

**30% DESIGN REVIEW  
RACCOON ISLAND PROJECT (TE-48)  
PHASE B – MARSH CREATION**

**INTRODUCTION**

The Raccoon Island Shore Marsh Creation Project area lies within the Terrebonne Hydrologic Basin in Terrebonne Parish, Louisiana. The project area is located central to a point approximately twenty-one miles southwest of the community of Cocodrie. The island is the westernmost barrier island in the Isles Dernieres chain and falls within Region 3 of the Coast 2050 Management Plan. The project encompasses approximately 242 acres of beach, shrub, saline marsh, and dunes above mean normal tide (USGS 2003). This island is a unique habitat that supports the greatest diversity of nesting colonial water birds on the Louisiana coast, and perhaps in the nation. Among these birds are the endangered brown pelican, roseate spoonbill, reddish egret and royal tern. The threatened piping plover also winters here, and much of the island, such as the western spit, is critical plover habitat.

The purpose of this phase of the project is to protect the Raccoon Island rookery and sea bird colonies from an encroaching northern shoreline by reducing the rate of shoreline erosion along the bay side of the island. The primary objectives are to create an intertidal buffer to extend the longevity of existing and created bayside dune and supratidal areas, and provide additional critical nesting, foraging, and resting habitat for brown pelicans, colonial waterbirds, and neotropical migrants. Strategies proposed to accomplish such objectives include using non-structural measures to dampen wave energies from Caillou Bay, create additional barrier island habitat, incorporate vegetative plantings utilizing woody and herbaceous plant species, and extending the longevity of the backbay marsh by creating intertidal wetlands.

**RECOMMENDED PROJECT FEATURES**

The recommended features of this project consist of the following:

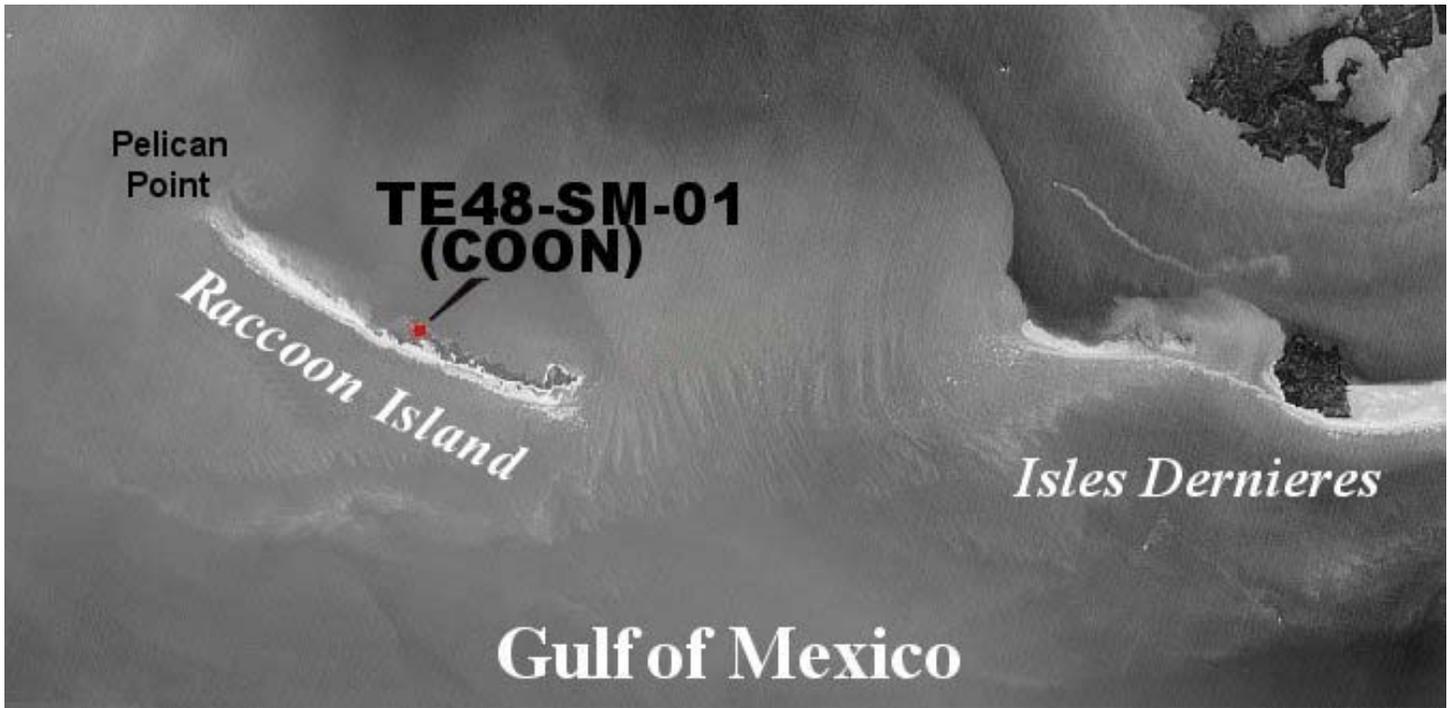
- A containment dike fully containing the project area.
- Marsh creation constructed with an offshore borrow source.

**CHANGES FROM PHASE 0 APPROVAL**

No changes have been made to this portion of the project from what was proposed at Phase 0. Phase B of the TE-48 Project covers the Marsh Creation portion of the original Phase 0 proposal.

**ENGINEERING AND DESIGN SURVEYS**

Design surveys have been completed. The surveys are post Katrina and were performed in April 2007. The surveys were completed using a combination of GPS RTK and conventional survey methods. A descriptor of the benchmark used in this survey, “Coon”, follows. Descriptions of benchmarks “Raccoon D,” “Raccoon E”, and also follow. See the construction drawings for topo, section sets and profiles developed from the field surveys. See Appendix A for the survey report.



**VICINITY MAP** Scale: 1" = 2000'

Reproduced LDNR "SONRIS" Interactive Map

**Station Name: TE48-SM-01 (COON)**

**Monument Location:** Located in Terrebonne Parish, Louisiana, on the north side of Raccoon Island in Isles Dernieres, and is approximately 24 miles southwesterly of Cocodrie, Louisiana.

**Monument Description:** NGS Style floating sleeve monument; 9/16" stainless steel rods driven 88 feet to refusal, set in a sand filled 6" PVC pipe with access cover set flush with the ground.

**Stamping:** "COON"

**Date:** January 2005

**Monument Established By:** John Chance Land Surveys, Inc.

**For:** LA Dept. of Natural Resources, CRD

**Adjusted NAD 83 Geodetic Position (CORS)**

Lat. 29° 03' 14.79149"N  
 Long. 90° 55' 59.37441"W

**Adjusted NAD 83 Datum LSZ (1702) Ft**

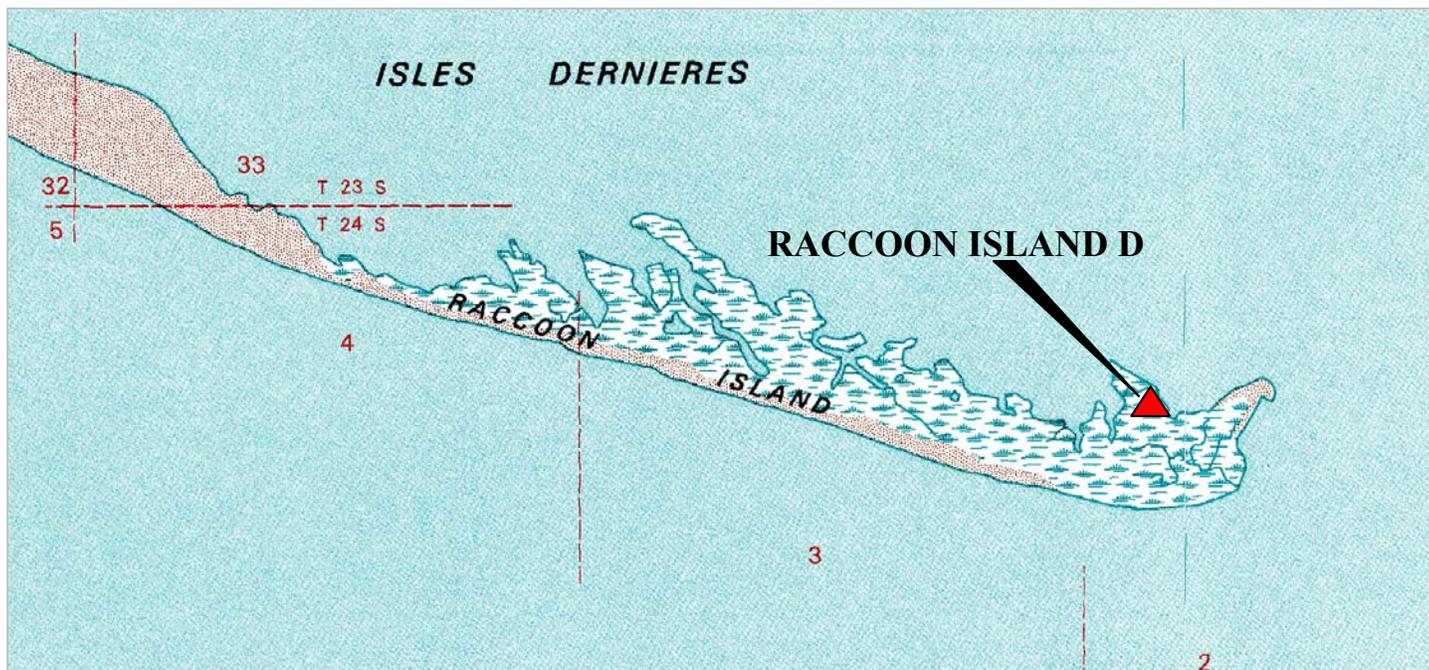
N= 201,740.57  
 E= 3,408,702.09

**Adjusted NAVD88 Elevation**

2.46 feet (0.750 mtrs)

Ellipsoid Height = -23.524 mtrs  
 Geoid99 Height = -24.274 mtrs





**VICINITY MAP** Scale: 1" = 2000' Reproduced from USC&GS "Western Isles Dernieres, La" Quadrangle

**Station Name: "RACCOON ISLAND D"**

**Location:** Located on the southeast end of Raccoon Island approximately 22 miles southwest of Cocodrie, Louisiana.

**Monument Description:** 3" brass cap attached to a 20' stainless steel rod driven to refusal encased in a 6" PVC sleeve and protective cover set in concrete.

**Stamping:** RACCOON ISLAND D

**Re-Survey Date:** October 2003

**Monument Re-Surveyed By:** Morris P. Hebert, Inc.

**Monument Re-Surveyed by using RTK methods.**

**For:** Louisiana Department of Natural Resources, CRD

**Adjusted NAD 83 Geodetic Position**

Lat. 29°03'00.16041" N

Long. 90°55'03.63302" W

**Adjusted NAD 83 Datum LSZ (1702) Feet**

N= 200,280.21

E= 3,413,654.99

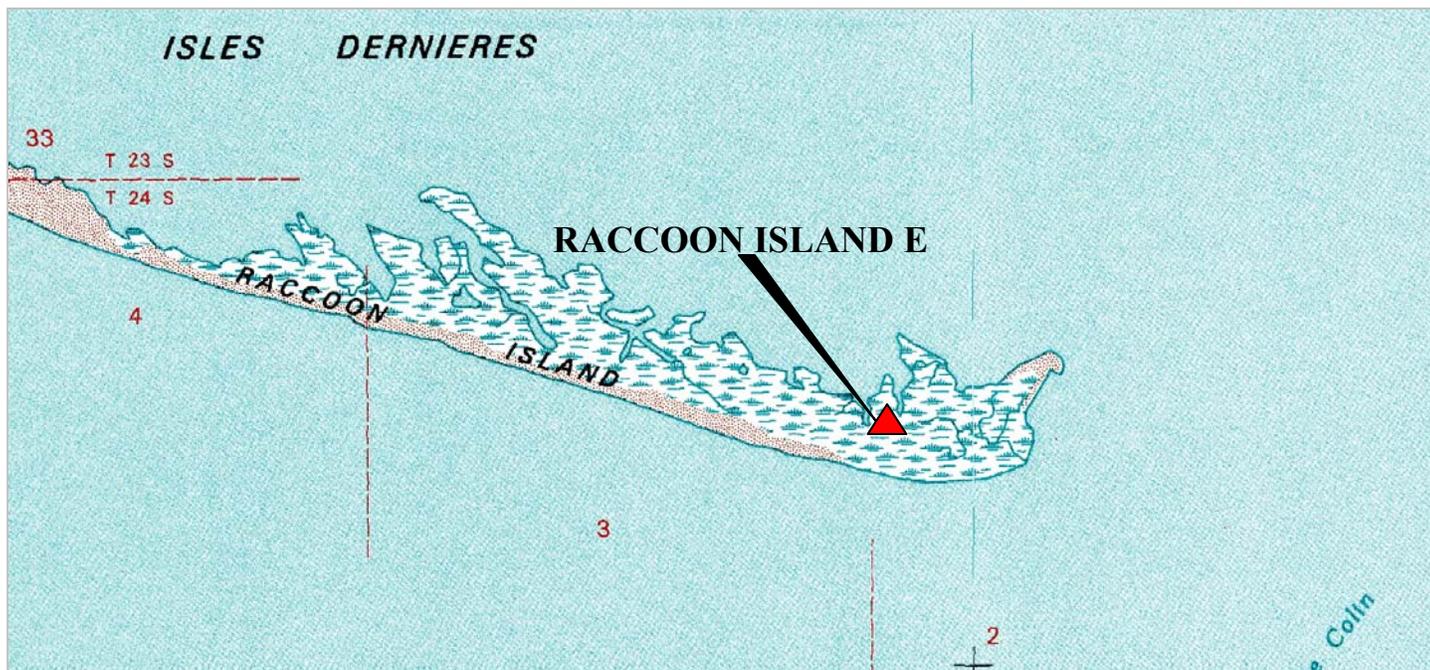
**Adjusted NAVD88 Height**

Elevation = 4.48 feet (1.365 Mtrs)

**Adjusted October 2003 By:**

Morris P. Hebert, Inc.





**VICINITY MAP** Scale: 1" = 2000' Reproduced from USC&GS "Western Isles Dernieres, La" Quadrangle

**Station Name: "RACCOON ISLAND E"**

**Location:** Located on the southeast end of Raccoon Island approximately 22 miles southwest of Cocodrie, Louisiana.

**Monument Description:** 3" brass cap attached to a stainless steel rod driven to refusal encased in a 6" PVC sleeve and protective cover set in concrete.

**Stamping:** RACCOON ISLAND E

**Re-Survey Date:** October 2003

**Monument Re-Surveyed By:** Morris P. Hebert, Inc.

**Monument Re-Surveyed by using RTK methods.**

**For:** Louisiana Department of Natural Resources, CRD

**Adjusted NAD 83 Geodetic Position**

Lat. 29°02'55.23944" N  
 Long. 90°55'10.62174" W

**Adjusted NAD 83 Datum LSZ (1702) Feet**

N= 199,780.87  
 E= 3,413,036.45

**Adjusted NAVD88 Height**

Elevation = 3.62 feet (1.103 Mtrs)

**Adjusted October 2003 By:**

Morris P. Hebert, Inc.



## GEOTECHNICAL INVESTIGATIONS

From the SJB/STE and/or CEC geotechnical report summaries, the foundation properties of the placement area were evaluated for settlement and containment dike stability, the dredge borrow area was evaluated for dredge slurry characteristics, and wave impacts to the Raccoon Island shoreline was evaluated relative to dredging in the borrow area.

In general the estimated stable side slopes for the containment dike are 4H:1V (SJB/STE). The estimated foundation settlement in the fill area is 1.2 feet (SJB/STE). Ninety percent of this settlement is predicted to occur during dredge fill placement, leaving ten percent settlement after placement. Therefore, approximately 10% of (1.2 feet + 0.17 feet) = 0.14 feet of fill is required for post construction settlement. See the following paragraphs in this section for an explanation of the additional 0.17 feet of settlement included above.

NRCS performed additional stability analyses for cohesionless soils by use of the infinite slope equations, (with and without seepage). For our case seepage is eminent. The results of these analyses indicated that a containment dike with sides slope no steeper than 5H:1V will be required.

The overall containment dike geometry will not be dictated to the contractor in the construction contract documents. The soil characteristics will be provided in the contract documents and the contractor will be allowed to construct the appropriate containment system for his/her dredge fill operation. The results of the SJB/STE and NRCS analyses indicate that a constructible and stable containment system constructed of in situ material is obtainable. During the project advertisement for bids, potential contractors will be made aware of the existing geotechnical reports and will be provided copies upon request.

During the project team evaluation of the project it was decided that a hardened structure such as a rock riprap along the backbay shoreline was unacceptable. Therefore, a containment dike with some minimum geometry requirements is provided in the construction drawings so as to provide protection to the freshly placed fill material. The in situ material for construction of the containment dikes is classified as sand (SM or SC) with a phi angle of 24 degrees. It is anticipated that as the containment dike deteriorates due to north wind wave action that a "breach profile" similar to what occurs during beach restoration projects will develop north of the shoreline providing some wave attenuation for an extended period. Also, the containment dike along the northern toe of the existing island is provided with some minimum geometry requirements so as to establish an area with higher than marsh elevations.

The 30% review quantity for borrow material is based on prior dredging projects with similar material. Cut to fill values have been estimated to be between 0.67 and 2.0 depending on the type containment system, dredging operation employed, moisture contents, grain size and void ratios. CEC recommended a value of 1.6 be used relative to the geotechnical investigation they performed for the borrow area. Borrow quantities are estimated using a cut to fill ratio of 1.6 as recommended.

The target elevation of the dredge fill at five years post construction has been set at 1.8 feet NAVD 88. Based on previous projects and borrow material properties the end of construction dredge fill height is set at +3.0 feet NAVD 88. Some projects of reference are: TE-50 Whiskey Island Back Barrier Marsh Creation, fill height of +2.5 feet NAVD 88; TE-46 West Lake Boudreaux, fill height of + 3.7 (twenty year target elevation) feet NAVD 88; BA-36 Dedicated Dredging on the Barataria Basin Landbridge, fill height of +2.8 feet NAVD 88; Dedicated Dredging Program (LA-01) Point Au Fer Island Site, fill height of +3.0 feet NAVD 88, and BA-41 South Shore of The PEN, fill height of +2.8 to +3.1 feet NAVD 88. A preliminary dredge fill volume of 631,112 CY was calculated based on: dredge fill height elevation (+3.0'), existing ground surface elevation (-1.5' AVG), settlement (1.2'), and fill area (54 acres) + a borrow quantity of 134,528 CY for containment dike construction. The preliminary cut volume in the dredge borrow area is estimated to be (631,112 CY) (1.6) = 1,009,779 CY. The assumed constructed containment dike geometry is 5H:1V side slopes, 20' top width, and top elevation of 6.0' with average ground profile along the dike alignment as shown in the drawings. See the following paragraph for quantity adjustments relative to datum conversion.

Reference is made to both NAVD 88 and MSL datum in the SJB/STE geotechnical report. It is unknown why both datums were referenced. Specifically Figure 11 indicates settlement values based on fill heights relative to the MSL datum. From the TE-50 Whiskey Island Back Barrier Marsh Creation Project 30% Design Report, section 3.3, pages 12-14 the correlation between MSL and NAVD 88 has been determined to be, MSL = NAVD 88 datum +0.86 feet. Conversely, NAVD 88 = MSL datum -0.86 feet. Therefore, from observation of the top two curves in Figure 11, +3.0 feet MSL and +2.5 feet MSL represent predicted settlements of 1.2 feet and 1.1 feet respectively. Converting the constructed fill elevation +3.0 feet NAVD 88 to MSL yields, +3.0' NAVD 88 + 0.86' = +3.86 feet MSL. This in turn is 0.86 feet higher than the top curve shown in Figure 11. Therefore, by interpolation of the top two curves, settlement for an additional 0.86 feet of fill is estimated to be 0.17 feet. Distributing the 0.17 feet over the 54 acre fill site generates an additional fill volume of 14,810 CY. Resulting in, (14,810 CY) (1.6) = 23,696 CY of additional dredge borrow material. This brings the total final estimated dredge borrow quantity to, (1,009,779 CY + 23,696 CY) = **1,033,476 CY**.

See the 30% construction drawings for specific geometric details.

See the following SJB/STE summaries, CEC conclusion and recommendation for details of the investigations and analyses, and pages 12-14 of the TE-50 30% Design Report. See Appendices B and C for complete geotechnical and wave analyses reports. **NOTE: Some items in the report refer to proposed break waters. The break waters are no longer proposed items, they have been constructed.**

**REPORT OF  
 GEOTECHNICAL INVESTIGATION  
 RACCOON ISLAND SHORELINE PROTECTION  
 MARSH CREATION  
 TE-48  
 TERREBONNE PARISH, LOUISIANA**

**EXECUTIVE SUMMARY**

The principal findings of this investigation are summarized below for convenience. Details are contained in the main body of this report, plus its Appendix.

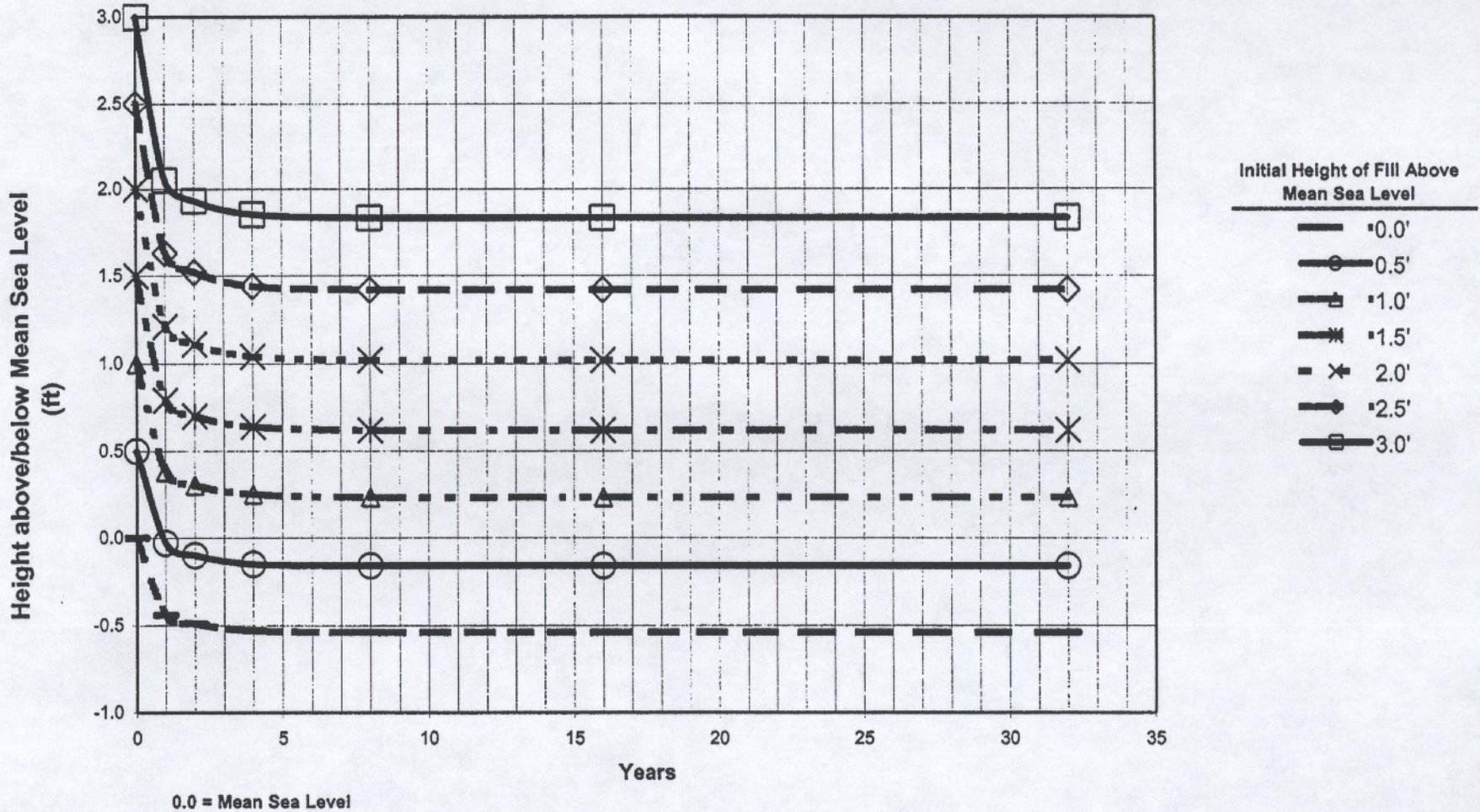
- 1. Project.** This project will provide for a hydraulic fill covering some 50 acres. A levee around 4,900 feet long will provide containment for the fill. Additionally, eight new breakwater structures will be constructed along the southern edge of the island.
- 2. Scope of Work.** The geotechnical investigation entailed drilling/sampling 11 soil borings providing appropriate laboratory testing, and performing geotechnical analyses. The basic geotechnical considerations are stability of the new levees, plus the amounts and time-rates of settlements for the new levees, breakwaters, and the fill areas.
- 3. Subsurface Conditions.** The soils are loose sands followed by relatively weak compressible Holocene clay soils to depths of over 100 feet. While there are variations, the general area stratification can be summarized as

Depth (feet)	Soil Type	Unified Classificat ion
0-15	Loose SAND and SILTY SAND	SM
12-50	Soft CLAY and SILTY CLAY	CH, CL

- 4. Slope Stability.** For the breakwater levees (associated with borings B-8, B-9, B-10 & B-11) The allowable levee slope of 1(V):3(H) is generally acceptable. For the levee in the fill areas, (associated with borings B-1 through B-7) a 1(V):4(H) slope is generally acceptable. Geotextiles separation is recommended for all locations.
- 5. Levee Settlements.** If the levees are built and then allowed to settle; the ultimate (long-term) centerline settlements will range from about 15% to 22% of the as-constructed heights. Should they be rebuilt to initial height periodically, the total settlements (including rebuilding soil) will range from about 20% to 30% of their as-constructed heights. Settlement within the one-year construction period will be about 10 to 15% of the as-constructed heights, assuming no rebuilding during this period. After 20 years, this increases to the ultimate values.

**6. Deposition Area Settlements.** The settlements expected over the majority of the Deposition Areas are some 0.7 to 1.7 feet. About 90% of this movement will occur during the filling process, and some 10% will remain after the excess surface water drains from the site. This area load will also cause some 0.1 to 0.2 feet of additional settlement at the levee centerline.

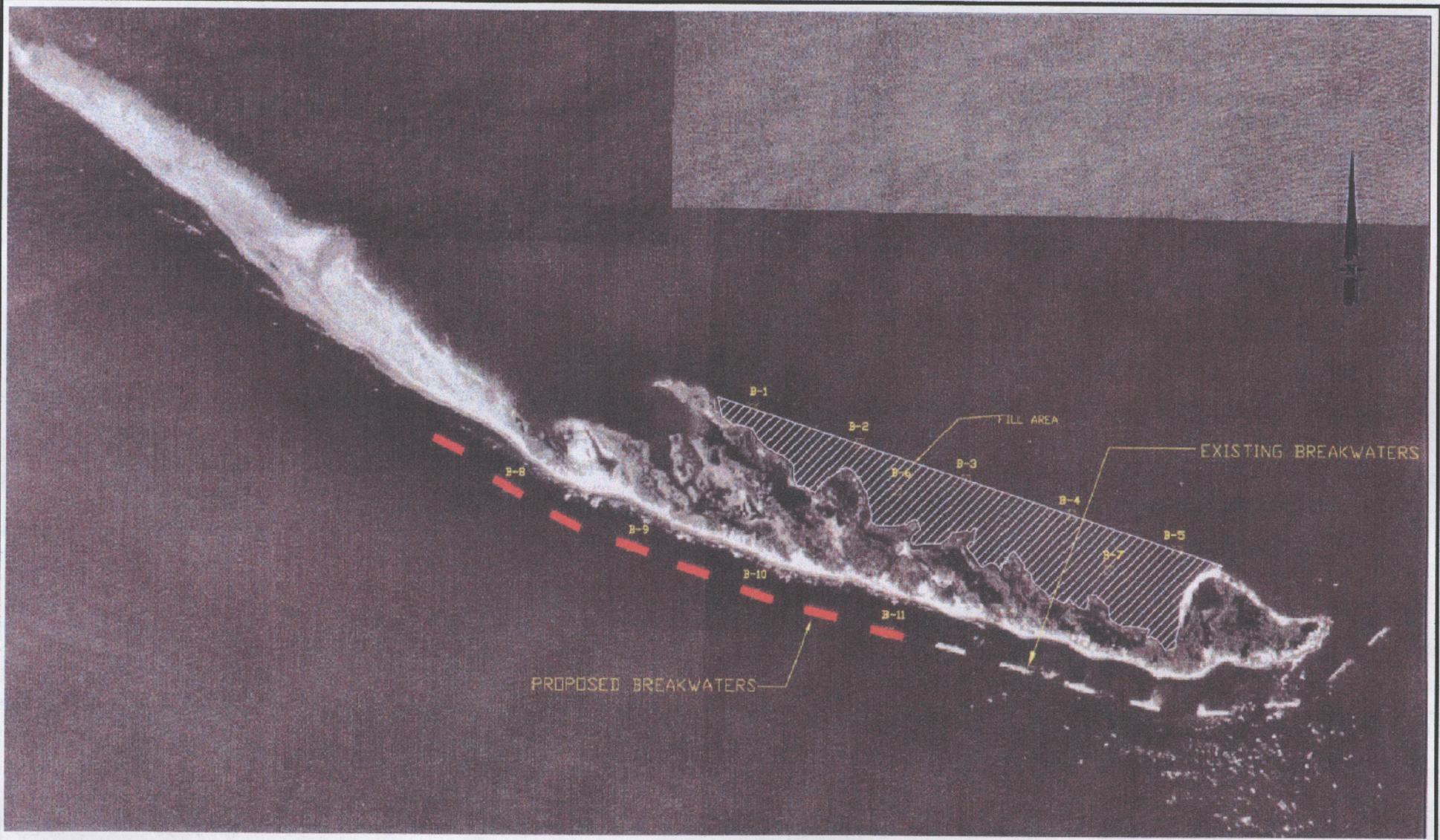
**Settlements within Deposition Areas**



**RACCOON ISLAND  
SHORELINE PROTECTION  
PROJECT TE-48**  
TERREBONNE PARISH, LOUISIANA  
for  
LOUISIANA DEPARTMENT OF NATURAL  
RESOURCES  
BATON ROUGE, LOUISIANA

**STE**  
Soil Testing Engineers, Inc.  
Baton Rouge, LA Lake Charles, LA Metairie, LA

Project Engineer: <b>R. Leblanc</b>	Drawn by: <b>DMS</b>	Checked by:
File No.: <b>03-1067</b>	Date: <b>8-21-03</b>	Figure No.: <b>11</b>
Title: <b>SETTLEMENTS</b>		



**RACCOON ISLAND  
SHORELINE PROTECTION  
PROJECT TE-48**

TERREBONNE PARISH, LOUISIANA

for  
**LOUISIANA DEPARTMENT OF NATURAL  
RESOURCES**  
BATON ROUGE, LOUISIANA

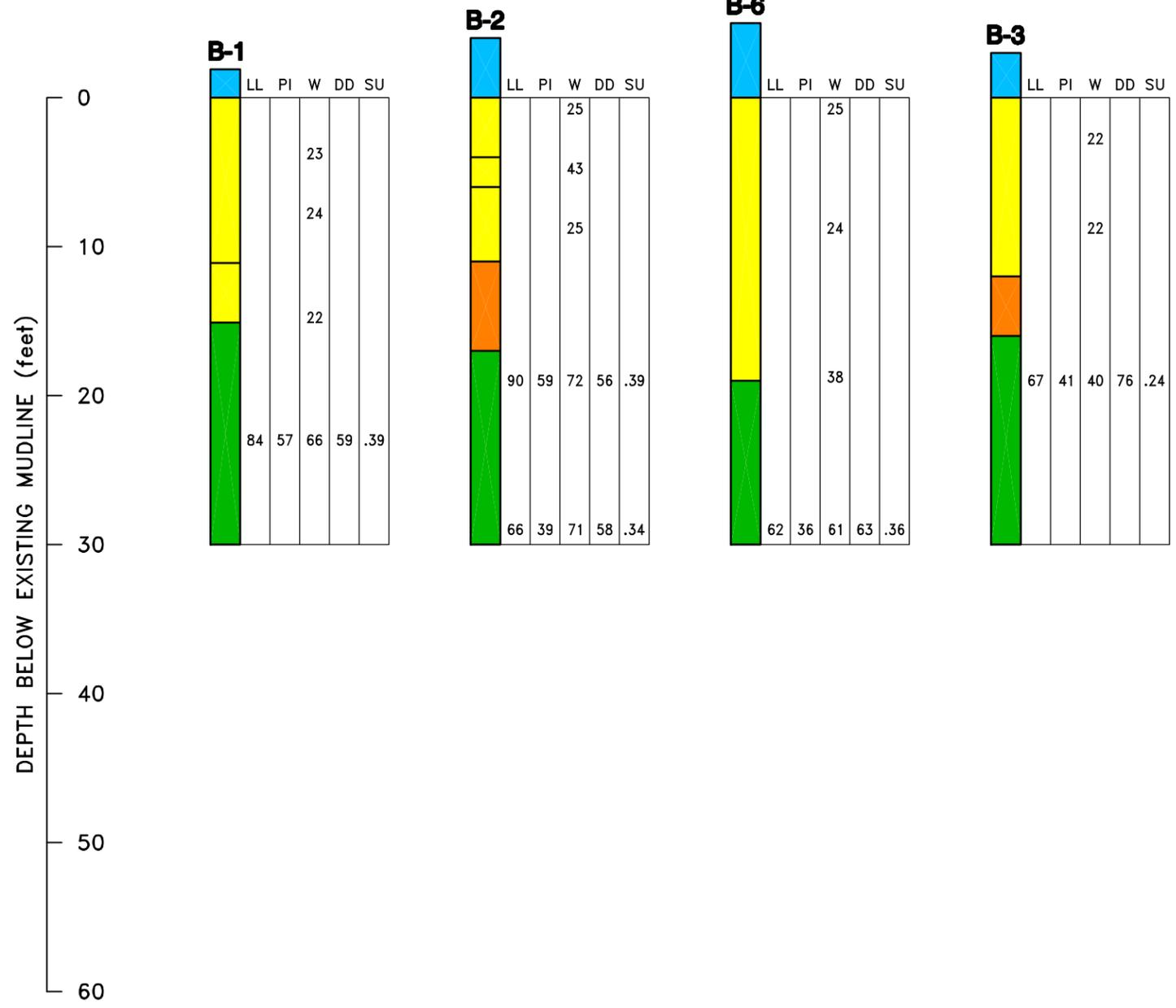
for  
**SJB GROUP, INC.**  
ENGINEERS  
BATON ROUGE, LOUISIANA

**STE**  
Soil Testing Engineers, Inc.  
Baton Rouge, LA Lake Charles, LA Metairie, LA

Project Engineer: C.N. TSAI    Drawn by: BJ    Checked by:

File No.: 03-1067    Date: 7-30-03    Figure No.: 1

Title: **BORING PLAN**

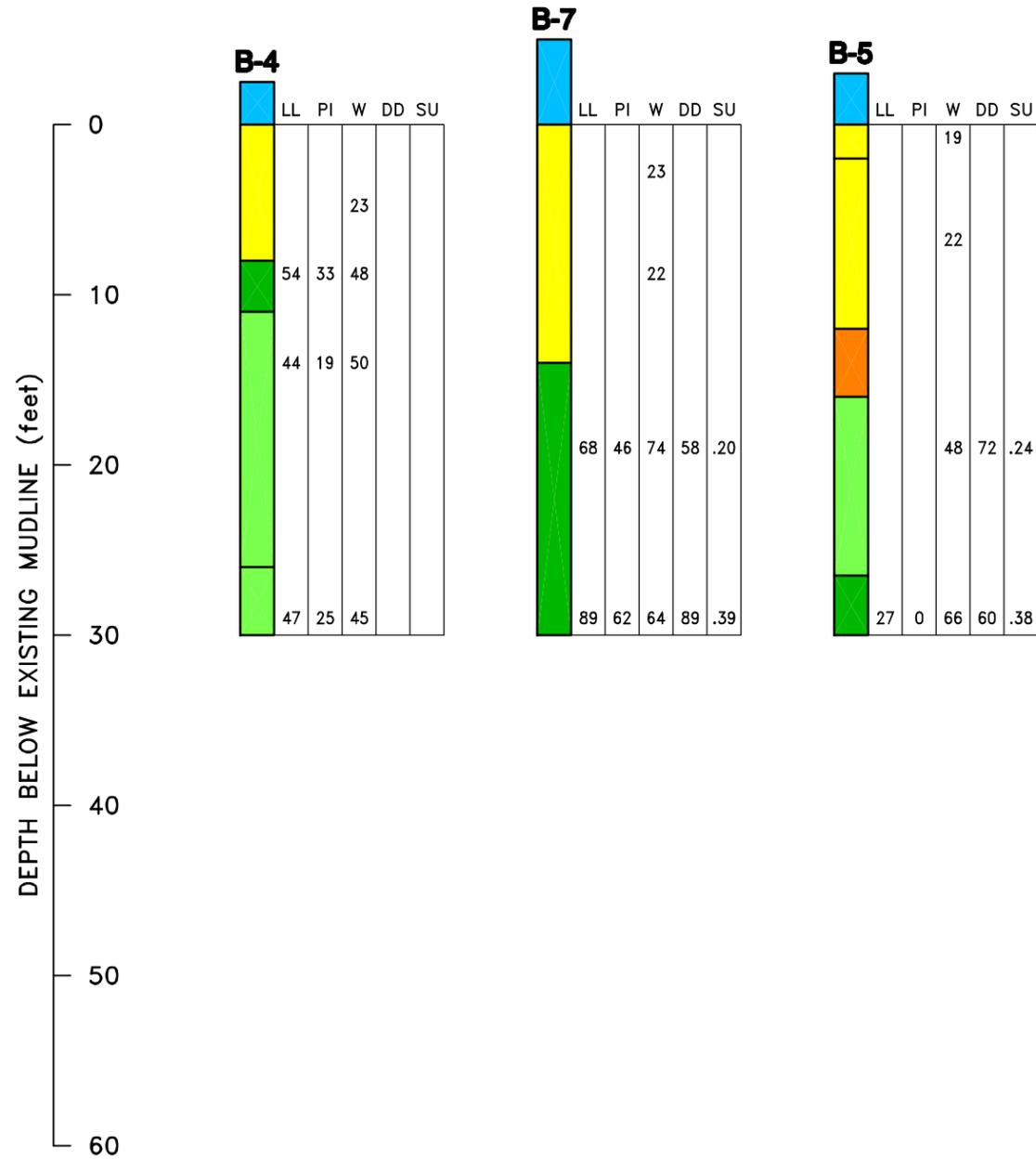


SYMBOL	SOIL TYPE
[Blue Box]	WATER
[Grey Box]	PEAT
[Brown Box]	ORGANIC CLAY (OH)
[Green Box]	CLAY (CH)
[Light Green Box]	SILTY CLAY (CL)
[Orange Box]	SANDY SILT, CLAYEY SILT (ML)
[Yellow Box]	SILTY SAND (SM), CLAYEY SAND (SC)

**LEGEND:**

- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- W WATER CONTENT (%)
- DD DRY DENSITY (pcf)
- SU UNDRAINED SHEAR STRENGTH (tsf)

<b>RACCOON ISLAND SHORELINE PROTECTION PROJECT TE-48</b>		
TERREBONNE PARISH, LOUISIANA		
for <b>LOUISIANA DEPARTMENT OF NATURAL RESOURCES</b> BATON ROUGE, LOUISIANA		
for <b>SJB GROUP, INC.</b> ENGINEERS BATON ROUGE, LOUISIANA		
		<b>STE</b>
Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA Metairie, LA		
Project Engineer: <b>R. Leblanc</b>	Drawn by: <b>DMS</b>	Checked by:
File No.: <b>03-1067</b>	Date: <b>7-14-03</b>	Figure No.:
Title: <b>SOIL PROFILE B-1, B-2, B-6 &amp; B-3</b>		

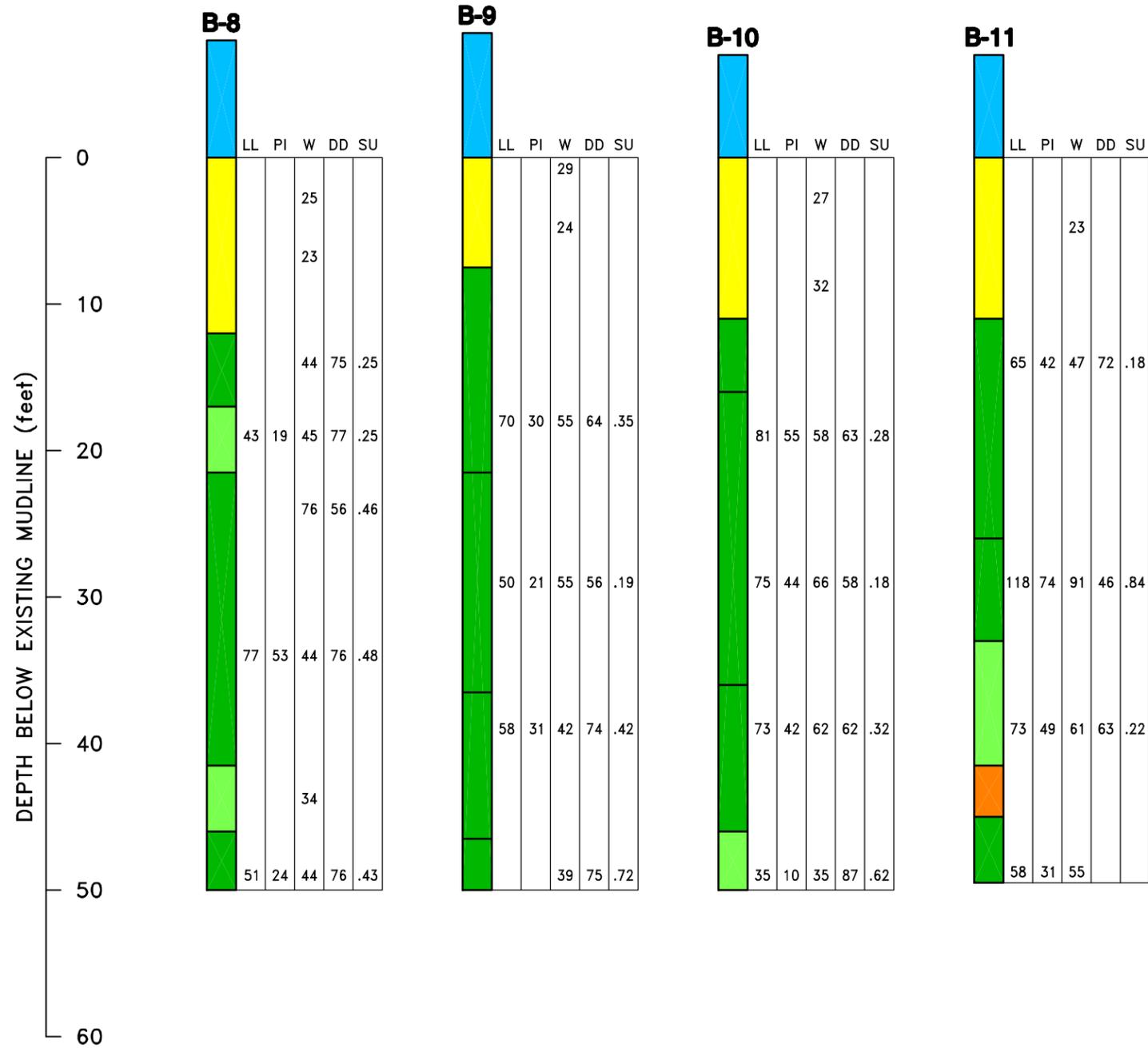


SYMBOL	SOIL TYPE
[Blue]	WATER
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<b>RACCOON ISLAND SHORELINE PROTECTION PROJECT TE-48</b>		
TERREBONNE PARISH, LOUISIANA		
for <b>LOUISIANA DEPARTMENT OF NATURAL RESOURCES</b> BATON ROUGE, LOUISIANA		
for <b>SJB GROUP, INC.</b> ENGINEERS BATON ROUGE, LOUISIANA		
		<b>STE</b>
Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA Metairie, LA		
Project Engineer: <b>R. Leblanc</b>	Drawn by: <b>DMS</b>	Checked by:
File No.: <b>03-1067</b>	Date: <b>7-14-03</b>	Figure No.:
Title: <b>SOIL PROFILE B-4, B-7 &amp; B-5</b>		



SYMBOL	SOIL TYPE
[Blue]	WATER
[Grey]	PEAT
[Brown]	ORGANIC CLAY (OH)
[Green]	CLAY (CH)
[Light Green]	SILTY CLAY (CL)
[Orange]	SANDY SILT, CLAYEY SILT (ML)
[Yellow]	SILTY SAND (SM), CLAYEY SAND (SC)

**LEGEND:**

LL LIQUID LIMIT (%)  
 PI PLASTICITY INDEX (%)  
 W WATER CONTENT (%)  
 DD DRY DENSITY (pcf)  
 SU UNDRAINED SHEAR STRENGTH (tsf)

<b>RACCOON ISLAND                  SHORELINE PROTECTION                  PROJECT TE-48</b> TERREBONNE PARISH, LOUISIANA		
for <b>LOUISIANA DEPARTMENT OF NATURAL                  RESOURCES</b> BATON ROUGE, LOUISIANA		
for <b>SJB GROUP, INC.</b> ENGINEERS BATON ROUGE, LOUISIANA		
		<b>STE</b> Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA Metairie, LA
Project Engineer: R. Leblanc	Drawn by: DMS	Checked by:
File No.: 03-1067	Date: 7-14-03	Figure No.:
Title: <b>SOIL PROFILE B-8, B-9, B-10 &amp; B-11</b>		

OFFSHORE GEOPHYSICAL AND  
GEOTECHNICAL SURVEY REPORT

RACCOON ISLAND SHORELINE PROTECTION/  
MARSH CREATION PROJECT PHASE B (TE-48)  
LDNR CONTRACT NO. 2503-05-47  
SEPTEMBER 21, 2006

EXECUTIVE SUMMARY

Geophysical and geotechnical surveys, consisting of sub-bottom and bathymetric profiling, magnetometer surveying, and vibracoring have been conducted in the area offshore of the south coast of Racoon Island in Terrebonne Parish, Louisiana. A total of approximately 100 nautical miles of geophysical survey lines were run and five (5) preliminary short vibracores and thirteen (13) long vibracores were collected during the project.

The geophysical survey was conducted in two parts, the first being a regional survey. This survey confirmed the presence of two buried channels within the surveyed area. A primary channel was surveyed from a point approximately six miles offshore of Racoon Island for at least 20,000 feet in a northwesterly direction. A detailed survey was conducted to outline the channel, with lines spaced at 500-foot intervals perpendicular to the channel orientation. The delineated buried channel is between 15 and 25 feet thick and between 500 and 750 feet in width. A second potential channel feature was outlined with survey lines conducted at 1,500 foot intervals. Magnetometer surveys within the detailed areas did not detect any significant features, finding only limited amounts of metallic debris.

Preliminary sediment sampling was conducted at locations along the primary channel where the geophysical data indicated the potential for coarser sediments to be found. Based upon visual observations, the sediments recovered in the short cores ranged from highly cohesive clay to coarse silt/very fine sand. The secondary channel was not sampled but may contain silty material.

A detailed geotechnical investigation consisting of additional sediment sampling using coring equipment capable of penetrating and recovering samples to 20 feet below the sea floor within the primary channel was conducted in a second mobilization to further determine the sediment characteristics. Laboratory analysis of the sediments indicated the material located within the northern reach of the primary channel has the most potential for marsh building at Racoon Island. The cores taken within the northern reach had an average grain size of 0.10 mm and an average percent coarse fraction retained above the No. 200 sieve of 16.5 %. The texture of the material is mixed sediment with minor sand fractions with the exception of vibracore 1 (VC-1).

The sediment data for VC-1, shows the top ten feet of the cores had an average grain size of 0.11 mm and an average percent coarse fraction retained above the No. 200 sieve of 24.6 %. Based on this sediment data, an approximate ten foot deep cut is recommended as the primary borrow area cut in the reach where the vibracores were collected to provide the coarsest material identified by this study. A secondary cut is recommended in the bottom ten feet of the reach where the cores were collected. Further, the borrow area was extended to the north, outside of the reach where the cores were collected, based upon the sub-bottom profiles and seismic signatures correlated from the ground-truthed vibracore sampling area, and is recommended for inclusion within the secondary cut.

The overall borrow area was delineated 8,850 feet long at a maximum cut depth of 20 feet with a five-foot overdredge tolerance and a width varying from 440 to 890 feet. The overall texture of the sediment in the borrow area is mixed sediment with minor sand fractions and the average mean grain size is 0.10 mm. The cut volume in the primary cut is estimated to be approximately 830,000 cubic yards and the total cut volume within the overall borrow area is estimated to be approximately 3,420,000 cubic yards.

Based on the gradation and hydrometer analyses of cores from the proposed borrow area and experience with similar projects built using the anticipated construction techniques to be employed on this Project, an overall cut to fill ratio of 1.6 is recommended.

Wave modeling was performed to evaluate changes to wave refraction and sediment transport patterns resulting from excavation of the proposed borrow area. Based on the analysis, it was determined that the proposed borrow area will have minor effects on wave height, wave refraction and resultant sediment transport patterns in the vicinity of Raccoon Island. Thus, it is predicted that there will be no adverse impacts on the island's shoreline.

Additionally, a slope stability analysis was performed on the proposed bay-side berm design. The analysis produced acceptable safety factors for the soils in the vicinity of where the berm will be constructed for the given design parameters and configurations.

# OFFSHORE GEOPHYSICAL AND GEOTECHNICAL SURVEY REPORT

RACCOON ISLAND SHORELINE PROTECTION/  
MARSH CREATION PROJECT PHASE B (TE-48)  
LDNR CONTRACT NO. 2503-05-47  
SEPTEMBER 21, 2006

## 1.0 INTRODUCTION

Geophysical and geotechnical surveys consisting of seismic sub-bottom profiling, echo sounding, magnetometer profiling, core sampling and sediment sample analysis and description was performed by Alpine Ocean Seismic Survey, Inc. (Alpine) and Coastal Engineering Consultants (CEC), Athena Technologies, Inc. (Athena), Soil Testing Engineers, Inc. (STE) and Coastal Technology Corporation (CTC) under a Sub-Consultant Agreement with SJB Group, Inc., for the Louisiana Department of Natural Resources, LDNR Contract No. 2503-05-47, Raccoon Island Shoreline Protection / Marsh Creation Project Phase B (TE-48).

The objective of Phase B of the Project is to protect and preserve the structural integrity of the back-barrier shoreline along Calliou Bay. The Project, as planned, would include the design and construction of a sand dike with subsequent filling of the area within the dike to make a marsh platform. The extent and exact locations of the dike and platform are being determined by LDNR and the federal project sponsor, the Natural Resources Conservation Service (NRCS).

The purpose of this survey is to locate potential offshore borrow areas which can be used as sources for sediments useful as marsh fill and dike construction on Raccoon Island, evaluate the potential sources, determine the suitability and thickness of the sediments, and evaluate quantities. Additional purposes include identifying any pipelines or other obstructions within the borrow area by remote sensing and evaluating wave impacts which dredging may have to the adjacent shorelines.

## 2.0 GEOLOGIC SETTING

The general study area, shown in Figure 1, is located offshore and within a five-mile radius of Raccoon Island, seaward of the approximate depth of closure. This island forms the westernmost point in the Isles Dernieres barrier island chain located offshore of Terrebonne Parish, on the east central Louisiana Gulf shoreline. The Isles Dernieres Island chain represents the remains of a historic Mississippi River delta. The sand which presently composes the islands is migrating inland with rising sea level. During the transgression of the sea over the former land surface, small distributary channels, and other similar stream channels that had been present on the land surface, were abandoned. These streams were areas of higher velocity water movement, which served to winnow out the fine grained sediments, sometimes leaving evidence, in the form of crossbedded stratigraphy, coarser sediment deposits.

## VEGITATIVE PLANTINGS

Plantings will be phased over two or three applications, depending on the timing and degree of changes in field conditions post-construction.

Interior (Island Side) Retaining Dike – 6,176 linear feet; 20ft top width; side slope as required for containment.

1. Post-construction component (Phase I) – This dike will be planted with herbaceous species immediately post-construction. Species considered will be Gulf Coast marshhay cordgrass (*Spartina patens* var. ‘Gulf Coast’), Vermilion smooth cordgrass (*Spartina alterniflora* var. ‘Vermilion’), Brazoria seashore paspalum (*Paspalum vaginatum* var. ‘Brazoria’), and salt grass (*Distichlis spicata*), as well as Fourchon bitter panicum (*Panicum amarum* var. *amarum* ‘Fourchon’), gulf cordgrass (*Spartina spartinae*), seacoast bluestem (*Schizachyrium maritimum*) and seashore dropseed (*Sporobolus virginicus*). The final selection and placement of species will be dependent upon expected life of the containment feature, side slopes, and expected soil conditions including soil type, salinity and elevations.

Expected plant sizes will be primarily 4-inch containers or vegetative plugs. Plants will be installed on the top and at the toe of the dike, as well as on the side slopes if sufficient slope length is available. Plants will be installed on both sides at the toe of the dike (approx 1.5ft NAVD 88) on one row on 5-foot centers. Given sufficient slope length, plants will be installed on each side slope of the dike on two rows approx X feet apart (at approx. 3ft ft NAVD 88 and at 4.5 ft NAVD 88) on 5-foot staggered centers. On the top of the dike, plants will be installed on 3 rows 5 feet apart on 5-foot staggered centers. All plants will be fertilized with a slow-release tablet or packet.

Estimated plant numbers/costs:

Toe	2,472	plants x \$4.50/plant installed =	\$11,124.00
Side slope	4,944	plants x \$4.50/plant installed =	\$22,248.00
Top	<u>3,708</u>	plants x \$4.50/plant installed =	<u>\$16,686.00</u>
Totals	11,124	plants	\$50,058.00

2. Project target year 3 woody component (Phase III) – The dike will be planted with woody species at approximately 2 to 3 years post-construction to allow for leaching of soil salinity. Species considered will be Pelican black mangrove (*Avicennia germinans* var. ‘Pelican’), matrimony vine (*Lycium carolinianum*), marsh elder (*Iva frutescens*), and groundselbush (*Baccharis halimifolia*), and possibly wax myrtle (*Morella cerifera*). The final selection and placement of species will be dependent upon expected life of the containment feature, side slopes, and expected soil conditions including soil type, salinity and elevations.

Expected plant sizes will be trade-gallon-sized containers. Plants will be installed on two rows on the top of the dike, as well as on each side slope (at approx. between 3.5 and 4 ft NAVD 88) , if sufficient slope length is available, and at the toe (approx NAVD 88) for a

total of six rows. Plants will be on 5-foot staggered centers. All plants will be fertilized with a slow-release tablet or packet.

Estimated Plant numbers/costs:

Toe	2,472	plants x \$8.00/plant installed =	\$19,776.00
Side slope	2,472	plants x \$8.00/plant installed =	\$19,776.00
Top	<u>2,472</u>	plants x \$8.00/plant installed =	<u>\$19,776.00</u>
Totals	7,416	plants	\$59,328.00

Exterior (Bay Side) Retaining Dike – 4,754 linear feet; 20ft top width; 6:1 side slope for exposed bay side.

1. Post-construction component (Phase I) – This dike will be planted with herbaceous species immediately post-construction. Species considered will be Vermilion smooth cordgrass (*Spartina alterniflora* var. ‘Vermilion’), and possibly Gulf Coast marshhay cordgrass (*Spartina patens* var. ‘Gulf Coast’), Fourchon bitter panicum (*Panicum amarum* var. *amarum* ‘Fourchon’), Brazoria seashore paspalum (*Paspalum vaginatum* var. ‘Brazoria’), and salt grass (*Distichlis spicata*). The final selection and placement of species will be dependent upon expected life of the containment feature, side slopes, and expected soil conditions including soil type, salinity and elevations.

Expected plant sizes will be primarily 4-inch containers or vegetative plugs (interior and top) and trade gallons (exterior). Plants will be installed at the toe of the dike, and possibly on side slopes and top. Plants will be installed on both sides at the toe of the dike in the intertidal zone (between approx 1.0 and 1.8 ft NAVD 88) on 3-foot centers. The number of rows planted at the exterior toe of the dike is slope dependent, so if more than one row is possible within the intertidal zone, rows will be two to three feet apart with plants on staggered centers. On both side slopes of the dike, if planted, plants will be installed on two rows approx 6 feet apart (at approx. 3 ft NAVD 88 and at 4.5 ft NAVD 88) on 5-foot staggered centers. On the top of the dike, if planted, plants will be installed on two rows 10 feet apart on 5-foot centers. All plants will be fertilized with a slow-release tablet or packet.

Estimated plant numbers/costs:

Toe (exterior)	3,172*	plants x \$8.00/plant installed =	\$25,376.00
Toe (interior)	1,586	plants x \$4.50/plant installed =	\$ 7,137.00
Side slope	3,808	plants x \$4.50/plant installed =	\$17,136.00
Top	<u>1,904</u>	plants x \$4.50/plant installed =	<u>\$ 8,568.00</u>
Totals	10,470	plants	\$58,217.00

\*assumed 2 rows

NOTE: Where (if) points in the dike are degraded to allow tidal exchange, the plants that would have been placed on side slopes and top of those sections will instead be concentrated in vicinity of openings to protect against rapid scouring.

2. Project target year 3 - woody component (Phase III) – The dike may be planted with woody species at approximately 2 to 3 years post-construction to allow for leaching of soil salinity. If planted, the species considered will be matrimony vine (*Lycium carolinianum*), marsh elder (*Iva frutescens*), and groundselbush (*Baccharis halimifolia*), and possibly Pelican black mangrove (*Avicennia germinans* var. ‘Pelican’). The final selection and placement of species will be dependent upon expected life of the containment feature, side slopes, and expected soil conditions including soil type, salinity and elevations.

Expected plant sizes will be trade-gallon-sized containers. Plants will be installed on one row on the interior side slope of the dike (at approx. 3.5 to 4 ft NAVD 88). Plants will be on 5-foot centers. All plants will be fertilized with a slow-release tablet or packet.

Estimated Plant numbers/costs:

Side slope                    952 plants x \$8.00/plant installed = \$7,616.00

Marsh Creation Component – 54 acres; constructed elevation 3 ft NAVD 88, target elevation 1.8 ft NAVD 88

1. Post-construction component (Phase I) – This area will be planted with herbaceous species immediately post-construction. Species considered will be Vermilion smooth cordgrass (*Spartina alterniflora* var. ‘Vermilion’), and possibly Gulf Coast marshhay cordgrass (*Spartina patens* var. ‘Gulf Coast’), salt grass (*Distichlis spicata*), and gulf cordgrass (*Spartina spartinae*). The final selection and placement of species will be dependent upon expected soil conditions including soil type, salinity, elevations, and hydrology.

Expected plant sizes will be mainly 4-inch containers or vegetative plugs. Plants will be installed in the created marsh area at a per-acre density of approximately 4 rows 50 feet apart on 10-foot staggered centers. All plants will be fertilized with a slow-release tablet or packet.

Estimated plant numbers/costs:

Marsh Area 54ac x (88 plants/ac x \$4.50/plant installed = \$396.00/ac)  
 Total                    4,752 plants                    \$21,384

2. Project target year 1 – herbaceous component (Phase II) – This area will be planted with herbaceous species at approximately one to two years post-construction if determined necessary. Timing of planting will be dependent on achievement of target elevation, appropriate hydrology, and confirmation that prolonged soil hypersalinity conditions are not occurring. Soils analysis may be conducted. Species considered will primarily be Vermilion smooth cordgrass (*Spartina alterniflora* var. ‘Vermilion’), and possibly Gulf Coast marshhay cordgrass (*Spartina patens* var. ‘Gulf Coast’), salt grass (*Distichlis spicata*), Brazoria seashore paspalum (*Paspalum vaginatum* var. ‘Brazoria’), and gulf cordgrass (*Spartina*



**Planting costs by phase:**

Phase I - Post-construction – stabilization components:

# Plants by Type	Cost/Plant	Total Costs
Interior dike totals	11,124 - 4" pots	@ \$4.50
	\$50,058.00	
Exterior dike totals	7,298 - 4" pots	@ \$4.50
	32,841.00	
	3,172 - trd gal.	@ \$8.00
	25,376.00	
Marsh area totals	<u>4,752 - 4" pots</u>	@ \$4.50
	<u>21,384.00</u>	
	26,346 plants	
\$129,659.00		
	Mobilization/Demob.	
	\$20,000.00	
	Soil Sample Analysis	
<u>\$2,000.00</u>		
	TOTAL Phase I	
	\$151,659.00	

Phase II - Project target year 1 – herbaceous component:

Marsh area totals	<u>23,760 - 4" pots</u>	@ \$4.50
	<u>\$106,920.00</u>	
	Mobilization/Demob.	
	\$20,000.00	
	Soil Sample Analysis	
<u>\$1,500.00</u>		
	TOTAL Phase II	
	\$128,420.00	

Phase III - Project target year 3 - woody component:

Interior dike totals	7,416 - trd gal.	@ \$8.00
	\$59,328.00	
Exterior dike totals	952 - trd gal.	@ \$8.00
	\$7,616.00	

\$57,024.00 Marsh area 7,128 - trd gal. @ \$8.00

15,496 – trd gal.  
\$123,968.00

Mobilization/Demob.  
\$20,000.00

\$1,500.00 Soil Sample Analysis

TOTAL Phase III  
\$145,468.00

**Plant #'s and costs by plant size:**

# Plants by Type	Cost/Plant	Total Costs
4" pots	46,934	\$4.50
\$211,203.00		
trade gallons	<u>18,668</u>	<u>\$8.00</u>
149,344.00		
<hr/> TOTAL Plants	65,602	
\$360,547.00		

**Totals for All Phases:**

Plants  
\$360,547.00  
Mob/Demob  
\$60,000.00  
Soil Sample Analysis  
\$5,000.00

**GRAND TOTAL** \$425,547.00

## **FINAL MODELING REPORT**

A wave analysis has been performed associated with the borrow area. The analysis evaluated the impacts to the Raccoon Island shore line and the littoral drift adjacent to the island. It is determined that the borrow area geometry will have negligible impacts to either of the island's evaluated parameters due to wave transformation.

See Appendix C for the wave analysis report.

## **DRAFT ECOLOGICAL REVIEW**

A draft Ecological Review document has been prepared by the Ecological Section of LDNR. See the following pages for the Ecological Review.

## **LAND OWNERSHIP INVESTIGATIONS**

The land ownership process has been completed. See the following pages for Land ownership information and a list of Louisiana Department of Wildlife and Fisheries (LDWF) rules and regulations concerning the island.

Updates to the Memorandum, dated April 6, 2004, are necessary as follows:

1<sup>st</sup> Page, para. I.a. – Should be replaced with the following, “Prior to **ANY** activities on the refuge Mr. Michael Carloss, Programs Manager, or his assignee shall be contacted at 337-373-0032.”

2<sup>nd</sup> Page, para. I.c. – Should be replaced with the following, “No activities will be allowed within 1,500 feet of nesting bird colonies, unless otherwise approved by LDWF’s Program Manager.

April 6, 2004

## Memorandum

To: Ismail Merhi - Project Manager

From: Jim Altman - Landrights Project Manager

RE: Completion of Landrights on the **Raccoon Island Shoreline Protection / Marsh Creation Project TE-48**

The CRD Land Section has completed all landrights necessary to proceed to construction contracting on the above referenced project. The following information is being transmitted via this memorandum, or has already been forwarded to you under separate memorandum:

<input type="checkbox"/> <i>Servitude Agreement(s)</i>	<input type="checkbox"/> <i>Mineral Operations Agreement(s)</i>
<input checked="" type="checkbox"/> <i>Grant of Particular Use</i>	<input type="checkbox"/> <i>Pipeline Agreement(s)</i>
<input type="checkbox"/> <i>State Land Office Letter of No Objection</i>	<input type="checkbox"/> <i>Oil/Gas Operator Agreement(s)</i>
<input checked="" type="checkbox"/> <i>Assignment of Rights to Federal Sponsor</i>	<input type="checkbox"/> <i>Memorandum(s) of Agreement</i>
<input checked="" type="checkbox"/> <i>Landrights Certification Letter</i>	<input checked="" type="checkbox"/> <i>CWPPRA Section 303(e) approval (applied for by NRCS)</i>
<input checked="" type="checkbox"/> <i>Letter Agreement with LDWF</i>	<input type="checkbox"/> <i>Right(s) of Entry for Construction</i>

Please note the following information that will need to be included in the contract specifications and/or for future monitoring, operations and maintenance site visits:

- I. This project is on the Isles Dernieres Barrier Island Refuge and accordingly ALL activities on the refuge will be in strict accordance with the certain Letter Agreement by and between DNR and DWF which will include, but is not limited to the following.
  - a. Prior to **ANY** activities on the refuge Greg Linscombe, Programs Manager, or his assignee shall be contacted at 337-373-0032.
  - b. All equipment and routes shall be approved by the Programs Manager.

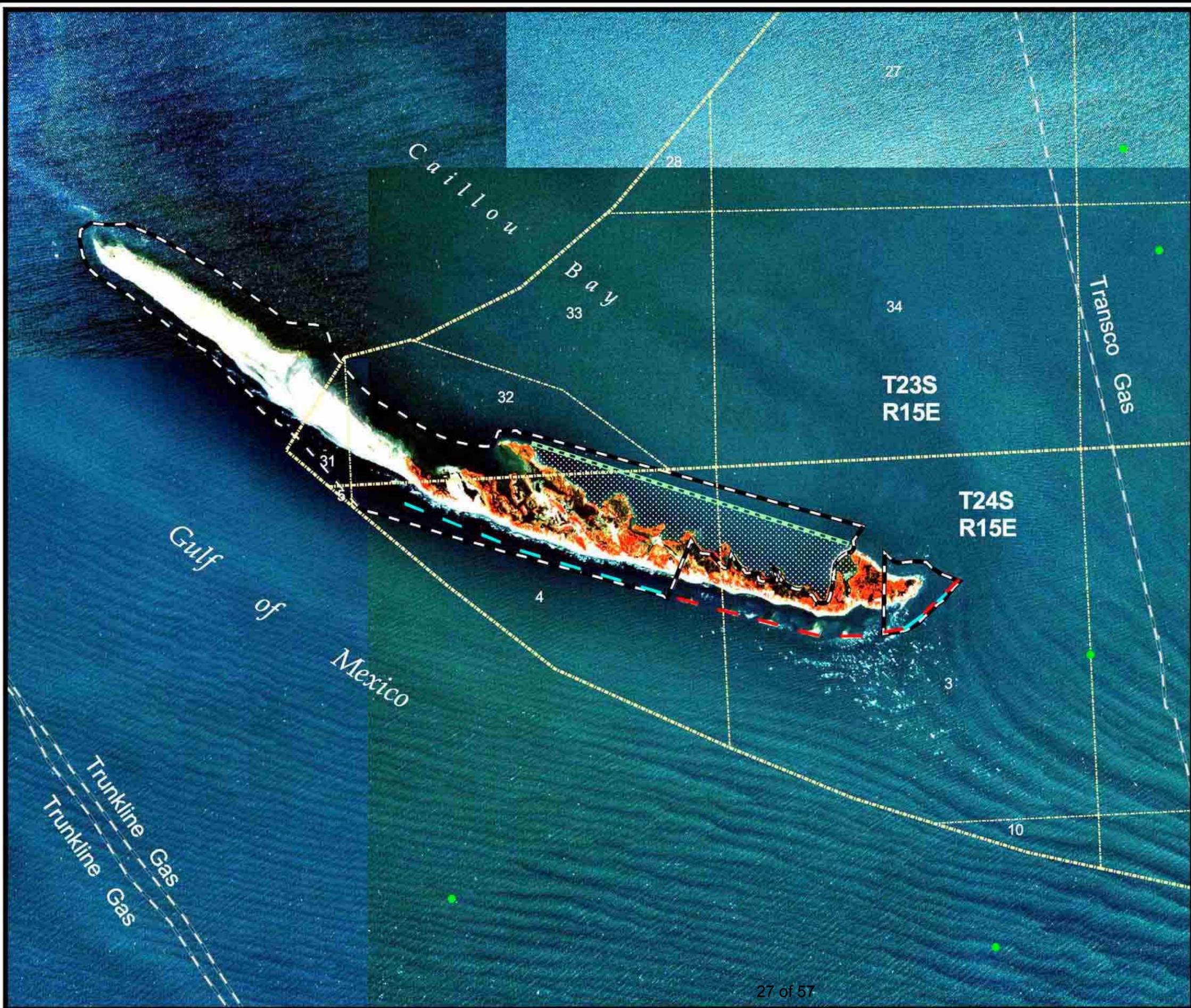
- c. No Activities will be allowed within 1,500 feet of nesting bird colonies.
- d. DNR shall abide by IDBIR regulations as noted in Exhibit C of DWF's Letter Agreement dated September 29, 2003. A few of the more important regulations are listed below.
  - 1. Littering is prohibited.
  - 2. Carrying, possessing, or discharging firearms, fire works, or explosives is prohibited.
  - 3. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited.

I WILL CONTACT YOU, THE PROJECT ENGINEER, THE MAINTENANCE MANAGER, THE CONSTRUCTION MANAGER, AND THE MONITORING MANAGER TO SCHEDULE A WRAP-UP MEETING TO DISCUSS THE REQUIREMENTS IN THE DOCUMENT WHICH MAY HAVE AN IMPACT ON CONTRACTING SPECIFICATIONS.

Thank you for your attention to this matter.

Jim Altman, Landrights Project Manager

c: (w/o enclosures)      Todd Folse, CRD Project Monitoring Manager  
                                     Brian Babin, Project Construction Manager  
                                     Brian Babin, Project Operation & Maintenance Manager  
                                     Beau Tate, Project Engineer



**Exhibit A**

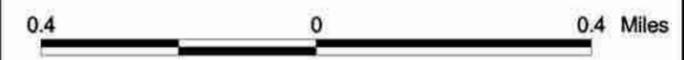
**Raccoon Island Shoreline Protection/Marsh Creation Project TE-48**

*Terrebonne Parish, Louisiana*

**Legend**

-  Project Boundary
-  Proposed Retainer Dike
-  Existing Breakwaters
-  Proposed Breakwaters
-  Proposed Marsh Creation
-  Township/Range Line
-  Section Line
-  Pipeline (LGS & NPMS)
-  Inactive Well
-  Shut-In Well
-  Active Well
-  Other Well
-  SWD Well
-  Orphan Well
-  Well without status code (Tobin data)

All features are graphical representations only and may not reflect true location or dimension.



Data Source:  
 U. S. Geological Survey  
 National Wetlands Research Center  
 Coastal Restoration Field Station  
 Louisiana Department of Natural Resources  
 Coastal Restoration Division  
 1998 DOQQ Photography  
 Map Date: September 24, 2003  
 Map ID: USGS-NWRC 2003-04-0316

May 18, 2004

## MEMORANDUM

**TO:** Ismail Merhi, CRD Project Manager

**FROM:** Jim Altman, Land Specialist

**RE:** Project Landrights 30% Design Report  
Raccoon Island Shoreline Protection / Marsh Creation Project TE-48

The Raccoon Island Shoreline Protection / Marsh Creation Project TE-48 is located on a portion (Raccoon Island) of the Isle Dernieres Barrier Islands chain. This island chain was originally owned by The Louisiana Land and Exploration Company who subsequently donated the land to the State. The Louisiana Department of Wildlife and Fisheries manages the island chain as the Isles Dernieres Barrier Island Refuge. Pipelines were researched and none were found in the immediate area of the project. (See note below). The Louisiana Department of Wildlife and Fisheries oyster database was searched and no oyster leases were found in the project area (See note below). For your reference a map is attached showing the project features and pipelines.

**Ownership:** **Department of Wildlife and Fisheries.** A Letter Agreement has been taken from the Department of Wildlife and Fisheries and subsequently assigned to NRCS.

**State Lands:** A Grant of Particular Use has been taken from State Lands.

**Pipelines:** **Trunkline Gas - 2-30" gas lines;** these lines are approximately 4,500' southwest of Raccoon Island running in a northwest to southeast direction. **Williams Energy Services - Transcontinental Gas - 26" gas line;** this line is approximately 3,000' east of the eastern end of Raccoon Island and runs in a northwest to southeast direction.

Note: Although these pipelines are not in the immediate vicinity of the project they should be noted depending on the location of the sand source for the back bay marsh creation.

**Oil & Gas Operations:**

It should be noted that there are oil & gas operations in the area of the project. SL-17105 which overlaid a portion of the project area apparently expired 5/14/04. SL-17091 is still an active lease and expires 5/14/06. This lease is about ½ mile south of the project area. SL-14832 is held by production. The producing well(s) are located south of the project and production goes to Devon Louisiana Corporation's production facilities in Ship Shoal Block 64 south of the project area.

Note: Depending upon the location of the sand source the oil & gas production infrastructure south of the project could be an issue.

**Oyster Leases:**

The Louisiana Department of Wildlife and Fisheries oyster data base was searched for oyster leases within the project area. None were found.

If you have questions or wish to discuss this matter further, please contact me at your convenience.

c: Ismail Merhi, CED Project Manager  
Loland Broussard, NRCS Project Manager, Lafayette  
Quin Kinler, NRCS, Baton Rouge

C:\Documents and Settings\IsmailM.000\Local Settings\Temporary Internet Files\OLK52\TE-48 30% design report.wpd

# EXHIBIT C

Louisiana Register Vol. 25, No. 5 May 20, 1999 {PAGE }

## **DECLARATION OF EMERGENCY Department of Wildlife and Fisheries Wildlife and Fisheries Commission**

Isles Dernieres Barrier Islands Refuge  
(LAC 76:III.321 and 331)

The Wildlife and Fisheries Commission does hereby establish emergency regulations for the management of the Isles Dernieres Barrier Islands Refuge which includes Wine Island, East Island, Trinity Island, Whiskey Island, and Raccoon Island. Formerly, three of these islands, i.e., Wine, Whiskey, and Raccoon Islands, were included within the Terrebonne Barrier Islands Refuge and were regulated under provisions of LAC 76:III.321. By promulgation of this declaration of emergency, the Terrebonne Barrier Islands Refuge regulations found at LAC 76:III.321 are hereby repealed.

A declaration of emergency is necessary to regulate public access to the Isles Dernieres Barrier Islands Refuge in order to ensure that those members of the public utilizing the public use area on Trinity Island enjoy a clean and healthful environment and in order to minimize contact with the numerous species of colonial seabirds that utilize the islands as nesting habitat in the spring and summer months. This declaration of emergency will become effective on May 6, 1999 and shall remain in effect for the maximum period allowed under the Administrative Procedure Act or until adoption of the final rule.

### **Title 76**

### **WILDLIFE AND FISHERIES**

#### **Part III. State Game and Fish Preserves and Sanctuaries**

#### **Chapter 3. Particular Game and Fish Preserves and Commission**

#### **§321. Terrebonne Barrier Islands Refuge**

Repealed.

**AUTHORITY NOTE:** Promulgated in accordance with R.S. 56:6(18), R.S. 56:761 and R.S. 56:785.

**HISTORICAL NOTE:** Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 19:910 (July 1993), repealed LR 25:

#### **§331. Isles Dernieres Barrier Islands Refuge**

A. Regulations for Isles Dernieres Barrier Islands Refuge

1. Regulations for Wine Island, East Island, Whiskey Island, and Raccoon Island

a. Public access by any means to the exposed land areas, wetlands and interior waterways of these islands is prohibited. Requests to access exposed land

areas, wetlands and interior waterways shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands, or of planning and implementing island restoration projects.

b. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in writing by the Secretary or his designee for the uses provided for in Paragraph 1.a. above.

c. Boat traffic is allowed adjacent to the islands in the open waters of the Gulf and bays; however, boat traffic is prohibited in waterways extending into the interior of the islands or within any land-locked open waters or wetlands of the islands.

d. Fishing from boats along the shore and wade fishing in the surf areas of the islands is allowed.

e. Littering on the islands or in Louisiana waters or wetlands is prohibited.

f. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

#### **2. Regulations for Trinity Island**

a. Public access is allowed in a designated public use area. An area approximately 3,000 linear feet by 500 linear feet is designated as a public use area, the boundaries of which will be marked and maintained by the Department. The designated public use area shall extend westward from the western boundary of the servitude area reserved by Louisiana Land and Exploration Company in the Act of Donation a distance of approximately 3,000 linear feet and northward from the southern shoreline within this area by a distance of approximately 500 linear feet. Public recreation such as bird-watching, picnicking, fishing and overnight camping is allowed in this area. Travel on or across this area shall be limited to foot or bicycle traffic only. No use of all-terrain vehicles or other vehicles powered by internal combustion engines or electric motors shall be allowed.

b. Public access to all exposed land areas of Trinity Island, other than the public use area, is prohibited. Requests to access these exposed land areas shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands or of planning and implementing island restoration projects.

c. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in writing by the Secretary or his designee for the uses provided for in Paragraph 2.b. above.

d. Any member of the public utilizing the designated public use area shall be required to have a portable waste disposal container to collect all human wastes and to remove same upon leaving the island. Discharge of human wastes, including that within the disposal container, onto the island or into Louisiana waters or wetlands is prohibited.

e. Littering on the island or in Louisiana waters or wetlands is prohibited.

f. Carrying, possessing, or discharging firearms, fireworks, or explosives in the designated public use area is prohibited.

g. Boat traffic is allowed adjacent to the island in open waters of the Gulf and bays and within the man-made canal commonly known as California Canal for its entire length to its terminus at the bulkhead on the western end of the canal. No boat traffic is allowed in other man-made or natural waterways extending into the interior of the island or in any land-locked open waters or wetlands of the island.

h. Fishing from boats or wade fishing in the surf areas of the island is allowed.

i. Houseboats may be moored in designated areas along the California Canal. An annual permit shall be required to moor a houseboat in the canal. The required permit may be obtained from the Department of Wildlife and Fisheries New Iberia Office.

j. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

B. Violation of any provision of these regulations shall be considered a Class Two Violation, as described in R.S. 56:115(D), 56:764, and 56:787.

AUTHORITY NOTE: Promulgated in accordance with R.S. 56:6(18), R.S. 56:109, and R.S. 56:781 et seq.

HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 25:

Bill A. Busbice, Jr.  
Chairman

9905#041

## **OYSTER LEASE INFORMATION**

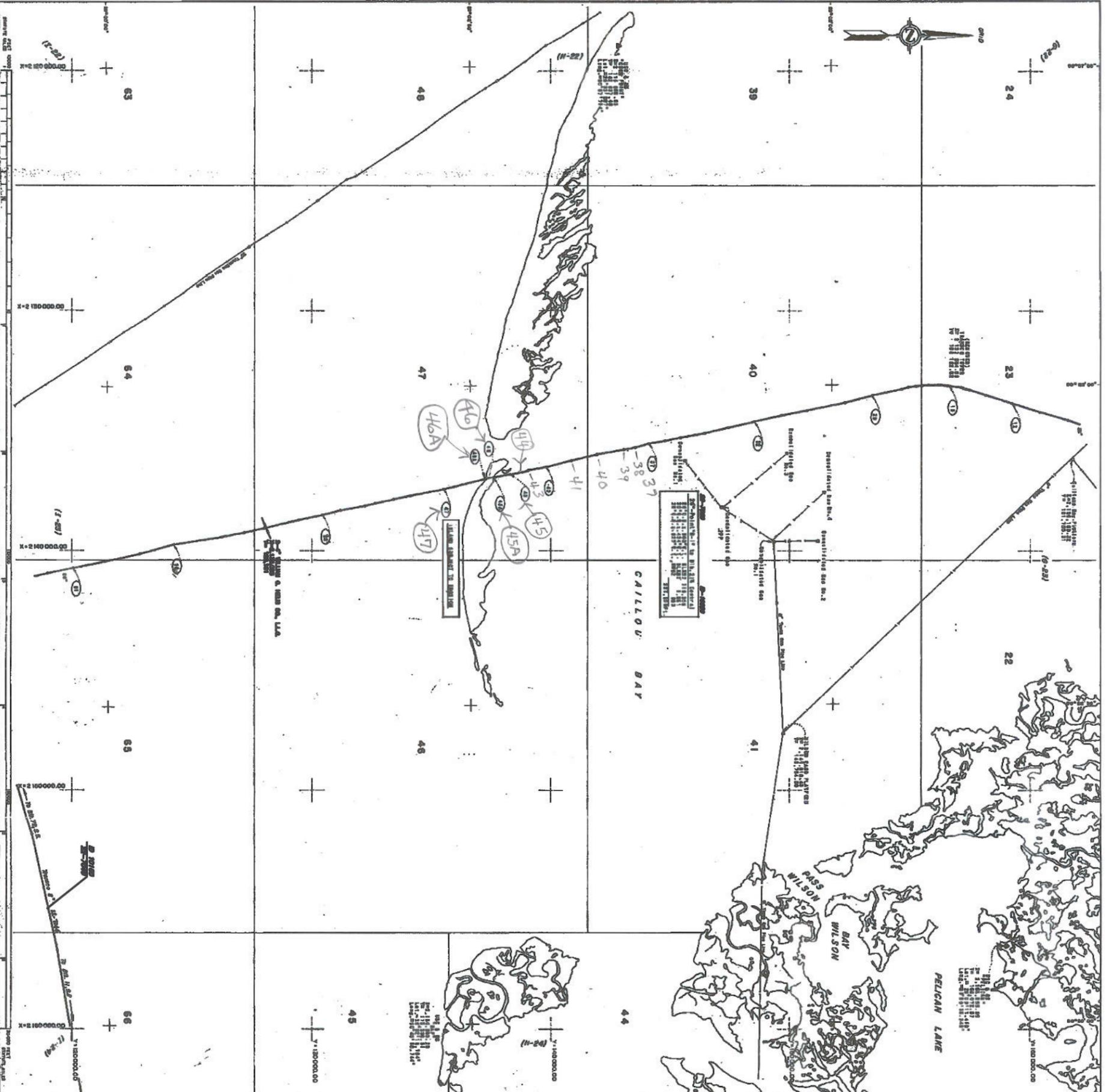
There are no oyster leases within the project area. See the Land Rights section of this report for documentation.

## **PIPELINE INVESTIGATIONS**

Pipeline investigations have been initiated and completed for the island and the offshore borrow area. See the Land Rights section of this report for documentation.







NO.	DESCRIPTION	DATE	BY	CHECKED
1	AS-BUILT OFFSHORE PIPE LINES	11/15/83	J. L. L...	J. L. L...
2	SHIP SHOULDER AREA	11/15/83	J. L. L...	J. L. L...
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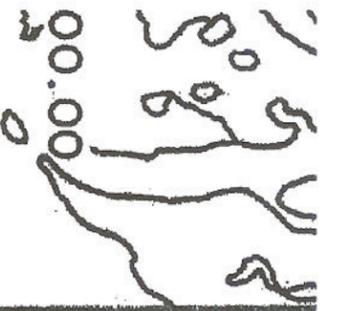
**AS-BUILT OFFSHORE PIPE LINES**  
**SHIP SHOULDER AREA**  
**GULF OF MEXICO**

**TRANSCONTINENTAL GAS PIPE LINE CORP.**  
 ENGINEERING DEPARTMENT  
 HOUSTON, TEXAS

DATE: 11/15/83  
 DRAWN BY: J. L. L...  
 CHECKED BY: J. L. L...  
 SCALE: AS SHOWN

1. Containing As-Built Pipe Profile  
 2. As-Built as Located (Location) from Contour Lines - Same Date  
 3. Location of Profile and Position marked by Utility Lines or Survey Lines  
 4. The As-Built as Located is a 20' separation within a 20' Pipe Diameter

ALL RIGHTS RESERVED. This map is not to be used for any other purpose without the written consent of Transcontinental Gas Pipe Line Corp. © TRANSCONTINENTAL GAS PIPE LINE CORP. 1983



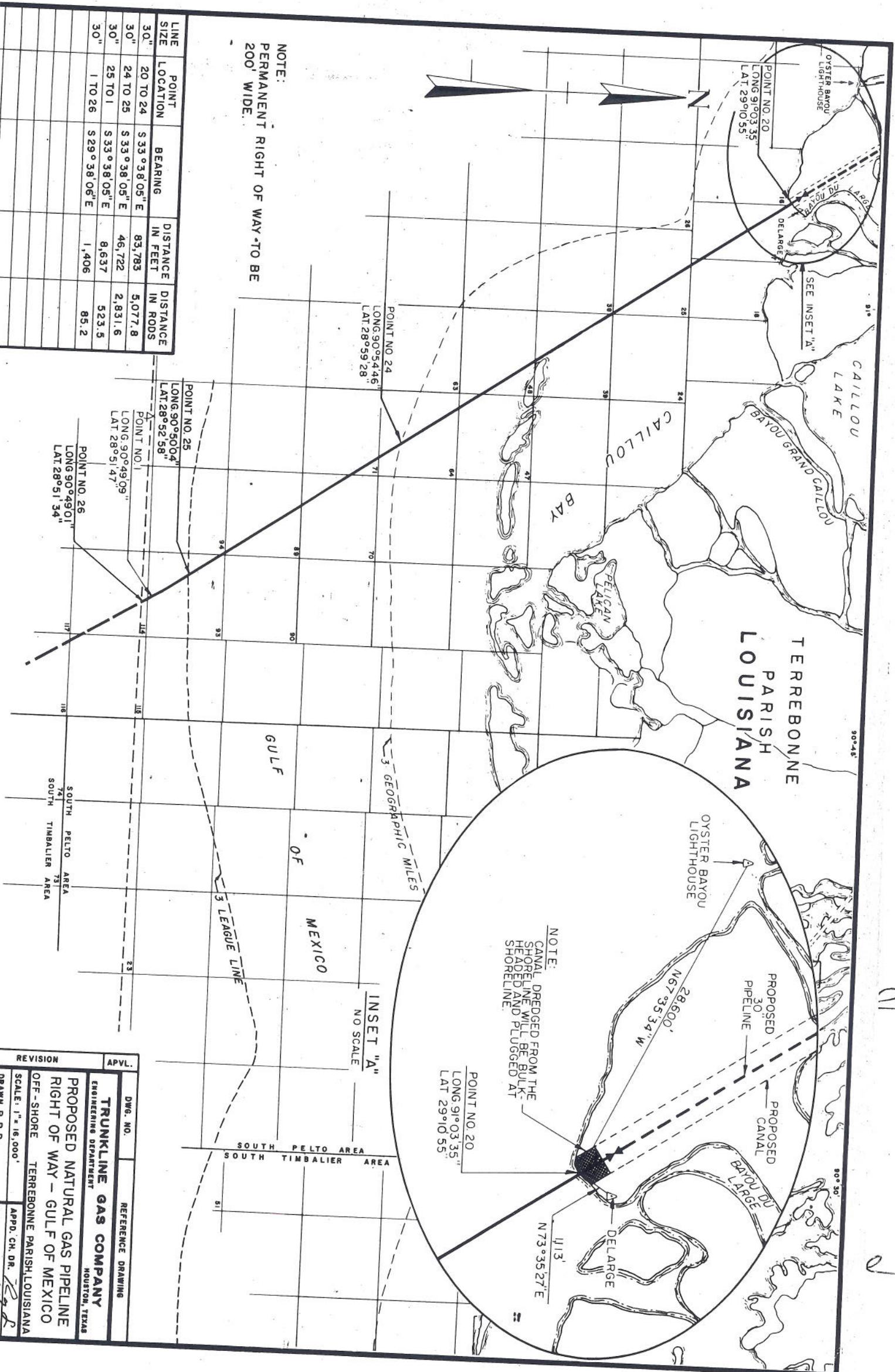
37	39° 07'	58° 37'	2	135 592.36	144.139.27	"	"
38	41° 08'	58° 36'	2	135 712.45	143 566.41	"	"
39	42° 47'	58° 35'	2	135 814.60	143 075.10	"	"
40	46° 28'	58° 36'	2	136 055.50	141 978.49	"	"
41	50° 07'	58° 36'	2	136 298.52	140 853.62	"	"
42	53° 14'	58° 36'	2	136 514.42	139 854.28	"	"
43	55° 33'	58° 36'	2	136 681.03	139 083.08	"	"
44	56° 06'	58° 36'	2	136 721.45	138 895.97	"	"
45	57° 46'	58° 36'	2	136 846.19	138 318.56	"	"
45A	CALC	CALC	2	136 999.78	137 607.69	P.L. at Edge of Island	
	U.S.C. & G.S.	Transco's					
	"Coon Point"	Tower					
		(Removed)					
46	60° 13'	58° 36'	2	137 036.31	137 438.59	P.L. at E of Island &	
						At Test Lead Post	
46A	CALC	CALC	2	137 083.94	137 312.58	P.L. at Edge of Island	
	U.S.C. & G.S.	Transco's					
	"Coon Point"	Tower					
		(Removed)					
47	65° 12'	58° 37'	2	137 459.72	135 507.86	Pipe Line	
48	68° 26'	58° 36'	2	137 749.67	134 136.60	"	
49	70° 02'	58° 36'	2	137 905.99	133 413.02	"	
50	71° 37'	58° 36'	2	138 067.71	132 664.47	"	
51	72° 25'	58° 35'	2	138 144.05	132 277.41	"	
52	74° 27'	58° 26'	2	138 276.07	131 222.07	"	

"X"

"Y"

NAD 27 in feet

Transco  
Pipeline  
Segment



REVISION	APVL.	DWG. NO.	REFERENCE DRAWING

**TRUNKLINE GAS COMPANY**  
ENGINEERING DEPARTMENT  
HOUSTON, TEXAS

**PROPOSED NATURAL GAS PIPELINE  
RIGHT OF WAY - GULF OF MEXICO  
OFF-SHORE**  
TERREBONNE PARISH, LOUISIANA

SCALE: 1" = 16,000'  
APPD. CH. DR. [Signature]



$X+Y^5$   
 Transco 26"  
 Page 2 of 2

Point	X	Y	Remarks
B-1	2137 332.61	170 283.86	Pipe Line
2	2137 088.76	169 478.81	" "
3	2136 671.66	168 128.53	" "
4	2136 261.42	166 800.44	" "
5	2135 683.13	164 928.33	" "
6	2135 300.56	163 689.85	" "
7	2135 052.93	162 888.21	8" Texas Gas X'ing
8	2135 040.67	162 848.50	Pipe Line
9	2134 798.33	162 063.96	Pipe Line
10	2134 645.38	161 568.82	" "
11	2134 285.45	160 403.60	" "
12	2133 926.22	159 237.53	" "
13	2133 591.84	158 156.15	" "
14	2133 370.00	157 438.73	" "
15	2133 345.28	157 356.38	" "
16	2133 305.26	157 213.56	" "
17	2133 259.46	157 016.28	" "
18	2133 196.27	156 592.27	" "
19	2133 190.91	156 566.48	" "
20	2133 185.47	156 526.59	" "
21	2133 168.44	156 279.88	" "
22	2133 165.78	156 239.60	" "
23	2133 153.05	155 789.60	" "
24	2133 171.38	155 521.27	" "
25	2133 202.80	155 254.61	" "
26	2133 257.42	154 940.75	" "
27	2133 319.78	154 667.34	" "
28	2133 590.90	153 440.92	" "
29	2133 842.05	152 311.63	" "
30	2134 178.84	150 787.15	" "
31	2134 420.92	149 682.34	" "
32	2134 670.89	148 549.28	" "
33	2134 916.81	147 446.65	" "
34	2135 133.51	146 465.74	" "
35	2135 319.46	145 446.07	" "
36	2135 458.20	144 807.47	" "
37	2135 592.36	144 139.27	" "
38	2135 712.45	143 566.41	" "
39	2135 814.60	143 075.10	" "
40	2136 055.50	141 978.49	" "
41	2136 298.52	140 853.62	" "
42	2136 514.42	139 854.28	" "
43	2136 681.03	139 083.08	" "
44	2136 721.45	138 895.97	" "
45	2136 846.19	138 318.56	" "
45-A	2136 999.78	137 607.69	P.L. at Edge of Island
46	2137 036.31	137 438.59	P.L. at E of Island
46-A	2137 063.94	137 312.58	P.L. at Edge of Island
47	2137 459.72	135 507.86	Pipe Line
48	2137 749.67	134 136.60	" "
49	2137 905.99	133 413.02	" "
50	2138 067.71	132 664.47	" "
51	2138 144.05	132 277.41	" "
52	2138 376.97	131 232.97	" "
53	2138 544.47	130 457.66	" "
54	2138 762.62	129 447.86	" "
55	2139 065.80	128 044.53	" "
56	2139 227.0	127 202.9	" "
57	2139 424.2	126 282.1	" "
58	2139 861.4	124 236.9	" "
59	2140 111.3	122 838.4	" "
60	2140 475.4	121 332.5	" "
61	2140 727.0	120 033.2	" "
62	2140 914.1	119 103.0	" "
63	2141 061.4	118 495.3	" "
64	2141 187.5	117 774.0	" "
65	2141 337.9	117 221.3	" "
66	2141 482.7	116 547.6	" "
67	2141 597.9	115 984.5	" "
68	2141 751.5	115 413.4	8" Valve No. LE-195
69	2141 857.2	114 968.5	8" Transco X'ing
70	2142 000.5	114 271.1	Pipe Line
71	2142 116.7	113 686.8	" "
72	2142 444.9	112 072.6	" "
73	2142 578.4	111 310.8	" "
74	2142 927.4	109 893.3	" "
75	2143 095.4	109 161.6	" "
76	2143 226.8	108 523.8	" "
77	2143 334.0	107 991.4	" "
78	2143 546.5	106 977.3	" "
79	2143 624.1	106 555.7	" "
80	2143 907.7	105 532.3	" "
81	2144 513.1	102 769.8	" "
82	2144 613.6	102 411.8	" "
83	2144 793.8	101 596.8	" "
84	2144 922.5	100 992.5	30" Trunkline X'ing
85	2145 048.3	100 231.1	Pipe Line
86	2145 393.7	98 799.4	" "
87	2145 562.1	98 044.7	" "
88	2145 656.4	97 721.5	" "
89	2145 900.6	96 567.0	" "
90	2146 143.0	95 296.8	" "
91	2146 322.1	94 224.4	" "
92	2146 467.4	93 617.0	" "
93	2146 906.9	91 838.9	" "
94	2147 052.4	90 823.1	" "
95	2147 510.1	88 770.1	" "

-Y=150,000.00

-Y=120,000.00

-Y=90,000.00

EWARD FROM LA.  
 AST LINE

-Y=60,000.00

GULF OF

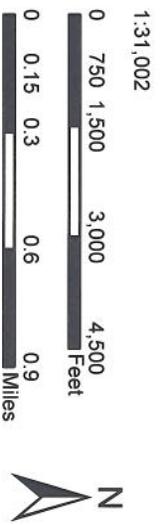
Raccoon Island Shoreline Protections & Marsh Creation Project TE - 48

**CWPPRA**

*Terrebonne Parish, Louisiana*

	Secured CRMS Site Location
	Pending CRMS Site Location
	DNR Monitoring Location - Active
	DNR Monitoring Location - Proposed/Inactive
	LA Public Land

All features are graphical representations only and may not reflect true location or dimension.



**Map Location**



Map Compilation and Verification:  
Louisiana Department of Natural Resources  
Coastal Restoration Division  
Monitoring Section

2000 SPOT Satellite Imagery  
Map Date: June 18, 2007  
Map ID: Infrastructure spot view



EXHIBIT "A"

PORTION OF TRACT NO. 27871, Said Portion being more fully described as follows:

That portion of Tract No. 27871 being more fully described as follows: Beginning at the Southeast corner of Block 47, Ship Shoal Area, having Coordinates of X = 2,140,400.00 and Y = 127,591.99; thence West 5,150.00 feet on the South line of said Block 47 to a point having Coordinates of X = 2,135,250.00 and Y = 127,591.99; thence North 5,230.77 feet to a point having Coordinates of X = 2,135,250.00 and Y = 132,822.76; thence East 1,000.00 feet to a point having Coordinates of X = 2,136,250.00 and Y = 132,822.76; thence North 17 degrees 26 minutes 50 seconds East 1,834.39 feet to a point having Coordinates of X = 2,136,800.00 and Y = 134,572.76; thence East 3,600.00 feet to a point on the East line of said Block 47 having Coordinates of X = 2,140,400.00 and Y = 134,572.76; thence South 6,980.77 feet on the East line of said Block 47 to the point of beginning, containing approximately 774.10 acres, as shown outlined in red on a plat on file in the State Land Office, Division of Administration. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

ENTIRE TRACT NO. 27871 being described as follows:

TRACT 27871 - PORTION OF BLOCK 47, SHIP SHOAL AREA, Terrebonne Parish, Louisiana

That portion of Block 47, Ship Shoal Area, Terrebonne Parish, Louisiana, belonging to the State of Louisiana and not under mineral lease on October 12, 1994, described as follows: Beginning at the Southeast corner of Block 47, Ship Shoal Area, having Coordinates of X = 2,140,400.00 and Y = 127,591.99; thence West 7,800.00 feet on the South line of said Block 47 to a point having Coordinates of X = 2,132,600.00 and Y = 127,591.99; thence North 9,548.89 feet to a point having Coordinates of X = 2,132,600.00 and Y = 137,140.88; thence Southeasterly on a straight line to a point having Coordinates of X = 2,133,089 and Y = 136,940; thence Southeasterly on a straight line to a point having Coordinates of X = 2,134,210 and Y = 136,726; thence Southeasterly on a straight line to a point having Coordinates of X = 2,138,231 and Y = 136,387; thence Southeasterly on a straight line to a point having Coordinates of X = 2,139,529 and Y = 136,276; thence Southeasterly on a straight line to a point on the East line of said Block 47 having Coordinates of X = 2,140,400.00 and Y = 136,276.00; thence South 8,684.01 feet on the East line of said Block 47 to the point of beginning, containing approximately 1,605.45 acres, as shown outlined in red on a plat on file in the State Land Office, Division of Administration. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

54-14792  
*[Handwritten signature]*

STATE OF LOUISIANA       §  
  §  
PARISH OF TERREBONNE   §

**PARTIAL RELEASE**

KNOW ALL MEN BY THESE PRESENTS THAT:

WHEREAS, Estate of William G. Helis, a partnership, and Helis Oil & Gas Company, L.L.C. are the present owners and holders of that certain oil, gas and other gaseous mineral lease executed by the State Mineral Board for the State of Louisiana as Lessor, identified as State Lease No. 14792, covering certain therein described property situated within Terrebonne Parish, Louisiana, as more particularly described as follows:

State Lease No. 14792, executed by the State Mineral Board on behalf of the State of Louisiana, as Lessor, in favor of Estate of William G. Helis, a partnership, as Lessee, dated October 17, 1994, recorded in COB 1443, Entry No. 947693, of the Conveyance Records of Terrebonne Parish, Louisiana;

reference to which recorded lease is being made for all purposes hereof (hereinafter referred to as "Subject Lease");

NOW THEREFORE, Lessees hereby release, relinquish, and surrender unto the State of Louisiana all the rights owned and held by them in and to two hundred fifty-five (255) acres of the Subject Lease, as shown on the attached plat and described as the Released Area, and Lessees retain all of their rights, title, and interest in and to five hundred nineteen and 10/100 (519.10) acres, as shown on the attached plat and as described as the Retained Acreage.

IN WITNESS whereof Estate of William G. Helis, a partnership, and Helis Oil & Gas Company, L.L.C. have executed this instrument effective as of the 29<sup>th</sup> day of July, 2005, in the presence of the undersigned competent witnesses and the undersigned Notary Public.

WITNESSES:

*[Signature]*  
\_\_\_\_\_  
Lynn C. Desmond  
*[Signature]*  
\_\_\_\_\_  
Betty Wallace

**Estate of William G. Helis, a partnership**

*[Signature]*  
\_\_\_\_\_  
By: David A. Kerstein  
General Agent

WITNESSES:

*[Signature]*  
\_\_\_\_\_  
Lynn C. Desmond  
*[Signature]*  
\_\_\_\_\_  
Betty Wallace

**Helis Oil & Gas Company, L.L.C.**

By: Helis Energy, Inc., Manager  
*[Signature]*  
\_\_\_\_\_  
By: David A. Kerstein  
President





**RELEASED AREA OF STATE LEASE NO. 14792  
BLOCK 47, SHIP SHOAL AREA  
TERREBONNE PARISH, LOUISIANA**

**RELEASED AREA**

Beginning at a point having Coordinates of X = 2,140,400.00 and Y = 134,572.76; thence South 2,590.08 feet to a point having Coordinates of X = 2,140,400.00 and Y = 131,982.68; thence West 5,150.00 feet to a point having Coordinates of X = 2,135,250.00 and Y = 131,982.68; thence North 840.08 feet to a point having Coordinates of X = 2,135,250.00 and Y = 132,822.76; thence East 1,000.00 feet to a point having Coordinates of X = 2,136,250.00 and Y = 132,822.76; thence North 17 degrees 26 minutes 50 seconds East 1,834.39 feet to a point having Coordinates of X = 2,136,800.00 and Y = 134,572.76; thence East 3,600.00 feet to the point of beginning, containing approximately **255.00 acres**. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

**RETAINED AREA OF STATE LEASE NO. 14792  
BLOCK 47, SHIP SHOAL AREA  
TERREBONNE PARISH, LOUISIANA**

**RETAINED AREA**

Beginning at a point having Coordinates of X = 2,140,400.00 and Y = 127,591.99; thence West 5,150.00 feet to a point having Coordinates of X = 2,135,250.00 and Y = 127,591.99; thence North 4,390.69 feet to a point having Coordinates of X = 2,135,250.00 and Y = 131,982.68; thence East 5,150.00 feet to a point having Coordinates of X = 2,140,400.00 and Y = 131,982.68; thence South 4,390.69 feet to the point of beginning, containing approximately 519.10 acres. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

# Terrebonne Parish Recording Page

I. Robert "Bobby" Boudreaux  
Clerk Of Court  
P.O. Box 1569  
Houma, La 70361-1569  
(985) 868-5660

Received From :  
HELIS OIL & GAS COMPANY LLC  
228 ST. CHARLES AVE., SUITE 912  
NEW ORLEANS, LA 70130

**First VENDOR**

HELIS WILLIAM G ESTATE OF A PARTNERSHIP

**First VENDEE**

LOUISIANA STATE OF

Index Type : Conveyances

File # : 1216835

Type of Document : Partial Release

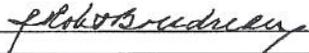
Book : 1929

Page : 579

Recording Pages : 6

### Recorded Information

I hereby certify that the attached document was filed for registry and recorded in the Clerk of Court's office for Terrebonne Parish, Louisiana

  
Clerk Of Court

On (Recorded Date) : 08/08/2005

At (Recorded Time) : 10:11:57:000 AM



Doc ID - 004253760006

CLERK OF COURT  
I. ROBERT "BOBBY" BOUDREAUX  
Parish of Terrebonne  
I certify that this is a true copy of the attached  
document that was filed for registry and  
Recorded 08/08/2005 at 10:11:57  
Recorded in Book 1929 Page 579  
File Number 1216835



  
Deputy Clerk

Return To :  
HELIS OIL & GAS COMPANY LLC  
228 ST. CHARLES AVE., SUITE 912  
NEW ORLEANS, LA 70130

Do not Detach this Recording Page from Original Document

EXHIBIT "A"

PORTION OF TRACT NO. 27996, Said Portion being more fully described as follows:

That portion of Tract No. 27996 being more fully described as follows: Beginning at a point on the South line of Block 47, Ship Shoal Area, having Coordinates of X = 2,132,600.00 and Y = 127,591.99; thence North 9,548.89 feet to a point having Coordinates of X = 2,132,600.00 and Y = 137,140.88; thence the following courses: Southeasterly on a straight line to a point having Coordinates of X = 2,133,089 and Y = 136,940, Southeasterly on a straight line to a point having Coordinates of X = 2,134,210 and Y = 136,726 and Southeasterly on a straight line to a point having Coordinates of X = 2,136,800.00 and Y = 136,507.64; thence South 1,934.88 feet to the Northernmost Northwest corner of State Lease No. 14792 having Coordinates of X = 2,136,800.00 and Y = 134,572.76; thence on the boundary of said State Lease No. 14792 the following courses: South 17 degrees 26 minutes 50 seconds West 1,834.39 feet, West 1,000.00 feet and South 5,230.77 feet to its Southwest corner on the South line of said Block 47 having Coordinates of X = 2,135,250.00 and Y = 127,591.99; thence West 2,650.00 feet on the South line of said Block 47 to the point of beginning, containing approximately 683.31 acres, as shown outlined in red on a plat on file in the State Land Office, Division of Administration. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

ENTIRE TRACT NO. 27996 being described as follows:

TRACT 27996 - PORTION OF BLOCK 47, SHIP SHOAL AREA, Terrebonne Parish, Louisiana

~~That portion of Block 47, Ship Shoal Area, Terrebonne Parish, Louisiana, belonging to the State of Louisiana and not under mineral lease on December 14, 1994, described as follows: Beginning at a point on the South line of Block 47, Ship Shoal Area, having Coordinates of X = 2,132,600.00 and Y = 127,591.99; thence North 9,548.89 feet to a point having Coordinates of X = 2,132,600.00 and Y = 137,140.88; thence the following courses: Southeasterly on a straight line to a point having Coordinates of X = 2,133,089 and Y = 136,940, Southeasterly on a straight line to a point having Coordinates of X = 2,134,210 and Y = 136,726, Southeasterly on a straight line to a point having Coordinates of X = 2,138,231 and Y = 136,387, Southeasterly on a straight line to a point having Coordinates of X = 2,139,529 and Y = 136,276 and Easterly on a straight line to a point on the East line of said Block 47 having Coordinates of X = 2,140,400.00 and Y = 136,276.00; thence South 1,703.24 feet on the East line of said Block 47 to the Northeast corner of State Lease No. 14792 having Coordinates of X = 2,140,400.00 and Y = 134,572.76; thence on the boundary of said State Lease No. 14792 the following courses: West 3,600.00 feet, South 17 degrees 26 minutes 50 seconds West 1,834.39 feet, West 1,000.00 feet and South 5,230.77 feet to its Southwest corner on the South line of said Block 47 having Coordinates of X = 2,135,250.00 and Y = 127,591.99; thence West 2,650.00 feet on the South line of said Block 47 to the point of beginning, containing approximately 831.35 acres, as shown outlined in red on a plat on file in the State Land Office, Division of Administration. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).~~

LEASE FOR OIL, GAS AND OTHER LIQUID  
OR GASEOUS MINERALS

STATE OF LOUISIANA  
PARISH OF EAST BATON ROUGE

State Lease No. 17036  
Louisiana State Lease Form Revised 2000 with  
Approved Rider Attached

WHEREAS, under the provisions of Sub-Part A of Chapter 2, Title 30 of the Louisiana Revised Statutes of 1950, as amended, and other applicable laws, the State Mineral Board of the State of Louisiana advertised for bids for a lease covering oil, gas and other liquid or gaseous minerals in solution and produced with oil or gas on the property described below, and

WHEREAS, in response to required advertisements, bids were received and duly opened in the City of Baton Rouge, Parish of Baton Rouge, State of Louisiana on the 14<sup>TH</sup> day of MARCH, 2001 at a meeting of the State Mineral Board of the State of Louisiana and

WHEREAS, by resolution duly adopted, the State Mineral Board accepted the bid of THE LOUISIANA LAND & EXPLORATION COMPANY whose mailing address is 400 N SAM HOUSTON PARKWAY EAST SUITE 1200, HOUSTON, TX 77060-3593 (hereinafter referred to as "Lessee") as being the most advantageous to the State of Louisiana

NOW THEREFORE, be it known and remembered that the State Mineral Board of the State of Louisiana, acting under said authority for and in behalf of the State of Louisiana, as Lessor, does hereby lease, let, and grant exclusively unto the said Lessee, and Lessee's successors and assigns, the property described below for the purpose of exploring by any method, including but not limited to geophysical and geological exploration for formations or structures and prospecting and drilling for and producing oil, gas, and any other liquid or gaseous minerals in solution and produced with oil or gas, hereinafter sometimes referred to for convenience as oil, gas or other liquid or gaseous mineral. In connection therewith Lessee shall have the right to use so much of the property as may be reasonably necessary for such operations, including but not limited to storing minerals and fluids in facilities or by means other than subsurface storage, laying pipelines, dredging canals, and building roads, bridges, docks, tanks, power stations, telephone and electric transmission lines, and other structures and facilities. The leased property, situated in the Parish of TERREBONNE, State of Louisiana, is more fully described as follows

PORTION OF TRACT 33280 - PORTION OF BLOCK 40, SHIP SHOAL AREA, Terrebonne Parish, Louisiana  
All of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, belonging to the State of Louisiana and not under mineral lease on March 14, 2001, situated in Terrebonne Parish, Louisiana, and more particularly described as follows: Beginning at the Southeast corner of Block 40, Ship Shoal Area, having Coordinates of X = 2,140,400 00 and Y = 141,553 53, thence West 980 10 feet on the South line of said Block 40 to a point having Coordinates of X = 2,139,419 90 and Y = 141,553 53, thence North 2,000 00 feet to a point having Coordinates of X = 2,139,419 90 and Y = 143,553 53, thence East 980 10 feet to a point on the East line of said Block 40 having Coordinates of X = 2,140,400 00 and Y = 143,553 53, thence South 2,000 00 feet on the East line of Block 40 to the point of beginning, containing approximately 45 00 acres, as shown outlined in red on a plat on file in the Office of Mineral Resources, Department of Natural Resources, as provided by the applicant. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone)

NOTE The State of Louisiana does hereby reserve, and this lease shall be subject to, the imprescriptible right of surface use in the nature of a servitude in favor of the Department of Natural Resources, including its Offices and Commissions, for the sole purpose of implementing, constructing, servicing and maintaining approved coastal zone management and/or restoration projects. Utilization of any and all rights derived under this lease by the mineral lessee, its agents, successors or assigns, shall not interfere with nor hinder the reasonable surface use by the Department of Natural Resources, its Offices or Commissions, as hereinabove reserved

This lease excludes free sulphur, potash, lignite, salt and other solid minerals. Lessee shall not have any rights to explore, drill for, mine, produce or take any action whatsoever in regard to any such solid mineral deposits

Notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for seismic and geophysical exploration by any seismic permittee of the state whose valid permit predates the effective date of this mineral lease and includes all or a portion of the surface area encompassed within the geographical boundary of the leased premises herein. The said seismic permittee shall owe the mineral Lessee no duty to share seismic or geophysical information acquired under the predating permit nor to reimburse the mineral Lessee for surface usage, but said seismic permittee shall not unreasonably interfere with the mineral Lessee's exercise of its rights acquired hereunder and shall owe the mineral Lessee reasonable reimbursement for any actual damages caused by the seismic or geophysical operations carried out under the predating permit

Further notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for coastal restoration, reclamation and conservation projects promulgated, funded and effected through the Department of Natural Resources and its divisions, whether solely or in conjunction with other state, local or federal governmental agencies or with private individuals or entities. The mineral Lessee, in the exercise of its exclusive rights granted hereunder, shall utilize the best technology available, including directional drilling so as to minimize interference with the ongoing surface usage entailed in the development, construction and maintenance of the said coastal restoration, reclamation and conservation projects which will now or may utilize all or a portion of the premises leased for mineral exploration and development herein. Rights to geothermal resources are specifically excluded from this lease

1 Lessee has this day paid to Lessor a cash payment of Fourteen Thousand, Eight Hundred Fifty and No/100ths (\$14,850 00) Dollars one-half (1/2) of which is bonus as full and adequate consideration for every right granted hereunder and not allocated as mere rental for a period, and one-half (1/2) of which is rental for the first year of this lease

2 Subject to the other provisions hereof this lease shall be for a term of Three (3) years from the date hereof (hereinafter called "primary term") and as long thereafter as oil, gas or other liquid or gaseous mineral is produced hereunder in paying quantities or any operation is conducted, payment is made, or condition exists, which continues this lease in force, according to its terms

LEASE FOR OIL, GAS AND OTHER LIQUID  
OR GASEOUS MINERALS

STATE OF LOUISIANA  
PARISH OF EAST BATON ROUGE

State Lease No. 17037  
Louisiana State Lease Form Revised 2000 with  
Approved Rider Attached

WHEREAS, under the provisions of Sub-Part A of Chapter 2, Title 30 of the Louisiana Revised Statutes of 1950, as amended, and other applicable laws, the State Mineral Board of the State of Louisiana advertised for bids for a lease covering oil, gas and other liquid or gaseous minerals in solution and produced with oil or gas on the property described below, and

WHEREAS, in response to required advertisements, bids were received and duly opened in the City of Baton Rouge, Parish of Baton Rouge, State of Louisiana on the 14<sup>th</sup> day of MARCH, 2001, at a meeting of the State Mineral Board of the State of Louisiana, and

WHEREAS, by resolution duly adopted, the State Mineral Board accepted the bid of THE LOUISIANA LAND & EXPLORATION COMPANY whose mailing address is 400 N SAM HOUSTON PARKWAY EAST, SUITE 1200, HOUSTON, TX 77060-3593 (hereinafter referred to as "Lessee") as being the most advantageous to the State of Louisiana

NOW THEREFORE, be it known and remembered that the State Mineral Board of the State of Louisiana, acting under said authority for and in behalf of the State of Louisiana, as Lessor, does hereby lease, let, and grant exclusively unto the said Lessee, and Lessee's successors and assigns, the property described below for the purpose of exploring by any method, including but not limited to geophysical and geological exploration for formations or structures and prospecting and drilling for and producing oil, gas, and any other liquid or gaseous minerals in solution and produced with oil or gas, hereinafter sometimes referred to for convenience as oil, gas or other liquid or gaseous mineral. In connection therewith Lessee shall have the right to use so much of the property as may be reasonably necessary for such operations, including but not limited to storing minerals and fluids in facilities or by means other than subsurface storage, laying pipelines, dredging canals, and building roads, bridges, docks, tanks, power stations, telephone and electric transmission lines, and other structures and facilities. The leased property, situated in the Parish of TERREBONNE, State of Louisiana, is more fully described as follows:

PORTION OF TRACT 33281 - PORTION OF BLOCK 47, SHIP SHOAL AREA, Terrebonne Parish, Louisiana

All of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, belonging to the State of Louisiana and not under mineral lease on March 14, 2001, situated in Terrebonne Parish, Louisiana, and more particularly described as follows. Beginning at the Northeast corner of Block 47, Ship Shoal Area, having Coordinates of X = 2,140,400.00 and Y = 141,553.53, thence South 2,400.00 feet on the East line of said Block 47 to a point having Coordinates of X = 2,140,400.00 and Y = 139,153.53, thence West 980.10 feet to a point having Coordinates of X = 2,139,419.90 and Y = 139,153.53, thence North 2,400.00 feet to a point on the North line of said Block 47 having Coordinates of X = 2,139,419.90 and Y = 141,553.53, thence East 980.10 feet on the said North line of said Block 47 to the point of beginning, containing approximately 54.00 acres, as shown outlined in red on a plat on file in the Office of Mineral Resources, Department of Natural Resources. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

NOTE: The State of Louisiana does hereby reserve, and this lease shall be subject to, the imprescriptible right of surface use in the nature of a servitude in favor of the Department of Natural Resources, including its Offices and Commissions, for the sole purpose of implementing, constructing, servicing and maintaining approved coastal zone management and/or restoration projects. Utilization of any and all rights derived under this lease by the mineral lessee, its agents, successors or assigns, shall not interfere with nor hinder the reasonable surface use by the Department of Natural Resources, its Offices or Commissions, as hereinabove reserved.

This lease excludes free sulphur, potash, lignite, salt and other solid minerals. Lessee shall not have any rights to explore, drill for, mine, produce or take any action whatsoever in regard to any such solid mineral deposits.

Notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for seismic and geophysical exploration by any seismic permittee of the state whose valid permit predates the effective date of this mineral lease and includes all or a portion of the surface area encompassed within the geographical boundary of the leased premises herein. The said seismic permittee shall owe the mineral Lessee no duty to share seismic or geophysical information acquired under the predating permit nor to reimburse the mineral Lessee for surface usage, but said seismic permittee shall not unreasonably interfere with the mineral Lessee's exercise of its rights acquired hereunder and shall owe the mineral Lessee reasonable reimbursement for any actual damages caused by the seismic or geophysical operations carried out under the predating permit.

Further notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for coastal restoration, reclamation and conservation projects promulgated, funded and effected through the Department of Natural Resources and its divisions, whether solely or in conjunction with other state, local or federal governmental agencies or with private individuals or entities. The mineral Lessee, in the exercise of its exclusive rights granted hereunder, shall utilize the best technology available, including directional drilling so as to minimize interference with the ongoing surface usage entailed in the development, construction and maintenance of the said coastal restoration, reclamation and conservation projects which will now or may utilize all or a portion of the premises leased for mineral exploration and development herein. Rights to geothermal resources are specifically excluded from this lease.

1 Lessee has this day paid to Lessor a cash payment of Seventeen Thousand, Eight Hundred Twenty and No/100ths (\$17,820.00) Dollars one-half (1/2) of which is bonus as full and adequate consideration for every right granted hereunder and not allocated as mere rental for a period, and one-half (1/2) of which is rental for the first year of this lease.

2 Subject to the other provisions hereof this lease shall be for a term of Three (3) years from the date hereof (hereinafter called "primary term") and as long thereafter as oil, gas or other liquid or gaseous mineral is produced hereunder in paying quantities or any operation is conducted, payment is made, or condition exists, which continues this lease in force according to its terms.

LEASE FOR OIL, GAS AND OTHER LIQUID  
OR GASEOUS MINERALS

STATE OF LOUISIANA  
PARISH OF EAST BATON ROUGE

State Lease No. 17038  
Louisiana State Lease Form Revised 2000 with  
Approved Rider Attached

WHEREAS, under the provisions of Sub-Part A of Chapter 2, Title 30 of the Louisiana Revised Statutes of 1950, as amended, and other applicable laws, the State Mineral Board of the State of Louisiana advertised for bids for a lease covering oil, gas and other liquid or gaseous minerals in solution and produced with oil or gas on the property described below, and

WHEREAS, in response to required advertisements, bids were received and duly opened in the City of Baton Rouge, Parish of Baton Rouge, State of Louisiana on the 14<sup>TH</sup> day of MARCH, 2001, at a meeting of the State Mineral Board of the State of Louisiana, and

WHEREAS, by resolution duly adopted, the State Mineral Board accepted the bid of THE LOUISIANA LAND & EXPLORATION COMPANY whose mailing address is 400 N SAM HOUSTON PARKWAY EAST, SUITE 1200, HOUSTON, TX 77060-3593 (hereinafter referred to as "Lessee") as being the most advantageous to the State of Louisiana

NOW THEREFORE, be it known and remembered that the State Mineral Board of the State of Louisiana, acting under said authority for and in behalf of the State of Louisiana, as Lessor, does hereby lease, let, and grant exclusively unto the said Lessee, and Lessee's successors and assigns, the property described below for the purpose of exploring by any method, including but not limited to geophysical and geological exploration for formations or structures and prospecting and drilling for and producing oil, gas, and any other liquid or gaseous minerals in solution and produced with oil or gas, hereinafter sometimes referred to for convenience as oil, gas or other liquid or gaseous mineral. In connection therewith Lessee shall have the right to use so much of the property as may be reasonably necessary for such operations, including but not limited to storing minerals and fluids in facilities or by means other than subsurface storage, laying pipelines, dredging canals, and building roads, bridges, docks, tanks, power stations, telephone and electric transmission lines, and other structures and facilities. The leased property, situated in the Parish of TERREBONNE, State of Louisiana, is more fully described as follows:

PORTION OF TRACT 33282 - PORTION OF BLOCK 41, SHIP SHOAL AREA, Terrebonne Parish, Louisiana

All of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, belonging to the State of Louisiana and not under mineral lease on March 14, 2001, situated in Terrebonne Parish, Louisiana, and more particularly described as follows: Beginning at the Southwest corner of Block 41, Ship Shoal Area, having Coordinates of X = 2,140,400.00 and Y = 141,553.53, thence North 2,000.00 feet along the West boundary of said Block 41 to a point having Coordinates of X = 2,140,400.00 and Y = 143,553.53, thence East 4,590.00 feet to a point having Coordinates of X = 2,144,990.00 and Y = 143,553.53, thence South 483.53 feet to a point having Coordinates of X = 2,144,990.00 and Y = 143,070.00, thence East 201.60 feet to a point having Coordinates of X = 2,145,191.60 and Y = 143,070.00, thence South 1,516.47 feet to a point on the South boundary of said Block 41 having Coordinates of X = 2,145,191.60 and Y = 141,553.53, thence West 4,791.60 feet along the said South boundary of said Block 41 to the point of beginning, containing approximately 217.76 acres, as shown outlined in red on a plat on file in the Office of Mineral Resources, Department of Natural Resources. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone).

NOTE: The State of Louisiana does hereby reserve, and this lease shall be subject to, the imprescriptible right of surface use in the nature of a servitude in favor of the Department of Natural Resources, including its Offices and Commissions, for the sole purpose of implementing, constructing, servicing and maintaining approved coastal zone management and/or restoration projects. Utilization of any and all rights derived under this lease by the mineral lessee, its agents, successors or assigns, shall not interfere with nor hinder the reasonable surface use by the Department of Natural Resources, its Offices or Commissions, as hereinabove reserved.

This lease excludes free sulphur, potash, lignite, salt and other solid minerals. Lessee shall not have any rights to explore, drill for, mine, produce or take any action whatsoever in regard to any such solid mineral deposits.

Notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for seismic and geophysical exploration by any seismic permittee of the state whose valid permit predates the effective date of this mineral lease and includes all or a portion of the surface area encompassed within the geographical boundary of the leased premises herein. The said seismic permittee shall owe the mineral Lessee no duty to share seismic or geophysical information acquired under the predating permit nor to reimburse the mineral Lessee for surface usage, but said seismic permittee shall not unreasonably interfere with the mineral Lessee's exercise of its rights acquired hereunder and shall owe the mineral Lessee reasonable reimbursement for any actual damages caused by the seismic or geophysical operations carried out under the predating permit.

Further notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for coastal restoration, reclamation and conservation projects promulgated, funded and effected through the Department of Natural Resources and its divisions, whether solely or in conjunction with other state, local or federal governmental agencies or with private individuals or entities. The mineral Lessee, in the exercise of its exclusive rights granted hereunder, shall utilize the best technology available, including directional drilling so as to minimize interference with the ongoing surface usage entailed in the development, construction and maintenance of the said coastal restoration, reclamation and conservation projects which will now or may utilize all or a portion of the premises leased for mineral exploration and development herein. Rights to geothermal resources are specifically excluded from this lease.

1. Lessee has this day paid to Lessor a cash payment of Seventy-One Thousand Eight Hundred Sixty and 80/100ths (\$71,860.80) Dollars one-half (1/2) of which is bonus as full and adequate consideration for every right granted hereunder and not allocated as mere rental for a period, and one-half (1/2) of which is rental for the first year of this lease.

2. Subject to the other provisions hereof this lease shall be for a term of Three (3) years from the date hereof (hereinafter called "primary term") and as long thereafter as oil, gas or other liquid or gaseous mineral is produced hereunder in paying quantities or any operation is conducted, payment is made, or condition exists, which continues this lease in force, according to its terms.

LEASE FOR OIL, GAS AND OTHER LIQUID  
OR GASEOUS MINERALS

STATE OF LOUISIANA  
PARISH OF EAST BATON ROUGE

State Lease No. 17040  
Louisiana State Lease Form Revised 2000 with  
Approved Rider Attached

WHEREAS, under the provisions of Sub-Part A of Chapter 2, Title 30 of the Louisiana Revised Statutes of 1950, as amended, and other applicable laws, the State Mineral Board of the State of Louisiana advertised for bids for a lease covering oil, gas and other liquid or gaseous minerals in solution and produced with oil or gas on the property described below, and

WHEREAS, in response to required advertisements, bids were received and duly opened in the City of Baton Rouge, Parish of Baton Rouge, State of Louisiana on the 14<sup>TH</sup> day of MARCH, 2001, at a meeting of the State Mineral Board of the State of Louisiana and

WHEREAS, by resolution duly adopted, the State Mineral Board accepted the bid of THE LOUISIANA LAND & EXPLORATION COMPANY whose mailing address is 400 N SAM HOUSTON PARKWAY EAST, SUITE 1200, HOUSTON, TX 77060-3593 (hereinafter referred to as "Lessee") as being the most advantageous to the State of Louisiana

NOW THEREFORE, be it known and remembered that the State Mineral Board of the State of Louisiana, acting under said authority for and in behalf of the State of Louisiana, as Lessor, does hereby lease, let, and grant exclusively unto the said Lessee, and Lessee's successors and assigns, the property described below for the purpose of exploring by any method, including but not limited to geophysical and geological exploration for formations or structures and prospecting and drilling for and producing oil, gas, and any other liquid or gaseous minerals in solution and produced with oil or gas, hereinafter sometimes referred to for convenience as oil, gas or other liquid or gaseous mineral. In connection therewith Lessee shall have the right to use so much of the property as may be reasonably necessary for such operations, including but not limited to storing minerals and fluids in facilities or by means other than subsurface storage, laying pipelines, dredging canals, and building roads, bridges, docks, tanks, power stations, telephone and electric transmission lines, and other structures and facilities. The leased property, situated in the Parish of TERREBONNE, State of Louisiana, is more fully described as follows

PORTION OF TRACT 33283 - PORTION OF BLOCK 46, SHIP SHOAL AREA, Terrebonne Parish, Louisiana

All of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, belonging to the State of Louisiana and not under mineral lease on March 14, 2001, situated in Terrebonne Parish, Louisiana, and more particularly described as follows: Beginning at the Northwest corner of Block 46, Ship Shoal Area, having Coordinates of X = 2,140,400 00 and Y = 141,553 53, thence East 4,791 60 feet on the North line of said Block 46 to a point having Coordinates of X = 2,145,191 60 and Y = 141,553 53, thence South 2,400 00 feet to a point having Coordinates of X = 2,145,191 60 and Y = 139,153 53, thence West 4,791 60 feet to a point on the West line of said Block 46 having Coordinates of X = 2,140,400 00 and Y = 139,153 53, thence North 2,400 00 feet on the said West line of said Block 46 to the point of beginning, containing approximately 264.00 acres, as shown outlined in red on a plat on file in the Office of Mineral Resources, Department of Natural Resources. All bearings, distances and coordinates are based on Louisiana Coordinate System of 1927 (South Zone)

NOTE: The State of Louisiana does hereby reserve, and this lease shall be subject to, the imprescriptible right of surface use in the nature of a servitude in favor of the Department of Natural Resources, including its Offices and Commissions, for the sole purpose of implementing, constructing, servicing and maintaining approved coastal zone management and/or restoration projects. Utilization of any and all rights derived under this lease by the mineral lessee, its agents, successors or assigns, shall not interfere with nor hinder the reasonable surface use by the Department of Natural Resources, its Offices or Commissions, as hereinabove reserved.

This lease excludes free sulphur, potash, lignite, salt and other solid minerals. Lessee shall not have any rights to explore, drill for, mine, produce or take any action whatsoever in regard to any such solid mineral deposits.

Notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for seismic and geophysical exploration by any seismic permittee of the state whose valid permit predates the effective date of this mineral lease and includes all or a portion of the surface area encompassed within the geographical boundary of the leased premises herein. The said seismic permittee shall owe the mineral Lessee no duty to share seismic or geophysical information acquired under the predating permit nor to reimburse the mineral Lessee for surface usage, but said seismic permittee shall not unreasonably interfere with the mineral Lessee's exercise of its rights acquired hereunder and shall owe the mineral Lessee reasonable reimbursement for any actual damages caused by the seismic or geophysical operations carried out under the predating permit.

Further notwithstanding any language herein to the contrary, the rights granted herein exclusively to the mineral Lessee shall be subject to the surface usage for coastal restoration, reclamation and conservation projects promulgated, funded and effected through the Department of Natural Resources and its divisions, whether solely or in conjunction with other state, local or federal governmental agencies or with private individuals or entities. The mineral Lessee, in the exercise of its exclusive rights granted hereunder, shall utilize the best technology available, including directional drilling so as to minimize interference with the ongoing surface usage entailed in the development, construction and maintenance of the said coastal restoration, reclamation and conservation projects which will now or may utilize all or a portion of the premises leased for mineral exploration and development herein. Rights to geothermal resources are specifically excluded from this lease.

1 Lessee has this day paid to Lessor a cash payment of Eighty-Seven Thousand, One Hundred Twenty and No/100ths (\$87,120 00) Dollars one-half (1/2) of which is bonus as full and adequate consideration for every right granted hereunder and not allocated as mere rental for a period, and one-half (1/2) of which is rental for the first year of this lease.

2 Subject to the other provisions hereof this lease shall be for a term of Three (3) years from the date hereof (hereinafter called "primary term") and as long thereafter as oil, gas or other liquid or gaseous mineral is produced hereunder in paying quantities or any operation is conducted, payment is made, or condition exists, which continues this lease in force, according to its terms.

## **CULTURAL RESOURCES ASSESSMENT**

A cultural resources assessment was performed for the Raccoon Island Demonstration Project (TE-29). The cultural resources assessment for TE-29 is included as a portion of this report. Refer to the documents on the following pages.

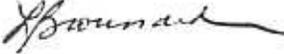
Cultural resources coordination with the Louisiana State Historic Preservation Office (SHPO) for this phase of the project has been initiated (personal comm. Mr. Duke Rivet, Division of Archaeology, Dept of CRT). Preliminary review of the SHPO sites files indicates that there are no known cultural resources within the proposed marsh/berm creation area on Raccoon Island. Cultural resources coordination has not been initiated with Mineral Management Service (MMS) in the potential borrow area in the Gulf of Mexico in federal waters.

For the marsh creation area on Raccoon Island, SHPO concurrence was obtained in August 2006 that no archaeological sites or historical properties are anticipated to be impacted by project construction.

Ongoing coordination with the U. S. Department of Interior, Mineral Management Service (MMS) is currently taking place due to the offshore borrow site being beyond the 3-mile state limit and considered federal territory (i.e. outer continental shelf). For this site in federal waters, the only required cultural resources coordination at this point is an advance notification to the MMS New Orleans Office of any proposed onsite geotechnical work (personal communication with Mr. Roger Amato, MMS, Wash. D.C.). Cultural resources coordination with MMS will continue. The next step of cultural resources coordination will be to determine if a previously conducted survey that includes the borrow site exists and the data can be obtained. If existing data is not available or does not meet MMS approval for use, MMS will require a remote-sensing survey (high resolution side-scan sonar) of the site at a line-spacing interval of either 50 or 300 meters, and preparation of an archaeological report.

## INTEROFFICE MEMORANDUM

**TO:** TE-29 Raccoon Island Demo Project Files

**FROM:** Loland Broussard 

**DATE:** May 28, 1996

**RE:** Cultural Resources

Phone conversation with Joe Conti, Alexandria NRCS Water Resources Staff, Cultural Resources Liaison officer. He stated that due to the fact that a 404 permit had been issued by the Corps for this project, the SHPO office has already had the opportunity to review and comment relative to cultural and historic resources on the island. No further action is required by NRCS.



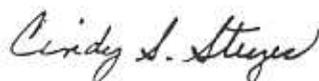
May 16, 1996

Mr. Loland Broussard  
Project Leader  
Field Office Project Support Staff  
3470 NE Evangeline Thruway  
Lafayette, Louisiana 70507-2554

RE: PTE-15vii Raccoon Island Demonstration Project-Cultural Resources

Dear Loland:

As of this date, my review of the site survey files of the LA Dept. of Culture, Recreation and Tourism, Division of Archaeology has revealed that there are no known cultural sites or historic properties located within the Raccoon Island Demo project area, nor in fact, anywhere on Raccoon Island. Therefore, construction or other activity related to this project will not threaten or detrimentally affect any significant cultural resources. NRCS can now request concurrence from the State Historic Preservation Officer that no further cultural resource investigation is required. If you have any questions, please don't hesitate to call.



Cindy S. Steyer  
Coastal Vegetative Specialist

cc: Bennett Landreneau, ASTC/WR, Alexandria  
Britt Paul, WRPSL, Alexandria  
Faye Talbot, FOPSSL, Lafayette  
Randolph Joseph, AC, Crowley  
Ronald Marcantel, CC, Lake Charles  
Mike Tullos, DC, Thibodaux

## **CONSTRUCTION COST ESTIMATES**

The revised construction cost estimate with contingency for the Phase B portion of this project is **\$17,606,570**. This cost estimate is based on design surveys and geotechnical investigations pertinent to this phase of the project.

## **PRELIMINARY DESIGN DRAWINGS**

A set of Preliminary Design Drawings has been completed for this project which details the preliminary designs of the proposed features of this project.