

**Rehabilitation of Bohemia Spillway
Salinity Control Structure
Phase 1**

for

Plaquemines Parish Government



by

NEWELL ENGINEERING, LLC



November 2018

REHABILITATION OF BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE PHASE 1

PLAQUEMINES PARISH, LOUISIANA

OCTOBER 2018



VICINITY MAP
SCALE: 1" = 20000'

REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1



1/20/0

BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
SITE PLAN
SCALE: 1" = 600'



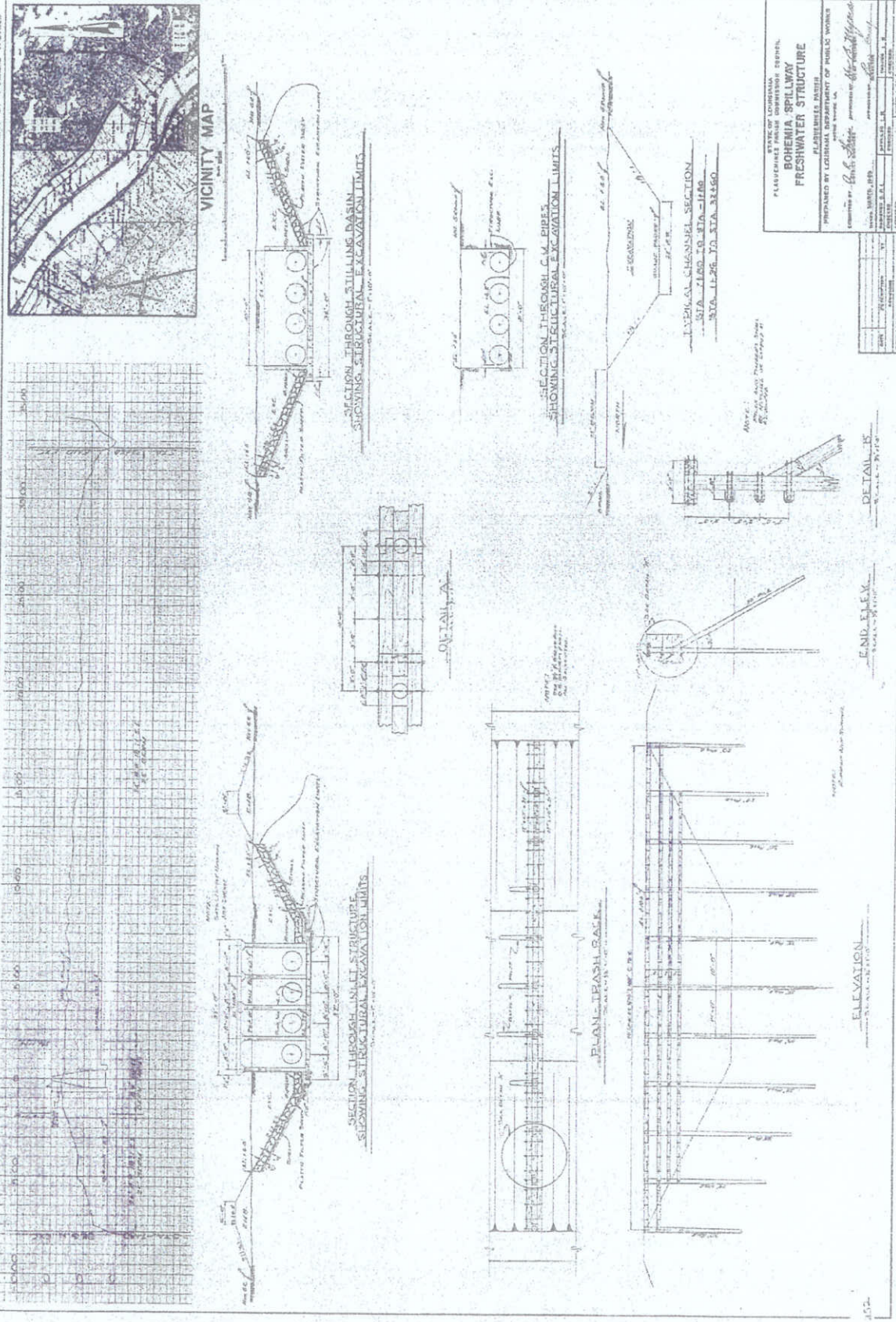
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FIGURE 2
SITE PLAN
JANUARY 16, 2018

REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1

STATE OF LOUISIANA

DEPARTMENT OF PUBLIC WORKS



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BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
CONSTRUCTION PLANS
N.T.S.

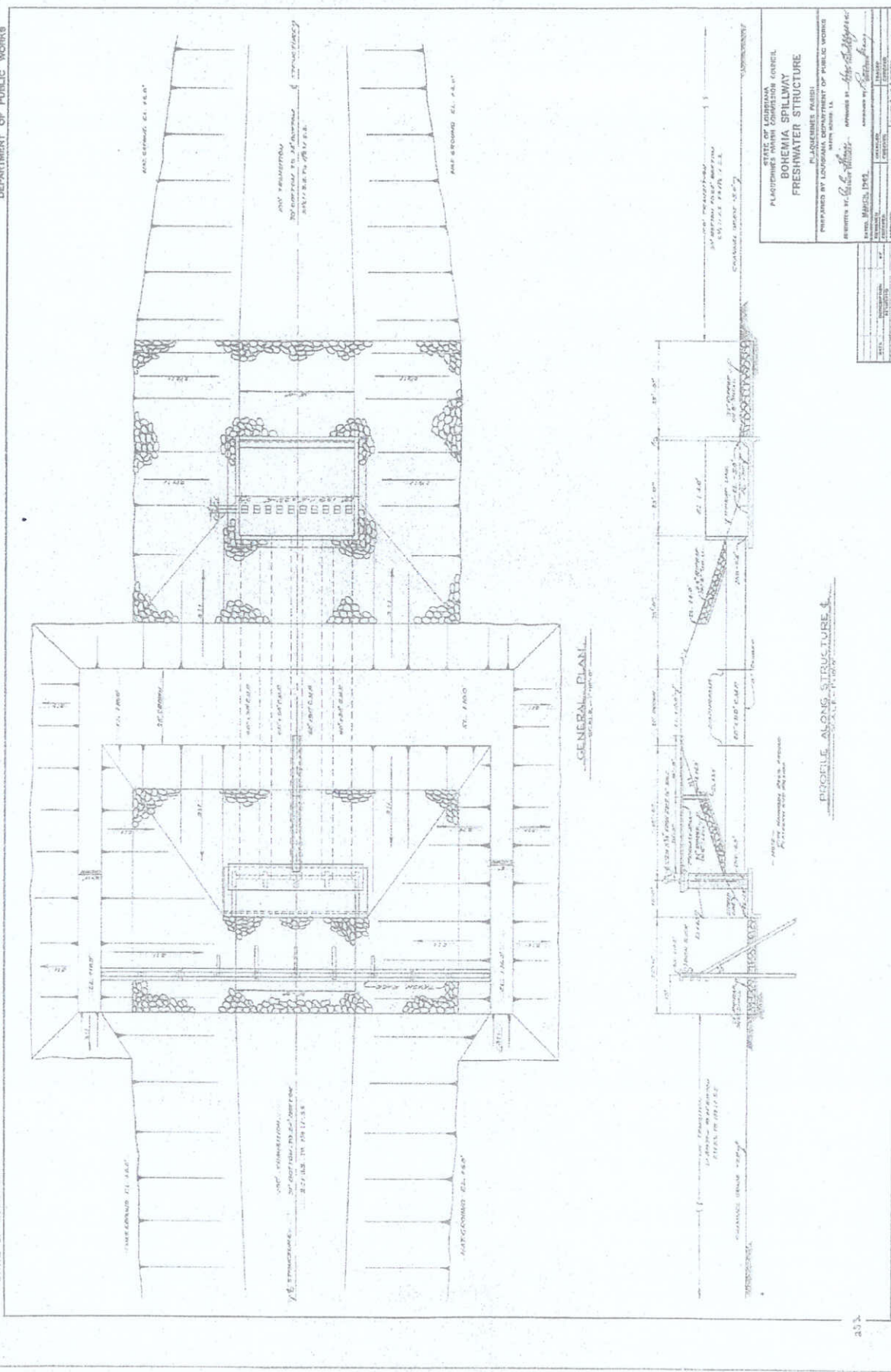
FIGURE 3
BOHEMIA SPILLWAY SALINITY
CONTROL STRUCTURE
CONSTRUCTION PLANS
JANUARY 16, 2018

STATE OF LOUISIANA DEPARTMENT OF PUBLIC WORKS PLANNING DIVISION	
BOHEMIA SPILLWAY FRESHWATER STRUCTURE	
PREPARED BY: <i>John A. Smith</i>	
DATE: 1/16/18	BY: <i>John A. Smith</i>
PROJECT: 18-001	SCALE: 1" = 10'-0"
FILE NO. M-2301-1	

REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1

STATE OF LOUISIANA

DEPARTMENT OF PUBLIC WORKS



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BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
CONSTRUCTION PLANS
N.T.S.

FIGURE 4
BOHEMIA SPILLWAY SALINITY
CONTROL STRUCTURE
CONSTRUCTION PLANS
JANUARY 16, 2018

Sound

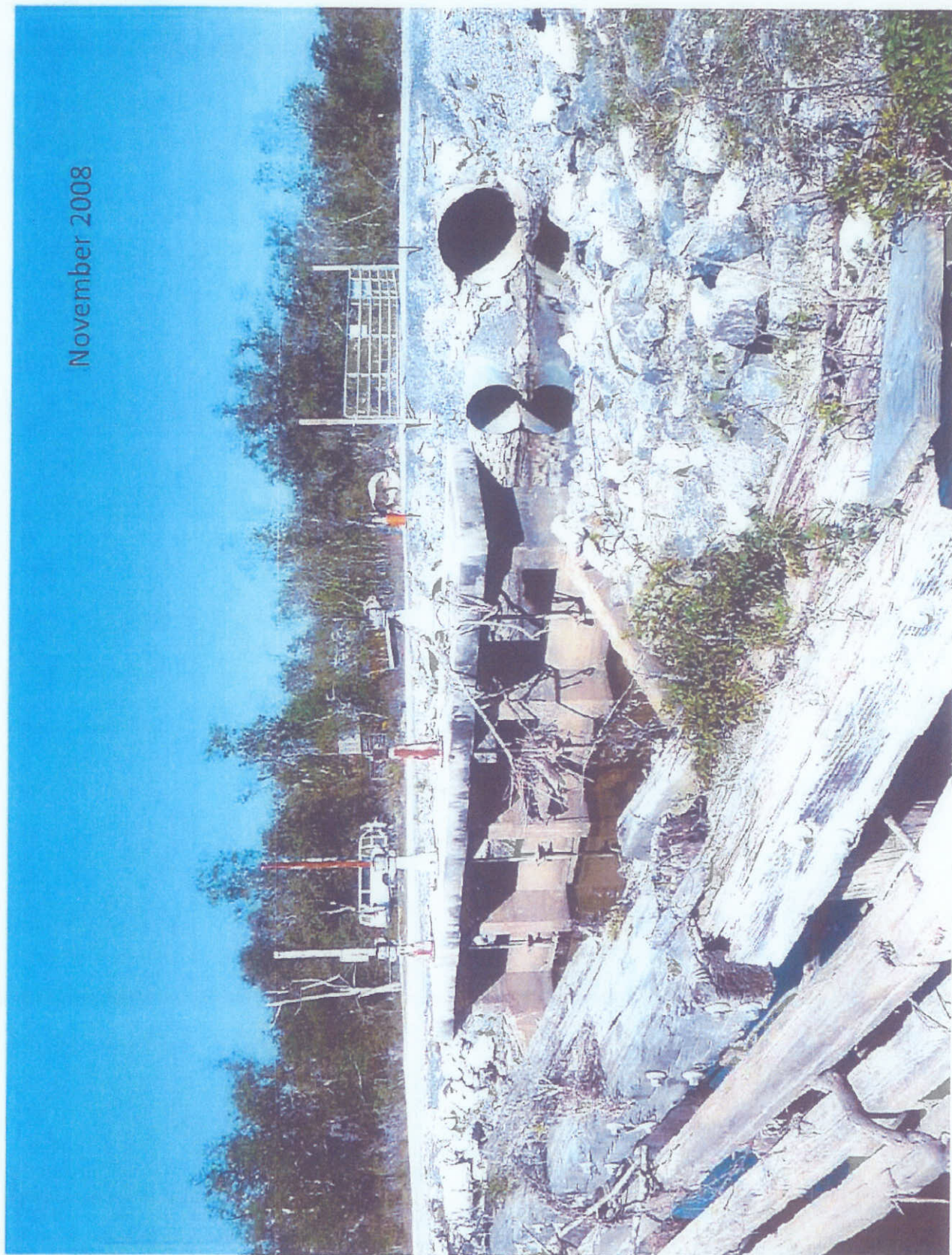
October 10, 2010 overflight

Back Levee Canal

Road

Mississippi
River

November 2008





Picture of washout of the culverts at the Bohemia Box culverts in 2008. Note the road being slightly overtopped near Dr. John Lopez (LPBF) and Dr. Mark Kulp (UNO). More overtopping was occurring just downriver of the culverts where the breach occurred in 2011 to form Mardi Gras Pass, south about 100 – 200 feet. This water flowed parallel to the road shown in whitewater flow the foreground.

Mardi Gras Pass Bohemia Spillway

Feb 24, 2012



Figure 50: Waterfalls occurred on the erosional escarpment as Mardi Gras Pass reached to Mississippi River bank. On this day, large schools of pogy or Gulf menhaden (*Brevoortia patronus*) were in Mardi Gras Pass, and were be eaten by river otters.



Figure 51: Progression of Mardi Gras Pass advancing across the river bar from July 2011 to March 10, 2012. Yellow arrows track the progression of the escarpment across the river bar as it moved towards the river through the process of headward erosion.

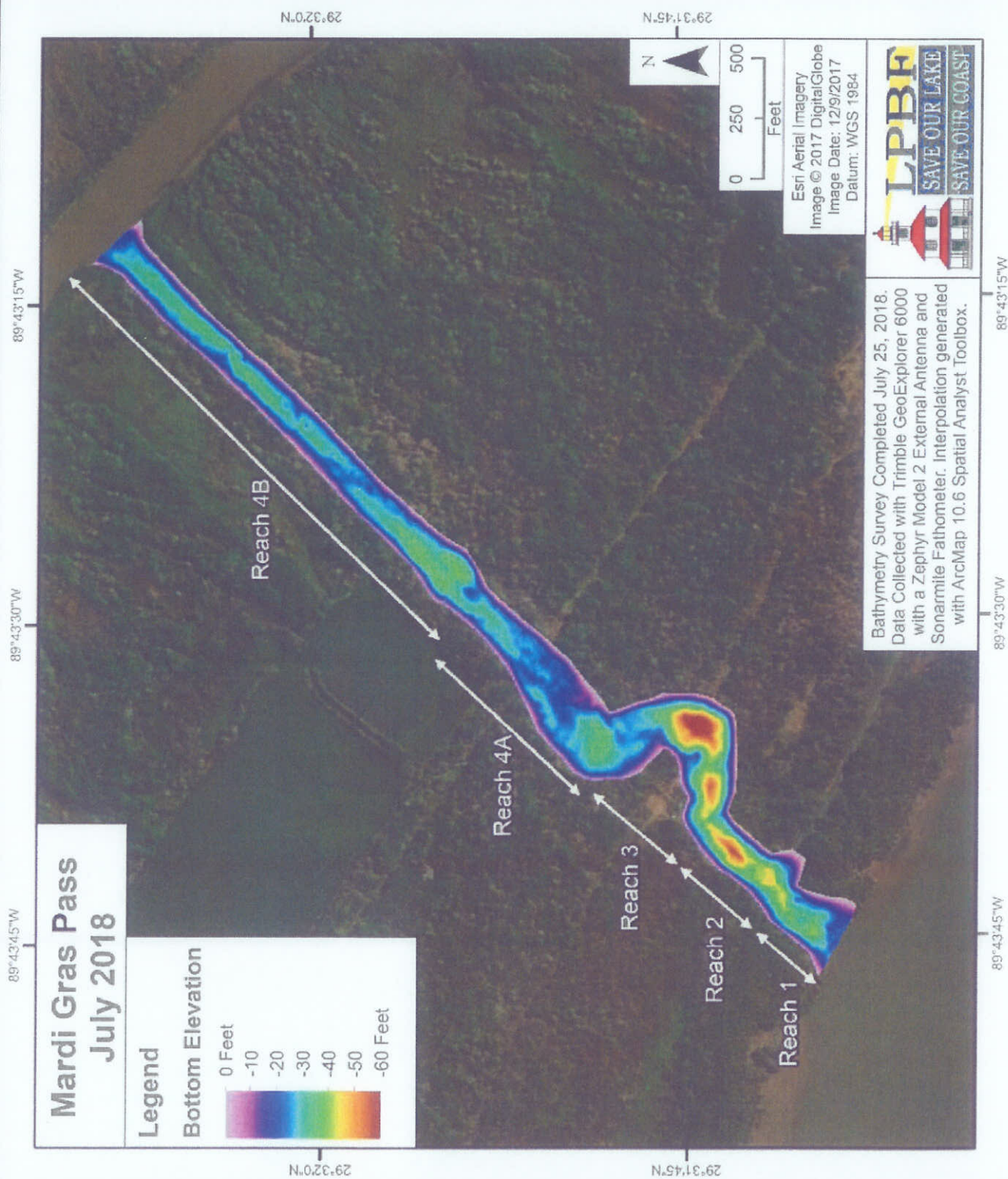


Figure 5: Mardi Gras Pass interpolated bottom elevation based on bathymetric surveys collected on July 25, 2018. Mississippi River and Back Levee Canal bathymetry points were excluded from this interpolation. Interpolated bottom surface was generated using the Spatial Analyst Toolbox in ArcGIS 10.6.

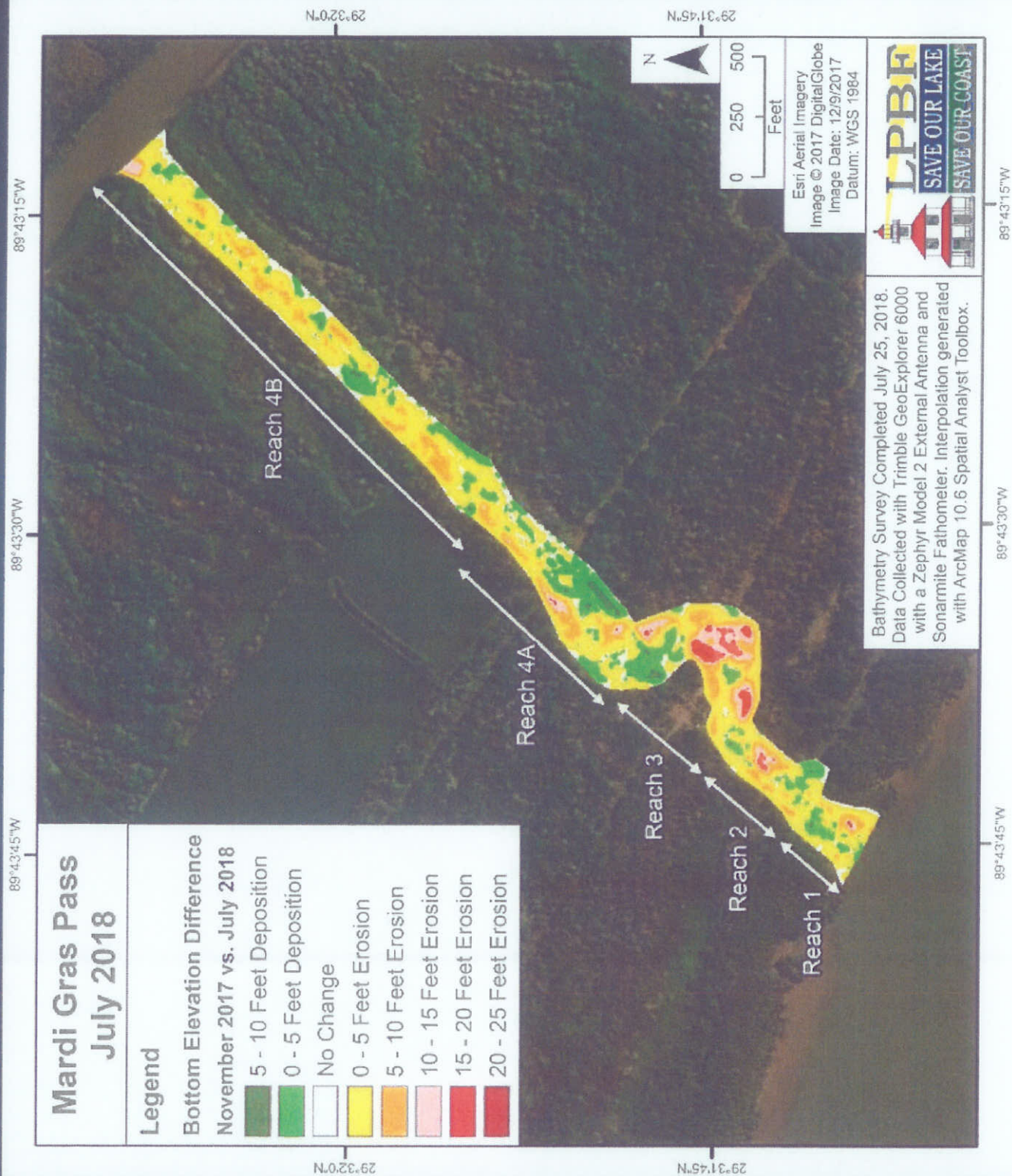


Figure 6: Mardi Gras Pass bottom elevation difference map that shows change in bottom elevation from the November 2017 interpolation compared to the July 2018 interpolation. All interpolations created using bathymetry data from respective surveys and the ArcMap 10.6 Spatial Analyst Toolbox.



Figure 8: Polygons used to summarize the average depths (feet) of the Mardi Gras Pass in Reaches 1 through 4A. Average depth statistics computed using raw bathymetry points

Comparative Cross-sections of Mardi Gras Pass and Mississippi River

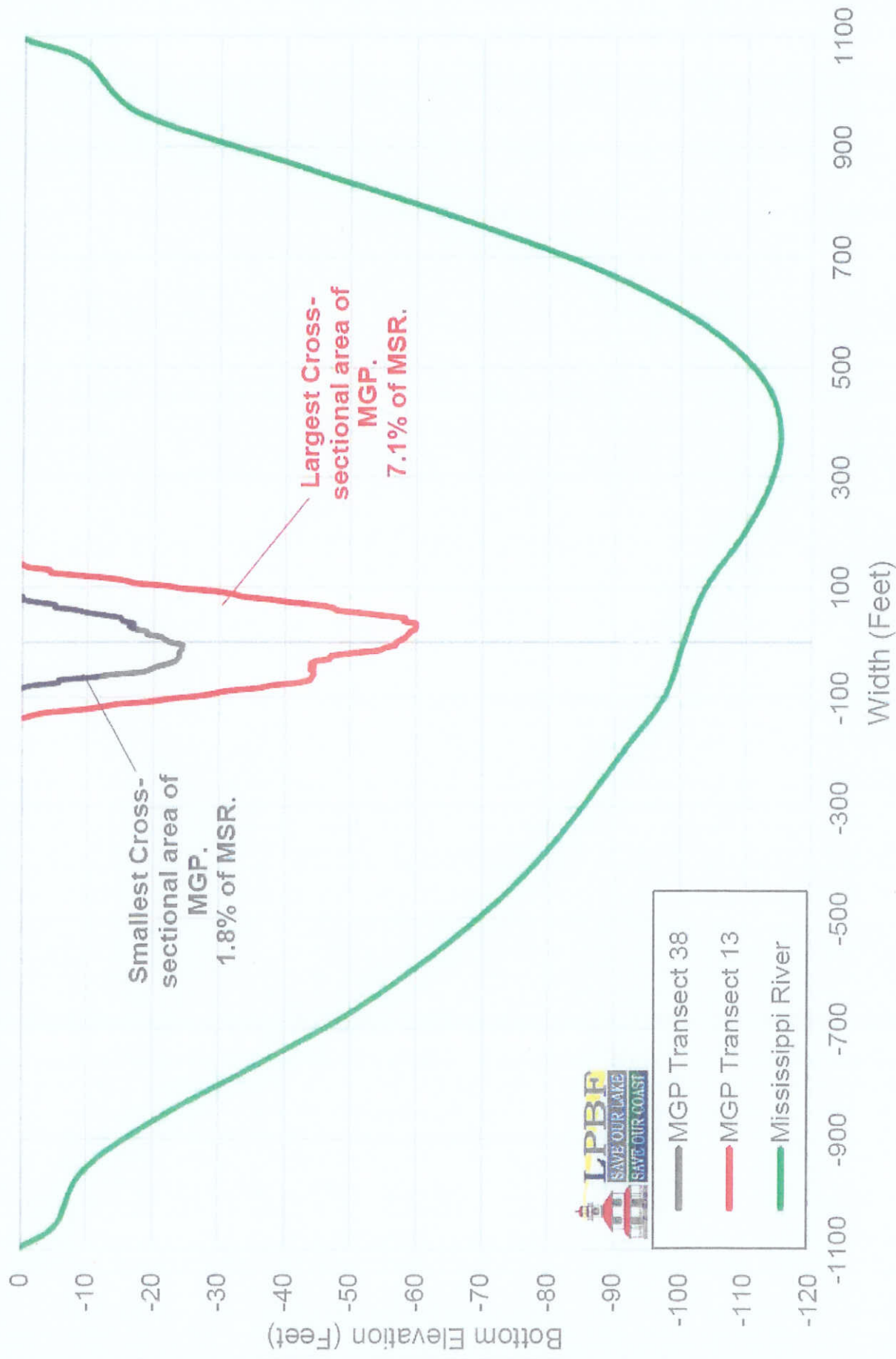
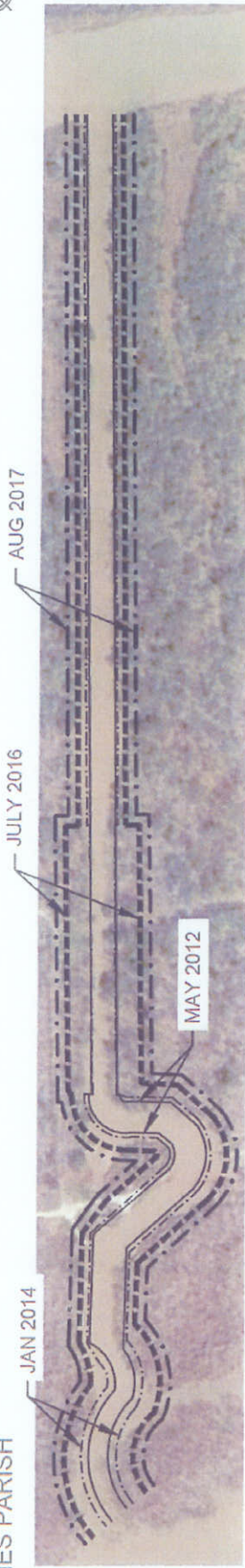


Figure 11: Comparative cross-sections of Mardi Gras Pass and the adjacent Mississippi River. Mississippi River cross-section was calculated directly south of Mardi Gras Pass. Black line represents smallest cross-sectional area found in Mardi Gras Pass and the red line represents the largest. All three cross-sectional

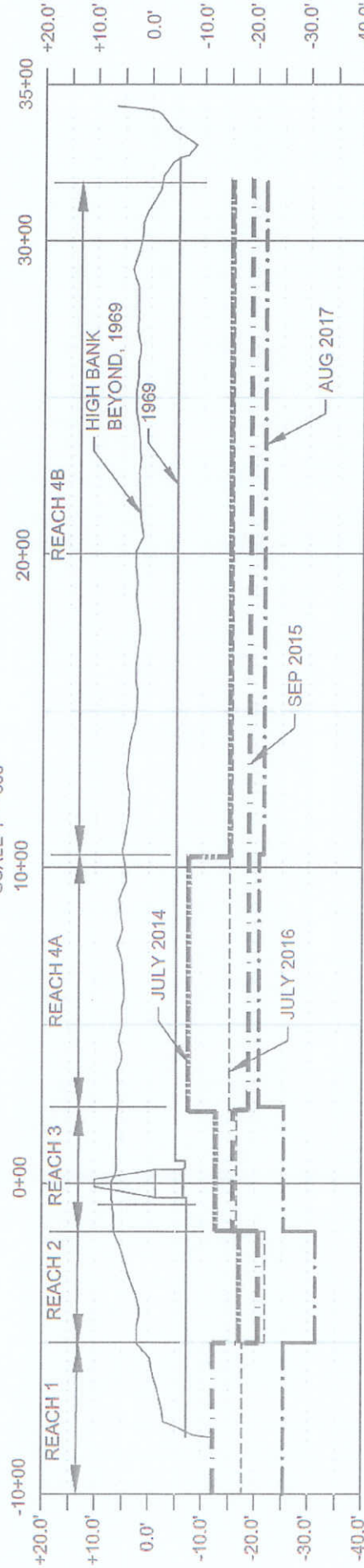
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1



PLAN

SCALE 1" = 500'

IMAGERY DATE: JAN 2015



PROFILE

SCALE
1" = 30' V
1" = 500' H

GRAPHIC SCALE



(IN FEET)

PLAN LEGEND

- MAY 2012 EDGE OF WATER
- - - JAN 2014 EDGE OF WATER
- JULY 2016 EDGE OF WATER
- AUG 2017 EDGE OF WATER

PROFILE LEGEND

- 1969 CHANNEL BOTTOM
- JULY 2014 CHANNEL BOTTOM
- SEP 2015 CHANNEL BOTTOM
- JULY 2016 CHANNEL BOTTOM
- AUG 2017 CHANNEL BOTTOM

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MARDI GRAS PASS AVERAGE CHANNEL WIDTHS (FT)

	MAY 2012	JAN 2013	JAN 2014	SEP 2015	JULY 2016	AUG 2017
REACH 1	56.2	73.6	102.7	137.6	201.1	245.6
REACH 2	98.7	102.0	113.7	150.2	162.8	181.8
REACH 3	90.3	83.9	117.5	140.7	193.3	212.4
REACH 4A	74.5	72.6	71.2	138.8	212.9	227.5
REACH 4B	74.5	72.6	90.6	110.9	137.7	169.0

MARDI GRAS PASS AVERAGE BOTTOM ELEVATIONS

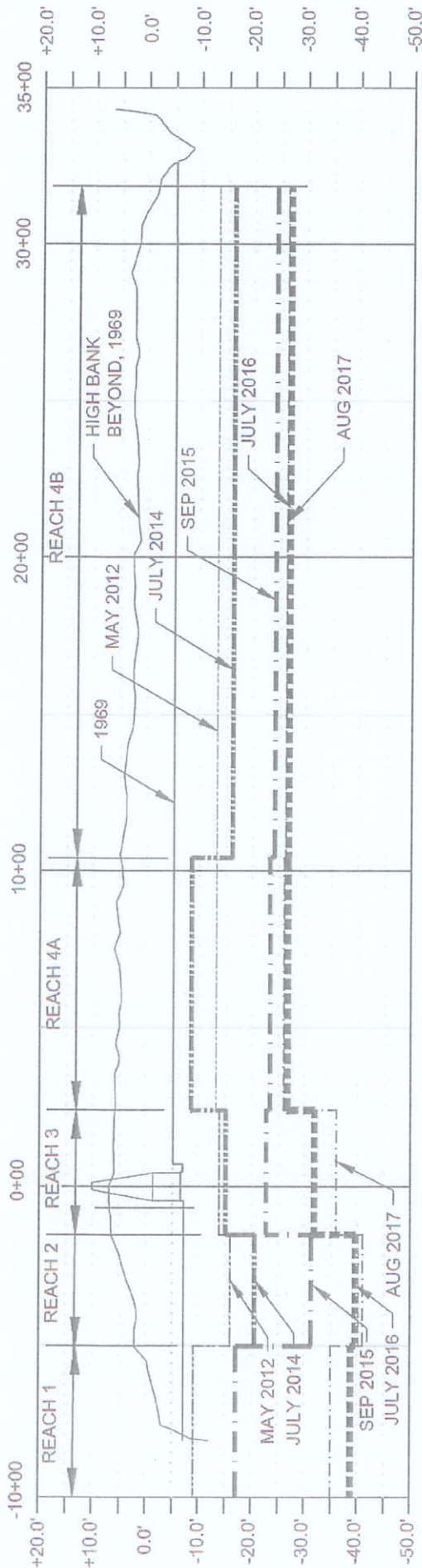
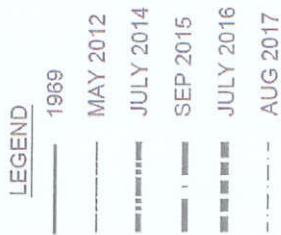
	JULY 2014	SEP 2015	JULY 2016	AUG 2017
REACH 1	NO DATA	-12.2	-17.7	-25.4
REACH 2	-17.1	-20.7	-21.9	-31.4
REACH 3	-12.7	-15.9	-16.6	-26.6
REACH 4A	-7.6	-18.8	-15.2	-20.2
REACH 4B	-15.2	-19.0	-15.6	-22.0

FIGURE 5
HISTORIC CHANNEL WIDTH
AND DEPTH PROFILE
MARDI GRAS PASS
JANUARY 16, 2018

HISTORIC CHANNEL WIDTH AND DEPTH PROFILE

MARDI GRAS PASS

REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1



ELEVATION OF THALWEG DEPTH BASED
ON WATER SURFACE ELEVATION OF +1.0'

MARDI GRAS PASS HISTORIC
THALWEG DEPTH

SCALE
1" = 30' V
1" = 500' H

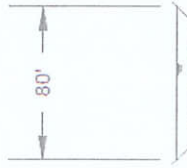
MARDI GRAS PASS AVERAGE THALWEG DEPTHS					
	MAY 2012	JULY 2014	SEP 2015	JULY 2016	AUG 2017
REACH 1	6.8	NO DATA	17.1	38.8	35.4
REACH 2	14.2	20.6	31.3	39.7	42.2
REACH 3	12.1	15.2	22.8	31.9	35.8
REACH 4A	11.8	8.6	23.4	26.7	26.4
REACH 4B	11.8	16.2	24.2	26.8	26.5

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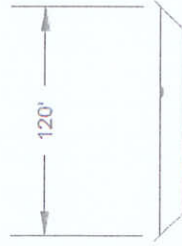
FIGURE 6
HISTORIC THALWEG DEPTH
MARDI GRAS PASS
JANUARY 16, 2018

SOURCE: LAKE PONTCHARTRAIN BASIN FOUNDATION

REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH
PHASE 1



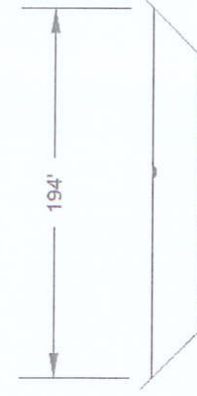
INITIAL CONDITIONS DEPTH = 7'
SCALE: 1" = 100'



2014 CONDITIONS DEPTH = 12'
SCALE: 1" = 100'



2016 CONDITIONS DEPTH = 20'
SCALE: 1" = 100'



2017 CONDITIONS DEPTH = 25'
SCALE: 1" = 100'

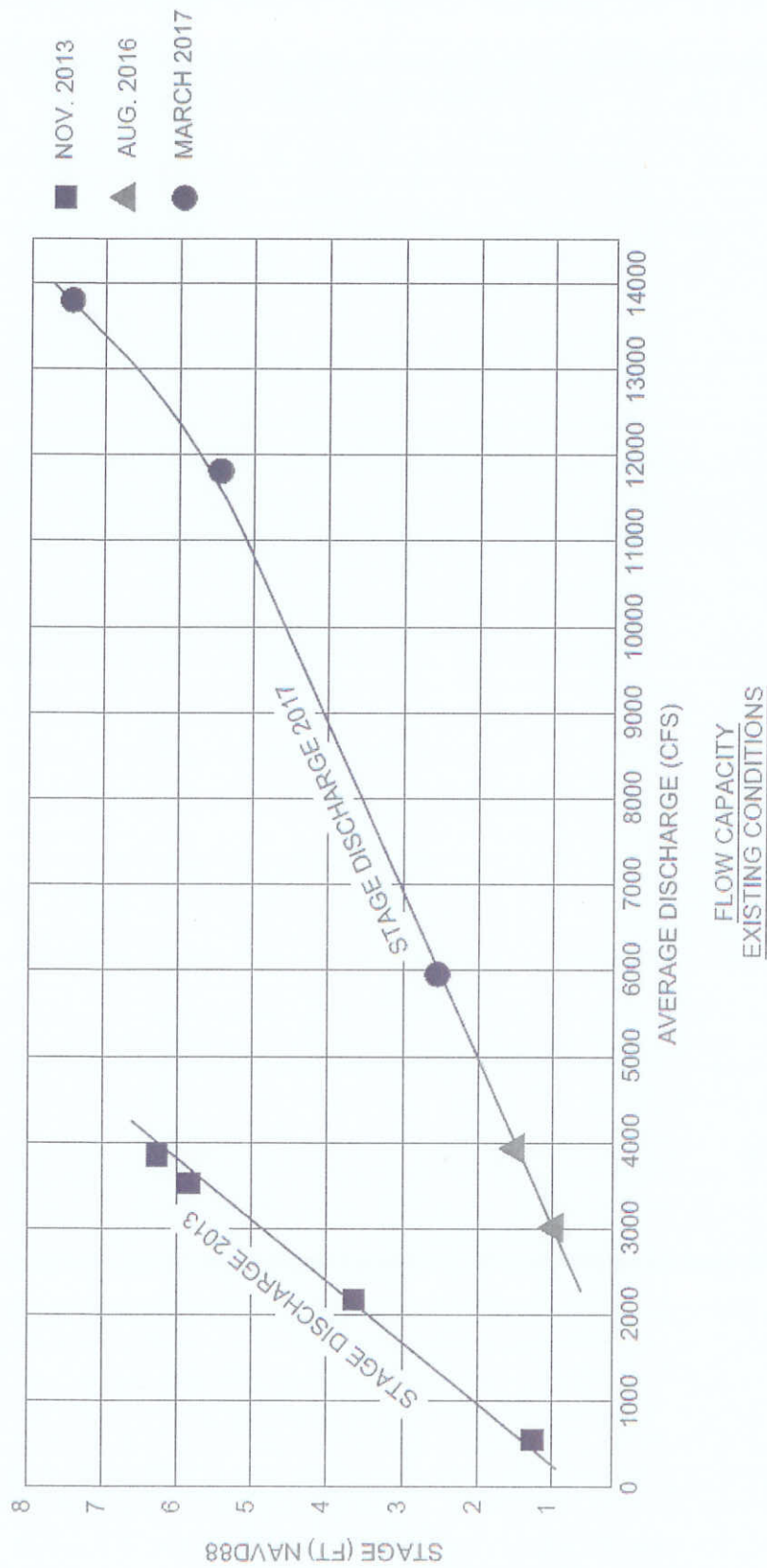
Initial Conditions						2014 Conditions						2016 Conditions						2017 Conditions					
ΔH (ft)	Area (ft2)	Slope (ft/ft)	Hydraulic Radius (ft)	Velocity (ft/s)	Flow, Q (cfs)	ΔH (ft)	Area (ft2)	Slope (ft/ft)	Hydraulic Radius (ft)	Velocity (ft/s)	Flow, Q (cfs)	ΔH (ft)	Area (ft2)	Slope (ft/ft)	Hydraulic Radius (ft)	Velocity (ft/s)	Flow, Q (cfs)	ΔH (ft)	Area (ft2)	Slope (ft/ft)	Hydraulic Radius (ft)	Velocity (ft/s)	Flow, Q (cfs)
1	511	0.000238	5.942	1.676	856.48	1	1296	0.000238	9.969	2.367	3067.10	1	3200	0.000238	16.327	3.288	10521.92	1	4225	0.000238	19.6776	3.7239	15733.47
2	511	0.000476	5.942	2.370	1211.25	2	1296	0.000476	9.969	3.347	4337.54	2	3200	0.000476	16.327	4.650	14880.24	2	4225	0.000476	19.6776	5.2664	22250.49
3	511	0.000714	5.942	2.903	1483.47	3	1296	0.000714	9.969	4.099	5312.38	3	3200	0.000714	16.327	5.695	18224.5	3	4225	0.000714	19.6776	6.4500	27251.17
4	511	0.000952	5.942	3.352	1712.96	4	1296	0.000952	9.969	4.733	6134.21	4	3200	0.000952	16.327	6.576	21043.84	4	4225	0.000952	19.6776	7.4478	31466.94
5	511	0.00119	5.942	3.748	1915.15	5	1296	0.00119	9.969	5.292	6858.25	5	3200	0.00119	16.327	7.352	23527.73	5	4225	0.001190	19.6776	8.3269	35181.11
6	511	0.001429	5.942	4.106	2097.94	6	1296	0.001429	9.969	5.797	7512.84	6	3200	0.001429	16.327	8.054	25773.34	6	4225	0.001428	19.6776	9.1217	38538.98
7	511	0.001657	5.942	4.435	2266.04	7	1296	0.001657	9.969	6.261	8114.80	7	3200	0.001657	16.327	8.699	27838.39	7	4225	0.001656	19.6776	9.8525	41626.85

NOTE: CHANNEL FLOWS AND VELOCITIES WERE COMPUTED USING MANNING'S EQUATION WITH A CHANNEL LENGTH OF 4200FT AND ROUGHNESS COEFFICIENT OF 0.045.

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FIGURE 7
HYDRAULIC ASSESSMENT
MARDI GRAS PASS
JANUARY 16, 2018

HMIA
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PHASE 1



NOTE: FLOW INFORMATION PUBLISHED BY LAKE PONTCHARTRAIN BASIN FOUNDATION IN A DOCUMENT ENTITLED "MEASUREMENT OF LATERAL FLOW FROM THE MISSISSIPPI RIVER AT MARDI GRAS PASS AND FLOW DISTRIBUTION WITHIN THE BOHEMIA SPILLWAY USING SYNOPTIC AND TRIPOD ADCP OBSERVATIONS" DATED AUGUST 02, 2017

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FIGURE 8
FLOW CAPACITY
EXISTING CONDITIONS
MARCH 22, 2018

Figure 95 illustrates this hypothetical "geomorphic limit" which reflects processes not fully defined here. These processes likely include deposition in the outfall area which may restrict flow, as well as landscape elevation which defines head; both of which have control on water velocity and, therefore, erosion. Other factors such as *in situ* soil properties, vegetation, and wetland creation, may all ultimately contribute to a subtle balance of competing rates. In general, the avulsion or abandonment outcome is determined by competing balance of erosion and deposition. Together these properties may drive the crevasse to continue to enlarge, stabilize or become smaller. This hypothetical limit is referred to as the "geomorphic limit" and it is shown in Figure 95 as a possible boundary to the incremental creep of the rating curve to the right with greater flow capacity.



Figure 95: This figure illustrates a hypothetical limit to increasing flow capacity of Mardi Gras Pass. This limit may be greater or less than some acceptable level of flow to managers.

Figure 95 also suggests the context of this geologic, avulsive process in the realm of human management. For a multitude of reasons all relating to the unnatural management of the river for betterment of societal needs, it may be determined that there is a limit to the desired flow through a particular location of the river such as at MGP. The limit may or may not fall above the geomorphic limit. If the acceptable limit is above the geomorphic limit, the implication is that the need for human management or intervention of MGP is minimal. If the acceptable limit falls below the geomorphic limit, then a more aggressive management strategy

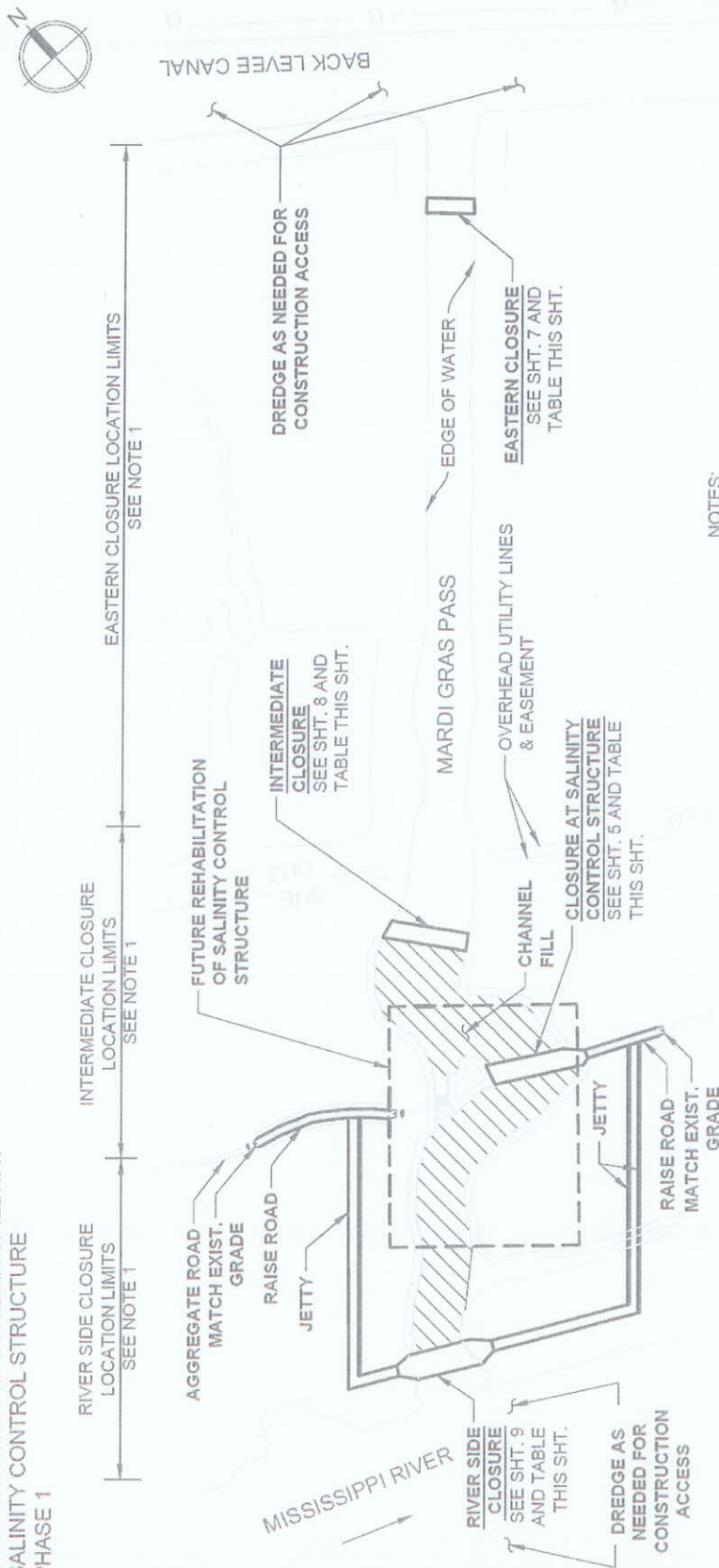








REHABILITATION OF BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE PHASE 1



NOTES:

- 1.) THE LOCATION OF THE CLOSURES MAY VARY. THE FINAL LOCATION OF THE CLOSURES WILL BE DETERMINED DURING PROJECT IMPLEMENTATION.
- 2.) WATER LEVELS VARY WITH TIDES AND RIVER LEVELS
- 3.) CLOSURES, JETTIES, STABILITY BERMS, AND CHANNEL FILL MAY CONSIST OF A COMBINATION OF STONE, AGGREGATE, STONE GABIONS, GRAVITY STRUCTURES, SAND, DREDGED SPOIL, CONCRETE MATS AND/OR GEOSYNTHETICS.
- 4.) GROUND MODIFICATION MEASURES SUCH AS DEEP SOIL MIXING, ETC. MAY BE REQUIRED

PLAN OF IMPROVEMENTS

SCALE: 1" = 500'

	CHANNEL WIDTH	TOP OF BANK EL	AVG BOTTOM EL
RIVER SIDE CLOSURE	250.0	3.0	-31.0
SALINITY CONTROL STRUCTURE CLOSURE	265.0	6.0	-30.0
INTERMEDIATE CLOSURE	250.0	5.5	-16.0
EASTERN CLOSURE	150.0	3.5	-16.0

LEGEND

DENOTES
CHANNEL FILL

DENOTES
CLOSURE

DENOTES
STEEL SHEETING

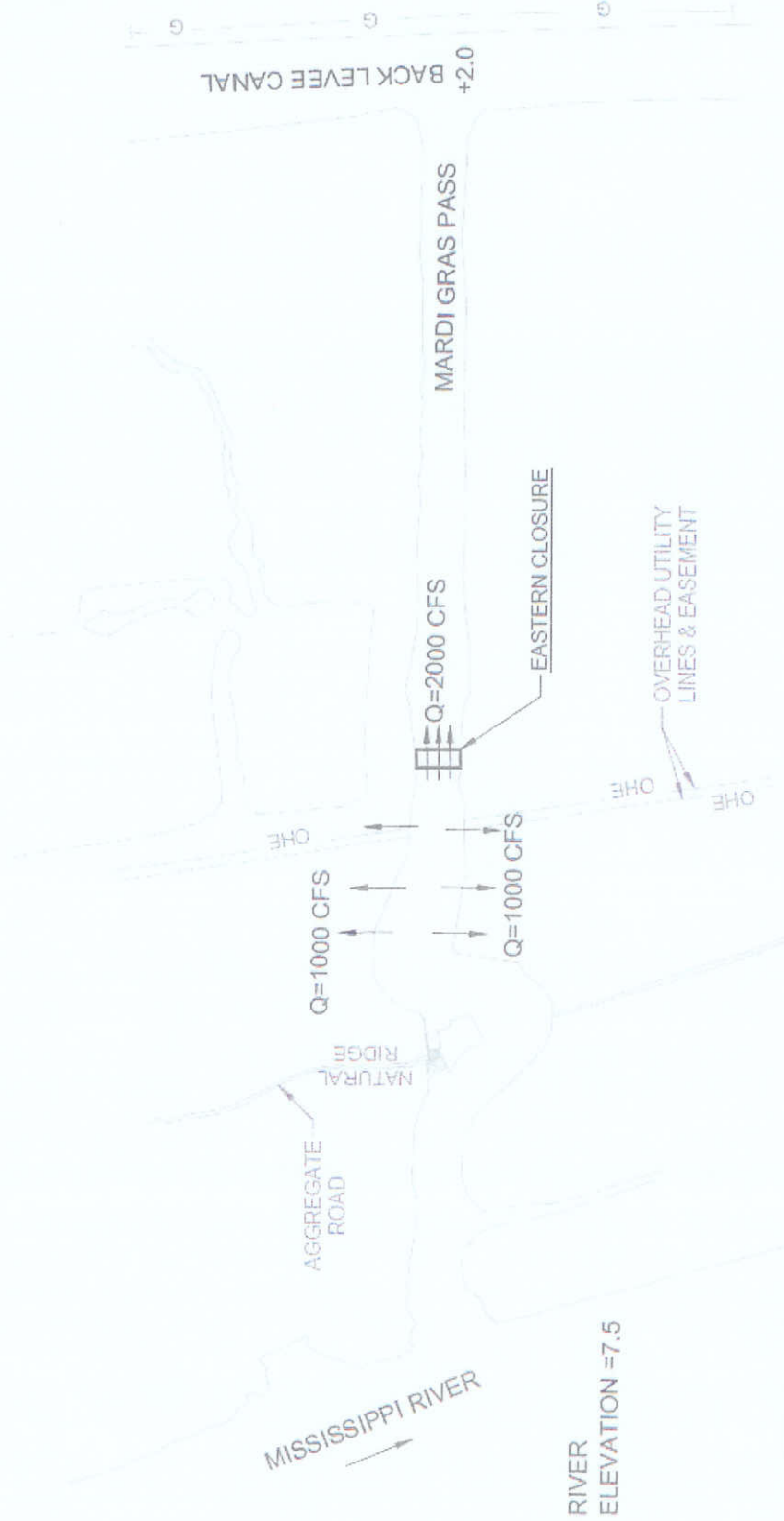
DENOTES
WATER LEVEL

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PLAN OF IMPROVEMENTS
MARCH 23, 2017
SHEET 4 OF 9

HMIA
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PHASE 1



ESTIMATED FLOWS
HIGH RIVER CONDITION
PHASE 1
SCALE: 1" = 600'

LEGEND
DENOTES
CLOSURE

FIGURE 13
ESTIMATED FLOWS
HIGH RIVER CONDITIONS
PHASE 1
MARDI GRAS PASS
MARCH 22, 2018

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REHABILITATION OF BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE PHASE 1

PLAQUEMINES PARISH, LOUISIANA

PLAQUEMINES PARISH GOVERNMENT

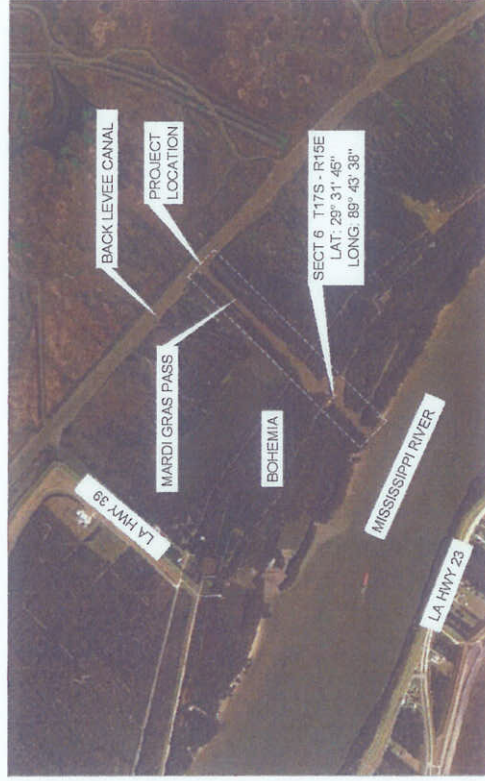
AMOS CORMIER, III
PARISH PRESIDENT

COUNCIL MEMBERS:

DISTRICT 1 - JOHN L. BARTHELEMY, JR.
DISTRICT 2 - WILLIAM "BEAU" BLACK
DISTRICT 3 - KIRK M. LEPINE
DISTRICT 4 - IRVIN JUNEAU, JR.
DISTRICT 5 - BENEDICT "BENNY"
ROUSSELLE
DISTRICT 6 - CHARLIE BURT
DISTRICT 7 - AUDREY T. SALVANT
DISTRICT 8 - JEFF E. EDGEcombe
DISTRICT 9 - NICOLE SMITH WILLIAMS

INDEX TO SHEETS

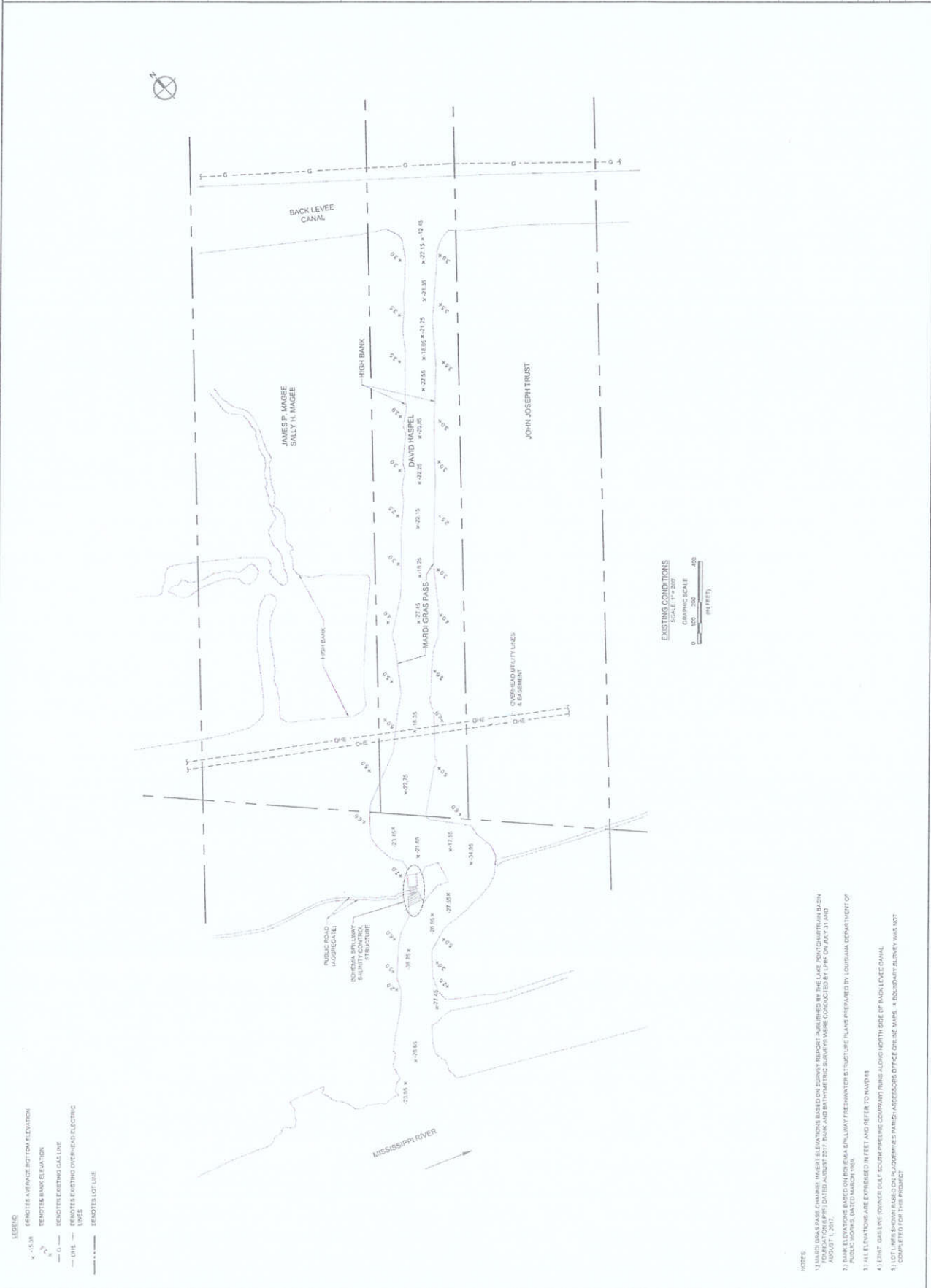
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES, ABBREVIATIONS, LEGEND AND QUANTITIES
3	EXISTING CONDITIONS
4	PLAN OF IMPROVEMENTS
5	EASTERN CLOSURE STRUCTURE SECTIONS AND DETAILS
6	CONSTRUCTION PHASING / FLOW VELOCITIES



VICINITY MAP
SCALE: 1" = 1000'

PROJECT DESCRIPTION: REHABILITATION OF BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE PLAQUEMINES PARISH, LOUISIANA		SHEET DESCRIPTION: TITLE SHEET	
PREPARED FOR: PLAQUEMINES PARISH GOVERNMENT		DATE: 09/05/2018	
INITIAL REVISION DATE:		Prepared under the supervision of: Frank C. Newell, P.E., P.L.S. LA PE 33850, LA P.L.S. 04577 700 Poydras Avenue, Suite 202 Metairie, Louisiana 70005 (504) 206-3150 fnewell@newelling.com	
No. DATE DESCRIPTION BY APPROVED		NEWELL ENGINEERING www.newelling.com	
SCALE: 1" = 1000'		DRAWN BY: EPN	
CHECKED BY: FCN		SHEET NO. 1 OF 6	

PROJECT DESCRIPTION REHABILITATION OF BOHEMA SPILLWAY SALINITY CONTROL STRUCTURE PLaquemines Parish, Louisiana		SHEET DESCRIPTION EXISTING CONDITIONS		PREPARED FOR PLaquemines Parish GOVERNMENT	
PROJECT NO. 09/05/2018		DATE 09/05/2018		DRAWN BY EPN	
CHECKED BY FCN		SCALE 1" = 200'		SHEET NO. 3 OF 6	
PREPARED UNDER THE SUPERVISION OF: Frank C. Newell, P.E., P.L.S. 700 Papworth Avenue, Suite 202 Metairie, Louisiana 70005 NE@newellengineering.com Newell Engineering, LLC LA PE 203850 LA PLS 04577		NEWELL ENGINEERING www.newellengineering.com			



NOTE:

- 1) MAHDI GRASS PASS ELEVATIONS BASED ON SURVEY REPORT PUBLISHED BY THE LAKE PONTCHARTRAIN BASIN DISTRICT, NEW ORLEANS, LOUISIANA, DATED AUGUST 2017. BANK AND BATHYMETRIC SURVEYS WERE CONDUCTED BY LPMC ON JULY 31 AND AUGUST 1, 2017.
- 2) BANK ELEVATIONS BASED ON BOHEMA SPILLWAY FRESHWATER STRUCTURE PLANS PREPARED BY LOUISIANA DEPARTMENT OF PUBLIC WORKS, DATED MARCH 1965.
- 3) ALL ELEVATIONS ARE EXPRESSED IN FEET AND REFER TO NAVD83.
- 4) EXIST' GAS LINE (PONDCE GULF SOUTH-PHELIX COMPANY) RUNS ALONG NORTH SIDE OF BACK LEVEE CANAL.
- 5) 151' WIDE BOHEMA BASIN, PLaquemines Parish, ASSUMES OFFICE OFFICE MAPS. A SECONDARY SURVEY WAS NOT COMPLETED FOR THIS PROJECT.

DATE	11/11/2017
DRAWN BY	EPN
CHECKED BY	FCN
JOB No.	012-018
SHEET No.	4 of 6

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Prepared under the supervision of:
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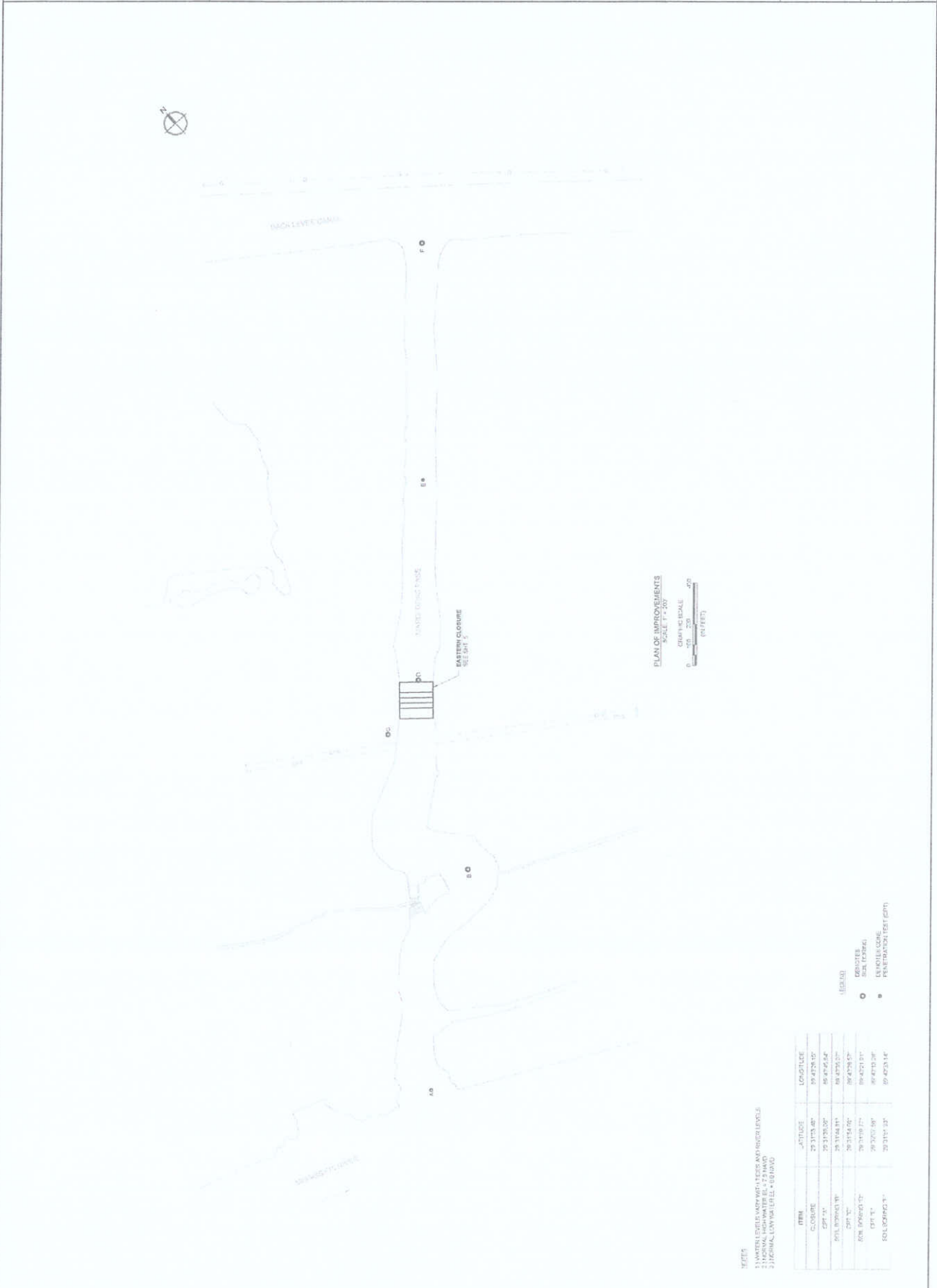


PROJECT DESCRIPTION:
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH, LOUISIANA

SHEET DESCRIPTION:
PLAN OF IMPROVEMENTS

PREPARED FOR:
PLAQUEMINES PARISH
GOVERNMENT

INITIAL REVISION DATE	NO.	DATE	DESCRIPTION	BY	APPROVED



Prepared under the supervision of:
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LA PE 23850, LA PLS 04577
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Metairie, Louisiana 70005
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09/05/2018

PROJECT DESCRIPTION:	SHEET DESCRIPTION
REHABILITATION OF BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE PLAQUEMINES PARISH, LOUISIANA	EASTERN CLOSURE STRUCTURE SECTIONS AND DETAILS

PLAQUEMINES PARISH
GOVERNMENT

INITIAL REVISION DATE	DATE	DESCRIPTION	BY	APPROVED
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- NOTES
- FOR ANY GIVEN SIZE, THE LARGEST DIMENSION OF A SPECIFIED SIZE IN SECTION 71.21 OF THE CONSUMERS STANDARD SPECIFICATIONS FOR PULP AND BRIDGE AND THE LARGEST DIMENSION OF THE FOLLOWING IS INDICATED BY THE FIRST COLUMN AND THE LARGEST DIMENSION OF THE SPECIFIED PULP CLASS
- | AS PER PULP CLASSES | SPHERICAL DIAMETER (FT.) | N OF STONE SMALLER THAN |
|---------------------|--------------------------|-------------------------|
| 2000 | 3.60 | 100 |
| 1600 | 3.00 | 4000 |
| 400 | 1.75 | 14,500 |
| 100 | 1.00 | 40,000 |
| 40 | 1.00 | 518 |
-
- | 1000 LB PULP CLASS | SPHERICAL DIAMETER (FT.) | N OF STONE SMALLER THAN |
|--------------------|--------------------------|-------------------------|
| STONE SIZE (LBS) | | |
| 2000 | 2.81 | 45,100 |
| 1600 | 2.50 | 9,500 |
| 1000 | 2.50 | 9,500 |
| 400 | 2.50 | 9,500 |
| 100 | 2.50 | 9,500 |
- STEPS IN STEERING SHALL BE BASED ON 100 LB SPECIFICATIONS. MINIMUM PULP SPECIFICATIONS 1000 LB. MINIMUM SPECIFICATION: 400 LB. AT 5% N. AT MINIMUM VOLUME OF RETENT: 300 T. (T)
- BEFORE SURFACING, THE SHEET PILE SHALL BE CLEANED AND BRISTLED ON THE TOP PORTION OF THE SHEET. PILE SYSTEM TO BE A 2:1 COAL. AN EMPLOYMENT IN ACCORDANCE WITH THE SPECIFICATIONS FOR THE SHEET PILE SHALL BE BASED ON THE SPECIFICATIONS FOR BRISTLED SHEET PILE AND APPROVED EQUIPMENT.



PHASE 1.1 - CONSTRUCT ROCK DIKE TO EL. +14.0

Phase 1.1

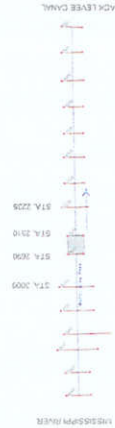
Channel Structure	Flow	Sta. 3000	Sta. 2000 Velocity	Velocity at Channel	Sta. 2510	Sta. 2215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	3.70	3.70	3.70	3.70	3.70

ESTIMATED PHASE 1.1 CHANNEL VELOCITIES DURING CONSTRUCTION

Phase 1.1

Channel Structure	Flow	Sta. 3700	Sta. 3700 Velocity	Velocity at Channel	Sta. 3510	Sta. 3215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	4.17	4.17	4.17	4.17	4.17

ESTIMATED PHASE 1.1 CHANNEL VELOCITIES DURING CONSTRUCTION



MARDI GRASS PASS STATIONS - PLAN
NOT TO SCALE



Phase 1.2A Channel Width Through Closure + 100 Feet

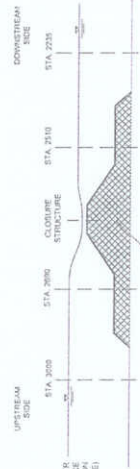
Channel Structure	Flow	Sta. 3000	Sta. 2000 Velocity	Velocity at Channel	Sta. 2510	Sta. 2215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	3.70	3.70	3.70	3.70	3.70

ESTIMATED PHASE 1.2A CHANNEL VELOCITIES DURING CONSTRUCTION

Phase 1.2A Channel Width Through Closure + 100 Feet

Channel Structure	Flow	Sta. 3000	Sta. 2000 Velocity	Velocity at Channel	Sta. 2510	Sta. 2215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	3.70	3.70	3.70	3.70	3.70

ESTIMATED PHASE 1.2A CHANNEL VELOCITIES DURING CONSTRUCTION



MARDI GRASS PASS STATIONS - PROFILE
NOT TO SCALE



Phase 1.2B Channel Width Through Closure + 50 Feet

Channel Structure	Flow	Sta. 3000	Sta. 2000 Velocity	Velocity at Channel	Sta. 2510	Sta. 2215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	3.70	3.70	3.70	3.70	3.70

ESTIMATED PHASE 1.2B CHANNEL VELOCITIES DURING CONSTRUCTION

Phase 1.2B Channel Width Through Closure + 50 Feet

Channel Structure	Flow	Sta. 3000	Sta. 2000 Velocity	Velocity at Channel	Sta. 2510	Sta. 2215
Elevation	(ft)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)	Velocity (ft/s)
-14	1775	3.70	3.70	3.70	3.70	3.70

ESTIMATED PHASE 1.2B CHANNEL VELOCITIES DURING CONSTRUCTION

Rehabilitation of the Bohemia Spillway Salinity Control Structure - Phase 1

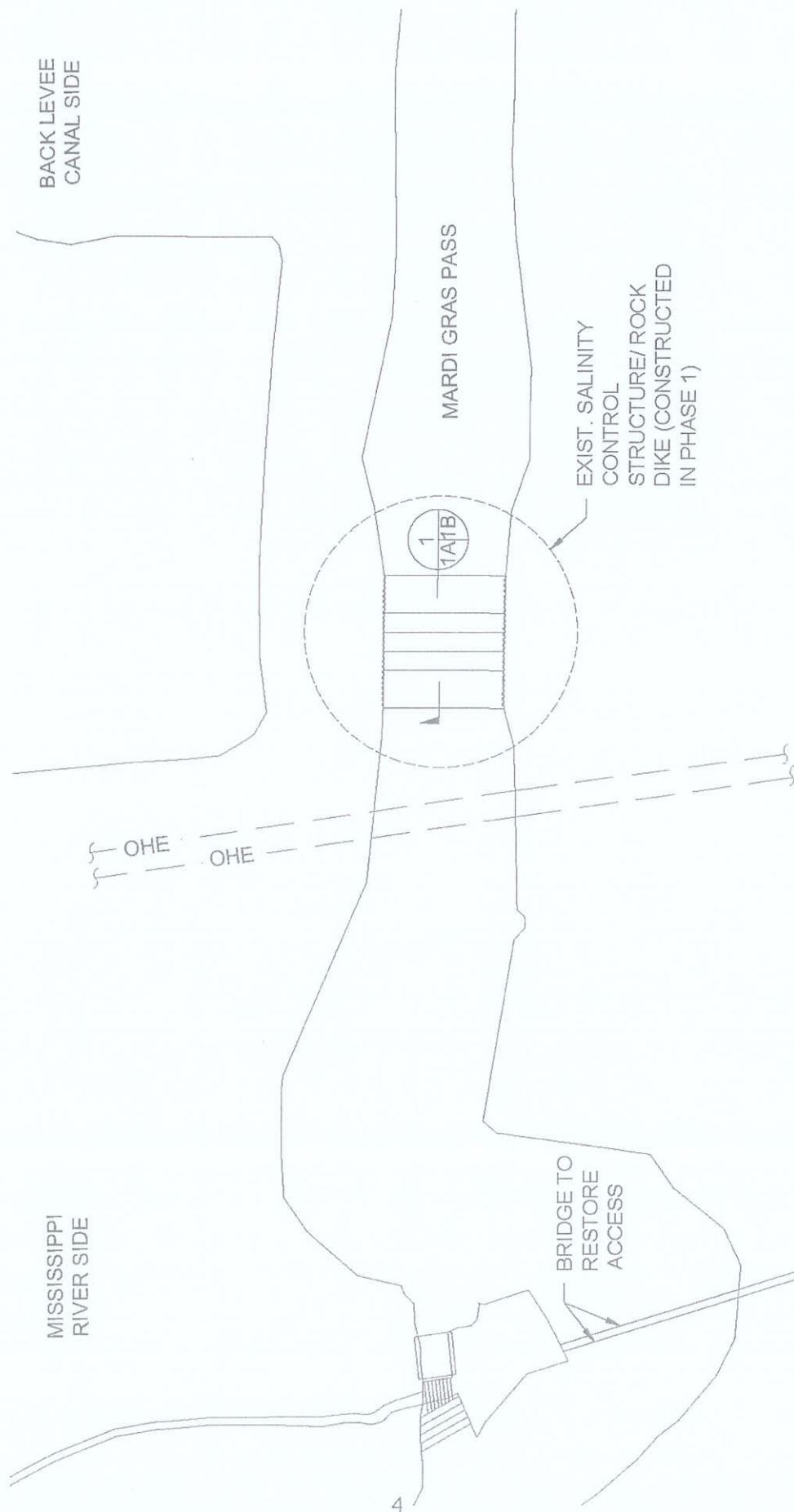
Construction Cost Estimate

Plaquemines Parish Government

August 29, 2018

Item	Description	Estimated Quantity	Engineer's Estimate	
			Unit Price	Extension
1.	Initial Surveys	1 Lump Sum	\$ 25,000.00	\$ 25,000.00
2.	Progress Surveys	150 Per Day	\$ 1,000.00	\$ 150,000.00
3.	As-Built Surveys	1 Lump Sum	\$ 25,000.00	\$ 25,000.00
4.	Geotechnical Investigations	1 Lump Sum	\$ 400,000.00	\$ 400,000.00
5.	Steel Sheet Piling	360 Linear Foot	\$ 4,950.00	\$ 1,782,000.00
6.	Closure Material (440 lb Class)	23,500 Tons	\$ 65.00	\$ 1,527,500.00
7.	Closure Material (1000 lb Class)	7,890 Tons	\$ 95.00	\$ 749,550.00
8.	Mobilization/Demobilization	1 Lump Sum	\$ 400,000.00	\$ 400,000.00
9.	Interim Mobilization/Demobilization	1 Lump sum	\$ 400,000.00	\$ 400,000.00
	Construction Cost Estimate [Items 1.-8.]:		\$	5,459,050.00
	Contingencies		\$ 1,569,935.00	\$ 1,569,935.00
	Engineering Administration		\$ 971,015.00	\$ 971,015.00
	Total Project Budget:		\$	8,000,000.00

FIGURE 1A
 FUTURE REHABILITATION ALTERNATIVE 1
 REHABILITATION OF BOHEMIA SPILLWAY
 SALINITY CONTROL STRUCTURE
 PLAQUEMINES PARISH

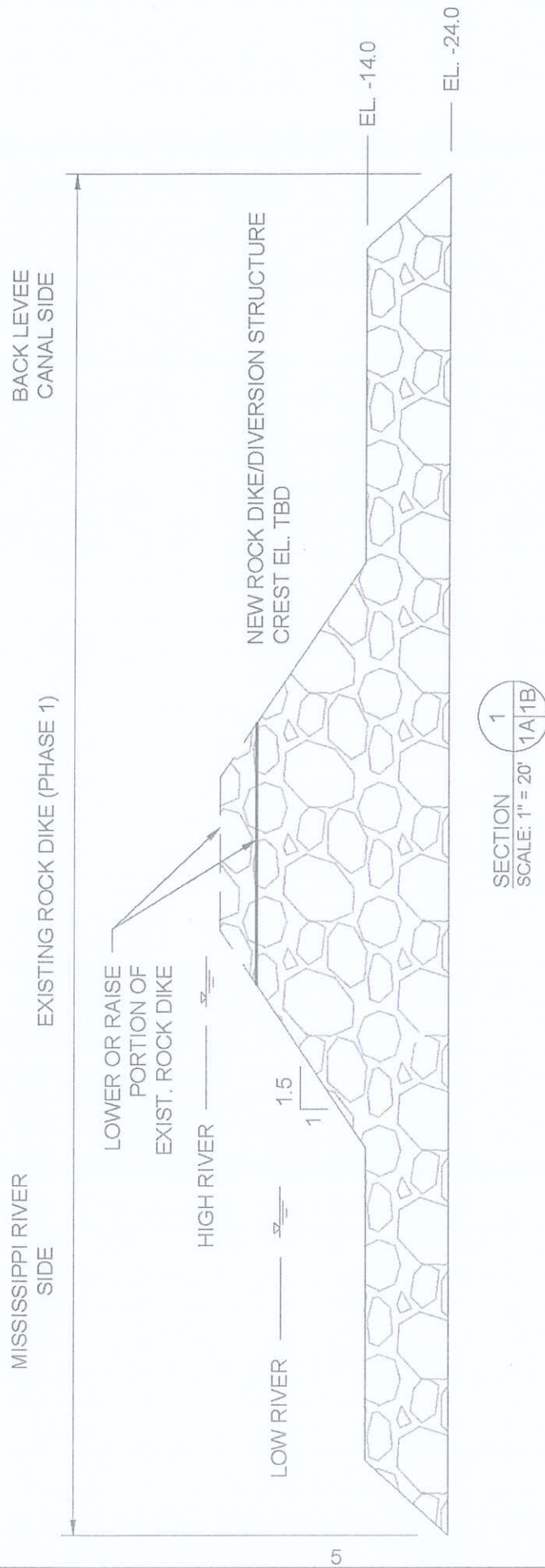


BOHEMIA SPILLWAY
 SALINITY CONTROL STRUCTURE
 PLAN OF IMPROVEMENTS
 SCALE: 1" = 200'

Newell Engineering, L.L.C.
 700 Papworth Avenue, Suite 202
 Metairie, Louisiana 70005
 (504) 206-3150
 NE@newellengineering.com

FIGURE 1B

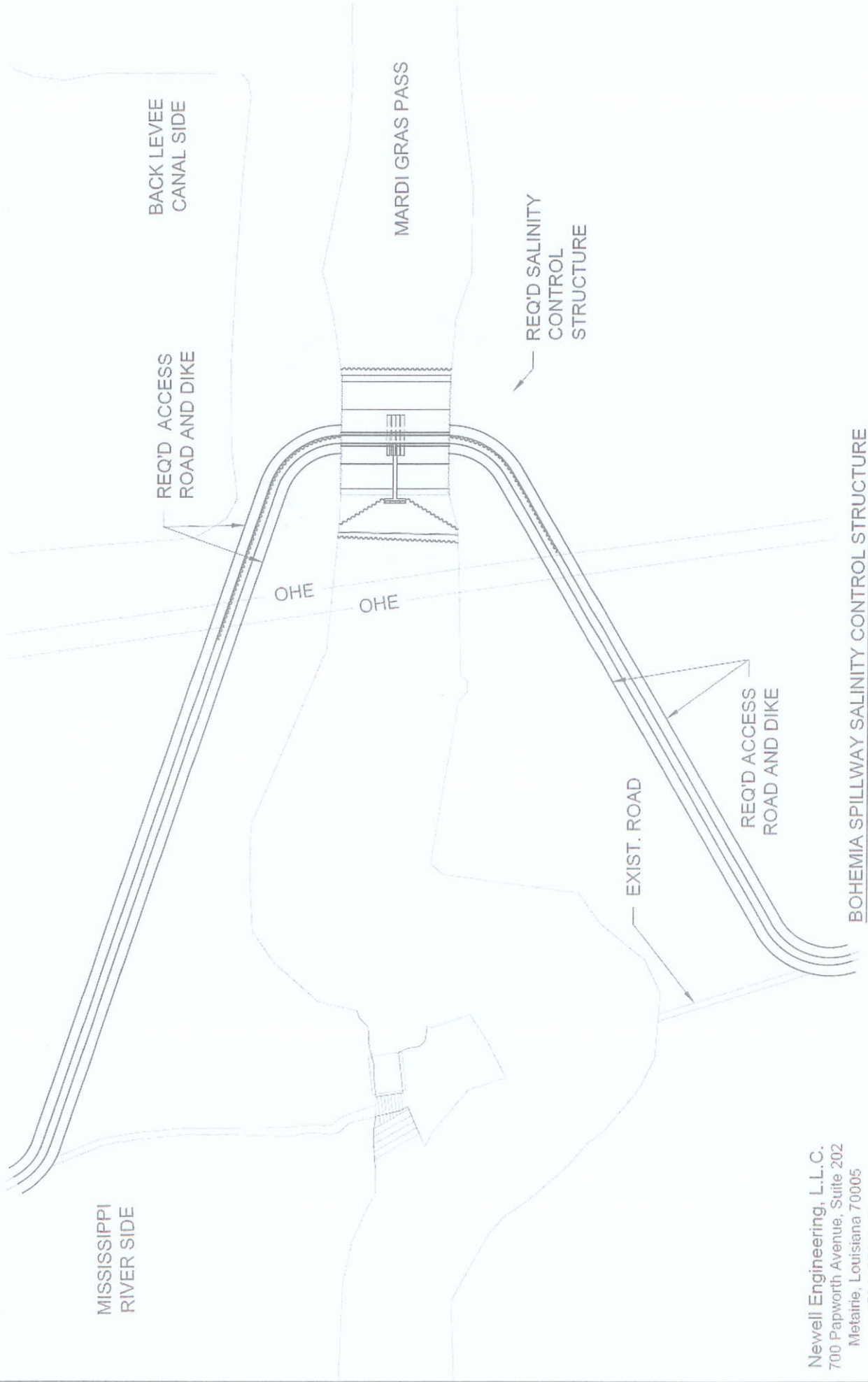
FUTURE REHABILITATION ALTERNATIVE 1
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH



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FIGURE 2A

FUTURE REHABILITATION ALTERNATIVE 2
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH

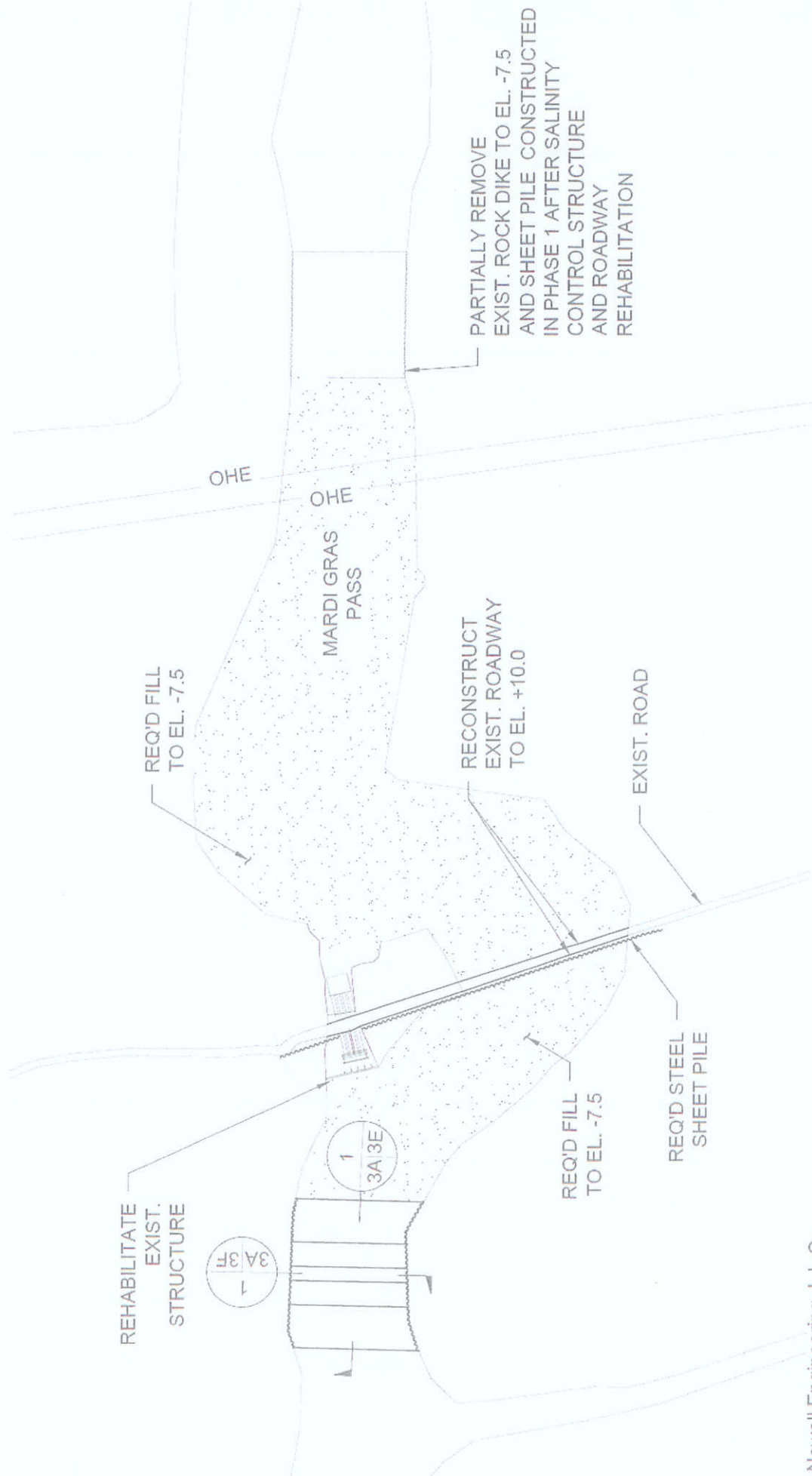


BOHEMIA SPILLWAY SALINITY CONTROL STRUCTURE
PLAN OF IMPROVEMENTS

SCALE: 1" = 200'

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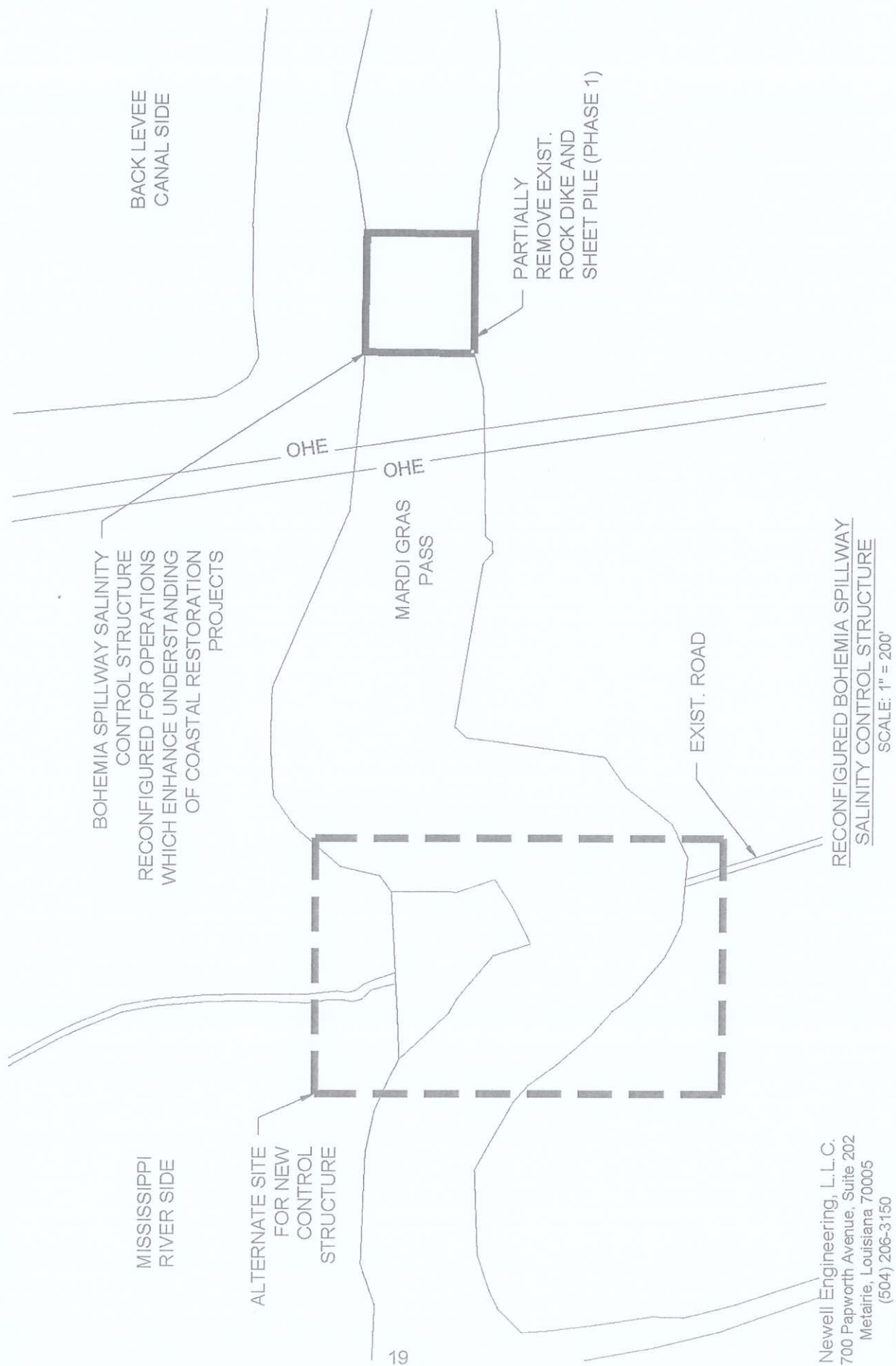
FIGURE 3A
FUTURE REHABILITATION ALTERNATIVE 3
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH



BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAN OF IMPROVEMENTS
SCALE: 1" = 200'

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FIGURE 4
FUTURE REHABILITATION ALTERNATIVE 4
REHABILITATION OF BOHEMIA SPILLWAY
SALINITY CONTROL STRUCTURE
PLAQUEMINES PARISH



Summary of Potential Environmental Impacts

Environmental Factor	Alternative 1 Impacts	Alternative 2 – No Action Impacts
Conservation (4.1)	No expected impacts	Long-term, adverse impacts possible
Economics (4.2)	Minor, direct benefits	Long-term, major, adverse impacts possible
Aesthetics (4.3)	Minor, indirect impact	Minor impacts
General Environmental Concerns (4.4)	Short-term, direct, minor, adverse impacts	Adverse impacts possible
Wetlands (4.5)	Long-term, indirect, major benefits	Long-term, major, adverse impacts possible
Historic Properties (4.6)	No expected impacts	No expected impacts
Fish and Wildlife Values (4.7)	No expected impacts	Major, adverse impacts possible
Flood Hazards (4.8)	No expected impacts	No expected impacts
Floodplain Values (4.9)	Long-term, indirect, major benefits	Long-term, major, adverse impacts possible
Land Use (4.10)	Long-term, indirect benefits	Long-term, major, adverse impacts possible
Navigation (4.11)	Long-term, direct, minor benefits	Long-term, major, adverse impacts possible
Shore Erosion and Accretion (4.12)	Long-term, indirect, major benefits	Long-term, major, adverse impacts possible
Recreation (4.13)	Long-term, indirect, major benefits	Long-term, major, adverse impacts possible
Water Supply and Conservation (4.14)	No expected impacts	Long-term, major, adverse impacts possible
Water Quality (4.15)	Long-term, direct, major benefits	Long-term, major, adverse impacts possible
Energy Needs (4.16)	Long-term, direct benefits	Long-term, major, adverse impacts possible
Safety (4.17)	Long-term, indirect, major benefits	Long-term, major, adverse impacts
Food and Fiber Production (4.18)	Long-term, indirect, major benefits	Long-term, major adverse impacts
Mineral Needs (4.19)	No impacts expected	No impacts expected
Considerations of Property Ownership (4.20)	Long-term, direct benefits	Long-term, major, adverse impacts possible
Needs and Welfare of the People (4.21)	Long-term, indirect, major benefits	Long-term, major, adverse impacts possible

PERMIT STATUS PATH FORWARD



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PUBLIC OYSTER REEF GROUNDS

SCALE: 1" = 20000'

OCTOBER 22, 2018