

**VICINITY MAP**

1" = 2000'

NEW ORLEANS QUADRANGLE  
LOUISIANA-PLAQUEMINES PARISH  
100K DRG SERIES

**APPLICANT:** RESTORATIONS SYSTEMS, LLC

**PROPOSAL:** MARSH RESTORATION

**LOCATION:** PLAQUEMINES, LOUISIANA

**JESUIT BEND:** JESUIT BEND, LOUISIANA

**WESTERN POINT-** **LATITUDE:** 29° 44' 41"

**LONGITUDE:** 90° 02' 31"

**EASTERN POINT-** **LATITUDE:** 29° 44' 30"

**LONGITUDE:** 90° 01' 33"

**DREDGE AND RECOVERY**

**TOTAL FILL VOLUME:** 1,830,000 C.Y.

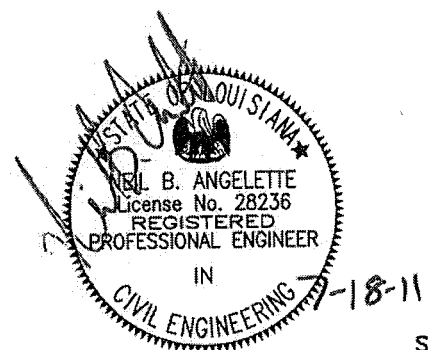
**Angelette • Picciola, LLC**  
CONSULTING ENGINEERS & SURVEYORS

13379 HWY 3235 - CUT OFF, LA 70345

P.O. BOX 970 - LAROSE, LA 70373

PHONE: 985-798-7700

FAX: 985-798-7755



SHT-01  
REVISED 7-18-11  
REVISED 7-13-11  
REVISED 6-21-11  
6-9-11  
110011

MISSISSIPPI RIVER

LA. HWY. 23

JESUIT BEND ESTATES

EXISTING 25' ACCESS SERVITUDE

RIVERBEND ESTATES

3075±

PROPOSED DREDGE DISCHARGE PIPE (ALTERNATE BORROW)

PROPOSED DREDGE DISCHARGE PIPE (PRIMARY BORROW)

CONTAINMENT DIKE

FISHERY CHANNEL (40' WIDE)

OVERFLOW BOX TO BE PLACED HERE IF PRIMARY BORROW IS USED

OVERFLOW BOX TO BE PLACED HERE IF ALTERNATE BORROW IS USED

1600±

PROPOSED MITIGATION AREA & WORK AREA

FILL LIMITS

4215±

PROPOSED ACCESS ROUTE (100' WIDE-TYP.)

ACREAGE BREAKDOWN

MITIGATION AREA	273.6 AC.
RENOURISHMENT AREA	12.7 AC.
FISHERY CHANNEL	3.6 AC.

LEGEND

- MITIGATION AREA
- RENOURISHMENT AREA
- CONTAINMENT DIKE
- DISCHARGE PIPELINE

NOTE: MARSH BUGGY & AIRBOAT TO BE USED IN DEFINED WORK AREA ONLY.

## SITE PLAN

SCALE: 1" = 1000'



REVISED 7-18-11  
REVISED 7-13-11  
REVISED 6-21-11

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RESTORATION SYSTEMS, LLC

SITE PLAN SHOWING LOCATION OF PROPOSED MITIGATION AREA.

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CONSULTING ENGINEERS & SURVEYORS

13379 HWY 3235 - CUT OFF, LA 70345  
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DESIGNED BY

L.J.P.

DRAWN BY

A.J.L.

CHECKED BY

K.S.P.

SCALE

SHOWN

DATE

6-9-11

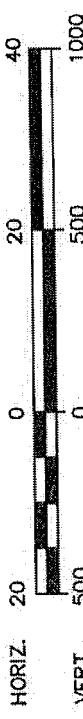
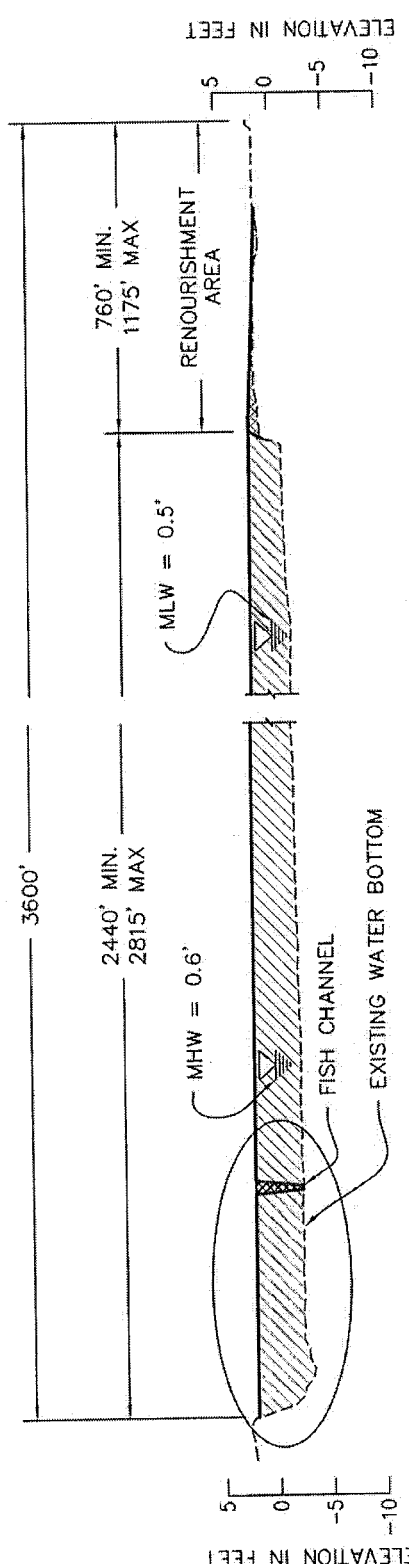
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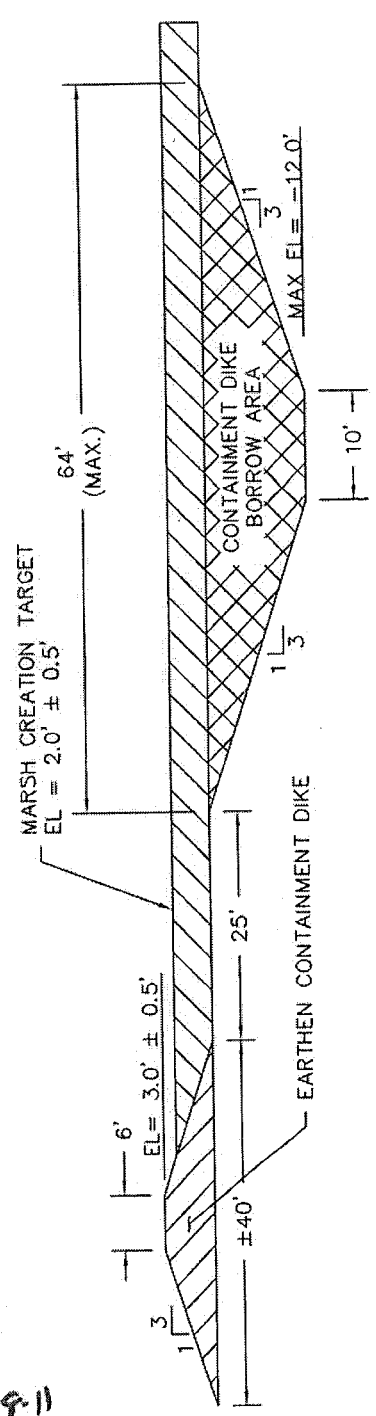
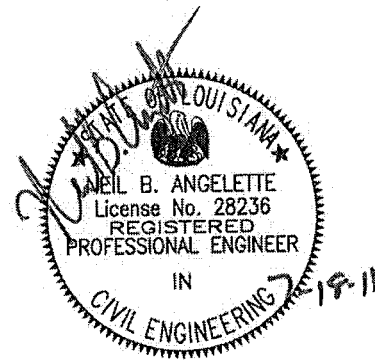
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**"A"**  
SHT-02

**SECTION**



**"B"**  
SHT-02

**SECTION**

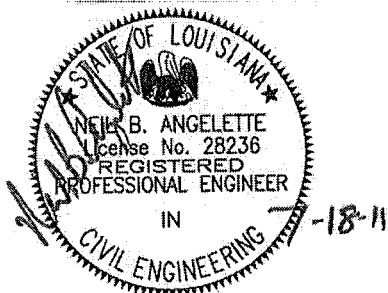
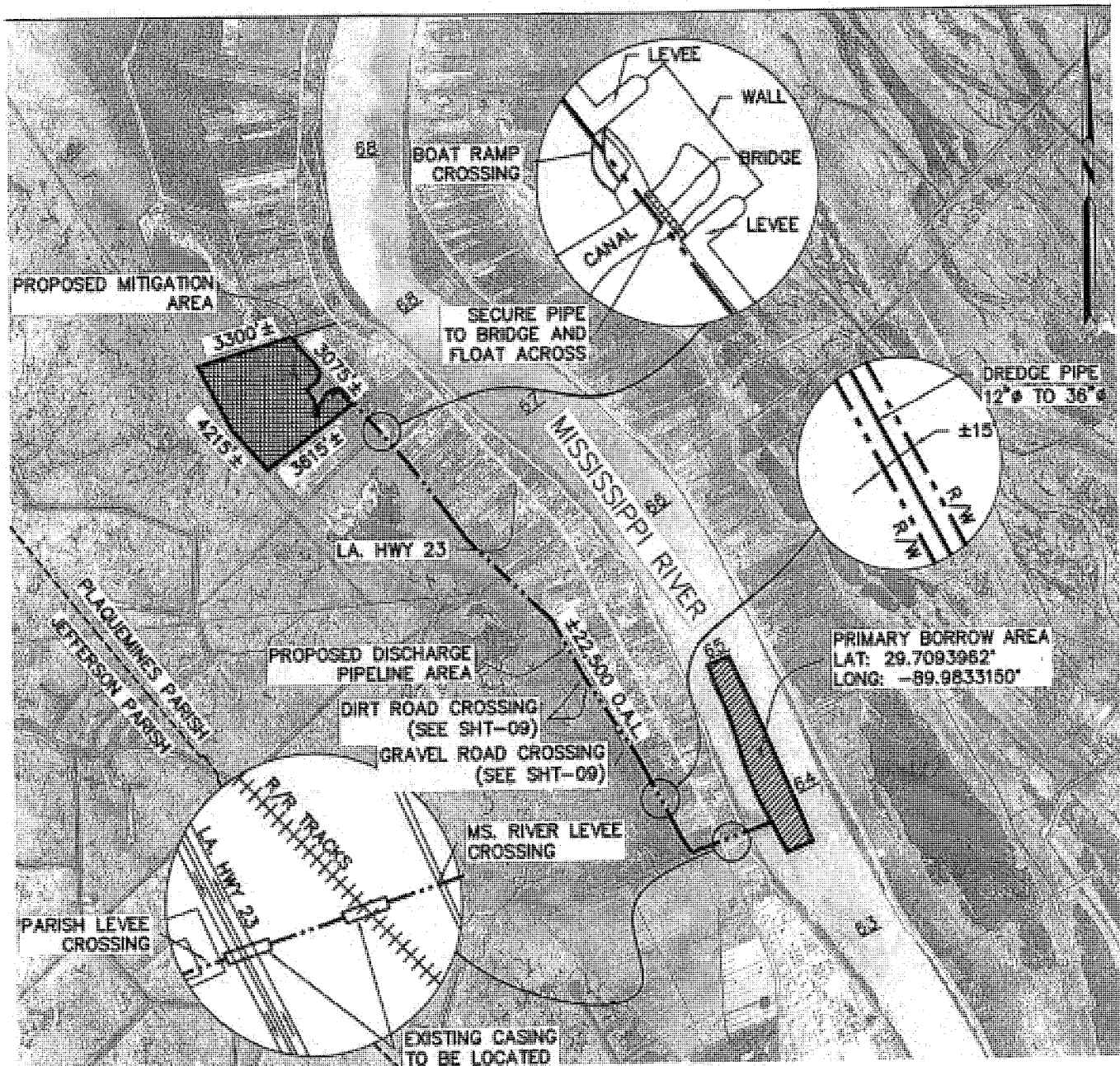
**EARTHEN CONTAINMENT  
DIKE DETAIL**

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REVISED 7-18-11  
REVISED 7-13-11  
REVISED 8-21-11

<b>RESTORATION SYSTEMS, LLC</b>	<b>Angelette • Picciola, LLC</b> CONSULTING ENGINEERS & SURVEYORS 13379 HWY 3235 - CUT OFF, LA 70345 P.O. BOX 970 - LAROSE, LA 70373 PHONE: 985-798-7790 FAX: 985-798-7755			SCALE SHOWN
OVERALL TYPICAL MITIGATION SECTION AND DETAIL.	DESIGNED BY L.J.P.	DRAWN BY A.J.L.	CHECKED BY K.S.P.	DATE 6-9-11
				PROJECT 110011
				SHEET NO. 3 OF 17



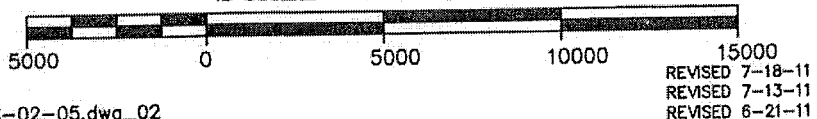


## OVERALL SITE PLAN PRIMARY BORROW SOURCE

### LEGEND

- PROPOSED MITIGATION AREA
- BORROW AREA
- RIVER MILE

SCALE: 1" = 5000'



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## RESTORATION SYSTEMS, LLC

OVERALL SITE PLAN SHOWING LOCATION OF PROPOSED MITIGATION AND BORROW AREA AND DISCHARGE PIPELINE PROJECTION FOR THE PRIMARY BORROW OPTION.

## Angelette • Picciola, LLC

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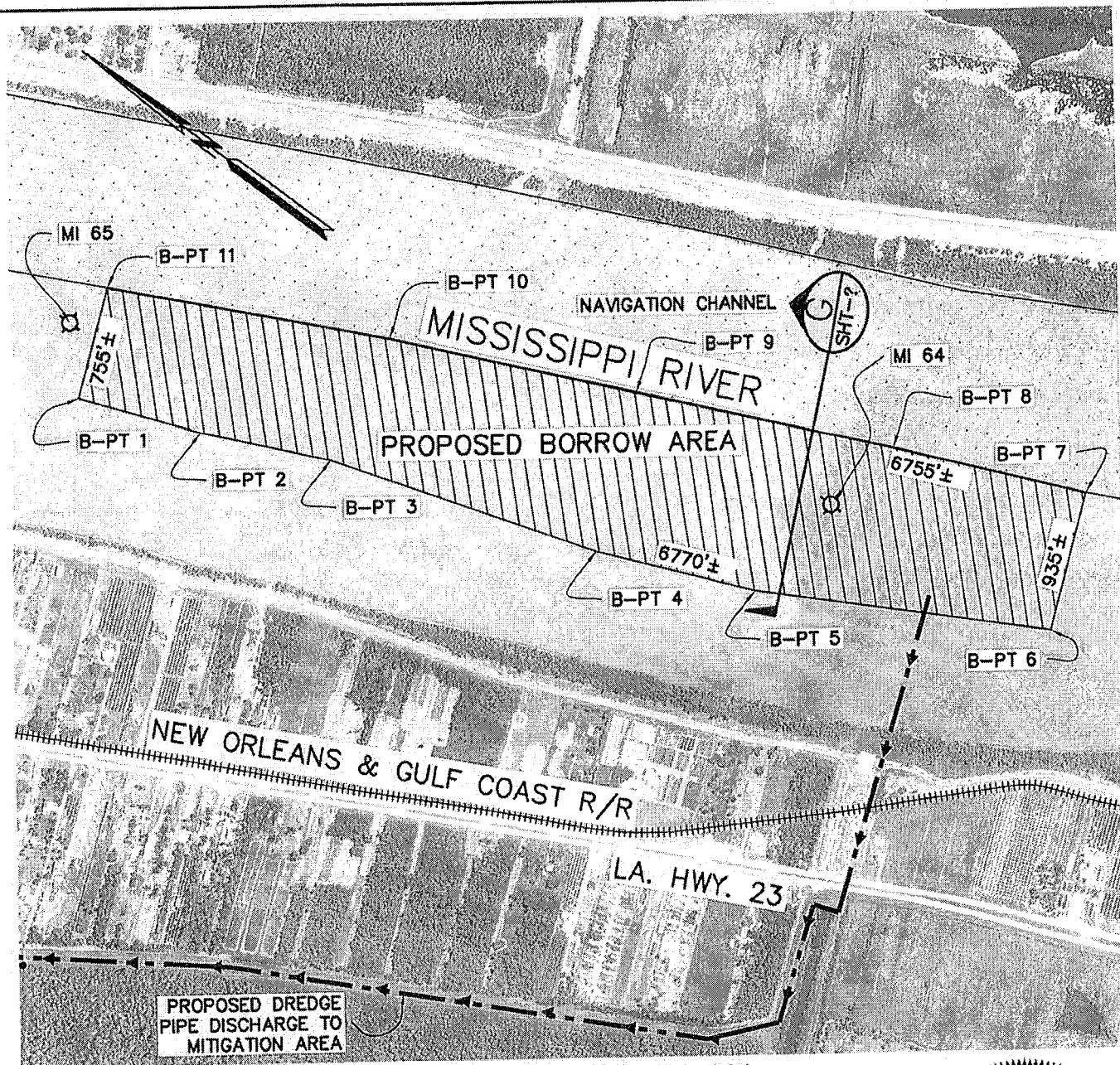
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6-9-11

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110011

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4 OF 17



## SITE PLAN

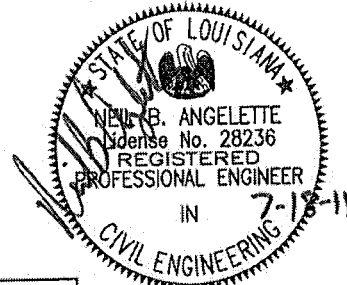
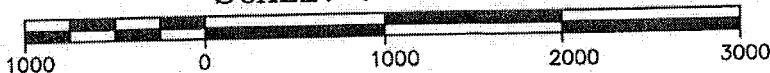
### PRIMARY BORROW AREA

BORROW AREA		
PT.	NORTHING	EASTING
B-PT 1	444,959.36	3,707,834.63
B-PT 2	444,163.19	3,708,133.88
B-PT 3	443,344.13	3,708,504.85
B-PT 4	441,544.29	3,709,080.62
B-PT 5	440,521.00	3,709,482.20
B-PT 6	438,741.87	3,710,454.01
B-PT 7	439,081.43	3,711,326.79
B-PT 8	440,321.85	3,710,803.50
B-PT 9	441,950.01	3,710,069.56
B-PT 10	443,501.85	3,709,384.42
B-PT 11	445,233.44	3,708,537.26

#### LEGEND

- NAV. CHANNEL
- BORROW AREA
- R/R TRACKS
- RIVER MILE
- DISCHARGE FLOW

SCALE: 1" = 1000'



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## RESTORATION SYSTEMS, LLC

SITE PLAN SHOWING LOCATION OF PROPOSED PRIMARY BORROW AREA.

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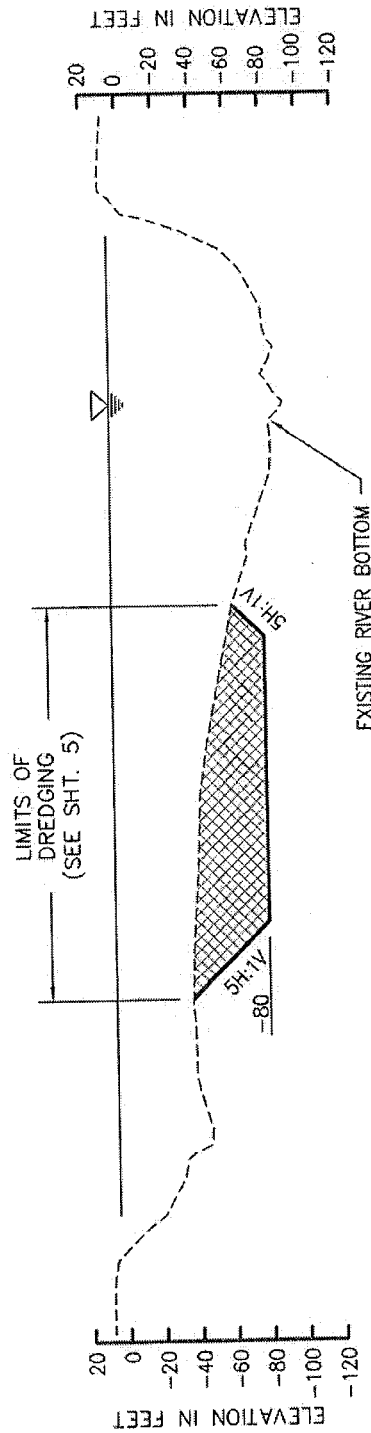
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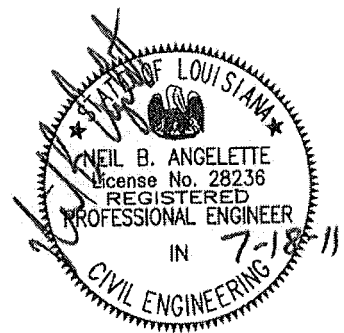
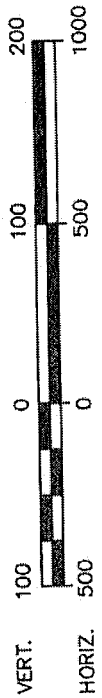
SHEET NO.

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SECTION  
1" = 500'

29 G  
SHT-05



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REVISED 7-13-11  
REVISED 6-21-11

RESTORATION SYSTEMS, LLC

TYPICAL CROSS SECTION OF PRIMARY BORROW SECTION.

Angelette • Picciola, LLC  
CONSULTING ENGINEERS & SURVEYORS

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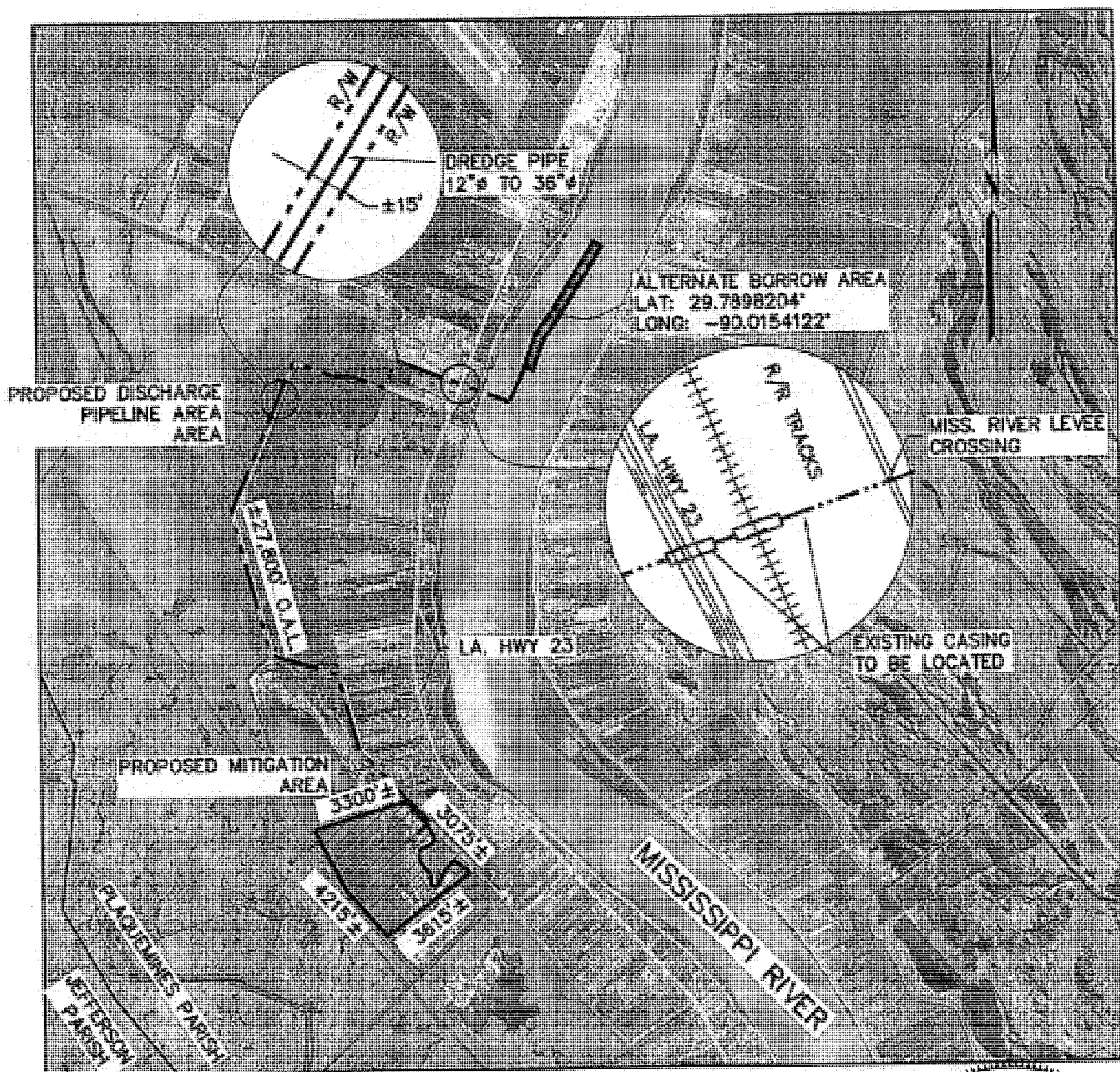
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110011

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## OVERALL SITE PLAN

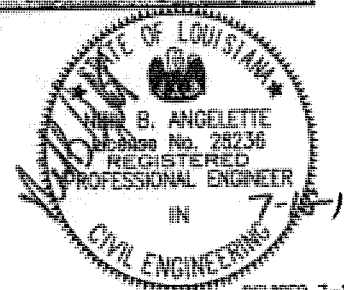
### LEGEND

- PROPOSED MITIGATION AREA
- BORROW AREA
- RIVER MILE

SCALE: 1" = 5000'



FILE: 110011\RESTORATION SYSTEM, LLC\PERMIT\03-SHT-01.dwg



REVISED 7-18-11  
REVISED 7-13-11  
REVISED 6-21-11

## RESTORATION SYSTEMS, LLC

OVERALL SITE PLAN SHOWING LOCATION OF PROPOSED MITIGATION AND ALTERNATE BORROW AREA AND DISCHARGE PIPELINE PROJECTION.

## Angelette • Picciola, LLC

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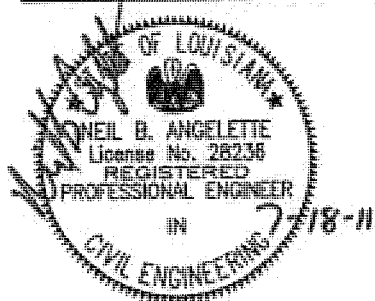
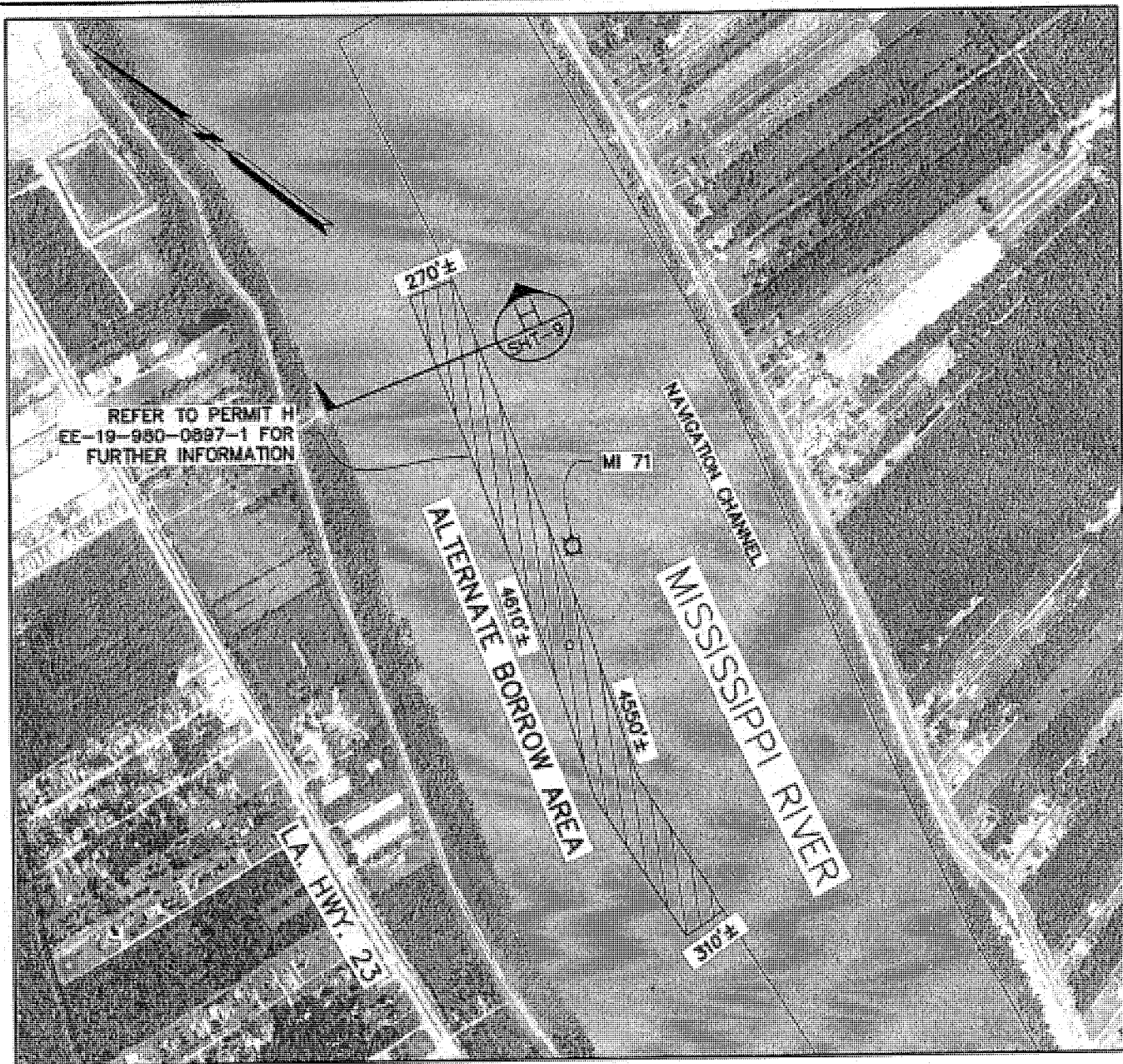
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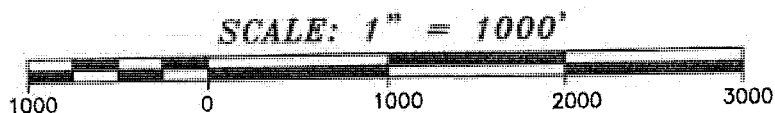
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## SITE PLAN

### ALTERNATE BORROW AREA

- LEGEND**
- NAV. CHANNEL
  - BORROW AREA
  - RIVER MILE



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## RESTORATION SYSTEMS, LLC

SITE PLAN SHOWING LOCATION OF PROPOSED ALTERNATE BORROW AREA.

## Angelette • Picciola, LLC

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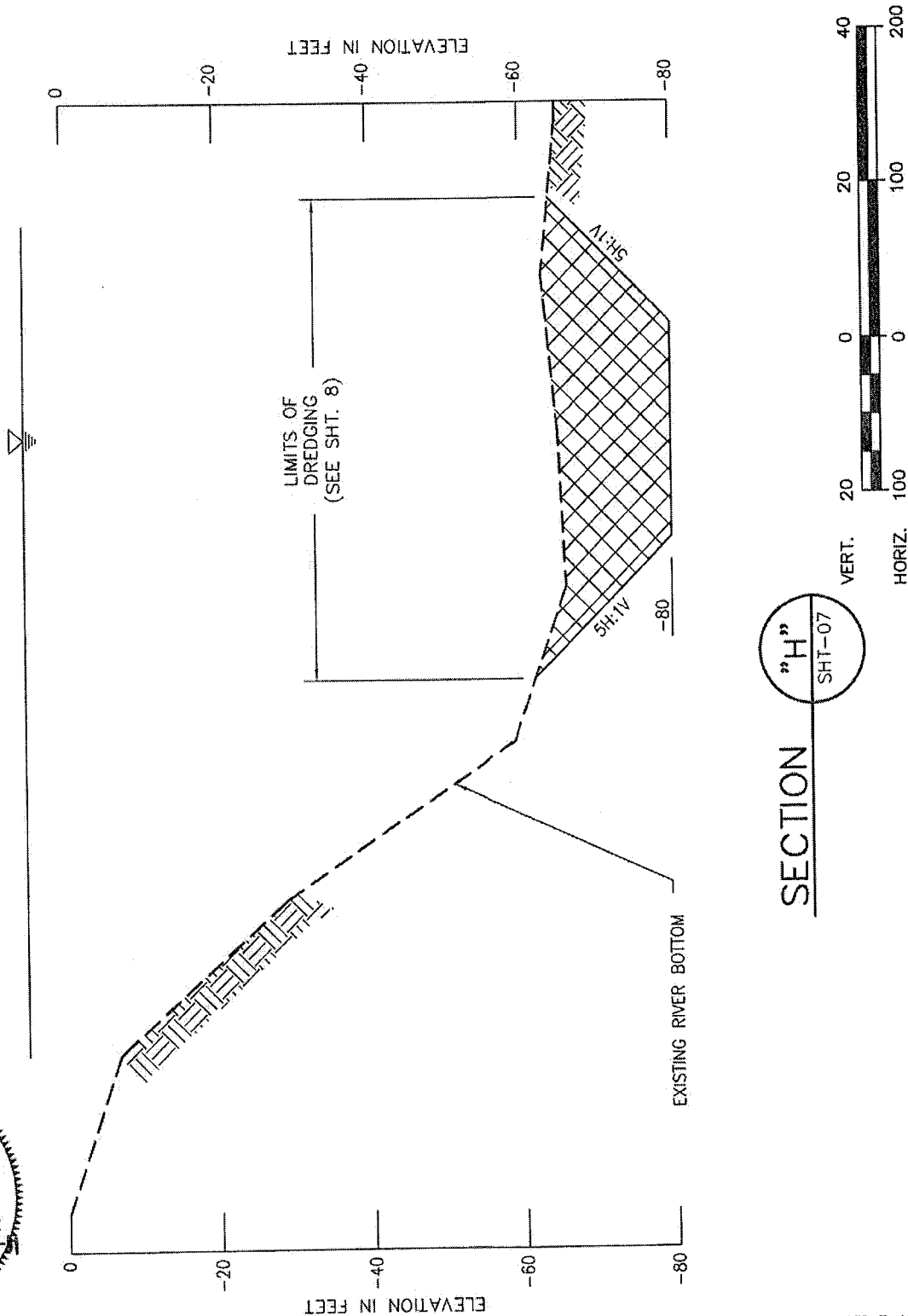
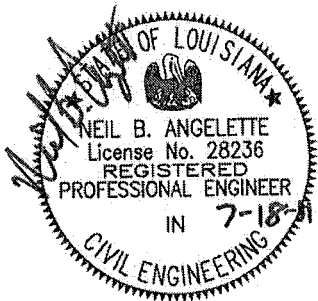
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**RESTORATION SYSTEMS, LLC**

TYPICAL ALTERNATE BORROW SECTION.

**Angelette • Picciola, LLC**

CONSULTING ENGINEERS & SURVEYORS

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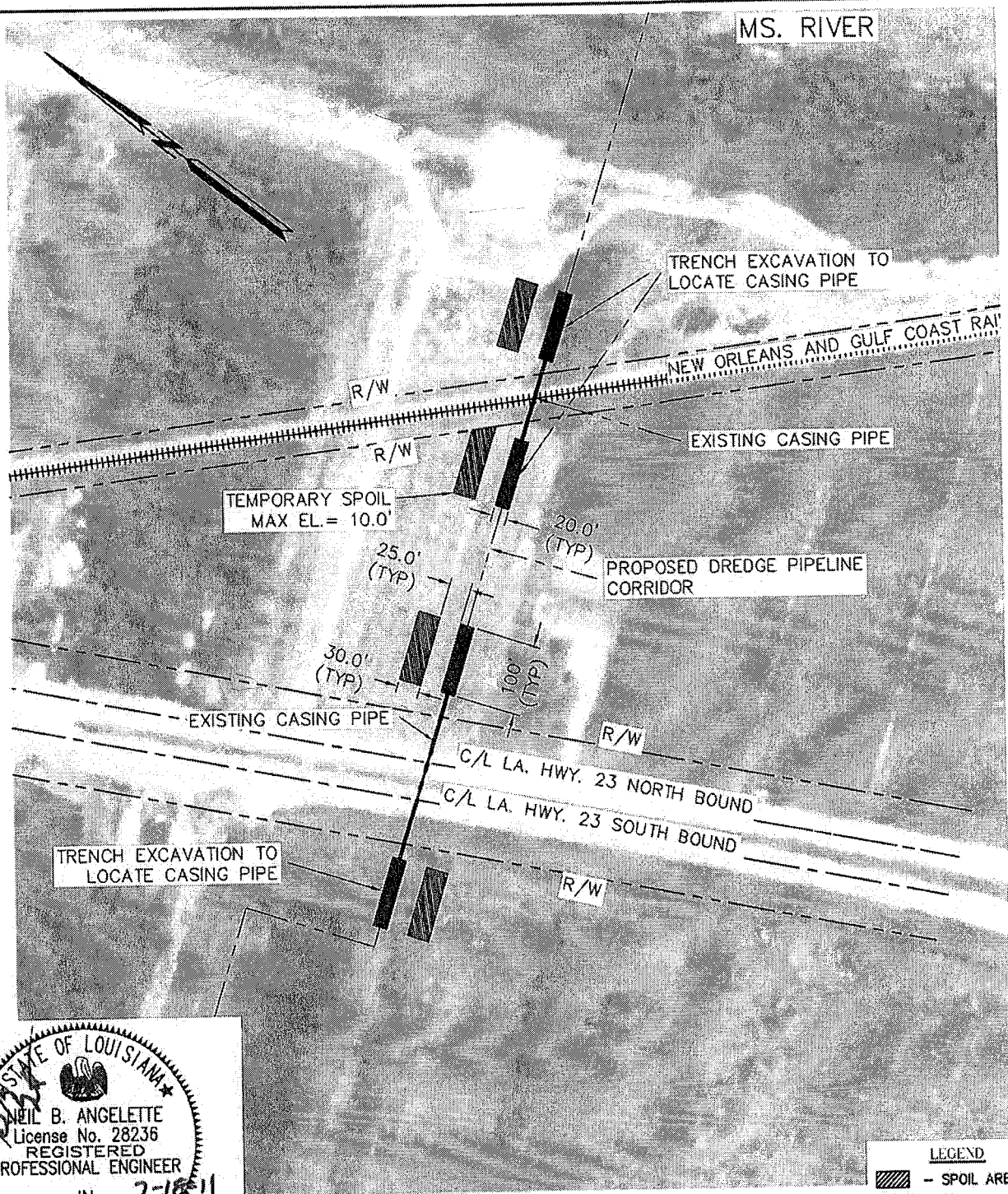
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SCALE  
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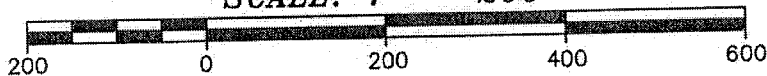
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110011

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## SITE PLAN

SCALE: 1" = 200'



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LEGEND	
	- SPOIL AREA
	- TRENCH EXCAVATION
	- R/R TRACKS
	- EXISTING CASING
	- RIGHT OF WAY

NOTE:  
TEMPORARY SPOIL SHALL BE  
BACKFILLED INTO TRENCHES  
PRIOR TO DEMOBILIZATION

REVISED 7-18-11  
REVISED 7-13-11  
REVISED 6-21-11

## RESTORATION SYSTEMS, LLC

SITE PLAN SHOWING LOCATION OF EXISTING ROAD AND RAILROAD  
CROSSINGS FOR PRIMARY BORROW AREA.

## Angelette • Picciola, LLC

CONSULTING ENGINEERS & SURVEYORS

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PROJECT

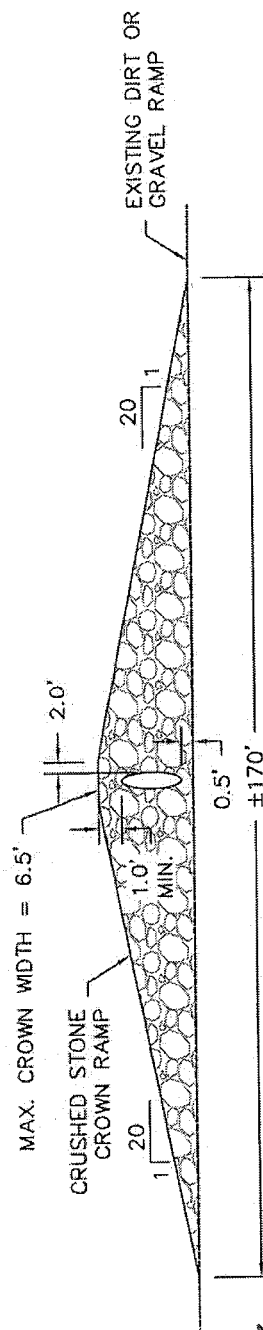
110011

SHEET NO.

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Diagram illustrating the plan view of the proposed gravel ramp and dredge pipeline crossing. The structure consists of a central section labeled "DREDGE PIPELINE" and two side sections labeled "CRUSHED STONE CROWN RAMP". The total width of the structure is indicated as 10.0'. The structure is shown crossing an "EXISTING DIRT OR GRAVEL ROAD". A circular feature labeled "C" is shown at the top of the diagram, with an arrow pointing towards the structure.

GRAVEL OR DIRT ROAD CROSSING  
PLAN VIEW



SECTION "C"

60-IHS

REVISED 7-18-11  
REVISED 7-13-11  
REVISED 6-21-11

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RESTORATION SYSTEMS, LLC

TYPICAL ROAD CROSSING DETAILS.

**Angelette • Picciola, LLC**  
CONSULTING ENGINEERS & SURVEYORS

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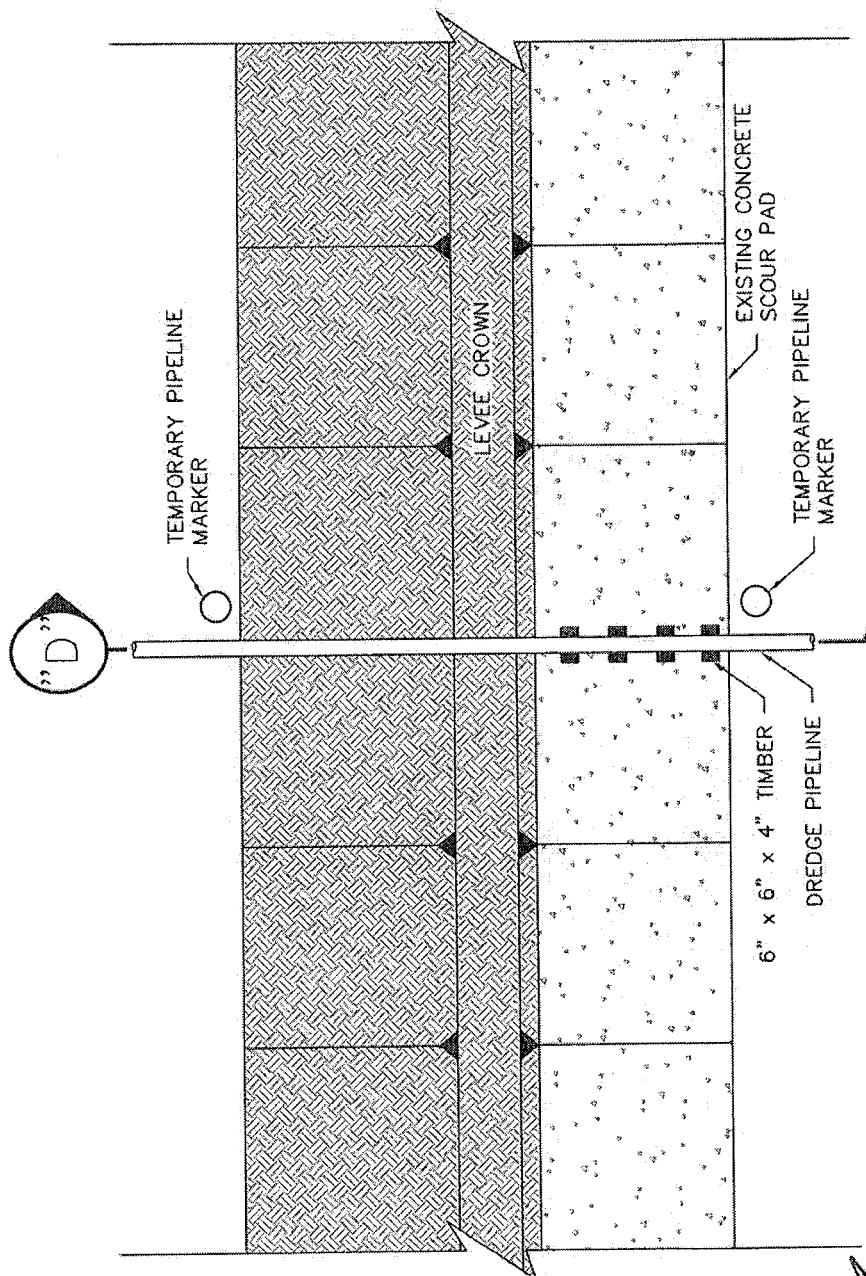
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11 OF 17





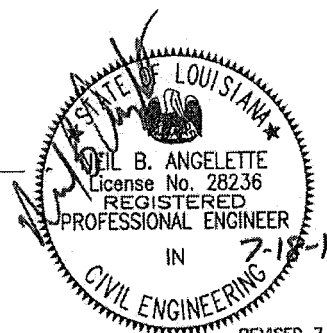
NOTE:  
TEMPORARY PIPELINE MARKERS  
INDICATING OWNER, CONTENTS, AND  
ADDRESS FOR CONTACTING OWNER  
SHALL BE PLACED AND MAINTAINED  
AT EACH TOE OF THE LEVEE NEAR  
DREDGE PIPELINE.

MISSISSIPPI RIVER

MISSISSIPPI RIVER LEVEE

PLAN VIEW

N.T.S.



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RESTORATION SYSTEMS, LLC

MISSISSIPPI RIVER LEVEE CROSSING PLAN VIEW.

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K.S.P.

SCALE

N.T.S.

DATE

6-9-11

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12 OF 17

MISSISSIPPI RIVER  
SIDE

6" x 6" x 4" TIMBER

EXISTING CONCRETE  
SCOUR PAD

LEVEE CROWN  
APPROX. EL. = 17.0'

DREDGE PIPELINE

TEMPORARY PIPELINE  
MARKER

EXISTING MISSISSIPPI  
RIVER LEVEE

20  
18  
12  
8  
4  
0

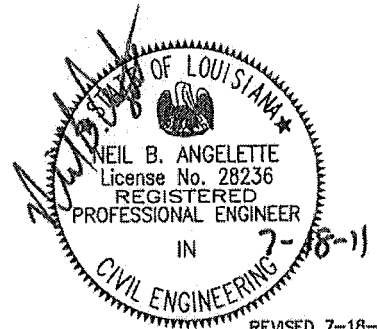
"D"

SHT-10

SECTION

VERT. 10 0 10 20  
HORIZ. 10 0 10 20

NOTE:  
TEMPORARY PIPELINE MARKERS  
INDICATING OWNER, CONTENTS, AND  
ADDRESS FOR CONTACTING OWNER  
SHALL BE PLACED AND MAINTAINED  
AT EACH TOE OF THE LEVEE NEAR  
DREDGE PIPELINE.



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RESTORATION SYSTEMS, LLC

MISSISSIPPI RIVER LEVEE CROSSING SECTION VIEW.

Angelette • Picciola, LLC

CONSULTING ENGINEERS & SURVEYORS

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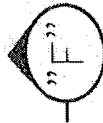
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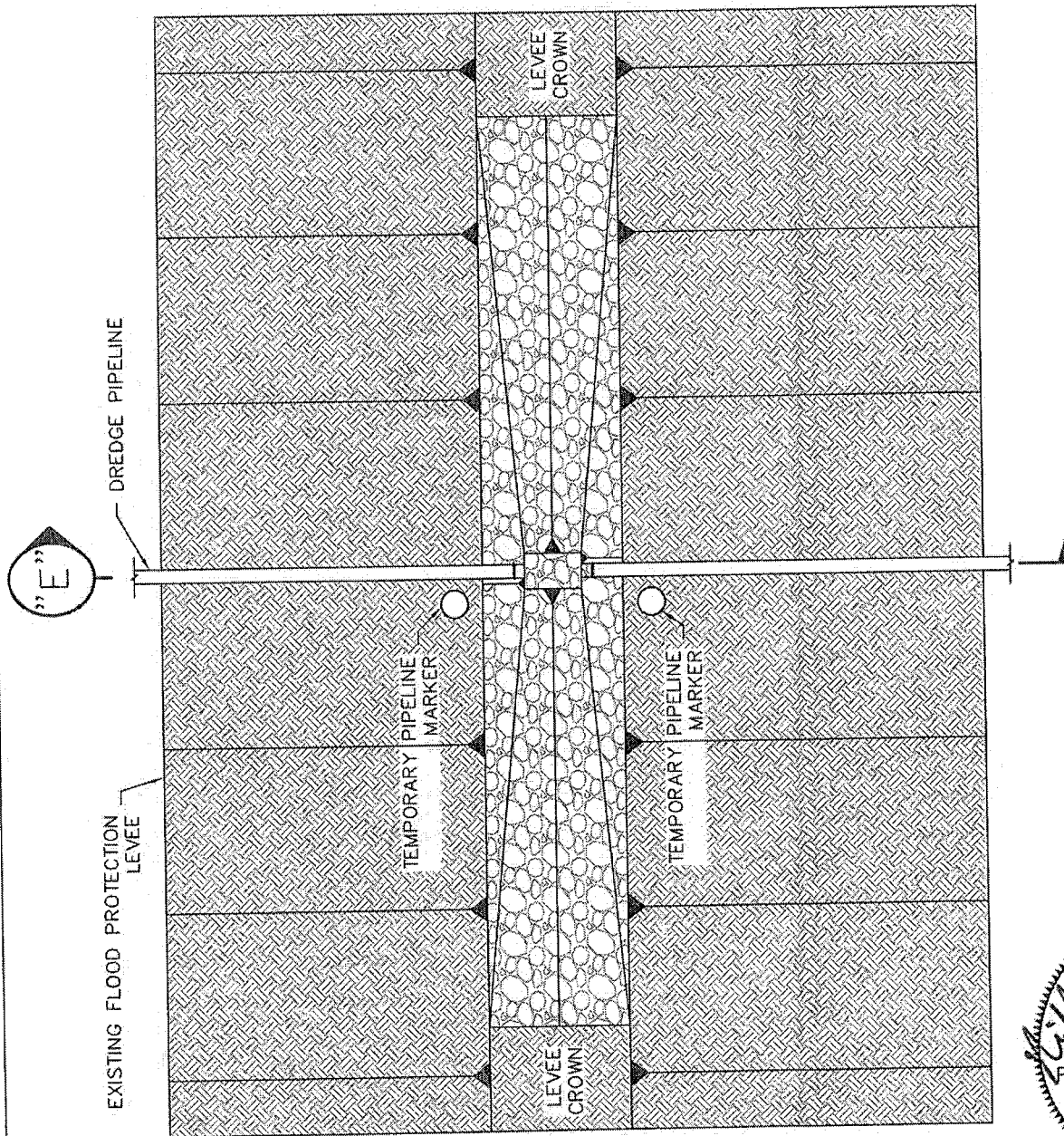
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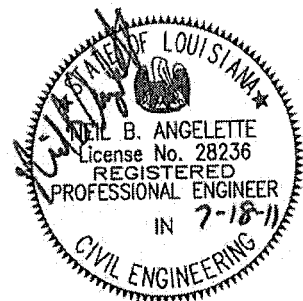
NOTE:  
TEMPORARY PIPELINE  
MARKERS INDICATING  
OWNER, CONTENTS,  
AND ADDRESS FOR  
CONTACTING OWNER  
SHALL BE PLACED  
AND MAINTAINED AT  
EACH TOE OF THE  
LEVEE NEAR DREDGE  
PIPELINE.



NOTE:  
THE CROWN RAMP  
OVER THE PIPELINE  
CROSSINGS SHALL  
CONSIST OF CRUSHED  
STONE FOR FULL  
WIDTH (10' MINIMUM)  
AND LENGTH OF  
RAMP. THE CRUSHED  
STONE MATERIAL  
SHALL CONFORM TO  
DOTD 2000  
SPECIFICATION  
1003.04 (a).



PLAQUEMINES PARISH FLOOD  
PROTECTION LEVEE  
N.T.S.



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RESTORATION SYSTEMS, LLC

TYPICAL PROTECTION LEVEE CROSSING DETAIL.

Angelette • Picciola, LLC  
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N.T.S.

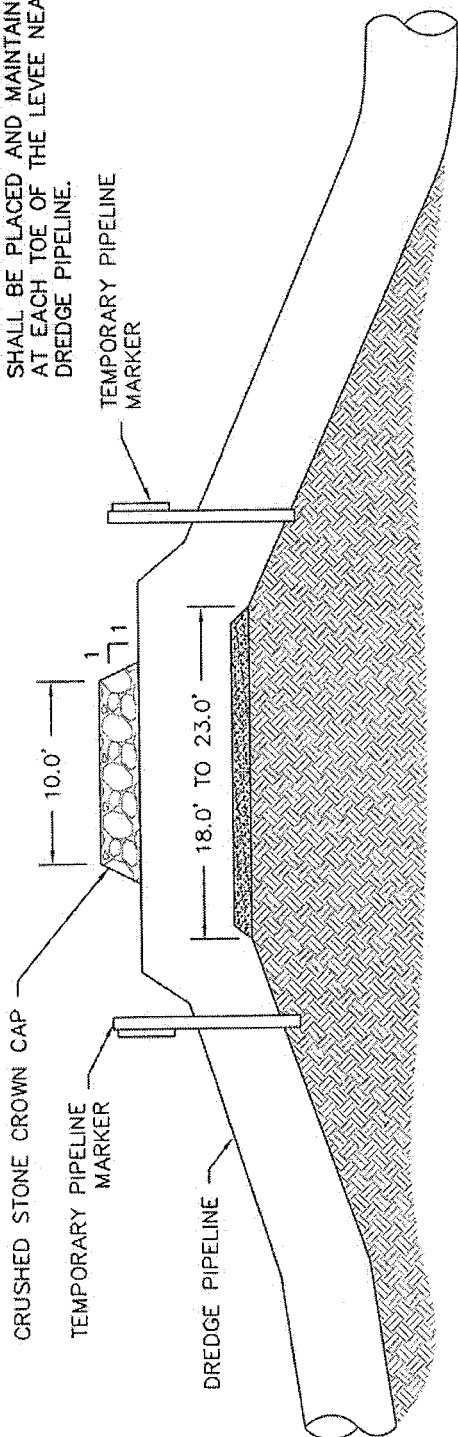
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14 OF 17

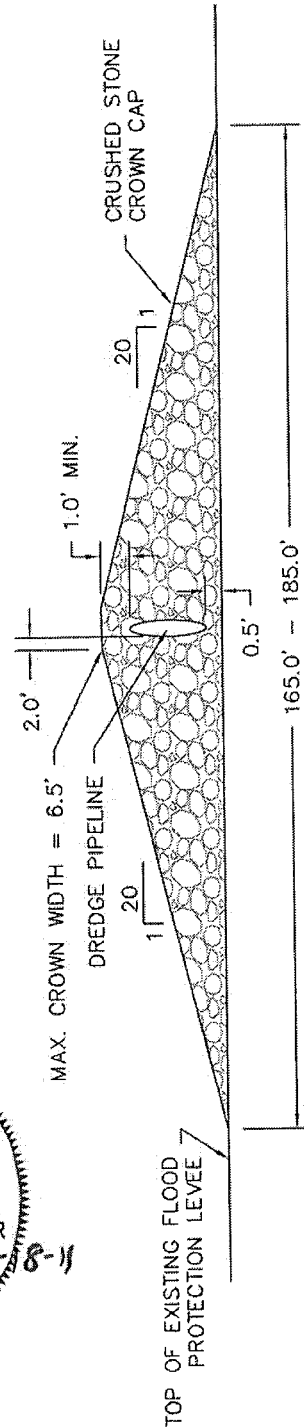
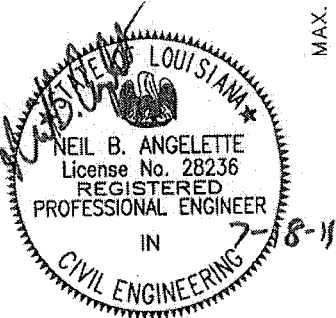
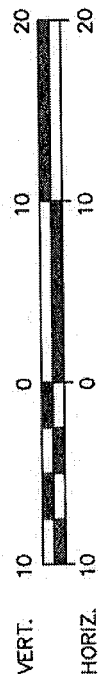


NOTE:  
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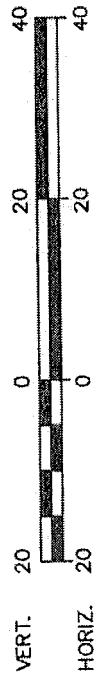
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# SECTION



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REVISED 7-13-11  
REVISED 6-21-11

RESTORATION SYSTEMS, LLC

TYPICAL PROTECTION LEVEE CROSSING SECTIONS.

Angelette • Picciola, LLC  
CONSULTING ENGINEERS & SURVEYORS

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P.O. BOX 970 - LAROSE, LA 70373

PHONE: 985-798-7700

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DESIGNED BY

L.J.P.

DRAWN BY

A.J.L.

CHECKED BY

K.S.P.

SCALE

N.T.S.

DATE

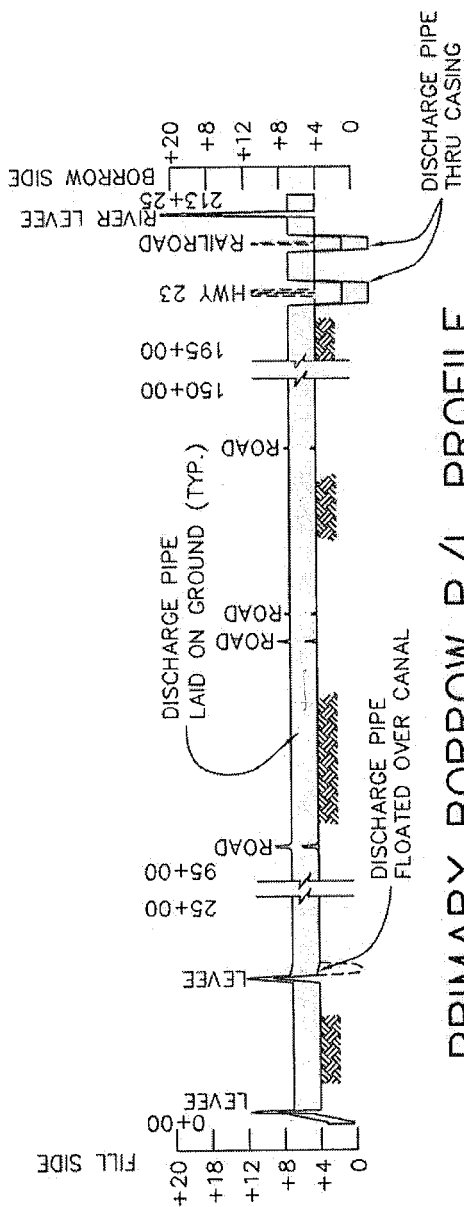
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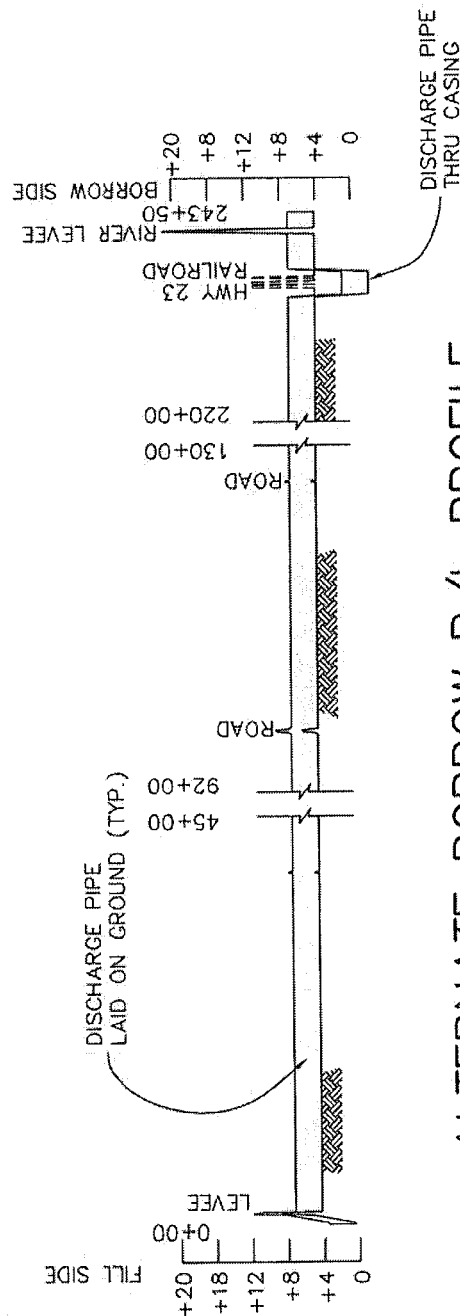
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15 OF 17



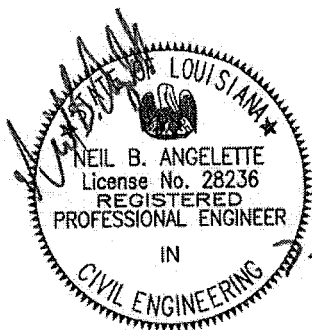
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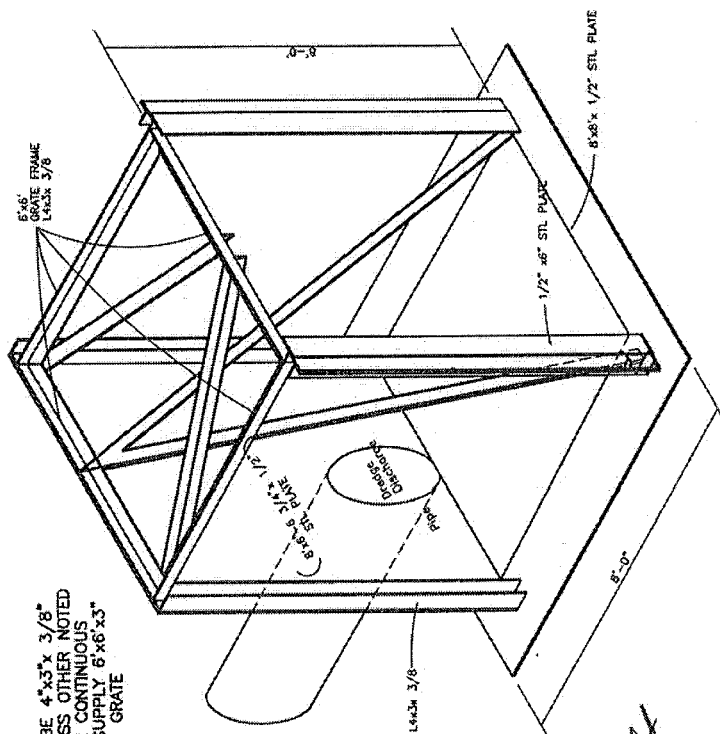


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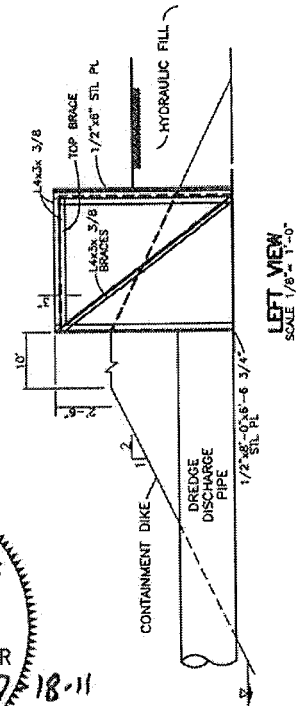
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REVISED 6-21-11

RESTORATION SYSTEMS, LLC	Angelette • Picciola, LLC			SCALE N.T.S.
DISCHARGE PIPELINE PROFILES	CONSULTING ENGINEERS & SURVEYORS			DATE 6-9-11
	13379 HWY 3235 - CUT OFF, LA 70345 P.O. BOX 970 - LAROSE, LA 70373 PHONE: 985-798-7700 FAX: 985-798-7755			PROJECT 110011
	DESIGNED BY L.J.P.	DRAWN BY A.J.L.	CHECKED BY K.S.P.	SHEET NO. 16 OF 17

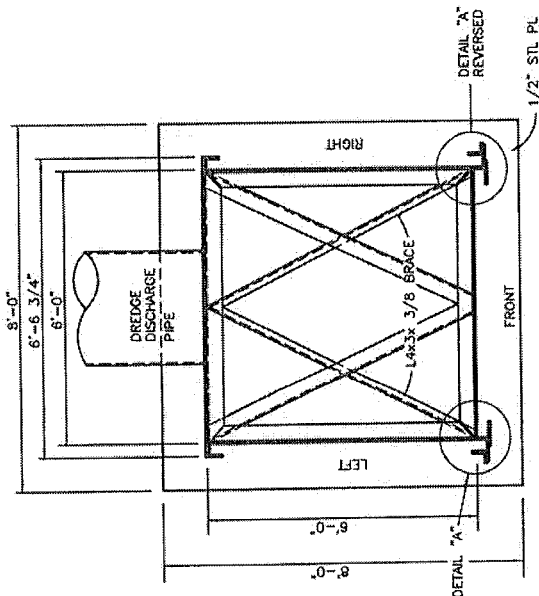
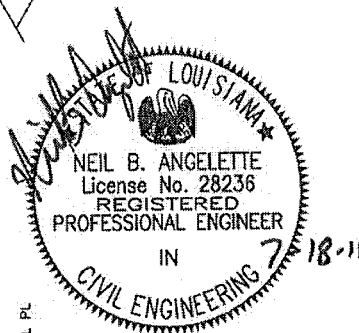


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ANGLE IRON UNLESS OTHER NOTED  
ALL WELDS TO BE CONTINUOUS  
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1 3/4" SERRATED GRATE

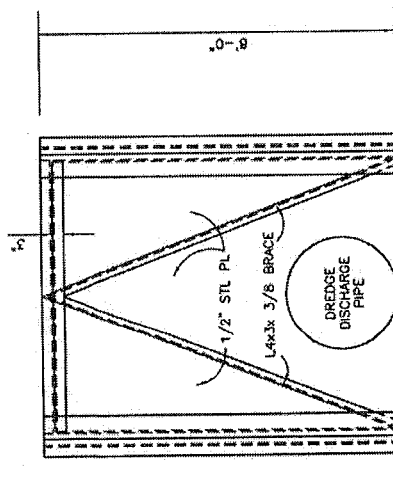
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LEFT VIEW  
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TOP VIEW  
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FRONT VIEW  
SCALE 1/4"=1'-0"

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RESTORATION SYSTEMS, LLC

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SCALE

NOTED

DATE

6-9-11

PROJECT

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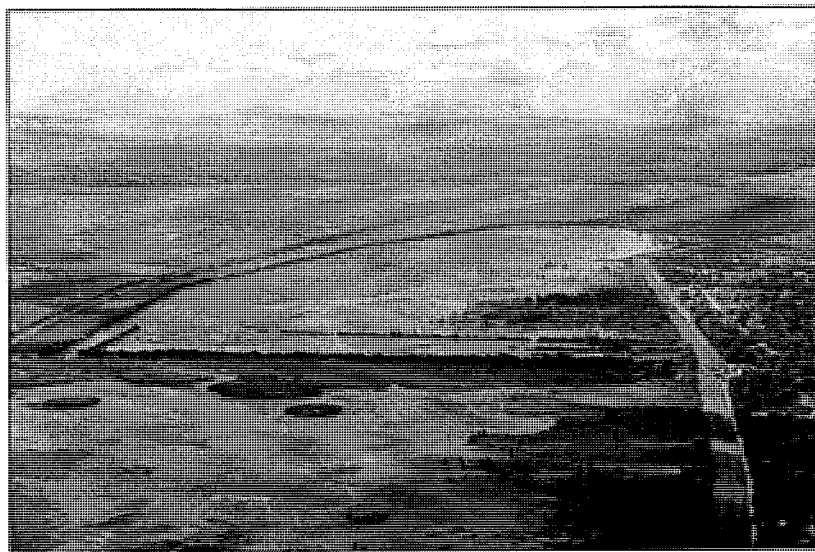
SHEET NO.

17 OF 17



- Sediment discharge pipelines for both the primary and alternate borrow sources shall be laid on the protected side (eastern side) berm of the Plaquemines Parish Flood Protection Levee.
- In order to construct containment dikes for the mitigation fill area, native material will be borrowed directly adjacent to the containment dikes from within the proposed fill area (See typical section "B" on sheet 3 of the permit drawings). Once the transported sediment has been placed and settled into the mitigation fill area up to the desired finished grade elevation, the containment dikes will then be degraded to match the adjacent mitigation area elevation of +2.0' N.A.V.D +/- 0.5'.

**PROSPECTUS  
JESUIT BEND MITIGATION BANK  
PLAQUEMINES PARISH, LOUISIANA**



July 1, 2011

*Sponsor:*



**1101 Haynes Street, Suite 211  
Raleigh, NC 27604**

*Agent:*



**2420 Lakeshore Drive, Suite 100  
Tallahassee, FL 32312**

*Prospectus developed in concert with:*



**DAVID O'REILLY  
ENGINEERING CONSULTANTS**

**5003 Tchoupitoulas Street  
New Orleans, LA 70115**

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## 1.0 INTRODUCTION

The Sponsor, Restoration Systems, LLC (RS), proposes establishing a freshwater wetland mitigation bank in Plaquemines Parish approximately 8 miles south of Belle Chase, Louisiana. The bank will provide mitigation credits (MC) for wetland and aquatic resource impacts in the mitigation service area.

The proposed Jesuit Bend Mitigation Bank (JBMB) encompasses approximately 338 acres of open water, wooded berm, emergent marsh, and cypress swamp. Nearly all of the JBMB Site has compensatory mitigation potential in the form of re-establishment, rehabilitation, and preservation of freshwater marsh and cypress-tupelo gum swamp, including a fishery habitat and bayou. The entire Site will be preserved and protected by a Conservation Servitude. Finally, there is the potential for the bank to increase in size to  $\pm 1000$  acres once adjacent land is acquired from current owners. An additional 25-acre parcel is in the process of being acquired.

### 1.1 Site Location

JBMB occurs in Plaquemines Parish (**Figure 1**). The Site is easily visible on satellite photographs and lies approximately one-half mile west of the Mississippi River at Jesuit Bend; Site photographs are provided as **Appendix 1a**. Site coordinates are 29.74197° N latitude and -90.03363° W longitude in Township 15 South, Range 24 East, Sections 14,15,16, and 17. The Site occurs in the East Central Louisiana Coastal Water Basin in the United States Geological Survey eight-digit cataloguing unit 08090301 and Louisiana Department of Environmental Quality's (DEQ) Barataria basin (**Figure 2**).

The 338-acre Site is bounded on the east by the Plaquemines Parish Flood Protection Levee (also known as the Plaquemines 2 non-federal levee-PL2, IPET 2009); south by another inundated Site; west by pipeline canals and their associated low berms; and on the north by over 20 inundated parcels of land. JBMB may be accessed from the Plaquemines Levee by way of the Ollie Pump Station Site that is located at the west end of Ollie Road in unincorporated Jesuit Bend, LA (**Figure 3**).

The Plaquemines Levee is bound on its east by the Parish Canal and to its east by a Jesuit Bend neighborhood of single-family residences. The land immediately north and south of the Site is of the same character as the JBMB Site: shallow open-water ponds. The Ollie Canal lies immediately south of the southern-adjointing parcel. The lands to the west are the large expanses of freshwater and transitional marsh of the Barataria landbridge, which are separated from JBMB by a pipeline canal.

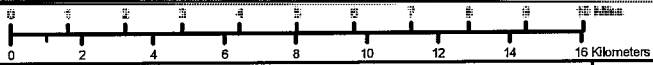
A video taken from a helicopter of JBMB is located at <http://tinyurl.com/33u6jqx>.

## 2.0 PROJECT GOALS AND OBJECTIVES

The goals of JBMB are to restore and preserve the natural community functions of approximately 277 and 51 acres, respectively, of freshwater and cypress-tupelo gum swamp at JBMB that have been degraded due to anthropogenic activities, natural land subsidence, sediment deprivation from the Mississippi River, wave fetch, and the wind, flood and saltwater damages associated with a series of recent hurricanes. The Site will be restored by importing river sediments to the Site to return it to natural wetland grade and replanting (**Figure 4**). The post-mitigation wetlands will be freshwater marshes and cypress-tupelo gum swamps. There will be a transitional forested zone at the eastern edge of the cypress-tupelo gum swamp where it meets the PL-2.

JBMB is strategically located and capable of restoring a variety of biotic and physical functions to the watershed. Therefore, the objectives of JBMB are multiple.

- Wetland – Long-term loss of wetland functions at this Site will be restored by reversing the causes of the Site's degradation.
- Physical – New sediment will be brought into the system. This will provide greater flood protection and flood storage, as well as extend the Barataria land bridge.

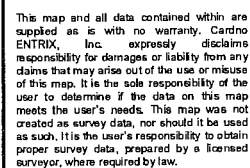


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**Figure 1 - Location Map**  
**Jesuit Bend Mitigation Bank**  
**Plaquemines Parish, Louisiana**




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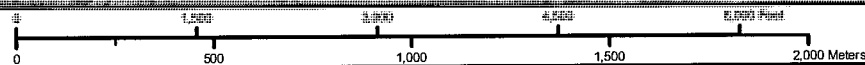


RESPIRATION  
SYSTEMS, INC.

Circle 66

	
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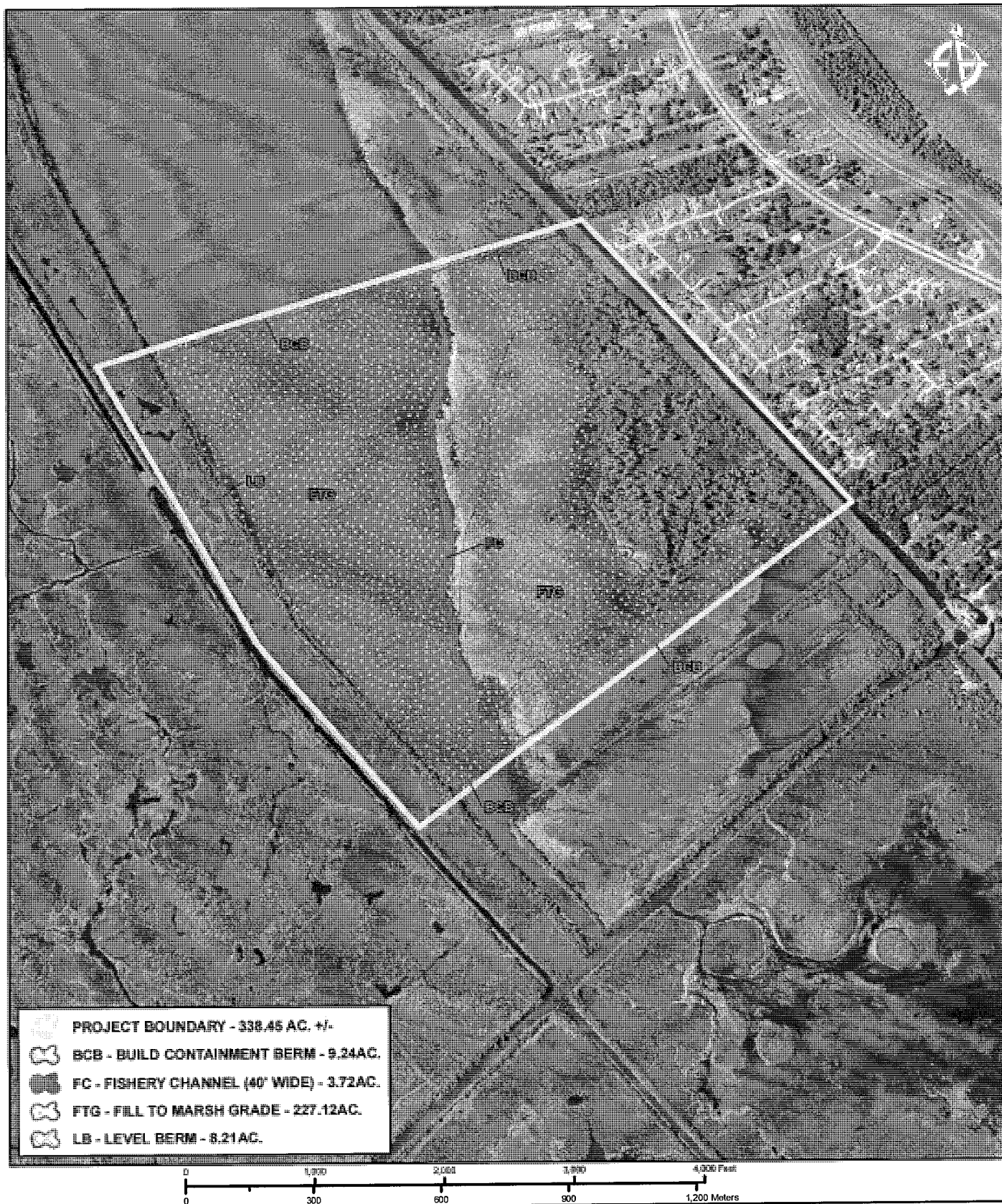
**Figure 3 - Site Access Map**  
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**Plaquemines Parish, Louisiana**



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## Figure 4 - Proposed Mitigation Plan Map

Jesuit Bend Mitigation Bank  
Plaquemines Parish, Louisiana



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- Biotic – Marsh and swamp habitat functions will be restored and enhanced; sensitive fishery functions (red drum, white and brown shrimp, as well as gulf menhaden, Atlantic croaker and blue crab habitat) will be substantially enhanced; as will avian and wetland mammal species habitats.
- Biogeochemistry – Re-building marsh and swamp habitats will restore biogeochemical processes as substantially more plant and invertebrate detritus will enter system.
- Soils – Restoration of the Site topography and vegetative habitats will ensure restoration of the organic material to the system that is critical for rebuilding an organic soil profile at the Site.
- Hydrologic – Restoration of the Site topography, incorporation of the fishery channel, while maintaining a connection to offsite waters will restore the Site's hydrologic processes.

The overall mitigation plan is depicted in **Figure 4**. The Sponsor will use re-establishment, rehabilitation, and preservation to implement JBMB. **Table 1** indicates the method to be used by habitat and location.

**Table 1.** Mitigation Plan Summary: Habitats; Methods; and Area Affected.

Habitat Type	Acres	Method
Cypress-Tupelo Gum Swamp	51.1	Rehabilitation and Preservation
Fishery Channel	3.7	Rehabilitation
Freshwater Marsh	273.2	Re-establishment and Rehabilitation
Plaquemines Levee	6.7	NA
Drainage Canal	4.0	NA
TOTAL	338.7	

### 3.0 ECOLOGICAL SUITABILITY OF THE SITE



JBMB will restore the Site to its prior conditions. As described below, the plan will reverse the processes that caused the severe degradation of the marsh system and restore wetland functions to the Site.

#### 3.1 Historical Ecological Characteristics of the Site

Historically the Site was at the edge of the forested floodplain of the Mississippi River and the upper freshwater reaches of the Barataria Bay system. Since construction of the Mississippi River levee system, the Site's hydrology has been altered such that hydrologic inflows may now only access the Site from the Barataria system. Currently the Site is subject to tidal fluctuations and seasonal variations of the tidal flows. The tidal inflows and outflows on the Site are exclusively from an isolated narrow opening in an existing weir on the southern adjoining property border with Ollie Canal. The opening is approximately 30 feet wide. Anticipated tidal fluctuations of 1 to 1.5 feet maximum (typical variations between .5 to .8 feet) are expected which is typical for this area and ideal for marsh and forested growth sustainability. **Figure 5** <http://ChemStation.com> depicts the Site conditions after construction of the PL-2 and the Ollie Canal but prior to other canals or berms in the immediate vicinity. Most of the Site was a marsh with a cypress-tupelo gum swamp by the PL-2.

The communities that would have been present historically (**Table 2**), following the Cowardin classification system (Cowardin *et al.* 1979), were Palustrine Forested Broad & Needle-Leaved Deciduous and Palustrine Emergent Persistent. In lay terms, these habitats would be known as cypress-tupelo gum swamps and freshwater marshes. From an eco-region standpoint, the community types would be characterized as cypress-tupelo gum swamps in the Southern Holocene Meander Belts and freshwater marshes in the Deltaic Coastal marshes (Daigle *et al.* 2006). These community types are typical of long hydroperiod wetlands common in the region.



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**Table 2.** Historic Habitats at JBMB.

Habitat/Community Type	Community Common Name	Ecoregion Types	Species
Palustrine Forested Broad and Needle-Leaved Deciduous	Cypress-Gum Swamp	Southern Holocene Meander Belts (73K)	In wettest areas, cypress-gum swamps (bald cypress, water tupelo); on less flooded zones, overcup oak, Nuttall oak, willow oak, water hickory, elm, green ash, sweetgum; on point bars and natural levees, sweetgum, ash, cottonwood, some areas of live oak. Some forested canebrakes with open, mixed deciduous trees and giant cane
Palustrine Emergent Persistent	Freshwater Marsh	Deltaic Coastal Marshes (73O)	Freshwater marsh vegetation of grasses, sedges, and rushes with few to no trees. Alligator weed, spike rush, maidencane, cutgrass, and bulltongue

In terms of land uses, in the former swamp lands, bottomland forests and landward edges of the extensive marshes have been cleared and the region has been extensively modified for agriculture, flood control, and navigation. Levee and canal systems are extensive throughout the region. Soybeans, sugarcane, cotton, corn, and pasture are the major crops with crawfish aquaculture common. The wetland systems act as a buffer to help moderate flooding and tidal inundation during storm events.

JBMB Site has been used for a variety of types of agriculture including cattle ranching, crops and aquaculture. Implementation and protection of Bank resources through a Conservation Servitude will promote the sustainability of aquatic resources in the mitigation service area.

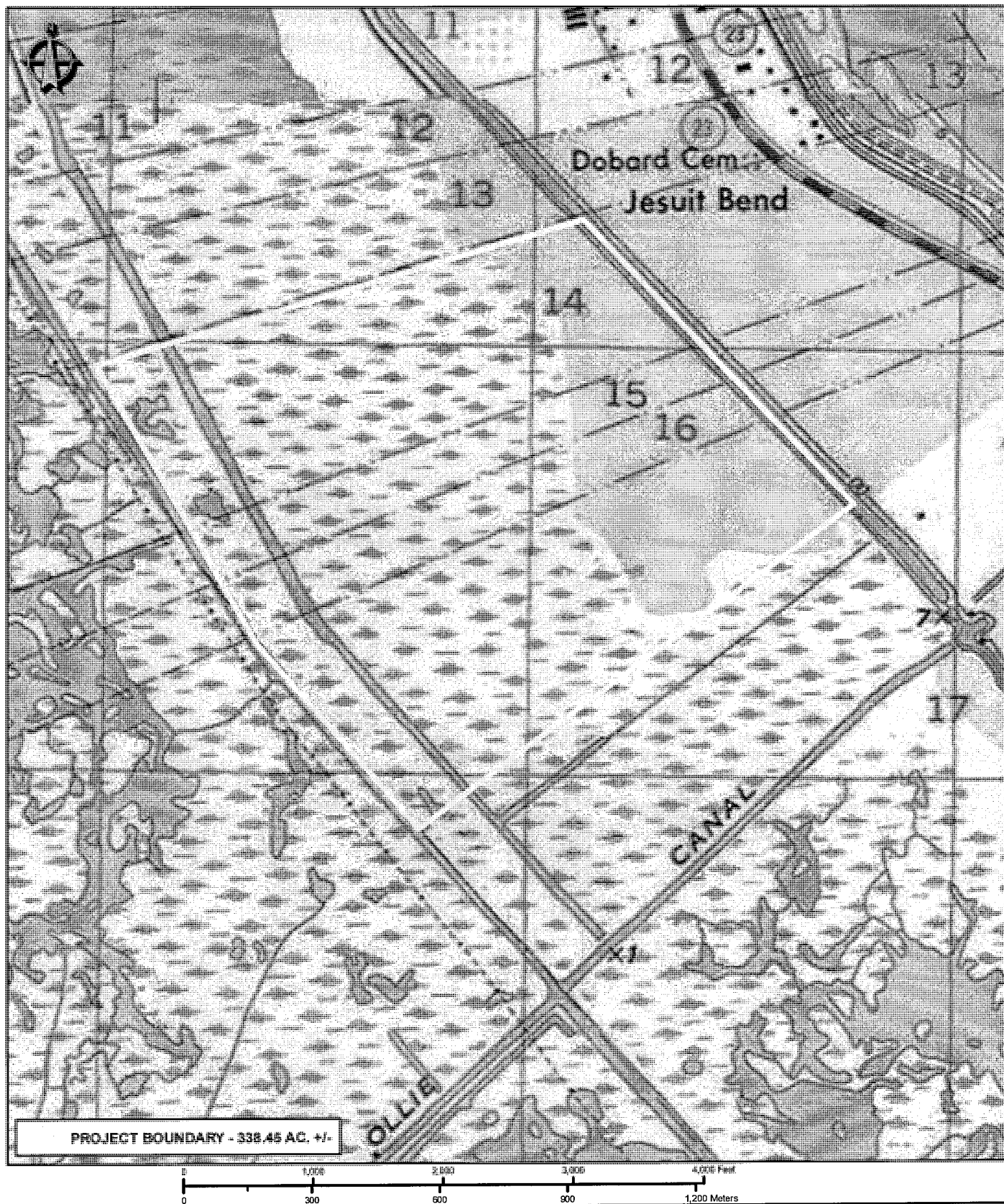
### ***3.2 Current Ecological Characteristics of the Site***

The Site is entirely flat and wet (**Figures 5 and 6**). Nearby spot elevations (**Figure 6**) indicate the land surface varies from elevations of one foot in the marsh to seven feet at the Plaquemines Levee edge. The top of the Plaquemines Levee is approximately 8.5 feet in elevation (IPET 2009, pg. VIII-5-48).

The Site vegetation is typical for the unmanaged lands in this region (**Figure 7, Table 3**). The existing Site is bounded by the Plaquemines Levee on the east, which grades into a deeply inundated cypress swamp that has a ground cover of emergent marsh species (**Appendix 1c Photographs 1 and 2**). There is a mixed hardwood and exotic species edge as the levee grades into the swamp (**Appendix 1c Photographs 3 and 4**). A low wooded berm on the western side of the Site (**Appendix 1c Photographs 5 and 7**) separates the main body of open water (**Appendix 1c Photograph 6**) from an emergent freshwater marsh community (**Appendix 1c Photograph 7**).

Soils at the Site are Allemands and Barbary Mucks (**Figure 8**; NRCS 2010). Neither soil type is a prime farmland soil due to their hydric characteristics. Allemands Muck supports marsh vegetation and is typically characterized by 36 inches of muck, comprised of decomposed organic material, that overlays deeper clayey backswamp deposits. It is frequently flooded by non-saline to very slightly saline (0.0 to 4.0 mmhos/cm) water. Barbary Muck supports swamp vegetation and is typically comprised of 4 inches of muck over fluid clayey backswamp deposits. It is frequently flooded by non-saline (0.0 to 2.0 mmhos/cm) water. The levee is presumably made of spoils from canal construction. The internal berm would have been constructed with adjacent on-Site soils. **Table 3** summarizes the current Site conditions.





**Figure 6 - USGS Quadrangle Map**

**Jesuit Bend Mitigation Bank  
Plaquemines Parish, Louisiana**

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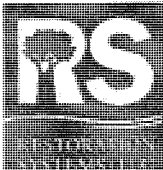


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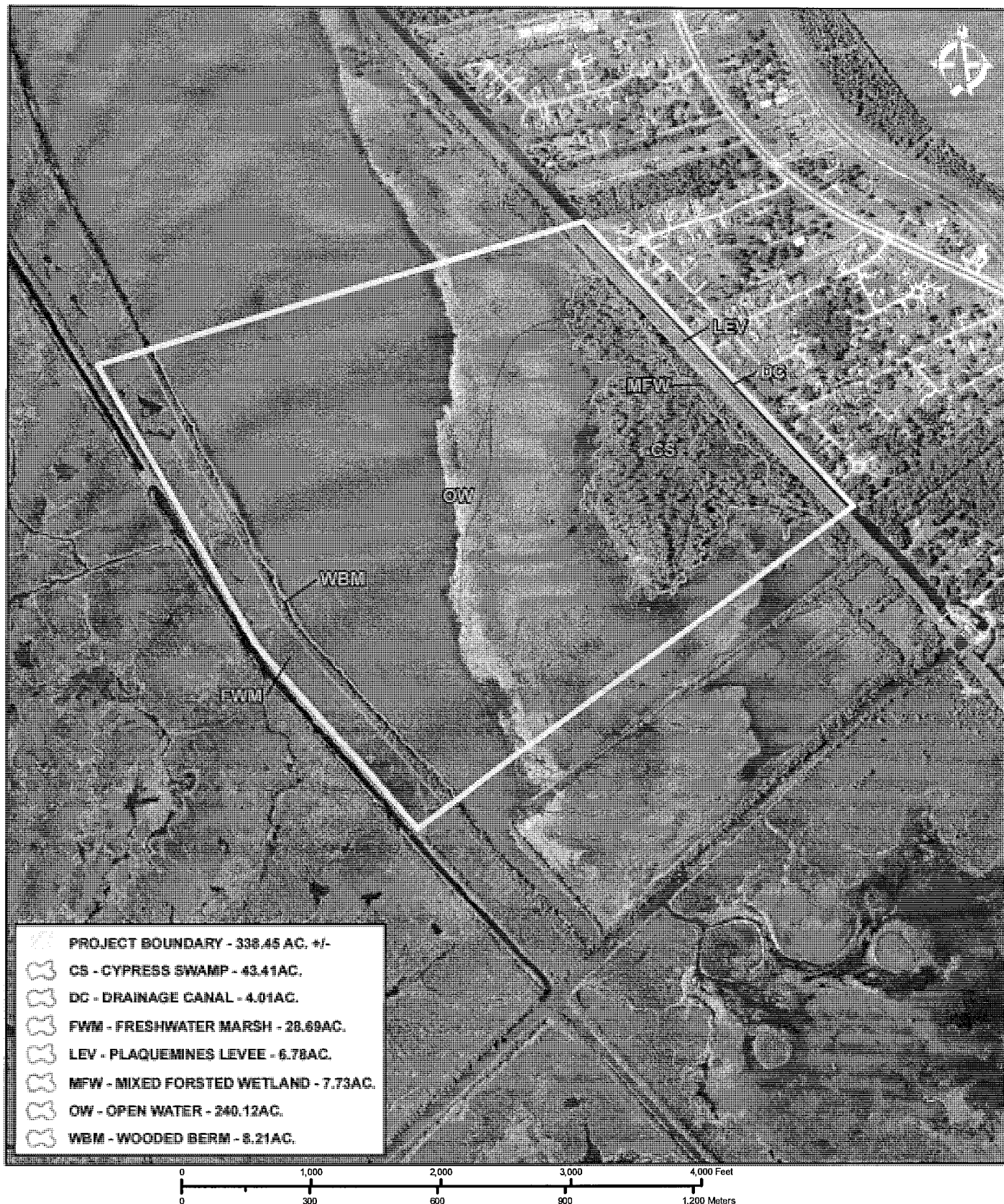


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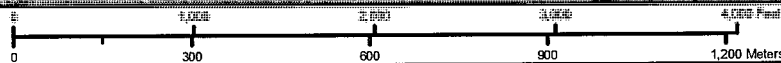
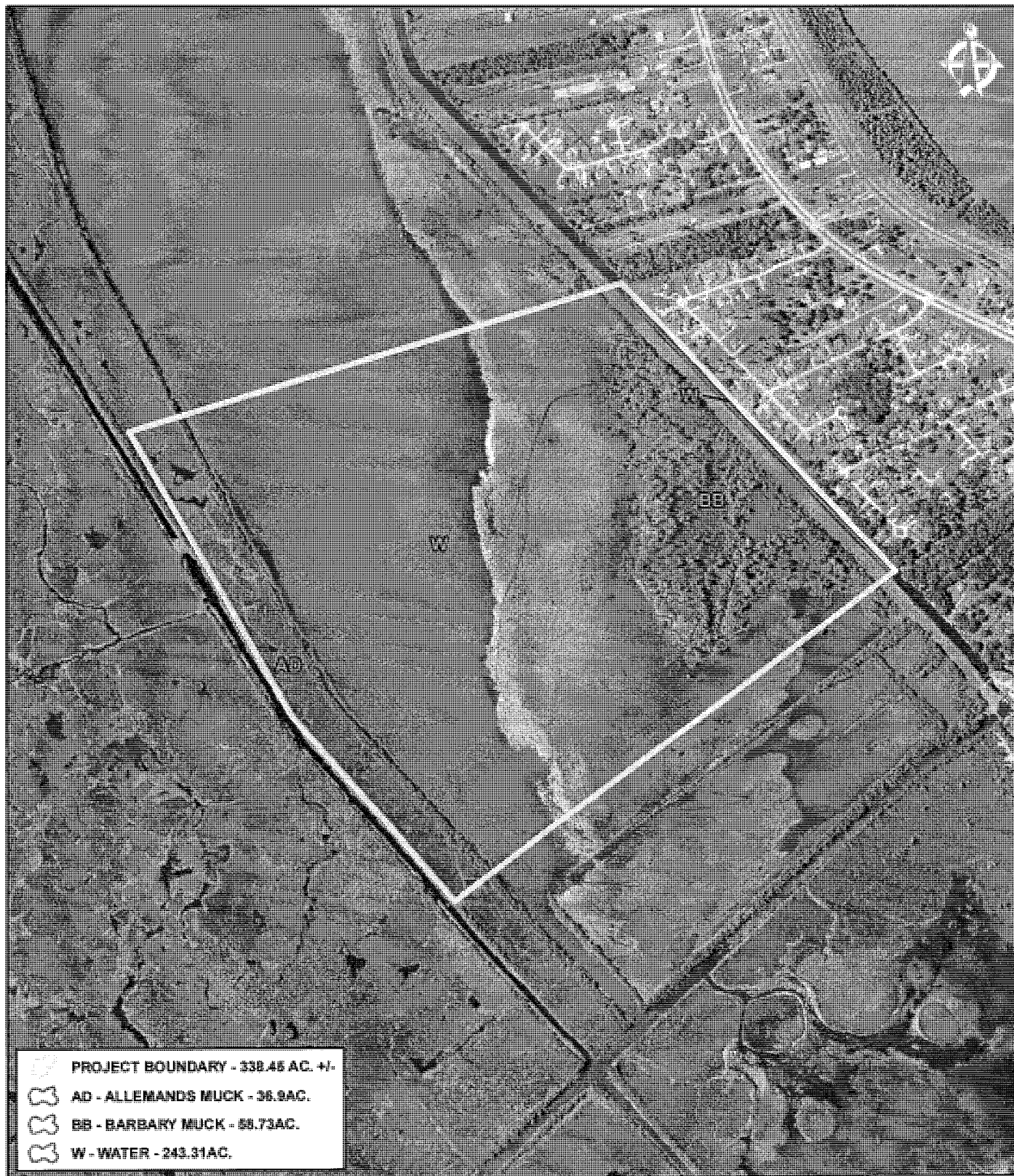
**Figure 7 - Current Vegetative Communities Map**

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Plaquemines Parish, Louisiana**



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**Figure 8 - NRCS Soils Map**  
**Jesuit Bend Mitigation Bank**  
**Plaquemines Parish, Louisiana**



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**Table 3.** Current Site Conditions. Habitats, Soils and Acres by Type and Quality

Area	Acres	Condition	Soils
Plaquemines Levee and Canal	10.8	NA, maintained upland levee	Spoil from Canal
Cypress Swamp	43.4	Relatively open canopy, low to moderate quality with marshy ground cover, SWG II/III transitional status	Barbary Muck
Mixed Forested Wetland (eastern edge of Site)	7.7	Levee edge, moderate quality, includes popcorn trees	Barbary Muck
Wooded Berm	8.2	Low trees: native and popcorn tree	Allemands Muck
Open Water, Shallow	240.1	2.4' to 3.5' deep, occasional water hyacinth patches, no submergent vegetation	Allemands and Barbary Mucks
Freshwater Marsh	28.7	Moderate quality	Allemands Muck

As can be seen in Site maps, aerials and photos, as well as deduced from the soils and vegetation mapping, the entire Site, with the exception of the Plaquemines Levee, is within the dredge and fill regulatory jurisdiction of the U. S. Army Corps of Engineers (COE).

In summary, the Site is primarily an open water pond due to local and regional subsidence. The wetland habitats at the eastern and western edges vary from low to moderate levels of functioning caused by exotic invasions and the negative effects of the open water element of the Site.

### ***3.3 General Need for the Project in this Area***

The East Central Louisiana Coastal Watershed is a large drainage area within the Deltaic Plain in Southern Coastal Louisiana. A combination of the population growth rate, ongoing implementation of the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS), and impacts from the oil and gas industry has created a need for a compensatory mitigation bank to service the region. There is one other private bank in this geographic area which has a limited number of bottomland hardwood and cypress-tupelo mitigation credits for sale. JBMB would provide freshwater marsh and additional cypress-tupelo swamp credits to the watershed, expanding the availability of watershed-based mitigation options.

Historically the upper Barataria system was nourished with fresh water, sediments, and nutrients from the Mississippi River and its tributary channels. Construction of flood control levees have cut off fresh water and its sediments as has closure of Bayou Lafourche. Both sets of actions contributed to perhaps the highest rate of wetland loss along the Louisiana coast (Environmental Protection Agency; EPA 2007). As open water areas have expanded and fetch has increased, the remaining marsh has been exposed to erosion from wind-generated waves. The JBMB is consistent with the Louisiana Coastal Wetlands Conservation and Restoration Task Force, and the Wetlands Conservation and Restoration Authority Region 2 ecosystems strategy to help stabilize the Barataria Basin Landbridge and protect freshwater marsh of the upper basin from increased marine/tidal influence.

An central goal of JBMB is to become an active participant in implementation of the regional sediment management plan as further described. This will occur by the use of Mississippi River sediments as donor material in JBMB's implementation phase.

### ***3.4 Technical Feasibility***

Historically, JBMB Site was seasonally flooded by the Mississippi River. Due to the construction of levees along the banks of the river over the past 100 years, the Site has lost its natural connectivity to the sediment deposits that these floods precipitate. The historic Mississippi River floodplain system cannot be restored; however, the local subsidence can be addressed. The proposed plan is to import beneficial use sediment from the Mississippi River to re-construct the marsh platform at JBMB Site. Approximately 1,830,000 cubic yards of sandy material will be dredged from the Mississippi River, pumped to the Site,



and distributed at elevations needed to sustain a healthy marsh environment. Similarly, sediment will be used to spot-fill areas located within existing degraded swamp areas to provide a platform for reestablishment of cypress-tupelo in areas inundated and unable to regenerate these species. A dredge permit, MVN 2010.02690MR, has been filed for this project showing primary and alternative borrow sources in the Mississippi River which have been identified. The method of taking beneficial use dredge material from the Mississippi River and depositing it to re-establish marsh will avoid having to utilize borrow material from existing marshes and deepening areas within an already subsiding landscape.

JBMB's close proximity to the successful Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Site, Bayou DuPont (BA-39) provides the perfect model and technical knowledge to guide the Sponsor during this restoration project. JBMB is modeled after this successful project and will mimic its techniques and implementation. The Bayou Dupont Site lies roughly 8 miles south of the JBMB and is similarly located in the landscape to JBMB. Technically, the Site used the same methods for implementation and provides an excellent example of the feasibility of JBMB.

#### 4.0 ESTABLISHMENT OF THE MITIGATION BANK

##### 4.1 Site Restoration Plan

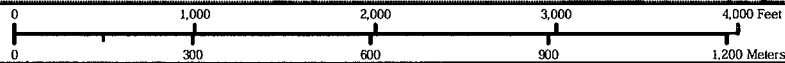
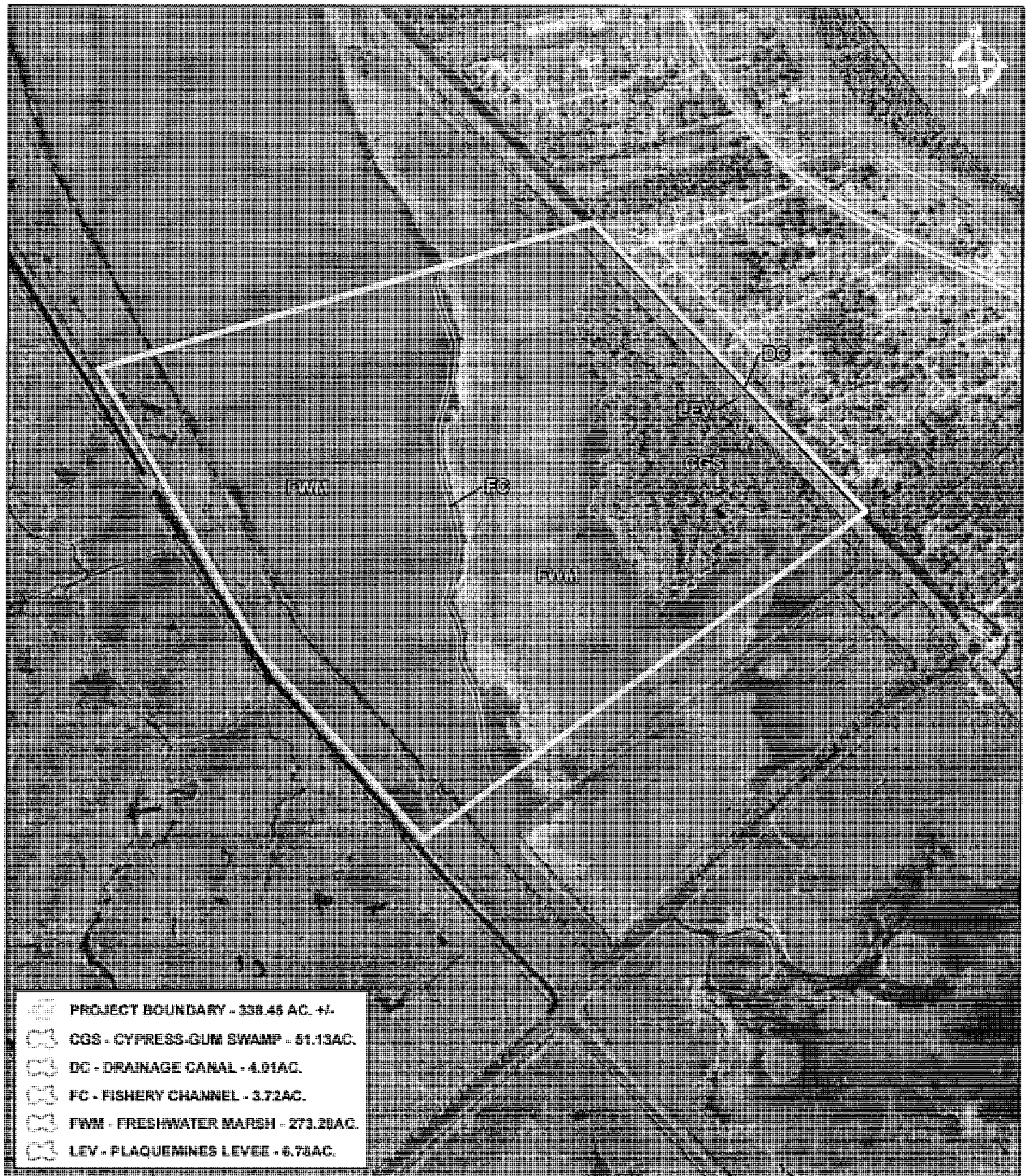
As described in **Section 2.0**, freshwater marsh and cypress-tupelo gum swamp will be restored and preserved using the techniques described here and as depicted in **Figure 10**. The Site is a shallowly inundated pond which can be brought back to grade with imported excess river sediments, then graded with earth moving equipment to restore the Site's topographic features, and re-planting. Because the swamp is a transitional SWG Condition Class II/III (CFSWG 2005), it will be re-planted in the shallower zones and the marsh will be planted "behind" the earthwork in a continuing fashion; this will ensure Site stabilization as quickly as possible and spread out the planting operation over time. No hardened structures will be necessary for Site stabilization; the relatively shallow substrate in combination with plantings will provide sufficient stabilization for the project. The proposed habitats are depicted on **Figure 10** and the conversion of the existing to proposed habitats is detailed in **Table 4**.

Table 4. Matrix of Existing to Proposed Habitats.

Existing Habitats	Proposed Habitats					Total
	Cypress-Gum Swamp	Freshwater Marsh	Fishery Channel	Drainage Canal	Plaquemines Levee	
Mixed Forested Wetland	7.7					7.7
Cypress Swamp	43.4					43.4
Freshwater Marsh		28.7				28.7
Open Water		236.4	3.7			240.1
Wooded Berm		8.2				8.2
Drainage Canal				4.0		4.0
Plaquemines Levee					6.8	6.8
<b>Total</b>	<b>51.1</b>	<b>273.3</b>	<b>3.7</b>	<b>4.0</b>	<b>6.8</b>	<b>338.9</b>

##### Marsh Platform Restoration

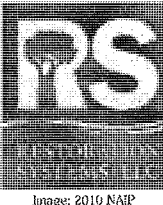
The average elevation of pre-restoration marsh in the JBMB project area is +0.88 foot North American Vertical Datum (NAVD) 88. Healthy marsh elevation is estimated to be approximately +1.3 feet NAVD 88. A fill elevation of +2.0 feet NAVD 88 was chosen because it would yield desirable marsh elevations for most of the project life. Filling to this elevation, most of the foundation settlement and self-weight consolidation would occur within two years after construction. The created marsh platforms would settle to +1.3 feet NAVD 88 at year 10, and to +1.2 feet NAVD 88 at the end of the 20-year project life (**Figure 11**).



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## Figure 9 - Proposed Vegetative Communities Map

Jesuit Bend Mitigation Bank  
Plaquemines Parish, Louisiana



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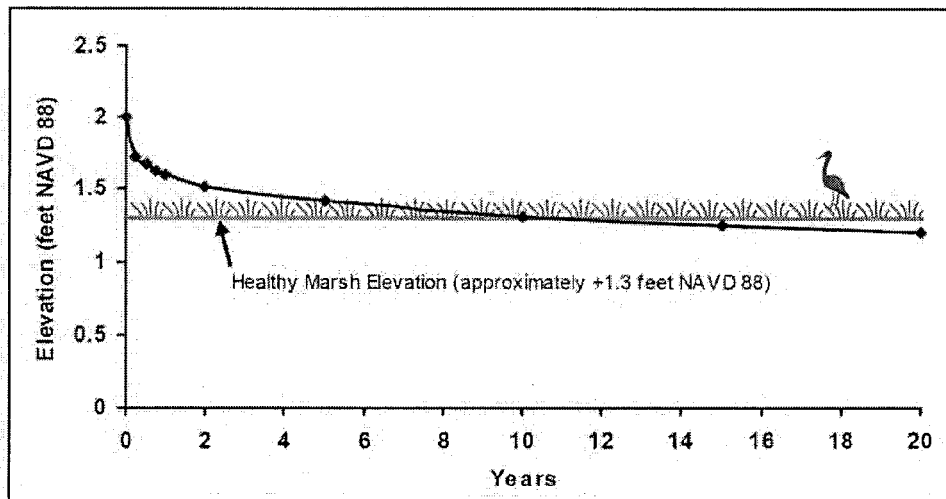


Figure 10. Fill Settlement vs. Time.

#### Containment Berms

Containment Berms (dikes) are planned at the proposed project location. The containment dike design will result in construction of a dike that has a crown elevation of +3.0 feet NAVD 88 (allowing one foot of freeboard above the marsh fill), a crown width of 6 feet, and side slopes of 1(V):3(H) producing a slope stability factor of 1.64 (Figure 12). The dikes will be constructed using material mechanically-dredged from within the marsh creation areas. The dikes will be leveled after completion of the marsh platform. Figure 12 represents a generalized containment cross section of the containment dikes proposed for JBMB.:

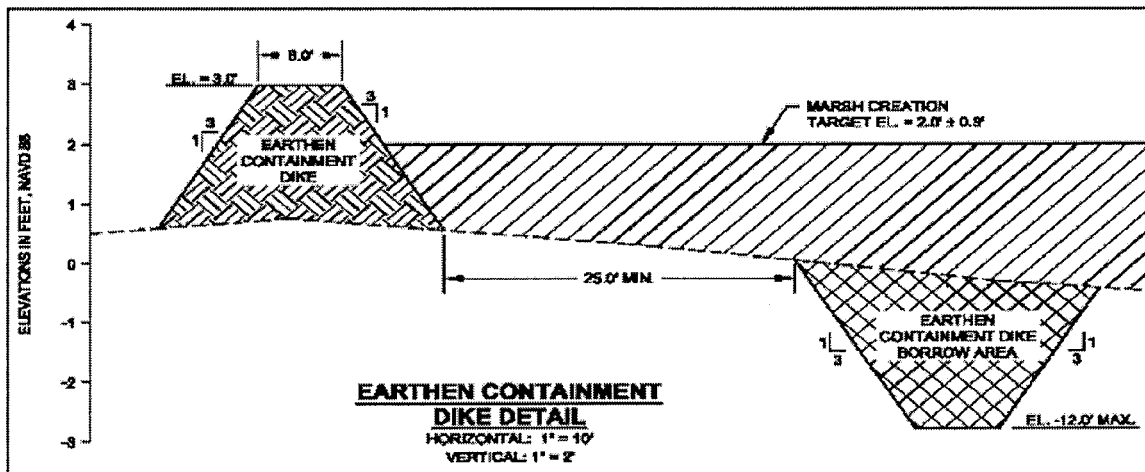


Figure 11. Containment Dike (detail).

Based on available geotechnical data, it is reasonable to assume that a similar design may be employed at the proposed JBMB Site. The borrow material for the containment berm will be taken from the interior of the proposed mitigation Site. The borrow pit will then be replaced with dredged material and no adverse impacts outside the project footprint will impact the neighboring environment.

The bank will be implemented in the following general sequence:

- a. Site surveying and benchmarks established.
- b. Begin mobilization of equipment (marsh buggies, dozers, pumps, barges, etc)
- c. Begin fusing and installation of discharge pipe from river inlet to Site.
- d. Build containment dikes at the north and south edges of the Site using on-Site material.
- e. Install turbidity curtains along the edges of the cypress swamp not being re-established.
- f. Mobilize dredge to borrow source(s) on the Mississippi River.
- g. Hydraulically dredge renewable bed-load sediment from the Mississippi River, pump the sediment over the Mississippi River levee, through existing infrastructure (located at Naomi Siphon) and under Highway 23, along the Plaquemines Parish Flood Protection Levee, and then onto the Site via pipeline (**Figure 13**). The proposed dredging is under review for USACE Permit No. MVN2010.02690MR
- h. Begin spreading the pumped sediment with grading equipment to establish the appropriate elevations for marsh re-establishment
- i. Excavate the fishery channel 3-4 feet below final grade.
- j. Place material to slough into the pre-excavated fishery channel for a finished width of 15 feet +/-.
- k. Spread the sediment in pre-determined areas around existing cypress trees to re-establish appropriate grade to facilitate planting of new swamp species and foster natural re-seeding.
- l. Level existing low berm in western side of the Site to foster surface water exchange throughout the Site.
- m. Establish the appropriate marsh and swamp vegetation. Planting in the swamp areas will begin when appropriate compaction of the substrate will sustain seedlings.

#### **4.2 Current Site Risks**

This Site is in a zone within the Barataria system that exhibits a high subsidence rate (Gagliano 1998) of 2.1 to 3.5 feet per century. Without the addition of new sediments to the system, subsidence will continue. Related effects of this continued subsidence is an increase in saltwater intrusion, which will affect the community composition.

Due to damages and breeches in the current non-federal levee system (NFL) from recent hurricanes, Congress directed that COE should “replace or modify” the existing PL-2, an NFL. COE is currently preparing a Supplemental Environmental Impact Statement (SEIS) for incorporation of the PL-2 Project into the Federal system. When completed in 2014, the upgraded PL-2 levee will be part of the New Orleans to Venice Federal Levee System. The overall project is currently in design and is going through the environmental compliance process in accordance with National Environmental Policy Act (NEPA; Van Antwerp 2010). The upgraded levee may overlap the eastern edge of the Site and coordination meetings have held with the Vicksburg District planners.

Due to the Site’s location, adjacent development and proposed development from surrounding areas are not an issue. The Sites adjoining neighbors to the north, south and west are all located in water 2-3 deep, and the Plaquemines Parish levee borders the project to the east. There are no known zoning conflicts or planned developments on or adjacent to the property.

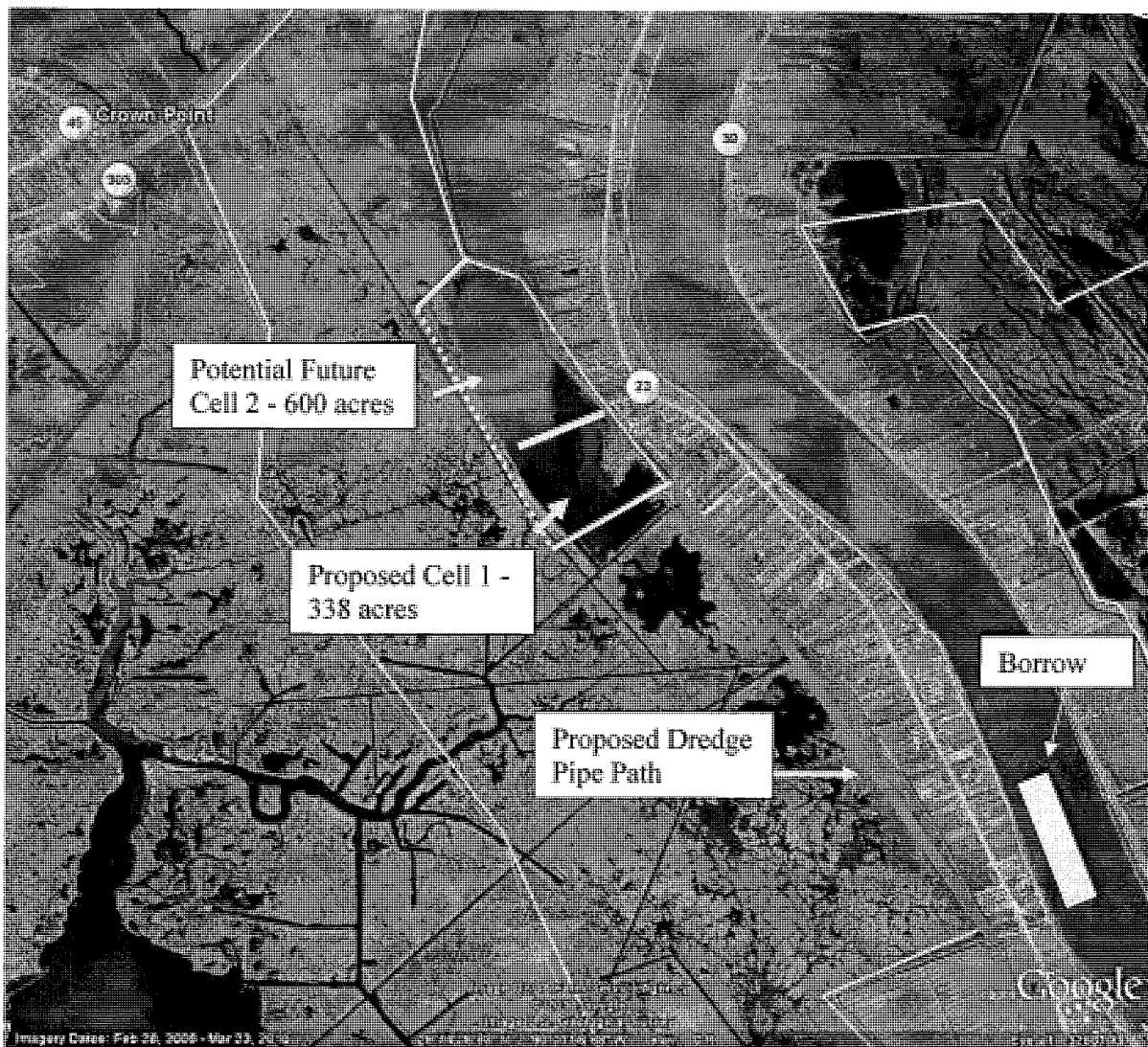


Figure 12. Proposed Jesuit Bend Mitigation Bank General Dredging Plan Layout.

JBMB exhibits these advantages:

1. Fee-simple title to the land has been acquired by the sponsor. There are no known servitudes, easements, or encumbrances to the Site;
2. Open water to be converted to fresh water marsh to provide a buffer between Plaquemines Parish residents and the Gulf of Mexico;
3. The Site's close proximity to renewable Mississippi River beneficial use borrow Sites provides easy access to imported dredge material;
4. The Site has water depth elevations averaging 2-3 feet depth, which provides an opportunity for a low amount of sediment needed to provide a sustainable marsh.
5. River sediment can be transported via pipeline to the proposed project Site pursuant to USACE Permit No. MVN-2010.02690MR using existing infrastructure which has been installed under Highway 23, under the railroad tracks, and over the Mississippi River Federal levee;

6. Containment dikes are minimized due to existing Site conditions and existing containment dikes surrounding the project area;
7. The Site is relatively insulated from erosion and tidal inundation;
8. The Site is close to the Naomi Siphon, which provides approximately 2100 cfs with the potential to deliver 150,000 yards<sup>3</sup> of river sediment annually in the vicinity of the proposed project;
9. The entire Site has the potential for ecological uplift;
10. The Site has been identified by the COE Borrow Team of the New Orleans District as a potential location for compensatory mitigation for the Hurricane Storm Damage Risk Reduction System levee improvements. The project complements the CPRA Master Plan.

#### ***4.3 Long-Term Sustainability of the Site***

Due to its location and project design, JBMB has a very high likelihood of success. The Site will be restored to the types of communities that were historically present on the property. The hydrologic and landscape processes that have caused the Site to have lost sediment, resulting in a largely open water environment, will be reversed. The Site's hydrology will be connected to the surrounding marsh network to the west and south, tying it into the region's natural hydrologic processes. No weirs or structures will be required to maintain the Site's post-restoration hydrologic regime, so structural maintenance will not be an issue. Similarly, the reliance on the systems natural vs. engineered hydrology will ensure that the restored habitats are subject to a regionally-appropriate, natural hydroperiod.

#### **5.0 PROPOSED SERVICE AREA**

The Primary Geographic Service Area (PGSA) is the 8-digit Cataloging Unit 08090301 (**Figure 2**); however, the bank's potential to benefit to adjacent service areas may warrant credits to be purchased from outside this PGSA, including the Deltaic Plain, may be done so on a case-by-case basis.

#### **6.0 OPERATION OF THE MITIGATION BANK**

JBMB will be managed by the sponsor throughout pre-construction, construction, and monitoring. The sponsor will be responsible for the bank's success, for the sale of credits in accordance with an approved credit release schedule, and for transferring the bank's conservation servitude to an appropriate entity such as a land conservancy or local government.

##### ***6.1 Project Representatives***

###### **Sponsor and Landowner**

Mr. George Howard  
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919-334-9105

###### **Agent**

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5003 Tchoupitoulas Street  
New Orleans, LA 70115  
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504-782-2010

##### ***6.2 Qualifications of the Sponsor***

Restoration Systems, LLC (Sponsor) has been a leader in the development of successful aquatic mitigation Sites in North Carolina and the Southeast for over 10 years. Sponsor's qualifications are best illustrated by its track record in selecting high quality Sites and using highly skilled technical designers and experts in implementation is well-demonstrated. Sponsor has forty regional off-Site mitigation or mitigation bank projects in some stage of design, implementation, or completion. These projects

encompass wetland, stream, and riparian buffer mitigation projects in North Carolina, Tennessee, Maryland, Virginia, Texas, and Georgia encompassing more than 22,000 acres of wetlands and 50 miles of streams. Most of Sponsor's non-mitigation bank projects provide regionally significant in-lieu-fee mitigation for departments of transportation impacts, primarily for the North Carolina Environmental Enhancement Program (NCEEP). The remainder of Sponsor's projects provides third party, off-Site, regionally significant mitigation for project-specific impacts. Sponsor also has seven mitigation banks being permitted in five southeastern states. Furthermore, Sponsor provides financial surety for every project through every phase of work and each Site is inspected by staff no less than quarterly in addition to requisite technical monitoring.

Included among the mitigation projects completed, or in advanced planning, by Sponsor are:

**Table 5.** Sponsor's Projects.

Existing Regional Offsite Mitigation Projects						
Project	Project	State	Client	Status	Mitigation Type	Credits
1	Anderson Swamp	NC	EEP	Monitoring Year 4	Non-Riparian Wetland	15.5
2	Angola Bay	NC	Private	Design	Wetland	750
3	Big Bull Creek	NC	EEP	Monitoring Year 5	Buffer	35
4	Brogden Road	NC	EEP	Monitoring Year 5	Buffer	15
5	Brown Marsh	NC	EEP	Monitoring Year 3	Stream	5,000
					Non-Riparian Wetland	5
6	Burrows Cove	TN	TN DOT	Monitoring Year 1	Wetland	40
7	Butlers Branch	NC	City of Raleigh	Design	Nutrients	122,742
					Stream	6,748
8	Cane Creek	NC	EEP	Monitoring Year 3	Riparian Wetland	4.4
					Non-Riparian Wetland	5
9	Carbonton Dam	NC	EEP	Monitoring Year 5	Stream	90,494
10	Casey Dairy	NC	EEP	Closed Out	Buffer	72
11	Causey Farm	NC	Fed-Ex	Closed Out	Stream	7,000
					Riparian Wetland	4
12	The Cliffs	NC	Private	Design	Stream	5,900
					Wetland	0.5
13	Columbus Swamp	NC	EEP	Monitoring Year 2	Wetland	32
14	Conetoe Creek	NC	EEP	Monitoring Year 5	Buffer	10
15	Cutawhiskie	NC	EEP	Monitoring Year 3	Stream	3,375
					Wetland	12.3
16	Elk Shoals	NC	EEP	Monitoring Year 5	Stream	5,188
17	Fox Run	NC	EEP	Monitoring Year 1	Buffer	45
18	Frog Hollow	NC	Global Transpark	Closed Out	Preservation	1,114
19	Gatlin Swamp	NC	EEP	Monitoring Year 5	Non-Riparian Wetland	125
20	Gray Farm	NC	EEP	Monitoring Year 5	Stream	7,610
21	Haw River	NC	EEP	Closed Out	Riparian Wetland	28.9
22	Heath	NC	EEP	Design	Buffer	60
23	Holly Grove	NC	EEP	Monitoring Year 2	Stream	15,726
24	Jarman's Oak	NC	EEP	Monitoring Year 3	Stream	6,640
					Wetland	12
25	Lick Creek	NC	EEP	Monitoring Year 5	Stream	9,500
26	Little Buffalo	NC	EEP	Monitoring Year 5	Buffer	18.5
					Stream	4,750
27	Lloyd	NC	EEP	Monitoring Year 4	Riparian Wetland	3.3
					Non-Riparian Wetland	3.1
28	Lowell Mill Dam	NC	EEP	Monitoring Year 5	Dam Removal	34,990
29	Morgan Creek	NC	EEP	Monitoring Year 2	Stream	4,083
					Wetland	1
30	Salisbury Wicomico Airport	MD	Private	Monitoring Year 3	Wetland	40
31	Sleepy Creek	NC	NC DOT	Monitoring Year 5	Riparian Wetland	192



Jesuit Bend Mitigation Bank  
Prospectus – July 1, 2011

Existing Regional Offsite Mitigation Projects						
Project	Project	State	Client	Status	Mitigation Type	Credits
32	Three Mile Creek	NC	EEP	Monitoring Year 2	Stream	8,021
					Wetland	2.3
33	Vickis Thicket	NC	EEP	Monitoring Year 1	Buffer	28
34	Walnut Creek	NC	EEP	Closed Out	Buffer	25
Approved Mitigation Banks						
35	Bear Creek	NC	NC DOT	Closed Out	Riparian Wetland	165.6
36	Cripple Creek	NC	Bank	Approved	Stream	4,518
					Wetland	7.85
37	Lane	NC	Bank	Monitoring Year 3	Nutrients	120,651
					Buffer	10.56
38	Wellons	NC	Bank	Monitoring Year 3	nutrients	73,804
Mitigation Banks Under In-Development						
39	Bass Mountain	NC	Bank	In-Development	Stream	5,748
40	Pancho	NC	Bank	In-Development	Stream	8,158
					Wetland	33.5
					Nutrients	31,000
41	Cranston Mill Pond	VA	Bank	In-Development	VA Nutrients	565
42	Katy Prairie/Warren Creek	TX	Bank	In-Development	Stream	14,761
43	Milburnie Dam	NC	Bank	In-Development	Stream	32,590
44	Salisbury III	MD	Bank	In-Development	Stream	700
					Wetland	9.61
					Wetland	TBD
45	Jesuit Bend	LA	Bank	In-Development	Wetland	TBD
46	Little Hazel	GA	Bank	In-Development	Stream	147,060
					Wetland	56.92

As illustrated in **Table 5**, Sponsor has extensive experience implementing wetland and stream mitigation, in addition to other forms of mitigation. Many of these projects involve wetland re-establishment and rehabilitation, and all include preservation. In addition, many of Sponsor's projects have been implemented in the coastal plain environment, in which this Site is also located.

### 6.3 Sponsor Approach to Project Establishment

JBMB will be established only after completion of a series of processes and tasks (see below) that are considered to be standard practices of the Sponsor and other professional providers in the mitigation banking industry:

1. GIS landscape-level Site evaluation;
2. Site (project area) reconnaissance including walking/boating exploration;
3. Real estate acquisition;
4. Analysis of the market;
5. Cursory investigations of the project area with an emphasis on:
  - a. Site hydrology, drainage features, plant and animal communities, rare species, rare habitats, existing marsh communities, *etc.*; and
  - b. Site re-establishment/ rehabilitation/ enhancement potential
  - c. Jurisdictional Determination field work performed;
6. Intensive inventory of existing Site conditions and resources;
7. Detailed topographic mapping;
8. Site investigations to determine feasibility of the Site using planned dredging techniques;
9. Submit required permits for review
10. Begin Restoration Design Plans (see page 17, Implementation);

11. Confirm re-establishment/ rehabilitation/ enhancement potential credits on the Site;
12. Determine appropriate phases for implementation of project;
13. Establish Conservation Servitude holder and place Conservation Servitude over Bank;
14. Establish the Construction and Establishment (C&E) & Long Term Maintenance and Protection Fund escrow accounts;
15. Complete advanced design and submit Mitigation Banking Instrument (MBI) to Interagency Review Team (IRT) for approval;
16. Implement Restoration Design Plans following approval of MBI and issuance of all applicable permits and authorizations (see page 17, Implementation);
17. Perform post implementation walkthroughs monthly and photo document progress;
18. Perform monitoring reports as required.

#### ***6.4 Proposed Long-Term Ownership and Management Representatives***

Restoration Systems LLC (the Sponsor) has purchased in fee-simple the JBMB Site in its entirety. Restoration Systems is the responsible party for all financial assurances for the development of the Bank. All JBMB property is free of liens and encumbrances that would conflict with its use as a mitigation bank.

#### ***6.5 Site Protection***

Before the MBI is utilized, the Sponsor will have an approved “holder” of the servitude. The Sponsor is currently in communication with Plaquemines Parish and the State of Louisiana which have expressed interest in being the holder of the Conservation Servitude. Once the holder responsible party is identified, the Sponsor shall burden the Property with a perpetual Conservation Servitude in accordance with Louisiana law, La. R.S. 9:1272. The conservation servitude shall be signed and filed in the Plaquemines Parish office with an executed copy of the MBI attached. After filing, a copy of the recorded Conservation Servitude, clearly showing the book, page and date of filing, will be provided to CEMVN prior to the release of credits. The portions of the Site that will be preserved are those that are designated as cypress-tupelo gum swamp, freshwater marsh, and fishery channel on **Figure 10**.

#### ***6.6 Long-Term Strategy***

The Sponsor agrees to provide Financial Assurances sufficient to ensure satisfactory completion for the work described in the Mitigation Work Plan and the Adaptive Management Plan. The Sponsor will establish the Construction and Establishment (C&E) & Long Term Maintenance and Protection Fund escrow accounts to assure sufficient funds are available to perform work required to construct and maintain the Bank through successful attainment of long term success criteria following requirements provided by USACE-MVN. An assessment of the initial and capital costs and ongoing management funds required to manage and monitor the Bank will be included in the draft Mitigation Banking Instrument and will provide an estimate of work and cost requirements for construction and establishment of the Bank through achievement of long term success criteria. The Sponsor proposes to establish at the District Engineer’s request an A+ Surety Performance Bond or Escrow Accounts.

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- USEPA Surf Your Watershed: [http://cfpub.epa.gov/surf/huc.cfm?huc\\_code=08090301](http://cfpub.epa.gov/surf/huc.cfm?huc_code=08090301)

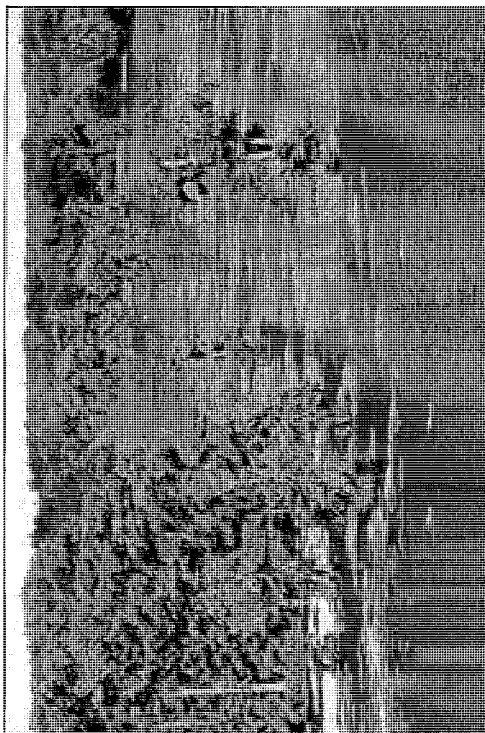
Van Antwerp, R. 2010. Department of the Army Corps of Engineers, Complete Statement of Lt. General Robert Van Antwerp, Chief of Engineers, U. S. Army Corps of Engineers, Before the Ad Hoc Subcommittee on Disaster Recovery, Committee on Homeland Security and Governmental Affairs, US Senate, on “Five Years Later: Examination of Lessons Learned, Progress Made, And Work Remaining from Hurricane Katrina” August 26, 2010

Wetlands Conservation and Restoration Authority. 1999. Coastal Wetlands Conservation and Restoration Plan. March 29, 1999. Submitted to the Louisiana House and Senate Natural Resources Committees. 81 pp.

**Appendix 1a**  
**Current Condition Aerials**



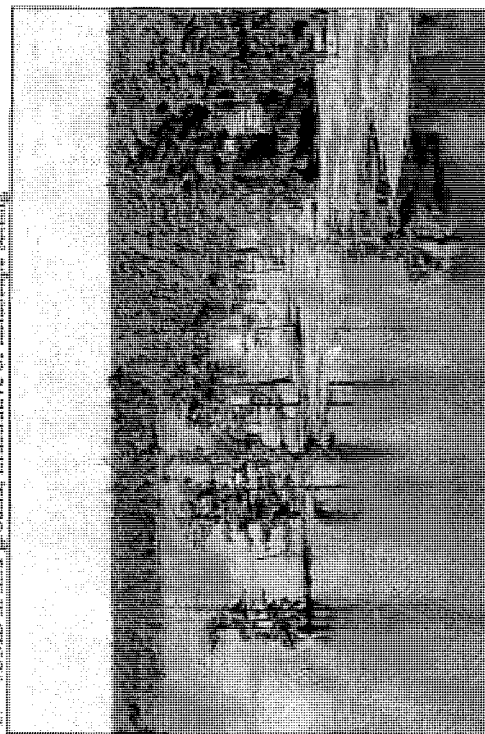
1. JBMB view to north



3. Southeast corner JBMB

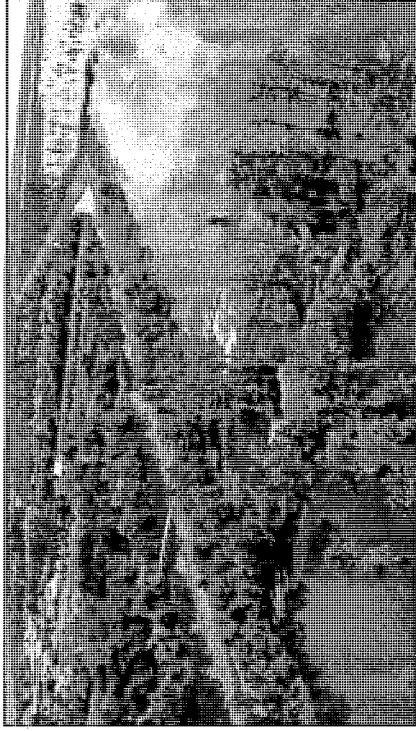


2. JBMB in mid-ground, illustrative of landscape setting



4. Eastern side of JBMB





5. JBMB in right background with the Plaquemines Levee along its eastern edge; view to south

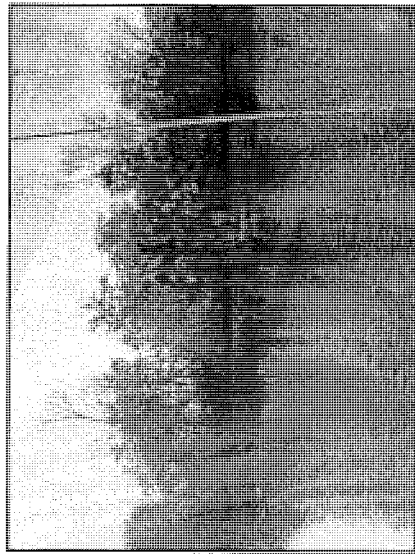


6. JBMB in right foreground with Mississippi River in background; view to northeast

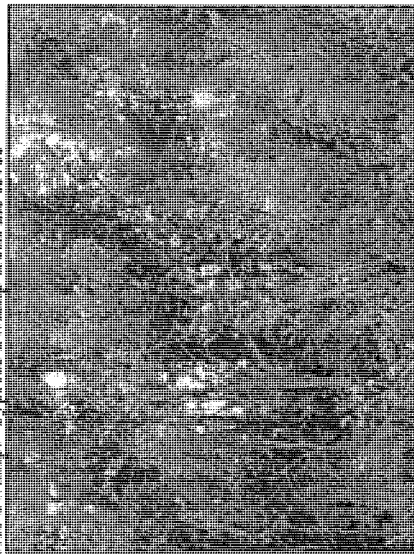
**Appendix 1c**  
Current Conditions Site Photos



1. Cypress Swamp: Cypress Swamp from the levee

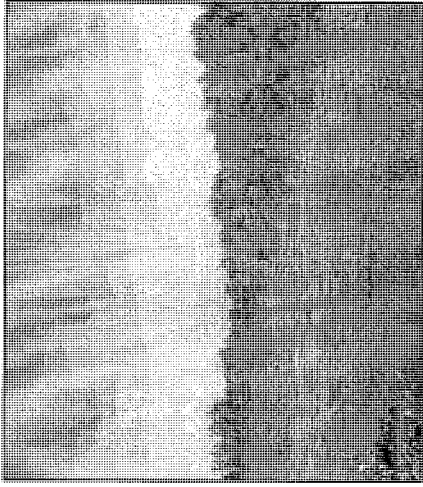


2. Cypress Swamp: Cypress Swamp from the water



3. Mixed forested wetland at levee edge: Open subcanopy zone

4. Mixed forested wetland at levee edge: Transitional edge and hackberry



5. Woody Berm: Southern Berm



6. Open Water: Open water, note floating water hyacinth clumps



7. Freshwater Marsh: Bull tongue, wooded berm in background