1st Meeting of Committees

File
Stable Berm
Mobile Harbor

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
P.O. BOX 631
VICKSBURG, MISSISSIPPI 39180-0631

REPLY TO
ATTENTION OF
CEWES-CD-S

13 October 1987

MEMORANDUM FOR RECORD

SUBJECT: Discussions on the Monitoring Efforts for the Mobile District's Feeder and Stable Berm Projects.

1. Background. The Mobile District (CESAM) has taken the initiative on construction of two submerged features using dredged material off the Gulf Coast of Alabama. Construction on the smaller feature, the Feeder Berm located approximately 3.5 nautical miles southwest of Mobile Point, was completed in February 1987. Construction of the larger Stable Berm, located approximately 5.5 nautical miles southwest of Mobile Point, is scheduled to begin in October/November 1987 using new material from the Mobile Harbor Deepening Project. Both features are shown in encl 1. The Waterways Experiment Station's Coastal Engineering Research Center (CERC) is providing assistance to CESAM in the design and implementation of monitoring efforts to describe the ultimate fate of the placed material. The purpose of both berms is to explore the beneficial uses of dredged material. The Feeder Berm was constructed on the 19-ft contour off of Sand Island using sand from routine maintenance dredging of the Mobile Channel Bar. Bathymetry surveys, side-scan sonar, a wave gage, seabed drifters, and sediment samples will be used to determine the fate of the placed material. The intent of the Feeder Berm is to place the sandy material within a zone of active wave influence where it may eventually become part of the beach evolution process and, therefore, increase the amount of littorally transported material (i.e. feed the beach). The Stable Berm will be constructed of new material in 35 to 45 ft of water. The structure will be approximately 9000 ft long, 1000 ft wide and have a nearly uniform depth of approximately 20 ft. The intent of the Stable Berm will be to create a stable submerged structure that may trip incident wave energy during storms and provide an aquatic habitat. Monitoring efforts utilized to determine the fate of the Stable Berm material will include several of the Feeder Berm techniques plus sediment profiling camera surveys, subbottom profiling, and a directional wave gage. Fishery concerns will be addressed by an Environmental Protection Agency (EPA) monitoring program. On 26 August 1987, personnel from CESAM, CERC, and the Water Resources Support Center (WRSC) met at CERC to discuss the current status and monitoring program of both projects. The remaining portion of this MFR details the results of that meeting.

ROUTING:
1. CEWES-CD-S 10/25
2. CEWESCD
3. CEWES-CV-A
4. CEWES-CV-Z
5.
6. CEWES-CD-S (McLellan)
7. CEWES-CD-S (Daughtry) (file)

2. The discussion outline for the 26 August meeting is shown in encl 2. CERC was represented by Messrs. Charles C. Calhoun, Jr., Edward B. Hands, T. Neil McLellan, and Ms. Joan Pope; representatives from CESAM were Messrs. Patrick Langan, Hugh McClellan, Paul Bradley, and Dewayne Imsand; and WRSC was represented by Mr. David Mathis. The meeting was chaired by Mr. Langan. The meeting was to update and inform personnel involved of the current status of the two berm projects. To improve project coordination and establish a formal line of communication, two committees, one management and one technical, were established. The Management Committee members are Messrs. Thomas W. Richardson (CERC), Calhoun, Langan (Chairman), McClellan, and Mathis. The Technical Committee will consist of two groups representing the project's Principal Investigators (Messrs. Hands and Bradley for the Feeder Berm, and Messrs. McLellan and Imsand for the Stable Berm) and other technical experts as necessary. Ms. Pope will serve as CERC's central coordinator for the Technical Committee and CERC's liaison from the Technical Committee to the Management Committee. It will be the Technical Committee's responsibility to maintain the daily progress of the study and to report progress, results, and problems to the Management Committee. The Management Committee will be responsible for the overall direction of the projects and advising the Technical Committee. Points of contact for the Management Committee will be Mr. Calhoun for CERC and Mr. Langan for CESAM. Technical points of contact will be the project's Principal Investigators.

3. The second item on the discussion outline was the philosophy and purpose of the mound projects. Mr. Calhoun reaffirmed CERC's commitment to do whatever needs to be done to document the effectiveness of the "feeder" and "stable" berm concepts. To fully do this, CERC needs to know what is ongoing for each project even though it may not appear to directly relate to the research and development aspects of the project. Mr. Calhoun also indicated he would like to see a project chart showing time lines, responsibilities, and tasks for the Stable Berm. Mr. Langan stated that CESAM was totally committed to the demonstration projects and realized their importance both at the District and the national levels. Mr. Langan also agreed on the practicality of a chart/worksheet showing project phases and report preparation scheduling. Confusion about the various nomenclature which has been used for the two mounds was also discussed. Upon conferring with Mr. Bill Murden, Chief Dredging Division, WRSC, Mr. Mathis reported that the two projects will be officially known as the "Feeder Berm" and "Stable Berm." The project chart for the Stable Berm was scheduled to be completed by Messrs. McLellan and Imsand the following week in Mobile.

4. An additional topic of the 26 August meeting not on the discussion outline was EPA's involvement in the Stable Berm project. EPA is involved with the Stable Berm site due to its designation as a 103 site. As a 103 site, EPA has management responsibility for any type of ocean disposal and is directed to review any Gulf Monitoring Program. Through coordination with CESAM, EPA has turned over much of the management responsibility to the Corps, but a

separate report is still required. Because of the requirement for an EPA report and the time lag between completion of the two projects, there will be a separate report for each project. A single synthesis report for the two projects may be useful. The main concern of EPA is that the material remains within the disposal limits described by CESAM and to document any direct fisheries benefits derived from the berm. To monitor any migration of the material outside of the disposal site, 25 sediment sample locations have been identified by EPA. Through coordination with CESAM, EPA will also take the lead to collect samples to address the fisheries aspects of the berm.

5. The third item on the discussion outline was the review/briefing request by Mr. Murden. The proposed letter to Mr. Murden was reviewed by the group, and several changes/comments were suggested. The letter will include a description of the current meeting and a proposed time frame for a briefing, most likely October. Mr. Murden will also be informed that oil companies were in the planning stages of placing a pipeline through the berm in 1990 or later. Oil companies have been cooperative in the past, allowing the Corps of Engineers to locate instrumentation on existing gas wells. The type of report to be prepared at the completion of both projects was also discussed. The options discussed were a synthesis/executive report describing each project or individual summary reports for each project. The decision on the type of report to be submitted to WRSC was deferred to the next management meeting.

6. The Feeder Berm was the next topic of discussion. Messrs. Hands and Bradley briefly gave a project introduction and reported progress to date. The berm was described as constructed from sandy maintenance material from the Mobile Channel Bar. It has roughly 6 ft of relief, a base width of 500 ft, and was constructed almost exactly as designed. Mr. Langan noted that the contractors did an excellent job placing the material as high as possible. The dredge occasionally ran aground while stacking the material on the berm. Messrs. Hands and Bradley described the monitoring program as continuing and on schedule. The berm had changed little with only slight erosion and flattening of the peaks. With little measurable change since placement in February, monthly surveys were postponed until after the summer calm. The monitoring effort was reinitiated in August with a seabed drifter release, wave/current measurements, sand samples, and bathymetric survey. Repetitive surveys are currently scheduled to continue at least through this calendar year. The in situ material and the placed material were not dissimilar enough to obtain a clear description using side-scan sonar, and its use was discontinued. The wave and current gage has not worked as well as expected, and one gage was lost when the mooring was dislodged, probably due to a collision or unintentional severing during mooring by a trawler. CERC is exploring several options for improving the gaging effort, and was not yet ready to propose a specific alternative. Some of the alternatives currently under investigation include:

a. Placement of two wave gages, using one as a backup.

b. Two or three gages in place for short periods of time throughout the year for comparison to the National Data Buoy Center (NBDC) data set.

c. Use of a telemetered system attached to one of the in-place oil/gas wells in the area.

d. Improve mounting of a new system to withstand storms and trawlers.

e. Use of NDBC buoy for one backup system.

f. Use of an alternative type of instrument.

Mr. Langan stated that he would like justification for whatever option was selected. A proposal outlining options and costs for the revised plan will be submitted to CESAM. It was also suggested that the monitoring program be continued since it is currently scheduled to end this calendar year and there has been limited movement of material to date due to unusual calm conditions on-site. The newly formed management group unanimously supported the extension, and Mr. Mathis was going to explore financial options at WRSC for an additional year of study.

7. The final topic in the discussion outline was the Stable Berm. Major needs for the monitoring program identified during the meeting include a detailed plan of study, including schedules and assigned responsibilities for the entire study program, and a detailed scope of work (SOW). The plan of study will be developed by Messrs. Imsand and McLellan when Mr. McLellan visits CESAM the week of 31 August. From this plan of study, a detailed SOW will be developed for the entire monitoring program. The goals of the monitoring program stated by the Management Committee will drive the plan of study and SOW. Data collections to date on the project have been suspended pending initiation of dredging activity. The monitoring effort was originally scheduled to coincide with construction which was initially to begin in July 1987. Construction is currently scheduled to begin in October or November with monitoring beginning 30 days prior to construction. The construction schedule has been extended from 20 to 36 months due to problems with the dredge CHICAGO. The baseline survey and sediment samples contract has been awarded, and the contractor is waiting for the letter to proceed. Some sediment profile camera data were collected in July at 20 sites located outside the disposal site. The survey report was due at the end of August 1987. There was considerable discussion on the availability of technology for measuring the in situ density of the mound after placement. In situ density will be essential if mass balance calculations of the mound are required. Density data would allow researchers to quantify the change in mound elevation over time, i.e. to separate erosion from consolidation effects. Economic density measurements, however, are probably not feasible due to the expected

thickness and inhomogeneity of the mound and the limited water depth for free fall density sampler. Further investigation will be carried out at CESAM and CERC to identify additional options for density measurements. Some options include (a) vibracores, (b) push cores, (c) cone penetromenters, and (d) nuclear density meters. These devices would be needed before the winter of 1988, therefore, there is little time to thoroughly evaluate which option is most applicable for this situation.

8. The major results/conclusions of the 26 August meeting are as follows:

a. Formation of a Management Committee.

b. Formation of a Technical Committee.

c. The necessity of extending the Feeder Berm study.

d. Investigation is needed to maintain a reliable process measuring station for Feeder Berm.

e. A detailed Plan of Study needs to be developed for the Stable Berm.

f. A detailed SOW needs to be developed for the monitoring needs for the Stable Berm.

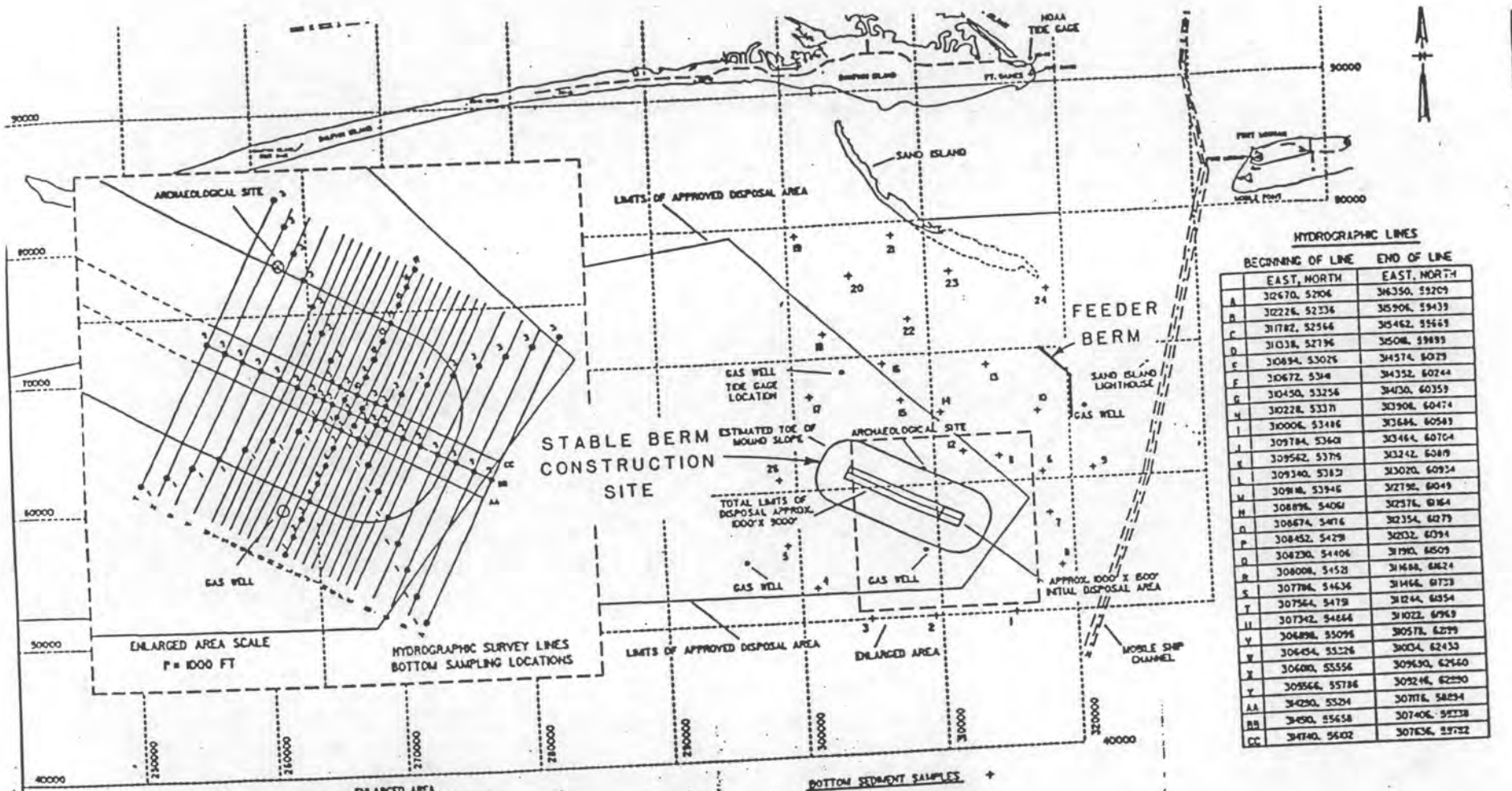
g. Investigation is underway to determine methods for density measurements for the Stable Berm.

2 Encls

T. Neil McLellan

T. NEIL MCLELLAN
Coastal Structures and Evaluation Branch
Engineering Development Division
Coastal Engineering Research Center

CF (wo/encls):
CESAM-OP (Mr. Patrick Langan)
CESAM (Mr. Hugh McClellan)
CESAM-RD-EC (Mr. Dewayne Imsand)
CESAM-OP-ON (Mr. Paul Bradley)
CEWRC (Mr. David Mathis)
CEWRC-D (Mr. William R. Murden)
CEWES-CD-S (Ms. Joan Pope)
CEWES-CD (Mr. Thomas W. Richardson)
CEWES-CV-A (Mr. Charles C. Calhoun, Jr.)
CEWES-CD-S (Mr. Edward B. Hands)



HYDROGRAPHIC LINES

	BEGINNING OF LINE EAST, NORTH	END OF LINE EAST, NORTH
A	312670, 52706	316350, 59209
B	312226, 52336	315906, 59439
C	311782, 52566	315462, 59669
D	311338, 52796	315018, 59899
E	310894, 53026	314574, 60129
F	310672, 53141	314352, 60244
G	310450, 53256	314130, 60359
H	310228, 53371	313908, 60474
I	310006, 53486	313686, 60589
J	309784, 53601	313464, 60704
K	309562, 53716	313242, 60819
L	309340, 53831	313020, 60934
M	309118, 53946	312798, 61049
N	308896, 54061	312576, 61164
O	308674, 54176	312354, 61279
P	308452, 54291	312132, 61394
Q	308230, 54406	311910, 61509
R	308008, 54521	311688, 61624
S	307786, 54636	311466, 61739
T	307564, 54751	311244, 61854
U	307342, 54866	311022, 61969
V	306898, 55096	310578, 62199
W	306454, 55326	310134, 62430
X	306010, 55556	309690, 62660
Y	305566, 55786	309246, 62890
AA	314230, 55204	307776, 58854
BB	314450, 55658	307406, 59338
CC	314740, 56102	307636, 59722

ENLARGED AREA BOTTOM SEDIMENT SAMPLES

	EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH
A1	312670, 52706	E2	312724, 56578	K3	311632, 57712	L18	311448, 58386	P2	310222, 57843	V3	309888, 60868
A2	314501, 55658	E3	313654, 58354	L1	311065, 57161	L#2	311648, 58830	P3	310535, 58320	W	306814, 56214
A3	316310, 59209	G	311600, 55476	L2	312295, 57605	L#3	311878, 59274	Q1	309960, 57070	W2	308294, 58878
B	312456, 52780	G2	312290, 56808	M	309118, 53946	L#4	312908, 59718	Q2	310070, 57958	W3	309674, 61542
B2	314066, 55888	G3	312990, 58440	M2	309348, 54390	L#5	312338, 60162	Q3	310530, 58846	X	306240, 56000
B3	315676, 58995	I1	313086, 56450	M3	309518, 54834	L#6	312568, 60605	S1	308936, 56856	X2	307850, 59908
C	312742, 53454	I2	313146, 57038	M4	309908, 55278	L#7	312798, 61049	S2	309629, 58188	X3	309460, 62208
C2	313472, 56688	I3	312306, 57926	M5	310038, 55722	M	310462, 57318	S3	310316, 59520	Y1	305566, 55786
C3	315002, 58718	J	312171, 56678	M6	310258, 56166	K2	310859, 57835	U	308262, 56642	Y2	307406, 59338
D	312928, 54228	J2	312624, 57153	M7	310498, 56610	O1	310284, 57284	U2	309982, 58418	Y3	309246, 62890
D2	313978, 56348	J3	313171, 57630	L#8	310728, 57054	O2	310544, 57728	U3	310027, 60984		
D3	314578, 58568	K	311177, 56824	M9	310958, 57498	O3	310744, 58172	V1	307588, 56428		
E	311814, 54802	K2	311402, 57268	L#10	311188, 57942	P1	310045, 57366	V2	308738, 58648		

BOTTOM SEDIMENT SAMPLES

	EAST, NORTH		EAST, NORTH
1	315327, 50047	14	310575, 65530
2	309545, 50008	15	307843, 66560
3	304592, 50047	16	306576, 69481
4	300958, 52542	17	304190, 67154
5	297926, 55868	18	302378, 71787
6	297830, 60596	19	300636, 73711
7	298217, 57492	20	304398, 76403
8	298570, 53453	21	307645, 78054
9	321652, 60779	22	308635, 72658
10	317523, 65293	23	311805, 76064
11	317623, 65293	24	318653, 74440
12	320040, 62442	25	322098, 70633
13	323380, 68976	26	298525, 60937

MOBILE HARBOR DEEPENING
GULF DISPOSAL AREA
BASE LINE SURVEY

WESCD-S 25 AUGUST 87

COMMITTEE MEETING ON MOBILE MOUNDS
26 AUGUST 1987

DISCUSSION OUTLINE

I. INTRODUCTIONS AND ESTABLISHMENT OF COMMITTEE (LANGAN)

II. PHILOSOPHY AND PURPOSE OF MOUND PROJECTS (MATHIS/CALHOUN)

III. REVIEW OF MURDEN LETTER AND RESPONSE
- BRIEFING

IV. SAND ISLAND BERM (HANDS AND BRADLEY)
- Status of project
- Status of monitoring program
- Extension of monitoring program
- Modification of monitoring program scale
- Funding

V. OUTER MOUND (MCLELLAN AND SAM)
- Plan and status of project (dredging [redacted] Contract)
- Plan and status of monitoring program
- Goals of monitoring program
- Roles of CERC and SAM
- Coordination and identify POC
- Detailed discussion of monitoring tasks
  (who, what, timeline, schedule, analysis, etc.)
- Develop written detailed monitoring plan
- Reports (Procedures, involvement, schedules)

(ATTACHMENT #1)

FACT SHEET

CESAM-OP-O
Langan/3319
28 Jul 87

UNDERWATER BERM CONSTRUCTION, MOBILE HARBOR, AL

- General Hatch, Civil Works Director, had approved a national demonstration project to assess and document potential physical and fishery benefits associated with underwater berms as a beneficial uses application of dredged material. It was agreed that the demonstration be conducted by the Mobile District because of its record of responding innovatively to the environmental challenges brought about by NEPA and the CWA, and its long-standing and productive association with the applied R&D community.

- Mobile District proposed construction of a feeder berm in relatively shallow water and a stable berm in deeper water in the Gulf south of Dauphin Island.

- The feeder berm was constructed in Feb 87 by routine hopper dredging of the Bar Channel.

  - Berm was constructed in 18-19 feet of water, 1 mile long, 6 feet high.
  - Located about 1 mile from Sand Island, and about 4 miles from Dauphin Island and west of the Ship Channel.
  - Monitoring will continue through end of this CY; hydrosurveys, wave gauge, and deployment of sea bed drifters are techniques being utilized to track movement of sand as a supplemental sand source to Sand and Dauphin Islands.
  - Predictions of sand movement premature at this time; all data will be analyzed at end of monitoring period.
  - Monitoring costs funded through O&M program.

- Stable berm to be constructed as the disposal plan for Phase I Deepening.

  - Center of berm will be located about 3-3 1/2 miles from Sand Island; 6 miles from Dauphin Island.
  - Berm will be the largest underwater feature ever constructed.

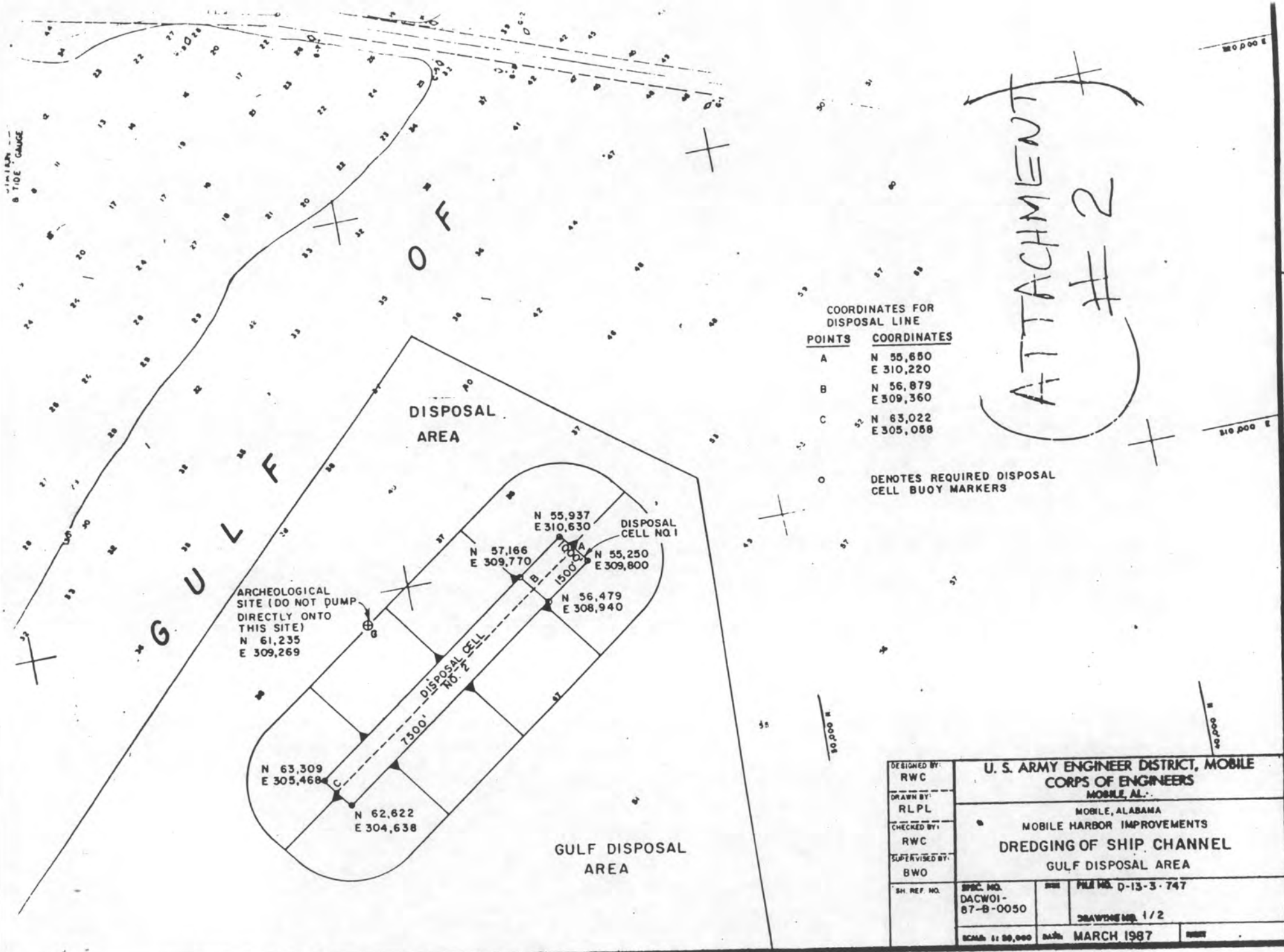
    - 20 feet high in 40 feet water
    - Crest dimensions: 1,000 feet by 9,000 feet long.
    - Bottom dimensions: 1 mile by 2 1/2 miles.

  - Monitoring program will determine whether the feature remains in place, contributes to wave energy dissipation, and provides an improved habitat. Monitoring techniques to be used will include: hydrographic and side scan sonar surveys, sediment samples, wave gauges, aerial and satellite photography, and fishery censuses and trawling.

- Monitoring costs as a requirement of ocean dump regulations will be funded under CG; additional costs for beneficial uses monitoring to be funded under O&M.

- Oil companies have expressed some concern. We have rotated the alignment of the berm somewhat to resolve their immediate concern.

• Results of monitoring programs for both berms are expected to have nationwide application. In addition to the potential physical and fishery benefits that might accrue, if proven feasible, application of the concept could result in significant cost savings by reducing haul distances for future new work and maintenance projects. Due to the relative close proximity of the channel to the designated disposal area, it is recognized that Mobile Harbor does not offer the large scale cost savings that appear possible at other locations; however, some savings will be realized.



COORDINATES FOR DISPOSAL LINE

POINTS	COORDINATES
A	N 55,650 E 310,220
B	N 56,879 E 309,360
C	N 63,022 E 305,068

O DENOTES REQUIRED DISPOSAL CELL BUOY MARKERS

ATTACHMENT #2

DESIGNED BY: RWC	U. S. ARMY ENGINEER DISTRICT, MOBILE CORPS OF ENGINEERS MOBILE, AL.
DRAWN BY: RLPL	MOBILE, ALABAMA
CHECKED BY: RWC	MOBILE HARBOR IMPROVEMENTS
SUPERVISED BY: BWO	DREDGING OF SHIP CHANNEL
SH. REF. NO.	GULF DISPOSAL AREA
SPEC. NO. DACW01-87-B-0050	FILE NO. D-13-3-747
SCALE 1: 80,000	DRAWING NO. 1/2
DATE MARCH 1987	SHEET

(ATTACHMENT # 3)

The Contractor shall bid this additional channel widening under Bidding Schedule No. 2 as specified in paragraph: BID SUBMITTALS contained in the Invitation for Bids, herein before.

4.2.3 Dredge Material Overflow: No dredge slurry overflow will be allowed if excavation is accomplished by either hopper dredge or hydraulic dredge pumping into dump scows between Stations 112+50 and 1600+40.

4.3 Bar Channel Dredging:

4.3.1 General: All required material above elevation -51 foot MLLW over the bottom widths including easements shown on the contract drawings, including side slopes as shown on the contract drawings, shall be removed, transported, and deposited into the Gulf disposal area(s) shown on the contract drawings. Dredge slurry overflow will be allowed in the Bar Channel between Stations 1600+40 and 2030+00.

4.3.2 Side Slopes Excavation: Material actually removed, within the required dredging limits approved by the Contracting Officer, to provide for final side slopes no flatter than 1 vertical on 7 horizontal, but not in excess of the amount originally lying above this required dredging limiting side slope will be estimated and paid for, in accordance with the provisions contained in Paragraph: MEASUREMENT AND PAYMENT, whether dredged in original position or by dredging space below the required side slope plane, at the bottom of that slope, for upslope material capable of falling into the cut. End slopes and transition slopes will not be estimated or paid for under this contract. In such cases, a OH:1V slope will be used with no allowance provisions applied outside the required prism.

4.4 Debris and Obstruction Removal: All debris such as stumps, roots, logs and any other objects that are unearthed during the excavation operation will be removed and disposed of as specified in Paragraph: DISPOSAL OF EXCAVATED MATERIAL. These specifications are not all-inclusive reference types of debris that will be encountered in this excavation. Some, but not all, of debris and foreign obstructions are shown on the contract drawings.

4.5 Excessive Dredging: Material from beyond the limits as specified in Paragraph: Bay Channel Dredging will be deducted from the total amount dredged as excessive overdepth dredging, or excessive side slope dredging for which payment will not be made. Nothing herein shall be construed to prevent payment for the removal of shoals performed in accordance with the applicable provisions of SPECIAL CLAUSE Paragraph: FINAL EXAMINATION AND ACCEPTANCE and Paragraph: SHOALING.

5. DISPOSAL OF EXCAVATED MATERIAL:

5.1 General: All dredged material shall be disposed of according to specific requirements and restrictions as explained hereinbelow. The Contractor shall develop his disposal procedures based on these requirements and restrictions.

(S) The Contractor shall submit a Disposal Plan, included as part of the plan required in Paragraph: ORDER OF WORK, above, to the Contracting Officer for approval prior to disposal of any dredged material under this contract. The Contractor's Disposal Plan shall be completely explanatory and include all assumptions, statements of fact, computations and a narrative to fully explain the procedures that the Contractor will follow during the contract. The Disposal Plan will include, as a minimum, all requirements of subparagraphs below.

5.2. It is the intent of these specifications that the material be placed initially in Disposal Cell No. 1 along a southeast-northwest disposal line as shown on the Contract drawings. Disposal shall advance along the line only as necessary to provide safe keel clearance or other equipment considerations while achieving the desired mounding height of 20 feet below MLLW (approximate). The specific disposal line will be designated at the pre-work conference, depending upon the contract dredge characteristics. If the material accumulates along the designated disposal line to such an extent that additional passes or disposal lines are necessary to accommodate the entire quantity of dredge material, these subsequent lines shall adjoin the previous disposal line in a southeast-northwest fashion. Disposal will commence at the southeast boundary (Point A) of Disposal Cell No. 1 along the disposal line, as described above, and proceed in a northwest direction until such time that 5,000,000 cubic yards of dredge material have been deposited in Disposal Cell No. 1. The dredge disposal operation will then be transferred to the northwest boundary (Point C) at Disposal Cell No. 2 and disposal will proceed in a southeast direction along the aforementioned disposal line and in the same general method as described hereinbefore, except that disposal will proceed in a southeast direction until completion of the contract. Except as otherwise authorized by the Contracting Officer in writing, no dumping shall be performed unless an inspector appointed by the Contracting Officer is present at the time. Bids received will be based on utilizing only the disposal site described herein before. After the above requirements have been met, if additional material remains to be disposed of, it can be placed in any cell, providing it is placed uniformly along another southeast-northwest dumpline axis and as close as possible to one of the previously used cells.

5.3 The Contractor shall perform a "before" and "after" condition survey of the Gulf disposal site(s) to be used. These surveys will be taken on 100-foot intervals and be of sufficient length to adequately cover the disposal site(s). These surveys will be referenced to MLLW and corrected for tide conditions at
(S) the time of the survey. The Contractor shall submit this data in "raw" form (fathometer charts, books, etc.) and plotted form immediately after the survey is completed.

5.4 Markings for disposal site and disposal line: The Contractor shall be responsible for marking the Gulf disposal site(s) described on the contract drawings. Also, the Contractor shall mark the disposal line within each Disposal Cell. Each disposal cell and disposal line will be marked with conspicuous buoys, all as approved by the Authorized Representative of the Contracting Officer, during the excavation and disposal operations as indicated on the disposal drawings. The buoys will have lights installed in accordance with Coast Guard standards. Coordinates for the Gulf disposal site(s) and the disposal lines are shown on the contract drawings.

5.5. Misplaced Material: Any dredged material that is deposited elsewhere than in places designated or approved by the Contracting Officer will not be paid for, and the Contractor will be required to remove such misplaced material and redeposit it where directed, at his own expense. This redeposit of the misplaced material shall not be basis for claim against the Government under this contract.

5.6 Disposal Operation Verification (Gulf Disposal Operations Only):

5.6.1 General: The Contractor shall have the responsibility to prepare and
(S) operate an acceptable electronic verification plan, included as part of the plan required in Paragraph: ORDER OF WORK, above, for all disposal events. That plan

must be submitted in writing by the Contractor, and be approved by the Contracting Officer prior to commencement of any disposal operations. No disposal operations will be allowed to occur unless this surveillance system is functional at the time disposal operations are in progress, including the actual transport operations. The Contractor can develop his own plan but it must meet all the characteristics as stated under Paragraph: Plan Characteristics. The Contracting Officer will make the final decision as to the Contractor's plan meeting those characteristics.

5.6.2. Plan Characteristics: The Contractor's plan shall involve an electronic surveillance feature of the movement of and deposition of the excavated material, including all debris. This surveillance feature shall monitor horizontal location and draft condition (vertical) of the transport medium devices from the point of excavation, to the disposal area and back to the point of excavation. Both horizontal location and draft condition (vertical) data shall be continuously indexed to continuous time-of-day with not more than one-quarter hour skip. Horizontal location shall have an accuracy at least equal to or better than the existing LORAN system available in the work area (NOTE): This is a different horizontal positioning system, type and accuracy, from that required under Paragraph: Electronic Positioning, below). Draft or vertical condition shall have an accuracy of + or - one-half foot and must have continuous (updated every hour, minimum) correction for tidal conditions. The surveillance system must produce a hard copy of all data discussed above such that the disposal of excavated materials can be verified at all times. The hard copy shall be orderly organized in report form and maintained at some central location on essentially a daily basis. These reports shall be available for evaluation by the Contracting Officer or his Authorized Representative at all times. At the end of each
(S) month of operation, the Contractor shall orderly bind-up the collected data and submit same to the Contracting Officer for permanent file record.

6. REPORTING REQUIREMENTS: The Contractor will be required to prepare and submit two (2) Daily Reports of Operations, MOB Form No. 720 and ENG Form No.
(S) 4267, for all work activities. These reports must be submitted on a daily basis and not in groups (groups = multi-days reports packaged together at one time). A reduced sample of each form for recording the required information is bound herein. In addition to the two (2) daily reports required, the Contractor shall prepare a Monthly Report of Operations for each month or partial month's
(S) work on ENG Form 4267. The monthly report is to be submitted to the Contracting Officer's Representative on or before the 7th of each month, consolidating the previous month's work. The Contractor shall mail the original of these reports to the Authorized Representative of the Contracting Officer. A copy of these reports will be maintained by the Contractor on the dredge(s) for the Government's inspection purposes. Further instructions on the preparation of the reports will be furnished at the Preconstruction Conference. Upon
(S) completion of the job, the Contractor shall submit a consolidated job report, combining the monthly reports.

7. NOTICES:

7.1 The Contractor shall give the Contracting Officer 30 days advance written
(S) notice of the date he plans to commence dredging work under this contract in order that monumentation and other controls may be adequately installed.

CESAM-PD-EC
Imsand

(ATTACHMENT #4)

Date Prepared
6 August 1987

Fact Sheet
Gulf Disposal Area Monitoring Program
Mobile Harbor Ship Channel Deepening Project

Background - The plan for the Deepening of the Mobile Harbor Ship Channel includes the disposal of approximately 18.7 million cubic yards of excavated material in an approved Gulf Disposal Area located approximately 5 miles south of Dauphin Island. The disposal area averages about 4 miles wide and 15 miles long with the long side generally parallel to the island. Since the most cost effective disposal would be associated with the shortest haul distance, a location at the eastern extremity of the disposal area was selected for use. Further, the disposal plan limits the release of the disposal material from the transport vessels to a 1000' by 9000' drop zone. See attached figure. The utilization of this 1000' by 9000' drop zone is expected to result in an approximate 20 foot high mound of disposal material that would have ecological and possibly physical benefits.

The formation of the planned mound on the otherwise featureless bottom of the region is expected to become a fish attractor and serve as a habitat for other aquatic organisms that previously could not exist at the location. The creation of this habitat area is expected to result in more diverse and plentiful ecological community than that which former existed.

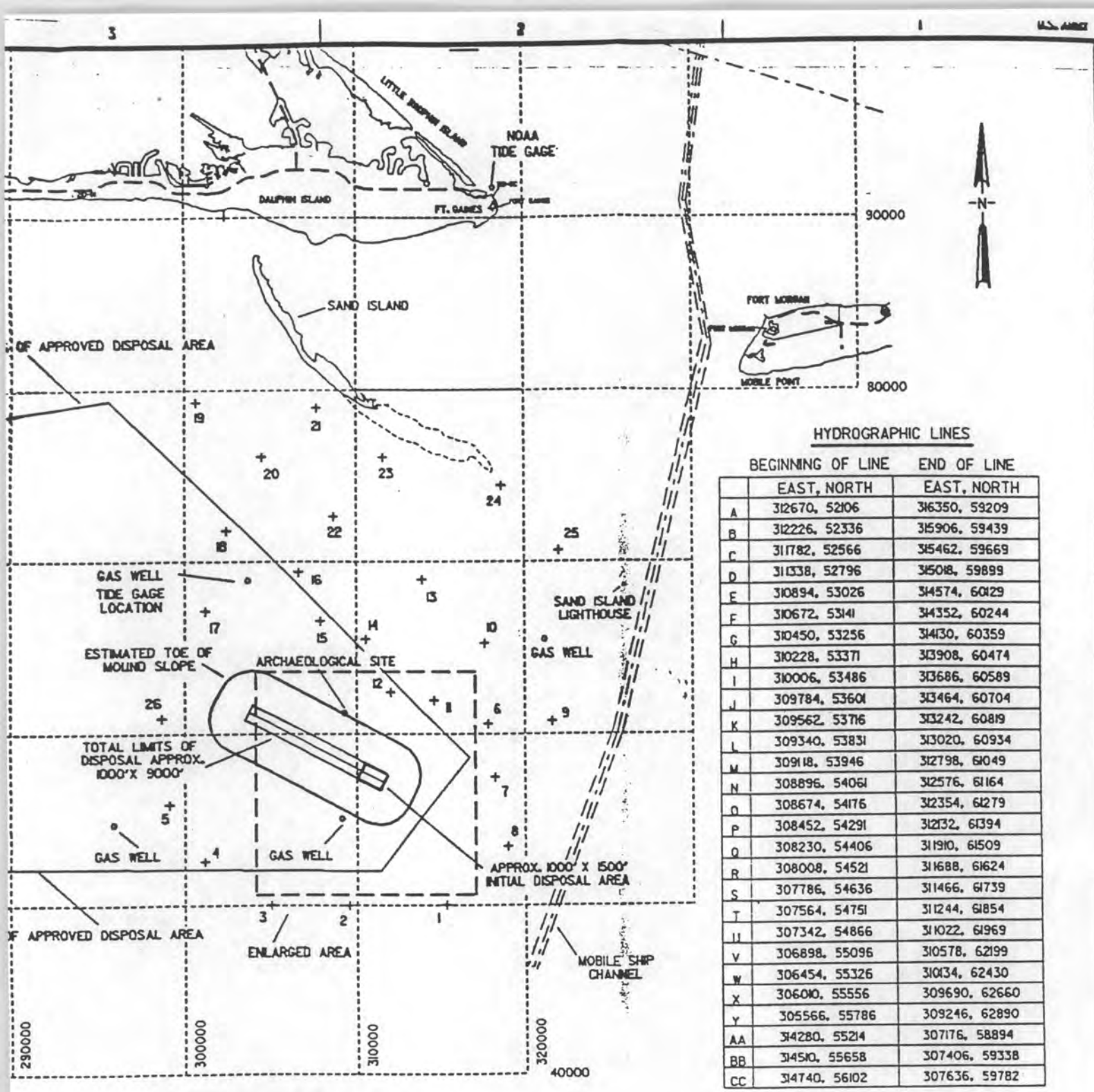
The physical benefits which could possibly result from the construction of the mound is a reduction in the adverse erosional effects of waves and currents along the shoreline to the north. Throughout history, the Gulf bottom and shoreline, to the north of the disposal location has been very dynamic. If through the planned construction, a reduction of the these erosional effects, particularly during storms, is realized, the measure of stability will be an enhancement to the area.

Definition of Study Area - As mentioned above the disposal plan requires that all material from the deepening project to be disposed of within a 1000' by 9000' long drop zone. In order to reduce the size of the ecological monitoring area and associated costs, and to obtain indications of the success of the plan at an early date, the easternmost 1500' of the larger drop zone was selected as an intensive study area. The disposal plan requires that this area is to be used for disposal first and when a sufficient height of disposal material has been achieved disposal operations would move to the western extreme of the 9000' long drop zone. As the target crest elevation is reached at the western end succeeding disposal would occur in an easterly direction. This serves to isolate the 1000' by 1500' area for intensive study and achieve the desired objectives.

Disposal Site Environmental Monitoring - The Gulf disposal plan described above necessitates two classes of Environmental Monitoring. The first is the monitoring associated with EPA requirements for monitoring the disposal of dredged material in offshore waters, and the second is the monitoring of the projected beneficial aspects of the disposal plan. The EPA required monitoring is a cost-shared item while the monitoring to determine the beneficial aspects of the plan is totally funded by the Corps.

The basic technique to be used in the overall investigation is one in which measured pre-disposal (baseline) conditions are compared to post-disposal conditions measured over time. The baseline condition investigation consists of the following major items of work: Tide, wind and barometric pressure gage installation, hydrographic surveying; bottom sediment sampling and photographic investigation of bottom sediments; and wave gage installation. The post-disposal monitoring includes the continuation of the above items with the addition of sidescan and subbottom profile surveying; and an investigation of the fisheries connected with the disposal mound by divers. The diver investigation is principally centered around ecological aspects and the wave gauge installation is to determine any changes in the wave climate and erosion potential that may be due to the construction. The tide gage, hydrographic survey lines and the bottom sediment sampling locations are shown on the attached Figure.

Schedule of Monitoring Activities - It is planned to conduct the baseline investigation within 30 days prior to the initiation of disposal activities which is presently scheduled to begin in November 1987. It is estimated that approximately two months will be required to construct the mound in the intensive study area. Post-disposal investigations will begin in January 1988 or shortly after disposal activities cease in the 1000' by 1500' drop zone. Post-disposal investigations will be repeated approximately every three months for two years or so depending on previous and projected findings. However, in order to comply with EPA required monitoring some limited monitoring may extend beyond two years.



HYDROGRAPHIC LINES

	BEGINNING OF LINE EAST, NORTH	END OF LINE EAST, NORTH
A	312670, 52106	316350, 59209
B	312226, 52336	315906, 59439
C	311782, 52566	315462, 59669
D	311338, 52796	315018, 59899
E	310894, 53026	314574, 60129
F	310672, 53141	314352, 60244
G	310450, 53256	314130, 60359
H	310228, 53371	313908, 60474
I	310006, 53486	313686, 60589
J	309784, 53601	313464, 60704
K	309562, 53716	313242, 60819
L	309340, 53831	313020, 60934
M	309118, 53946	312798, 61049
N	308896, 54061	312576, 61164
O	308674, 54176	312354, 61279
P	308452, 54291	312132, 61394
Q	308230, 54406	311910, 61509
R	308008, 54521	311688, 61624
S	307786, 54636	311466, 61739
T	307564, 54751	311244, 61854
U	307342, 54866	311022, 61969
V	306898, 55096	310578, 62199
W	306454, 55326	310134, 62430
X	306010, 55556	309690, 62660
Y	305566, 55786	309246, 62890
AA	314280, 55214	307176, 58894
BB	314510, 55658	307406, 59338
CC	314740, 56102	307636, 59782

BOTTOM SEDIMENT SAMPLES +

	EAST, NORTH		EAST, NORTH
1	315327, 50047	14	310575, 65530
2	309545, 50008	15	307843, 66560
3	304912, 50047	16	306576, 69411
4	301151, 52542	17	301190, 67154
5	299131, 55868	18	302378, 71787
6	317830, 60596	19	300636, 79271
7	318217, 57492	20	304398, 76103
8	318970, 53453	21	307645, 78954
9	321663, 60779	22	308635, 72658
10	317623, 65293	23	311605, 76064
11	317623, 65293	24	318653, 74440
12	312040, 62442	25	322098, 70639
13	313980, 68976	26	298695, 60937

, NORTH
3, 60868
. 56214
4, 58878
4, 61542
0, 56000
0, 59108
0, 62216
6, 55786
6, 59338
6, 62890

1" = 3000 FT

SCALE IN FEET

1" = 1000 FT

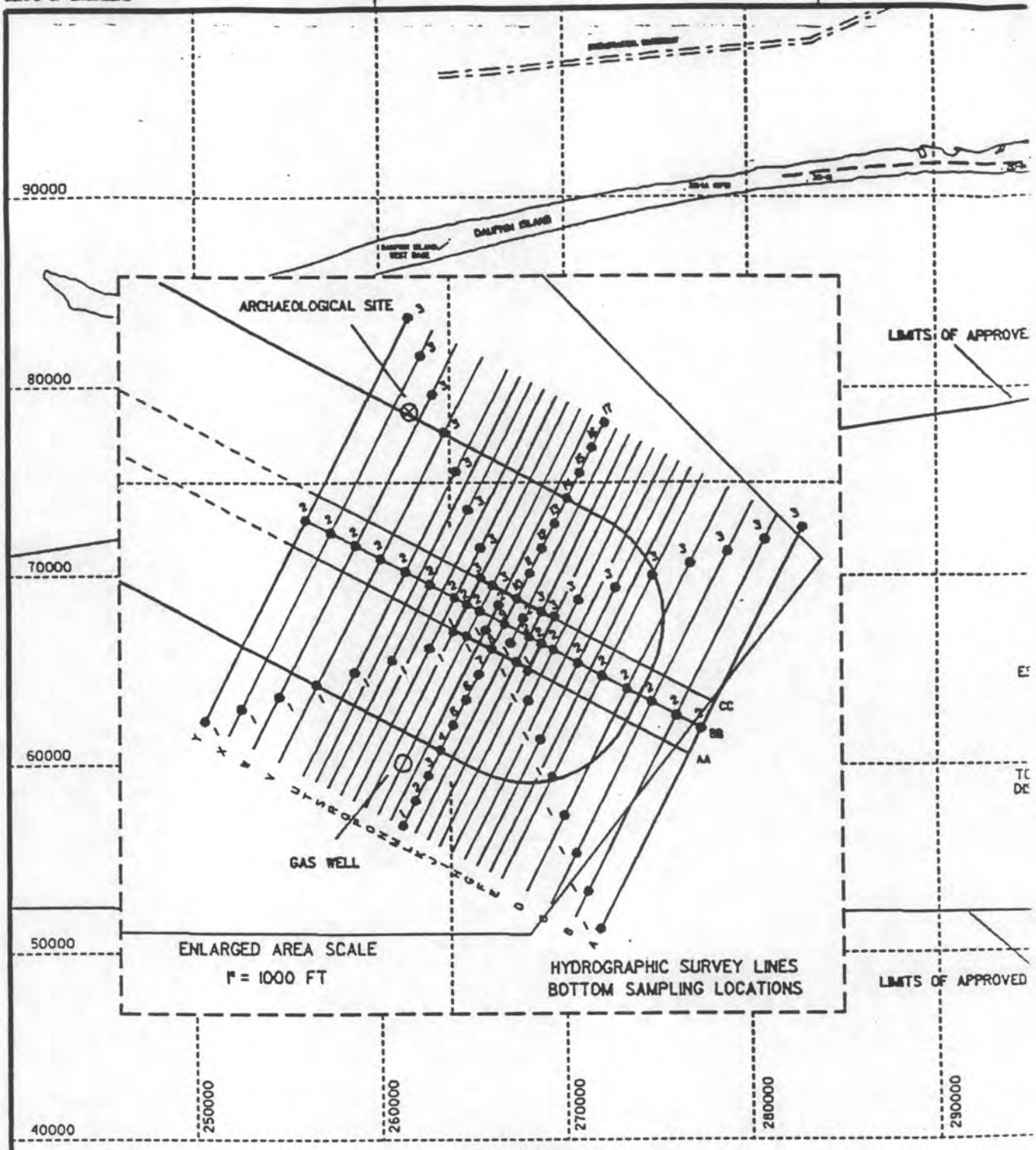
SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, MOBILE
CORPS OF ENGINEERS
MOBILE, ALA

MOBILE HARBOR DEEPENING
GULF DISPOSAL AREA
BASE LINE SURVEY

FILE NO. C-87-196
PROJECT CHART

SCALE 1:30000 | 12 MAY 1987 | SHEET 1 OF 1



ENLARGED AREA
BOTTOM SEDIMENT SAMPLES •

	EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH		EAST, NORTH
A1	312670, 52106	E2	312734, 56578	K3	311632, 57712	M11	311418, 58386	P2	310292, 57843	V3	309888, 60868
A2	314510, 55658	E3	313654, 58354	L1	311065, 57161	M12	311648, 58830	P3	310539, 58320	W1	306914, 56214
A3	316350, 59209	G1	311600, 55476	L2	311295, 57605	M13	311878, 59274	Q1	309610, 57070	W2	308294, 58878
B1	312456, 52780	G2	312290, 56808	M1	309118, 53946	M14	312108, 59718	Q2	310070, 57958	W3	309674, 61542
B2	314066, 55888	G3	312980, 58140	M2	309348, 54390	M15	312338, 60162	Q3	310530, 58846	X1	306240, 56000
B3	315676, 58995	I1	311386, 56150	M3	309578, 54834	M16	312568, 60605	S1	308936, 56856	X2	307850, 59108
C1	312242, 53454	I2	311846, 57038	M4	309808, 55278	M17	312798, 61049	S2	309626, 58188	X3	309460, 62216
C2	313622, 5618	I3	312306, 57926	M5	310038, 55722	N1	310621, 57391	S3	310316, 59520	Y1	305566, 55786
C3	315002, 58781	J1	311377, 56676	M6	310268, 56166	N2	310851, 57835	U1	308262, 56642	Y2	307406, 59338
D1	312028, 54128	J2	311624, 57153	M7	310498, 56610	O1	310284, 57284	U2	309182, 58418	Y3	309246, 62890
D2	313178, 56348	J3	311871, 57630	M8	310728, 57054	O2	310514, 57728	U3	310102, 60194		
D3	314328, 58568	K1	311172, 56824	M9	310958, 57498	O3	310744, 58172	V1	307588, 56428		
E1	311814, 54802	K2	311402, 57268	M10	311188, 57942	P1	310045, 57366	V2	308738, 58648		