FINAL ENGINEERING REPORT

for

ISLES DERNIERES RESTORATION PROJECT:

PHASE 0 - EASTERN ISLE DERNIERE and PHASE 1 - TRINITY ISLAND

State Contract No. 25085-94-02

March 31, 1994

Prepared For

LOUISIANA DEPARTMENT OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION

STATE OF LOUISIANA
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3/30/94

COASTAL ENGINEERING AND
ENVIRONMENTAL CONSULTANTS, INC.
Engineering, Surveying, Planners
& Environmental Consultants

(1)

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I. INTRODUCTION

1.0 GENERAL

The Isle Dernieres Barrier Island chain stretches for 20 miles along the coast of Louisiana, about 63 miles west of the mouth of the Mississippi River and 75 miles southwest of New Orleans, Louisiana. Coastal studies conducted since 1985 by the United States Geological Survey and the Louisiana Geological Survey indicate that the Isle Dernieres are eroding as fast as 66 feet per year. These high erosion rates, caused by both natural forces and human actions, have produced one of the most rapidly deteriorating shorelines in the world.

In 1978, the Terrebonne Parish Consolidated Government established as its major priority the restoration of its Barrier Islands. As evidence of this priority and its commitment to it, the Parish has spent over $1 million of local funds toward barrier island restoration. The State of Louisiana, through the Department of Natural Resources/Coastal Restoration Division and the South Terrebonne Tidewater District Management and Conservation District, also recognized the importance of these barrier islands and has spent millions of dollars in developing proven techniques (with demonstration projects) in an attempt to restore and protect these islands.

Until recently, active measures in restoring and protecting Isle Dernieres were prevented due to high project costs and absence of funds. On November 29, 1990, the Coastal Wetlands

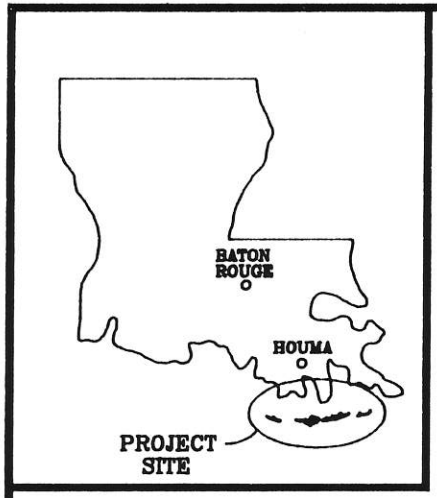
Planning, Protection and Restoration Act of the U. S. Congress was implemented and the Terrebonne Parish Consolidated Government, with the Environmental Protection Agency as the Federal Sponsor, submitted the State Project No. TE-20 and Federal Project No. 4352F14 for East Island and XTE-41 and Federal Project No. 4353F15 for Trinity Island as candidate projects for the Priority Project List 1 and 2. This proposed restoration and marsh creation on East Island and Trinity Islands was based on the experience gained in a successful pilot project implemented by Terrebonne Parish in 1985.

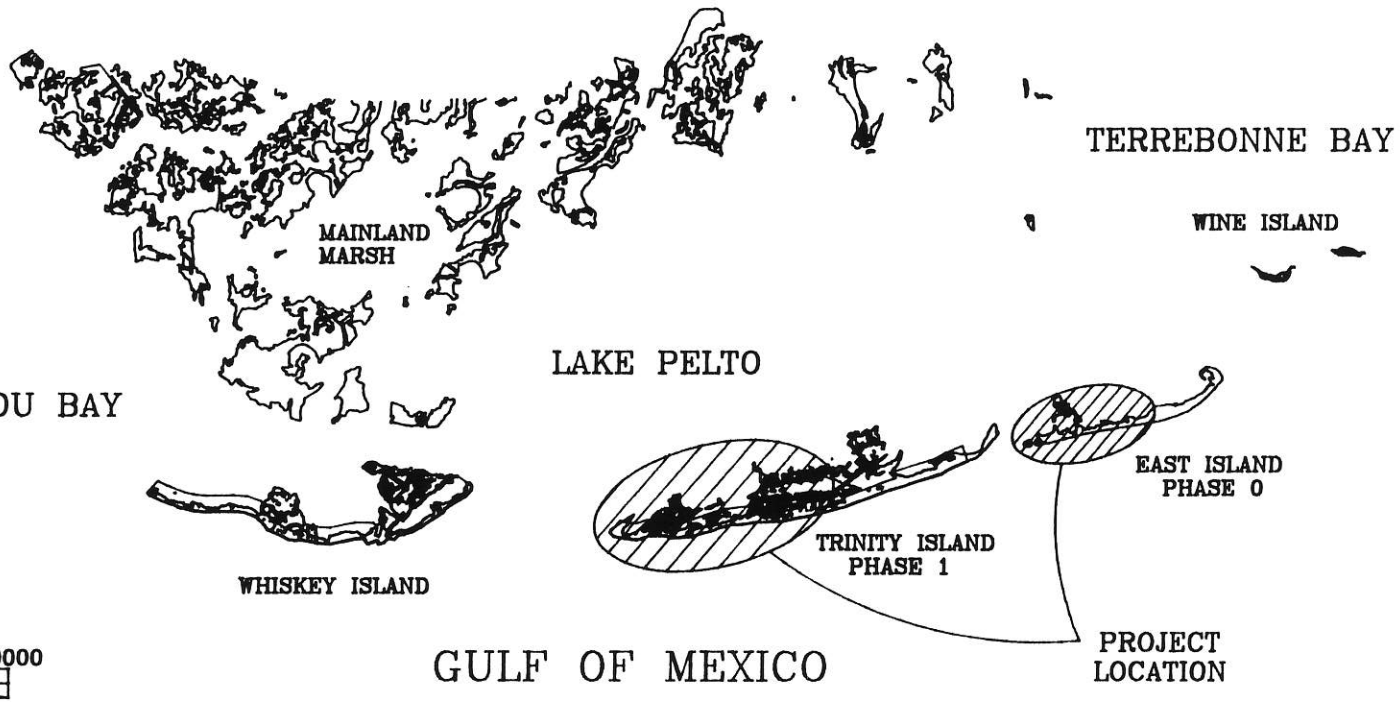
1.1 PROJECT AUTHORIZATION

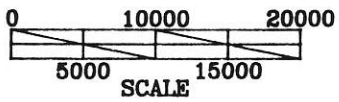
T. Baker Smith & Son, Inc. submitted a proposal in accordance with the Louisiana Department of Natural Resources' (DNR's) RFP on August 12, 1993. By letter dated September 13, 1993, T. Baker Smith & Son, Inc. received tentative notification that it had been selected to perform all work on DNR Contract No. 25085-94-02, OCR Contract No. 435-4003. By letter dated October 11, 1993, T. Baker Smith & Son, Inc. received executed contracts and Notice to Proceed. Copies of award notice and Notice to Proceed correspondence are included in Appendix A.

1.2 SITE LOCATION

The project involves restoration of Eastern Isle Dernieres (Phase 0) and Trinity Island (Phase 1) in Terrebonne Parish and includes marsh creation. The Phase 0 project is centered at longitude 90°40'00" west and latitude 29°03'37" north and the Phase 1 project is centered at longitude 90°45'00" west and latitude 29°02'30" north - (Exhibit 1).







THIS PLAN HAS BEEN APPROVED BY COASTAL RESTORATION LOUISIANA DEPARTMENT OF NATURAL RESOURCES.
SPONSOR:
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
FUNDS HAS BEEN APPROPRIATED THROUGH C.W.P.P.A. (BREAUX BILL).

ISLE DERNIERES RESTORATION PROJECT

PHASES 0 AND 1

PROJECT IS CENTERED AT
LONGITUDE 90 DEGREES 48' WEST
AND LATITUDE 29 DEGREES 03' NORTH

EXHIBIT 1

1.3 STATEMENT OF THE PROBLEM

The U. S. Geological Survey Circular 1075, 1990, features the Isle Dernieres in its publication entitled *COASTS IN CRISIS* and state that due to natural and human forces, the island has one of the most rapidly deteriorating shorelines in the world. The entire chain may be submerged by 2020, with Eastern Isle Dernieres predicted to be submerged much earlier. Using the Louisiana Geological Survey shoreline erosion rates, Eastern Isle Dernieres, except for approximately 30 acres, will be lost in 20 years. If the rate of coastal erosion between 1978 and 1988 continues, East Island will disappear by 1998 and Trinity Island by 2007. Using more conservative breached island erosion rates, the Isle Dernieres are projected to disappear by the year 2010. These islands provide the primary line of defense against wave energy from the Gulf of Mexico for an extensive estuarine system and a vast expanse of wetlands in Terrebonne Parish.

The rapid erosion, breaching and disappearance of the Isle Dernieres reduces their effectiveness in preventing storm surges from reaching lands adjoining the estuary, opens up bay areas to direct wave attack from the Gulf of Mexico, and increase the frequency and residence time of saline water incursions and the impact of tidal cycles. The result is accelerated conversion of estuarine areas to a less productive open Gulf of Mexico habitat.

Without the protection of barrier islands, the estuaries in the lower deltaic plain are susceptible to a dramatic increase in erosion rates, and consequently, further land loss. Restoration

of barrier islands is considered a vital component in any comprehensive plan for wetlands protection in Louisiana and was addressed in the State's application for the Terrebonne-Barataria Estuary to be included in the National Estuary Program.

Experience has demonstrated that a cost-effective method of restoration is to use sediment and vegetation to nourish beaches and to build back-island marshes. Extensive information is included in Penland et al (1990), McBride et al (1989) and a number of other reports.

1.4 PROJECT OBJECTIVES

The objectives of the project are to restore and elevate the coastal dunes, construct and enhance the wetlands of the Isle Dernieres, enhance the physical integrity of the wetlands, and protect the lower Terrebonne estuary and associated vegetated wetlands against direct exposure to the Gulf of Mexico.

Specific objectives are to increase the height and width of the barrier island dune system, close existing breaches, prevent new breaches, prevent island overwash, and construct new and enhance existing back barrier marsh. Other objectives include prevention of Gulf wave attack on mainland marsh behind the islands and habitat protection for fish and wildlife, including migratory birds.

The proposed dune restoration and marsh creation is based on experience gained in a successful pilot project implemented by Terrebonne Parish in 1985. Overwash sands will be initially used to build up a frontal retention dune structure. Emergent sands

will be used to close breaches and build retaining structures behind and over which dredged material will be pumped.

Sediment will be suction dredged from bay areas behind the island and used to hydraulically fill the area between the retaining structures. The hydraulic fill will be shaped to form the dune and an elevated marsh platform. The dune and marsh platform will be planted with species appropriate to dune and saline marsh habitats. The dune may vary in height from 6 to 8 NGVD and in width from 100 to 300 feet. The marsh platform may vary in height from 3 to 4 NGVD and in width from 350 to 500 feet. This project will create approximately 105 acres of wetlands on the Barrier Islands, providing wildlife and fisheries habitat.

The Phase 0, East Island Project will be additive to the existing 1985 Project and will extend to the west, a distance of approximately 10,400 feet to New Cut. The Phase 1 Project, Trinity Island, will extend east from Whiskey Pass toward Trinity Bayou, a distance of approximately 15,500 feet.

Restoration of barrier islands to their original continuous, high and wide profile will provide greater protection to back-barrier bays, estuaries and marshes, compared to the existing conditions. The protection comes from a combination of island features, including: reduction of overwash erosion and island breaching; reduction of fetch for local wind-induced waves; greater energy dissipation of storm surges; fewer tidal inlets and less saline intrusion. Direct benefits have been estimated beyond those retaining the integrity of the island itself, to a reduction

in land loss at least 100 acres per mile of restoration; however, these benefits are not included in the approach to evaluation of benefits.

Although the RFP and the engineering contract did not specify a project design life, it is our understanding from discussions with EPA and DNR that the project life should be 20 years. According to Kureth and Wise (1988), the 1987 La.DOTD Barrier Islands Project was designed for a 20-year project life. That did not mean that the 1988 Project should be designed to withstand the 20-year storms (Kureth and Wise, 1988). In fact, Kureth and Wise predicted that a series of strong storms greater than the 20-year level could totally destroy the project and severely damage the island. Since cost was a constraint then just as it is now, the minimum recommended project now should not be less than that designed by Kureth and Wise in 1988 for the same 20-year project life. Alternate No. 2 for Phase 0 and Phase 1 has the same dune cross section as 1988 design as far as height and width are concerned. The difference between the two designs is the marsh platform feature which has been added. In a small way, this will increase the project life. The base bid for both phases will certainly increase project life, but again a series of strong storms greater than the 20-year level could reduce project life.

Since it is unknown, but doubtful, whether maintenance money will be available, it is recommended that existing funds be utilized to the maximum to achieve as high and wide a dune as is initially feasible. If future maintenance money becomes available,

we recommend consideration be given to construction of a terminal groin on the west end of each island to trap westward moving sand and offshore breakwaters to slow down westward moving sand and build beach. Such hard structures were recommended by Kureth and Wise, 1988. Breakwaters are being successfully used at Holly Beach to build beach. Terminal groins have been in use much longer and are known to be effective in trapping littorally transported sand. Both of these hard approaches will be much less costly in maintaining future beaches.

1.5 PERMIT APPLICATIONS

Coastal Zone and U. S. Army Corps of Engineers permit applications for Phase 0 and Phase 1 were prepared and submitted by others under separate contract. The permits have been issued by Coastal Zone Management and the U. S. Army Corps of Engineers. A copy of those permits are included in Appendix B.

1.6 FINAL REPORT ORGANIZATION

This report addresses both phases. Each section first discusses, in general, characteristics of work that are identical to each island. This is followed by a presentation of facts about each phase that are different. The report is a revision to the preliminary report dated 11/19/93. It incorporates information from the 1/14/94 Design Memorandum and the 3/4/94 Semi-Final Engineering Report.

II. PROPERTY LISTING

2.1 OWNERSHIP DESCRIPTIONS

2.1.1 Private (Surface)

The East Isle Dernieres and Trinity Island were sold to the Louisiana Land & Exploration Company, formerly known as the Border Research Corporation, by H. H. Timken on the 2nd of February, 1926. This sale was recorded on the 13th of February, 1926. It may be noted that the records show that the sale was recorded on May 13, 1926, but the actual sale document shows the date as February 13, 1926. The name Border Research Corporation was changed to Louisiana Land & Exploration Company on the 19th of January, 1928 and filed on the 20th of January, 1928. Appendix C contains copies of these documents.

2.1.2 State (Water Bottoms)

The State of Louisiana is the owner of all surrounding water bottoms below +0.94 NGVD, mean high water winter months.

2.2 SURFACE LEASES

2.2.1 Private

There are a total of twenty-three active surface leases on all lands owned by Louisiana Land & Exploration Company on Isle Dernieres. Table 1 is a listing of the names and addresses of all of the lessees. With the exception of Lease No. T-2421, all other leases are located on Trinity Island and East Isle Derniere. Only Lease T-0568 is located on East Isle Derniere, Exhibit 2. All others are clustered at the intersection of Trinity Bayou and the California Canal on Trinity Island, Exhibit 3. An example of a typical surface lease is shown in Appendix D.

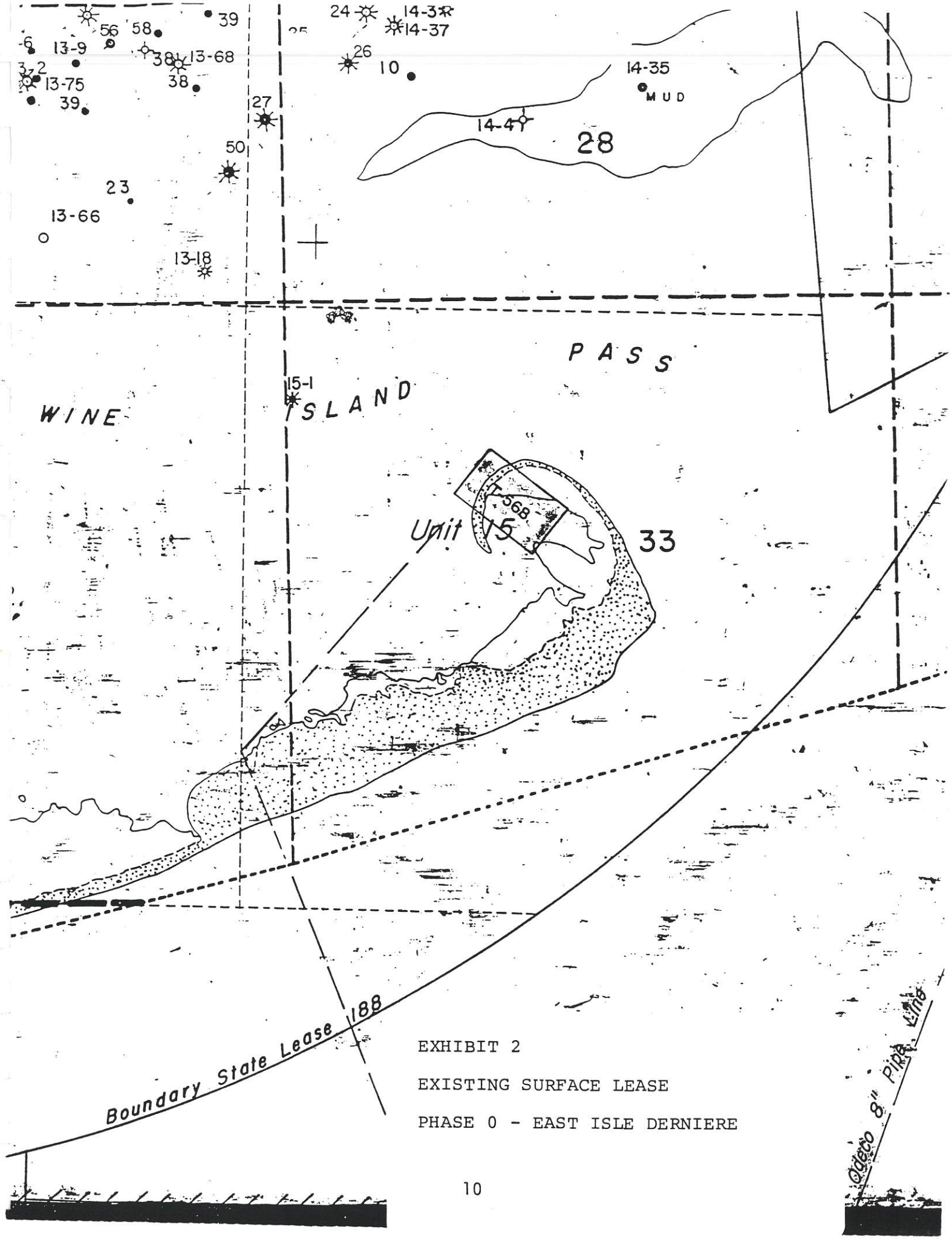


EXHIBIT 2

EXISTING SURFACE LEASE

PHASE 0 - EAST ISLE DERNIERE

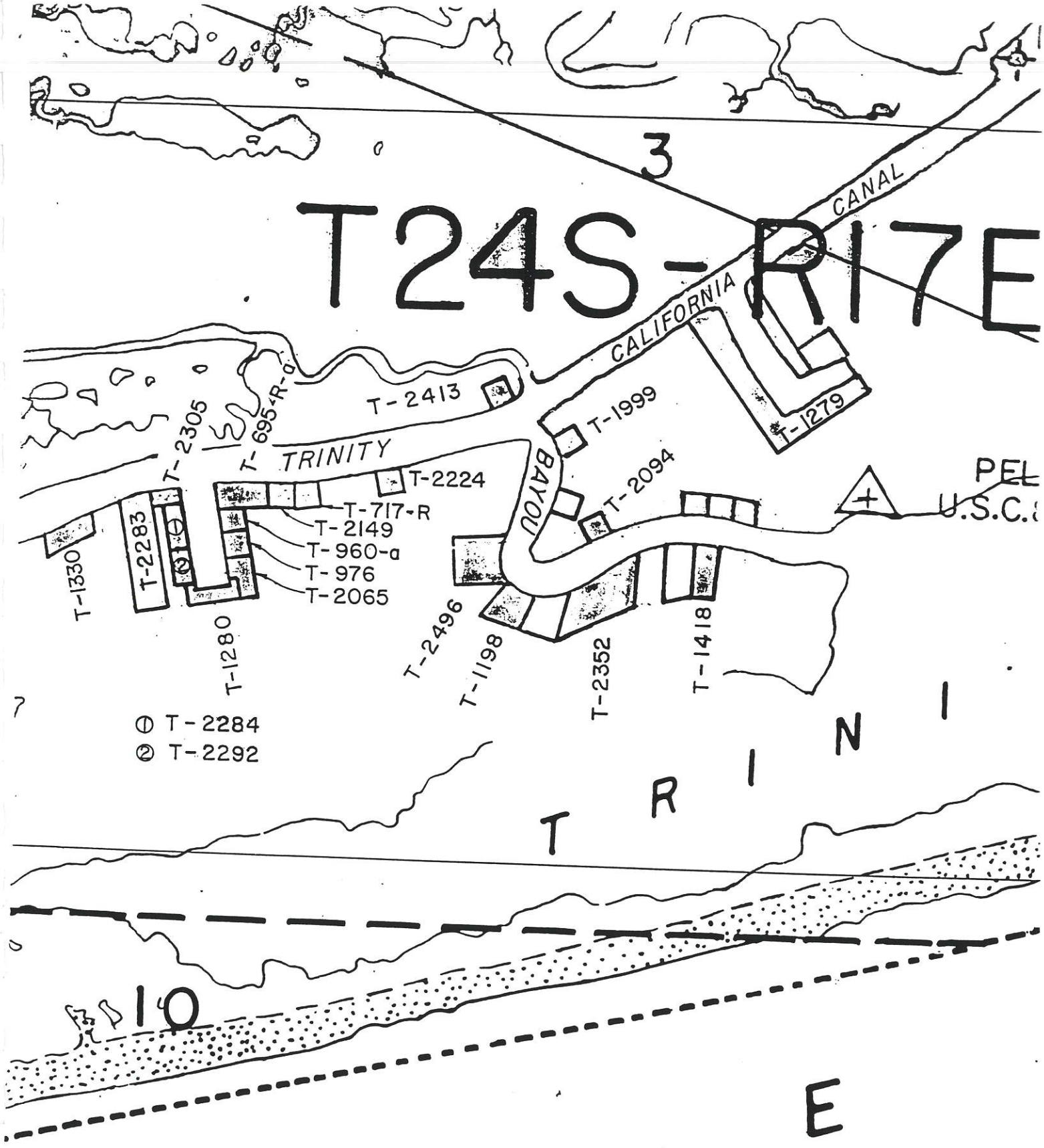


EXHIBIT 3

EXISTING SURFACE LEASES

PHASE 1 - TRINITY ISLE

Lease T-2421 is with the Louisiana Wildlife & Fisheries. That lease includes major portions of Raccoon Island, all of Whiskey Island, and Wine Island. A copy of the lease with map exhibit is included in Appendix E.

2.2.2 Mineral

There are no known surface mineral leases on Trinity or East Isle Derniere.

2.3 WATER BOTTOM LEASES

2.3.1 Minerals

Table 2 lists four leases issued by the State of Louisiana for minerals. Exhibit 4 shows the location of them with respect to the project. Their location is not expected to present any problems. Existing well heads in Lake Pelto will not cause any problems either. Appendix F contains copies of the lease documents.

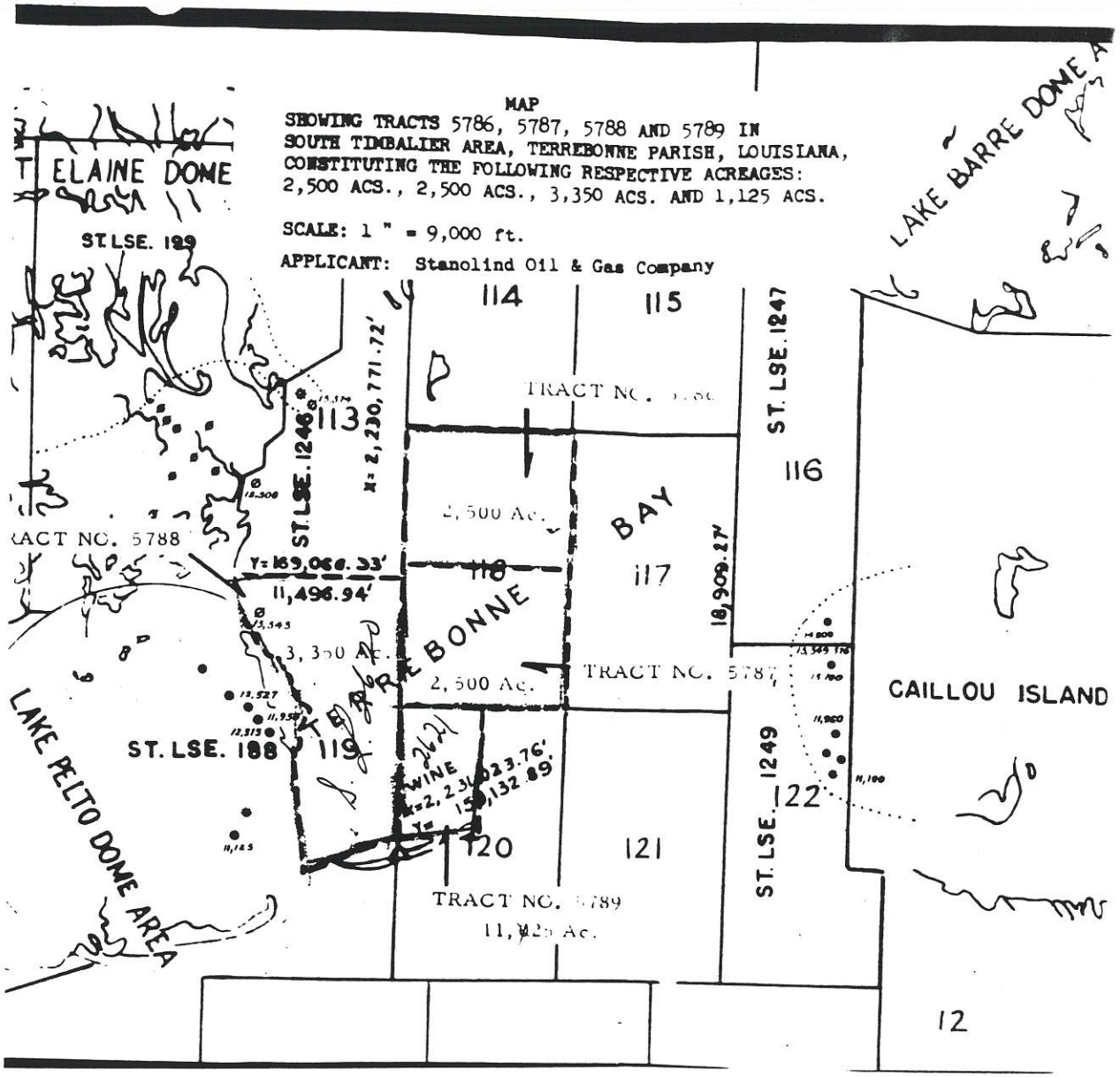


EXHIBIT 4

MAP SHOWING STATE WATERBOTTOM
MINERAL LEASES

TABLE 1

SUMMARY OF ACTIVE SURFACE LEASES
TRINITY ISLAND AND EAST ISLE DERNIERES

T0568	Energy Assets International		1221 Lamar, Ste. 1600	Houston	TX	77010
T0695Ra	Rogers	Louis D.	651 Duval St.	Houma	LA	70364
T0717R	Marie	M. P.	208 Howard Ave.			
T0960a 70361	Duval	Claude B.	P. O. Box 3017	Houma	LA	
T0976	Voss	Jack L.	P. O. Box 1013	Houma	LA	70361
T1198	Fanguy	Ulysse P.	111 Thomas St.	Houma	LA	70360
T1279	Terrebonne Parish Consolidated Govt.		P. O. Box 2768	Houma	LA	70361
T1280	Carrere	James R.	11 Five Oaks Dr.	Houma	LA	70361
T2094	Cenac	Cindy Trahan	714 Kenny St.	Houma	LA	70364
T1330	Cenac	Cindy Trahan	714 Kenny St.	Houma	LA	70364
T1418	Coyle	Billy	P. O. Box 9064	Houma	LA	70364
T1999	Dardard	Julia S.	P. O. Box 1262	Kenner	LA	70063
T2065	Dagate's Marine, Inc.		1128 Barrow St.	Houma	LA	70360
T2149	Bayou Investment Properties, Inc.		525 East Park Avenue	Houma	LA	70364
T2224	Caminita, Sr.	Salvador J.	140 Caminita Rd.	Perkinston	MS	39573
T2283	Cenac	Richard J.	P. O. Box 3577	Houma	LA	70361
T2284	Cenac	Arlen B.	301 Rightor St.	Houma	LA	70361
T2292	Weaver, Jr.	Charles K.	405 Central	Houma	LA	70364
T2305	Deligans	Billy R.	P. O. Box 144	Houma	LA	70361
T2352	Saia, III	Louis P.	P. O. Box 9189	Houma	LA	70361
T2413	Porche	Marvin J.	205 Garden Lane	Houma	LA	70363
T2421	La. Dept. Wildlife & Fisheries		P. O. Box 98000	Baton Rouge	LA	70898
T2496	Ellender	Albert	102 Ramey Rd.	Houma	LA	70360

Mineral Lease to Texaco, Inc. (1928 Contract) covering, but not limited to, the East 1/2 of Section 32 & Section 33, T23S-R18E.

TABLE 2

SUMMARY OF STATE WATER BOTTOM MINERAL LEASES

LEASE NUMBER	LEASE DATE	LESSEE
188	2/9/28	Louisiana Land & Exploration Co.
199	3/26/28	Louisiana Land & Exploration Co.
2620	6/17/56	Sun Oil Company
1246	6/21/67	Sun Oil Company

2.3.2 Oysters

In the vicinity of the projects, the State of Louisiana, Department of Wildlife & Fisheries, has issued five active oyster leases for bedding grounds. Four other applications for leases in the vicinity of the project areas have been made. Table 3 lists the leases and Exhibit 5 shows their location. Appendix G contains a copy of the leases and a copy of an oyster assessment prepared in September, 1993. A letter of no objection was received from Tideland; however, Mr. Thibodeaux objected and expressed his desire to be compensated for his lease. Copies of these letters are included in Appendix G.

According to Melancon and Schultz (1993), soundings taken on the lease did not detect any oysters or shell and no oysters were detected along the shores. Only one area appeared to have what may have been a small reef at one time, but it was buried in mud and sand according to Melancon and Schultz (1993). Melancon and Schultz did not take any dredge samples because of the lease location. Melancon and Schultz described this lease as being most conducive to having an intertidal reef because of the adjacent

marsh areas. By their observations, however, no intertidal reef was seen nor was there any evidence of recent commercial use of the lease. Reed (1993) predicted that sediment from borrow areas would not affect this reef because currents through Whisky Pass would carry these disposal sediments off before they could reach Lease 27249. She predicted that the main impact to this lease would be from the disposal of sediments for beach creation. For more on this lease, refer to Appendix G.

TABLE 3

SUMMARY OF ACTIVE OYSTER LEASES AND

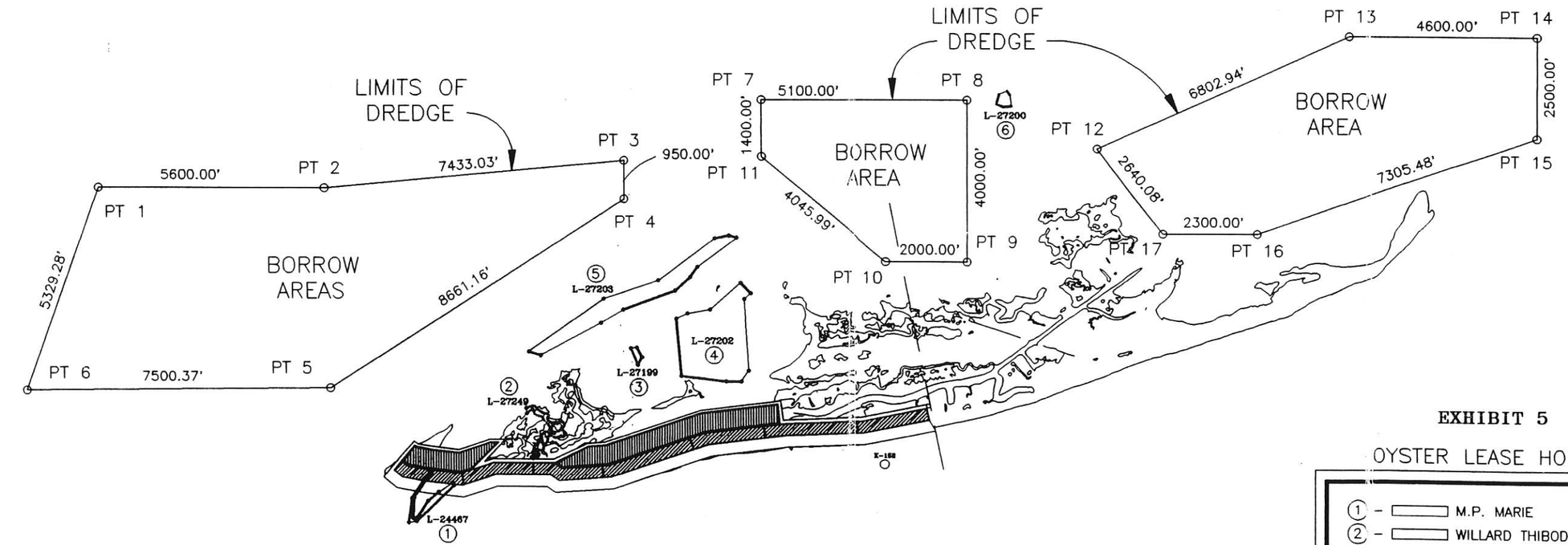
APPLICATIONS FOR OYSTER LEASES

LEASE NUMBER	DATE OF ISSUE	NAME OF LESSEE
27202	May 7, 1984	Tideland Seafood Company
27203	May 7, 1984	Tideland Seafood Company
27199	May 7, 1984	Tideland Seafood Company
27200	May 7, 1984	Tideland Seafood Company
27249	May 16, 1984	Willard Thibodeaux
24467	Expired January 1, 1993	M. P . Marie

APPLICATION NUMBER	NAME OF APPLICANT
CC-195	Charlene O'Neal
PP-784	Lloyd J. Price
PP-928	Harold J. Price
PP-785	George J. Price

BORROW AREA COORDINATES

POINT NO.	X COOR.	Y COOR.
PT 1	2,173,500	144,700
PT 2	2,179,100	144,700
PT 3	2,186,500	145,400
PT 4	2,186,500	144,450
PT 5	2,179,225	139,750
PT 6	2,171,725	139,675
PT 7	2,189,900	146,900
PT 8	2.195,000	146,900
PT 9	2,195,000	142,900
PT 10	2,193,000	142,900
PT 11	2,189,900	145,500
PT 12	2,198,200	145,700
PT 13	2,204,400	148,500
PT 14	2,209,000	148,500
PT 15	2,209,000	146,000
PT 16	2,202,100	143,600
PT 17	2,199,800	143,600



OYSTER LEASE LOCATIONS
TRINITY ISLAND

EXHIBIT 5

OYSTER LEASE HOLDER

① – M.P. MARIE
② – WILLARD THIBODEAUX
③ – TIDELAND SEAFOOD CO, INC.
④ – TIDELAND SEAFOOD CO, INC.
⑤ – TIDELAND SEAFOOD CO, INC.
⑥ – TIDELAND SEAFOOD CO, INC.

2.4 SURFACE RIGHT-OF-WAY/SERVITUDES-ENCUMBRANCES

2.4.1 Pipelines

There are five pipelines which cross Isle Dernieres between Raccoon Point and Wine Island. Four of these are in the vicinity of the project and may be affected by dredging activities in Lake Pelto behind the islands. Table 4 lists the operators and the line size. Exhibits 6, 7, 8, and 9 show the approximate location of these lines with respect to the project. These lines have been located recently in the field using a proton magnetometer. The location compares closely to as-built information furnished by the pipeline operators. The specifications require the Engineer to locate these lines prior to construction. The Contractor will be responsible for maintaining markers or having the necessary navigational equipment to avoid these high pressure natural gas pipelines. Copies of right-of-way documents and letters from pipeline operators are in Appendix H.

TABLE 4

SUMMARY OF PIPELINES OPERATORS

OPERATOR	LOCATION	SIZE
Transcontinental Gas Pipeline Corp.	Raccoon Island, East End	26"
Tennessee Gas Pipeline Co.	Whisky Pass, East End	26"
Texas Gas Transmission Corp.	Trinity Island	8" & 42"
Chevron Oil Co.	East Isle Dernieres	4"

2.4.2 Utilities and Others

There are no other known surface right-of-way, servitudes or encumbrances.

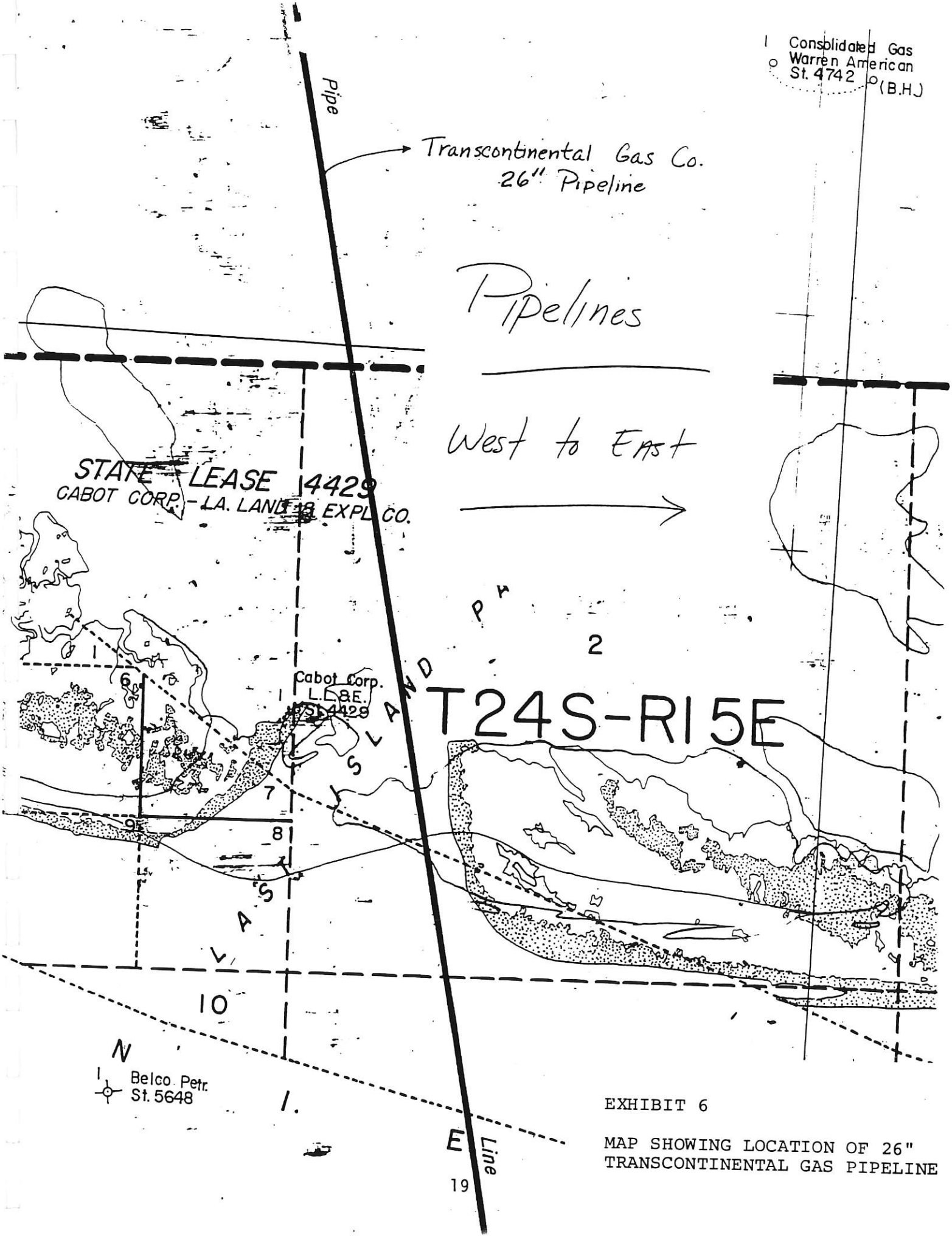


EXHIBIT 6

MAP SHOWING LOCATION OF 26" TRANSCONTINENTAL GAS PIPELINE

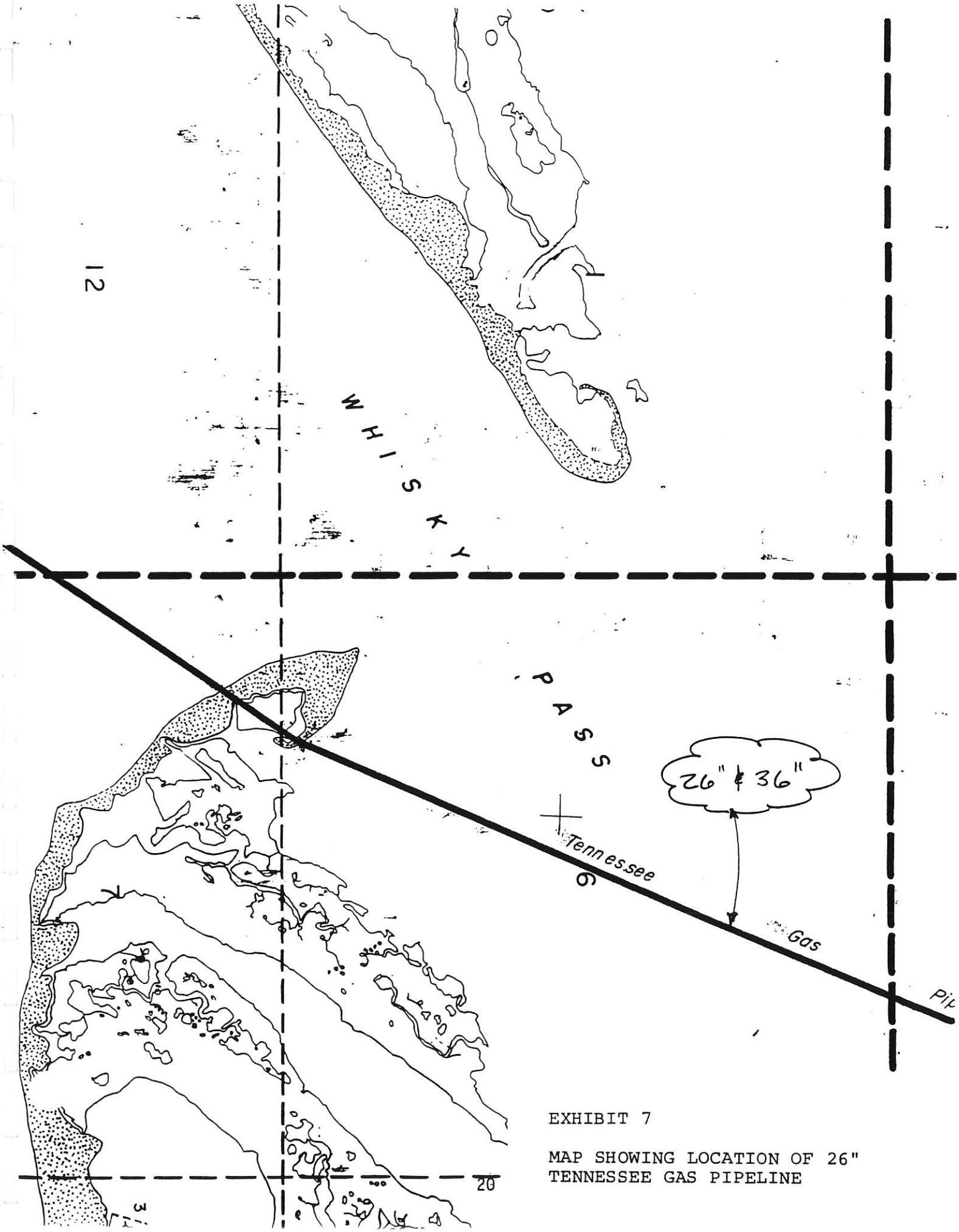


EXHIBIT 7

MAP SHOWING LOCATION OF 26" TENNESSEE GAS PIPELINE

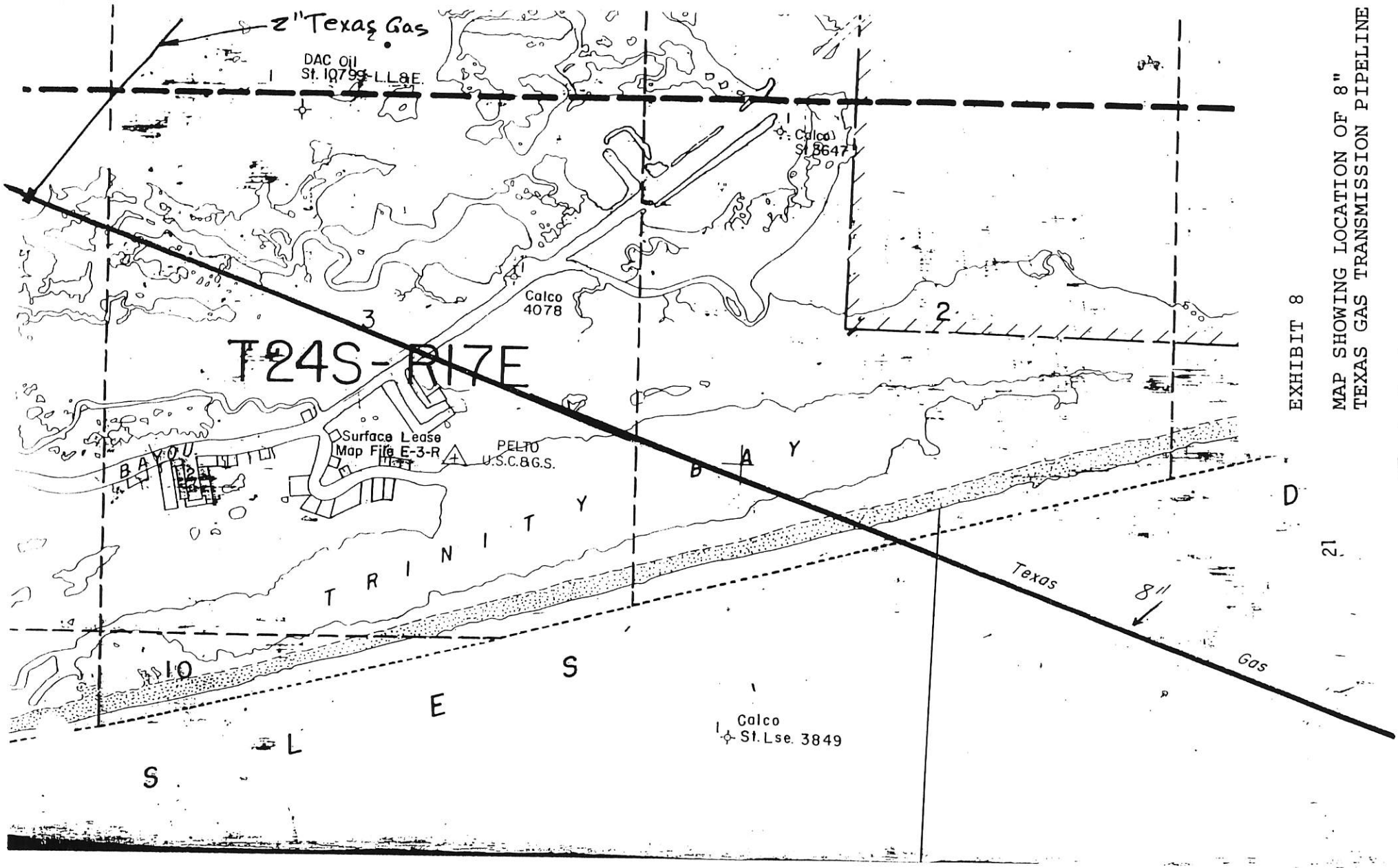


EXHIBIT 8

MAP SHOWING LOCATION OF 8"
TEXAS GAS TRANSMISSION PIPELINE

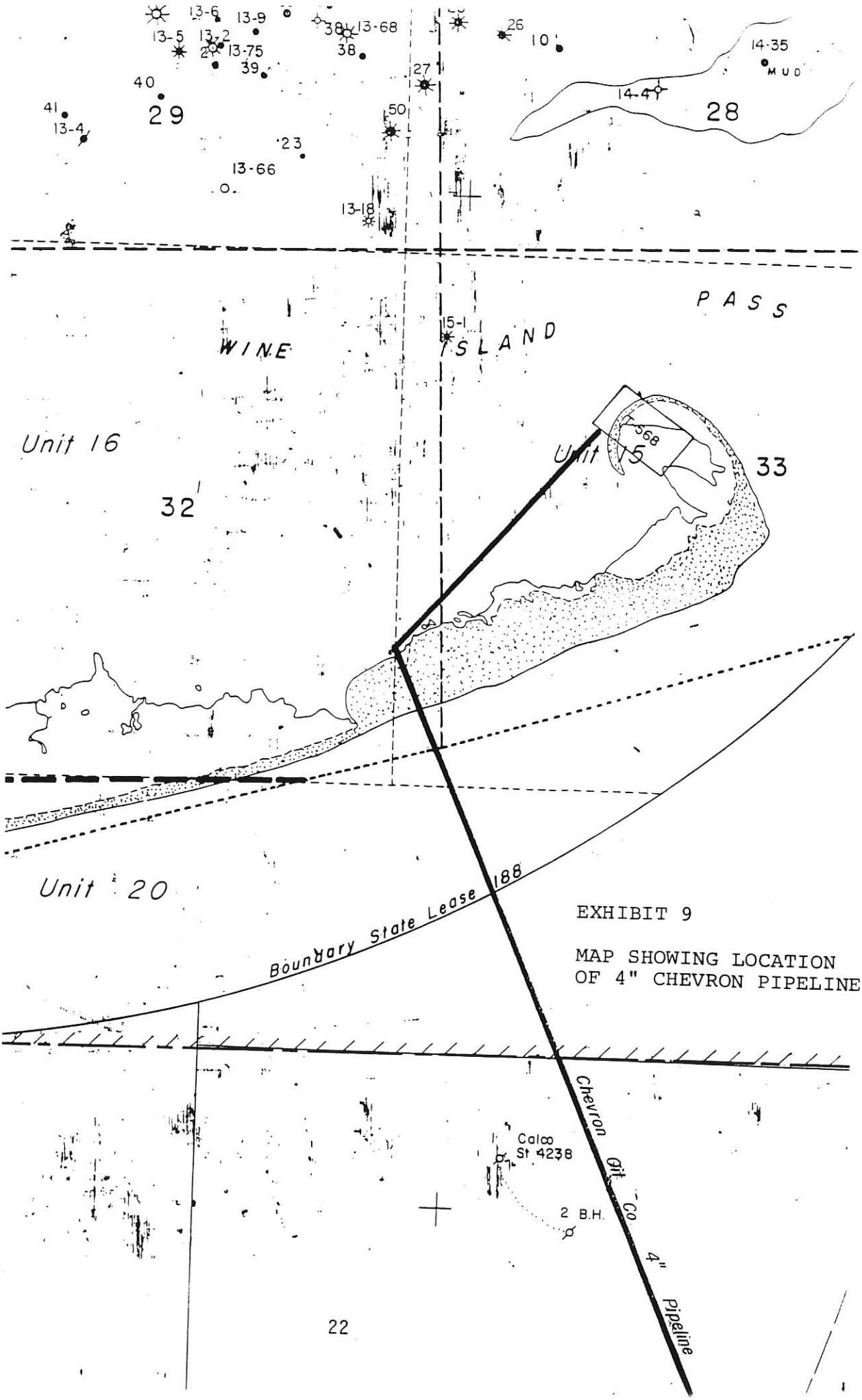


EXHIBIT 9

MAP SHOWING LOCATION OF 4" CHEVRON PIPELINE

2.5 PROPOSED CONSTRUCTION AGREEMENTS

2.5.1 Louisiana Land & Exploration Company Agreement

Louisiana Land & Exploration Company hand delivered to DNR on June 15, 1993 a proposed construction agreement for the work on Isle Dernieres. Appendix H contains a copy of those documents.

2.5.2 DNR Construction Agreement

By letter from DNR dated October 29, 1993, we received a copy of DNR Construction Agreement for work on Isle Dernieres. Appendix J contains a copy of those documents.

2.5.3 Construction Agreement

In accordance with DNR's 12/20/93 letter, we have deferred from contacting Louisiana Land & Exploration Co. It is our understanding that there is the possibility of of a surface donation to Louisiana Wildlife & Fisheries from Louisiana Land & Exploration Co., but Louisiana Land & Exploration Co. wants to retain mineral rights to the existing land and new land created by the projects. We are awaiting a contract amendment to provide DNR with a map showing the contour line which delineates private property from State land.

III. FIELD SURVEYS

3.1 GENERAL

Field surveys for design purposes were required. Previous surveys are either not representative of current conditions or are not in sufficient detail for plan preparation. Survey work required included setting up horizontal and vertical control traverses along both phases and performing topographic,

cross-sectional and bathymetric surveys. Survey permission was obtained from Louisiana Land & Exploration Co., Inc. on October 5, 1993. A copy of the survey permission agreement may be found in Appendix K.

3.1.1. Horizontal/Vertical Control

Beginning points for all survey work were established in March and April, 1993 under Contract No. 25030-92-35 with the DNR. A copy of the report which describes those points is included in Appendix L herein. Horizontal and vertical controls Points EI-1 and EI-2 described in the report and having X,Y&Z control were used as the basis for all survey work on East Isle Derniere (Phase 0). On Trinity Island, controls Points TI-1 and TI-2 described in the report and having X,Y&Z control were used as the basis for all survey work on Trinity Island (Phase 1).

3.1.2 Control Traverses

Control traverses for each phase were run east to west to east in a clockwise direction. Stationing for the survey, however, begins on the west end and ends on the east end for each phase. This station orientation is to facilitate continuity in plan preparation. No reference points were established on P.I.'s and P.O.T.'s on the base line segment of the control traverse since it is likely that they will be destroyed as easily as the base line P.I.'s and P.O.T.'s during construction. Traverse points located north of the proposed work can be used for reestablishing segments of the survey base line destroyed during construction.

3.1.3. Cross Sections

Cross sections for each phase were taken at 200-foot intervals along the survey base line. Each section extended on the average 500 feet gulfward and about 1,000 feet bayward. Data points were picked up at 25-foot intervals and at all land/waters interfaces. At 1,000-foot intervals along the base line, the bayward cross sections were run 2,000 feet north. These extended cross sections were done to obtain data on water depths on the fringe of areas where marine-mounted bathymetric equipment could not operate effectively. The gulfward cross sections were restricted by surf conditions. Other special topographic features such as piling, wrecks, etc. were tied in while performing cross sections.

3.1.4 Bathymetric Surveys

Bathymetric surveys of the water depth over the sand source borrow areas resulted in contour maps that show water depths in one foot contour intervals. These contours are superimposed on overlapping sand source stratas.

3.2 EAST ISLE DERNIERE (PHASE 0)

Coastal Engineering & Environmental Consultants, Inc. (CEEC) was subcontracted to perform all survey work on East Isle Derniere. The East Isle Derniere Project (Phase 0) is located between the 1985 Terrebonne Parish Consolidated Government Project and New Cut. The project is in Sections 5 and 6 of T24S-R18E and Sections 31, 32, and 33 of T23S-R18E, Terrebonne Parish. The approximate latitude and longitude for the east and west ends are:

East End at 1985 TPCG Project Lat. 29°03'46" N

Long. 90°38'59' W

West End at New Cut Lat. 29°03'43" N

Long. 90°40'57' W

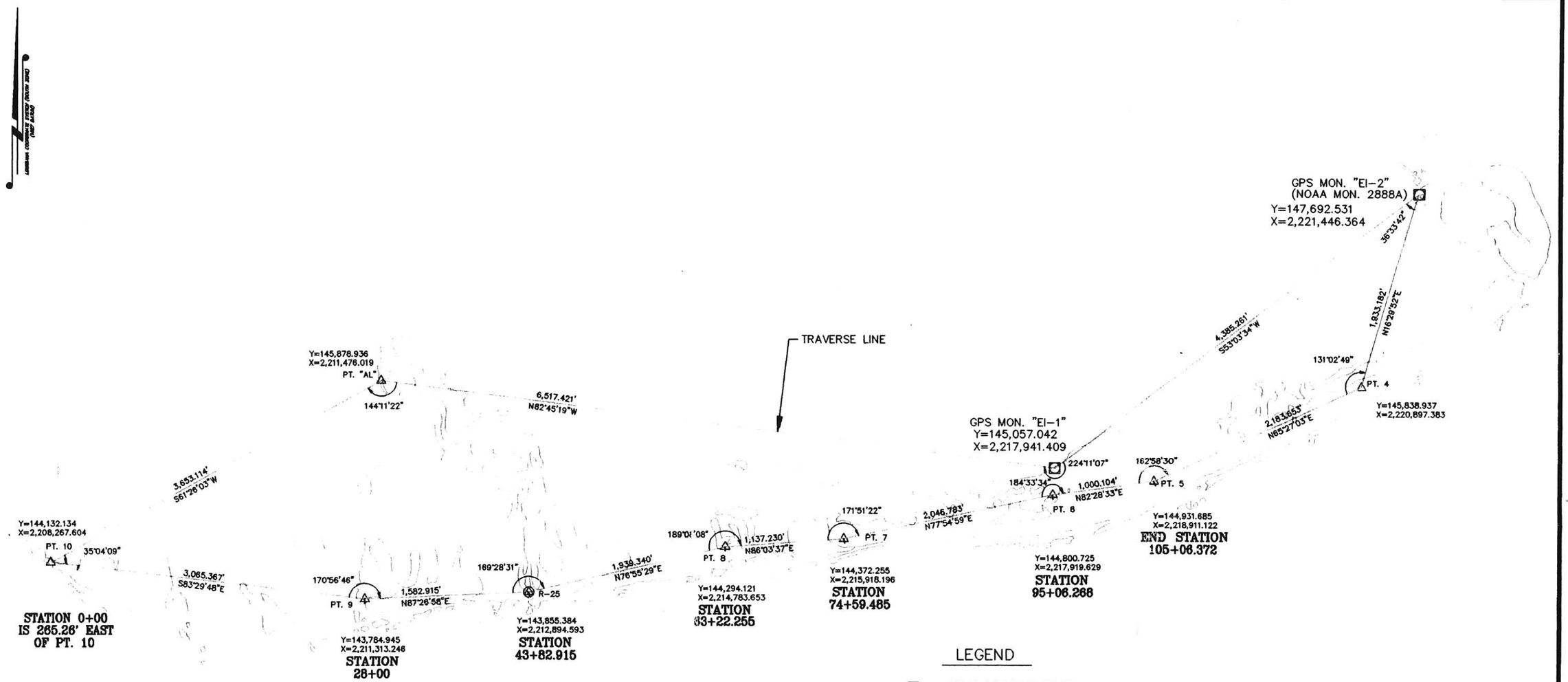
3.2.1 Horizontal/Vertical Control

Prior to traversing, a field reconnaissance located Points EI-1 and EI-2. Several points from the 1987 La.DOTD Barrier Island Survey were also identified. Among those are Points R23 and R25. The X,Y&Z data established for EI-1 and EI-2, using GPS equipment, was the basis for the control traverse. It appears that control point EI-1 will fall within the proposed improvement, resulting in its destruction. To replace it, a similar control point should be set at control traverse point "AL" for future reference and use in reestablishment of the survey base line.

3.2.2 Control Traverse

The horizontal control traverse for East Isle Derniere (Phase 0) is shown on Exhibit 10. Equipment used to run this traverse consisted of Topcon GTS-30 total station (00°00'05" accuracy) and Sokkia C 30 level. Stationing for the control traverse begins on the west end near New Cut at Station 10+00 and ends on the east end at Station 85+056.27 just west of the 1985 Parish Project. The horizontal control traverse had a closure of 1 in 19,623. No adjustments were made. As a result of this control traverse, an error in control point EI-2 was discovered and corrected. Field notes and calculation sheets are contained in

SHEET NO.



CLOSURE INFORMATION

CLOSING LINE:	S36°29'46"E, 1.277'
DISTANCE TRAVERSED:	25,059.111'
PRECISION:	1/19,622.936

LEGEND

- ☐ GPS MONUMENT
  BRASS DISK SET IN CONCRETE EXTENDING APPROX. 18" ABOVE GROUND
  ENCASED IN 6" PVC PIPE
- ⊛ U.S. C.O.E. MONUMENT
  3" BRASS DISK MOUNTED ON TOP OF ALUMINUM RODS
  EXTENDING 18" ABOVE GROUND
- △ SET 1" GIP (EXTENDING 6" ABOVE GROUND)

EXHIBIT 10

CONTROL TRAVERSE

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
PHASE 0 – EAST ISLAND

DWG. FILE: 1136-18 DATE: NOVEMBER 1993
SCALE: 1"=1000'

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering – Surveying – Planners – Environmental Consulting

DESIGNED	DETAILED SAM	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION	BY
	REVISIONS	

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2296 HOUMA, LOUISIANA 70361

Appendix M.

The vertical control established for Phase 1 was looped along the survey base line. This third order survey closed within acceptable limits and therefore no adjustments were necessary. The field notes are also contained in Appendix M.

3.2.3 Cross Sections

A total of fifty-one (51) cross sections were taken on East Isle Derniere. The cross section station locations and temporary bench mark locations with elevations are shown on Exhibit 11. Appendix N contains the actual cross sections.

3.3 TRINITY ISLAND (PHASE 1)

3.3.1 Horizontal/Vertical Control

The Trinity Island Project (Phase 1) is located between Whisky Pass and Trinity Bayou. The project is in Sections 2, 3, 4, 5, 8, and 9 of T24S-R17E, Terrebonne Parish. The approximate longitude and latitude for the east and west ends are:

West End at Whisky Pass	Lat. 29°02'36" N
	Long. 90°46'02' W
East End at Trinity Bayou	Lat. 29°02'56" N
	Long. 90°43'30' W

Control points TI-1 and TI-2 described in Appendix F were identified by field reconnaissance. Points previously established during the La.DOTD Barrier Island Survey were not located. The X,Y&Z data established from TI-1 and TI-2, using GPS equipment, was the basis for the control traverse on Trinity Island.

SHEET NO.

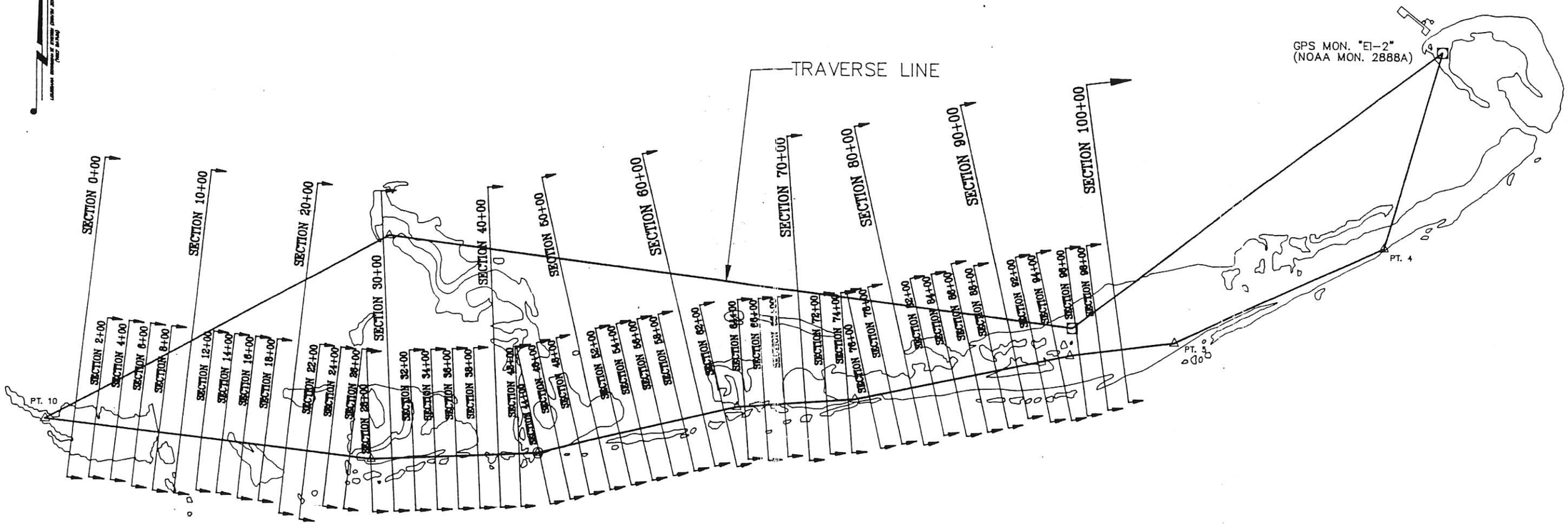


EXHIBIT 11

ELEVATION CROSS-SECTIONS

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION

ISLE DERNIERES RESTORATION PROJECT
PHASE 0 - EAST ISLAND

DWG. FILE: 1138-3A
DATE: OCTOBER 1993
SCALE: 1" = 1000'

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering - Surveying - Planners - Environmental Consulting

DESIGNED	DETAILED SAM	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION	BY
	REVISIONS	

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2000 HOUMA, LOUISIANA 70361

3.3.2 Vertical Control

The control traverse for Trinity Island (Phase 1) is shown on Exhibit 12. Equipment used to run this traverse consisted of Lietz SDR-33 Data Collector with a Sokkia TS Set 3 instrument (00°00'01" accuracy). Stationing for the control traverse begins on the west end near Whisky Pass at Station 10+00 and ends on the east end at Station 150+70.42 just west of TI-1. The traverse has a closure of 1 in 81,903. No adjustment were made. Field notes and calculations are contained in Appendix O. A vertical control loop was run along the base line was within third order accuracy and therefore did not warrant any adjustments in the loop. Field notes of the vertical control loop are also contained in Appendix O.

3.3.3 Cross Sections

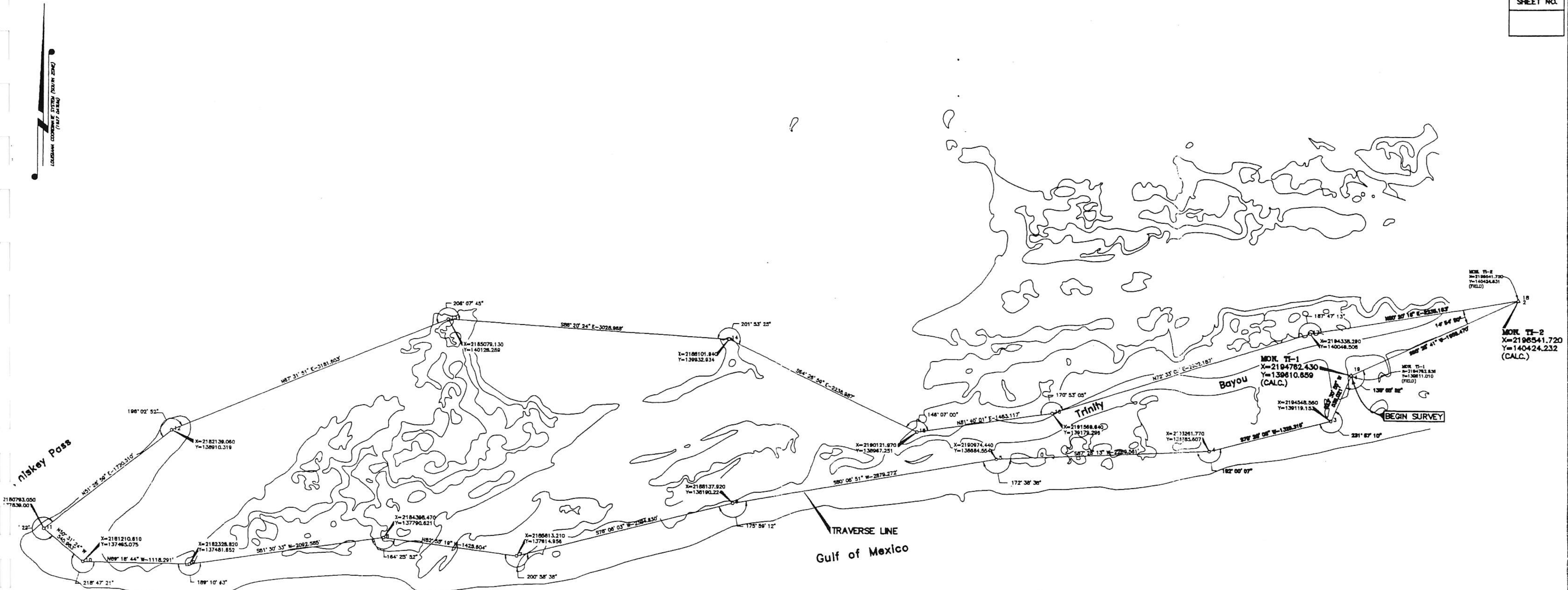
A total of seventy-one (71) cross sections were taken. The cross section station locations and temporary bench mark locations and elevations are shown on Exhibit 13. Appendix P contains the actual cross sections.

VI. GEOTECHNICAL ANALYSIS

4.1 EXISTING DATA

Between May and September of 1987, J. Wayne Plaisance/ T. Baker Smith & Son, Inc. subcontracted with Ocean Surveys, Inc. and McClelland Engineers while under contract with the La. Dept. of Transportation & Development, Office of Public Works, to conduct geophysical and geotechnical surveys for State Project No. 750-55-01, Isles Dernieres Stabilization Project. This work

SHEET NO.



LEGEND

△ DENOTES ALUMINUM DISK CRIMPED TO A 20' x 5/8" DIA. STAINLESS STEEL ROD.

○ DENOTES SET 3/4" G.I.P.

PLAN VIEW

SCALE IN FEET

1000 500 0 1000 2000 3000

CLOSURE INFORMATION

CLOSING LINE ---------- S30° 24' 30" W - 0.407'
DISTANCE TRAVERSED ------ 33,333.128'
PRECISION ---------- 1/81902.644

EXHIBIT 12

CONTROL TRAVERSE

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION

ISLE DERNIERS RESTORATION PROJECT
PHASE 1 - TRINITY ISLAND

PLAT SHOWING CONTROL TRAVERSE AND DATA

DATED: OCTOBER 12, 1993

DATE	DESCRIPTION	BY
	REVISIONS	

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2266 HOUMA, LOUISIANA 70361

DESIGNED	KWS	DETAILED	JWO	TRACED	JWO
CHECKED	KWS	CHECKED	KWS	CHECKED	KWS

SHEET NO.

LOUISIANA COORDINATE SYSTEM (SOUTH ZONE)
(NAD 83/90)

142,000

Y= 3,000

Trinity Bayou

P.I. # 11
MON. TI-2
STA. 175+82.91
X=2196341.720
Y=140424.232
ELEV.=

P.I. # 10
MON. TI-1
STA. 158+06.44
X=2194752.430
Y=139810.859
ELEV.=

P.I. # 9
STA. 150+70.42
X=2194546.560
Y=139118.153
ELEV.=

P.I. # 8
STA. 137+41.11
X=2193261.770
Y=138783.607
ELEV.=

P.I. # 7
STA. 114+81.56
X=2190874.440
Y=138654.554
ELEV.=

P.I. # 6
STA. 85+72.27
X=2188137.920
Y=138190.224
ELEV.=

Whiskey Pass

138,000

BEGIN BASE LINE

BASE LINE

Gulf of Mexico

P.I. # 1
X=00
Y=7783.050
Y=39.001

P.I. # 2
STA. 154+40.98
X=2181210.810
Y=137485.075
ELEV.=

P.I. # 3
STA. 26+39.25
X=2182328.620
Y=137481.652
ELEV.=

P.I. # 4
STA. 47+31.84
X=2184398.470
Y=137790.621
ELEV.=

P.I. # 5
STA. 81+77.44
X=2185813.210
Y=137814.956
ELEV.=

X=2,180,500

X=2,182,500

X=2,184,500

X=2,186,500

X=2,188,500

X=2,190,500

X=2,192,500

X=2,194,500

X=2,196,500

LEGEND

△ DENOTES ALUMINUM DISK CRIMPED TO A 20" x 5/8" DIA. STAINLESS STEEL ROD.

○ DENOTES SET 3/4" G.I.P.

PLAN VIEW

SCALE IN FEET

EXHIBIT 13

CROSS-SECTION LOCATIONS

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERS RESTORATION PROJECT
PHASE 1 - TRINITY ISLAND

PLAT SHOWING BASE LINE AND DATA

DATED: OCTOBER 12, 1993

DATE	DESCRIPTION REVISIONS	BY

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2286 HOUMA, LOUISIANA 70361

DESIGNED	KWS	DETAILED	JWO	TRACED	JWO
CHECKED	KWS	CHECKED	KWS	CHECKED	KWS

consisted of subbottom seismic profiling, vibracoring, conventional coring, data analysis, and sediment mapping.

4.1.1 Vibracores

As a prerequisite to vibracoring, 250 line miles of subbottom seismic profiling between Raccoon Point and Wine Island were conducted. This survey extended 1.5 miles north of the islands since it was assumed that it would be uneconomical to pump from sand sources farther north. Furthermore, the occurrence of sand farther north decreases as the distance from the island increases. This data was analyzed for acoustic reflectors which suggest the occurrence of sand. Since the seismic work was controlled by navigation/positioning equipment tied to X,Y control, promising borrow sites were identified, coordinated and then staked. Two hundred fifty-six (256) vibracores were then taken.

4.1.2 Borrow Areas

The sediment data from the vibracores were mapped in eleven prospective borrow areas from Raccoon Point to Wine Island. The mapping shows percentage of sand content using 10% contour intervals at depths of 0-5, 5-10, 10-15, and 15-20 for all eleven borrow pits for sands equal to or coarser than 3.75 phi. The Unified Soil Classification System classifies sediment as sand if its size is between -2.25 and +3.75 phi. Tables 5, 6, 7, and 8 show sand quantities in each borrow area for each of the four depth categories for sand percentages greater than 50%. These tables were developed by digitizing the area between the contours and multiplying by the 5 foot depth interval to determine the total

volume. The sand volume was determined by multiplying the average sand percentage (55% for example) by the total volume.

4.1.3 Usable Borrow Areas

In the Preliminary Engineering Report, all or portions of borrow areas F, G, H, I, and J were considered for use in Phases 0 and 1 of this contract. Table 9 summarizes the total volume of material (>3.75 phi) and sand (≤3.75 phi) for the four depth intervals. It is apparent from Table 9 that there will be sufficient sediments for both phases.

Previous reports which analyzed the vibracores sediments generally identified increasing grain size from west to east. The borrow areas with the coarsest grain size are F, H, I, and J. Table 10 shows borrow areas with the best source depths for sand. Exhibits 14, 15, 16, and 17 show sand sources within each borrow area at various source depths. The shaded areas correspond to the quantities in Tables 5, 6, 7, and 8.

Data on sediments are also used for foundation/stability analysis and determination of overfill ratios. Overfill ratios are of primary concern when dredging is unconfined, and payment for hydraulic dredging is based on borrow pit measurement. From the previous reports, Table 11 gives the best source depths by borrow area for overfill ratios of ≤4.0 for Trinity and East Isle Dernieres.

This data will have less of an impact on this project than it did on the 1988 project because there will be considerably less unconfined dredging required.

TABLE 5
SUMMARY OF AREA/VOLUMES/QUANTITIES - 0-5 FEET

borrow area		sand percentage 50-60%	60-70%	70-80%	80-90%	90-100%	TOTAL
A							
	area	7,016,741.4	8,709,376.4	10,986,739.8	6,555,113.7	7,755,345.8	
	total volume	1,299,396.6	1,612,847.5	2,034,581.5	1,213,909.9	1,436,175.1	7,596,912.0
	volume sand	714,668.1	1,048,350.9	1,525,936.1	1,031,823.5	1,364,366.4	5,685,144.9
B							
	area	3,202,937.5	2,176,753.6	777,412.0	0.0	0.0	
	total volume	593,136.6	403,102.5	143,965.2	0.0	0.0	1,140,205.0
	volume sand	326,225.1	262,016.6	107,973.9	0.0	0.0	696,215.7
C							
	area	319,559.0	447,382.6	0.0	0.0	0.0	
	total volume	59,177.6	82,848.6	0.0	0.0	0.0	142,027.0
	volume sand	32,547.7	53,851.6	0.0	0.0	0.0	86,399.3
D							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E1							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E2							
	area	2,525,498.6	1,496,591.8	1,278,338.8	1,652,486.7	311,789.9	
	total volume	467,684.9	277,146.6	236,729.4	306,016.1	57,738.9	1,345,316.0
	volume sand	257,226.7	180,145.3	177,547.1	260,113.7	54,851.9	929,884.7
F							
	area	2,957,240.0	2,296,580.0	2,233,660.0	1,981,980.0	2,642,640.0	
	total volume	547,637.0	425,292.6	413,640.7	367,033.3	489,377.8	2,242,982.0
	volume sand	301,200.4	276,440.2	310,230.6	311,978.3	464,908.9	1,664,758.3
G							
	area	702,768.0	556,358.0	468,512.0	263,538.0	234,246.0	
	total volume	130,142.2	103,029.3	86,761.5	48,803.3	43,380.7	412,117.0
	volume sand	71,578.2	66,969.0	65,071.1	41,482.8	41,211.7	288,312.9
H							
	area	1,647,957.9	1,446,167.2	1,311,640.0	538,108.7	0.0	
	total volume	305,177.4	267,808.7	242,896.3	99,649.8	0.0	915,532.0
	volume sand	167,847.6	174,075.7	182,172.2	84,702.3	0.0	608,797.8
I							
	area	4,835,027.6	5,490,095.9	779,843.2	967,005.5	623,874.5	
	total volume	895,375.5	1,016,684.4	144,415.4	179,075.1	115,532.3	2,351,082.0
	volume sand	492,456.5	660,844.9	108,311.6	152,213.8	109,755.7	1,523,582.5
J							
	area	63,888.0	0.0	0.0	0.0	0.0	
	total volume	11,831.1	0.0	0.0	0.0	0.0	11,831.0
	volume sand	6,507.1	0.0	0.0	0.0	0.0	6,507.1

TABLE 6
SUMMARY OF AREA/VOLUMES/QUANTITIES - 5-10 FEET

borrow area		sand percentage 50-60%	60-70%	70-80%	80-90%	90-100%	TOTAL
A							
	area	2,208,260.5	2,612,589.9	2,705,896.7	2,239,362.0	0.0	
	total volume	408,937.1	483,812.9	501,092.0	414,696.8	0.0	1,808,539.0
	volume sand	224,915.4	314,478.4	375,819.0	352,492.3	0.0	1,267,705.1
B							
	area	1,294,936.9	863,291.2	215,822.8	0.0	0.0	
	total volume	239,803.1	159,868.7	39,967.2	0.0	0.0	439,639.0
	volume sand	131,891.7	103,914.7	29,975.4	0.0	0.0	265,781.8
C							
	area	575,206.2	0.0	0.0	0.0	0.0	
	total volume	106,519.7	0.0	0.0	0.0	0.0	0.0
	volume sand	58,585.8	0.0	0.0	0.0	0.0	58,585.8
D							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E1							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E2							
	area	218,253.0	124,716.0	124,716.0	0.0	0.0	
	total volume	40,417.2	23,095.6	23,095.6	0.0	0.0	86,609.0
	volume sand	22,229.5	15,012.1	17,321.7	0.0	0.0	54,563.2
F							
	area	1,500,552.7	1,563,075.7	1,625,598.7	2,063,259.9	2,500,921.1	
	total volume	277,880.1	289,458.5	301,036.8	382,085.2	463,133.5	1,713,595.0
	volume sand	152,834.1	188,148.0	225,777.6	324,772.4	439,976.9	1,331,508.9
G							
	area	1,229,844.0	673,486.0	527,076.0	409,948.0	322,102.0	
	total volume	227,748.9	124,719.6	97,606.7	75,916.3	59,648.5	585,641.0
	volume sand	125,261.9	81,067.8	73,205.0	64,528.9	56,666.1	400,729.6
H							
	area	1,396,261.9	1,142,396.1	1,047,196.5	1,301,062.3	4,823,450.3	
	total volume	258,567.0	211,554.8	193,925.3	240,937.5	893,231.5	1,798,217.0
	volume sand	142,211.9	137,510.6	145,444.0	204,796.8	848,570.0	1,478,533.3
I							
	area	4,585,477.8	4,897,415.1	4,585,477.8	2,682,660.5	3,368,922.5	
	total volume	849,162.6	906,928.7	849,162.6	496,789.0	623,874.5	3,725,919.0
	volume sand	467,039.4	589,503.7	636,871.9	422,270.6	592,680.8	2,708,366.4
J							
	area	1,636,648.9	2,212,332.5	939,557.7	1,030,482.7	3,182,372.9	
	total volume	303,083.1	224,506.0	173,992.2	190,830.1	589,328.3	1,481,739.0
	volume sand	166,695.7	145,928.9	130,494.1	162,205.6	559,861.9	1,165,186.3

TABLE 7
SUMMARY OF AREA/VOLUMES/QUANTITIES - 10-15 FEET

borrow area		sand percentage 50-60%	60-70%	70-80%	80-90%	90-100%	TOTAL
A							
	area	528,738.4	1,057,476.9	124,409.0	93,306.8	0.0	
	total volume	97,914.5	195,829.0	23,038.7	17,279.0	0.0	334,062.0
	volume sand	53,853.0	127,288.9	17,279.0	14,687.2	0.0	213,108.1
B							
	area	1,479,927.8	739,963.9	184,991.0	0.0	0.0	
	total volume	274,060.7	137,030.4	34,257.6	0.0	0.0	445,349.0
	volume sand	150,733.4	89,069.7	25,693.2	0.0	0.0	265,496.3
C							
	area	575,206.2	0.0	0.0	0.0	0.0	
	total volume	106,519.7	0.0	0.0	0.0	0.0	106,520.0
	volume sand	58,585.8	0.0	0.0	0.0	0.0	58,585.8
D							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E1							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E2							
	area	342,968.9	249,432.0	155,895.0	342,968.9	0.0	
	total volume	63,512.8	46,191.1	28,869.4	63,512.8	0.0	202,086.0
	volume sand	34,932.0	30,024.2	21,652.1	53,985.9	0.0	140,594.2
F							
	area	625,230.3	656,491.8	437,661.2	562,707.3	2,532,182.6	
	total volume	115,783.4	121,572.6	81,048.4	104,205.0	468,922.7	891,532.0
	volume sand	63,680.9	79,022.2	60,786.3	88,574.3	445,476.6	737,540.2
G							
	area	29,282.0	439,230.0	1,551,946.0	2,811,072.0	439,230.0	
	total volume	5,422.6	81,338.9	287,397.4	520,568.9	81,338.9	976,067.0
	volume sand	2,982.4	52,870.3	215,548.1	442,483.6	77,271.9	792,156.3
H							
	area	207,101.1	172,584.2	1,173,572.6	2,071,010.5	7,179,503.2	
	total volume	38,352.0	31,960.0	217,328.3	383,520.5	1,329,537.6	2,000,699.0
	volume sand	21,093.6	20,774.0	162,996.2	325,992.4	1,263,060.7	1,793,917.0
I							
	area	1,372,524.0	2,464,304.4	3,431,309.9	8,391,112.4	19,371,304.1	
	total volume	254,171.1	456,352.7	635,427.8	1,553,909.7	3,587,278.5	6,487,142.0
	volume sand	139,794.1	296,629.2	476,570.8	1,320,823.3	3,407,914.6	5,641,732.0
J							
	area	1,970,040.4	1,515,415.7	909,249.4	636,474.6	939,557.7	
	total volume	364,822.3	280,632.5	168,379.5	117,865.7	173,992.2	1,105,693.0
	volume sand	200,652.3	182,411.1	126,284.6	100,185.8	165,292.6	774,826.4

TABLE 8
SUMMARY OF AREA/VOLUMES/QUANTITIES - 15-20 FEET

borrow area		sand percentage 50-60%	60-70%	70-80%	80-90%	90-100%	TOTAL
A							
	area	0.0	0.0	0.0	0.00	0.0	
	total volume	0.0	0.0	0.0	0.00	0.0	0.0
	volume sand	0.0	0.0	0.0	0.00	0.0	0.0
B							
	area	1,655,217.4	749,532.4	281,074.7	0.0	0.0	
	total volume	306,521.7	138,802.3	52,050.9	0.0	0.0	497,376.0
	volume sand	168,587.0	90,221.5	39,038.1	0.0	0.0	297,846.6
C							
	area	575,206.2	63,911.8	0.0	0.0	0.0	
	total volume	106,519.7	11,835.5	0.0	0.0	0.0	118,056.0
	volume sand	58,585.8	7,693.1	0.0	0.0	0.0	66,278.9
D							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E1							
	area	0.0	0.0	0.0	0.0	0.0	
	total volume	0.0	0.0	0.0	0.0	0.0	0.0
	volume sand	0.0	0.0	0.0	0.0	0.0	0.0
E2							
	area	405,326.9	124,716.0	155,895.0	124,716.0	62,358.0	
	total volume	75,060.5	23,095.6	28,869.4	23,095.6	11,547.8	161,670.0
	volume sand	41,283.3	15,012.1	21,652.1	19,631.2	10,970.4	108,549.1
F							
	area	750,276.3	539,968.8	500,184.2	312,615.1	3,032,366.9	
	total volume	138,940.1	109,994.2	92,626.7	57,891.7	561,549.4	961,002.0
	volume sand	76,417.0	71,496.2	69,470.0	49,207.9	533,472.0	800,063.2
G							
	area	263,538.0	117,128.0	117,128.0	146,410.0	0.0	
	total volume	48,803.3	21,690.4	21,690.4	27,113.0	0.0	119,296.0
	volume sand	26,841.8	14,098.7	16,267.8	23,046.0	0.0	80,254.4
H							
	area	1,149,410.8	1,025,150.2	1,460,062.4	2,236,691.4	4,100,600.8	
	total volume	212,853.9	189,842.6	270,381.9	414,202.1	759,370.5	1,846,652.0
	volume sand	117,069.6	123,397.7	202,786.4	352,071.8	721,402.0	1,516,727.6
I							
	area	4,398,315.4	3,649,666.0	4,429,509.2	6,769,083.6	12,820,612.6	
	total volume	814,502.9	675,864.1	820,279.5	123,525.7	2,374,189.2	4,808,362.0
	volume sand	447,976.6	439,311.6	615,209.6	1,065,496.8	2,255,479.7	4,823,474.4
J							
	area	939,153.6	972,694.8	737,906.4	603,741.6	402,494.4	
	total volume	173,917.3	180,128.7	136,649.3	111,804.0	74,536.0	677,035.0
	volume sand	95,654.5	117,083.6	102,487.0	95,033.4	70,809.2	
481,067.8							

TABLE 9

SUMMARY OF TOTAL MATERIAL AND SAND (CUBIC YARDS)

BORROW AREAS

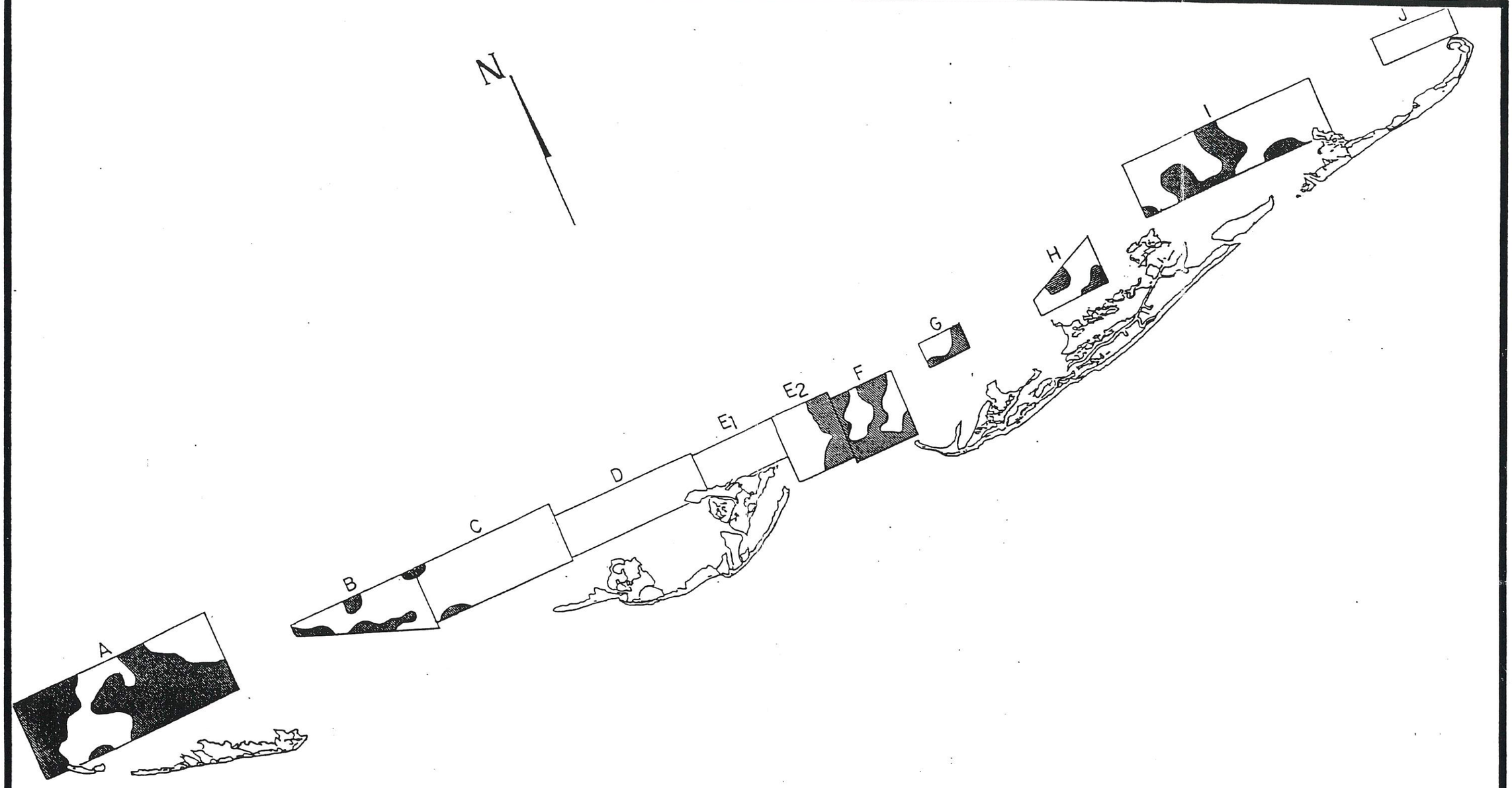
Depth Interval	Description	F	G	H	I	J	TOTAL
0-5	TV	2,242,979	412,115	915,530	2,351,081	11,831	5,953,536
	VS	1,664,758	286,313	608,798	1,523,583	6,507	4,089,949
5-10	TV	1,713,595	585,641	1,798,217	3,725,919	1,481,739	9,305,111
	VS	1,331,509	400,730	1,478,533	2,708,366	1,165,186	7,084,324
10-15	TV	891,532	976,067	2,000,699	6,487,140	1,105,693	11,461,131
	VS	737,540	791,156	1,793,917	5,641,732	774,826	9,939,171
15-20	TV	961,002	119,296	1,846,652	5,938,362	677,035	9,542,347
	VS	800,063	80,254	1,516,728	4,823,474	481,068	7,701,587
TOTAL	TV	5,809,108	2,093,119	6,561,098	18,502,502	3,276,298	36,242,125
	VS	4,533,870	1,558,453	5,397,976	14,697,155	2,427,587	28,615,041

TV = Total Volume
VS = Volume Sand

TABLE 10

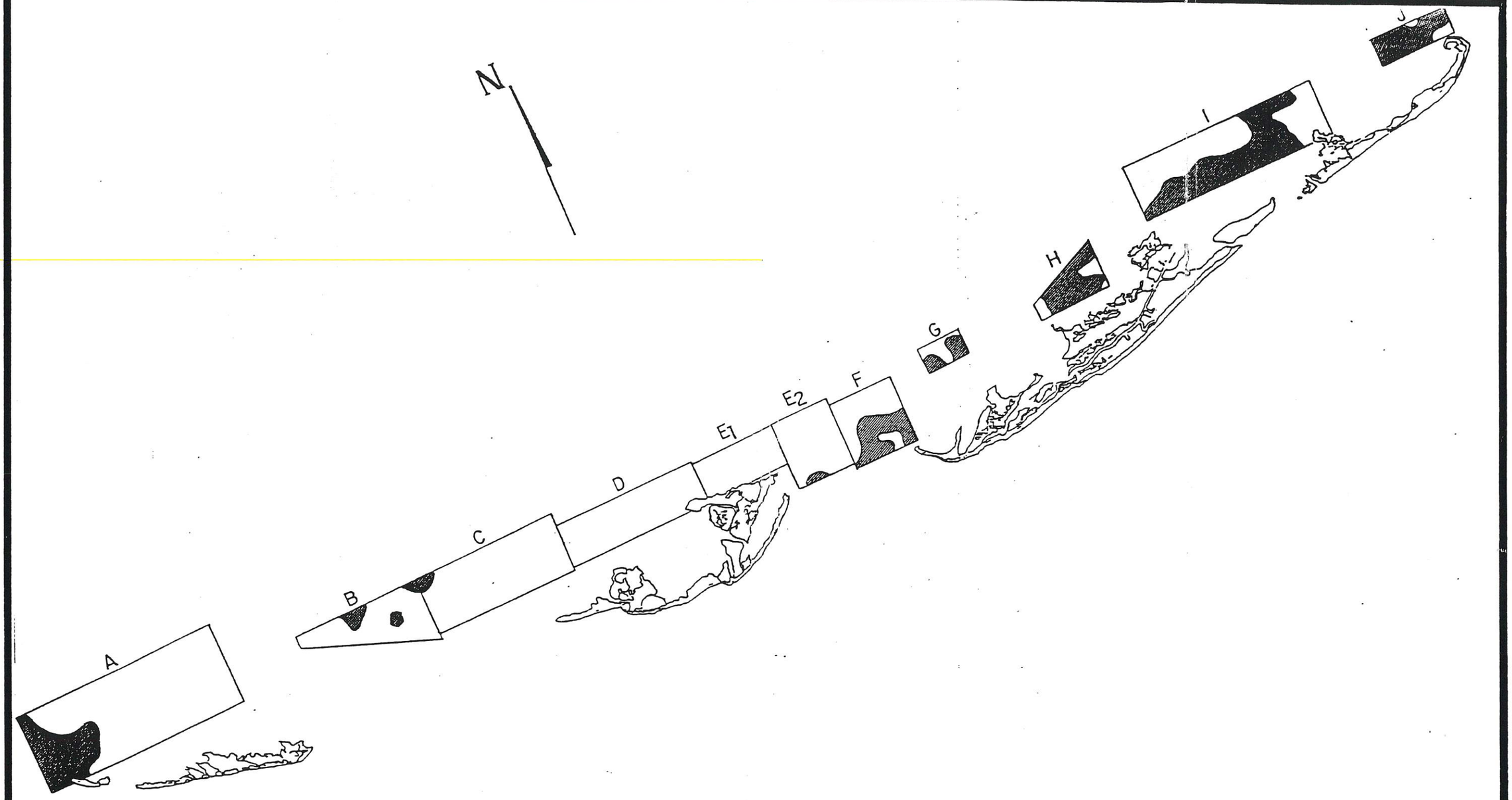
SUMMARY OF
BEST SOURCE DEPTHS
BY BORROW AREA

Borrow Area	Source Depth (feet)
A	0-5
B	0-2
C	-
D	-
E1	-
E2	0-5, 7-9
F	0-10
G	8-14
H	2-17
I	2-6, 8-20
J	4-10, 14-17



PAGE No.

T. BAKER SMITH & SON, INC. CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES P.O. BOX 2266 HOUMA, LOUISIANA 70361	PROJECT: ISLES DERNIERES RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIERE AND PHASE 1 – TRINITY ISLAND	DRAWING DATE: OCTOBER 29, 1993	EXHIBIT 14
	DNR CONTRACT No. 25085–94–02 OCR CONTRACT No. 435–4003	6400 3200 0 6400 12800 19200 SCALE IN FEET	TITLE: USABLE SAND AREAS: 0–5 FEET (BASED ON ORIGINAL MAPS PREPARED BY OCEAN SURVEYS, INC.)



PAGE No.

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2266 HOUMA, LOUISIANA 70361

PROJECT:
ISLES DERNIERES RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIERE AND PHASE 1 – TRINITY ISLAND

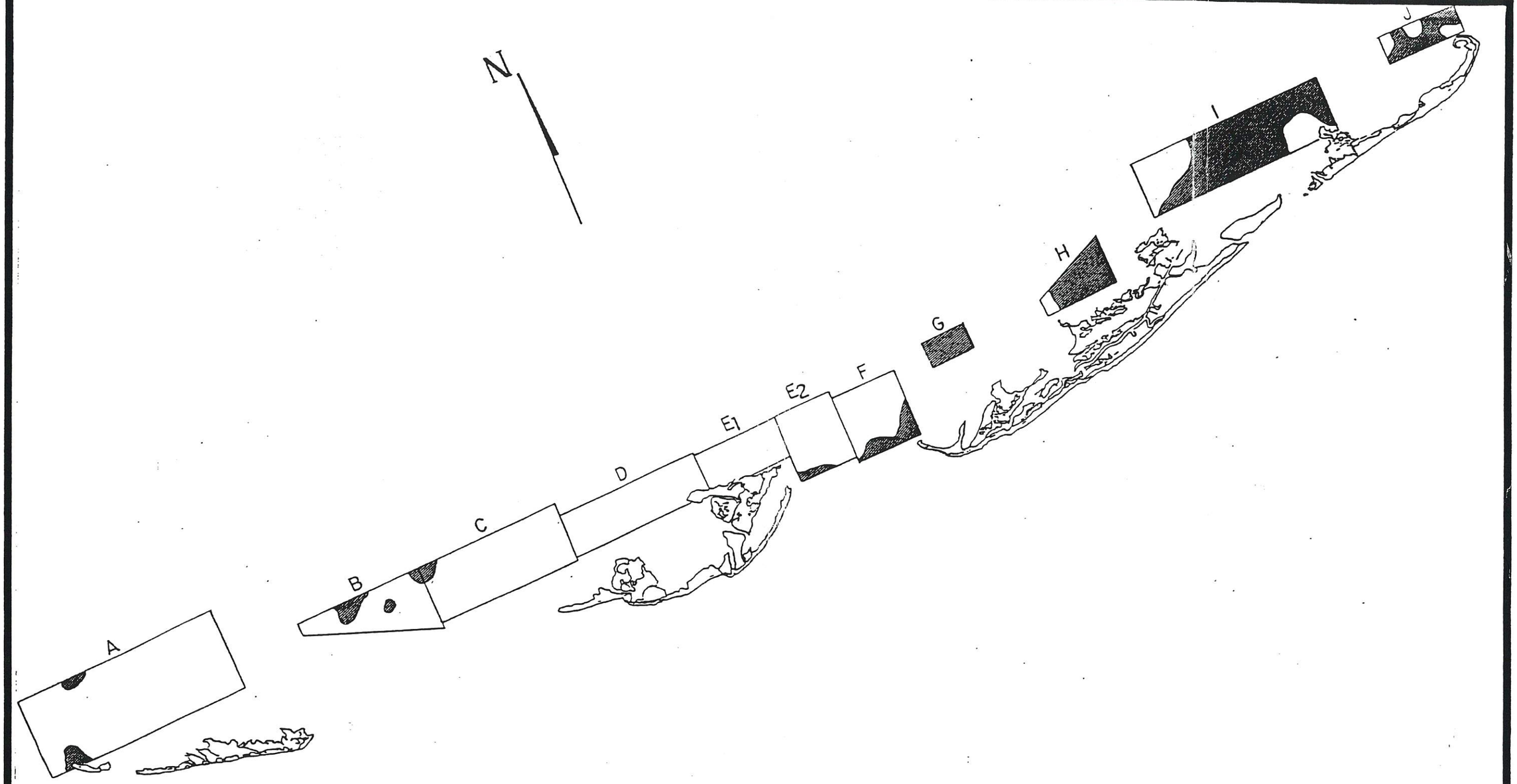
DRAWING DATE: OCTOBER 29, 1993

EXHIBIT 15

DNR CONTRACT No. 25085-94-02
OCR CONTRACT No. 435-4003

6400 3200 0 6400 12800 19200
SCALE IN FEET

TITLE: USABLE SAND AREAS: 5–10 FEET
(BASED ON ORIGINAL MAPS PREPARED BY OCEAN SURVEYS, INC.)



T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2286 HOUMA, LOUISIANA 70361

PROJECT:
ISLES DERNIERES RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIERE AND PHASE 1 – TRINITY ISLAND

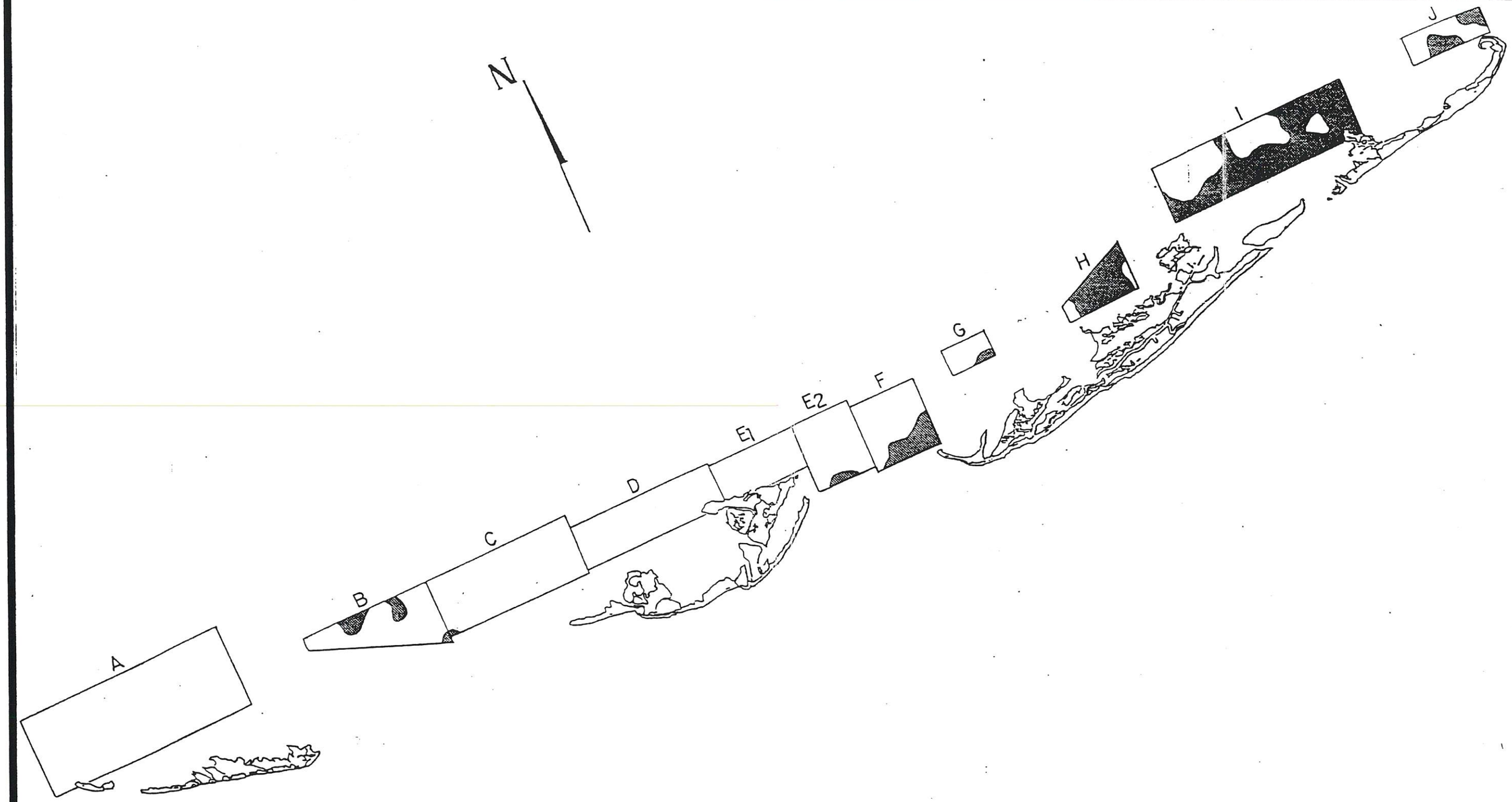
DNR CONTRACT No. 25085-94-02
OCR CONTRACT No. 435-4003

DRAWING DATE: OCTOBER 29, 1993

6400 3200 0 6400 12800 19200
SCALE IN FEET

PAGE No.
EXHIBIT 16

TITLE: USABLE SAND AREAS: 10–15 FEET
(BASED ON ORIGINAL MAPS PREPARED BY OCEAN SURVEYS, INC.)



PAGE No.

T. BAKER SMITH & SON, INC. CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES P.O. BOX 2266 HOUMA, LOUISIANA 70361	PROJECT: ISLES DERNIERES RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIERE AND PHASE 1 – TRINITY ISLAND	DRAWING DATE: OCTOBER 29, 1993	EXHIBIT 17
	DNR CONTRACT No. 25085-94-02 OCR CONTRACT No. 435-4003	6400 3200 0 6400 12800 19200 SCALE IN FEET	TITLE: USABLE SAND AREAS: 15–20 FEET (BASED ON ORIGINAL MAPS PREPARED BY OCEAN SURVEYS, INC.)

TABLE 11

SUMMARY BEST SOURCE DEPTHS BASED ON OVERFILL RATIO ≤4.0

TRINITY ISLE AND EAST ISLE

Borrow Area	Source Depth (feet)	Overfill Ratio
H	0-5, 10-15	3.5
I	10-15	4.0
J	5-10	3.5

4.2 NEW GEOTECHNICAL DATA

4.2.1 Conventional Coring

Since a major portion of the work for this project will involve confined dredging, a containment system will be required to hold, sort, and disperse the dredged sediments. The permit drawings show retainer levees constructed from insitu material being used as the containment system. Previous geotechnical work on the island indicated that sediments beneath surface sands on the island were clays and suitable for levee construction. Some levees depicted on the permit drawings, however, are located in the shallow lagoon areas in back of the island where no previous geotechnical work has been performed. Bottom surface sediment in these shallow lagoon areas are sandy. If subsurface sediment are identical, levee construction may not be a feasible method of sediment containment.

To determine the characteristics of the underlying lagoon sediment, 16 cores each 25 feet deep were taken at approximately 1,000-foot intervals. Ten cores were taken on East Isle, and six cores were taken on Trinity Island. The cores were taken approximately 1,000 feet north of the beach front in the vicinity of the proposed back containment levee. Analysis of sediment indicate that a back retention dike could be constructed but with a minimum side slope of 1:8 and factor of safety of 1.16 for a crown elevation of +4.0 N.G.V.D. and a base elevation at -2.0 N.G.V.D. The borrow area for this dike will be located on the south side (gulf side) of the dike. A minimum berm distance of 30

feet is recommended. Contractors may construct the back retention dike using other means or methods, but those means or methods must be approved by the Engineer prior to construction.

Because of the problems experienced at Raccoon Point and in an effort to hold down the unit cost for hydraulic dredging, seventy-two (72) twenty (20') foot conventional cores will be taken in the most promising borrow areas to verify location and quality of sand for the Contractor's benefit. This data will not be mapped but will be used to confirm the sand content by volume and depth strata. As of this report, we have not received a contract amendment to do this work. The location of these cores are shown on Exhibits 18 and 19.

4.2.2 Hand Auger Cores

In addition to the 16 cores described above, 10 hand auger holes were taken on the island. Six were taken on East Isle Derniere, and 4 were taken on Trinity Island. The cores were taken in areas of the beach where washovers are occurring daily. The purpose is to determine whether there is sufficient surface sand remaining to build a beach dune as proposed on the permit drawings. These areas are borderline candidates for unconfined dredging.

The findings and recommendations of the new geotechnical data received thus far and the core locations are included in Appendix Q.

V. PROJECT DESIGN

5.1 COASTAL PROCESS & DESIGN PRINCIPLES

There are many coastal processes such as tides, waves,

FEDERAL PROJECT NO.	STATE PROJECT NO.	CONTRACT NO.	PARISH	SHEET NO.
4052F14	TE-20		TERREBONNE	13 OF 28

AREA >70% SAND PERCENTAGE

SAND SOURCE I, 0-5 FT.
AREA = 7,705,056 FT.², VOL. = 1,306,492 YD.³

SAND SOURCE I, 5-10 FT.
AREA = 3,774,236. FT.², VOL. = 698,933 YD.³

SAND SOURCE I, 10-15 FT.
AREA = 9,382,977 FT.², VOL. = 1,737,588 YD.³

AREA OVERLAY, 0-5,5-10 FT.
AREA = 501,209 FT.², VOL. = 185,633 YD.³

AREA OVERLAY 0-5,10-15 FT.
AREA = 672,423 FT.², VOL. = 249,046 YD.³
OVERBURDEN = 124,523 YD.³

AREA OVERLAY 5-10,10-15 FT.
AREA = 4,120,649 FT.², VOL. = 1,526,166 YD.³
OVERBURDEN = 763,083 YD.³

AREA OVERLAY 0-5,5-10,10-15 FT.
AREA = 151,029 FT.², VOL. = 83,905 YD.³

LOUISIANA COORDINATE SYSTEM (SOUTH ZONE) (1927 DATUM)

COORDINATES OF SAND VERIFICATION CORE HOLES					
POINT	X	Y	POINT	X	Y
SV-1	2,203,399.4	146,577.6	SV-16	2,205,093.7	146,141.5
SV-2	2,203,270.3	145,991.1	SV-17	2,205,042.7	145,693.7
SV-3	2,203,250.6	145,445.9	SV-18	2,204,993.4	145,261.3
SV-4	2,203,709.7	146,830.9	SV-19	2,205,526.0	146,414.3
SV-5	2,203,651.4	146,425.4	SV-20	2,205,558.8	145,806.6
SV-6	2,203,620.4	146,027.6	SV-21	2,205,498.4	145,277.2
SV-7	2,204,150.8	146,699.1	SV-22	2,206,095.7	146,102.4
SV-8	2,204,113.6	146,372.7	SV-23	2,206,055.8	145,750.0
SV-9	2,204,068.4	145,976.5	SV-24	2,206,002.7	145,285.9
SV-10	2,204,013.5	145,494.9	SV-25	2,205,839.0	146,453.6
SV-11	2,204,642.9	146,601.9	SV-26	2,206,597.5	146,089.6
SV-12	2,204,596.9	146,198.1	SV-27	2,206,552.3	145,693.4
SV-13	2,204,545.9	145,750.3	SV-28	2,206,882.8	146,761.3
SV-14	2,204,489.4	145,255.1	SV-29	2,206,964.9	146,274.4
SV-15	2,205,145.7	146,606.3	SV-30	2,207,013.7	145,847.9

>70% SAND SOURCE "I", 0-5 FT.

>70% SAND SOURCE "I", 5-10 FT.

>70% SAND SOURCE "I", 10-15 FT.

BORE HOLE (30)

LAKE PELTO

PROPOSED DREDGE ACCESS TO FLOTATION CANAL

NEW CUT

MATCH LINE

CH 15
Y=144,968.04
X=2,213,269.34

PT. "AL"

CH 19
Y=145,024.34
X=2,209,816.30

70'-0"

CH A
Y=145,090.98
X=2,208,632.27

CH 18
Y=144,874.31
X=2,210,585.11

CH 17
Y=144,910.08
X=2,211,475.43

CH 16
Y=144,783.10
X=2,212,133.91

VH 1
Y=143,963.41
X=2,209,771.12

PT. 10

PT. 9

R=25

VH 3
Y=143,836.58
X=2,212,015.15

VH 2
Y=143,868.91
X=2,210,743.10

EAST ISLAND

WATER DEPTH CONTOURS (TYP.)

SHALLOW SUBMERGED SAND BAR

EXISTING PILE CLUSTER
X=2,205,999
Y= 143,753

TRINITY ISLAND

GULF OF MEXICO

COORDINATES OF SAND SOURCE OVERLAP 0-10 FT. >70% SAND

POINT	X	Y	POINT	X	Y
1	2,204,965	145,217	19	2,204,200	145,217
2	2,203,200	145,200	20	2,204,021	145,450
3	2,202,644	145,352	21	2,203,572	146,033
4	2,203,052	145,719	22	2,206,022	146,525
5	2,203,079	145,931	23	2,205,864	146,792
6	2,203,704	145,432	24	2,205,764	147,061
7	2,204,488	145,476	25	2,206,457	147,285
8	2,203,669	146,883	26	2,206,769	146,946
9	2,204,467	146,639	27	2,206,546	146,596
10	2,205,330	146,638	28	2,208,644	148,119
11	2,206,283	146,030	29	2,208,739	148,177
12	2,206,875	146,831	30	2,208,932	147,870
13	2,207,002	146,694	31	2,208,885	147,369
14	2,207,076	145,795	32	2,208,649	147,063
15	2,206,187	145,293	33	2,208,541	146,985
16	2,205,391	145,338			
17	2,205,329	145,237			
18	2,204,432	144,916			

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EXHIBIT 18
PAGE 48
BORROW AREA AND HYDROGRAPHIC MAP
WATER DEPTH CONTOURS

REFERENCE MAP: PAGES 7 & 8 OF A SET OF PLANS ENTITLED "STATE OF LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT OFFICE OF PUBLIC WORKS PLANS OF PROPOSED EAST ISLE DERNIERES RESTORATION S.P. NO. 750-55-01 TERREBONNE PARISH BY PLAISANCE/SMITH ENGINEERS, DATED 07/21/88

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering - Surveying - Planners - Environmental Consulting

DESIGNED	DETAILED EHK	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION	BY
	REVISIONS	

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
PHASE 0 - EAST ISLAND

DWG. FILE: 1138-13 DATE: MARCH, 1994
SCALE: 1" = 500'

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2286 HOUMA, LOUISIANA 70361

DESIGNED	DETAILED	TRACED
CHECKED	CHECKED	CHECKED

FEDERAL PROJECT NO.	STATE PROJECT NO.	ENGINEERING CONTRACT NO.	PARISH	SHEET NO.
4353F15	TE-24/XTE-41	25085-94-02	TERREBONNE	14

0-5', 5-10' & 10-15'OVERLAY SAND SOURCE F1 COORDINATES

POINT	X	Y
1	2175005.39	139315.77
2	2175004.86	139504.06
3	2175290.39	139824.90
4	2175960.23	140146.85
5	2176345.40	140487.35
6	2176958.64	140645.41
7	2177185.23	140533.50
8	2177749.03	139315.77

0-5', 5-10' & 10-15'OVERLAY SAND SOURCE F2 COORDINATES

POINT	X	Y
1	2179139.22	141286.50
2	2181048.63	142586.63
3	2180593.86	141385.34
4	2179984.93	139315.77
5	2178813.10	139315.77
6	2178903.41	139855.71
7	2178892.15	140388.04

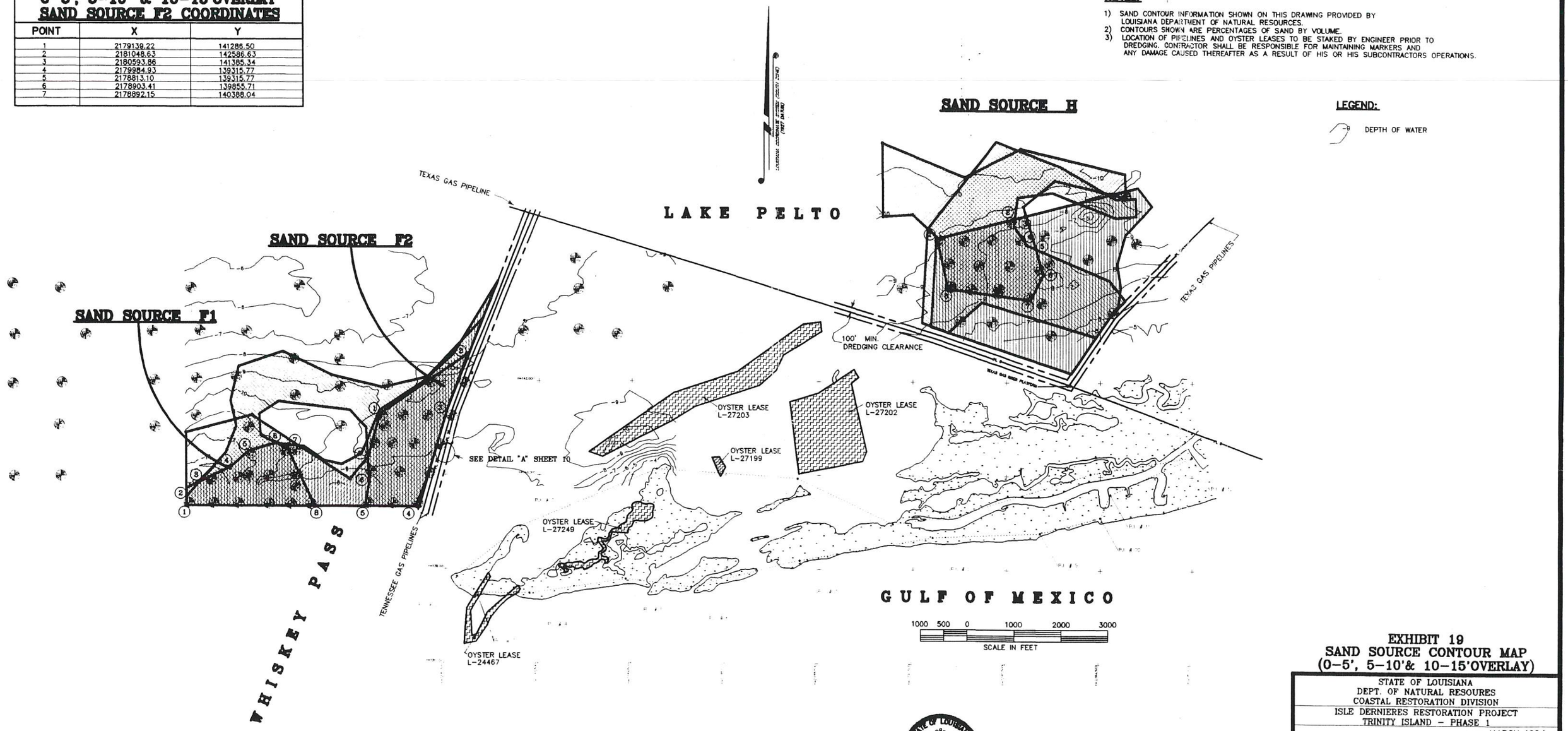
0-5', 5-10' & 10-15'OVERLAY SAND SOURCE H COORDINATES

POINT	X	Y
1	2191071.59	145055.66
2	2192724.38	145485.06
3	2192704.94	145340.16
4	2192881.24	144925.36
5	2193167.74	144856.17
6	2193332.42	144297.68
7	2193055.97	143753.60
8	2191306.96	143987.73

0-5', 5-10'& 10-15'OVERLAY SAND SOURCE	> 70% AREA (SQ. FT.)	> 70% VOLUME (CU. YDS.)
F1	2,338,319.22	1,299,066
F2	3,434,668.91	1,908,149
H	2,742,626.69	1,523,681
TOTAL:	8,515,614.82	4,730,897

NOTES:

1) SAND CONTOUR INFORMATION SHOWN ON THIS DRAWING PROVIDED BY LOUISIANA DEPARTMENT OF NATURAL RESOURCES.
2) CONTOURS SHOWN ARE PERCENTAGES OF SAND BY VOLUME.
3) LOCATION OF PIPELINES AND OYSTER LEASES TO BE STAKED BY ENGINEER PRIOR TO DREDGING. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING MARKERS AND ANY DAMAGE CAUSED THEREAFTER AS A RESULT OF HIS OR HIS SUBCONTRACTORS OPERATIONS.



REFERENCE MAP PAGES 7 & 8 OF A SET OF PLANS ENTITLED "STATE OF LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT OFFICE OF PUBLIC WORKS PLANS OF PROPOSED EAST ISLE DERNIERES RESTORATION S.P. No. 750-55-01 TERREBONNE PARISH" BY PLAISANCE/SMITH ENGINEERS, DATED 07/21/88

49

STATE OF LOUISIANA MARC J. ROGERS REG. No. 19440 REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

DATE	DESCRIPTION	BY
	REVISION	

EXHIBIT 19
SAND SOURCE CONTOUR MAP (0-5', 5-10'& 10-15'OVERLAY)

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
TRINITY ISLAND - PHASE 1

DWG. FILE: IDBCLAY1 DATE: MARCH 1994 SCALE: 1"=1000'

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2258 HOUMA, LOUISIANA 70361

DESIGNED M.J.R.	DETAILED B.A.S.	TRACED
CHECKED M.J.R.	CHECKED M.J.R.	CHECKED

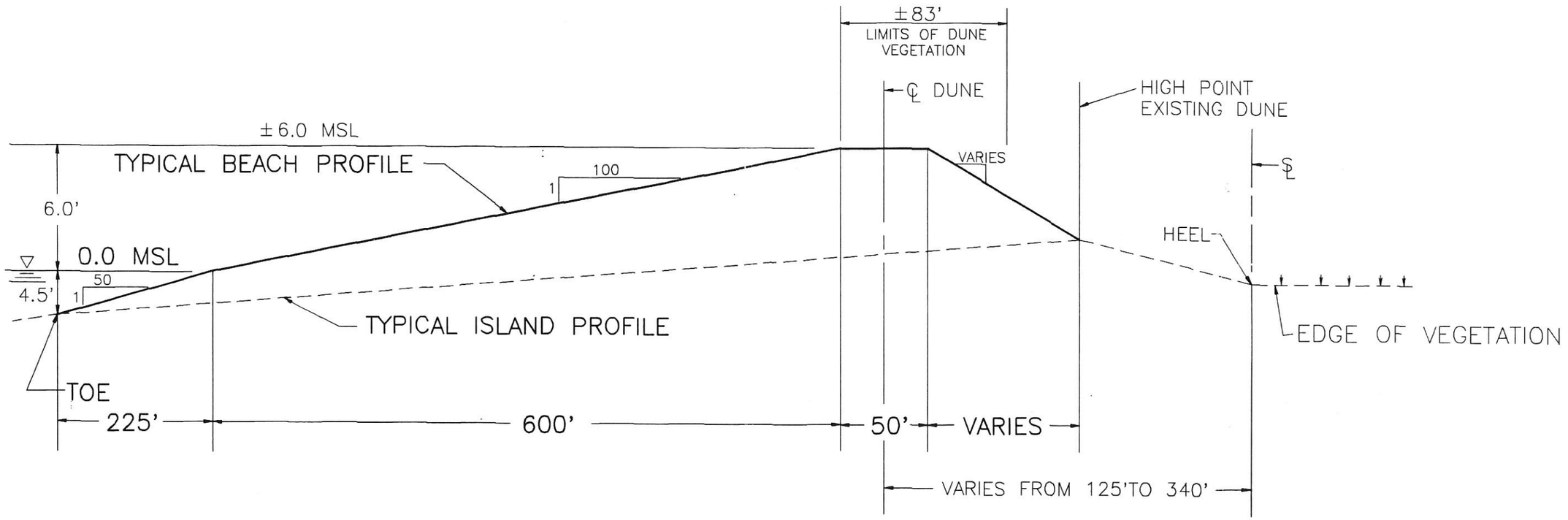
littoral transport, onshore/offshore sediment movement, sea level changes, overwash, and inlet processes which interact to constantly change the geometry of barrier islands. Design principles mean a methodology whereby historical and/or new data is applied to empirical formulas, the overall end result of which is indicative of structure type, size, location, geometry, required materials and quantities, and elevation. A detailed discussion of these processes and principles can be found in Sections 2.0 and 3.0 of the Preliminary Engineering Report prepared by The Traverse Group, Inc. for Plaisance/Smith Engineers for the 1987 Isles Dernieres Barrier Islands Stabilization Project.

This report and project will use as much of the design information and recommendations from that report as is feasible to develop the concept described in the RFP and shown on the permit drawings for this project.

5.2 DESIGN CONCEPT ANALYSIS

5.2.1 Barrier Islands Stabilization (Past)

In its conceptual stage, the 1987 project was a restoration project. Its objective was to widen and elevate all of the islands. The available construction funding, however, was insufficient to accomplish this. Since the objective to perform work on all of the islands was more desirable than widening and elevating, the project was rescoped to stabilize only. Stabilization for the 1987 Project included beach dune construction, breach closures, and terminal groins (Exhibit 20).



T. BAKER SMITH & SON, INC. CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES P.O. BOX 2266 HOUMA, LOUISIANA 70361	PROJECT: ISLES DERNIERES RESTORATION PROJECT PHASE 0 - EAST ISLE DERNIERE AND PHASE 1 - TRINITY ISLAND	DRAWING DATE: OCTOBER 29, 1993	EXHIBIT 20
	DNR CONTRACT No. 25085-94-02 OCR CONTRACT No. 435-4003	NOT TO SCALE	TYPICAL BEACH DUNE STABILIZATION CROSS SECTION (1987 PROJECT)

5.2.2 Barrier Islands Restoration (Present & Future)

Phases 0 and 1 of this project are restoration projects. Again, the objectives are to widen and elevate. This will cost more than stabilization for two reasons: one, the quantity of material is greater, and two, the islands are in much worse condition than just 7 years ago. Exhibit 21 also shows the typical restoration section. In comparing it to the stabilized section, the difference between the two can readily be seen. Stabilization was a viable alternative just 7 years ago because there was a much more definitive beach front. Today, however, the damage is so severe that restoration is needed.

5.2.3 Design Constraints

As with the 1987 project, one of the primary constraints today is funding. It is our understanding that the Environmental Protection Agency and the Terrebonne Parish Consolidated Government (TPCG) submitted reports in 1991 and 1992 for Phases 0 and 1 of Barrier Islands Restoration to be constructed as candidate projects. These candidate projects were competing for placement on the project priority list for projects which are being funded in part by the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), sometimes referred to as the Breaux/Johnston Bill. According to DNR'S 12/7/93 letter, there is presently $3,992,881 available for Phase 0 and $5,592,719 available for Phase 1. A copy of DNR's letter is included in Appendix R.

Unless we receive more up-to-date estimates, it is our understanding that the total money available for construction of

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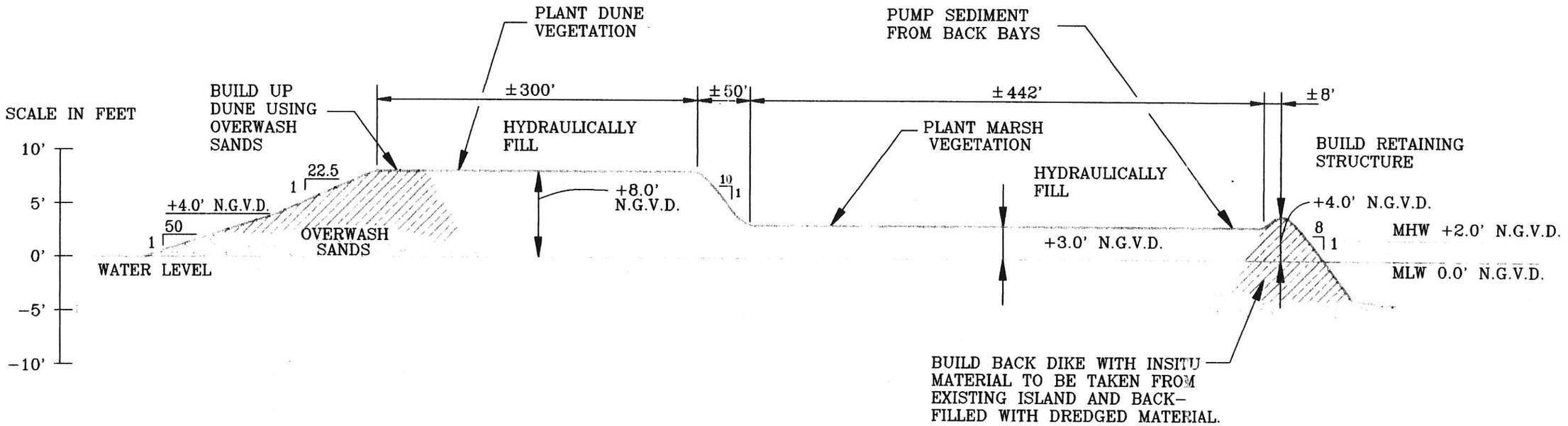


ISLE DERNIERES RESTORATION PROJECT
TYPICAL SECTION FOR CONFINED DREDGE MATERIAL

EXHIBIT 21

TYPICAL SECTION FOR CONFINED DREDGE

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering – Surveying – Planners – Environmental Consulting

DESIGNED	DETAILED SAM	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION REVISIONS	BY

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
PHASE 0 AND 1

DWG. FILE: SECT-88 DATE: NOVEMBER 1993
SCALE:

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2260 HOUMA, LOUISIANA 70361

Phases 0 and 1 is $9,585,600.00.

Other constraints include: 1) project design life of 20 years which is our understanding, though not specified in the contract; 2) currently there is no maintenance money available nor will there be in the future; and 3) the physical dimensions (length, height, and width) described as the project in the RFP. The remainder of the report will focus on developing the project design to satisfy as much of the constraints as is feasible.

5.2.4 Design Considerations

As a result of our preliminary field work and observations, there are three existing island conditions. The first condition is classified as a good condition. In this situation under normal tides and waves, no overwash occurs, vegetation is occurring, the beach is well defined, and there appears to be adequate beach and overwash sand to construct all or portions of the primary beach dune. Exhibit 22 is a color photograph showing a typical beach section which is representative of this condition. Exhibit 23 is a recent cross section of this condition with the RFP cross section superimposed.

The second condition is classified as fair. In this situation normal tides and waves overwash the island, there is no vegetation, the beach front is not well defined, and the amount of sand available for primary beach dune construction is substantially less than the good condition described above. Even if there was enough sand to construct the primary beach dune, these areas are so flat that normal high gulf tides and waves would erode the dune

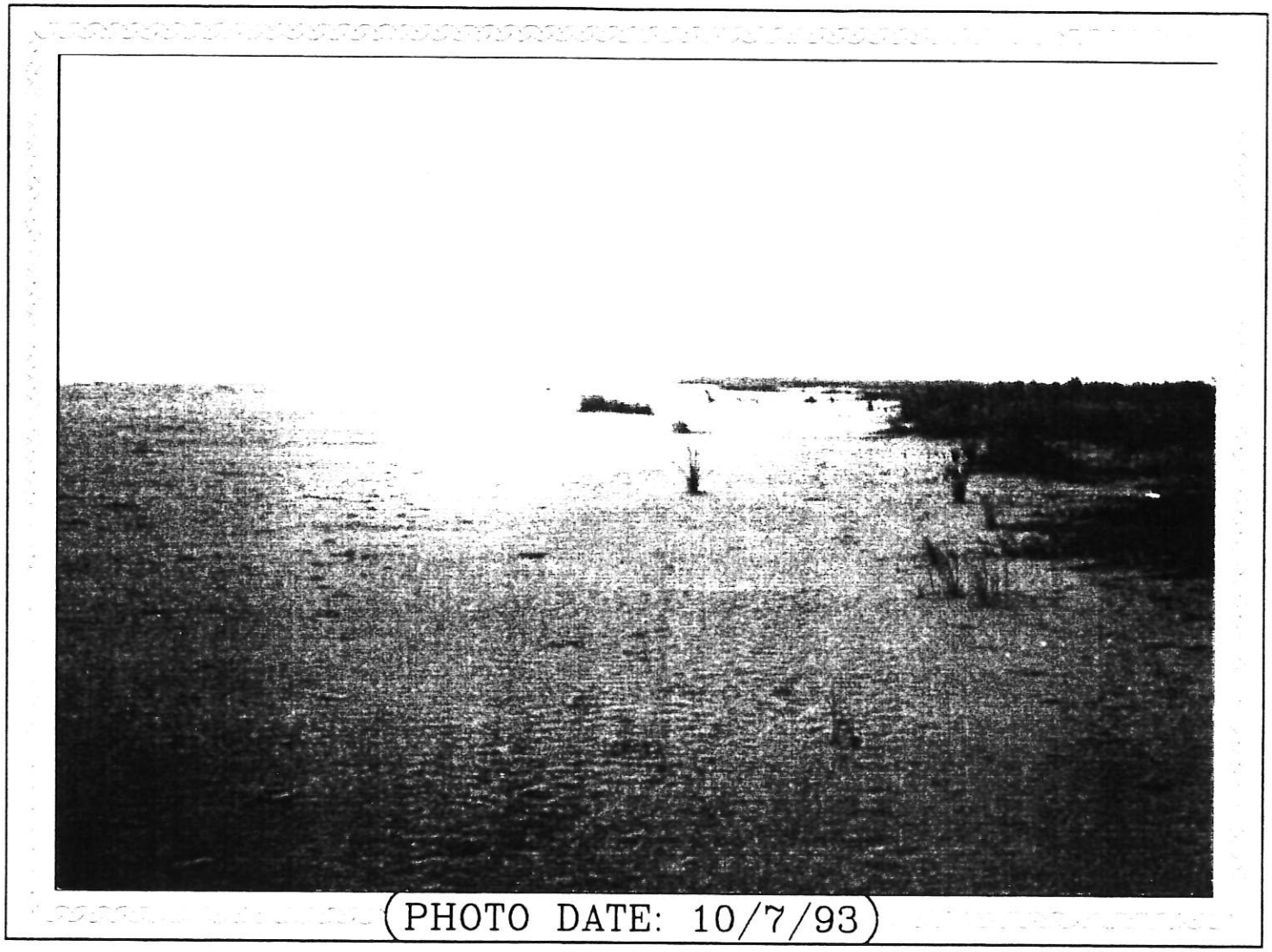


EXHIBIT 22

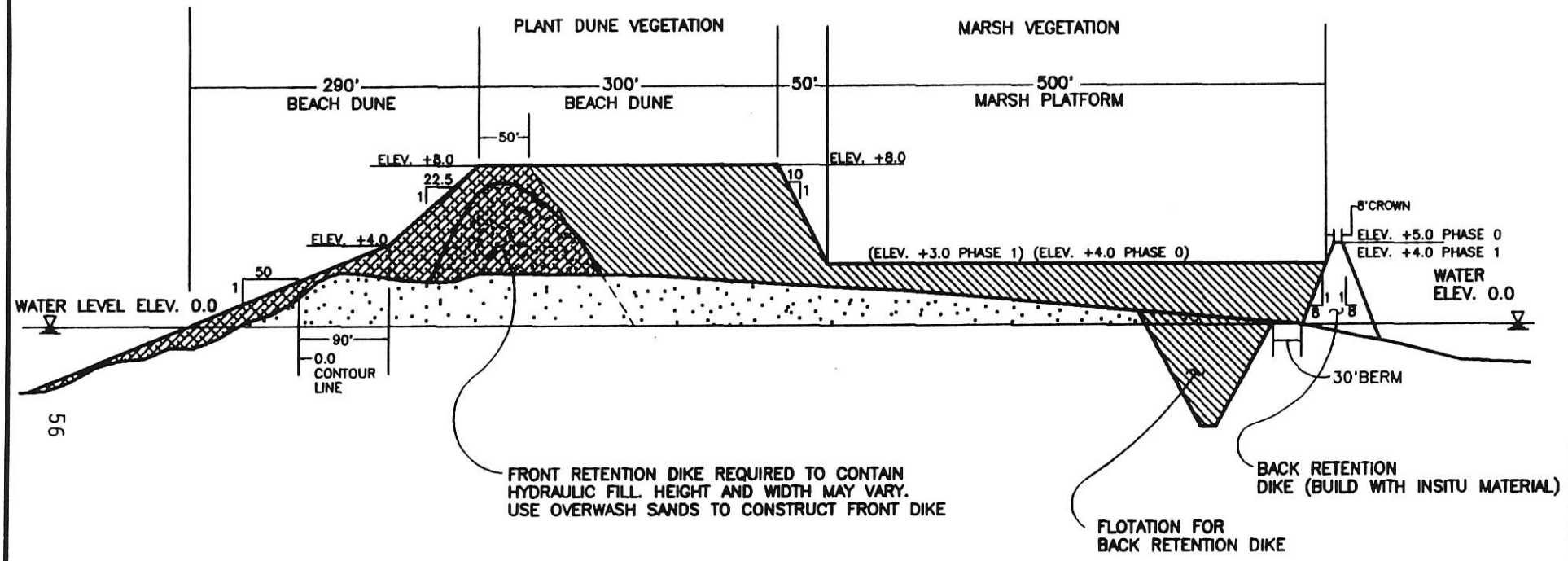
TYPICAL BEACH DUNE PHOTOGRAPH
GOOD CONDITION

quickly. Some unconfined dredging will be required to slope the beach front in front of the primary dune to break the waves before they reach the primary dune. Exhibit 24 is a color photograph showing a typical beach section representative of this condition. Exhibit 25 is a recent cross section of this condition with the RFP cross section superimposed.

The third condition is classified as poor. At these locations, the island is breached by a cut. Normal tides and waves are constantly washing through. The width varies, depths range from 1 to 3 feet, the beach front is not defined, and there is no sand available for primary beach dune construction. Unconfined dredging will be required to close these breaches. The breaches are not severe enough to warrant each closure prior to hydraulic fill placement. Exhibit 26 is a color photograph showing a typical beach section representative of this condition. Exhibit 27 is a recent cross section of this condition with the RFP Cross section superimposed.

5.2.5 Project Design Criteria

The Minimum and maximum design criteria for this project can be characterized as being either dimensional (D), physical (P), or structural (S). The minimum and maximum values were obtained from the following sources: 1) Coastal Engineering Report (CER), Isle Dernieres Stabilization Project, State Project No. 750-55-01 (1988); 2) RFP No. 25085-94-02 (7/1/93); 3) CWPPRA Priority List project descriptions; 4) Gore Engineering, Inc. Geotechnical Report (11/24/93); and 5) 25% Design Review (DR).



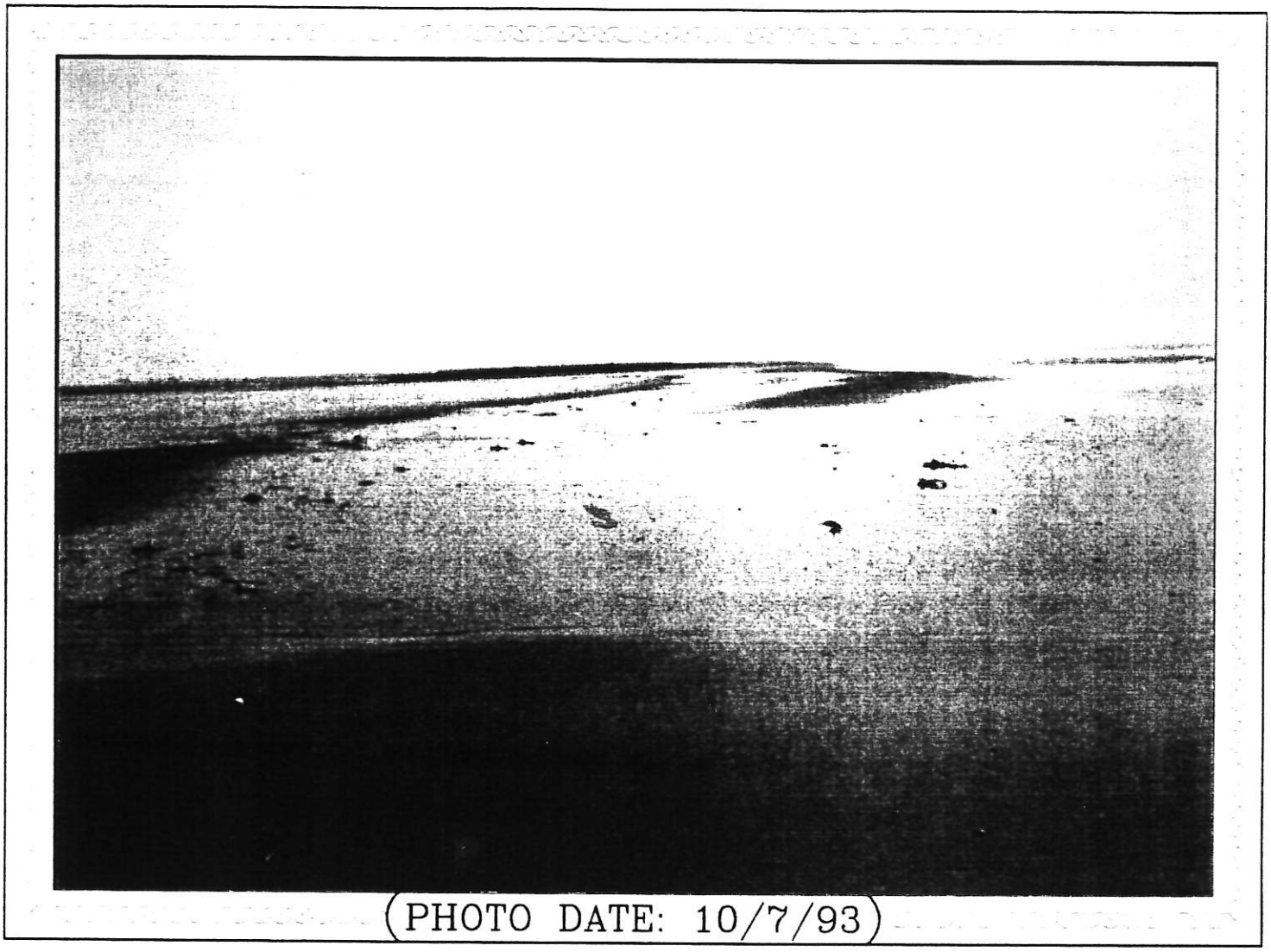
56

LEGEND

- OVERWASH SANDS
- HYDRAULIC FILL REQUIREMENTS FOR THIS AREA ARE BASED ON AN OVERFILL RATIO OF 3.5 ONLY FOR EXISTING BEACH SECTIONS BELOW +1.0 N.G.V.D.
- HYDRAULIC FILL REQUIREMENT FOR THIS AREA BASED ON OVERFILL RATIO OF 1.0

BASE BID TEMPLATE
PHASE 0 AND PHASE 1

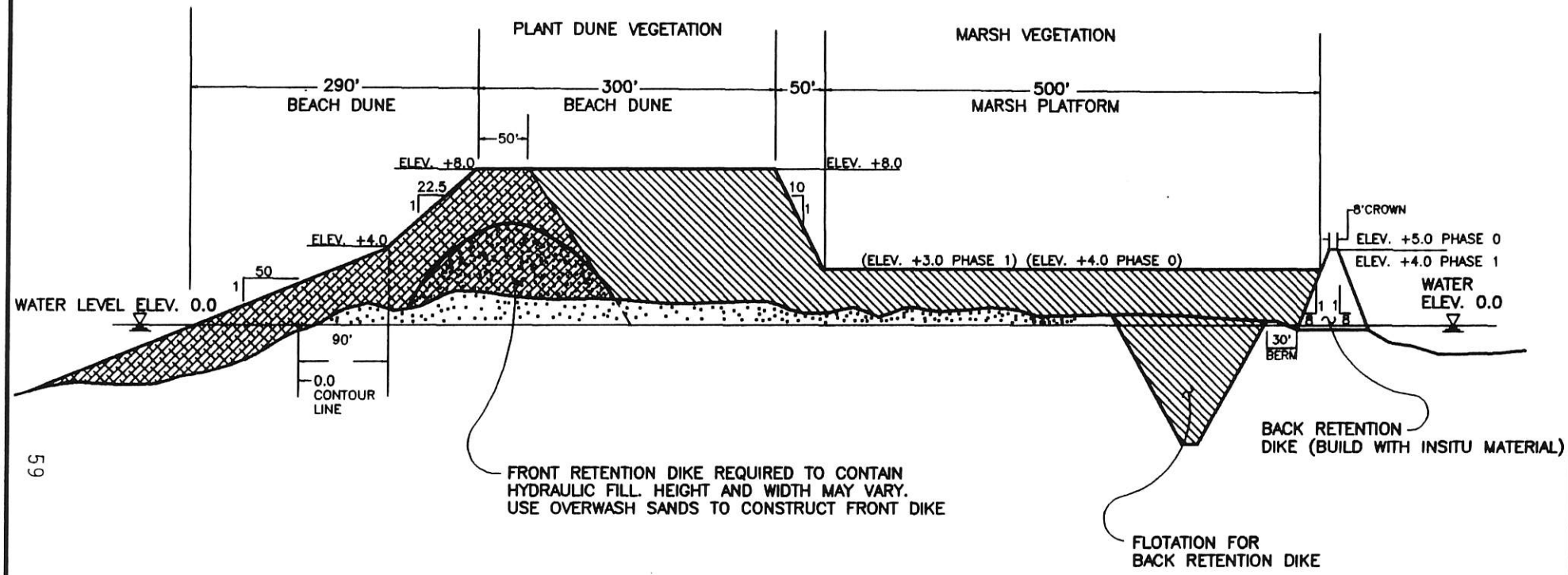
T. BAKER SMITH & SON, INC. CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES P.O. BOX 2260 HOUMA, LOUISIANA 70361	**PROJECT:** ISLES DERNIERS RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIER AND PHASE 1 – TRINITY ISLAND	DRAWING DATE: MARCH, 1994	EXHIBIT No. 23
	DNR CONTRACT No. 25085-94-02 OCR CONTRACT No. 435-4003	SCALE: 1"=150'(HORIZ.) 1"=7.5'(VERT.)	TYPICAL BEACH DUNE RESTORATION CROSS-SECTION WITH GOOD CONDITIONS



(PHOTO DATE: 10/7/93)

EXHIBIT 24

TYPICAL BEACH DUNE PHOTOGRAPH
FAIR CONDITION



59

LEGEND

- OVERWASH SANDS
- HYDRAULIC FILL REQUIREMENTS FOR THIS AREA ARE BASED ON AN OVERFILL RATIO OF 3.5 ONLY FOR EXISTING BEACH SECTIONS BELOW +1.0 N.G.V.D.
- HYDRAULIC FILL REQUIREMENT FOR THIS AREA BASED ON OVERFILL RATIO OF 1.0

BASE BID TEMPLATE
PHASE 0 AND PHASE 1

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2266 HOUMA, LOUISIANA 70361

PROJECT:
ISLES DERNIERS RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIER AND PHASE 1 – TRINITY ISLAND

DRAWING DATE: MARCH, 1993

EXHIBIT 25

DNR CONTRACT No. 25085-94-02
OCR CONTRACT No. 435-4003

SCALE: 1"=150'(HORIZ.)
1"=7.5'(VERT.)

TYPICAL BEACH DUNE RESTORATION
CROSS-SECTION WITH FAIR CONDITIONS

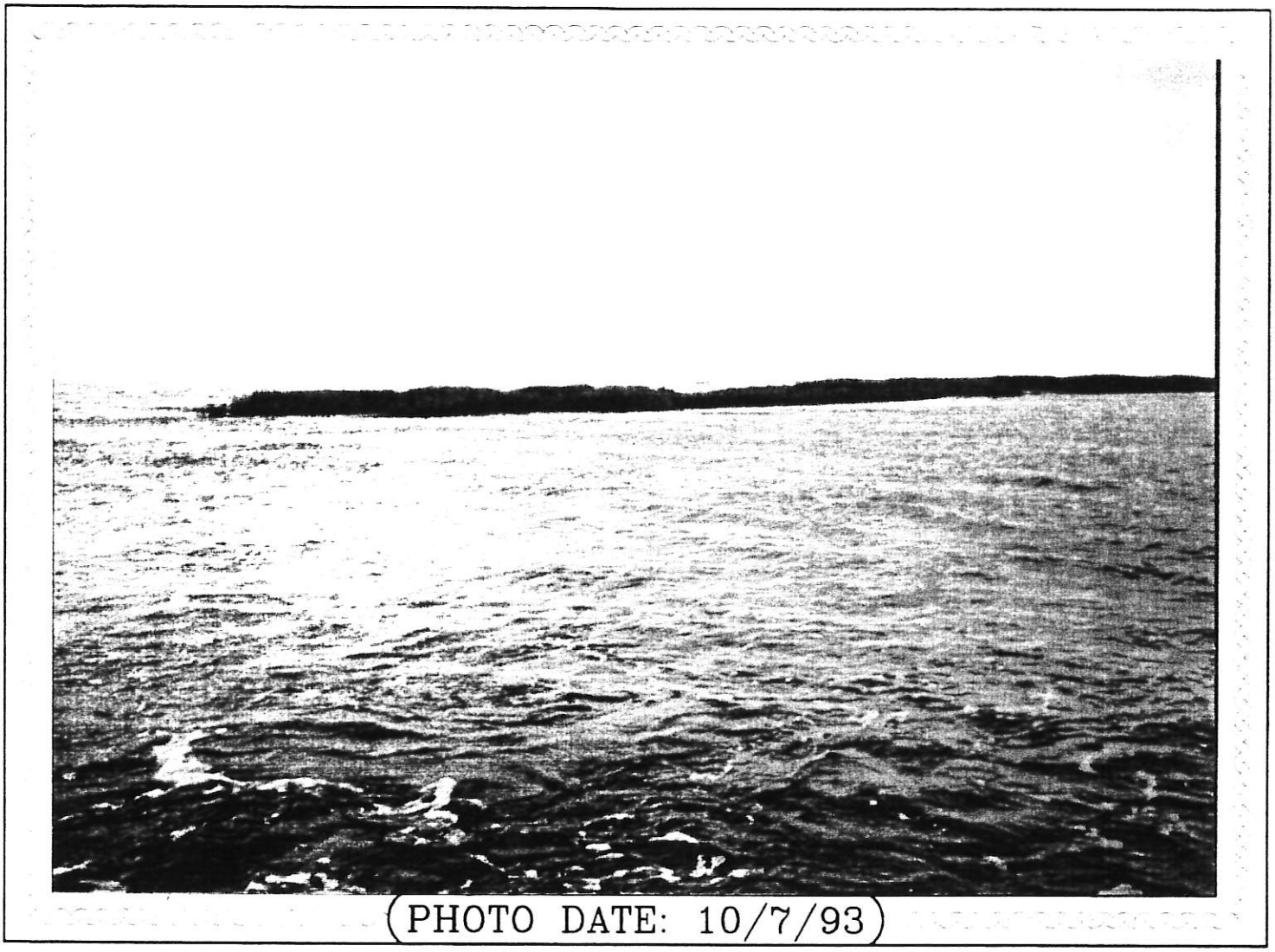
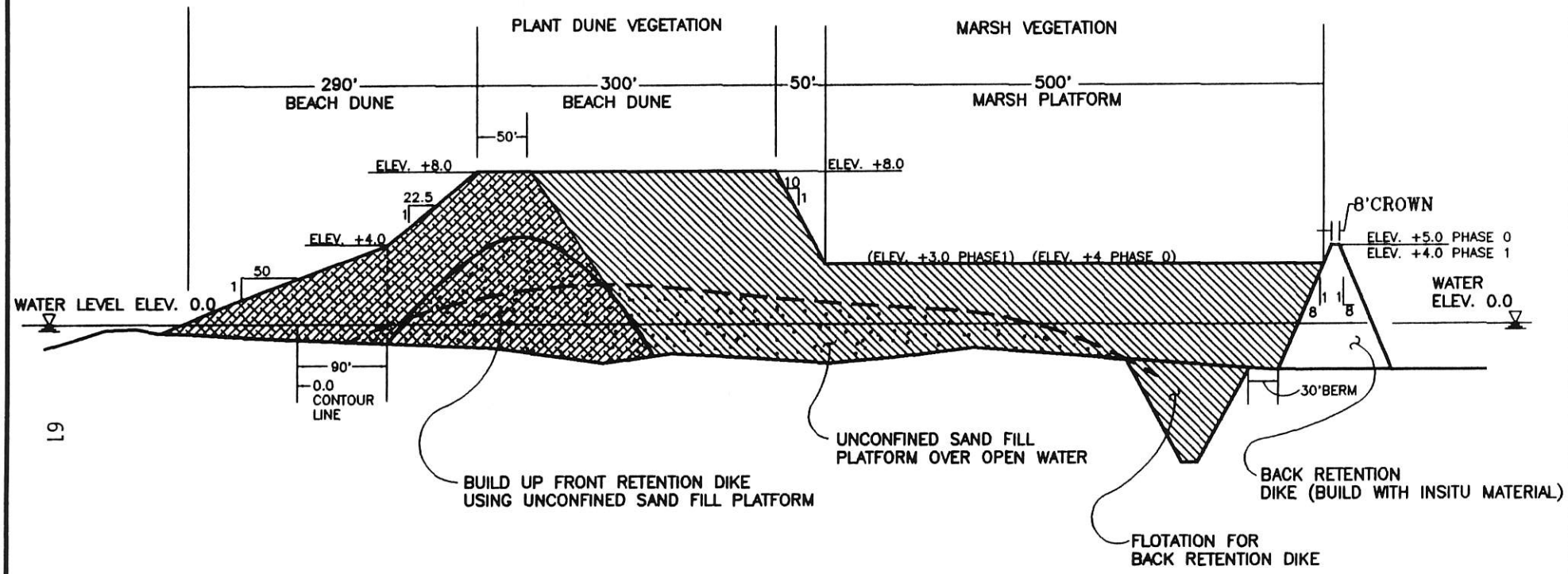


PHOTO DATE: 10/7/93

EXHIBIT 26

TYPICAL BEACH DUNE PHOTOGRAPH
POOR CONDITION



61

LEGEND

- HYDRAULIC FILL REQUIREMENT FOR THIS AREA BASED ON OVERFILL RATIO OF 3.5 ONLY FOR EXISTING BEACH SECTION BELOW +1.0 N.G.V.D.
- HYDRAULIC FILL REQUIREMENT FOR THIS AREA BASED ON OVERFILL RATIO OF 1.0
- UNCONFINED SAND FILL PLATFORM

BASE BID TEMPLATE
PHASE 0 AND PHASE 1

T. BAKER SMITH & SON, INC. CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES P.O. BOX 2906 HOUMA, LOUISIANA 70361	**PROJECT:** ISLES DERNIERS RESTORATION PROJECT PHASE 0 – EAST ISLE DERNIER AND PHASE 1 – TRINITY ISLAND	DRAWING DATE: MARCH, 1994	EXHIBIT 27
	DNR CONTRACT No. 25085–94–02 OCR CONTRACT No. 435–4003	SCALE: 1"=150'(HORIZ.) 1"=8'(VERT.)	TYPICAL BEACH DUNE RESTORATION CROSS–SECTION WITH POOR CONDITIONS

Table 12 below shows the range of values used to develop the final project plans, specifications, and quantities for the dune.

TABLE 12

SUMMARY OF DUNE CROSS-SECTIONAL DESIGN CRITERIA

COMPONENT	CHARA.	MINIMUM	MAXIMUM	SOURCE
Foreslope	D	1:50	1:22½	1988 CER
Height	D	+6	+8	1988 CER & 7/1/93 RFP
Width	D	100	300	1988 CER, 7/1/93 RFP & CWPPRA
Backslope	D	1:10	1:10	1988 CER
Settlement	S	0	0	'93 Gore Report
Shrinkage	P	0	0	'93 Gore Report
Length	D	10,600' (Phase 0)	15,500' (Phase 1)	7/1/93 RFP & CWPPRA
Overfill	P	0	3.5	1988 CER

The minimum dune height obtained from the 1988 CER predicted a project life of 20 years for the cross section shown on Exhibit 21. This should still be applicable for this project. No shrinkage and settlement factors were used to increase the dune quantities because geotechnical information supplied by DNR indicates good high quality sand is available from nearby sand sources. Furthermore, settlements will be minimized because the new dune will be built over existing overwash sands and sediments which have already been compressed and therefore have higher

supportive characteristics. Although the plans for the dune foreslope show a 1:50 slope, the natural winnowing process is expected to leave a foreslope after construction of 1:100 more or less.

Table 13 shows the range of values used to develop the preliminary project plans, specifications, and quantities for the marsh platform.

TABLE 13

SUMMARY OF MARSH PLATFORM CROSS-SECTIONAL DESIGN CRITERIA

COMPONENT	CHARA.	MINIMUM	MAXIMUM	SOURCE
Height	D	+3 NGVD	+5.0 NGVD	7/1/93 RFP CWPPRA
Width	D	350'	500'	7/1/93 RFP CWPPRA & 25% DR
Length	D	Varies Per Phase	Varies Per Phase	7/1/93 RFP CWPPRA & 25% DR
Settlement	3	3"	15"	'93 Gore Report
Shrinkage	P	5%	30%	'93 Gore Report
Overfill	P	0	0	1988 CER

Table 14 shows the range of values used to develop the final project plans, specifications, and quantities for the back retention dike.

TABLE 14

SUMMARY OF BACK RETENTION DIKE CROSS-SECTIONAL DESIGN CRITERIA

COMPONENT	CHARA.	MINIMUM	MAXIMUM	SOURCE
Height	D	+4 NGVD	+6.0 NGVD	'93 Gore Report
Crown Width	D	8'	None	'93 Gore Report
Sideslopes	P	None	1:8	'93 Gore Report
Berm	S&P	30'	None	'93 Gore Report

5.2.6 Project Design Analysis

The design cross section shown on Exhibit 21 will be used as the base bid for both phases. Where a stable marsh condition currently exists behind the beach, the marsh platform as shown on Exhibit 21 will not be constructed. This condition exists only on Phase 1, Trinity Island. Exhibit 28 shows the typical section without the marsh platform. Phase 0, East Isle, has no stable marsh condition and therefore will be constructed using the marsh platform along its entire length. Approximately one-half mile of Phase 1, Trinity Island, will be constructed using the cross section shown in Exhibit 28. The remainder will have the marsh platform.

Comparing Exhibit 21 to the RFP cross sections shows two differences: one, the intermediate longitudinal and transverse retention dikes have been eliminated, and secondly, elimination of those dikes eliminates the proposed steel sheetpile overflow structures.

This modification was made for two reasons. First

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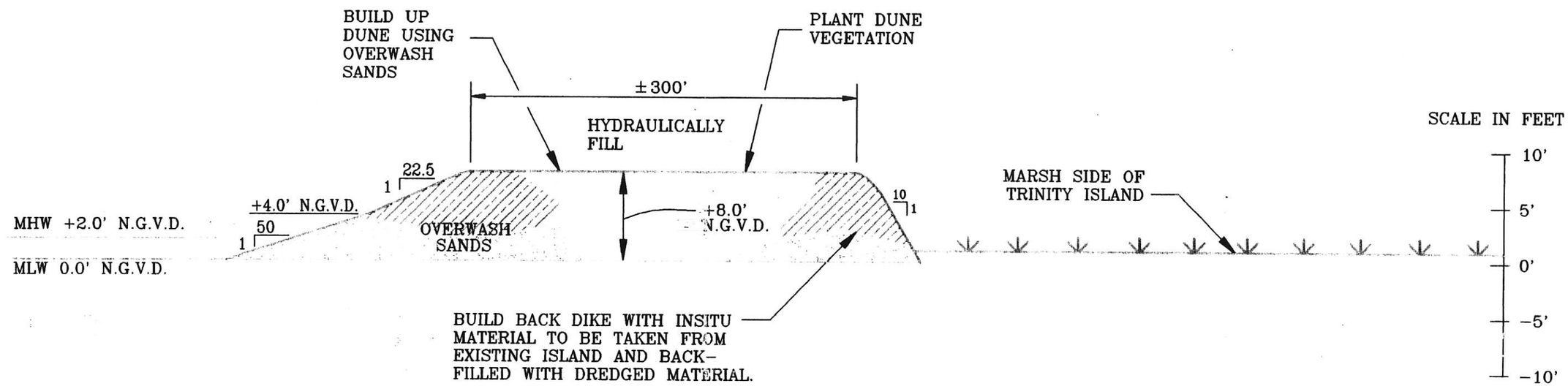


ISLE DERNIERES RESTORATION PROJECT
TYPICAL SECTION FOR CONFINED DREDGE MATERIAL ON TRINITY ISLAND

EXHIBIT 28

TYPICAL SECTION FOR CONFINED DREDGE ON TRINITY ISLAND

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
PHASE 0 AND 1

DWG. FILE: SECT-10B
DATE: NOVEMBER 1993
SCALE:

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering -- Surveying -- Planners -- Environmental Consulting

DESIGNED	DETAILED SAM	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION	BY
	REVISIONS	

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2296 HOUMA, LOUISIANA 70361

comparing the fill requirements in Sections 5.4 and 5.5 to the volume of sand in source depths with high sand percentages, it is obvious that there is enough high percentage sand (≥70%) available to construct the beach dune without the necessity to sort using hard structures.

Some clay in the dune may be desirable because it will keep the sand from blowing away when it is dry, and it will enhance vegetative growth. Using a high percentage slurry, sorting will occur naturally when the high percentage heavier sand falls out faster and closer to the end of the dredge discharge pipe and lighter silty sediments flow into the marsh platform, thus eliminating the need to construct the intermediate longitudinal retention dikes and fewer transverse dikes.

Since sorting is not a consideration for the marsh platform, there are many zones within the borrow area with low sand percentages (<70%) that can be used as fill. This is especially true for borrow Area I where some overburden will have to be removed to expose sand greater than 70% by volume in sufficient quantities for construction of beach dune for Phase 0. Removal of overburden is not necessary for Phase 1. It appears from existing data that sufficient sand quantities near the bottom surface down to fifteen (15') feet are available for dune and marsh platform construction. The Contractor will be allowed to utilize sand that is greater than 70% by volume to construct the marsh platform. Finally, keeping it simple will lower unit costs and eliminate unnecessary costs, thereby making funds available to place more sand and vegetation on the beach

and marsh platform. In this way, we help assure that the project can be built to satisfy all constraints.

Until now, no information on beach dune foreslopes has been given or shown on RFP exhibits and figures. The proposed typical sections show a slope of one to fifty (1:50) in the tidal zone. Kureth and Wise (1988) recommended this. See Exhibit 20. Exhibit 20 also shows a 1:100 slope up to +6.0 N.G.V.D. which was also recommended by Kureth and Wise, 1988. Although this is feasible up to the design finished height of +8.0, there may not be sufficient construction funds to construct the marsh platform depending on the unit price for hydraulic fill (net section fill). Although it is possible to receive approval from the CWPPRA Task Force to exceed the budget by 25%, that may not be enough. In anticipation of receiving high bids, we have incorporated two alternate proposals in the bid documents. Alternate No. 2 was mentioned earlier in Section 1.4 of this report. In our opinion, it qualifies for construction because it meets the 20-year project life as designed by Kureth and Wise (1988). The physical dimensions of Alternate No. 2 for Phase 0 and 1 are listed in Table 15 below.

TABLE 15

SUMMARY OF CROSS-SECTIONAL CHARACTERISTICS

ALTERNATE NO. 2

CHARACTERISTIC	PHASE 0	PHASE 1
Dune Foreslope	1:50	same
Dune Height	6 NGVD	same
Dune Width	100 feet	same
Marsh Platform Height	+4 NGVD	+3 NGVD
Marsh Platform Width	350 feet	same
Back Dike Sideslopes	1:8	same
Back Dike Crown	8 feet	same
Back Dike Height	+5 NGVD	+4 NGVD

All elevations shown are initial construction heights. The marsh platform height for Phase 0 is greater than Phase 1 because the soil conditions aren't as good as the Phase 1 location.

Alternate No. 1 is a cross section between the base and Alternate No. 2. The physical dimensions of Alternate No. 1 for Phase 0 and 1 are listed in Table 16 below.

TABLE 16

SUMMARY OF CROSS-SECTIONAL CHARACTERISTICS

ALTERNATE NO. 1

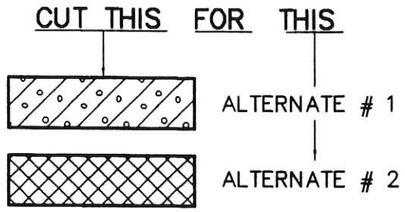
CHARACTERISTIC	PHASE 0	PHASE 1
Dune Foreslope	1:50	same
Dune Height	6 NGVD	same
Dune Width	150 feet	200 feet
Marsh Platform Height	+4 NGVD	+3 NGVD
Marsh Platform Width	500 feet	same
Back Dike Sideslopes	1:8	same
Back Dike Crown	8 feet	same
Back Dike Height	+5 NGVD	+4 NGVD

All elevations shown in Table 16 are initial construction heights. The physical differences in the existing island cross sections for each phase result in the difference in dune width. Exhibit 29 shows the base and alternate cross sections for Phase 0 and 1.

The preliminary location of the cross section for the base and alternates was determined by locating the average 0.0 N.G.V.D. contour from the cross-section data. After locating this point on the cross section, a slope of 1:22.5 was projected up to the finished dune construction height of +8 N.G.V.D. At +4 N.G.V.D. on this slope line, a slope of 1:50 was projected down into the gulf to intersect at the existing bottom contour.

The recommended length for the East Isle Derniere Project is 10,600'. Although the RFP showed an 8,200' project, it is our

TYPICAL DUNE/MARSH PLATFORM CROSS-SECTION
EAST ISLE AND TRINITY ISLE



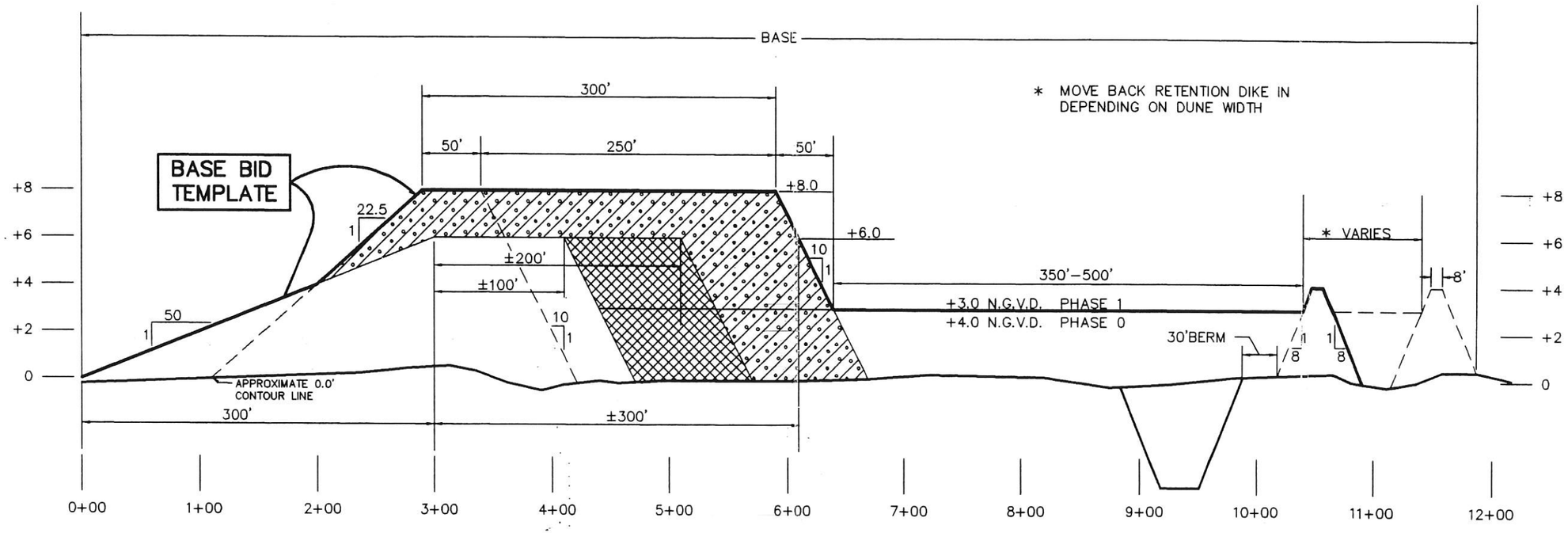


EXHIBIT 29

TYPICAL CROSS SECTION

SCALE: 1"=100'(HORIZ.)
1"=5'(VERT.)

DATE: MARCH, 1994

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2266 HOUMA, LOUISIANA 70361

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opinion that the additional 2,400' is desired by EPA, DNR, and CWPPRA because priority list 1 described it as being a 2-mile project. Furthermore, at the interagency meeting held on 11/17/93, the consensus was that the length of restoration had a higher priority than height and width.

The overall length of the Trinity Island phase is 15,500'. Approximately 14,000' of this actually faces south toward the Gulf of Mexico. The remainder hooks northward and faces Whiskey Pass on the west end.

5.2.7 Vegetation

Establishment of vegetative cover on the newly deposited fill material will be critical for long term maintenance of the area. A planting plan will be developed to accomplish establishment of vegetation on (1) dikes created from existing island material; (2) on dune sites created by the dredging activity; and (3) on a marsh platform area created by deposited overburden dredge material and fill material intended for this purpose.

To accomplish the vegetative establishment goals, a variety of plants will be required. Native vegetation should be used to the extent possible and in all cases where vegetation is planted, Louisiana ecotype material will be used. All vegetation planted must be field hardened for at least 90 days prior to planting. Soil conditions on the barrier islands are very sterile and contain high quantities of salinity. Fertilization during planting and at proper intervals during establishment of vegetation is recommended.

Guidelines for planting and fertilization will be based

upon information supplied by the U.S.D.A. Soil Conservation Service and will take advantage of past vegetative establishment efforts of La. DNR/CRD.

Due to the importance of protecting fresh deposits of levee and dredged fill material, aerial planting or modified agriculture techniques must be applied. Salt tolerant varieties of agriculture species of plants will be used. A combination of rye grass (Lolium sp.), bermuda grass (Cynodon sp.) and oats (Avena sp.) is recommended for application to freshly disturbed sites. Aerial application is the most convenient, however, due to the extensive acreage to be restored and the limited amount of acreage available at intervals of construction, it may be more logical to utilize a small agriculture seed planting drill and farm type of tractor.

Some seeds of plant species that will be recommended for planting will require planting depths of two or more inches below the surface. If aerial application is used to plant these seeds, it would require disking or plowing the surface after application. Due to the necessity of applying fertilizer to all techniques of revegetation of the project site, it would be simple to mix seeds of rye seeds, bermuda grass and oats for aerial application. For sites planted with conventional farm equipment, fertilization can be applied at planting or during stages of growth of the plants. A combination of aerial application and traditional farming techniques will be recommended.

Planting of vegetation is recommended for critical sites such as fresh levee facilities and on newly deposited dredge fill.

Plants to be used for this segment will be Louisiana ecotype of marshhay cordgrass (Spartina patens), saltgrass (Distichlis spicata), smooth cordgrass (Spartina alterniflora), roseau cane (Phragmite communis), and bitter panicum (Panicum amarum). The availability of other desirable plants that occur on Gulf of Mexico beaches such as little bluestem (Schizachyrium scoparium), crowfoot grass (Dactyloctenium aegyptium), Rhodes grass (Chloris Gayana), and seashore paspalum (Paspalum vaginatum) will be explored and used if a source is practical. All of these plants were observed at East and Trinity Islands.

In addition to the plants to be introduced, a large number of other plants will invade the new fill material from surrounding wetlands. A partial inventory of plants found on the existing barrier island complex revealed several that serve as good erosion control plants but may not be readily available from commercial sources to plant or seed. Some of the common plants observed were largeleaf pennywort (Hydrocotyle bonariensis), nut grass (Cyperus sp.), broomstraw (Andropogon elliottii), goldenrod (Solidago sempervirens), morning glory (Ipomoea sagittata), deerpea (Vigna luteola), silverleaf croton (Croton punctatus), sea ox-eye (Borrichia frutescens), glasswort (Salicornia spp.), marsh purslane (Sesuvium portulastrum), and saltmarsh fimbristylis (Fimbristylis castanea). Woody vegetation consisted of buckbrush (Baccharis halimifolia), marshelder (Iva frutescens), rattlebox (Sesbania drumdondii) and an occasional black mangrove (Avicennia germinans). A thorough identification of common plants on the adjacent beach areas should

be made to determine if additional plants exist that could be utilized to vegetate the new fill material. Any harvest of existing plant material for replanting must be under the supervision of a designated representative of La. DNR/CRD. A large number of composite species do grow in dense stands on the beach area restored by Terrebonne Parish several years ago and will invade the proposed restoration site by natural processes.

St. Augustine grass (Stenotaphrum secundatum) is a perennial grass and occurs naturally on many Gulf of Mexico beach areas. Extensive stands have been developed at camp sites on Trinity Island and provide excellent erosion control. Commercial sources of St. Augustine grass are available and comes in large sod strips that are easy to install and cultivate during the establishment period. This plant should be used on critical structures such as the dikes used to contain the dredged fill material. These structures will be left in place and will become a natural dune system over time.

Establishment of vegetation on beach dune sites vary from site to site and to a major degree is dependent upon access to the beach. In the case of East and Trinity Islands, access is difficult due to the isolation of the area by Terrebonne Bay. All construction equipment and planting material will have to be transported by marine equipment. Personnel to accomplish the planting program will have to be transported daily.

Use of sand fences has been successful in dune stabilization efforts and should be designed to be used in conjunction with planting. Various configurations should be tested

and the most successful one adopted for long term use.

Back marsh revegetation will depend upon the finish elevation of the new marsh surface. If the area is near normal marsh elevation, smooth cordgrass should be used. This plant grows best in intertidal zones and can tolerate high levels of water and soil salinity. Hand planting has been the normal method of planting; however, mechanical planting could be accomplished by modification of existing vegetable planting equipment and a small marsh buggy or farm tractor.

Only Louisiana ecotype of vegetation will be used on this project. All plants will be field hardened for at least 90 days prior to planting. Smooth cordgrass, marshhay cordgrass, saltgrass roseau cane, bitter panicum and St. Augustine grass are available from local wetland plant production sources. Seeds and plant material of other species listed above can be obtained through local wetland plant sources.

Most planting efforts of marshhay cordgrass has been carried out on two-foot spacing in rows two feet apart. This density provides for quick coverage on suitable sites; however, this would be very labor insensitive and quite expensive to accomplish on a large tract of land such as those being created on East and Trinity Islands. On the back marsh area, a 50-foot wide strip adjacent to the tidal zone should be planted with smooth cordgrass. Spacing on the strip of smooth cordgrass should be on 4-foot centers with individual plants on 4-foot centers.

On the elevated section of the back marsh area, two

marshhay cordgrass strips, 25 feet wide each, should be planted. Each strip will have 7 rows, and the individual plant spacing on each row will be on 4-foot centers. Position of the planting strips should be east to west to provide maximum protection from wind erosion.

Marshhay cordgrass and bitter panicum can be used following the strip pattern in the interbeach area that is to be filled with dredged material. Planting on this area should be carried out as soon as equipment and personnel can work on the surface. This will allow some benefits from moisture trapped in the soil material. Saltgrass can also be used in this area and planted in low sites that may hold water. Rows should be on 3-foot centers and plants should be on 3-foot spacings. Distance between strips of marshhay cordgrass and bitter panicum should be 100 feet. Position of the planting strips should be east to west to provide maximum protection from wind erosion.

Roseau cane, bitter panicum and St. Augustine grass should be planted on the spoil banks created to contain the dredged material. Planting should be done during periods of rainfall so that maximum moisture will be available. Plant spacing for roseau cane should be 4-foot centers and in rows on the front and top of the spoil bank. Bitter panicum plants should be planted in strips on the elevated section of the spoil banks with rows on 3-foot centers and plants on 3-foot spacing. Cluster planting of bitter panicum should be utilized in order to establish dense colonies that will provide natural seed sources for future expansion. St. Augustine sod should be planted in plots 9 feet square in an effort to provide moisture

and establish quick cover at critical erosion sites.

Planting time will vary for various species. Rye grass, oats, and bermuda grass should be aerial applied in mid-October through mid-December. Specific planting dates will be coordinated with SCS and La. DNR/CRD personnel and based upon best information from other planting efforts in south Louisiana.

Fertilization of plants and seeds will be coordinated with SCS personnel and based upon best information from other planting efforts in south Louisiana.

All plants to be used will be inspected at the planting site by a qualified inspector to assure maximum survival and high quality plants. Any damaged, wilted or stressed plants will not be used and will be replaced at the supplier's expense.

Planting preparations will be carried out at the advice of SCS personnel and will be done in a manner and time frame that will assure maximum survival of the planted seeds or plant material.

Present market price for smooth cordgrass, marshhay cordgrass, saltgrass, bitter panicum, roseau cane, and St. Augustine sod area listed in Table 17.

Rye grass, bermuda grass, and oat seeds are common agriculture products. Rye grass seed price is $ .50 per pound and should be applied at the rate of 50 pounds per acre; unhulled bermuda grass seed price at $2.60 per pound and should be applied at the rate of 25 pounds per acre; and oat seeds price is $ .20 per pound and should be applied at the rate of 75 pounds per acre.

TABLE 17

SUMMARY OF VEGETATIVE MARKET PRICES

SPECIE	MATERIAL	LABOR	FERTILIZATION	TOTAL
Smooth cordgrass single stem	.30/each	.30/each	.10/each	.70/each
Marshhay cordgrass single stem	.30/each	.30/each	.10/each	.70/each
Saltgrass single stem	.30/each	.30/each	.10/each	.70/each
Roseau cane single stem	.50/each	.40/each	.10/each	1.00/each
Bitter panicum pots	1.50/each	1.40/each	.10/each	3.00/each
St. Augustine	.33/SF	.33/SF	.10/SF	6.84/SF

Aerial application of rye grass, bermuda grass and oat seeds can be combined in 19-19-19 time release fertilizer at the rate of 175 pounds per acre. Based upon price per ton, this fertilizer formula would be $215.00 per ton. A small mixing fee would be required for aerial application of seeds and fertilizer.

Aerial application is estimated at $150.00 per acre; however, this price will vary depending upon time of year, flying conditions, and availability of suitable aircraft.

Due to the sterile condition of the planting sites on the restored island system, it is recommended that all plants that are installed be fertilized at the time of planting. Fertilizer pellets can be installed at the same time the plant is set in the ground. If a mechanical planter is used, the spacing as recommended will allow for the person doing the planting to place the pellet along with the plant or if manual planting is followed, the pellet can be

placed in the bottom of the hole before the plant is installed. Time release fertilizer pellets in large quantities will cost about $ .10 each.

Exhibit 30 shows the proposed location of each specie planting on the typical dune-marsh platform cross section.

5.3 Construction Contract Administration

5.3.1 General

This section will explain how quantities for the base and alternates for each phase were calculated. Sample calculations of bid quantities shown in Sections 5.4 and 5.5 are included in Appendix T and U, respectively. The advantages and disadvantages of various methods of payment and bidding will also be pointed out. The emphasis of this section will be on the major pay item hydraulic fill.

5.3.2 Net Section Borrow (NSB)

Payment for net section borrow requires the Owner's representative to measure how much material is being periodically removed from the borrow area as the basis of payment. Although this methods usually results in the lowest unit price ($/C.Y.), there are some disadvantages. One disadvantage is the Contractor has less incentive to perform his required work on the island since most of his pay is for work off of the island. More control is required from an administrative and inspection standpoint to insure performance on the island and this costs more. Borrow pit measurements are needed more often than net section measurement and are more costly. Borrow pit measurements are more contestable than other methods. This

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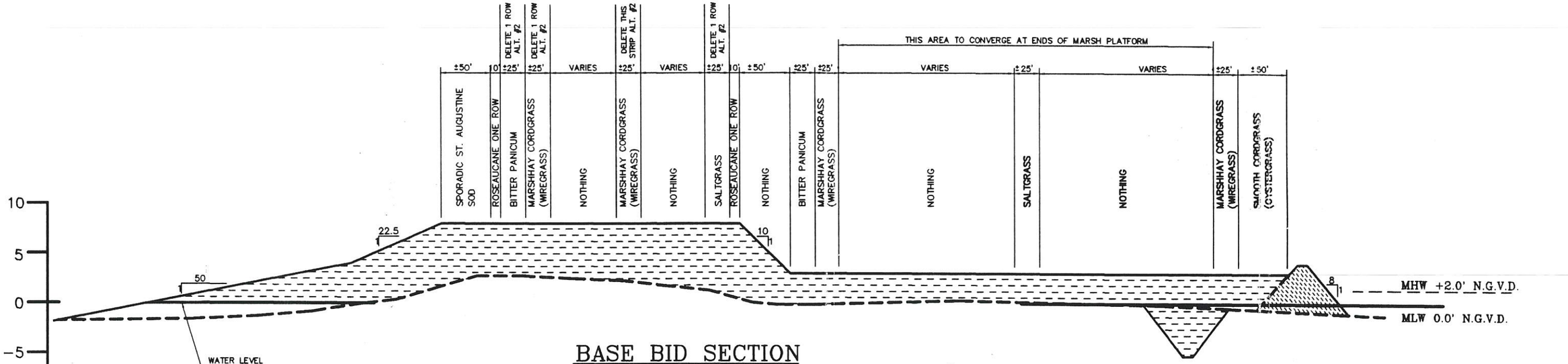


BASE BID SECTION

SCALE: HOR. 1"=100'
VERT. 1"=10'

EXHIBIT 30

VEGETATIVE PLANTING SCHEME

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
TRINITY ISLAND - PHASE 1

DWG. FILE: TISEC
DATE: MARCH 1994
SCALE: AS SHOWN

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SCIENTISTS
P.O. BOX 2260 HOUMA, LOUISIANA 70361

DATE	DESCRIPTION REVISIONS	BY

DESIGNED	M.J.R.	DETAILED	G.L.M.	TRACED
CHECKED	M.J.R.	CHECKED	M.J.R.	CHECKED

method places most of the risk on the Owner. Although this method of payment was not selected, it was still necessary to calculate the NSB quantity so that an estimate of the NSF unit price could be made. The ratio of NSB to NSF was multiplied by the NSB unit price of $1.27 which was the unit price for the recently completed Raccoon Point Project. The NSB quantity for the base and alternates was obtained by multiplying the NSF for the first 50 feet of dune on the gulf side by an overfill ratio of 3.5 for sections of beach where elevations are below +1.0 N.G.V.D. For Phase 0, East Island, 7,950 feet or 75% of the beach is at or below +1.0 N.G.V.D. For Phase 1, Trinity Island, 9,500'or 61% of the beach is at or below +1 N.G.V.D.

This Final Engineering Report does not contain estimates of net section borrow as did the Preliminary Engineering Report because NSF was recommended in the Preliminary Engineering Report as the basis of payment.

5.3.3 Net Section Fill (NSF)

Payment for net section fill requires the Owner's representative to measure periodically how much material is placed upon the island to build the typical section shown on the plans. This method usually results in higher unit prices ($/C.Y.). Unit prices are higher because of two reasons. First, the pay quantity does not contain the overfill required to construct the net section. And, secondly, the Contractor must estimate the overfill, thereby increasing the risk and unit price. The effect of the first reason is easy to calculate since it can be directly prorated. The other is more subjective and influenced by factors such as relevant

personnel and firm experience, equipment, weather, backup support, and reliable and accurate plans and specifications.

Net section fill is advantageous to the Owner for several reasons: 1) less risk is taken by the Owner; 2) since the Contractor is getting paid for work on the island, he has more incentive to complete it correctly; 3) the likelihood of cost overruns is less; 4) the Contractors have more freedom to construct the section by their own means, methods, and techniques; and 5) disputes over pay quantities are less likely than net section borrow because net section fill measurements are more accurate that net section borrow.

The Engineer will perform before and after fill surveys of hydraulic fill placed on the island for payment purposes. The Contractor will be paid the full contract unit price for all fill placed and shaped to the line and grades shown on the plans. For material placed, but not shaped (stockpiled), the Contractor will be paid for 95% of the stockpile in addition to normal retainages. No retainage will be withheld for material placed and shaped to line and grade. All section constructed to line and grade and approved by Engineer will be accepted as substantially complete with the exception of vegetative planting.

5.3.4 Hourly Rate (HR)

Payment for hourly rate work requires the Owner's representative to keep track of how many hours each piece of marine and land equipment is being used. In this method, the risk is shared more by both parties. By limiting the size and experience in specifications, many disadvantages can be eliminated. But if a

Contractor is weak in working on the island or has a poor dredging plan for work on the island, time will be lost and time is money in this contract. Advantages, on the other hand, include being the most flexible in terms of changing Contractor's means, methods, and techniques due to changing conditions in field and changing the project design without having to renegotiate unit prices for new items of work required. The Preliminary Engineering Report contained construction estimates based upon this method of pay. However since the Preliminary Engineering Report recommended NSF as the basis of payment, those estimates are not contained herein.

5.3.5 Retention Dike Construction

Net section borrow will be used as the basis of pay for the back retention dike only. To account for shrinkage, settlement, and losses during construction, the net levee section volume was doubled to obtain a net borrow pit quantity for bidding.

5.3.6 Mobilization

Only one lump sum pay item will be used for mobilization and demobilization. A percentage of the lump sum will be paid based on a percentage of the job complete. The percentage of the lump sum collectible will be set up in a schedule format in the Special Provisions of the specifications such that the Owner pays 100% of the bid items when the work is 50% complete.

5.3.7 Vegetative Planting

Based on Section 5.2.6, pay items will be required for each species of vegetative planting/fertilization and aerial planting/fertilization. Each specie will be paid on a per each or

square yard basis in place including fertilization. Aerial planting will be paid for on an acre basis including fertilization.

5.3.8 Bid Proposal Documents

The bid documents are set up to receive bids on the same or different days. Since there are not that many Contractors who may be available to bid, it will be more competitive, in our opinion, to open bids for each phase on different days. This will permit unsuccessful bidders at the first bid opening to bid at the second opening. No more than 30 days should separate the two bid dates.

The bid documents are also set up in such a manner as to allow one Contractor to receive both contracts and construct them consecutively with one dredge within a specified time. This allowance is provided by the Owner in anticipation of receiving a discount on the unit price for hydraulic fill and the lump sum price for mobilization. If the discount is not sufficient to cover the anticipated increase in project representation, the Owner has the authority to award the contracts to separate low bidders and run the contracts concurrently. The discount will only apply if one Contractor is low on both phases with the discount applied. If such is the case, the Contractor, not the Owner, has the option to construct the project consecutively or concurrently.

Exhibit 31 is a project compliance schedule showing a final completion date of 3/31/94, a 90-day bid advertisement/evaluation/ award period 4/1/94 to 6/30/94, a 30-day preconstruction/contract execution/notice to proceed period 7/1/94 to 7/30/94. Contract time would begin on 8/1/94. If the contracts run consecutively to take

COMPLIANCE
PROJECT SCHEDULE

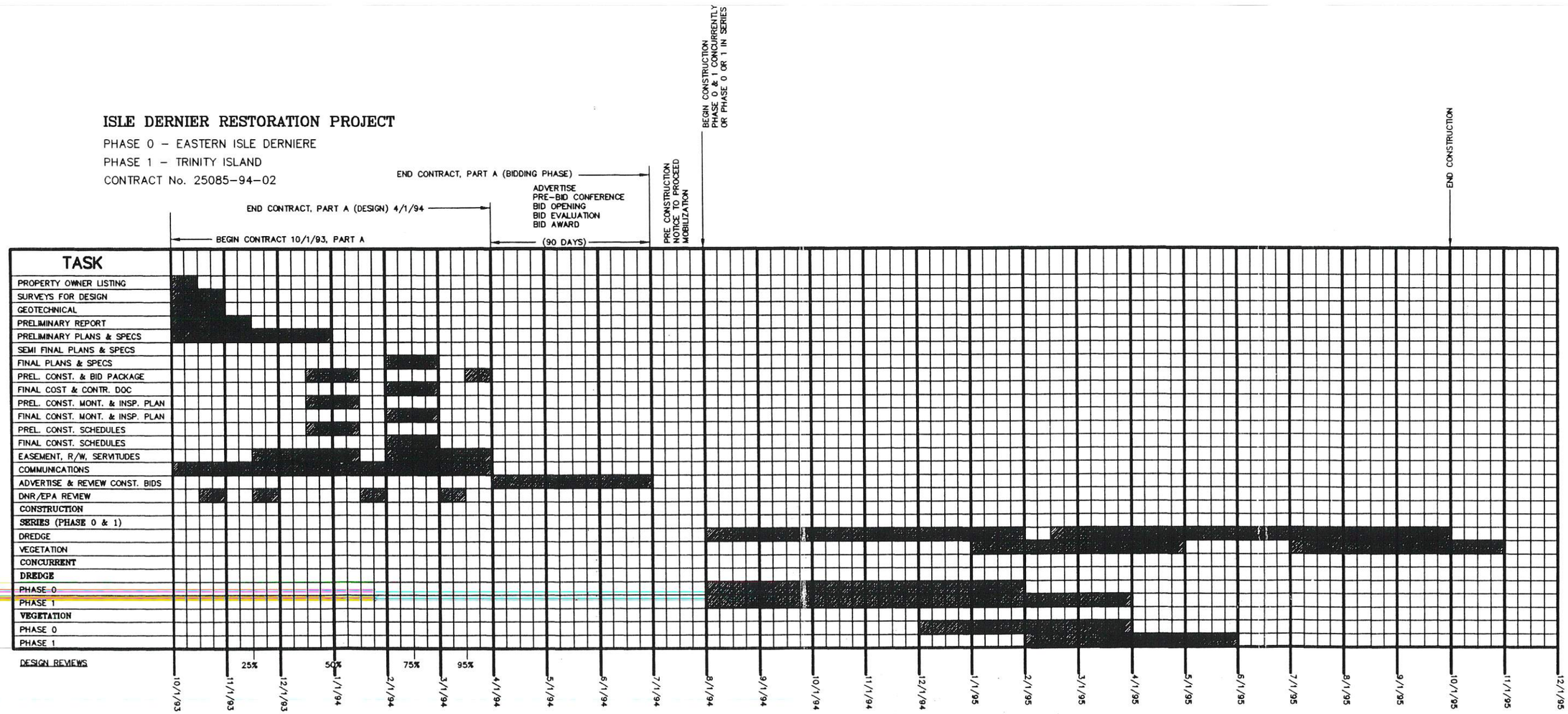


EXHIBIT 31

T. BAKER SMITH & SON, INC.

SHEET No. 17

advantage of a discount, construction should be complete by 11/1/95 which is one month past the RFP deadline for completion. If the contracts run concurrently, they should be completed by 6/1/95 which is four months before the RFP deadline for completion. The following checklist of required permits, rights-of-way, and environmental documents shows the status of each.

DOCUMENT DESCRIPTION	STATUS
404 Permit	Complete, effective 3/4/94
CZM Permit	Complete, effective 2/4/94
Oyster Lease Assurance	Complete, letters of no objection
Pipeline Clearance	Complete, letters requesting 48-hour notification prior to construction
EIS/EA	Complete, 1/7/94 FONSI (USCOE)
Land Agreement	Incomplete, pending resolution of ownership to reclaimed land and mineral rights (LL&E vs. State of La.)

5.4 East Isle Derniere

5.4.1 Hydraulic Fill Requirements (NSF)

Based on previous discussion and exhibits, the total estimated quantity of hydraulic net section fill required for the base and alternates are shown in Table 18.

TABLE 18

TOTAL HYDRAULIC FILL REQUIREMENTS

PART A, PHASE 0-EAST ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	2,261,375
Alternate No. 1	1,631,584
Alternate No. 2	1,489,548

Tables 19 and 20 break these figures down by Beach Dune and Marsh Platform requirements, respectively.

TABLE 19

TOTAL BEACH DUNE HYDRAULIC NET SECTION FILL REQUIREMENTS

PART A, PHASE 0-EAST ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	1,302,262
Alternate No. 1	706,607
Alternate No. 2	669,173

TABLE 20

TOTAL MARSH PLATFORM HYDRAULIC NET SECTION FILL REQUIREMENTS

PART A, PHASE 0-EAST ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	959,113
Alternate No. 1	924,977
Alternate No. 2	820,375

The figures in Table 20 include the hydraulic fill for the flotation canal for the back retention dike.

5.4.2 Hydraulic Fill Availability

Comparing the requirements in 5.4.1 to what is available in Tables 5 through 11, borrow area I has an ample supply of sediments to fulfill the beach and marsh requirements of Phase 0. Since completing the preliminary report, the information in Tables 5-11 has been mapped. These maps are a part of the project plans and provide the Contractor with a picture of the location of the best sand sources. Exhibit 18, for instance, shows sand stratas 0-5, 5-10, and 10-15 overlaid and lists the volume of material (sand or overburden) in each strata. Using this information and the water depths shown, the Contractor will develop a dredge plan most suited to his equipment and experience. For example, to construct the base bid, he may consider the area outlined by the Points 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 1, 19, 20, and 21. The total material available from this area is 2,378,154 cubic yards compared to the required 2,261,375 cubic yards for the net base section fill. Although this appears to satisfy the requirements, the Contractor will have to estimate how much overfill is required to construct a beach platform where beach conditions are poor as described in Section 5.2.4 and shown on Exhibit 24. The project plans also show for the base and each alternate the separate fill requirement for the dune and marsh platform. No overburden will be allowed to be pumped in the dune zone. Only material greater than 70% sand by volume may be pumped in the dune zone. The information shown on Exhibit 29 is based on sand contents that are greater than 70% by volume. Whether the other 30% remains on the dune or settles out in the marsh platform is acceptable. Borrow area J can supply all of the marsh

Comparing the requirements in 5.4.1 to what is available in Tables 5 through 11, borrow area I has an ample supply of sediments to fulfill the beach and marsh requirements of Phase 0. Since completing the preliminary report, the information in Tables 5-11 has been mapped. These maps are a part of the project plans and provide the Contractor with a picture of the location of the best sand sources. Exhibit 18, for instance, shows sand stratas 0-5, 5-10, and 10-15 overlaid and lists the volume of material (sand or overburden) in each strata. Using this information and the water depths shown, the Contractor will develop a dredge plan most suited to his equipment and experience. For example, to construct the base bid, he may consider the area outlined by the Points 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 1, 19, 20, and 21. The total material available from this area is 2,378,154 cubic yards compared to the required 2,261,375 cubic yards for the net base section fill. Although this appears to satisfy the requirements, the Contractor will have to estimate how much overfill is required to construct a beach platform where beach conditions are poor as described in Section 5.2.4 and shown on Exhibit 27. The project plans also show for the base and each alternate the separate fill requirement for the dune and marsh platform. No overburden will be allowed to be pumped in the dune zone. Only material greater than 70% sand by volume may be pumped in the dune zone. The volumes listed on Exhibit 18 are for sand contents that are greater than 70% by volume. Whether the other 30% remains on the dune or settles out in the marsh platform is acceptable. Borrow area J can supply all of the marsh

requirements but only 75% of the beach dune requirements. Based on this, borrow area I will be used. Its average distance from the end of Phase 0 (west end of Parish project) is approximately 3.5 miles. How this affects unit price can only be calculated by a Contractor, but it is well within reach of hydraulic dredging.

5.4.3 Back Retention Dike Requirements

The fill requirements for the back retention dike are the same regardless of the basis of pay for hydraulic fill. The total length is 10,600 feet. Based on the geotechnical report, the cross-sectional area is 288 S.F. Using factors described in 5.3.5 for shrinkage, losses, and settlement, the total estimated quantity is 260,000 cubic yards for the base, 130,000 cubic yards for Alternate No. 1 and 90,000 cubic yards for Alternate No. 2.

5.4.4 Beach Dune Dike Requirements

There is no pay item for construction of this frontal extension structure using available overwash sand, but it is required. The purpose is to confine hydraulic fill as much as is practical. The approximate total length required is 10,600.

5.4.5 Mobilization

No calculations were made to quantify this pay item. Pay will be on a lump sum basis with partial percentage payments based on percent completed.

5.4.6 Vegetation

Based on Section 5.6, Table 21 lists the total species required for the dikes, marsh platform, and beach dunes.

TABLE 21

SUMMARY OF VEGETATIVE REQUIREMENTS

PART A, PHASE 0 - EAST ISLAND

SPECIE	BASE BID	ALTERNATE NO.1	ALTTERNATE NO.2
Smooth cordgrass	26,600	26,600	26,600
Marshhay	59,300	57,300	57,300
Saltgrass	49,100	49,100	49,100
Roseau Cane	6,200	6,200	6,200
Bitter Panicum	51,900	51,900	51,900
TOTAL	191,100	191,100	191,100

One fertilizer pellet per plant will be used; therefore, the total number of pellets required is 191,100. In addition to the individual planting, aerial planting and fertilization are recommended for initial dike and dune construction to prevent excessive erosion during construction. This will be paid for on an acre basis. All three species recommended in Section 5.6 and fertilizer will be applied together. The total acreage to be covered is 56. Based on Section 5.6, 2,800 lbs. of rye grass, 1,400 lbs. of bermuda, 4,200 lbs. of oats, and 9,800 lbs. of fertilizer. One final vegetative recommendation which needs to be paid for separately is the use of St. Augustine sod on the dike. Using the recommendation in 5.6 and one site per 100 feet, 83 sites on East Isle or 800 sq. yds. are required.

5.4.7 Probable Project Budgets, Phase 0

Exhibits 32, 33, and 34 are probable project budgets for the base and alternate bids, respectively. All engineering costs are

based on current contract prices for Phase 0, Part B. If construction contracts run consecutively, project representation costs would increase by approximately 100% if 24-hour per day inspection were required. Where available, construction unit prices are based on similar work currently under construction or recently completed.

EXHIBIT 32

BASE BID
PROBABLE PROJECT BUDGET
PART A, PHASE 0 EAST ISLE
NET SECTION FILL

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	2,261,375	$ 2.28	$5,155,935
2	Back Retention Dike	CY	260,000	$ 1.00	260,000
3	Mobilization	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	26,600	$ .70	18,620
5	Marshhay	Each	57,300	$ .70	40,110
6	Saltgrass	Each	49,100	$ .70	34,370
7	Roseau Cane	Each	6,200	$ 1.00	6,200
8	Bitter Panicum	Each	51,900	$ 3.00	155,700
9	St. Augustine Sod	SY	800	$ 3.00	2,400
10	Aerial Planting	Acre	56	$150.00	8,400
TOTAL PROBABLE CONSTRUCTION COST					$5,931,735
Engineering:					
	Design				183,205
	Contract Administration*				219,519
TOTAL PROBABLE PROJECT COST					$6,334,459

Note: Project length increased from 8,200' to 10,600'.

Dune = 300' X 8'
Marsh = 500' X 4'

* Based on concurrent construction contracts. If construction runs consecutively, the portion of this cost associated with project representation will double for project.

Total probable construction cost is 48.6% above the available funds for construction [$3,992,881].

March 3, 1994

EXHIBIT 33

ALTERNATE NO. 1
PROBABLE PROJECT BUDGET
PART A, PHASE 0 EAST ISLE
NET SECTION FILL

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	1,489,548	$ 2.28	$3,396,169
2	Back Retention Dike	CY	130,000	$ 1.00	130,000
3	Mobilization	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	26,600	$ .70	18,620
5	Marshhay	Each	57,300	$ .70	40,110
6	Saltgrass	Each	49,100	$ .70	34,370
7	Roseau Cane	Each	6,200	$ 1.00	6,200
8	Bitter Panicum	Each	51,900	$ 3.00	155,700
9	St. Augustine Sod	SY	800	$ 3.00	2,400
10	Aerial Planting	Acre	56	$150.00	8,400
TOTAL PROBABLE CONSTRUCTION COST					$4,041,969
Engineering:					
	Design				83,205
	Contract Administration*				219,519
TOTAL PROBABLE PROJECT COST					$4,444,693

Note: (1) Project length increased from 8,200' to 10,600'.

Dune = 150' X 6'
Marsh = 500' X 4'

* Based on concurrent construction contracts. If construction runs consecutively, the portion of this cost associated with project representation will double for project.

Total probable construction cost is 1.2% above the available funds for construction [$3,992,881].

March 3, 1994

EXHIBIT 34

ALTERNATE NO. 2
PROBABLE PROJECT BUDGET
PART A, PHASE 0 EAST ISLE
NET SECTION FILL

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	1,090,327	$ 3.17	$3,456,337
2	Back Retention Dike	CY	90,000	$ 1.00	90,000
3	Mobilization	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	26,600	$ .70	18,620
5	Marshhay	Each	57,300	$ .70	40,110
6	Saltgrass	Each	49,100	$ .70	34,370
7	Roseau Cane	Each	6,200	$ 1.00	6,200
8	Bitter Panicum	Each	51,900	$ 3.00	155,700
9	St. Augustine Sod	SY	800	$ 3.00	2,400
10	Aerial Planting	Acre	56	$150.00	8,400
TOTAL PROBABLE CONSTRUCTION COST					$4,062,137
Engineering:					
	Design				183,205
	Contract Administration*				219,519
TOTAL PROBABLE PROJECT COST					$4,464,861

Note: (1) Project length increased from 8,200' to 10,600'.

Dune = 100' X 6'
Marsh = 350' X 4'

* Based on concurrent construction contracts. If construction runs consecutively, the portion of this cost associated with project representation will double for project.

Total probable construction cost is 1.7% above the available funds for construction [$3,992,881].

5.5 Trinity Island

5.5.1 Hydraulic Fill Requirements (NSF)

Based on Exhibit 19 and Section 5.3.3, Table 22 shows the total estimated quantity of hydraulic fill required for the base and alternates.

TABLE 22

TOTAL HYDRAULIC FILL REQUIREMENTS

PART A, PHASE 1 TRINITY ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	2,864,000
Alternate No. 1	2,190,000
Alternate No. 2	1,950,000

Table 23 gives the total hydraulic fill requirements for the beach dune construction only. Table 24 gives the total hydraulic fill requirements for the marsh platform. The figures in Table 24 include the hydraulic fill for the flotation canal for the back retention dike.

TABLE 23

TOTAL BEACH DUNE HYDRAULIC FILL REQUIREMENTS

PART A, PHASE 1 TRINITY ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	2,405,000
Alternate No. 1	1,620,000
Alternate No. 2	1,582,000

TABLE 24

TOTAL MARSH PLATFORM HYDRAULIC FILL REQUIREMENTS

PART A, PHASE 1 TRINITY ISLAND

CROSS SECTION	ESTIMATED QUANTITIES (CU.YDS)
Base Bid	458,000
Alternate No. 1	569,400
Alternate No. 2	368,000

5.5.2 Hydraulic Fill Availability

Comparing the fill requirements in 5.5.1 to the fill available in Tables 5 through 11, borrow areas F, G and H appear to have sufficient quantities of sand and silty sediments to fulfill the beach and marsh platform requirements of Phase 1. Since completing the Preliminary Engineering Report, the information in Tables 5-11 has been mapped. These maps are part of the project plans and provide the Contractor with a picture of the location and depth of the best sand sources. Exhibit 19, for instance, shows sand stratas 0-5, 5-10, and 10-15 overlaid and lists the volume of material (sand/overburden) in each strata. Using this information and the water depths shown, the Contractor will develop a dredge plan most suited to his equipment and experience. For example, to construct the base bid, the Contractor may use all or portions of Area F1, F2, and H which contain a total of 4,730,892 cubic yards compared to the 2,864,000 cubic yards required. All of the available material in these three areas is greater than 70% sand by volume and begins at the bottom and extends down 15 feet. The Contractor for this phase will probably use all three borrow areas

to reduce the pumping distance and therefore cost. As with Phase 0, the Contractor will have to estimate how much overfill is required to construct a beach platform where beach conditions are poor as described in Section 5.2.4 and shown on Exhibit 27. Dune and marsh platform fill requirements listed in Tables 22 and 23 are also shown on the plan typical sections for the base and alternate bids. The restrictions for hydraulic fill described in Section 5.4.3 for East Island apply to Trinity Island.

5.5.3 Retention Dike Requirements

The total length of back retention dike for both typical sections is approximately 13,000 feet. Again, based on the geotechnical report and the factors described in 5.4.3, the estimated quantity is 182,000 cubic yards for the Base and Alternate No. 1 and 165,000 cubic yards for Alternate No. 2.

5.5.4 Beach Dune Dike Requirements

As with Phase 0, East Island, there is no pay item for this frontal retention structure to be constructed using available overwash sand, but it is required. The total length is estimated to be about 15,500 feet.

5.5.5 Mobilization

No calculations were made to quantify this pay item. Pay will be on a lump sum basis with partial percentage payments based on percent completed.

5.5.6 Vegetation

Table 25 lists the total species required for the dikes, marsh platform and beach dune. As on East Isle, aerial

planting/fertilization is recommended for the initial dike and beach dune dike construction to prevent erosion of soft clayey sediments. As with East Isle, aerial planting/fertilization will be paid for on a per acre basis. The total acreage to be covered is 66 acres. Based on the application rates in 5.2.6, 3,100 lbs. of rye grass, 1,550 lbs. of bermuda, 4,650 lbs. of oats, and 10,850 lbs. of fertilizer are needed.

TABLE 25

SUMMARY OF VEGETATIVE REQUIREMENTS

PART A, PHASE 1 - TRINITY ISLAND

SPECIE	BASE BID	ALTERNATE NO.1	ALTTERNATE NO.2
St. Augustine Sod	1,550	1,550	1,550
Smooth cordgrass	18,800	18,800	18,800
Marshhay cordgrass	73,800	73,800	46,675
Saltgrass	57,300	57,300	52,030
Roseau Cane	8,100	8,100	8,100
Bitter Panicum	57,500	57,500	52,230
TOTAL PLANTS	217,050	217,050	179,385

In addition to these requirements, 1,350 square yards of St. Augustine are recommended.

5.5.7 Probable Project Budgets, Phase 1

Exhibits 35, 36, and 37 are probable project budgets for the Base and Alternate Bids, respectively. All engineering costs are based on current contract prices for Phase 1, Part B. All construction unit prices are based on similar work currently under construction. Project representation cost would increase by approximately 100% if construction contracts are consecutive.

EXHIBIT 35

BASE BID

PROBABLE PROJECT BUDGET
PART A, PHASE 1 TRINITY ISLAND
NET SECTION FILL
REVISED 3/30/94

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	2,864,000	$ 2.17	$6,214,880
2	Back Retention Dike	CY	182,000	$ 1.00	182,000
3	Mob/Demob	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	18,800	$ .70	13,160
5	Marshhay	Each	73,800	$ .70	51,660
6	Saltgrass	Each	57,300	$ .70	40,110
7	Roseau Cane	Each	8,100	$ 1.00	8,100
8	Bitter Panicum	Each	57,500	$ 3.00	172,500
9	St. Augustine Sod	SY	1,550	$ 3.00	4,650
10	Aerial Planting Fertilization	Acre	66	$150.00	9,900
TOTAL PROBABLE CONSTRUCTION COST					$6,946,960
Engineering:					
	Design				232,904
	Contract Administration*				254,823
TOTAL PROBABLE PROJECT COST					$7,434,687

Note: Dune height is +8.0 NGVD, dune width is 300', and marsh platform is +3.0 NGVD and 500' wide. The total probable construction cost is 24% above available funds ($5,592,719) for construction.

* Based on Concurrent Construction Contracts. If construction contracts are performed consecutively, the portion of the cost associated with project representation will double.

EXHIBIT 36

ALTERNATE NO. 1

PROBABLE PROJECT BUDGET
PART A, PHASE 1 TRINITY ISLAND
NET SECTION FILL
REVISED 3/30/94

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	2,190,000	$ 2.28	$4,993,200
2	Back Retention Dike	CY	182,000	$ 1.00	182,000
3	Mob/Demob	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	18,800	$ .70	13,160
5	Marshhay	Each	73,800	$ .70	51,660
6	Saltgrass	Each	57,530	$ .70	40,110
7	Roseau Cane	Each	8,100	$ 1.00	8,100
8	Bitter Panicum	Each	57,500	$ 3.00	172,500
9	St. Augustine Sod	SY	1,550	$ 3.00	4,650
10	Aerial Planting	Acre	66	$150.00	9,900
	Fertilization				
TOTAL PROBABLE CONSTRUCTION COST					$5,725,280
Engineering:					
	Design				232,904
	Contract Administration*				254,823
TOTAL PROBABLE PROJECT COST					$6,213,007

Note: Dune height is +6.0 NGVD, dune width is 200', and marsh platform is +3.0 NGVD and 500' wide. The total probable construction cost is 2.3% above the available funds ($5,592,719) for construction.

* Based on Concurrent Construction Contracts. If construction contracts are performed consecutively, the portion of the cost associated with project representation will double.

EXHIBIT 37

ALTERNATE NO. 2

PROBABLE PROJECT BUDGET
PART A, PHASE 1 TRINITY ISLAND
NET SECTION FILL
REVISED 3/30/94

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
1	Hydraulic Fill	CY	1,950,000	$ 2.55	$4,972,500
2	Back Retention Dike	CY	165,000	$ 1.00	165,000
3	Mob/Demob	Lump	Lump	$250,000	250,000
4	Smooth Cordgrass	Each	18,800	$ .70	13,160
5	Marshhay	Each	46,675	$ .70	32,672
6	Saltgrass	Each	52,030	$ .70	39,421
7	Roseau Cane	Each	8,100	$ 1.00	8,100
8	Bitter Panicum	Each	52,230	$ 3.00	151,690
9	St. Augustine Sod	SY	1,550	$ 3.00	4,650
10	Aerial Planting	Acre	66	$150.00	9,900
	Fertilization				
TOTAL PROBABLE CONSTRUCTION COST					$5,647,093
Engineering:					
	Design				232,904
	Contract Administration*				254,823
TOTAL PROBABLE PROJECT COST					$6,134,820

Note: Dune height is +6.0 NGVD, dune width is 200', and marsh platform is +3.0 NGVD and 500' wide. The total probable construction cost is 1% above the available funds ($5,592,719) for construction.

* Based on Concurrent Construction Contracts. If construction contracts are performed consecutively, the portion of the cost associated with project representation will double.

VI. FINDINGS, CONCLUSIONS & RECOMMENDATIONS

6.0 General

There are several findings which are common to each project. They are: 1) each island is lower and narrower than pre-Hurricane Andrew surveys; 2) insitu sediments for the dike construction, though usable, are poor; 3) intermediate dike and sheetpile structures are not needed because of high volume-high percentage sand availability; 4) pipelines are in the work vicinity but do not present any construction problems; 5) only one and the same landowner on each project; and 6) there are no surface leases in the work areas of each project.

6.1 East Isle Derniere - Phase 0

6.1.1 Findings

In addition to the findings listed in 6.0, the following findings are unique to East Isle Derniere, Phase 0.

1) The estimated Base Bid construction cost is up $1,888,854 which is 32.1% above the currently available funds for construction. This is based, however, on an 10,600-foot project which is 2,400' longer than the project described and shown in the RFP. The average cost per foot is $555.00.
2) The cost of the Base Bid project over the RFP distance is estimated to be approximately $4,551,000. This is 14% above the currently available funds for construction.
3) The estimated cost for Alternate Nos. 1 and 2 are

3) The estimated cost for Alternate Nos. 1 and 2 are very close to the currently available construction funds. This was done by holding the construction cost at or near the currently available construction funds and allowing the unit price to go up as the quantity of fill went down.

4) Previous reports indicate that this $3.99 million project was described as a two mile project. The project as designed (10,600') will reach New Cut. The RFP project (8,200') will not reach New Cut.

5) There are no active oyster leases in the project area.

6.1.2 Conclusions

Alternate No. 2 will provide at best a 20-year project life provided a series of strong storms does not totally destroy the island. Receiving construction bids on alternates gives the Owner flexibility in awarding a construction contract without having to readvertise because of high bids on one proposal. Construction of Alternate No. 1 or the base bid is justified since there are no future plans for maintenance of the new construction.

6.1.3 Recommendations

This project should extend at least to New Cut. There are two cuts in the 2,400-foot section of beach needed to reach New Cut. Alternate bid proposals should be received for the two reasons described above. Bids should be received on different days for each phase because this will optimize bidding by giving

unsuccessful bidders a second chance. The bid documents should be set up with the primary basis of payment being net section fill (NSF). Furthermore, the intermediate longitudinal dike and sheetpile structures should be deleted and material allowed to naturally sort. Exhibit 38 shows the recommended 10,600-foot Base Bid project.

6.2 Trinity Island

6.2.1 Findings

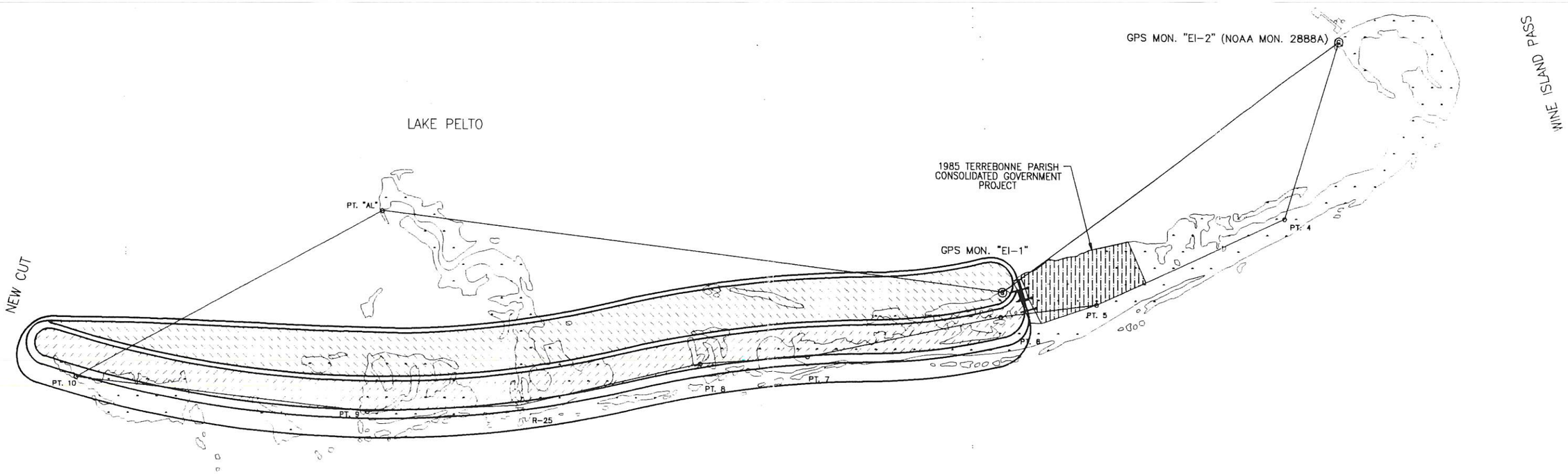
In addition to the findings listed in 6.0, the following findings are unique to Trinity Island.

1) The estimated Base Bid construction cost is up by approximately $1,348,091 which is 24% above the currently available funds for construction. The average cost per foot is $496.00.

2) The estimated cost for Alternates 1 and 2 are very close to the currently available construction funds. This was done by holding the construction cost at or near the current construction fund level and allowing the unit price to reach a maximum allowable as the hydraulic fill quantity decreased for each alternate.

3) There are four active oyster leases in the immediate vicinity. One may be partially covered but it is difficult to locate based on available lease maps. A letter of no objection has been obtained from all four lease holders.

FEDERAL PROJECT NO.	STATE PROJECT NO.	CONTRACT NO.	PARISH	SHEET NO.
4352F14	TE-20		TERREBONNE	4 OF 28



NOTE:
SEE SHEETS 9 THROUGH 13 FOR BORROW AREA LOCATIONS.

EXHIBIT 38
PAGE 107
BASE BID
PROJECT LAYOUT

STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES
COASTAL RESTORATION DIVISION
ISLE DERNIERES RESTORATION PROJECT
PHASE 0 - EAST ISLAND

DWG. FILE: 1136-4
DATE: MARCH, 1994
SCALE: 1" = 500'-0"

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL RESEARCH
P.O. BOX 2268 HOUMA, LOUISIANA 70361

DESIGNED	DETAILED	TRACED
CHECKED	CHECKED	CHECKED

Prepared By:
COASTAL ENGINEERING AND ENVIRONMENTAL CONSULTANTS, INC.
Engineering - Surveying - Planners - Environmental Consulting

DESIGNED	DETAILED SAM	TRACED
CHECKED	CHECKED	CHECKED

DATE	DESCRIPTION	BY
	REVISIONS	

4) Storm damage from Hurricane Andrew is much greater on Trinity Island. Compare Exhibits 39 and 40.

6.2.2 Conclusions

The conclusions and recommendations made for Phase 0, East Island, apply to Phase 1, Trinity Island. Exhibit 40 shows the recommended Base Bid project.

Elevation Legend

+3
+1
+5

N

Scale 1"=1000'

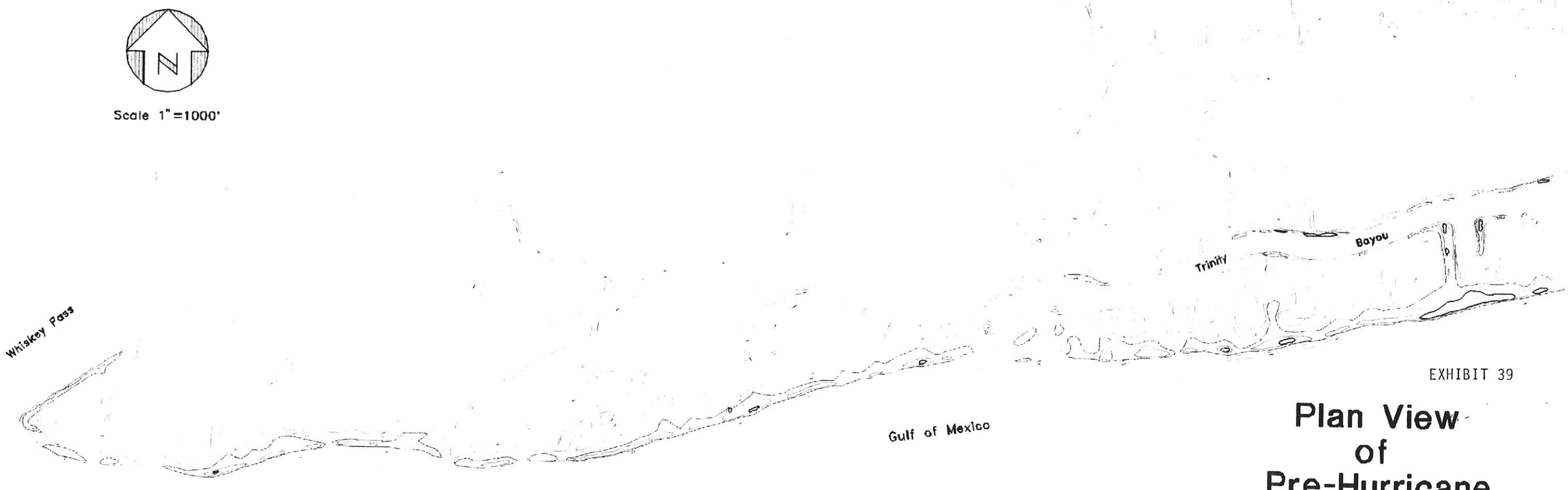


EXHIBIT 39

Plan View of Pre-Hurricane Andrew Conditions

Isle Dernieres Restoration Project

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2288 HOUMA, LOUISIANA 70361

Elevation Legend

-5
-6
-1
-4
-2
+3

N

Scale 1"=1000'

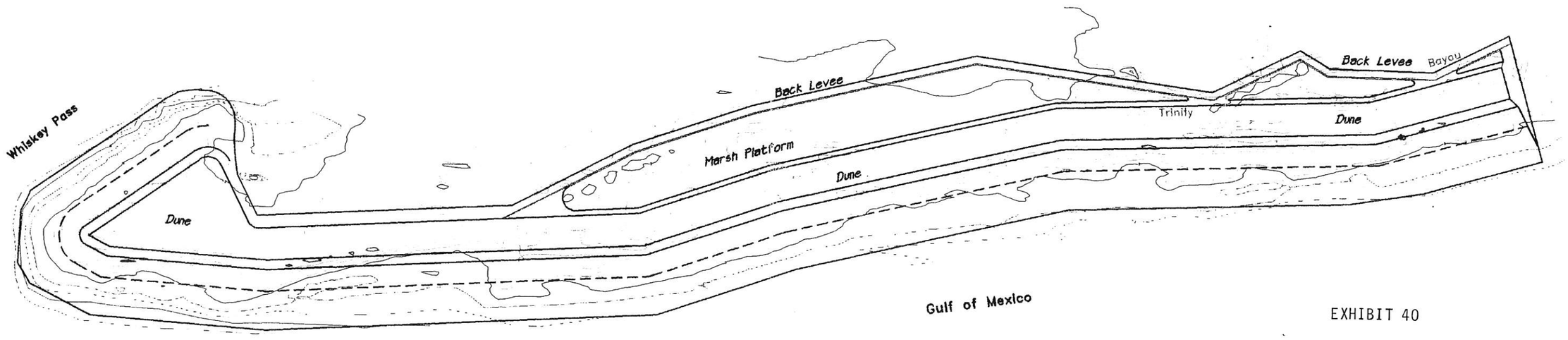


EXHIBIT 40

Plan View of Base Bid

Phase I - Trinity Island

Isle Dernieres Restoration Project

T. BAKER SMITH & SON, INC.
CIVIL ENGINEERS - SURVEYORS - ENVIRONMENTAL SERVICES
P.O. BOX 2266 HOUMA, LOUISIANA 70361

March 1994