SCOPE OF WORK
FOR MONITORING THE MOBILE STABLE
BERM DREDGED MATERIAL DISPOSAL SITE

PART I: INTRODUCTION

Background

1. The authorization for deepening of the Mobile Channel from the previously maintained 44 feet mean lower low water (MLLW) to 49 feet provides for monitoring of the physical and environmental effects of the offshore berm created by disposal of the dredged material. Discussions among the Corps of Engineers and State of Alabama have taken place and resulted in the finalization of a monitoring program for the disposal site. The component of that program addressed here supports other efforts underway to determine initial mounding characteristics of the disposal material and explain its subsequent stability or dispersion.

Study Area

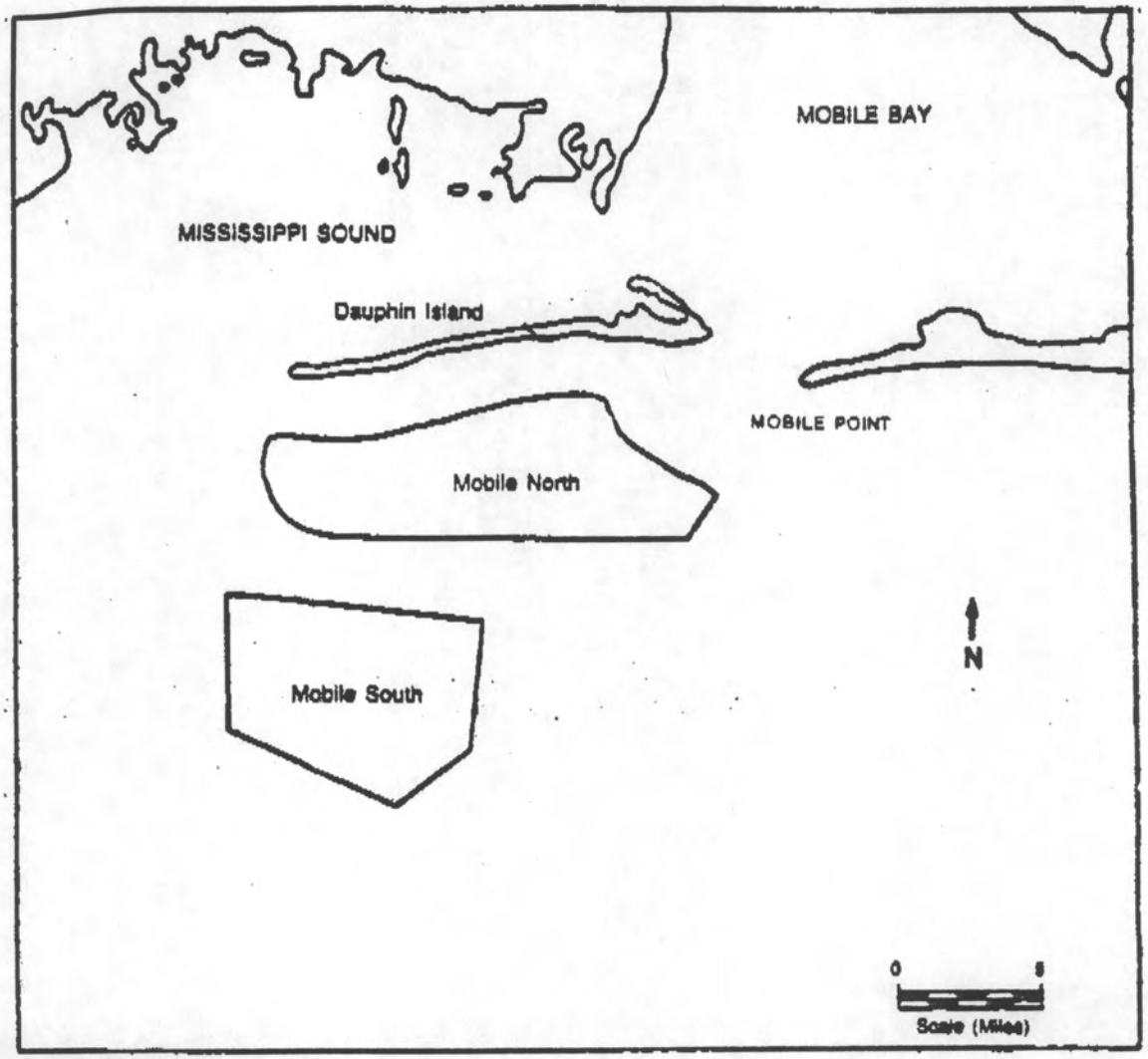
2. The 25 to 35 million cubic yards of material derived from the initial phase of the deepening project may be placed in the Mobile Channel open water disposal site known as Mobile North (Figure). Maintenance material encountered during the deepening project may be deposited in Mobile Bay. The study area for the monitoring program is approximately 5 nautical miles southwest of Mobile Point on the southeast end of Mobile North. The goal of the disposal operation is to create a mound offshore to advance the beneficial uses of dredged material including the improvement of aquatic habitat.

Purpose and Scope

3. Portions of the monitoring program will be carried out by the Corps of Engineers, the United States Coast Guard, and contractors obtained through the conventional bidding process. The purpose of this scope of work is to define the contractors responsibilities for the field monitoring of physical impacts at the Mobile Channel open water disposal site.

4. Evaluation of fisheries impacts and oceanographic conditions are being contracted separately

5. This scope of work includes descriptions of data to be collected to characterize the disposal site and the properties of the material at the disposal site. Additional descriptions of contractor support and instrumentation necessary during the monitoring period are also given.



Source: Harmon Engineering, 1984

Figure 1. Material dredged in the Mobile Harbor Ship Channel Deepening will be placed in the Bay or in the east end of the Mobile North Disposal Site

PART II: FIELD DATA COLLECTION PROGRAM

General

6. To provide insight on the mounding capabilities of dredged material at the entire disposal site, a smaller study area has been established within the disposal area for initial disposal and monitoring purposes. The monitored site is 8000 ft by 8000 ft and will be centered on a test mound near the southeast end of the disposal site. The amount of material which is deposited into the test site will depend on whichever of the following occurs first:

1.) Three million cubic yards of material is deposited.

2.) A mound is constructed 20 feet above pre-construction depths.

or

3.) The deposited material is found to be moving rapidly out of the designated disposal site.

The contractor will be responsible for knowing the amount of material deposited in the site. This can normally be obtained from the dredge operator production records.

7. The field data collection responsibilities of the contractor can be separated into four tasks; surveys, sediment profiling photographs, sediment samples, and support features. The major element will be a pre-construction and several post-construction hydrographic surveys. The contractor will carry out one sediment profiling survey during the first post-construction bathymetric survey. Immediately before, during, or immediately after conducting 6 of the surveys the contractor will assist members of the Corps for an average of two additional days of data collection and instrument deployment.

8. In addition to the three tasks outlined below the contractor will be responsible for describing sampling techniques employed, equipment utilized, equipment calibration procedures followed, and any other information pertinent to the quality of the monitoring data. A quality assurance plan will be prepared for each of the first three tasks. All dates, locations (x, y, and z) and personnel used for each sample period will also be provided in the contractors survey report.

Task I: Hydrographic Surveys

9. The full hydrographic survey will require a precision bathymetric survey as outlined in Appendix A and both side scan and subbottom surveys as described below. The contractor will be responsible for conducting one full pre-construction, one interim, and 7 post-construction surveys over a three year period.

10. Bathymetry. By employing one pre-construction survey and several post-construction surveys the mound can be delineated and changes recorded. The contractor will conduct a full survey of the test site not more than 30 days prior to initial construction. The interim survey will consist of bathymetry and side-scan only. The contractor must be able to conduct this survey within 10 days of notification by the contracting officers representative. The contractor will also be responsible for coordinating with members of the Corps and the dredge contractors to obtain a precision survey no more than 21 days after construction has ended at the monitored site. The contractor will conduct three to four surveys at the disposal site during the year after construction. Three of the required surveys are tentatively scheduled for January, April and August. A fourth may be scheduled after a major storm event. Two precision surveys will be conducted in the second and third years after construction (March and September). An optional survey will also be provided after one additional major storm event.

11. Side-Scan Sonar Survey. Side-scan sonar images will be produced along with the bathymetric survey. The imagery will be carefully tuned to provide the best discrimination between disposal and native materials. The contractor will provide both 500 and 100 Khz towfish. The higher frequency will be used most of the time, but the on-board CERC scientist may occasionally request the lower frequency for a portion of the survey. Survey lines will be every other line used for the bathymetry survey.

12. Subbottom Profiles. Subbottom profiles will provide a secondary source of information for estimation of the characteristics of the soil and mound thickness. The subbottom profiler will be equipped with at least a 3 Khz towfish and will be used along every third line used for the bathymetric survey. Subbottom profiling will be conducted during the first and third bathymetric survey. After the first post-construction survey the effectiveness of the subbottom profiler will be evaluated and may upon request of the contracting officers representative the be included on 2 of the subsequent surveys.

Task II: Sediment Profiling Camera Survey

13. As the mound thins towards the edge, the acoustic survey's ability to identify the dredged material decreases. To help quantify the amount of material in the fringe area of the mound a sediment profiling system survey will be incorporated into the monitoring plan. The sediment profiling system will be used during the first post-construction survey period. Six stations will be located on each of the transects for a total of 24 stations. The transects will be perpendicular to the fringe of the mound and positioned so that at least one of the stations is outside of the dredged material mound and at least two are located inside the mound. The contractor will be responsible for coordinating the exact location of each transect with Corp personnel prior to the sediment survey.

14. The sediment profiling will require an appropriate vessel, equipped with a winch and boom for raising and lowering the sediment profiling camera. The location of the station, station number, time, date and picture number should be recorded at each sample location. The sample transects should also be mapped out prior to the sampling period obtaining coordinates for each individual station. Three replicate pictures will be obtained at each station to insure quality and will be collected in accordance with Appendix B.

Task III: Sediment Sampling

15. Sediment Samples. To help delineate dredged material from in situ material pre-construction and post-construction sediment samples must be collected. Several post-construction sediment samples will allow researchers to identify what material remains on the mound and what is transported. The contractor will be responsible for collecting, appropriately labeling, and transporting surface grab samples from 49 pre-determined stations located in the monitored site (Figure 2). The location of each grab site in the local coordinate system is shown in Table 1. At each site, sediment samples will be collected by ponar, shipek, or other closed sampling devices approved by the contracting officer representative. In addition to these grab samples divers will descend on 7 or 8 of the 49 stations to collect short cores. For each sampling effort the contractor will relocate the same sampling position to within ±20 ft. Surface grab samples will be collected during each bathymetric survey period. for each survey period. Each sample will be analyzed for grain size distribution at 1/4 phi intervals from 0 to 4 phi by standard ASTM techniques.

16. Twenty two additional surface grab stations will be established outside of the immediate disposal site (Figure 3). Sediment grab samples will be collected at each of these stations during each survey period. The samples will be analyzed to determine sediment size gradation (sieve and hydrometer analysis) by standard ASTM techniques. These samples will be collected, recorded and transported as the 49 sediment samples above. Quart size sediment samples will be collected at each of the 22 stations during the pre-construction survey period. The sampler used to collect these samples and storage procedures must be approved so that in situ metal content of the sample can be determined. The quart size samples must be stored on ice and shipped to the EPA laboratory in Athens, Georgia. The contractor will send a 30 gm representative sediment sample, properly marked and stored, of each of the 71 grab sites from pre-construction, the first post-construction and final surveys to CERC.

Task IV: Support Features

17. In addition to the hydrographic surveys the contractor will support several Corps activities during 6 of the 9 to 11 surveys. For the purposes of this monitoring plan the survey time period

03/23/87 16:30 USAEWES CERC

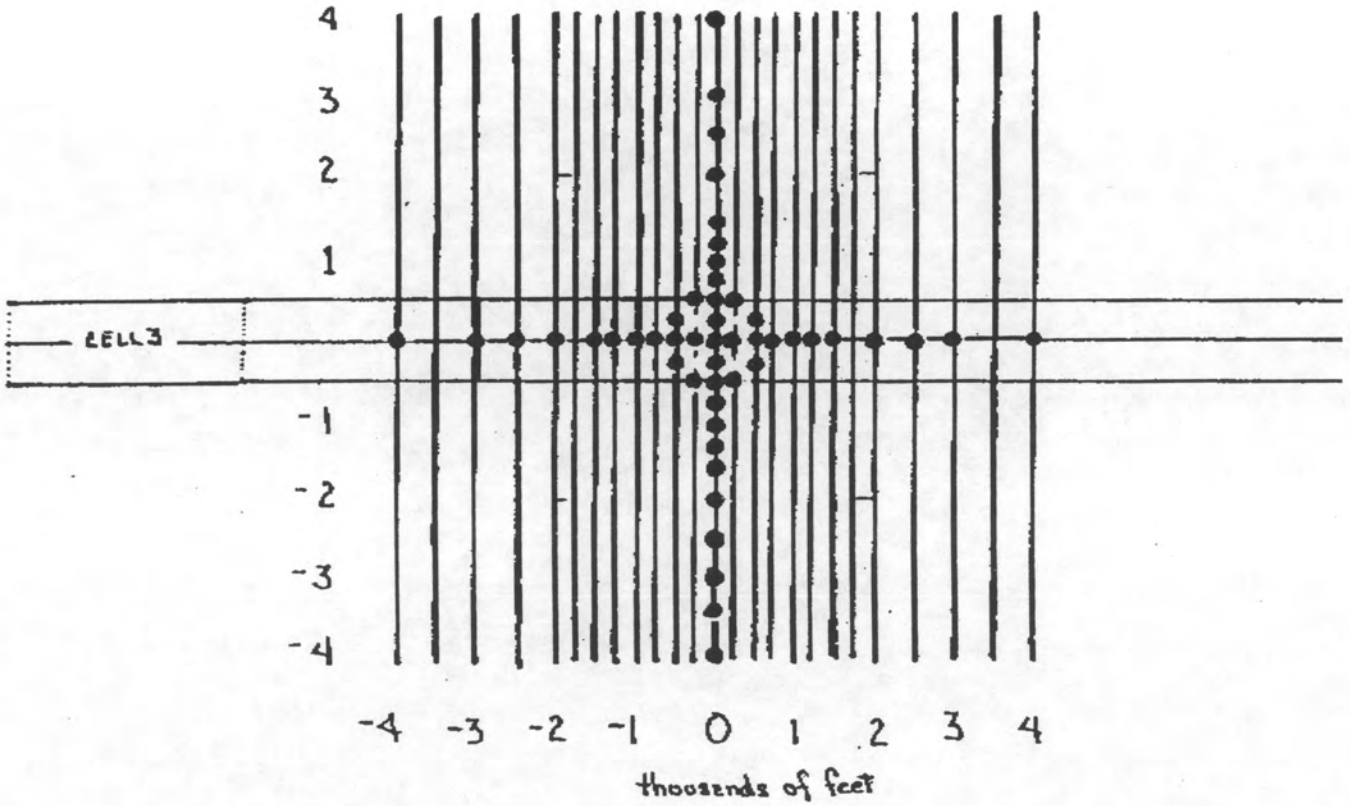


Figure 2. Survey lines and sample locations identified with respect to a local grid centered on the disposal mound.

TABLE 1. Grab sample locations for 49 Mobile Outer Mound Stations shown in Figure 2. Figure 3 shows 22 additional sample stations.

Local Grid System		State Plane System	
X[ft]	Y[ft]	Northing	Easting
-4000	0		
-3000	0	To be supplied	
-2500	0	prior to baseline survey	
-2000	0	"	"
-1500	0	"	"
-1250	0	"	"
-1000	0	"	"
-750	0	"	"
-500	0	"	"
-250	0	"	"
0	0	"	"
4000	0	"	"
3000	0	"	"
2500	0	"	"
2000	0	"	"
1500	0	"	"
1250	0	"	"
1000	0	"	"
750	0	"	"
500	0	"	"
250	0	"	"
0	-4000	"	"
0	-3000	"	"
0	-2500	"	"
0	-2000	"	"
0	-1500	"	"
0	-1250	"	"
0	-1000	"	"
0	-750	"	"
0	-500	"	"
0	-250	"	"
0	250	"	"
0	500	"	"
0	750	"	"
0	1000	"	"
0	1250	"	"
0	1500	"	"
0	2000	"	"
0	2500	"	"
0	3000	"	"
0	4000	"	"
-500	250	"	"
-250	500	"	"
250	500	"	"
500	250	"	"
500	-250	"	"
250	-500	"	"
-250	-500	"	"
-500	-250	"	"

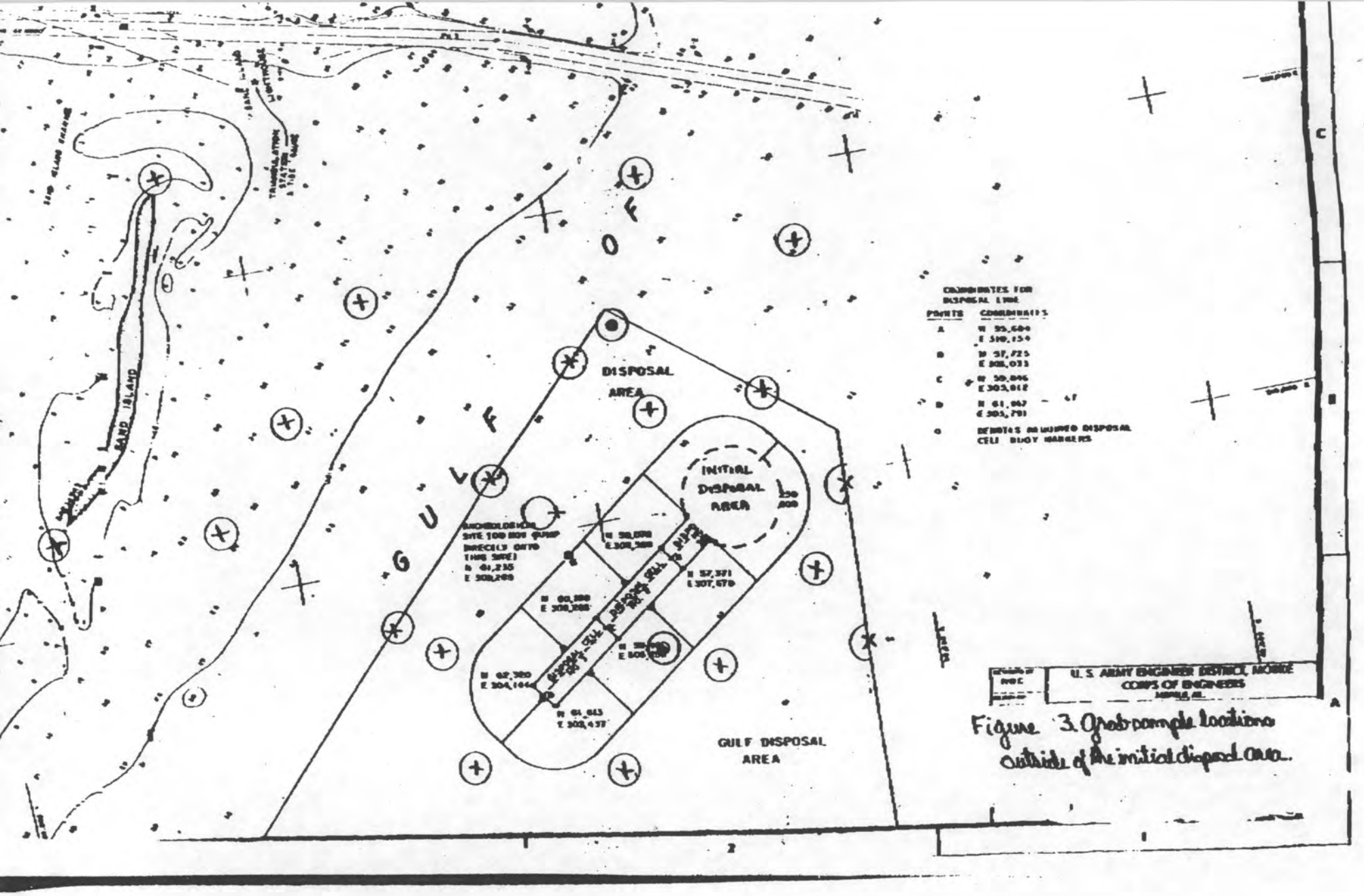


Figure 3. Grab sample locations outside of the initial disposal area.

03/23/87 16:31 USAEWES CERC NO.013 008

will be one week (7 days), excluding extreme weather delays. During this week all surveys and support work must be completed for each survey. The support work will include providing a work platform (sample vessel) to support divers collecting sediment cores and deploying equipment. The sample vessel must provide a safe work platform, be large enough to support four divers and their equipment, plus store samples while at sea. It must be capable of relocating a sampling station to at least ±20 ft, of anchoring in 75 ft of water, and provide easy ingress and egress for divers.

18. Seabed Drifters. Seabed drifters, supplied by the Corps, will be deployed during each survey period to determine predominate current influences on the bottom sediments and determine any changes in current direction caused by the berm construction. The contractor will provide a vessel, as described above, to release weighted bundles of seabed drifters at 6 pre-determined locations. It is expected to take approximately two hours to get between sites. Once on site the bundles will be dropped overboard with no loss of time while the grab sample is being taken on the same site.

PART III: DATA ANALYSES AND REPORT

19. All data collected by the contractor will be furnished to CERC; however, the contractor will also reduce the data to provide the following information in either graphical or tabular form for each survey:

a.) A detailed bathymetry map of the disposal site with depth in feet below MLLW and showing both local and state plane coordinates.

b.) A digitized list of the above map. The digitized data will be recorded on a 5.25 inch double density, double sided "floppy" diskettes using ASCII characters or another pre-approved recording method or device.

c.) After the initial pre-construction survey all subsequent surveys will be compared to the previous and initial survey to indicate the change in depth (delta z). A detailed 3 D perspective plot will be produced (similar to Figure 4) indicating x, y, and delta z values. This data will be digitized, as prescribed in b and furnished to the Corps.

d.) A map of interpreted disposal and native bottom materials will be provided for each side-scan survey. The map should be of sufficient detail to identify any isolated patches of the disposed material. After the initial post-construction survey all subsequent side-scan data will be compared to the previous data to reveal any changes over time.

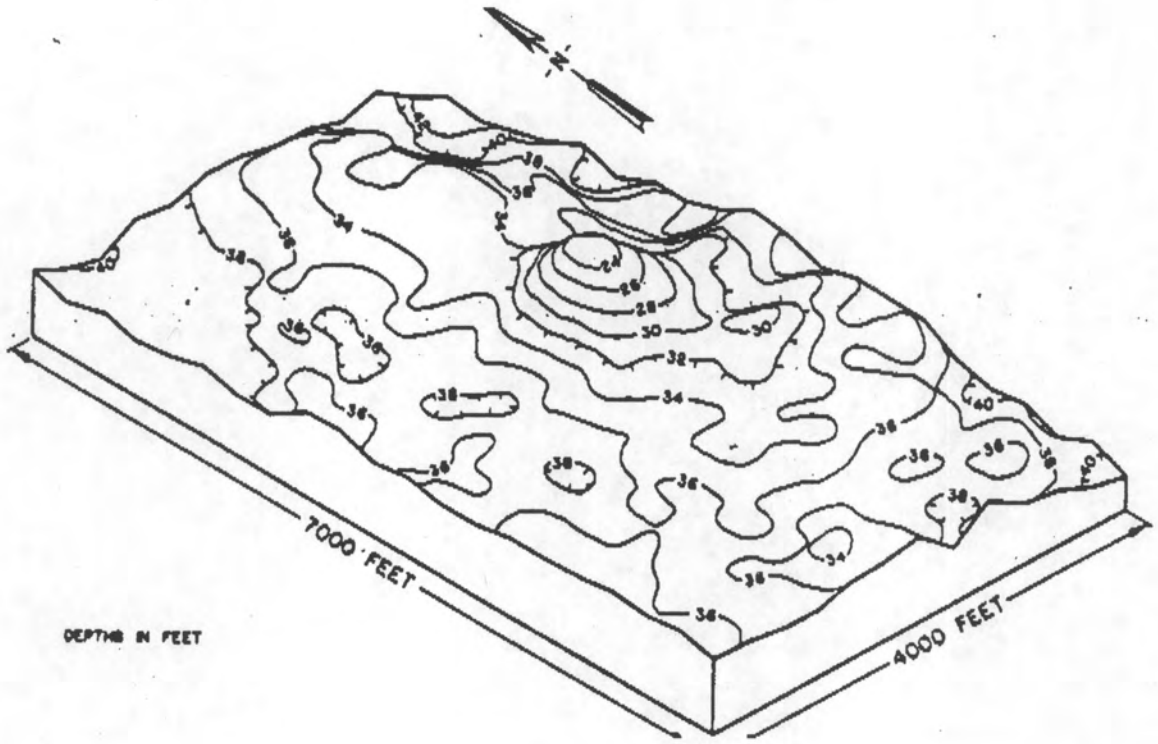


Figure 4. An example perspective plot.

e.) Subbottom data collected during the post-construction surveys will be analyzed to determine the stratification, thickness, and extent of the disposal mound. Horizons will be correlated with those identified on previous surveys.

f.) A table indicating the x,y,z locations and 1/4 phi grain size distribution for the 71 sediment grab sample stations from each cruise. This data will be digitized and supplied as prescribed in h.

g.) A detailed map depicting the fringe area of the disposal site as indicated by the sediment profiling camera survey. The thickness of disposal material indicated by the sediment camera survey will also be compared/contrasted to the pre-construction to post-construction change in depth.

h.) A contoured bathymetric map of the interim survey will be required as soon as possible, not more than 10 days after survey completion.

Report

20. The data and maps described in paragraph 19 together with a written report describing when, where, and how monitoring was conducted and the results of the surveys will be provided within 60 calendar days of their completion. These reports will include narrative descriptions of the conditions during monitoring, equipment utilized, monitoring techniques employed, results, and any other data pertinent to the monitoring effort. A written report summarizing the entire monitoring program and results will be provided 120 calendar days following the final survey period. This report will include narrative descriptions of the overall monitoring project, any deviations in sampling procedure or equipment from one survey period to the next, and/or modifications made during the project along with other data pertinent to the overall monitoring effort.

APPENDIX A

Bathymetry

Purpose

For each survey period a bathymetry survey will be conducted using the same 28 survey lines (Figure 2).

Description of Work.

a. The bathymetric survey will include a 8000 x 8000 foot area centered on the disposal mound. ? cost

b. The sounding line spacing will be 250 ft in the center section (Figure 2) and increase to 500 ft at the outer edges. The lines will be oriented into the direction of maximum wave approach to be identified by the contracting officers representative. Three 1800 ft cross lines 500 ft apart will be run to supplement the regular system of sounding lines. The central line will coincide with the disposal line. Soundings will be digitized no more than 25 feet apart.

c. Horizontal positioning will be supplied by an electric/microwave positioning system with an accuracy of at least ±3 meters.

d. Soundings will be taken with an electronic depth recorder, designed specifically for hydrographic surveying, with a 200Khz, 2.5 degrees transducer or comparable system. At a minimum, the depth recorded will be calibrated by a bar check at 5 ft. intervals from 20 to 40 feet before and after each days work. Soundings will be referenced every half hour to National Ocean Survey (NOS) mean lower low water. A tidal zoning established by National Oceanic and Atmospheric Administration (NOAA) will be used to rectify tide levels at the survey site from off-site tide readings; or a local tide gage will be maintained for the period of study. To the extent possible, tidal level rectification to 0.1 foot will be attained.

e. Whenever possible the contractor will carry out bathymetric surveys during minimal wave conditions (2 ft. or less). If a sustained wave height of over 4 ft is encountered the survey should be discontinued.

APPENDIX B

SEDIMENT PROFILING CAMERA SURVEY

A sediment profiling camera system (REMOTES or equivalent) will be deployed from the survey vessel at each of the twenty four (24) stations. Three (3) picture replicates will be obtained at each station and will result in three vertical sediment profile photographs. From these pictures an 8 x 10 inch positive print of each photograph will be retained by the contractor for interpretation and analysis and a replicate photo will be sent to the Waterways Experiment Station. A sediment-profile photographic data sheet shall be prepared. It will identify the project, location, station, number of photos per station, date and person taking and interpreting the photographs. Information obtained from each sediment profiling photograph shall consist of qualitative and semi-quantitative descriptions of sediment physical-chemical parameters. Physical-chemical parameters shall include grain size, total prism penetration depth, sediment surface relief; mud clasts (to include number, size, oxidized or reduced), redox area, redox contrast, relict redox boundaries as well any other pertinent comments. A narrative of information obtained from the sediment profiling camera should be provided for all samples collected at each station. Fence diagrams will be prepared to illustrate the correlation of redox discontinuities and other strata between camera stations.