The permittee shall conduct a bathymetric survey of the Port Everglades Harbor ODMDS within 30 days following project completion.

1. The number and length of the survey transects shall be sufficient to encompass the Port Everglades ODMDS and a 500 foot wide area around the site. The transects shall be spaced at 500-foot intervals or less with a depth recording density of 20 to 70 feet..

2. Vertical accuracy of the survey shall be ±0.1 feet. Horizontal location of the survey lines and depth sounding points will be determined by an automated positioning system utilizing either microwave line of site system or differential global positioning system. The vertical datum will be referenced to prescribed NOAA Mean Lower Low Water (MLLW) datum. MLLW is 1.8 feet below NGVD 1929. The horizontal datum will be Florida State Plane (zone 0901 FL East) or Geographic (NAD 1983). State Plane coordinates shall be reported to the nearest 0.10 foot and latitude and longitude coordinates shall be reported as degrees and decimal minutes to the nearest 0.01 minutes.

K. The permittee has read and agrees to assure that they are in compliance with the requirements of the Port Everglades ODMDS Site Management and Monitoring Plan.

II. REPORTING REQUIREMENTS

A. The permittee shall send the U.S. Army Corps of Engineers, Jacksonville District's Regulatory Branch and EPA Region 4's Wetlands, Coastal and Watersheds Branch (61 Forsyth Street, Atlanta, GA 30303) a notification of commencement of work at least fifteen (15) days before initiation of any dredging operations authorized by this permit.

B. The permittee shall submit to the U.S. Army Corps of Engineers weekly disposal monitoring reports. These reports shall contain the information described in Special Condition I.I.

C. The permittee shall send one (1) copy of the disposal summary report to the Jacksonville District's Regulatory Branch and one (1) copy of the disposal summary report to EPA Region 4 documenting compliance with all general and special conditions defined in this permit. The disposal summary report shall be sent within 90 days after completion of the disposal operations authorized by this permit. The disposal summary report shall include the following information:

1. The report shall indicate whether all general and special permit conditions were met. Any violations of the permit shall be explained in detail.

2. The disposal summary report shall include the following information: Corps permit number, actual start date and completion date of dredging and disposal operations, total cubic yards disposed at the Port Everglades Harbor, FL ODMDS, locations of disposal events, and post disposal bathymetric survey results (in hard and electronic formats).

III. PERMIT LIABILITY

A. The permittee shall be responsible for ensuring compliance with all conditions of this permit.

B. The permittee and all contractors or other third parties who perform an activity authorized by this permit on behalf of the permittee shall be separately liable for a civil penalty of up to $50,000 for each violation of any term of this permit thy commit alone or in concert with the permittee or other parties. This liability shall be individual, rather than joint and several, and shall not be reduced in any fashion to reflect the liability assigned to and civil penalty assessed against the permittee or any other third party as defined in 33 U.S.C. Section 1415(a).

C. If the permittee or any contractor or other third party knowingly violates any term of this permit (either alone or in concert), the permittee, contractor or other party shall be individually liable for the criminal penalties set forth in 33 U.S.C. Section 1415(b).

PORT EVERGLADES HARBOR ODMDS SMMP

Appendix C

Jacksonville District Corps of Engineers
Contract Specification Language

This page intentionally left blank

Jacksonville District Corps of Engineers Contract Specification Language

3.3 DISPOSAL OF EXCAVATED MATERIAL

3.3.1 General

Material excavated shall be transported to and deposited in the disposal areas designated on the drawings. The average distance to which the material will have to be transported is approximately 5 miles and the maximum distance will be approximately 6.5 miles.

3.3.2 General [Ocean Dredged Material Disposal Site (ODMDS)]

The material excavated shall be transported to and deposited in the ODMDS designated as "Ocean Disposal Area - O" as shown on the drawings. The material shall be dumped within 600 feet of the center of the ODMDS (X,Y Coordinates: 976098.2 E, 649292.4 N) or (Geographic Coordinates: 26° W 07.00' N; 080° 01.50' W). The state plane coordinates are based on the Transverse Mercator Projection for Florida, East Zone, North Atlantic Datum 1983. Dredged material shall not be placed higher than elevation -30 feet MLLW in "Ocean Disposal Area - O".

3.3.17 Electronic Tracking System (ETS) for Ocean Disposal Vessels

The Contractor shall furnish an ETS for surveillance of the movement and disposition of dredged material during [excavation and ocean disposal] [excavation and disposal (nearshore and ocean)]. This ETS shall be established, operated and maintained by the Contractor to continuously track in real-time the horizontal location and draft condition of the disposal vessel for the entire dredging cycle, including dredging area and disposal area. The ETS shall be capable of displaying and recording in real-time the disposal vessel's draft and location.

3.3.17.1 ETS Standards

The Contractor shall provide automated (computer) system and components to perform in accordance with COE EM 1110-1-2909. A copy of the EM can be downloaded from the following web site: http://www.usace.army.mil/inet/usace-docs'eng-manuals/em.htm. Horizontal location shall have an accuracy equal to or better than a standard DGPS system, equal to or better than plus/minus 10 feet (horizontal repeatability). Vertical (draft) data shall have an accuracy of plus/minus 0.5 foot. Horizontal location and vertical data shall be collected in sets and each data set shall be referenced in real-time to date and local time (to nearest minute), and shall be referenced to the same state plane coordinate system used for the survey(s) shown in the contract plans. The ETS shall be calibrated, as required, in the presence of the Contracting Officer at the work location before disposal operations have started, and at 30-day intervals while work is in progress. The Contracting Officer shall have access to the ETS in order to observe its operation. Disposal operations will not commence until the ETS to be used by the Contractor is certified by the Contracting Officer to be operational and within acceptable accuracy. It is the Contractor's responsibility to select a system that will operate properly at the work location. The complete system shall be subject to the Contracting Officer's approval.

3.3.17.2 ETS Data Requirements and Submissions

a. The ETS for each disposal vessel shall be in operation for all dredging and disposal activities and shall record the full round trip for each loading and disposal cycle. (NOTE: A dredging and disposal cycle constitutes the time from commencement of dredging to complete discharge of the material.) The Contracting Officer shall be notified immediately in the event of ETS failure and all dredging operations for

the vessel shall cease until the ETS is fully operational. Any delays resulting from ETS failure shall be at the Contractor's expense.

b. All data shall be collected and stored on 3 1/2-inch discs or CD-ROM(s) in ASCII format and shall be readable by MS Windows compatible software. Each dredging and disposal cycle shall be a separate and distinct ASCII file, labeled by the trip number. More than one file may be stored on the disc(s) or CD-ROM(s).

c. Data shall be collected, during the dredging and disposal cycle, every 500 feet (at least) during travel to the disposal area, and every minute or every 200 feet, whichever is smaller, while approaching within 1,000 feet and within the disposal area.

d. The required digital data to be collected for each dredging and disposal cycle includes the following:

(1) Trip Number
(2) Date
(3) Time
(4) Vessel ID
(5) Vessel Captain
(6) State Plane X Coordinate - in accordance with subparagraph c. above
(7) State Plane Y Coordinate - in accordance with subparagraph c. above
(8) Vessel Draft
(9) Type of Disposal Vessel
(10) Exact State Plane X and Y coordinate at start of dump
(11) Volume of Material Disposed

e. Plot Reporting (2 types):

(1) Tracking Plot - For each disposal event, data collected while the disposal vessel is in the vicinity of the disposal area shall be plotted in chart form, in 200-foot intervals, to show the track and draft of the disposal vessel approaching and traversing the disposal area. The plot shall identify the exact position at which the dump commenced. A sample Track and Draft Plot Diagram is on the web site indicated in paragraph CONSTRUCTION FORMS AND DETAILS below.

(2) Scatter Plot - Following completion of all disposal events, a single and separate plot will be prepared to show the exact disposal locations of all dumps. Every plotted location shall coincide with the beginning of the respective dump. Each dump shall be labeled with the corresponding Trip Number and shall be at a small but readable scale. A sample Scatter Plot Diagram is on the web site indicated in paragraph CONSTRUCTION FORMS AND DETAILS below.

(3) Summary Table - A spreadsheet which contains all of the information described in subparagraph d. above shall be prepared and shall correspond to the exact dump locations represented on the Scatter Plot Diagram. A sample Summary Table spreadsheet is on the web site indicated in paragraph CONSTRUCTION FORMS AND DETAILS below.

f. All digital ETS data shall be furnished to the Contracting Officer within 24 hours of collection. The digital plot files should be in an easily readable format such as Adobe Acrobat PDF file, Microstation DGN file, JPEG, BMP, TIFF, or similar. The hard copy of the ETS data and tracking plots shall be both maintained onboard the vessel and submitted to the Contracting Officer on a weekly basis.

SAMPLE SUMMARY SPREADSHEET

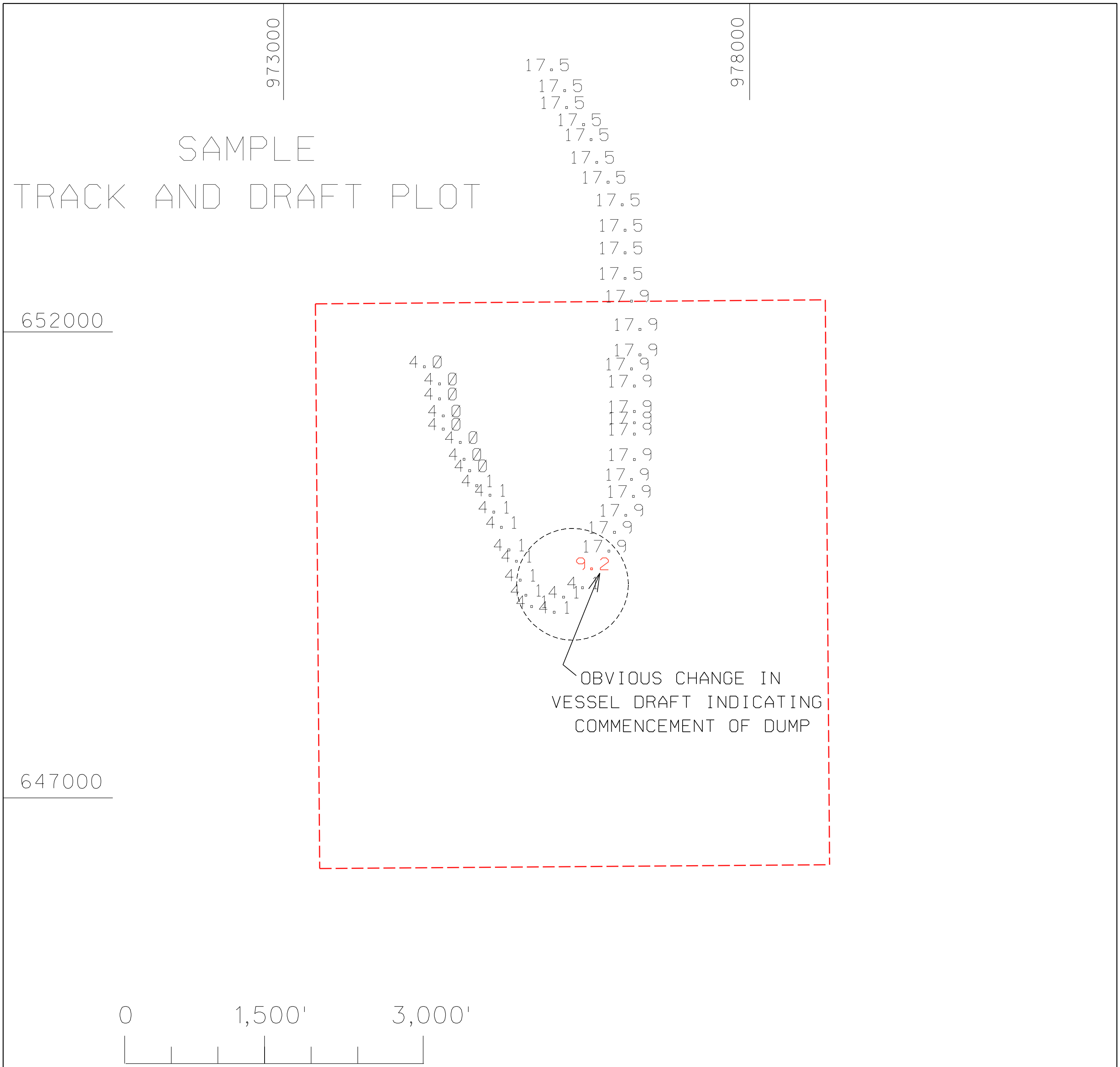
ETS Date Sheet: Port Everglades Harbor MD, W912P-XX-X-XXXX

Master ETS Dump Log to Accompany Scatter Plots

--Data to be extracted from ETS ASCII Data files--

DATE	TIME	LOADNO	CHAN	CUYDS	CAPTAIN	DRAFT*	EQUIPMENT	**BEGDUMPN**	**BEGDUMPE**	ENDUMPN	ENDUMPE
06/15/02	1400	0001	AS1	2,453	Nichols	10.8	Scow 3002	**1448772**	**814016**	1448677	814060
06/15/02	1320	0002	AS1	2,567	Nichols	9.7	Scow 3001	**1448465**	**814471**	1448383	814563
06/16/02	0800	0003	AS1	2,567	Nichols	4.3	Scow 3002	**1447989**	**813558**	1447861	813622
06/16/02	1400	0004	AS1	2,818	Nichols	4.3	Scow 3001	**1448049**	**813706**	1447981	813755
06/16/02	1320	0005	AS1	2,567	Nichols	9	Scow 3002	**1447967**	**814014**	1447843	814118
06/16/02	0800	0006	AS1	2,453	Nichols	12.2	Scow 3001	**1449087**	**814761**	1449015	814832
06/16/02	1430	0007	AS1	1,517	Nichols	4.3	Scow 3002	**1448123**	**814497**	1448034	814552
06/16/02	1400	0008	AS1	1,563	Nichols	5	Scow 3001	**1448487**	**813889**	1448448	813917
06/17/02	1320	0009	AS1	2,589	Nichols	4.2	Scow 3002	**1446384**	**813383**	1446198	813476
06/17/02	0800	0010	AS1	2,886	Nichols	11.4	Scow 3001	**1448097**	**813833**	1448028	813893
06/17/02	1400	0011	AS1	2,772	Nichols	10.7	Scow 3002	**1445275**	**814369**	1445151	814465
06/17/02	1320	0012	AS1	2,681	Nichols	12.2	Scow 3001	**1445293**	**815594**	1445308	815682
06/17/02	0800	0013	AS1	2,567	Nichols	4.7	Scow 3002	**1444986**	**815579**	1444940	815741
06/17/02	1430	0014	AS1	2,749	Nichols	10.5	Scow 3001	**1445861**	**815663**	1445856	815760
06/17/02	1400	0015	AS1	2,521	Nichols	11.8	Scow 3002	**1444683**	**815297**	1444761	815422
06/18/02	1320	0016	AS1	2,886	Nichols	4.3	Scow 3001	**1445098**	**815121**	1445136	815220
06/18/02	0800	0017	AS1	2,818	Nichols	5.1	Scow 3002	**1445633**	**813658**	1445624	813816
06/18/02	1400	0018	AS1	2,612	Nichols	5.2	Scow 3001	**1445551**	**815476**	1445616	815549
06/18/02	1320	0019	AS1	2,567	Nichols	11	Scow 3002	**1445509**	**813621**	1445500	813761
06/18/02	0800	0020	AS1	2,795	Nichols	4.3	Scow 3001	**1445180**	**814844**	1445127	814944

* DRAFT AT COMMENCEMENT OF DUMP



PORT EVERGLADES ODMDS

PROJECT NAME: PORT EVERGLADES, MAINTENANCE DREDGING

CONTRACT NUMBER: W912EP-XX-X-XXXX

DATE OF TRIP: 1 JUN 01

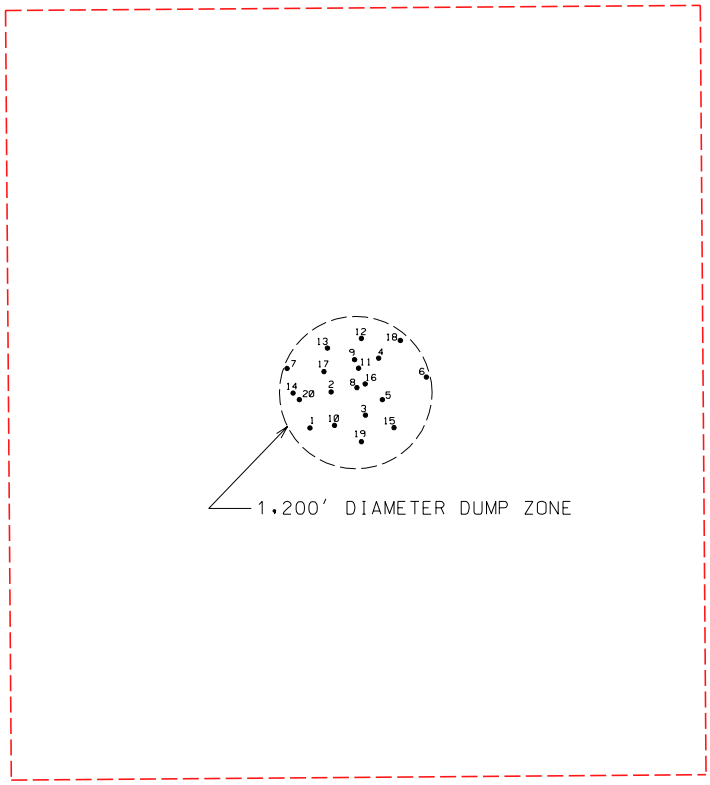
TRIP NUMBER: 1-20

973000

978000

SAMPLE SCATTER PLOT

652000



647000

0 1,500' 3,000'

PORT EVERGLADES ODMDS

PROJECT NAME: PORT EVERGLADES, MAINTENANCE DREDGING

CONTRACT NUMBER: W912EP-XX-X-XXXX

DATE OF TRIP: 1 JUN 01 TRIP NUMBER: 20