

# INVESTIGATION OF POTENTIAL MISSISSIPPI RIVER BORROW AREAS

## FINAL REPORT

Prepared for:



**Coastal Protection and  
Restoration Authority  
of Louisiana**

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## TABLE OF CONTENTS

|  |           |
|--|-----------|
| <b>1.0 INTRODUCTION .....</b>  | <b>1</b>  |
| <b>2.0 SUMMARY OF RECENT STUDIES.....</b>                                    | <b>2</b>  |
| 2.1 Geotechnical Investigation for Exploration of Sand Resources in LMR..... | 6         |
| 2.2 Mississippi River Sediment Delivery System – Bayou Dupont (BA-39) .....  | 7         |
| 2.3 Lake Hermitage Marsh Creation Project (BA-42) .....                      | 9         |
| 2.4 USACE Saltwater Barrier Sill .....                                       | 10        |
| 2.5 Scofield Island Restoration (BA-40).....                                 | 11        |
| 2.6 MR Long Distance Sediment Pipeline (BA-43 EB) .....                      | 12        |
| 2.6.1 Alliance Anchorage .....   | 12        |
| 2.6.2 Alliance South.....  | 14        |
| 2.6.3 Wills Point Anchorage.....   | 16        |
| <b>3.0 IDENTIFICATION AND DELINEATION OF POTENTIAL BORROW AREAS.....</b>     | <b>17</b> |
| 3.1 Identifying Potential Borrow Areas .....                                 | 17        |
| 3.2 Delineating Potential Borrow Areas.....                                  | 17        |
| 3.2.1 Required Borrow Area Excavation Constraints .....                      | 18        |
| 3.2.2 Data Sources.....  | 19        |
| 3.3 Preliminary Borrow Area Volume Estimates.....                            | 19        |
| <b>4.0 DATA REVIEW AND GAP ANALYSIS .....</b>                                | <b>28</b> |
| <b>5.0 DATA COLLECTION PLAN .....</b>  | <b>33</b> |
| 5.1 Overview .....   | 33        |
| 5.2 Data Collection Costs.....   | 35        |
| <b>6.0 REFERENCES.....</b>   | <b>37</b> |
| <b>APPENDIX A PRELIMINARY DESIGN OF POTENTIAL BORROW AREAS</b>               |           |
| <b>APPENDIX B LIMITS OF PERMISSIBLE EXCAVATION IN RIVER (USACE, 1974)</b>    |           |
| <b>APPENDIX C OVERVIEW MAPS OF POTENTIAL BORROW AREAS</b>                    |           |



## LIST OF FIGURES

|              |   |    |
|--------------|---|----|
| Figure 2-1:  | Recent Borrow Areas, Wills Point to Alliance South.....                                 | 3  |
| Figure 2-2:  | Recent Borrow Areas, BA-42 .....  | 4  |
| Figure 2-3:  | Recent Borrow Areas, BA-40 .....  | 5  |
| Figure 2-4:  | Planning-Level Borrow Areas Identified by Finkl et. al (2005).....                      | 6  |
| Figure 2-5:  | Mississippi River Sediment Delivery System (BA-39) Borrow Area<br>(Thompson, 2007)..... | 7  |
| Figure 2-6:  | USACE and BA-39 Alliance Anchorage Borrow Area Delineations .....                       | 8  |
| Figure 2-7:  | Lake Hermitage (BA-42) Borrow Area (CPRA, 2008).....                                    | 9  |
| Figure 2-8:  | USACE No. 1 Borrow Area (USACE, 2012).....  | 10 |
| Figure 2-9:  | USACE No. 2 Borrow Area (USACE, 2012).....  | 10 |
| Figure 2-10: | Scofield Island Restoration Project Borrow Areas (Poff et. al, 2011).....               | 11 |
| Figure 2-11: | LDSP (BA-43) Alliance Anchorage Borrow Area (CPRA, 2012).....                           | 13 |
| Figure 2-12: | LDSP & BA48 Alliance Anchorage Borrow Area - Typical Section .....                      | 13 |
| Figure 2-13: | LDSP (BA-43) Preliminary Alliance South Borrow Area (CPRA,<br>2012) .....               | 15 |
| Figure 2-14: | LDSP (BA-43) Preliminary Wills Point Anchorage Borrow Area<br>(CPRA, 2012) .....        | 16 |
| Figure 3-1:  | Potential Borrow Areas Overview Map (RM 94- RM 50) .....                                | 22 |
| Figure 3-2:  | Potential Borrow Areas Overview Map (RM 52- RM 15) .....                                | 23 |
| Figure 3-3:  | Potential Borrow Areas Overview Map (RM 15- RM 0) .....                                 | 24 |
| Figure 3-4:  | USACE Southwest Pass Disposal Sites (USACE, 2008) .....                                 | 25 |

**LIST OF TABLES**

|            |   |    |
|------------|---|----|
| Table 3-1: | Preliminary Borrow Area Volumes between New Orleans and Head of<br>Passes ..... | 26 |
| Table 4-1: | Summary of Recent Borrow Areas from Miscellaneous Projects .....                | 28 |
| Table 5-1: | Overview of Data Collection Costs .....   | 36 |



## 1.0 INTRODUCTION

This report summarizes the “Investigation of Potential Mississippi River Borrow Areas” study prepared for the Coastal Protection and Restoration Authority (CPRA). The study objective is to investigate and delineate potential Mississippi River borrow areas for large-scale marsh creation, ridge restoration and barrier island restoration projects in Louisiana’s 2012 Comprehensive Master Plan for a Sustainable Coast. The study follows a phased approach to identify, evaluate, and quantify potential borrow areas. Phase I of this task is to (1) identify and delineate potential Mississippi River borrow areas, (2) estimate the available sediment volumes, (3) identify the criteria necessary to finalize the borrow area design through a data gap analysis and review and (4) develop a prioritized field data collection plan. The study was initially confined to the lower 75 miles of the Mississippi River. However, at CPRA’s request the study was extended north to include up to New Orleans, River Mile 95.

This report presents an overview of recent borrow areas in the Lower Mississippi River (LMR), identification and delineation of potential borrow areas, available sediment volume estimates, review of pertinent survey and geotechnical, data gap analysis or necessary survey and geotechnical data, as well as the development of a standard data collection plan for potential borrow areas. Future coordination with CPRA will be required to develop a scope of services for additional tasks such as, but not limited to, cultural resources assessments, levee stability analyses, and sediment transport/morphological modeling.

## 2.0 SUMMARY OF RECENT STUDIES

Recent projects and other miscellaneous studies that have identified and evaluated potential Mississippi River borrow areas have been reviewed as part of this work, including:

- Geotechnical Investigation for Exploration of Sand Resources in LMR (Finkl et. al, 2005)
- Mississippi River Sediment Delivery System (BA-39) (Thompson, 2007)
- Lake Hermitage Marsh Creation (BA-42)(CPRA, 2008)
- Bayou Dupont Marsh and Ridge Creation (BA-48) (Coco, 2010)
- USACE Saltwater Barrier Sill, (USACE, 2010)
- Scofield Island Restoration (BA-40) (Poff, 2011)
- Long Distance Sediment Pipeline (LDSP) (BA-43 EB) (M&N, 2012)
- Louisiana Sand Resource Database (LASARD) (CPRA LACES 2012)

A map providing an overview of the associated respective borrow area locations in the Mississippi River is shown in Figure 2-1 to Figure 2-3. A summary of the relevant borrow area findings is presented in the following paragraphs.

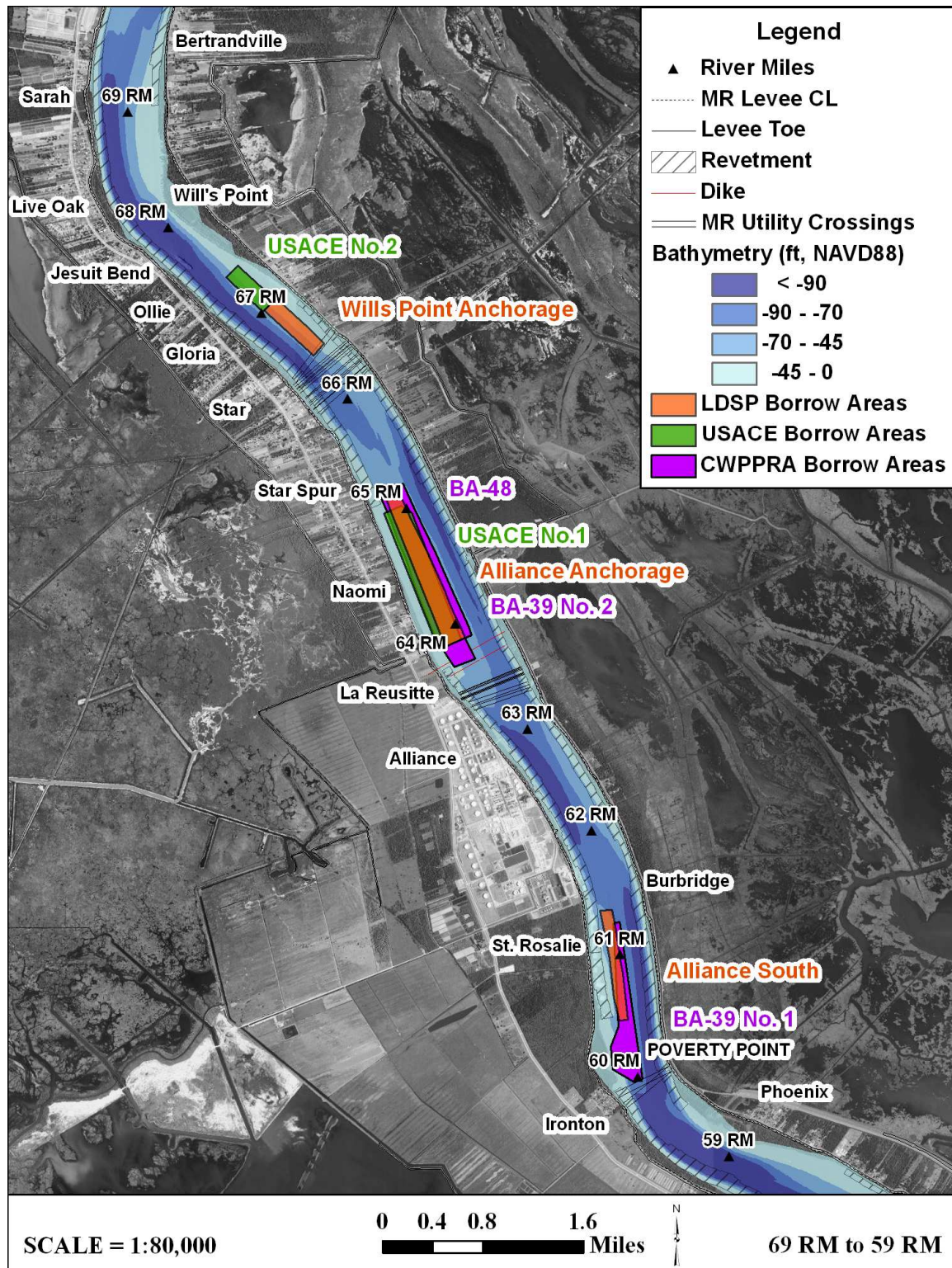


Figure 2-1: Recent Borrow Areas, Wills Point to Alliance South



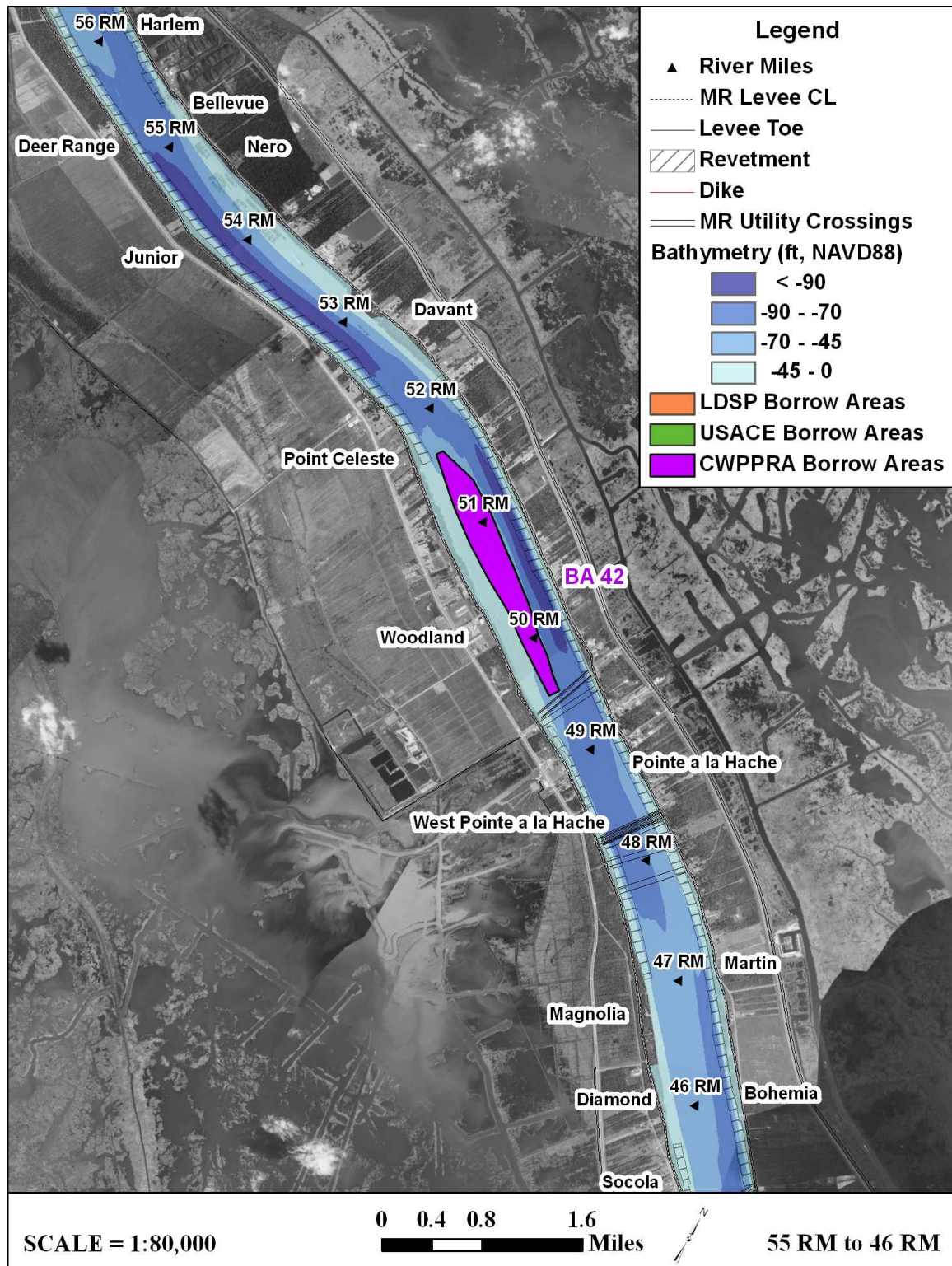


Figure 2-2: Recent Borrow Areas, BA-42

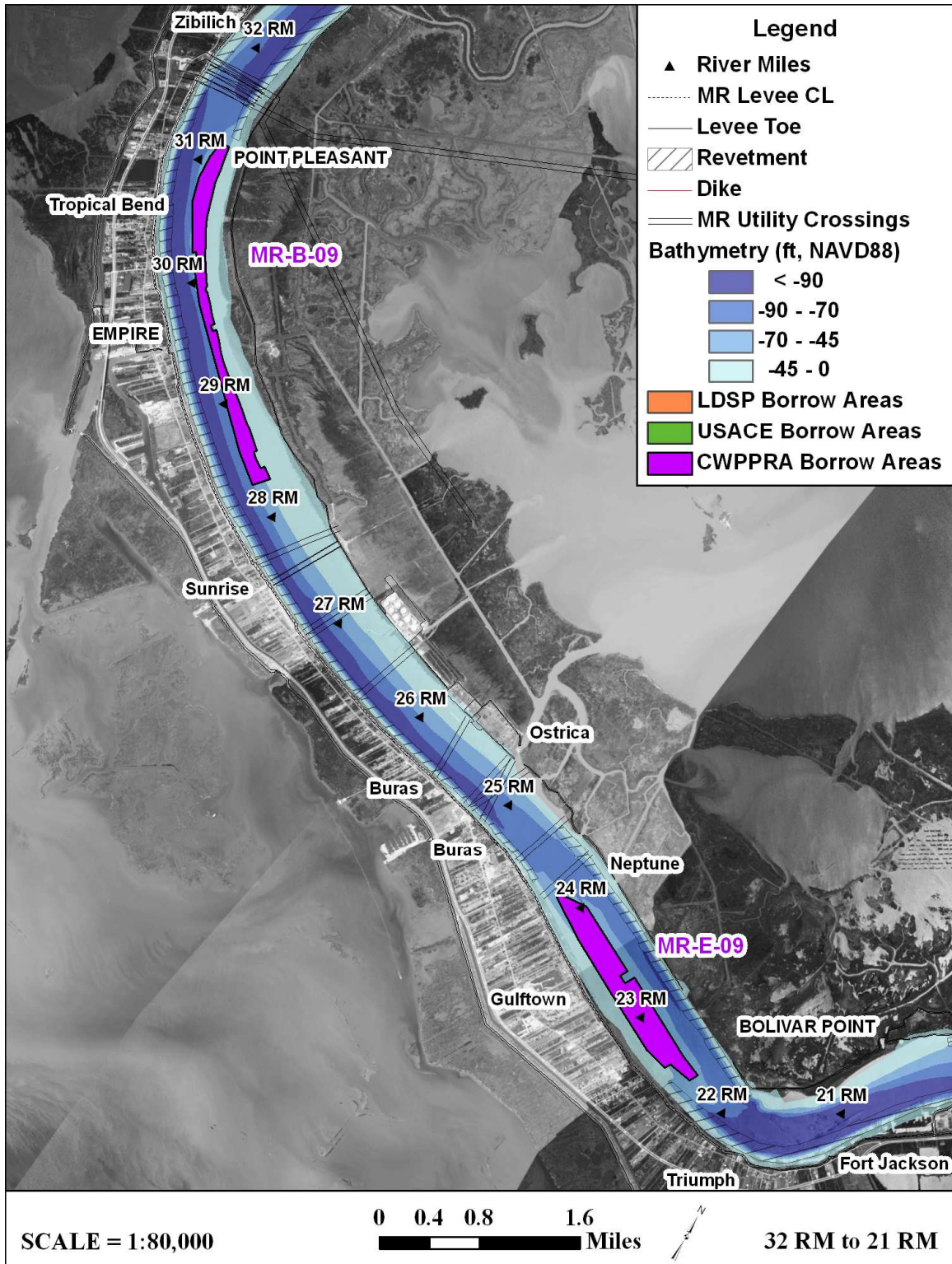


Figure 2-3: Recent Borrow Areas, BA-40



## 2.1 Geotechnical Investigation for Exploration of Sand Resources in LMR

The objective of the study performed by Coastal Planning & Engineering for the Louisiana Department of Natural Resources was to perform a planning-level search for potential borrow areas in the Lower Mississippi River (LMR) containing suitable sediment for beach nourishment (Finkl et. al, 2005; Finkl et. al, 2006). Emphasis was placed on the sediment characteristics (e.g. sediment class, size) since the intended use was beach nourishment. Geophysical surveys and vibracore sampling was performed at seven potential borrow areas between RM 35 and RM 15 in the LMR to characterize the underlying sediment at potential borrow areas. Seven borrow areas (MR-A through MR-G) were delineated based on the results of the geophysical surveys and vibracores. Borrow area delineations were appropriate for a feasibility level study and did not consider required levee, revetment, and navigation setbacks/buffers.

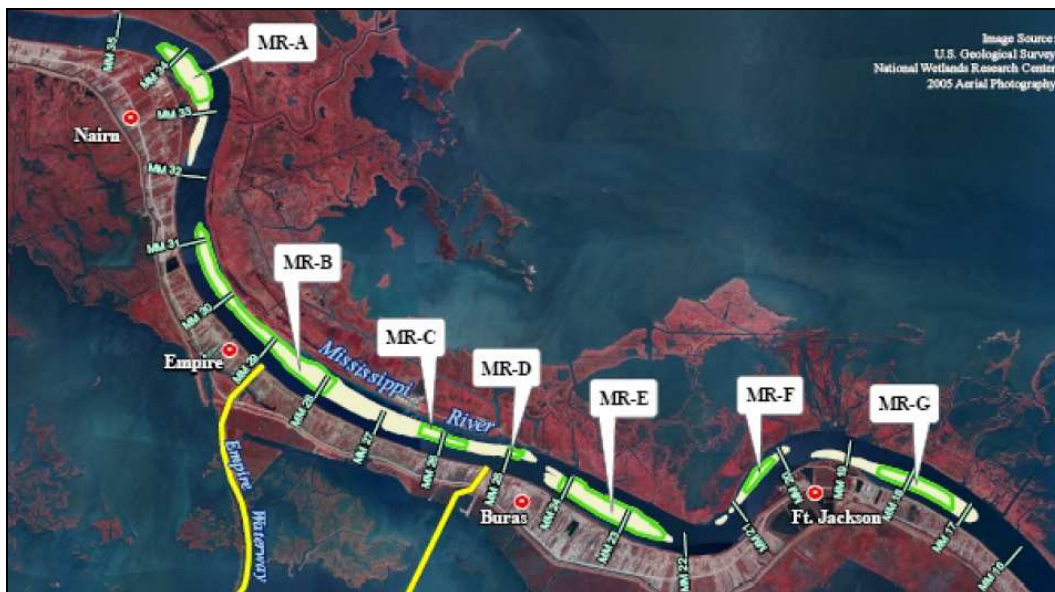


Figure 2-4: Planning-Level Borrow Areas Identified by Finkl et. al (2005)



## 2.2 Mississippi River Sediment Delivery System – Bayou Dupont (BA-39)

Initially two borrow areas, BA-39 No. 1 and BA-39 No. 2, were developed for the Mississippi River Sediment Delivery System Borrow (Thompson, 2007). BA-39 No. 1 is located on a point bar located just upstream of Ironton between RM 60 and 61.3. BA-39 No. 2 is located on a sand bar between RM 63.5 and 65 which has been previously used by the USACE (USACE No. 1) for construction of a saltwater barrier sill. The final design for BA-39 only included BA-39 No. 2.

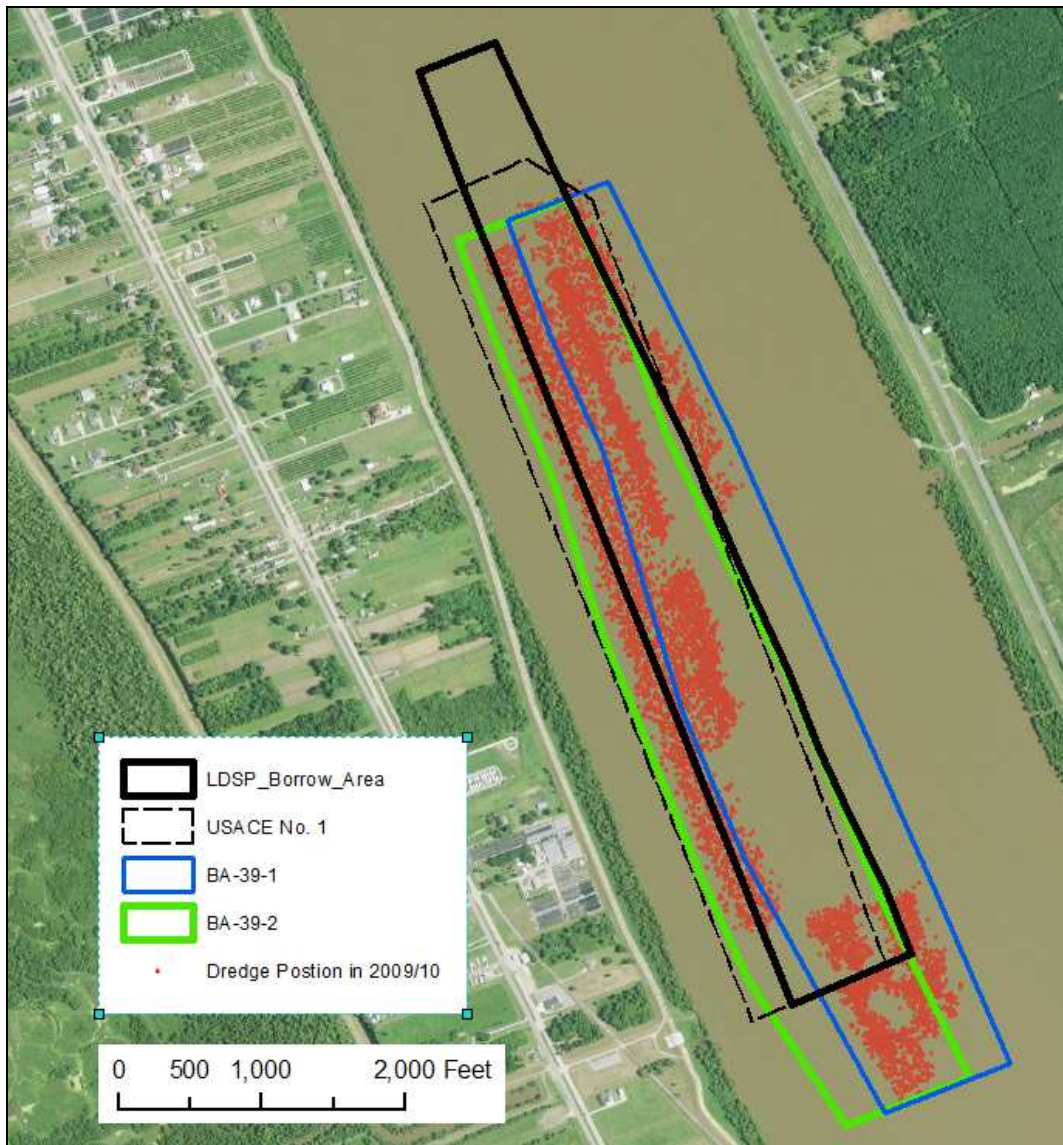
A 2003 hydrographic survey indicated that the volume of sediment available in BA-39 No. 2 was approximately 3.9 MCY. The eastern boundary of this borrow area was constrained by the navigation channel. The western boundary of this borrow area was constrained based on a 750 feet setback from the USACE levee. The southern limit of the borrow area was located 500 feet upstream of a submerged transmission line owned by Entergy. The northern limit of the borrow area was restricted by greater depths. A maximum depth of cut of -66.0 feet NAVD88 was initially proposed in the design.

However, after the eastern edge of the originally proposed borrow site (BA-39-1 in Figure 2-6) was moved west to address navigation concerns, the western edge of the borrow site was also moved west (see BA-39-2 in Figure 2-6). Specifically, USACE suggested a modified levee offset of 400 feet versus the standard 750 feet. Note, however, that as shown in Figure 2-6, some dredging still took place over that area before the change in geometry was effected.



**Figure 2-5: Mississippi River Sediment Delivery System (BA-39) Borrow Area (Thompson, 2007)**

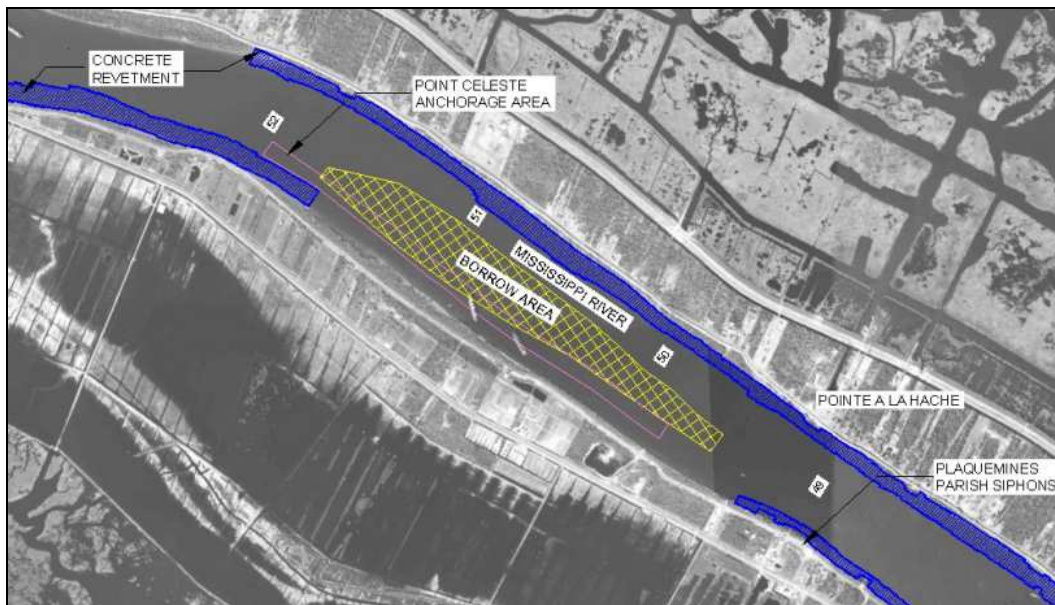
BA-39 No. 1 was eventually dropped due to anticipated impacts to the Alliance Refinery and grain elevator located just north of the borrow area. Both industries utilize the river bank for mooring and barge storage and it was believed that this would result in difficult dredging logistics at this site. BA-39 No. 1 was initially estimated to contain 1.2 MCY of material based on a 2003 hydrographic survey and a maximum cut depth of -66 NAVD88.



**Figure 2-6: USACE and BA-39 Alliance Anchorage Borrow Area Delineations**

### 2.3 Lake Hermitage Marsh Creation Project (BA-42)

The Lake Hermitage Borrow Area is located between RM 49.5 and RM 52 in the LMR (CPRA, 2008). This section of the river was selected for the project because it is located near the marsh fill site, contained sufficient sediment to meet the project's needs, and had shallow enough water depths to utilize a large hydraulic dredge. A detailed geophysical and magnetometer survey were performed in addition to several vibracores. The western boundary of the borrow area was constrained based on a 750 foot offset from the centerline of the levee. The eastern boundary of the borrow area was constrained by the navigation channel. However, specific criteria applied in determining an appropriate offset from the navigation channel is not provided in the design report. A maximum depth of cut of -66.0 feet NAVD88 was used in the design. A magnetometer survey showed no dredging hazards or pipelines. The total volume of available sediment was estimated at 6.2 MCY.



**Figure 2-7: Lake Hermitage (BA-42) Borrow Area (CPRA, 2008)**



## 2.4 USACE Saltwater Barrier Sill

The USACE has designated two borrow areas for use in constructing an emergency saltwater barrier sill located between RM 65 and 63.1 AHP (USACE-NO, 2010). The two borrow areas, USACE No. 1 and USACE No. 2, are located at the Alliance Anchorage and Wills Point anchorages. Figure 2-8 and Figure 2-9 show the most recent delineation of borrow areas USACE No. 1 and USACE No. 2 respectively (USACE, 2012). In the past the landside limit of both borrow areas has been constrained by a minimum offset of 300 feet (1V:3H cut) from the centerline of the levee. However, in the most recent delineations of borrow areas USACE No. 1 and USACE No. 2 the standard limits of permissible excavation (750 feet offset, 1V:5H cut) were applied. The USACE is currently performing geotechnical analyses to determine if it is possible to go back to a reduced levee setback without compromising the stability of the levee and adjacent bank.

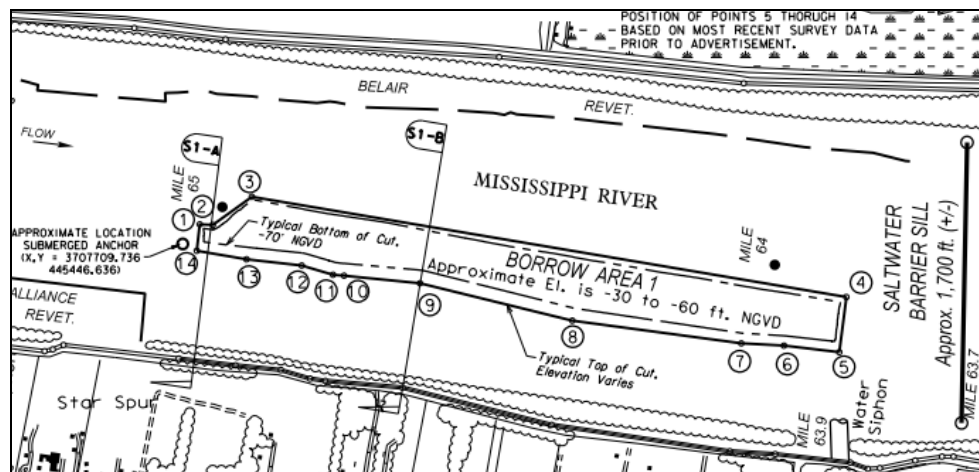


Figure 2-8: USACE No. 1 Borrow Area (USACE, 2012)

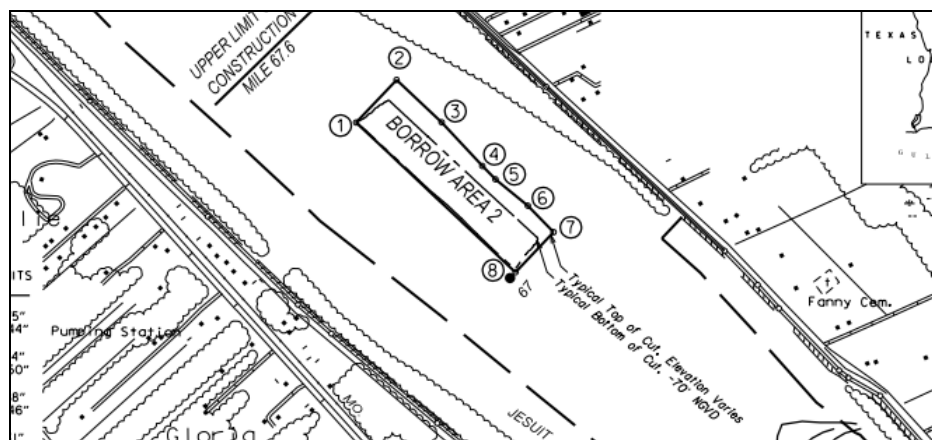


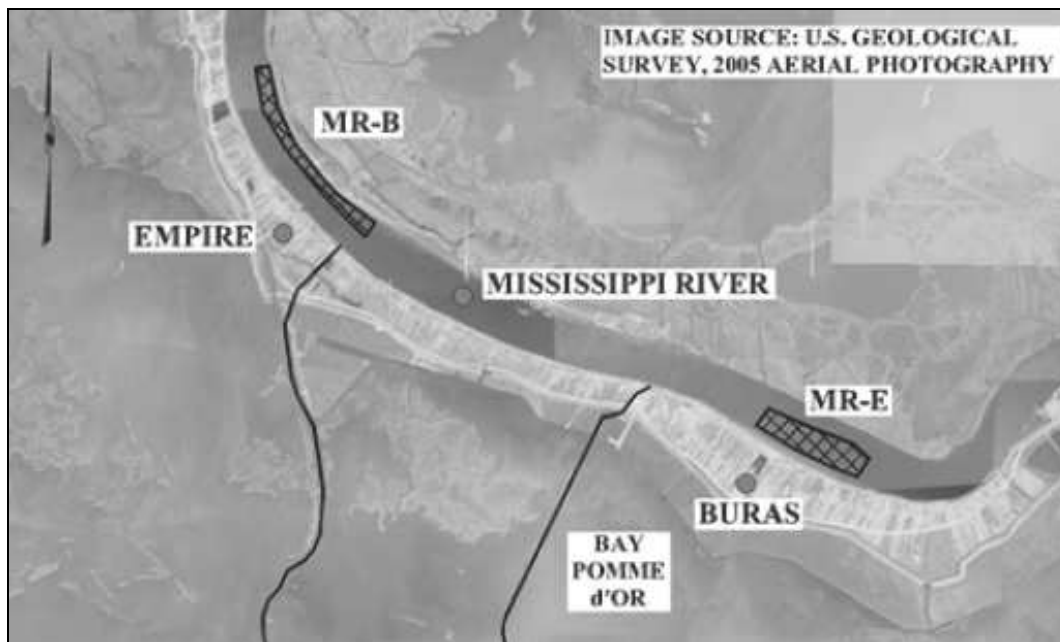
Figure 2-9: USACE No. 2 Borrow Area (USACE, 2012).

## 2.5 Scofield Island Restoration (BA-40)

Preliminary design plans were developed for two borrow areas (MR-B and MR-E) in the LMR to supply sediment for the Scofield Island Restoration Project (BA-40) (SBJ Group and CEC, 2010; Poff et. al, 2011). This study expanded upon the work performed by Finkl et. al (2005) which identified seven potential borrow areas between RM 35 and RM 15. Two of the seven borrow areas had sufficient volumes of compatible sediment to move forward and perform more detailed analyses. Detailed geophysical, geotechnical, and magnetometer surveys were performed for each borrow area to identify the areas of compatible material and identify potential dredging hazards. Final borrow area delineations were based on the sediment compatibility, required USACE levee and revetment setbacks, pipeline buffers, and navigation considerations.

MR-B was shifted towards the center of the Mississippi River to accommodate required USACE setbacks, concern regarding the stability of the side slopes of the river, and non-compatible material in the upper sediment layer near the bank. Buffers around potential dredging hazards discovered during the magnetometer survey were incorporated into the borrow area design. The design cut depth for MR-B is -66 feet NAVD88.

MR-E has also undergone refinements based on detailed geophysical surveys and limits of compatible material. The western limit of the borrow area is constrained by the required UASCE levee offset. The design cut depth for MR-E is -66 feet NAVD88.



**Figure 2-10: Scofield Island Restoration Project Borrow Areas (Poff et. al, 2011)**

## 2.6 MR Long Distance Sediment Pipeline (BA-43 EB)

Three potential borrow areas have been identified and delineated for the Mississippi River Long Distance Sediment Pipeline (LDSP) project: Alliance Anchorage, Alliance South, and Wills Point Anchorage (Moffatt & Nichol, 2012). Note that recent modifications to USACE borrow areas No. 1 and No. 2 may necessitate additional modifications to LDSP borrow area at Alliance Anchorage pending ongoing geotechnical analysis by USACE. At the present time these modifications have not been finalized and the LDSP borrow area delineation presented in this report is based on the past USACE borrow area No. 1 delineation which had reduced levee setbacks.

### 2.6.1 Alliance Anchorage

The large point bar located at RM 64 (Alliance Anchorage) has also been identified as a potential borrow site for LDSP. This is the same area that was dredged for construction of the BA-39 project and also being proposed as the borrow area for construction of BA-48. The original Alliance Anchorage borrow area delineation for the BA-39 project was determined based on water depths, location of any revetments, navigation channel location, location of any pipelines, and USACE MR dredging guidelines. As explained in the prior BA-39 section, the original borrow area delineation was shifted at the start of construction to address navigation concerns.

Additional changes were implemented as part of the LDSP project including moving the southern boundary to the north to match the USACE Borrow Area No. 1 delineation and avoid encroaching on the saltwater barrier construction site. The northern boundary was extended to maximize the volume of sediment. Dredge depth was increased from -70 ft to -90 ft to take full advantage of available sediment volumes within each borrow area. This cut depth, assuming water levels in the river below +10 ft NAVD88, is within the capabilities of hydraulic dredges than are typically used for this type project. In fact, the 30 inch dredge that performed the BA-39 work, GLDD's Florida, is capable of dredging to 100 ft below the water line. Typical 30-inch dredges are capable of dredging between 85 and 95 ft below the water.

Finally, the western boundary was shifted east from that used in the BA-39 project to allow for 1.3 Mcy (to a dredging depth of -70 ft) to remain in reserve along the western edge of USACE's No. 1 borrow site for construction of the saltwater barrier. This reserve was accounted for in the latest borrow area geometry proposed for both LDSP and BA-48 and shown in Figure 2-6 and Figure 2-11. The reserve area is also shown in cross-section in Figure 2-12.

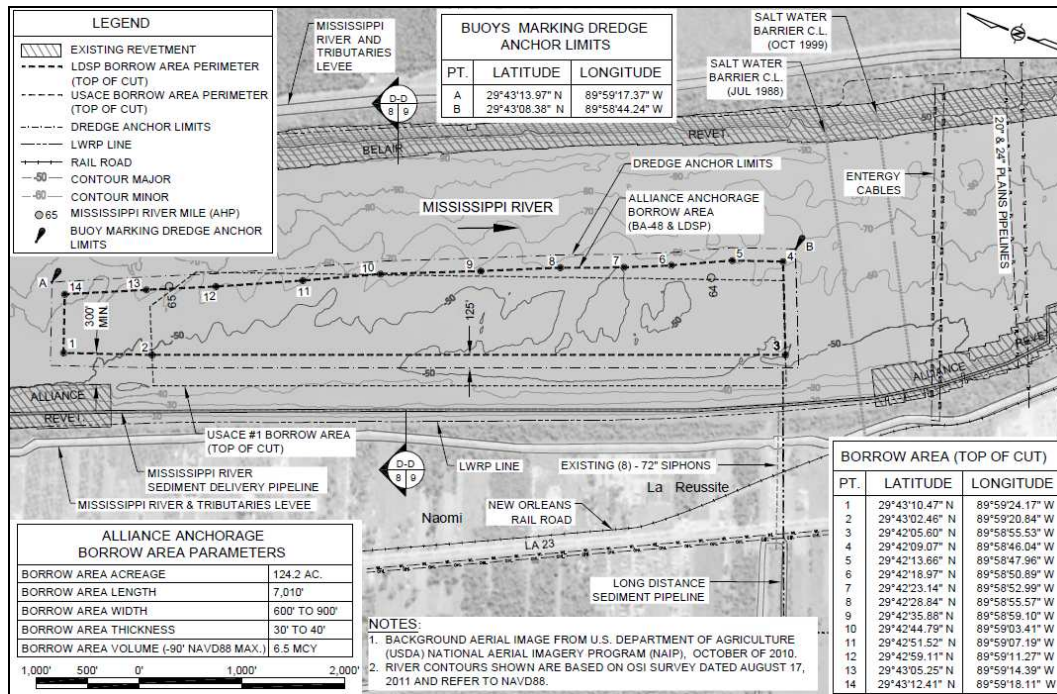


Figure 2-11: LDSP (BA-43) Alliance Anchorage Borrow Area (CPRA, 2012)

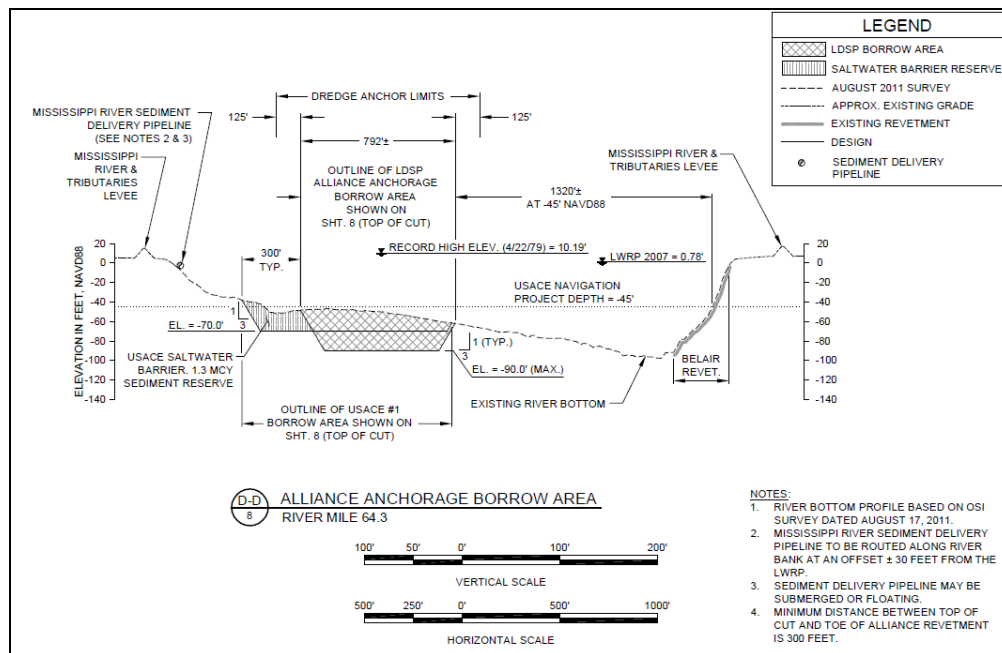


Figure 2-12: LDSP &amp; BA48 Alliance Anchorage Borrow Area - Typical Section

### 2.6.2 Alliance South

Another borrow area considered was the Alliance South area which is located on a shallow point bar between RM 60.0 and 61.3 near the west bank of the river. This site was also initially considered as a potential borrow site for BA-39 but eventually it was discarded due to several reasons:

- The Alliance refinery and a grain elevator are located just north of the borrow area. Both industries utilize the river bank for mooring and barge storage. Therefore, dredging logistics may be difficult in this area.
- A pipeline corridor from this borrow area would be challenging due to potential difficulty placing the dredge pipeline underneath the railroad due to its close proximity to the Mississippi River levee.
- A corridor farther south crossing the railroad at a location where it is inactive could be used instead. However, clearing of the wooded area between the railroad and LA 23 would be required for dredge pipe placement and maintenance.

Ultimately, this borrow site was not selected for BA-39 because it contained less than the volume required to construct the desired acreage of marsh. However, for the purposes of LDSP, it is worth reconsidering the use of the borrow site in combination with the Alliance Anchorage borrow area to the north. Consultations with Conoco Phillips (current owners of the Alliance Refinery facilities) suggest that a submerged pipeline corridor in the river from the borrow site to the proposed Naomi crossover location would be feasible.

The proposed delineation of this borrow site is presented in Figure 2-13. Note that this delineation is based on existing river contours, the location of the navigation channel, and the location of the Alliance and Myrtle Grove Revetments. In addition, detailed MR levee and bank stability analyses following HSDRRS Design Guidelines were recently performed by URS for CPRA to confirm that the proposed geometry meets the minimum factors of safety. A total of four (4) cross sections of the proposed borrow area were analyzed to excavation depths extending to EL. -70 feet and EL. -90 feet NAVD88. Results from the slope stability analysis showed that three (3) out of the four (4) cross-sections analyzed at the Alliance South borrow area meet the required minimum factors of safety for stability. However, the section south of the Myrtle Grove revetment does not meet the required minimum factors of safety. Therefore, borrow area extents shown in Figure 2-13 and the attached drawings do not extend south of the revetment.



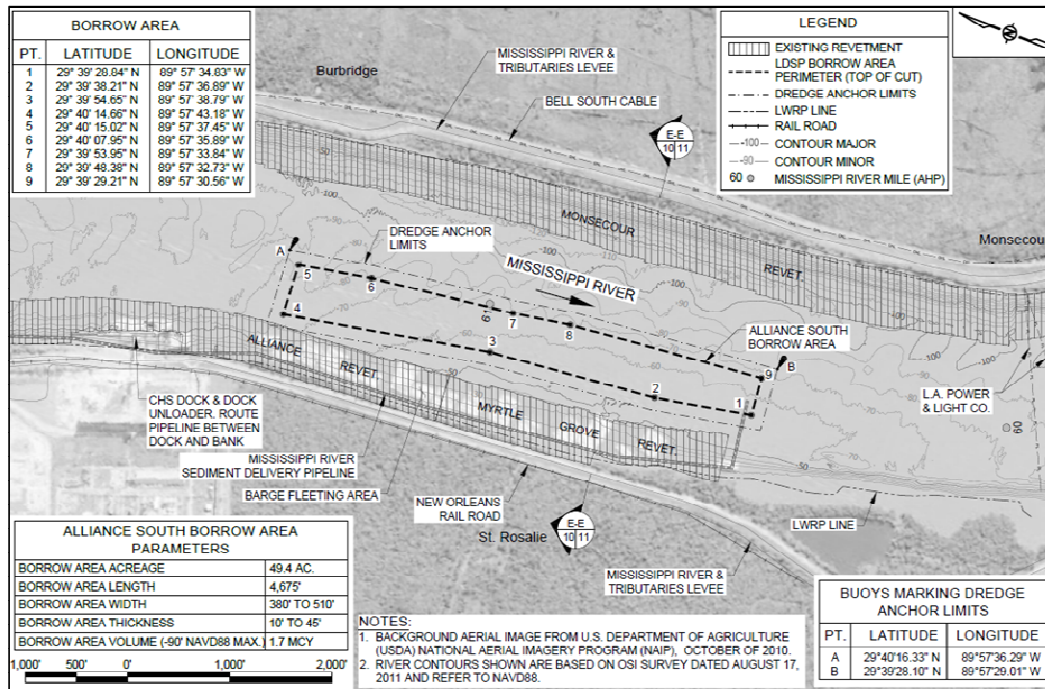
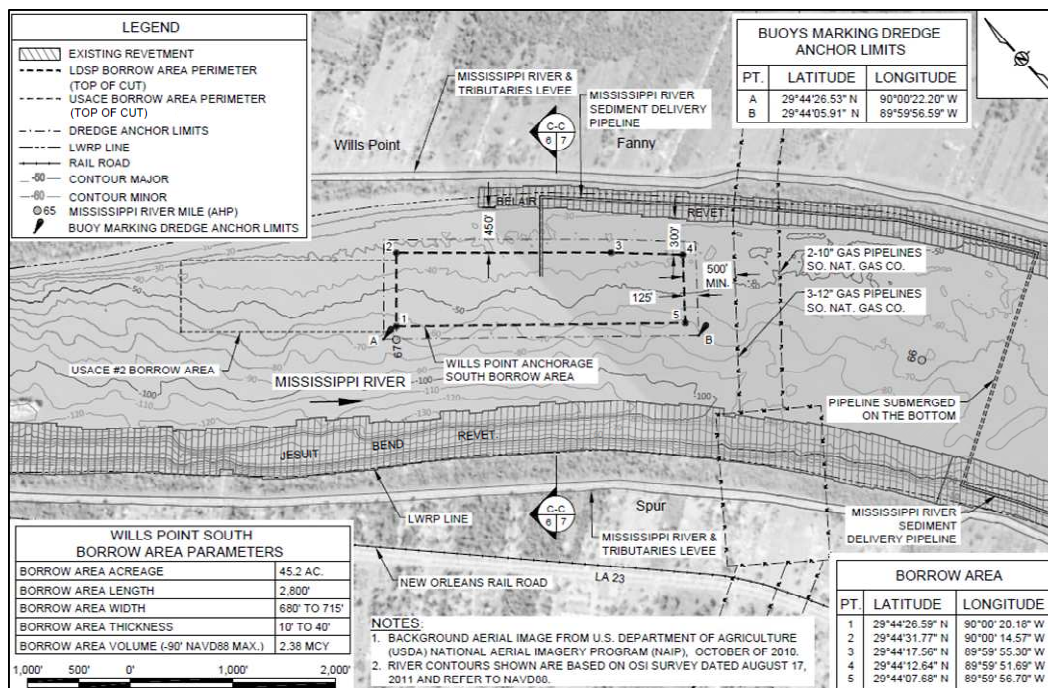


Figure 2-13: LDSP (BA-43) Preliminary Alliance South Borrow Area (CPRA, 2012)

### 2.6.3 Wills Point Anchorage

Wills Point Anchorage is an area approximately 1.1 miles in length along the east bank of the Mississippi River extending from RM 66.5 to 67.6. This anchorage is located over a relatively shallow point bar off the east river bank and has actually already been identified by USACE as an alternative source of sediment for the saltwater barrier sill (USACE Borrow Area No. 2). However, the area delineated by USACE does not cover the entire bar and it may be possible to dredge additional sediment to the south as shown in Figure 2-14.

As with the Alliance South borrow site, the exact delineation of this borrow area was determined based on input from USACE, USCG, and navigation industry. Potential impacts on the navigation channel and the Belair revetment on the east bank of the river were considered as well as the minimum buffer distance to the pipelines that cross the river immediately to the south of the proposed borrow area delineation. In addition, detailed MR levee and bank stability analyses following HSDRRS Design Guidelines were recently performed by URS for CPRA to confirm that the proposed geometry meets the minimum factors of safety. A total of three (3) cross sections of the proposed borrow area were analyzed to excavation depths extending to EL. -70 feet and EL. -90 feet NAVD88. Results from the slope stability analyses, showed that all three (3) cross-sections meet the minimum factors of safety.



**Figure 2-14: LDSP (BA-43) Preliminary Wills Point Anchorage Borrow Area (CPRA, 2012)**

### **3.0 IDENTIFICATION AND DELINEATION OF POTENTIAL BORROW AREAS**

#### **3.1 Identifying Potential Borrow Areas**

The first step in finding potential borrow areas is identifying shallow sections along the river containing large volumes of sediment within reach of standard dredges. Depositional features, such as point bars, are usually targeted. Point bars are located on the opposite bank of river as the channel thalweg. Therefore, point bars are usually located outside the Mississippi River shipping lane and are often used as anchorages. Borrow areas must be located a safe distance from the Mississippi River shipping lane and the location of the dredge and dredging equipment must be known and free from possible shipping traffic conflicts.

In addition to identifying possible borrow areas based on sediment volume and navigational constraints; it is desirable to know the underlying sediment characteristics (e.g. grain size, and sediment classification). Knowledge of underlying sediment characteristics is required to ensure that the sediment meets the needs of the restoration project. Nonetheless, sediment characteristics do not currently appear to be a significant limiting criteria for screening potential borrow areas because a wide range of sediment sizes may be suitable for the array of restoration projects currently under consideration.

The borrow area extents and thus available sediment volumes are typically constrained by required setbacks from the Federal Levee, revetments and other river infrastructure as mandated by U.S. Army Corps of Engineers (USACE). A more detailed discussion of the required setbacks is provided in the following section “Delineating Potential Borrow Areas”. In many instances the required setback from the levee can significantly reduce the potential volume of sediment within a borrow area. Therefore, to assist in the initial identification of potential borrow areas, the required levee and revetment setbacks were mapped and included in the initial screening process.

#### **3.2 Delineating Potential Borrow Areas**

Initially borrow areas were identified by locating shallower sections of the river outside the required USACE Levee setback and over areas that do not appear to interfere with navigation in the Mississippi River. These initial borrow areas have been refined to adhere to a specific set of borrow area excavation constraints based on the “Limits of Permissible Excavation in River” (USACE, 1974).

Due to the large uncertainty in permissible borrow areas extents and depths it is desirable at this phase of the study to bracket the range of possible sediment reserves. Therefore, a low and high estimate for the borrow area volume was developed at each location. In the past borrow areas have been typically dredged to 60-70 feet below NAVD88. However, recent projects, such as BA-48 and Long Distance Sediment Pipeline (LDSP), have

proposed dredging as deep as -90 feet NAVD88. The possibility of dredging to -90 feet NAVD88 would have a significant impact on the volume available in a borrow area.

Ultimately, a “low” or minimum estimate was developed based on a borrow area delineation that meets all the required standard USACE setbacks and a maximum cut depth of -70 feet NAVD88. A “high” estimate was also developed assuming that a variance would be granted by the USACE allowing reduced Levee setback (400 feet at a 1V:3H cut) and a maximum cut depth of -90 feet NAVD88. A geotechnical analysis which shows that the levee and adjacent bank will be stable for reduced setbacks will be required to obtain a variance from the USACE.

### *3.2.1 Required Borrow Area Excavation Constraints*

The following borrow area excavation requirements were applied in the delineation of the “low” (-70 feet) and “high” (-90 feet) borrow areas:

- Federal Levee Offset (-70 feet): Per “Limits of Permissible Excavation in River” (USACE, 1974) the landward edge of any excavation in the river shall be located a minimum of 750 feet from centerline of levee (1V:5H cut). A detailed explanation of the levee requirement is included in Appendix B. Note that preliminary borrow area delineations assume a landward levee toe elevation of + 5 feet NAVD88.
- Federal Levee Offset (-90 feet): The high borrow area estimate presumes that a variance would be granted by the USACE allowing reduced Levee setback of 400 feet from the centerline of the levee (1V:3H cut).
- Revetment Offset: Minimum offset from existing revetment equal to the horizontal distance between the toe of the revetment and the intersection of a 1V:6H slope from the toe of the revetment and proposed dredge cut elevation. For example, if the toe of the revetment is at -45 feet and the dredge cut is at -70 feet. The offset will have to be 150 feet –  $(70-45) \times 6$ .
- Navigation Requirement: Provide an adequate safe distance from the Mississippi River shipping lane (typically determined by MNSA). Location of dredge, dredging equipment must be known and free from possible shipping traffic conflicts. Preliminary borrow area delineations provide for a 1,200 feet wide shipping lane, as defined as the distance between the outside edge borrow area and the -45 feet NAVD88 contour on the opposite river bank.
- Navigation Aids: Minimum of 300 feet buffer between the edge of borrow site and navigation aid.
- Pipeline Buffer: Minimum of 500 feet buffer between the edge of borrow site and any pipelines.

- Bridge Buffer: Normally dredging will not be permitted within 4,000 feet of the upstream side of bridges.
- Dredging Hazards Buffer: A buffer should be given between known dredging hazards (e.g. debris). A magnetometer survey is required at each potential borrow site to identify potential dredging hazards.

### 3.2.2 Data Sources

The following data sources are applied in this study:

- Bathymetry: USACE Hydrographic Survey of 2004. Bathymetric contours were converted from the MicroStation drawings (DGN) to AutoCAD and ArcGIS shapefiles. A bathymetric surface was generated in AutoCAD from these contours. Delineations for LDSP borrow areas (Wills Point Anchorage, Alliance Anchorage, and Alliance South) have not been altered from their design delineation (M&N, 2012). Therefore, the borrow areas are based on recent multibeam surveys.
- Federal Levee Centerlines and Toes: USACE Hydrographic Survey of 2004.
- Revetment Footprints: USACE Hydrographic Survey of 2004.
- Navigation Aids: USACE 2007 Navigation Book, Nautical Charts No. 11361 and No. 11364.
- Utility Crossings: USACE Hydrographic Survey of 2004, USACE 2007 Navigation Book. Pipeline locations from the National Pipeline Mapping System were reviewed as part of the borrow area delineations.

### 3.3 Preliminary Borrow Area Volume Estimates

Borrow area delineations at this phase of the study should be considered preliminary and more recent bathymetric data, magnetometer and geophysical studies, as well as coordination with USACE, USCG and MNSA are required to further refine the borrow area delineations and volumes.

A total of 28 potential borrow areas have been identified from New Orleans to Head of Passes. An overview of the 28 borrow areas is provided in Figure 3-1 through Figure 3-3. Detailed design drawings for each of the potential borrow areas is included in Appendix A. Table 3-1 provides a summary of the geometry and volume for the high and low borrow area delineations at each location. Based on these preliminary borrow area delineations it is estimated that there is somewhere between 129 and 324 MCY of available sediment between New Orleans and Head of Passes.



Additional comments:

#### Recent CWPPRA Borrow Areas

Borrow areas at Wills Point Anchorage, Alliance Anchorage, and Alliance South were obtained from the 95% Design Drawings from the LDSP. All three borrow areas have a maximum cut depth of (-90 ft NAVD88). It is assumed in this study that these three borrow areas will be permitted as such and are therefore used in both the low and high volume estimates.

#### Pipeline Buffers

Borrow area delineations presented in this report are based on utility crossings from the USACE 2004 Hydrographic Survey and USACE 2007 Navigation Book. Recently acquired pipeline databases indicate that utilities may overlap with the following borrow areas: Dalcour North, Magnolia Anchorage, and Lower Venice Anchorage.

Nautical Chart No. 11361 indicates a pipeline area at the northern end of the Enclave. However, none of the other pipeline data sources indicate a pipeline in this area.

A Tennessee Gas pipeline is shown directly south of BA-40 borrow area MR-B-09 in the permit drawings (LDNR, 2007). However this pipeline did not show up in any of the other pipeline data sources. The approximate location of the pipeline has been added to the drawings and incorporated in the present delineation of Empire borrow area.

Initially four separate borrow areas were delineated at Buras; upon further review it was concluded the dredging logistics at Buras would be too complex giving the numerous pipeline crossings and active Chevron piers.

#### Active Piers and Docks

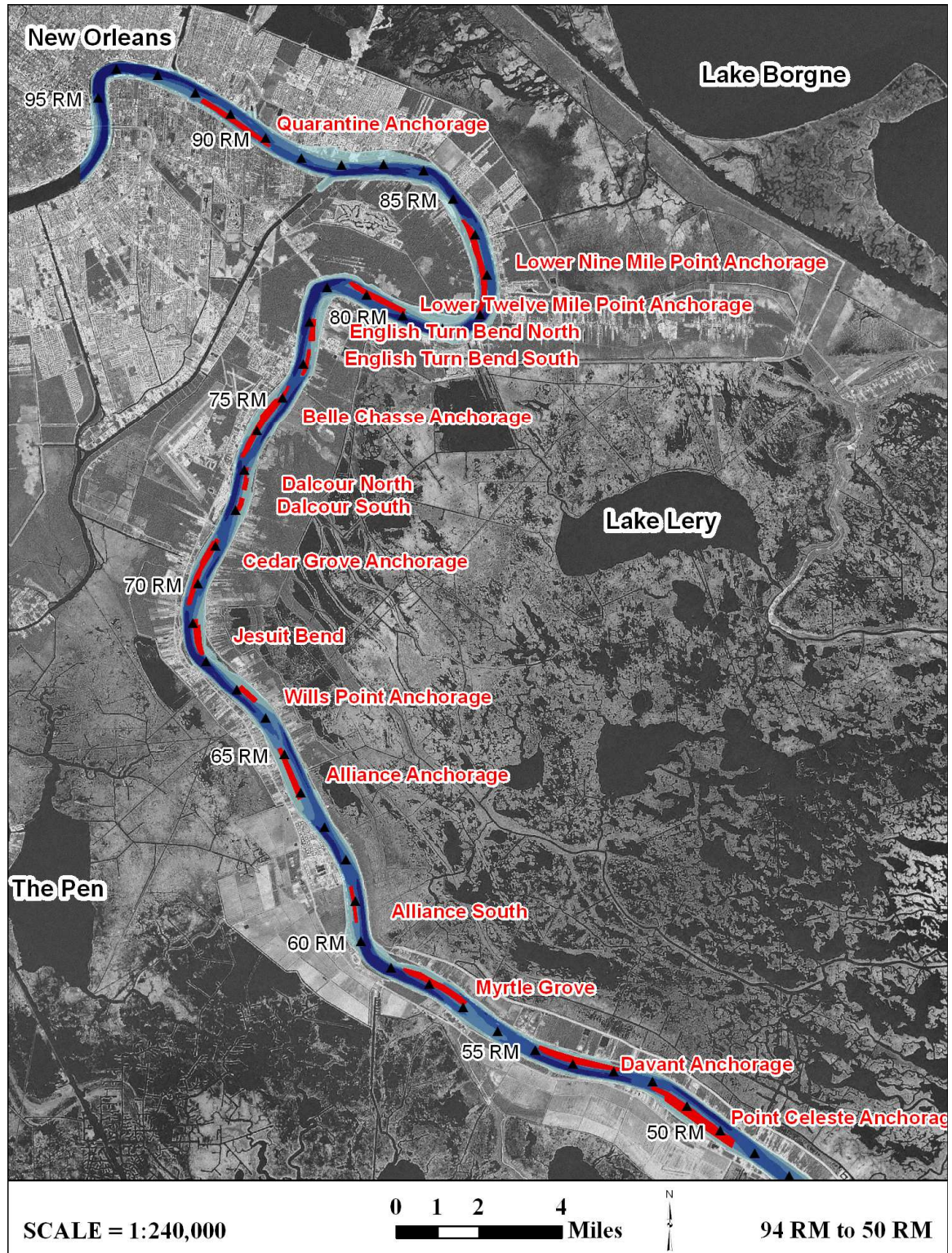
North of Violet, potential borrow areas are limited by the prevalence of active piers and docks as well as the width of the river. The northern bank of the river near Chalmette at 88 RM could be a sizeable borrow area; however, several active piers preclude this area as a potential borrow area. Similarly, the upstream end of the Quarantine Anchorage borrow area was truncated to prevent it from blocking access to the fixed dock near the US Naval Base. Active piers at TECO Bulk restricted the northern limit of Davant Anchorage.

#### Hopper Dredge Disposal Area at Head of Passes

Approximately 13 MCY are dredged annually from the Southwest Pass of the Mississippi River (USACE, 2008). Hopper dredges working between RM 4 Above Head of Passes (AHP) and Mile 11 Below Head Passes (BHP) dredge and haul approximately 7 MCY per year to an open water disposal area known as Hopper Dredge Disposal Area (HDDP). The HDDP is located on the east bank at AHP, Figure 3-4. Hopper dredges working

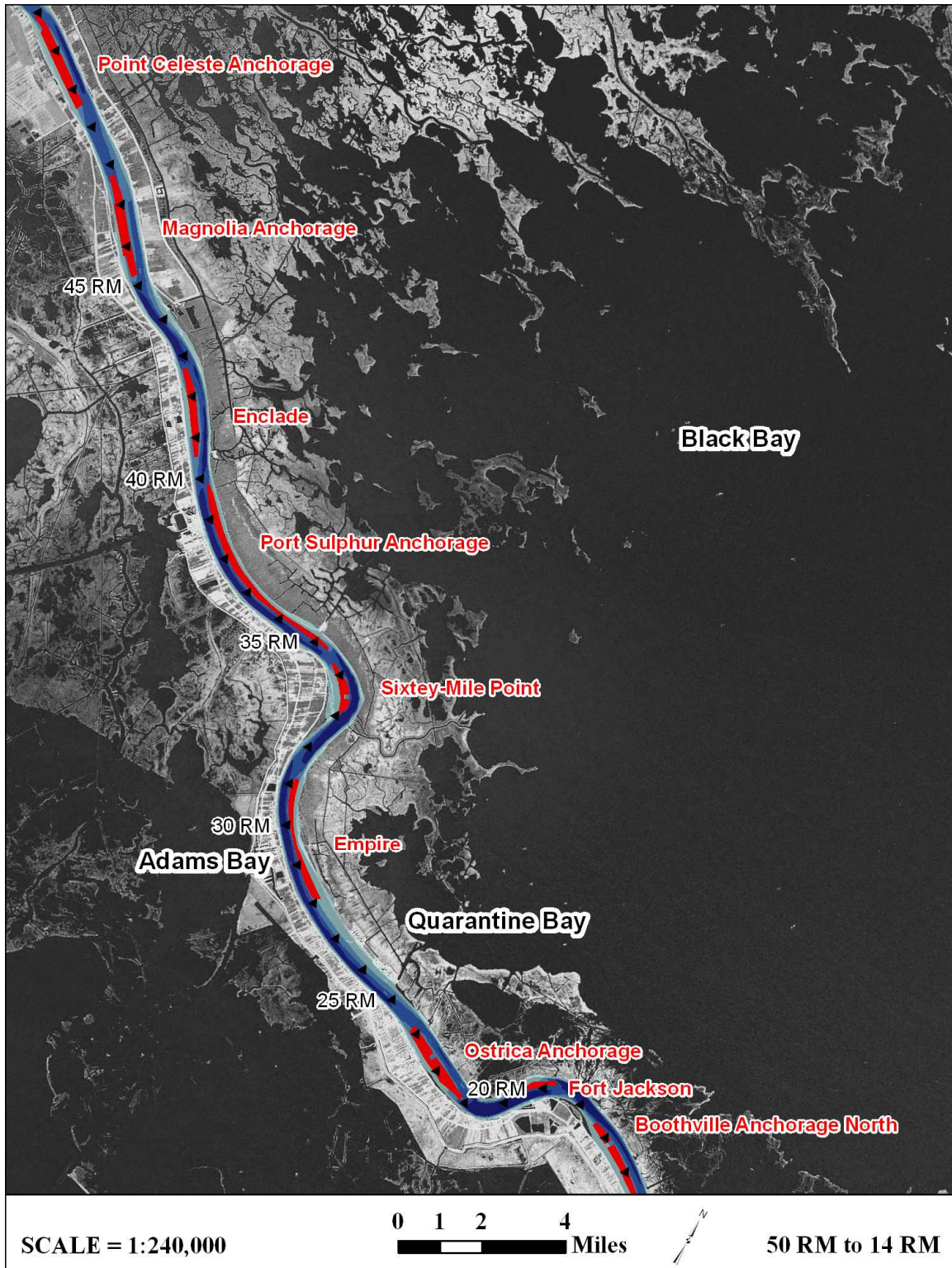
between Mile 11 BHP and Mile 18.8 BHP dredge and haul approximately 6 MCY per year to the designated ocean dredged material disposal site (ODMDS).

A 2008 study by the USACE evaluated the feasibility of performing pump-out disposal operations for hopper dredges in the Southwest Pass (USACE, 2008). The results of the study showed that it was not cost-effective to perform pump-out disposal as this dredging alternative would increase annual costs from \$38.9 M to \$57.6 M. Further analysis and discussions with the USACE are required to evaluate the possibility of using the HDDP as a potential borrow site. However, it is noted that the possibility of pump-out dredging as an alternative to placing the sediment in the HDDP should also be considered.



**Figure 3-1: Potential Borrow Areas Overview Map (RM 94- RM 50)**





**Figure 3-2: Potential Borrow Areas Overview Map (RM 52- RM 15)**



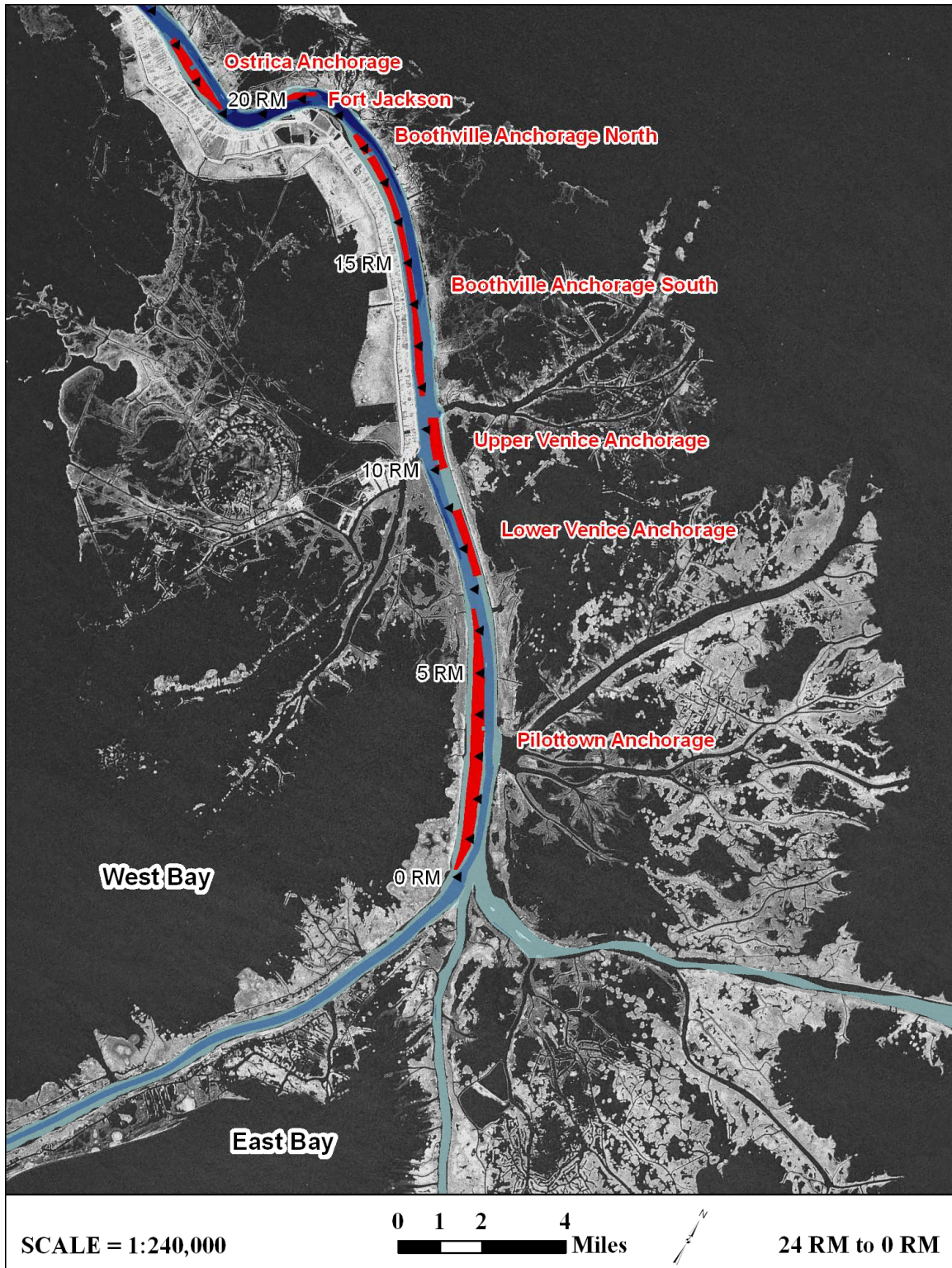


Figure 3-3: Potential Borrow Areas Overview Map (RM 15- RM 0)

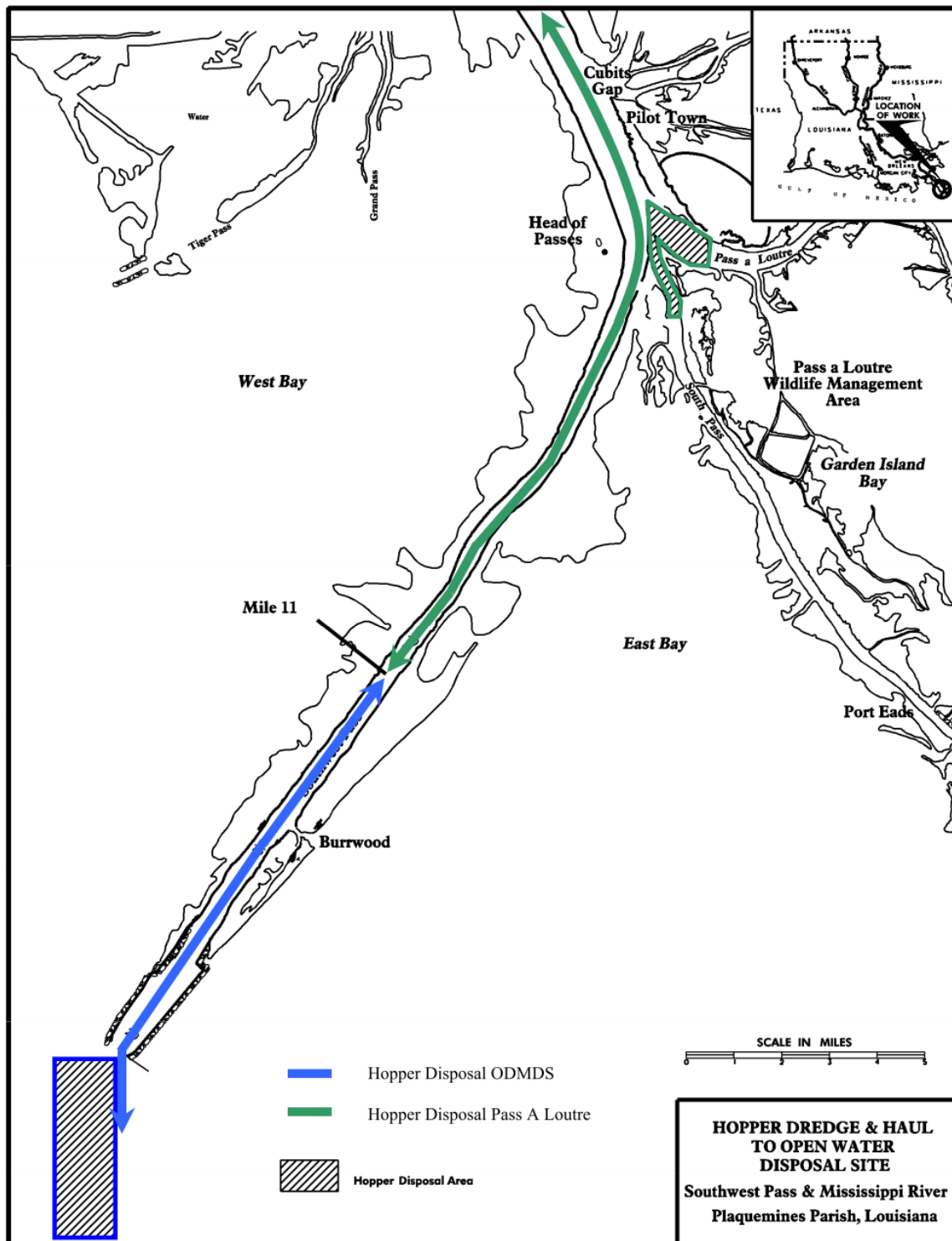


Figure 3-4: USACE Southwest Pass Disposal Sites (USACE, 2008)

**Table 3-1: Preliminary Borrow Area Volumes between New Orleans and Head of Passes**

| Borrow Area                        | “Low” - Maximum Cut Depth -70 Feet NAVD88 |               |              |                  |              | “High” - Maximum Cut -90 Feet NAVD88 |               |              |                  |              |
|------------------------------------|---|---------------|--------------|------------------|--------------|--------------------------------------|---------------|--------------|------------------|--------------|
|                                    | Area (Acres)                              | Length (Feet) | Width (Feet) | Thickness (Feet) | Volume (MCY) | Area (Acres)                         | Length (Feet) | Width (Feet) | Thickness (Feet) | Volume (MCY) |
| Quarantine Anchorage <sup>1</sup>  | n/a                                       | n/a           | n/a          | n/a              | n/a          | 160                                  | 10,470        | 300 - 750    | 18 to 38         | 6.5          |
| Lower 9 Mile Point Anchorage       | 130                                       | 11,375        | 300 - 680    | 0 to 28          | 2.0          | 210                                  | 12,630        | 325 - 885    | 18 to 48         | 9.6          |
| Lower 12 Mile Point Anchorage      | 21  | 2,310         | 300 - 540    | 0 to 10          | 0.2          | 139                                  | 8,020         | 415 - 845    | 10 to 52         | 5.9          |
| English Turn Bend North            | 31  | 2,875         | 370 - 570    | 0 to 44          | 0.7          | 47                                   | 2,875         | 570 - 870    | 144.00           | 2.5          |
| English Turn Bend South            | 23  | 2,950         | 300 - 395    | 0 to 20          | 0.4          | 40                                   | 3,500         | 445 - 570    | 20 to 44         | 1.7          |
| Belle Chasse Anchorage             | 124                                       | 8,550         | 310 - 880    | 0 to 36          | 3.6          | 186                                  | 10,920        | 350 - 1050   | 10 to 60         | 9.9          |
| Dalcour North                      | 31  | 2,790         | 300 - 540    | 0 to 35          | 0.6          | 35                                   | 2,975         | 300 - 660    | 20 to 58         | 1.7          |
| Dalcour South                      | 25  | 2,400         | 300 - 540    | 0 to 35          | 0.6          | 30                                   | 2,410         | 300 - 660    | 18 to 56         | 1.5          |
| Cedar Grove Anchorage              | 51  | 4,515         | 300 - 645    | 0 to 16          | 0.8          | 157                                  | 9,200         | 325 - 890    | 10 to 40         | 6.4          |
| Jesuit Bend                        | 68  | 4,350         | 600 - 850    | 0 to 45          | 2.1          | 94                                   | 5,180         | 480 - 940    | 10 to 68         | 5.6          |
| Wills Point Anchorage <sup>2</sup> | n/a                                       | n/a           | n/a          | n/a              | n/a          | 45                                   | 2,800         | 680 - 715    | 10 to 40         | 2.4          |
| Alliance Anchorage <sup>2</sup>    | n/a                                       | n/a           | n/a          | n/a              | n/a          | 124                                  | 7,010         | 600 - 900    | 30 to 40         | 6.5          |
| Alliance South <sup>2</sup>        | n/a                                       | n/a           | n/a          | n/a              | n/a          | 49                                   | 4,675         | 380 - 510    | 10 to 45         | 1.7          |
| Myrtle Grove                       | 103                                       | 8,525         | 300 - 700    | 10 to 28         | 1.7          | 168                                  | 9,100         | 300 - 925    | 10 to 60         | 7.9          |
| Davant Anchorage                   | 58  | 6,250         | 300 - 530    | 0 to 28          | 1.0          | 198                                  | 10,700        | 345 - 925    | 10 to 72         | 10.6         |
| Point Celeste Anchorage            | 213                                       | 11,530        | 300 - 1085   | 0 to 38          | 6.8          | 319                                  | 12,775        | 560 - 1200   | 12 to 68         | 19.6         |
| Magnolia Anchorage                 | 199                                       | 11,270        | 385 - 940    | 0 to 18          | 3.1          | 315                                  | 13,050        | 610 - 1280   | 16 to 48         | 14.2         |
| Enclade                            | 122                                       | 8,775         | 300 - 785    | 0 to 24          | 2.9          | 227                                  | 11,350        | 525 - 1080   | 10 to 46         | 11.6         |
| Port Sulphur Anchorage             | 129                                       | 13,220        | 300 - 460    | 0 to 24          | 2.1          | 466                                  | 27,990        | 300 - 950    | 10 to 70         | 21.7         |

| Borrow Area                | “Low” - Maximum Cut Depth -70 Feet NAVD88 |               |              |                  |                        | “High” - Maximum Cut -90 Feet NAVD88 |               |              |                  |              |
|----------------------------|---|---------------|--------------|------------------|------------------------|--------------------------------------|---------------|--------------|------------------|--------------|
|                            | Area (Acres)                              | Length (Feet) | Width (Feet) | Thickness (Feet) | Volume (MCY)           | Area (Acres)                         | Length (Feet) | Width (Feet) | Thickness (Feet) | Volume (MCY) |
| Sixty-Mile Point           | 109                                       | 5,750         | 300 - 1130   | 0 to 48          | 3.2                    | 128                                  | 7,000         | 300 - 1170   | 10 to 64         | 6.8          |
| Empire Anchorage           | 242                                       | 15,900        | 370 - 950    | 0 to 46          | 5.7                    | 242                                  | 15,900        | 370 - 950    | 20 to 66         | 12.2         |
| Ostrica Anchorage          | 205                                       | 10,350        | 300 - 1120   | 0 to 28          | 5.2                    | 266                                  | 10,750        | 550 - 1375   | 12 to 54         | 14.6         |
| Fort Jackson               | 16  | 1,960         | 300 - 445    | 0 to 26          | 0.2                    | 74                                   | 5,730         | 310 - 775    | 10 to 48         | 2.4          |
| Boothville Anchorage North | 56  | 2,830         | 590 - 970    | 0 to 42          | 1.6                    | 58                                   | 2,830         | 590 - 1060   | 20 to 62         | 3.2          |
| Boothville Anchorage South | 319                                       | 31,160        | 300 - 840    | 0 to 34          | 5.0                    | 579                                  | 31,160        | 660 - 1060   | 20 to 60         | 27.1         |
| Venice Upper Anchorage     | 212                                       | 6,720         | 830 - 1440   | 0 to 46          | 6.6                    | 212                                  | 6,720         | 830 - 1440   | 20 to 66         | 12.6         |
| Venice Lower Anchorage     | 212                                       | 8,590         | 1020 - 1240  | 14 to 48         | 9.0                    | 212                                  | 8,590         | 1020 - 1240  | 34 to 68         | 14.9         |
| Pilottown Anchorage        | 1,032                                     | 33,320        | 500 - 1770   | 20 to 54         | 53.1                   | 1,032                                | 33,320        | 500 - 1770   | 38 to 70         | 83.1         |
| <b>TOTAL</b>               |   |               |              |                  | <b>129<sup>3</sup></b> |                                      |               |              |                  | <b>324</b>   |

<sup>1</sup>Levee and Revetment for “Low” Delineation restrict width of borrow area to less than 300 feet

<sup>2</sup>Borrow Area delineations and volumes from latest revisions of the LDSP

<sup>3</sup>Includes LDSP Borrow Areas which have a maximum dredge depth of -90 feet NAVD88



#### 4.0 DATA REVIEW AND GAP ANALYSIS

A data review and data gap analysis was completed using GIS software for all potential borrow areas proposed for the lower Mississippi River. Data from numerous sources was obtained from CPRA and previous project files. Shapefiles detailing the location of each dataset were imported into GIS and compared with the locations of the borrow areas. Any data which overlapped with the borrow areas was recorded in Table 4-1 describing the data category, data type, a brief description of the data, and the quantity of data in the borrow area. Additionally, survey data in the river has been collected by the US Army Corps of Engineers for navigation purposes and some geotechnical borings have been performed associated with the levees. Borings along the levee are of particular importance for performing levee stability analysis and obtaining variances to standard levee setback.

Borrow areas considered for previous CWPPRA and other miscellaneous projects have varying amounts of information available while many of the potential borrow areas have little or no existing data. As part of LDSP (BA-43) data was collected for three borrow areas: Wills Point Anchorage, Alliance Anchorage, and Alliance South. This data included multibeam and magnetometer surveys, marine archeological cultural resource assessment, and geotechnical borings. This information was used in development of the permit documentation and for design of the borrow areas. Borrow areas designed for other projects have collected similar information. The LDSP project will serve as a representative example and help clarify the data which is required to design and permit borrow areas. Note that LDSP is the first project to request dredging of a borrow area to -90 feet.

**Table 4-1: Summary of Recent Borrow Areas from Miscellaneous Projects**

| Potential Borrow Areas | Data Category  | Report Title / Data Title                    | Description of Entire Dataset                | Quantity in Borrow Area | Date Collected / Date Published |
|------------------------|----------------|--|--|-------------------------|---------------------------------|
| Quarantine             | Shipwrecks     | -  | 14,000+ locations of known shipwrecks        | 4                       | N/A                             |
| St. Bernard Grove      | -              | -  | -  | -                       |                                 |
| Lower 9 Mile Point     | -              | -  | -  | -                       |                                 |
| Lower 12 Mile Point    | -              | -  | -  | -                       |                                 |
| English Turn Bend      | -              | -  | -  | -                       |                                 |
| Belle Chasse           | -              | -  | -  | -                       |                                 |
| Dalcour                | Infrastructure | LA Office of Coastal Management Pipelines V7 | coastal pipelines                            | 1                       | 12/31/2010                      |
| Cedar Grove            | -              | -  | -  | -                       |                                 |
| Jesuit Bend            | -              | -  | -  | -                       |                                 |
| Will's Point           | multibeam      | LDSP   | Multibeam hydrographic survey (bank-to-bank) | -                       | 8/17/2011                       |

| Potential Borrow Areas    | Data Category         | Report Title / Data Title   | Description of Entire Dataset  | Quantity in Borrow Area | Date Collected / Date Published |
|---------------------------|-----------------------|-----------------------------|--|-------------------------|---------------------------------|
|                           | magnetometer          | LDSP                        | Magnetometer survey (hazard-to-dredging) within proposed borrow area | -                       | 8/17/2011                       |
|                           | cultural resources    | LDSP                        | Marine cultural resource assessment within borrow area               | -                       | 10/27/2011                      |
|                           | geotechnical borings  | LDSP                        | Geotechnical borings to 120 feet and assessment                      | 2                       | 4/13/2012                       |
| <b>Alliance Anchorage</b> | Deposits/Borrow Areas | OCPR server                 | 5 shp files and a jpg indicating the deposit names                   | 1                       |                                 |
|                           | multibeam             | LDSP                        | Multibeam hydrographic survey (bank-to-bank)                         |                         | 8/17/2011                       |
|                           | multibeam             | LDSP                        | Multibeam hydrographic survey (borrow site area only)                | 2                       | 1/27/2011 and 11/19/2011        |
|                           | magnetometer          | LDSP                        | Magnetometer survey (hazard-to-dredging) within proposed borrow area | -                       | 8/17/2011                       |
|                           | geotechnical borings  | LDSP                        | Geotechnical borings to 120 feet and assessment                      | 2                       | 4/13/2012                       |
|                           | vibracores            | LDSP                        | vibracores in borrow area (mainly fine sands)                        | 8                       | 1/24/2011                       |
| <b>Alliance South</b>     | multibeam             | LDSP                        | Multibeam hydrographic survey (bank-to-bank)                         | -                       | 8/17/2011                       |
|                           | magnetometer          | LDSP                        | Magnetometer survey (hazard-to-dredging) within proposed borrow area | -                       | 8/17/2011                       |
|                           | cultural resources    | LDSP                        | Marine cultural resource assessment within borrow area               | -                       | 10/27/2011                      |
|                           | geotechnical borings  | LDSP                        | Geotechnical borings to 120 feet and assessment                      | 2                       | 5/20/2012                       |
| <b>Myrtle Grove</b>       | multibeam             | LDSP                        | Multibeam hydrographic survey (bank-to-bank)                         | -                       | 11/19/2011                      |
|                           | magnetometer          | LDSP                        | Magnetometer survey (hazard-to-dredging) within proposed borrow area |                         | 11/29/2011                      |
|                           | cultural resources    | LDSP                        | Marine cultural resource assessment within borrow area               |                         | 1/30/2012                       |
| <b>Davant</b>             | -                     | -                           | -  | -                       |                                 |
| <b>Point Celeste</b>      | Deposits/Borrow Areas | OCPR server                 | 5 shp files and a jpg indicating the deposit names                   | 1                       | N/A                             |
| <b>Magnolia</b>           | Infrastructure        | SONRIS Coastal Permit Lines | permit lines (assumed pipelines) from LDNR                           | 1                       | 9/18/2002                       |
| <b>Enclave</b>            | -                     | -                           | -  | -                       |                                 |
| <b>Port Sulphur</b>       | -                     | -                           | -  | -                       |                                 |

| Potential Borrow Areas  | Data Category         | Report Title / Data Title   | Description of Entire Dataset                      | Quantity in Borrow Area | Date Collected / Date Published |
|-------------------------|-----------------------|---|--|-------------------------|---------------------------------|
| <b>Sixty-Mile Point</b> | Deposits/Borrow Areas | OCPR server   | 5 shp files and a jpg indicating the deposit names | 1                       | N/A                             |
|                         | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 3                       | 8/15/2005                       |
|                         | Sidescan Sonar        | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 4 sidescan mosaics                                 | 1                       | N/A                             |
|                         | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | ~42 seismic lines                                  | 12                      | 11/30/2005                      |
|                         | Infrastructure        | SONRIS Coastal Permit Lines   | permit lines (assumed pipelines) from LDNR         | 2                       | 4/25/2011                       |
| <b>Empire</b>           | Core Borings          | Vibracore Sampling Borrow Areas MR-B-09 and MR-E-09 Mississippi River, Louisiana            | 12 vibracores                                      | 6                       | 12/17/2008 - 12/19/2008         |
|                         | Sidescan Sonar        | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 4 sidescan mosaics                                 | 1                       | N/A                             |
|                         | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 3                       | 08/15/2005 - 08/17/2005         |
|                         | Deposits/Borrow Areas | OCPR server   | 5 shp files and a jpg indicating the deposit names | 1                       | N/A                             |
|                         | Bathymetry/Topography | Geophysical Survey MR-B-09 and MR-E-09 Riverine Sand Mining Areas                           | Contour Lines at 2 ft contour spacing              | N/A                     | N/A                             |
|                         | Seismic               | Geophysical Survey MR-B-09 and MR-E-09 Riverine Sand Mining Areas                           | 17 Seismic profiles and trackline map              | 89 tracklines           | N/A                             |
|                         | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | ~42 seismic lines                                  | 8                       | 11/30/2005                      |
| <b>Buras</b>            | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | ~42 seismic lines                                  | 1                       | 11/30/2005                      |
|                         | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 1                       | 8/15/2005                       |



| Potential Borrow Areas | Data Category         | Report Title / Data Title   | Description of Entire Dataset                      | Quantity in Borrow Area | Date Collected / Date Published |
|------------------------|-----------------------|---|--|-------------------------|---------------------------------|
|                        | Sidescan Sonar        | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 4 sidescan mosaics                                 | 1                       | N/A                             |
| <b>Ostrica</b>         | Sidescan Sonar        | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 4 sidescan mosaics                                 | 1                       | N/A                             |
|                        | Deposits/Borrow Areas | OCPR server   | 5 shp files and a jpg indicating the deposit names | 1                       | N/A                             |
|                        | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 2                       | 8/15/2005                       |
|                        | Seismic               | Geophysical Survey MR-B-09 and MR-E-09 Riverine Sand Mining Areas                           | 17 Seismic profiles and trackline map              | 166 tracklines          | N/A                             |
|                        | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | ~42 seismic lines                                  | 6                       | 11/30/2005                      |
|                        | Bathymetry/Topography | Geophysical Survey MR-B-09 and MR-E-09 Riverine Sand Mining Areas                           | 2 ft. contours                                     | N/A                     | N/A                             |
| <b>Fort Jackson</b>    | Sidescan Sonar        | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 4 sidescan mosaics                                 | 1                       | N/A                             |
|                        | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 1                       | 8/15/2005                       |
|                        | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | ~42 seismic lines                                  | 5                       | 11/30/2005                      |
|                        | Deposits/Borrow Areas | OCPR server   | 5 shp files and a jpg indicating the deposit names | 1                       | N/A                             |
| <b>Boothville</b>      | Core Borings          | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 13 vibracores                                      | 2                       | 8/15/2005                       |
|                        | Seismic               | Geotechnical Investigation for Exploration of Sand Resources in the Lower Mississippi River | 12 vibracores                                      | 6                       | 12/17/2008 - 12/19/2008         |
|                        | Deposits/Borrow Areas | OCPR server   | 5 shp files and a jpg indicating the deposit names |                         | N/A                             |

| Potential Borrow Areas | Data Category  | Report Title / Data Title                    | Description of Entire Dataset | Quantity in Borrow Area | Date Collected / Date Published |
|------------------------|----------------|--|-------------------------------|-------------------------|---------------------------------|
| Upper Venice           | -              | -  | -                             | -                       |                                 |
| Lower Venice           | Infrastructure | LA Office of Coastal Management Pipelines V7 | coastal pipelines             | 1                       | 12/31/2010                      |
| Pilotown               | -              | -  | -                             | -                       |                                 |

## 5.0 DATA COLLECTION PLAN

### 5.1 Overview

Detailed borrow area design will require additional information describing the underlying sediment characteristics, bed elevation, as well as any possible dredging hazards and culturally significant resources. Geotechnical surveys (including deep borings) are of particular importance since they provide detailed information about the sediment characteristics which are needed to assess the sediment suitability and to obtain a variance from standard USACE levee setbacks. It is recommended that borings are collected rather than vibracores. Vibracores are not well suited for geotechnical investigations at identified borrow areas due to depth limitations (20-30 feet below the existing mudline).

The remaining information required for preliminary design of a borrow area may be obtained from bathymetric surveys, magnetic dredging hazards surveys, and cultural resource evaluations. These surveys and evaluations are generally performed simultaneously to reduce the costs of each individual component. Descriptions of all of the components that make up a comprehensive data collection plan are provided below:

#### Geotechnical Survey

Geotechnical survey consists of several boring samples within the borrow area. Borings should be collected to a termination elevation 20 to 30 feet below the maximum desired dredging elevation (e.g., -90 feet NAVD88). Laboratory analysis of the soil samples contained within the boring sample to establish adequate information on soil strength and sediment composition is required. It is recommended that several (nominally 3 per borrow area) borings be collected within each borrow area to adequately identify potential spatial variability in the composition of the bed sediment.

#### Multibeam Bathymetric Surveys

Multibeam bathymetry surveys with real-time-kinematic (RTK) GPS positioning provide precise high density bed elevation measurements. Multibeam surveys should be collected from bank to bank over the length of the potential borrow area and an additional half-mile upstream and downstream of the potential borrow area.

#### Magnetometer Surveys

Magnetometer dredging hazards surveys with real-time-kinematic (RTK) GPS positioning identify locations with magnetic anomalies (e.g., pipelines, cables, debris or other possible hazards to dredging). Magnetometer surveys should be acquired on a series of 75-foot spaced transects orientated parallel with the long axis of the borrow area (i.e., the river bank). The magnetometer survey coverage should extend 150 feet upstream and downstream of the potential borrow area; 50 feet beyond the delineated borrow area towards the shoreline and 250 feet towards the center of the River.

### Cultural Resource Evaluations

Cultural resource evaluations are required to identify historically or archaeologically significant cultural materials in the vicinity of the proposed borrow area. Cultural resource evaluations consist of two phases: archival research and review of available geophysical survey data.

Archival research is performed to obtain and synthesize information necessary for developing project area/region specific environmental and cultural contexts. It contains an inventory and description of results from previous archaeological investigations in the project area. Archival research generally includes a review of the following but not limited to:

- Cultural resource reports, site files, and State and National Register files at the offices of the LASHPO/Division of Archaeology in Baton Rouge;
- Historic maps and texts held at Tulane University's Special Collections Library in New Orleans;
- Historic documents and texts held at LSU's Special Collections Library in Baton Rouge;
- NOAA's AWOIS (Automated Wreck and Obstruction Information System);
- Northern Maritime Research's Northern Shipwreck Database (ver. 2002);
- Encyclopedia of American Shipwrecks (Berman 1972);
- Published and unpublished primary and secondary sources on the project area and region's cultural and environmental histories.

In the second phase of the cultural resource evaluation, review of available geophysical survey data, anomalies in the magnetometer and side scan sonar data with the potential to be submerged cultural resources are identified.



## 5.2 Data Collection Costs

Planning level cost-estimates for each of the items in the data collection plan are presented in Table 5-1 based on past project experience and consultation with two companies experienced in data collection in the Mississippi River: Ocean Surveys Inc. and Fugro Consultants, Inc.. Actual costs will vary along the river and for each potential borrow area. Table 5-1 presents unit cost estimates as well as the total cost for a typical small, medium and large borrow area. In this example the dimensions of Jesuit Bend, Alliance Anchorage, and Port Sulphur Anchorage are used to represent the small, medium, and large borrow areas. Based on past experience, a boring sample is required about every half mile along the length of a borrow area. In addition, a half mile buffer upstream and downstream of each potential borrow area is included in the multibeam survey cost estimates.

Based on the per unit cost estimates provided in Table 5-1 it is estimated that it would cost approximately \$6.8 Million to carry out the data collection plan for all 28 borrow areas (i.e., \$243K on average per borrow site). If the data collection efforts for several borrow areas are performed together, the Mob/Demob costs can be reduced considerably. For example, if a single Mob/Demob is performed for three borrow areas at a time, then the total cost is reduced to approximately \$5 Million.

**Table 5-1: Overview of Data Collection Costs**

| Evaluation Type                                  | Unit Cost                | Size of Borrow Area |                  |                  |
|--|--------------------------|---------------------|------------------|------------------|
|  |                          | Small               | Medium           | Large            |
| <b>Geotechnical Survey</b>                       |                          |                     |                  |                  |
| Mob/Demob <sup>1</sup>                           | \$75 K                   | \$75 K              | \$75 K           | \$75 K           |
| Field Exploration                                | \$11 K per boring        | \$22 K              | \$33 K           | \$111 K          |
| Laboratory Testing/Report                        | \$3 K per boring         | \$6 K               | \$9 K            | \$33 K           |
| Total Cost                                       |                          | <b>\$103 K</b>      | <b>\$117 K</b>   | <b>\$219 K</b>   |
| <b>Multibeam Surveys</b>                         |                          |                     |                  |                  |
| Mob/Demob <sup>2</sup>                           | \$8 K - \$12 K           | \$10 K              | \$10 K           | \$10 K           |
| Bank to Bank Survey                              | \$15 K per mile          | \$30 K              | \$37 K           | \$97 K           |
| Review Data and Create Drawing                   | \$1 K per mile           | \$2 K               | \$2.5 K          | \$5.5 K          |
| Total Cost                                       |                          | <b>\$42 K</b>       | <b>\$49.5 K</b>  | <b>\$112.5 K</b> |
| <b>Magnetometer Surveys</b>                      |                          |                     |                  |                  |
| Mob/Demob <sup>3</sup>                           | \$1.5 K                  | \$1.5 K             | \$1.5 K          | \$1.5 K          |
| Magnetometer                                     | \$75 per acre            | \$5 K               | \$9 K            | \$35 K           |
| Total Cost                                       |                          | <b>\$6.5 K</b>      | <b>\$10.5 K</b>  | <b>\$36.5 K</b>  |
| <b>Cultural Resource Evaluations<sup>4</sup></b> |                          |                     |                  |                  |
| Background Research of Area                      | \$10 K - \$30 K per site | \$10 K              | \$15 K           | \$30 K           |
| Review of Magnetometer Data                      | \$100 per acre           | \$7 K               | \$12.5 K         | \$46.5 K         |
| Total Cost                                       |                          | <b>\$17 K</b>       | <b>\$27.5 K</b>  | <b>\$76.5 K</b>  |
| <b>Grand Total Cost</b>                          |                          | <b>\$168.5 K</b>    | <b>\$204.5 K</b> | <b>\$444.5 K</b> |

<sup>1</sup> Including 4 days of travel time<sup>2</sup> Dependent on necessity to establish horizontal and vertical control points<sup>3</sup> Assumes Mob/Demob as part Multibeam Survey: If separate \$8-12 K<sup>4</sup> Presumes no collection or analysis of sidescan sonar or subbottom profiling

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**APPENDIX A**

**PRELIMINARY DESIGN OF POTENTIAL  
BORROW AREAS**





**APPENDIX B**

**LIMITS OF PERMISSIBLE EXCAVATION IN  
RIVER (USACE, 1974)**



# **APPENDIX C**

## **OVERVIEW MAPS OF POTENTIAL BORROW AREAS**

**APPENDIX A**

**PRELIMINARY DESIGN OF POTENTIAL  
BORROW AREAS**



STATE OF LOUISIANA  
COASTAL PROTECTION AND RESTORATION AUTHORITY

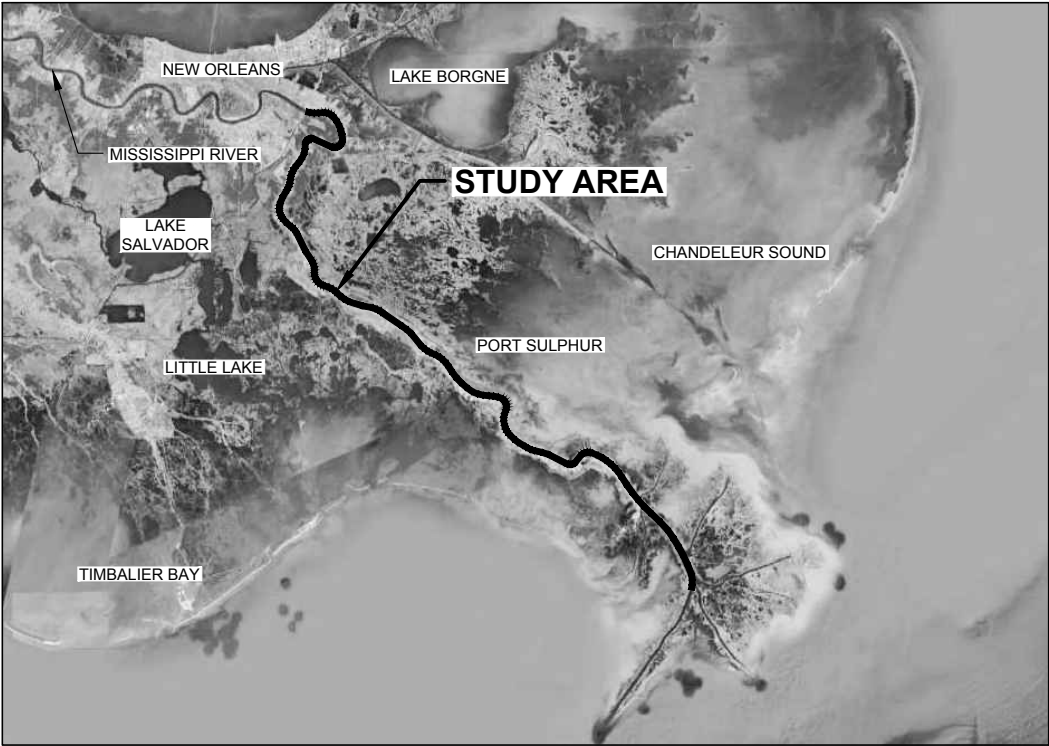
INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

INDEX TO SHEETS

SHEET NO. DESCRIPTION

1. TITLE SHEET
2. KEY MAP
3. REQUIRED BORROW AREA EXCAVATION SETBACKS
4. QUARANTINE ANCHORAGE POTENTIAL BORROW AREA
5. LOWER 9 MILE POINT ANCHORAGE POTENTIAL BORROW AREA
6. LOWER 12 MILE POINT ANCHORAGE POTENTIAL BORROW AREA
7. ENGLISH TURN BEND POTENTIAL BORROW AREAS
8. BELLE CHASSE ANCHORAGE POTENTIAL BORROW AREA
9. DALCOUR POTENTIAL BORROW AREAS
10. CEDAR GROVE ANCHORAGE POTENTIAL BORROW AREA
11. JESUIT BEND POTENTIAL BORROW AREA
12. WILLS POINT ANCHORAGE POTENTIAL BORROW AREA
13. ALLIANCE ANCHORAGE POTENTIAL BORROW AREA
14. ALLIANCE SOUTH POTENTIAL BORROW AREA
15. MYRTLE GROVE POTENTIAL BORROW AREA
16. DAVANT ANCHORAGE POTENTIAL BORROW AREA
17. POINT CELESTE ANCHORAGE POTENTIAL BORROW AREA
18. MAGNOLIA ANCHORAGE POTENTIAL BORROW AREA
19. ENCLADE POTENTIAL BORROW AREA
20. PORT SULPHUR ANCHORAGE POTENTIAL BORROW AREA (1 OF 2)
21. PORT SULPHUR ANCHORAGE POTENTIAL BORROW AREA (2 OF 2)
22. SIXTY-MILE POINT POTENTIAL BORROW AREA
23. EMPIRE ANCHORAGE POTENTIAL BORROW AREA
24. OSTRICA ANCHORAGE POTENTIAL BORROW AREA
25. FORT JACKSON POTENTIAL BORROW AREA
26. BOOTHVILLE ANCHORAGE POTENTIAL BORROW AREAS (1 OF 2)
27. BOOTHVILLE ANCHORAGE POTENTIAL BORROW AREAS (2 OF 2)
28. UPPER VENICE ANCHORAGE POTENTIAL BORROW AREA
29. LOWER VENICE ANCHORAGE POTENTIAL BORROW AREA
30. PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA (1 OF 3)
31. PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA (2 OF 3)
32. PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA (3 OF 3)

PRELIMINARY DESIGN FOR  
POTENTIAL BORROW AREAS



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450 LAUREL STREET  
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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

APPROVED BY:

TITLE SHEET

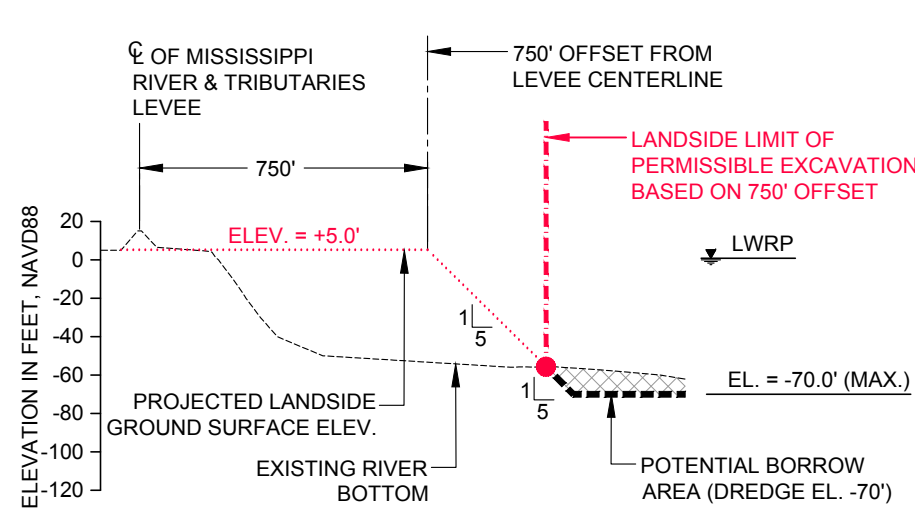
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SHEET 1 OF 32

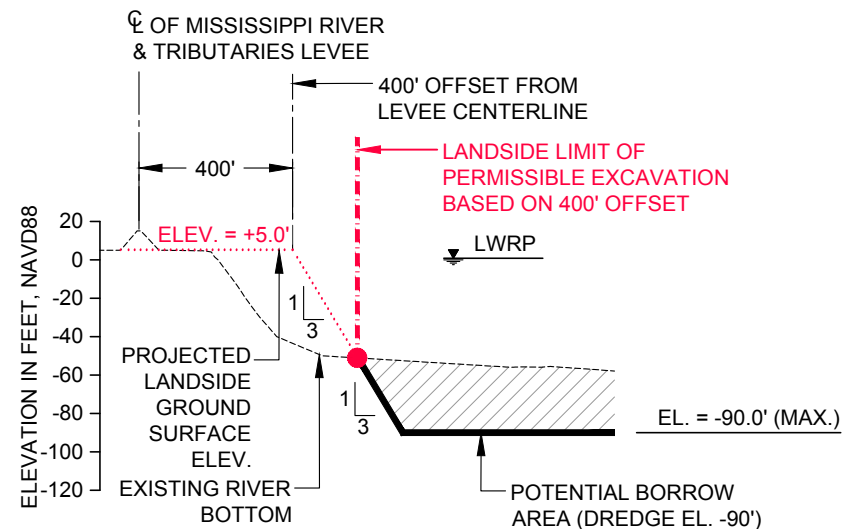




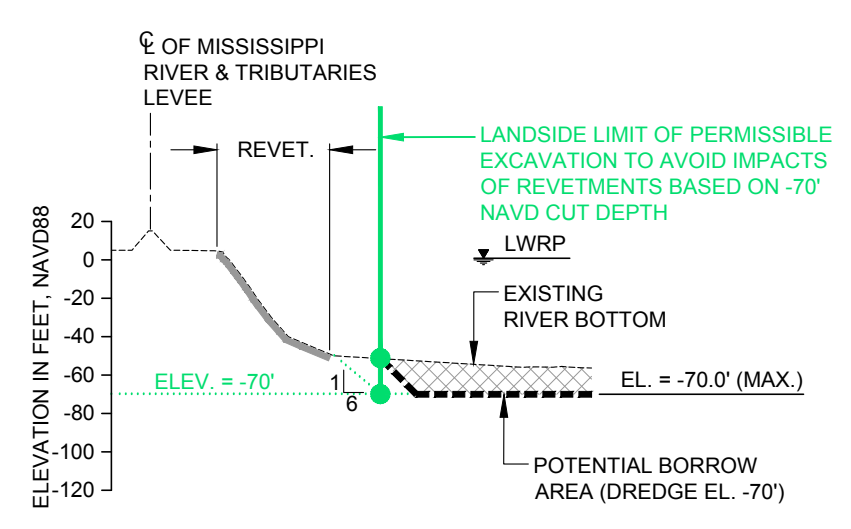




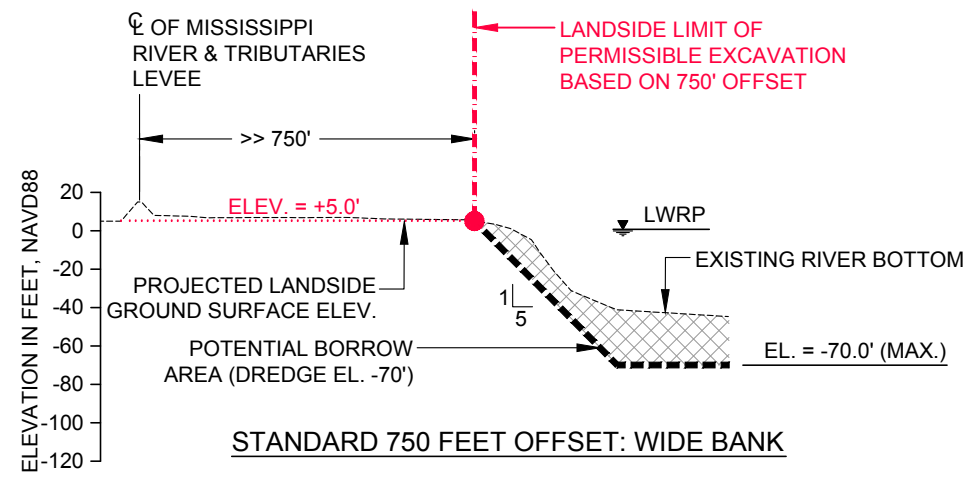
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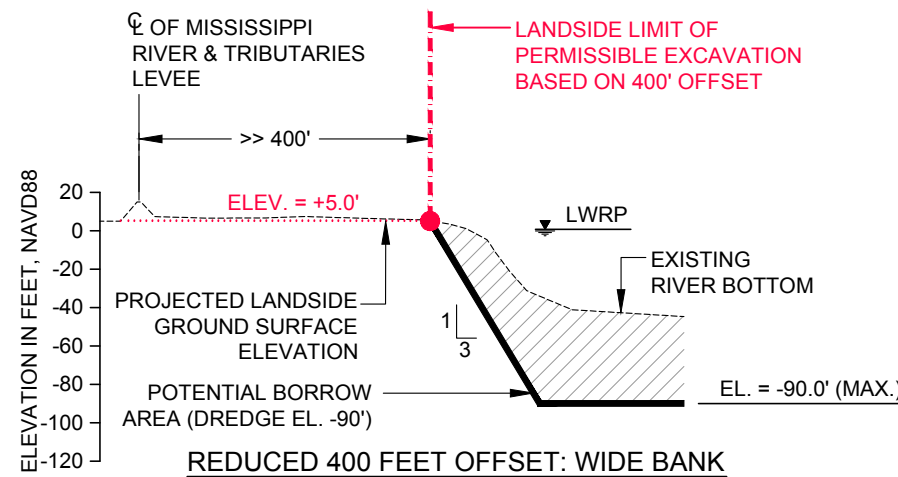
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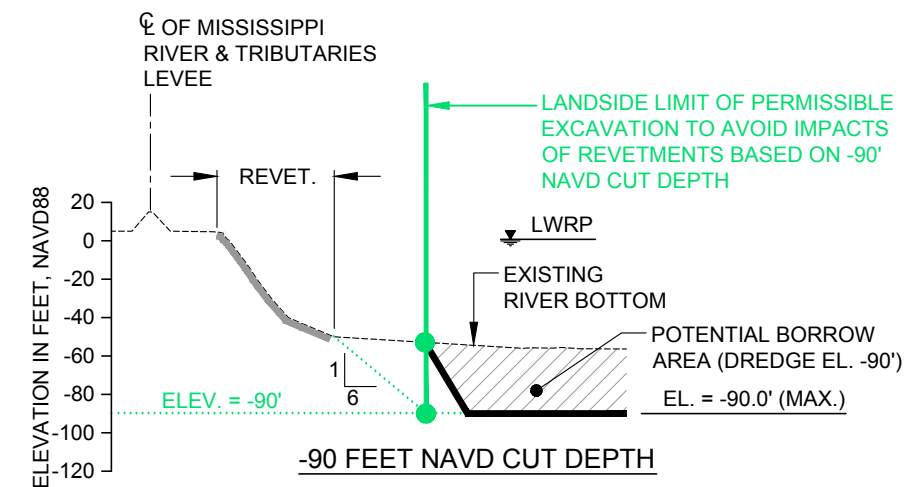
-70 FEET NAVD CUT DEPTH



STANDARD 750 FEET OFFSET: WIDE BANK



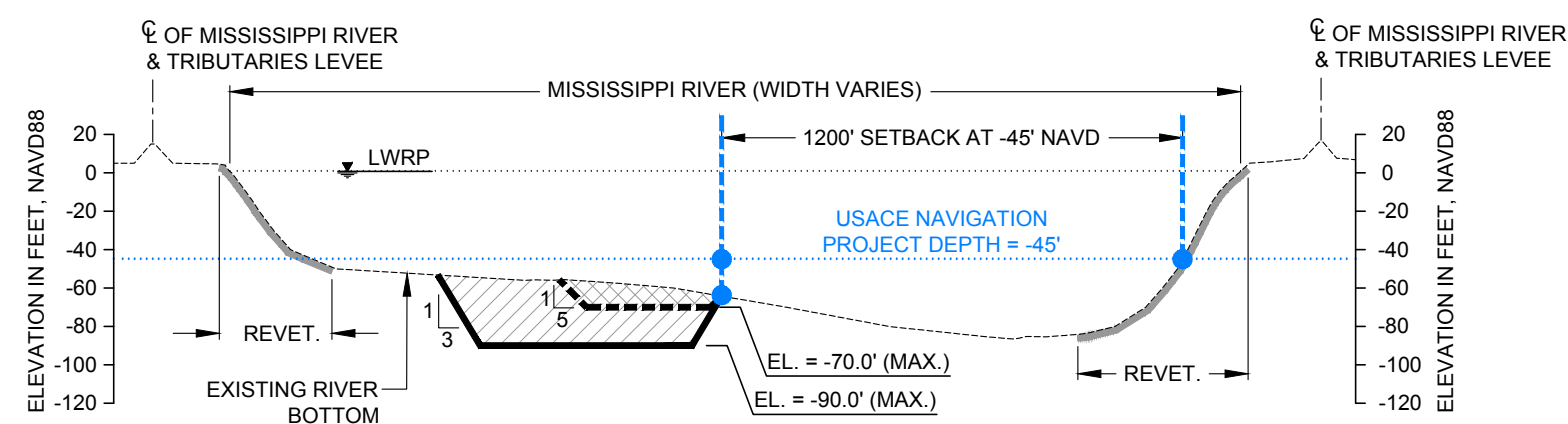
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-90 FEET NAVD CUT DEPTH

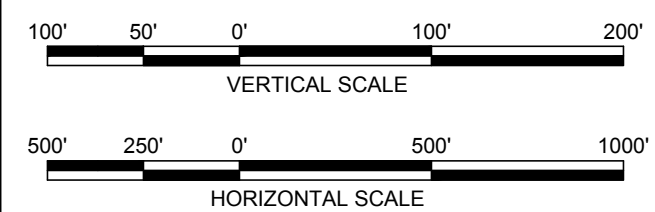
1  
X  
FEDERAL LEVEE  
SCALE: 1" = 500'

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REVETMENTS  
SCALE: 1" = 500'



3  
X  
NAVIGATION CHANNEL  
SCALE: 1" = 500'

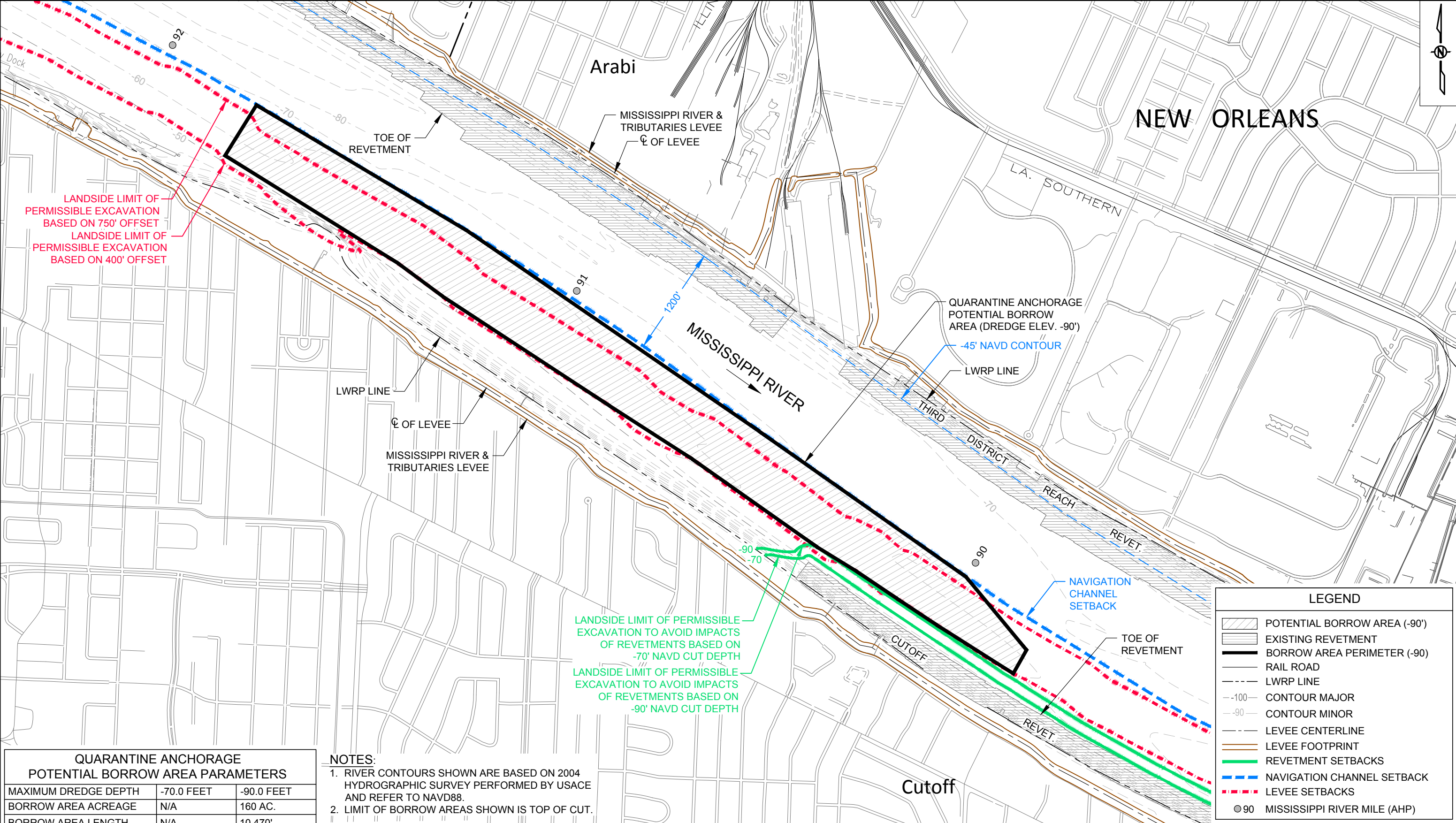
| LEGEND |                                |
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|        | POTENTIAL BORROW AREA (-70.0') |
|        | POTENTIAL BORROW AREA (-90.0') |
|        | USACE HYDROGRAPHIC SURVEY      |
|        | EXISTING REVETMENT             |
|        | DESIGN GRADE (-90.0')          |
|        | DESIGN GRADE (-70.0')          |
|        | REVETMENT SETBACKS             |
|        | NAVIGATION CHANNEL SETBACKS    |
|        | LEVEE SETBACKS                 |



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|---|-----------------|---|--|
| COASTAL PROTECTION AND RESTORATION AUTHORITY<br>450 LAUREL STREET<br>BATON ROUGE, LOUISIANA 70801 |                 | INVESTIGATION OF POTENTIAL MISSISSIPPI RIVER BORROW AREAS | REQUIRED BORROW AREA EXCAVATION SETBACKS |
|   |                 | STATE PROJECT NUMBER:                                     |  |
|   |                 |   |  |
| DRAWN BY: YC  | DESIGNED BY: SA | APPROVED BY:  | SHEET 3 OF 32                            |



| QUARANTINE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |            |              |
|--|------------|--------------|
| MAXIMUM DREDGE DEPTH                                     | -70.0 FEET | -90.0 FEET   |
| BORROW AREA ACREAGE                                      | N/A        | 160 AC.      |
| BORROW AREA LENGTH                                       | N/A        | 10,470'      |
| BORROW AREA WIDTH  | N/A        | 300' TO 750' |
| BORROW AREA THICKNESS                                    | N/A        | 18' TO 38'   |
| BORROW AREA VOLUME                                       | N/A        | 6.5 MCY      |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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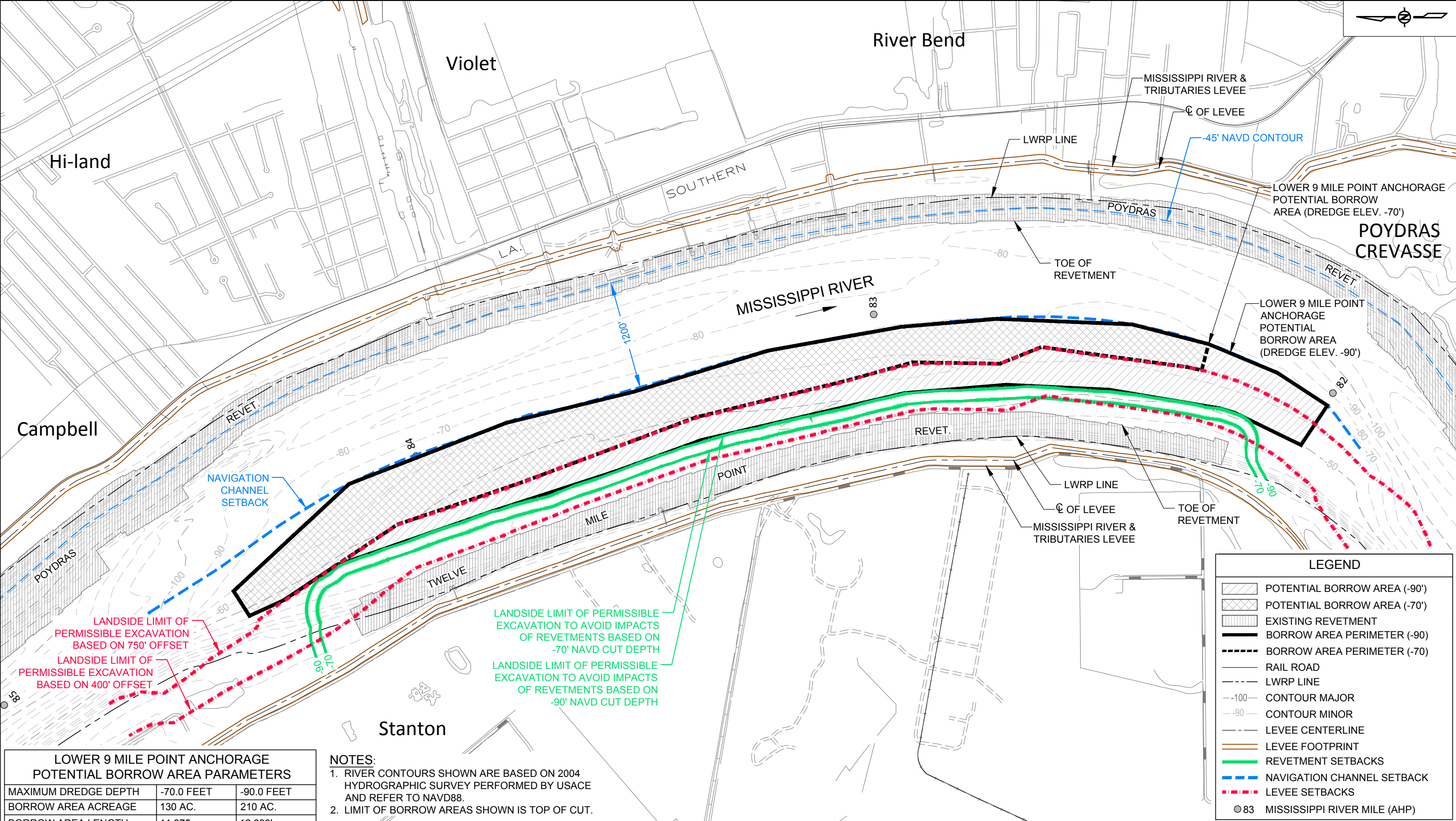
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QUARANTINE ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 4 OF 32





| LOWER 9 MILE POINT ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|--|--------------|--------------|
| MAXIMUM DREDGE DEPTH   | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE  | 130 AC.      | 210 AC.      |
| BORROW AREA LENGTH   | 11,375       | 12,630'      |
| BORROW AREA WIDTH  | 300' TO 680' | 325' TO 885' |
| BORROW AREA THICKNESS  | 0' TO 28'    | 18' TO 48'   |
| BORROW AREA VOLUME   | 2.0 MCY      | 9.6 MCY      |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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DESIGNED BY: SA

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MISSISSIPPI RIVER BORROW AREAS

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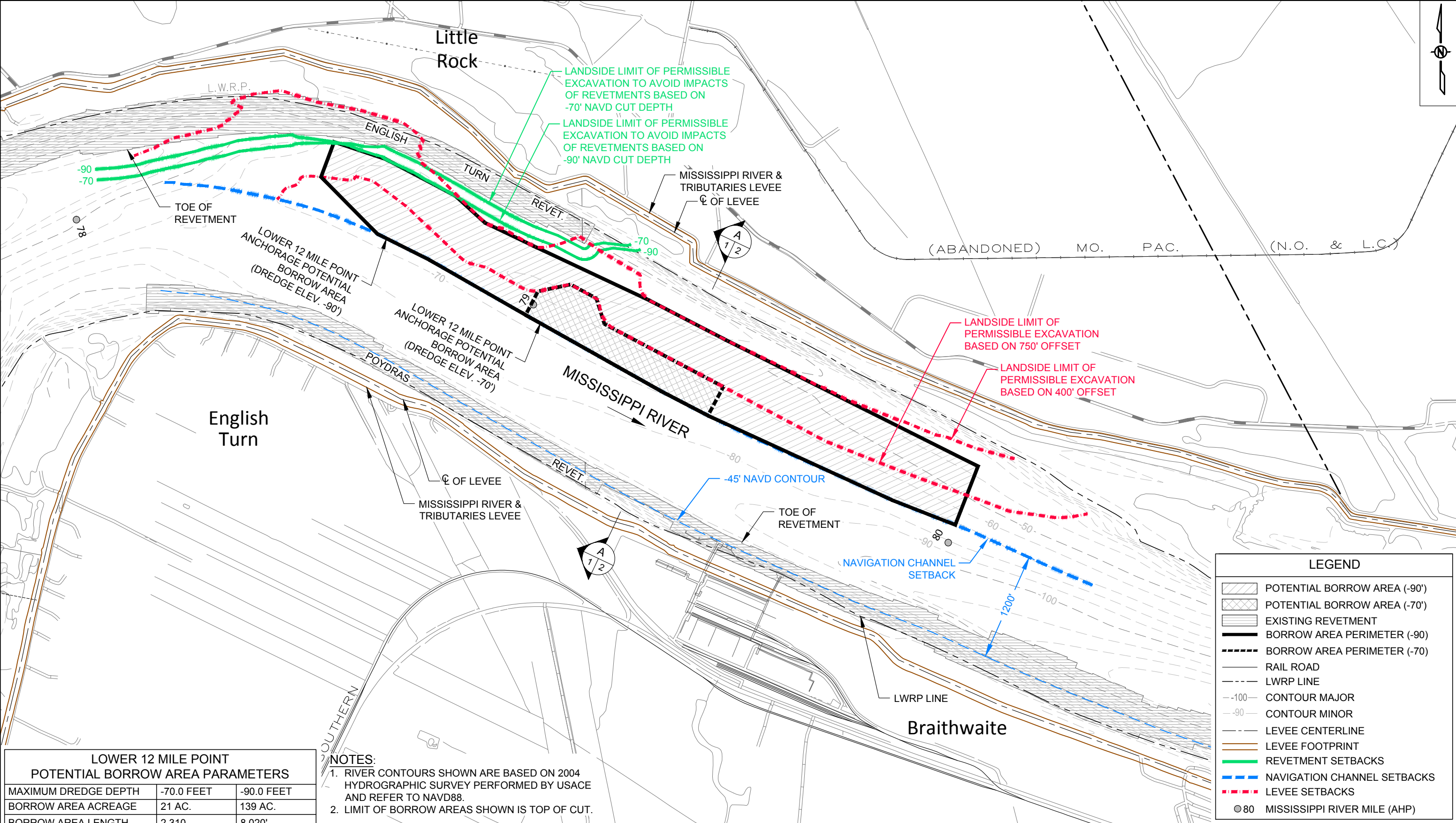
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LOWER 9 MILE POINT  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 5 OF 32





| LOWER 12 MILE POINT<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH                                    | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                                     | 21 AC.       | 139 AC.      |
| BORROW AREA LENGTH                                      | 2,310        | 8,020'       |
| BORROW AREA WIDTH                                       | 300' TO 540' | 415' TO 845' |
| BORROW AREA THICKNESS                                   | 0' TO 10'    | 10' TO 52'   |
| BORROW AREA VOLUME                                      | 0.2 MCY      | 5.9 MCY      |

- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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MISSISSIPPI RIVER BORROW AREAS

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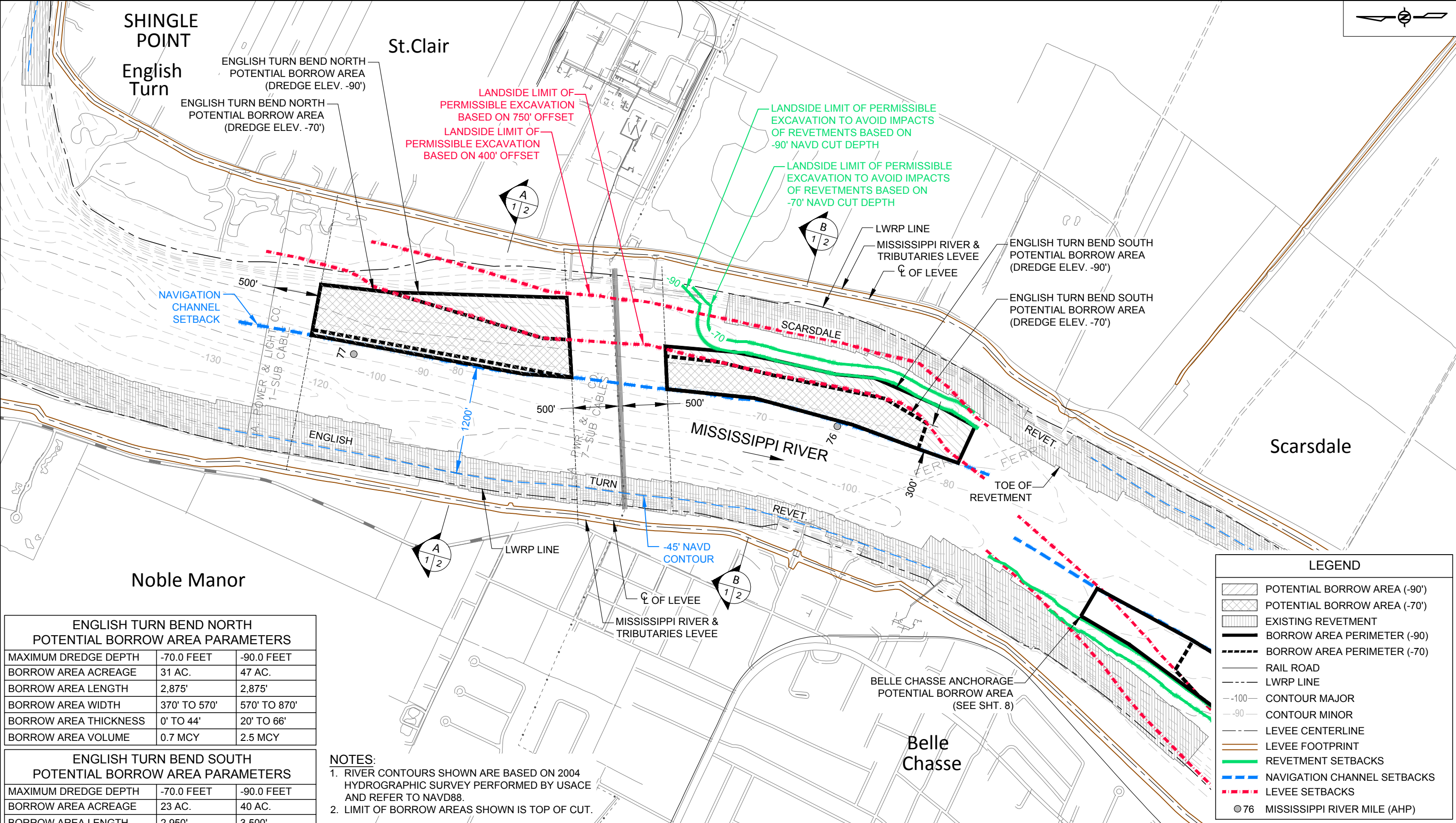
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LOWER 12 MILE POINT  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 6 OF 32





| ENGLISH TURN BEND NORTH<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH  | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE   | 31 AC.       | 47 AC.       |
| BORROW AREA LENGTH  | 2,875'       | 2,875'       |
| BORROW AREA WIDTH   | 370' TO 570' | 570' TO 870' |
| BORROW AREA THICKNESS                                       | 0' TO 44'    | 20' TO 66'   |
| BORROW AREA VOLUME  | 0.7 MCY      | 2.5 MCY      |

| ENGLISH TURN BEND SOUTH<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH  | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE   | 23 AC.       | 40 AC.       |
| BORROW AREA LENGTH  | 2,950'       | 3,500'       |
| BORROW AREA WIDTH   | 300' TO 395' | 445' TO 570' |
| BORROW AREA THICKNESS                                       | 0' TO 20'    | 20' TO 44'   |
| BORROW AREA VOLUME  | 0.4 MCY      | 1.7 MCY      |



NOTES:  
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.  
2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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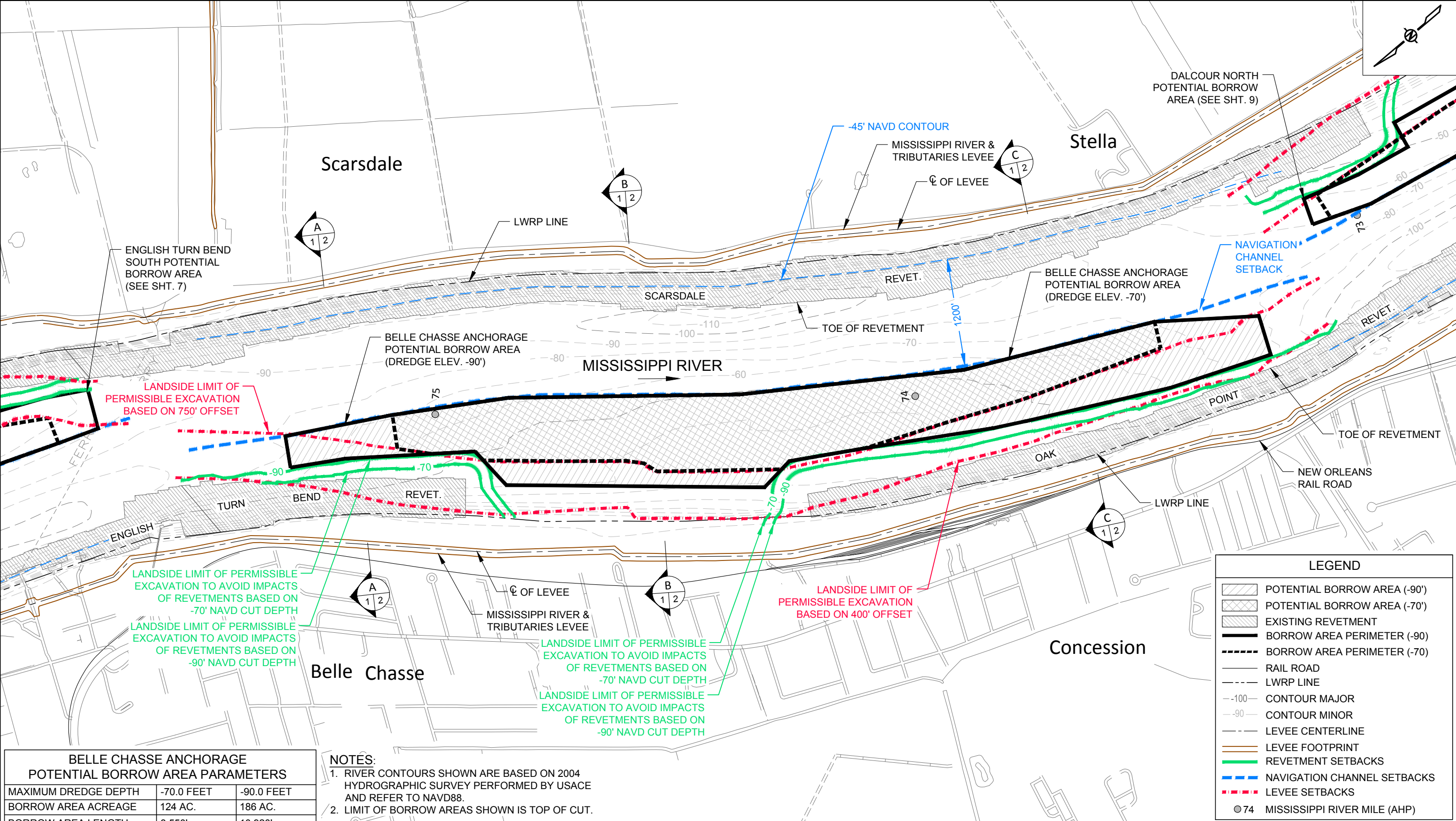
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### ENGLISH TURN BEND POTENTIAL BORROW AREAS

DATE: JULY 24, 2012

SHEET 7 OF 32





| BELLE CHASSE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |                |
|--|--------------|----------------|
| MAXIMUM DREDGE DEPTH                                       | -70.0 FEET   | -90.0 FEET     |
| BORROW AREA ACREAGE  | 124 AC.      | 186 AC.        |
| BORROW AREA LENGTH   | 8,550'       | 10,920'        |
| BORROW AREA WIDTH  | 310' TO 880' | 350' TO 1,050' |
| BORROW AREA THICKNESS                                      | 0' TO 36'    | 10' TO 60'     |
| BORROW AREA VOLUME   | 3.6 MCY      | 9.9 MCY        |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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MISSISSIPPI RIVER BORROW AREAS

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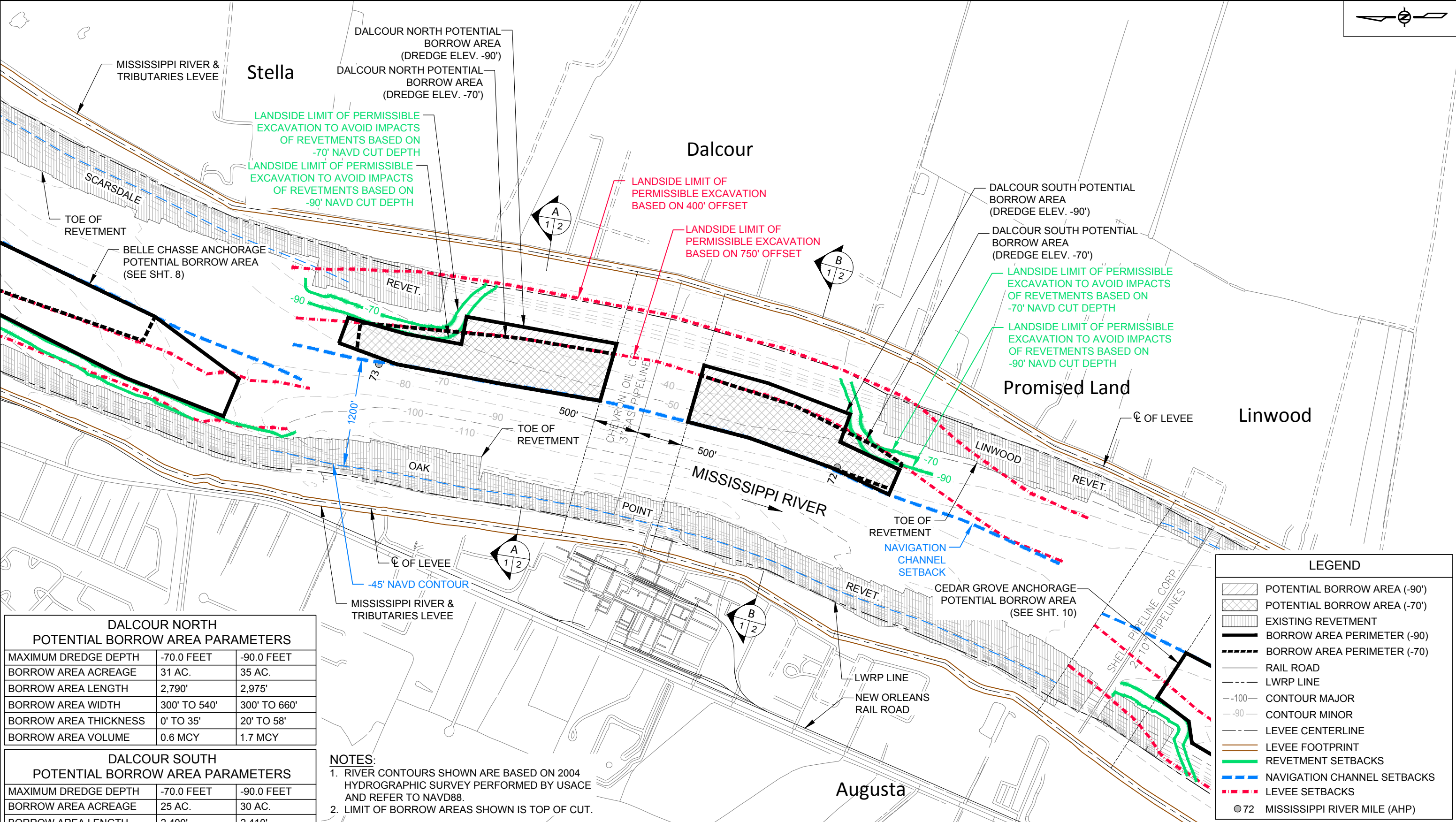
BELLE CHASSE  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 8 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | BORROW AREA PERIMETER (-70)  |
|        | RAIL ROAD                    |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| DALCOUR NORTH<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH                              | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                               | 31 AC.       | 35 AC.       |
| BORROW AREA LENGTH                                | 2,790'       | 2,975'       |
| BORROW AREA WIDTH                                 | 300' TO 540' | 300' TO 660' |
| BORROW AREA THICKNESS                             | 0' TO 35'    | 20' TO 58'   |
| BORROW AREA VOLUME                                | 0.6 MCY      | 1.7 MCY      |

| DALCOUR SOUTH<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH                              | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                               | 25 AC.       | 30 AC.       |
| BORROW AREA LENGTH                                | 2,400'       | 2,410'       |
| BORROW AREA WIDTH                                 | 300' TO 540' | 300' TO 660' |
| BORROW AREA THICKNESS                             | 0' TO 35'    | 18' TO 56'   |
| BORROW AREA VOLUME                                | 0.6 MCY      | 1.5 MCY      |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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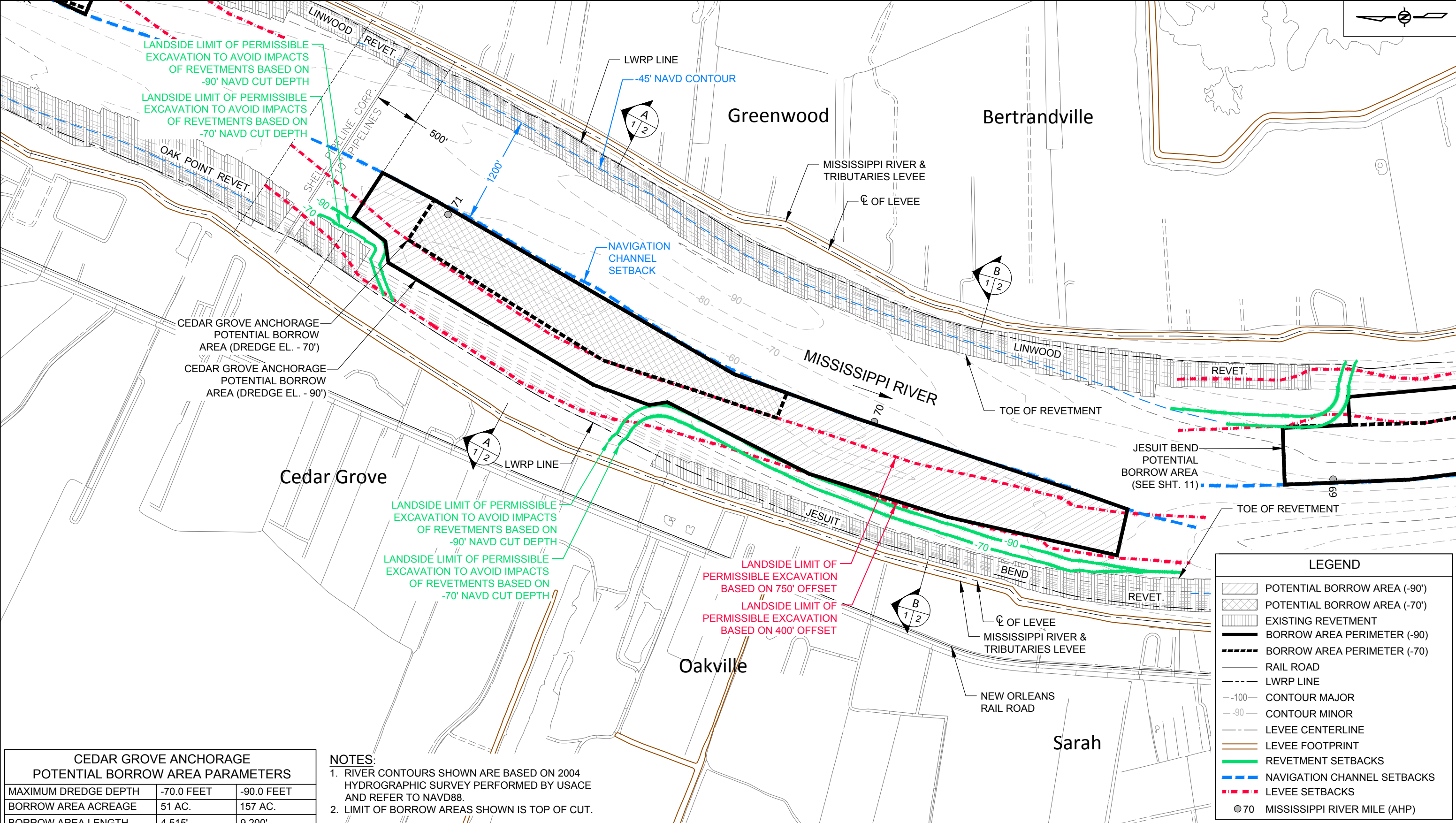
APPROVED BY:

DALCOUR  
POTENTIAL  
BORROW AREAS

DATE: JULY 24, 2012

SHEET 9 OF 32





| CEDAR GROVE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH                                      | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                                       | 51 AC.       | 157 AC.      |
| BORROW AREA LENGTH  | 4,515'       | 9,200'       |
| BORROW AREA WIDTH   | 300' TO 645' | 325' TO 890' |
| BORROW AREA THICKNESS                                     | 0' TO 16'    | 10' TO 40'   |
| BORROW AREA VOLUME  | 0.8 MCY      | 6.4 MCY      |



- NOTES:
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ONE AMERICAN PLACE  
301 MAIN STREET, SUITE 800  
BATON ROUGE, LA 70825  
225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

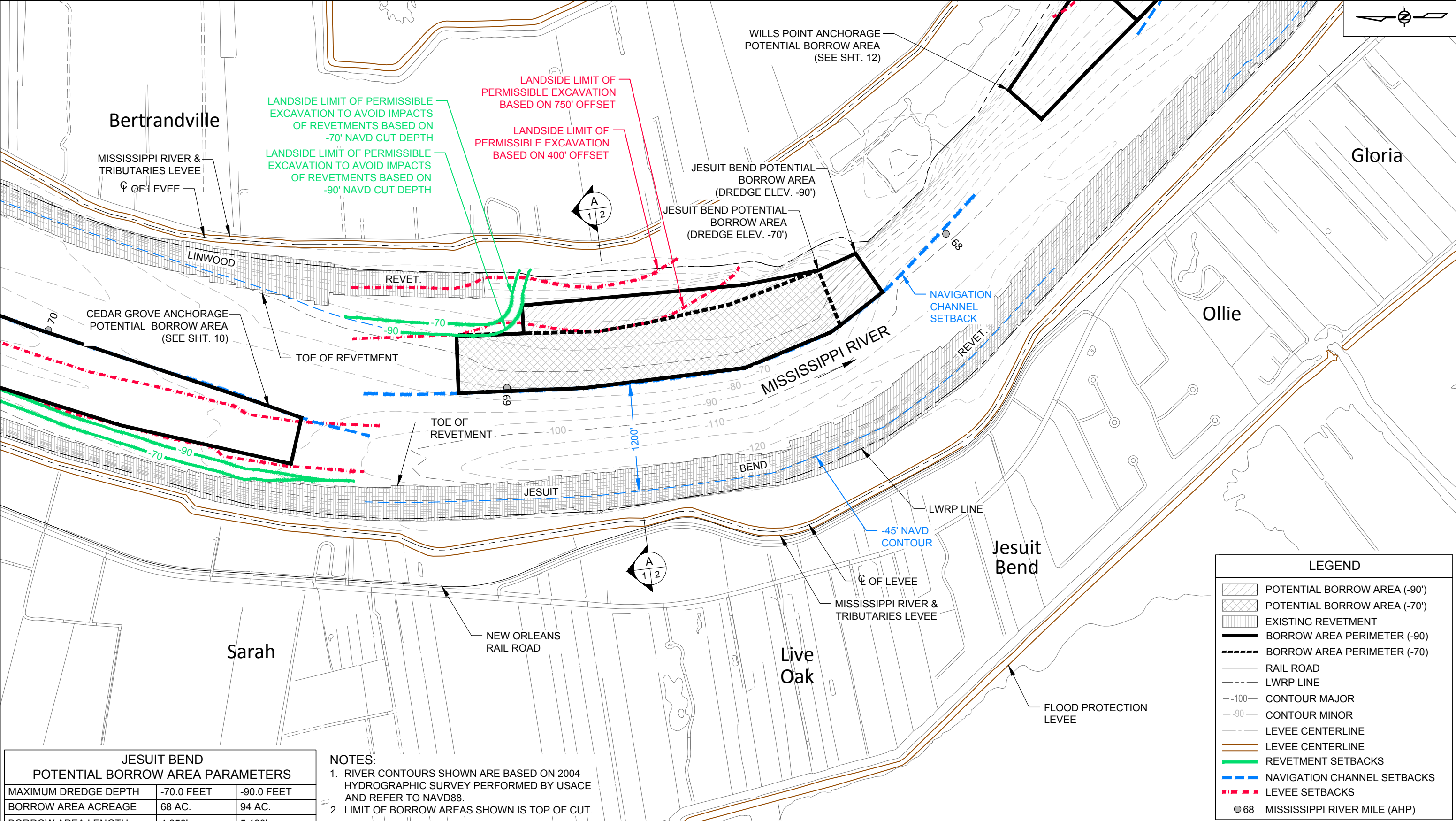
APPROVED BY:

CEDAR GROVE  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 10 OF 32





| JESUIT BEND<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|---|--------------|--------------|
| MAXIMUM DREDGE DEPTH                            | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                             | 68 AC.       | 94 AC.       |
| BORROW AREA LENGTH                              | 4,350'       | 5,180'       |
| BORROW AREA WIDTH                               | 600' TO 850' | 480' TO 940' |
| BORROW AREA THICKNESS                           | 0' TO 45'    | 10' TO 68'   |
| BORROW AREA VOLUME                              | 2.1 MCY      | 5.6 MCY      |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
301 MAIN STREET, SUITE 800  
BATON ROUGE, LA 70825  
225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

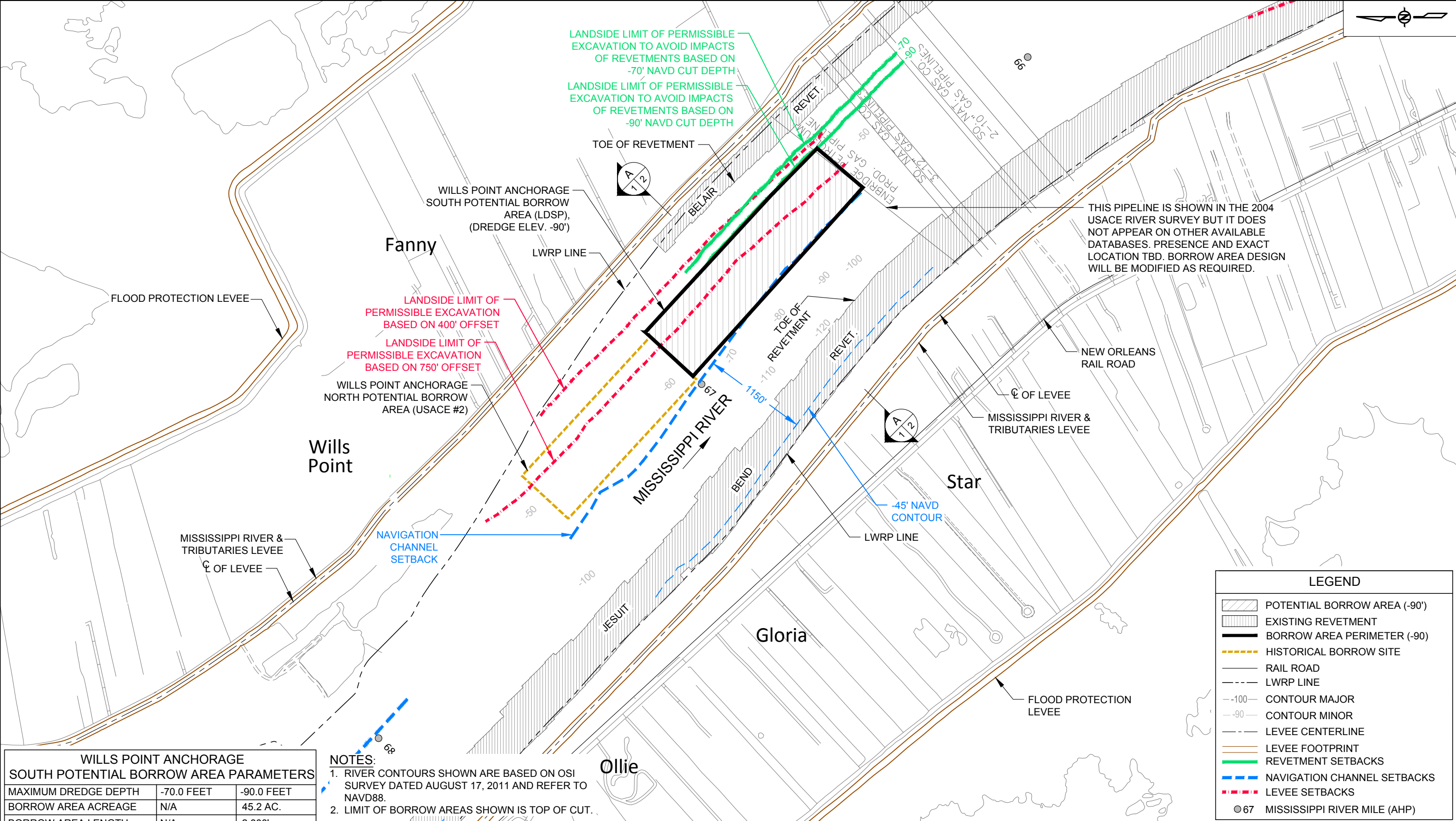
STATE PROJECT NUMBER:

APPROVED BY:

JESUIT BEND  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 11 OF 32



| WILLS POINT ANCHORAGE<br>SOUTH POTENTIAL BORROW AREA PARAMETERS |            |              |
|---|------------|--------------|
| MAXIMUM DREDGE DEPTH  | -70.0 FEET | -90.0 FEET   |
| BORROW AREA ACREAGE   | N/A        | 45.2 AC.     |
| BORROW AREA LENGTH  | N/A        | 2,800'       |
| BORROW AREA WIDTH   | N/A        | 680' TO 715' |
| BORROW AREA THICKNESS   | N/A        | 10' TO 40'   |
| BORROW AREA VOLUME  | N/A        | 2.38 MCY     |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON OSI SURVEY DATED AUGUST 17, 2011 AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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BATON ROUGE, LA 70825  
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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

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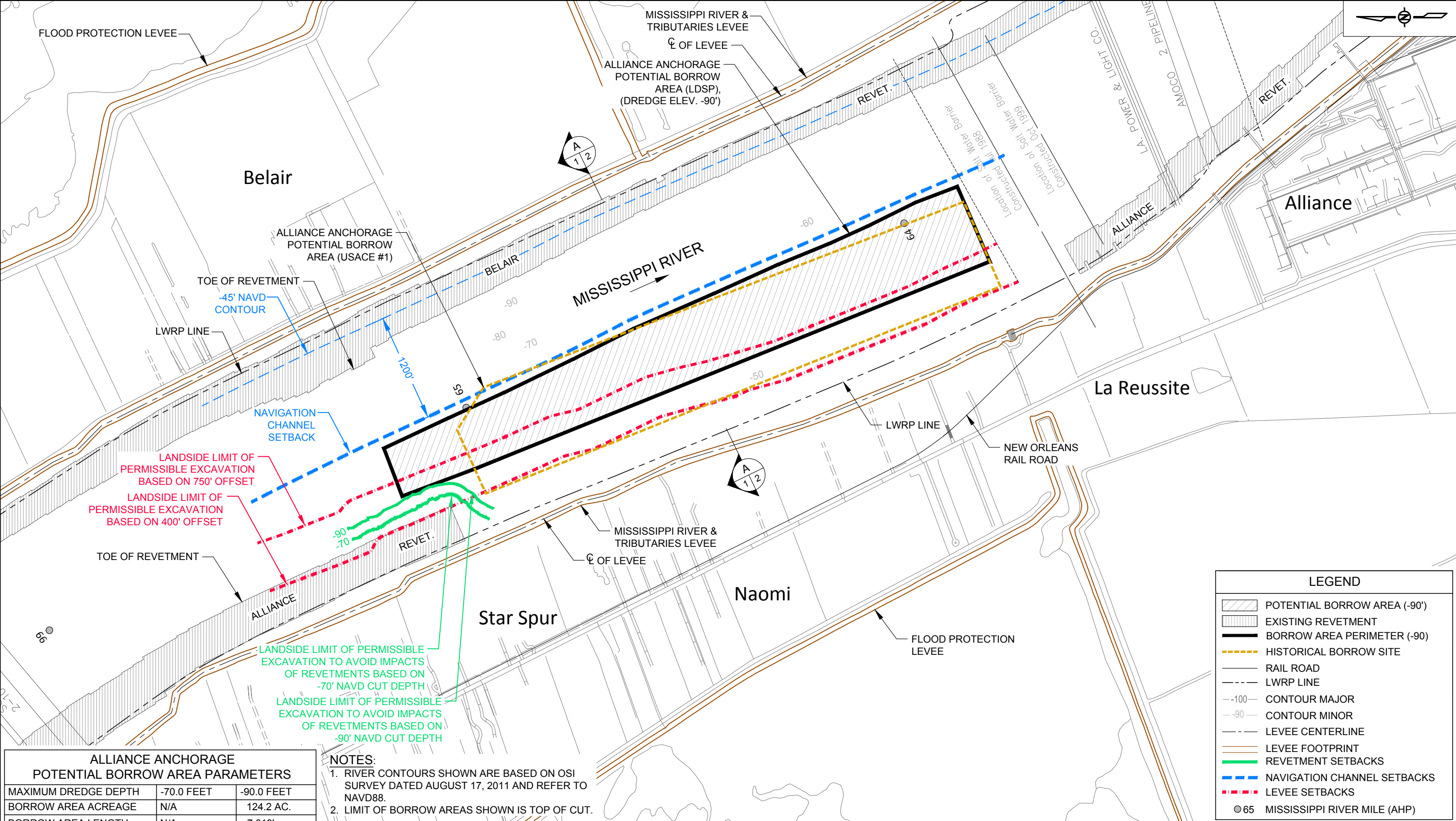
WILLS POINT ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 12 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | HISTORICAL BORROW SITE       |
|        | RAIL ROAD                    |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| ALLIANCE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |            |              |
|--|------------|--------------|
| MAXIMUM DREDGE DEPTH                                   | -70.0 FEET | -90.0 FEET   |
| BORROW AREA ACREAGE                                    | N/A        | 124.2 AC.    |
| BORROW AREA LENGTH                                     | N/A        | 7,010'       |
| BORROW AREA WIDTH                                      | N/A        | 600' TO 900' |
| BORROW AREA THICKNESS                                  | N/A        | 30' TO 40'   |
| BORROW AREA VOLUME                                     | N/A        | 6.5 MCY      |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

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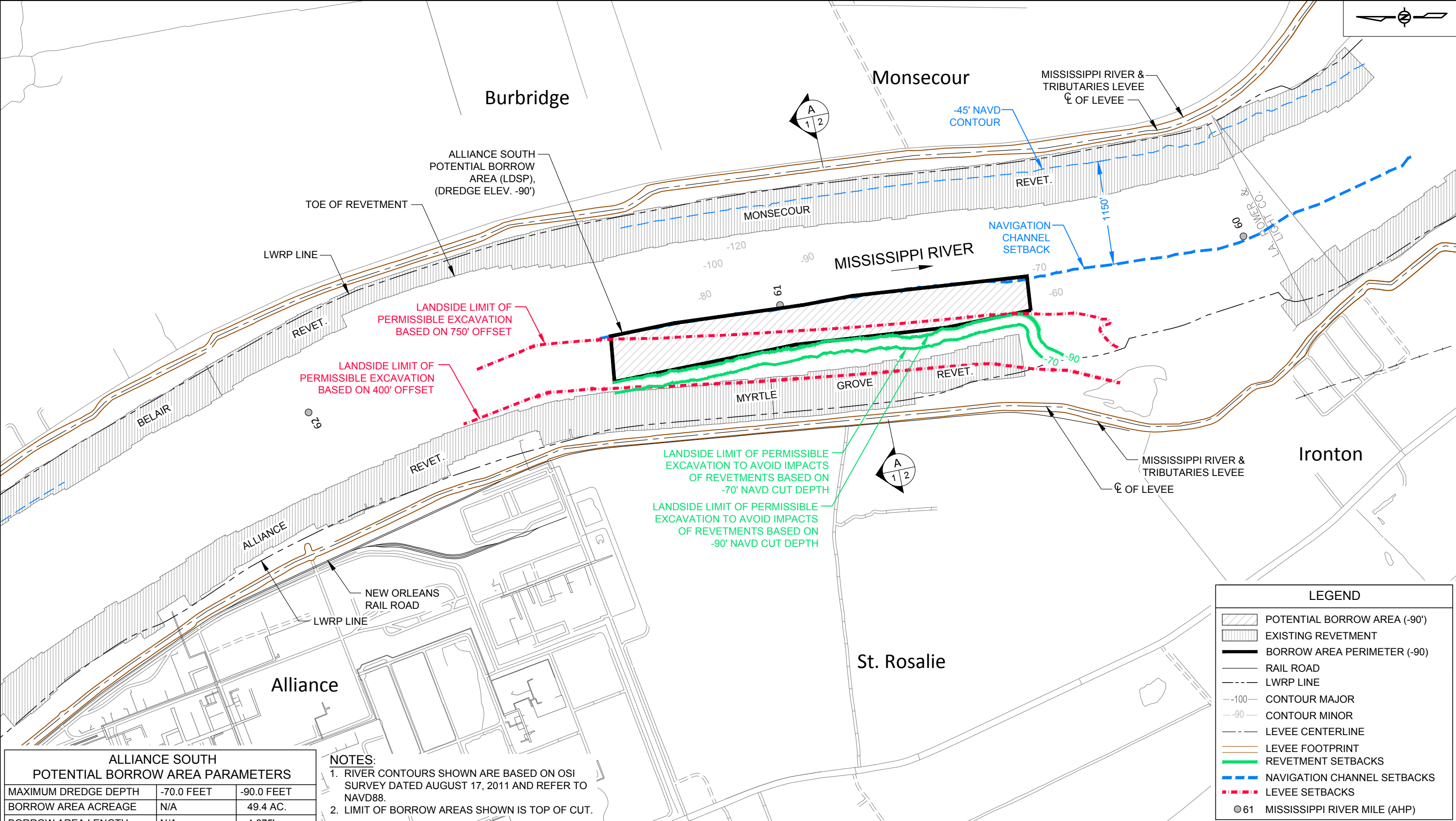
ALLIANCE ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 13 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | HISTORICAL BORROW SITE       |
|        | RAIL ROAD                    |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVTMENT SETBACKS            |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| ALLIANCE SOUTH<br>POTENTIAL BORROW AREA PARAMETERS |            |              |
|--|------------|--------------|
| MAXIMUM DREDGE DEPTH                               | -70.0 FEET | -90.0 FEET   |
| BORROW AREA ACREAGE                                | N/A        | 49.4 AC.     |
| BORROW AREA LENGTH                                 | N/A        | 4,675'       |
| BORROW AREA WIDTH                                  | N/A        | 380' TO 510' |
| BORROW AREA THICKNESS                              | N/A        | 10' TO 45'   |
| BORROW AREA VOLUME                                 | N/A        | 1.7 MCY      |

NOTES:  
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2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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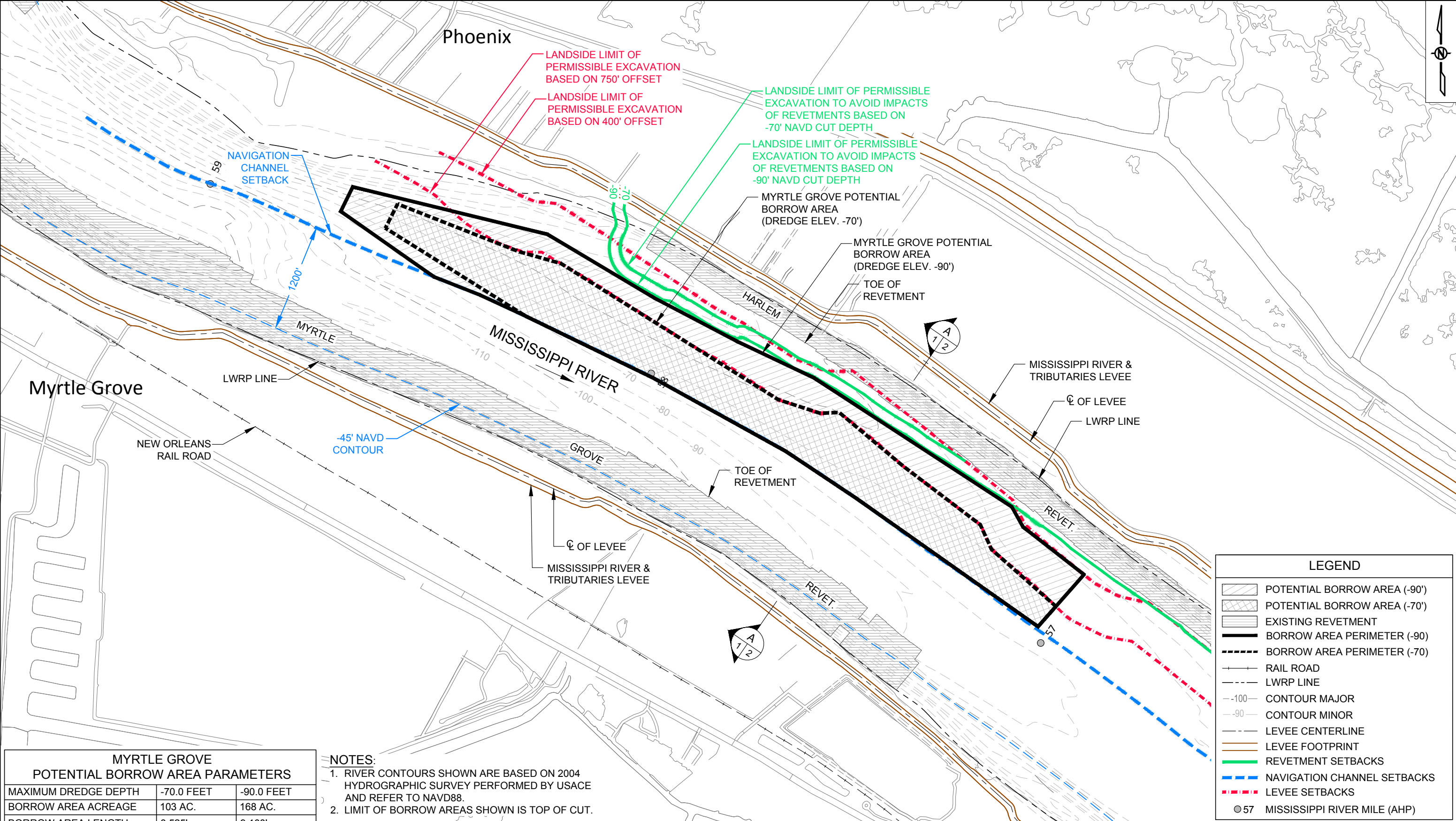
COASTAL PROTECTION AND  
RESTORATION AUTHORITY  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS  
STATE PROJECT NUMBER:  
APPROVED BY:

ALLIANCE SOUTH  
POTENTIAL  
BORROW AREA  
DATE: JULY 24, 2012  
SHEET 14 OF 32



| MYRTLE GROVE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|--|--------------|--------------|
| MAXIMUM DREDGE DEPTH                             | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                              | 103 AC.      | 168 AC.      |
| BORROW AREA LENGTH                               | 8,525'       | 9,100'       |
| BORROW AREA WIDTH                                | 300' TO 700' | 300' TO 925' |
| BORROW AREA THICKNESS                            | 10' TO 28'   | 10' TO 60'   |
| BORROW AREA VOLUME                               | 1.7 MCY      | 7.9 MCY      |

- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

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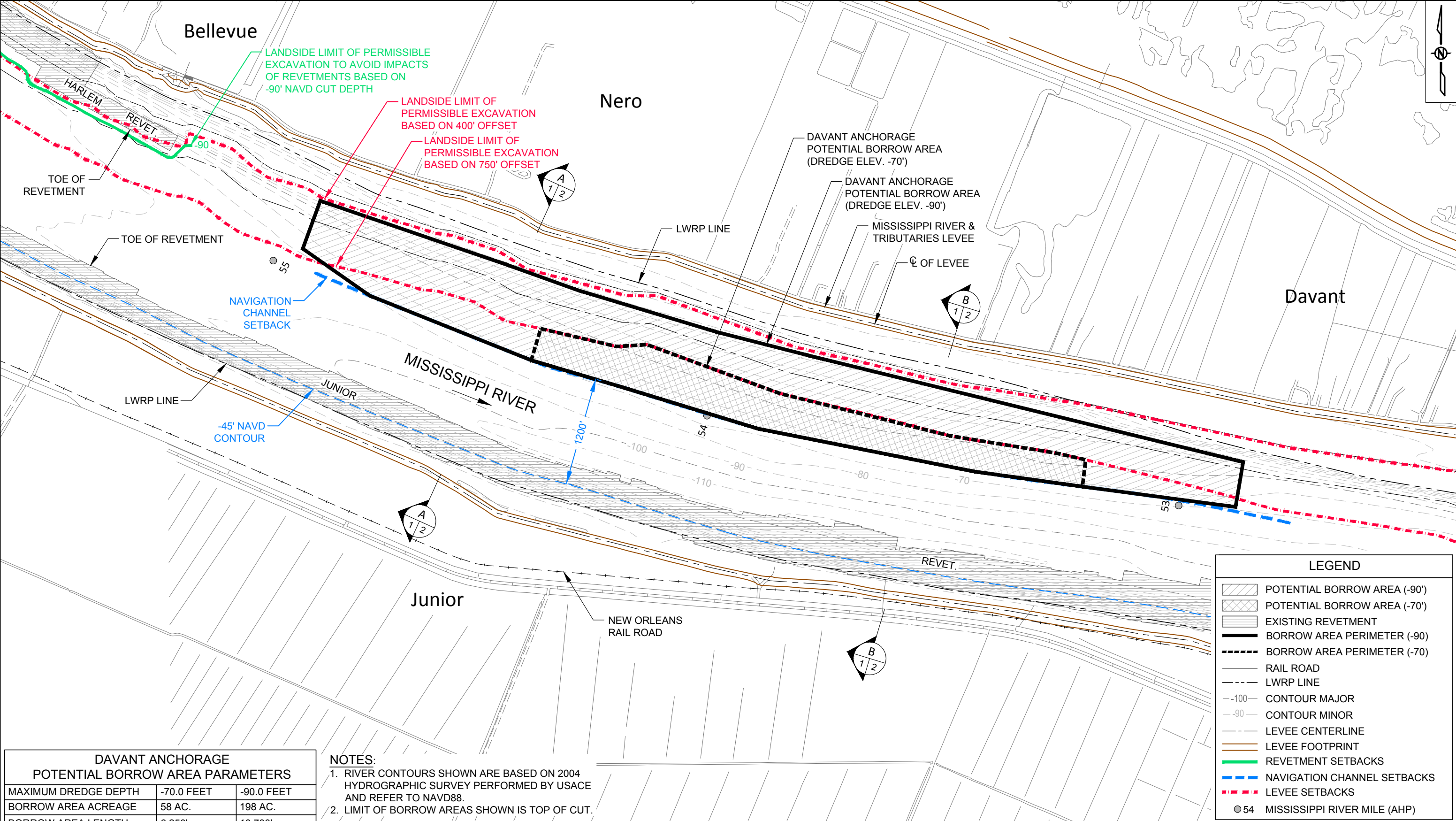
MYRTLE GROVE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 15 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | BORROW AREA PERIMETER (-70)  |
|        | RAIL ROAD                    |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVTMENT SETBACKS            |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| DAVANT ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|--|--------------|--------------|
| MAXIMUM DREDGE DEPTH                                 | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                                  | 58 AC.       | 198 AC.      |
| BORROW AREA LENGTH                                   | 6,250'       | 10,700'      |
| BORROW AREA WIDTH                                    | 300' TO 530' | 345' TO 925' |
| BORROW AREA THICKNESS                                | 0' TO 28'    | 10' TO 72'   |
| BORROW AREA VOLUME                                   | 1.0 MCY      | 10.6 MCY     |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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BATON ROUGE, LA 70825  
225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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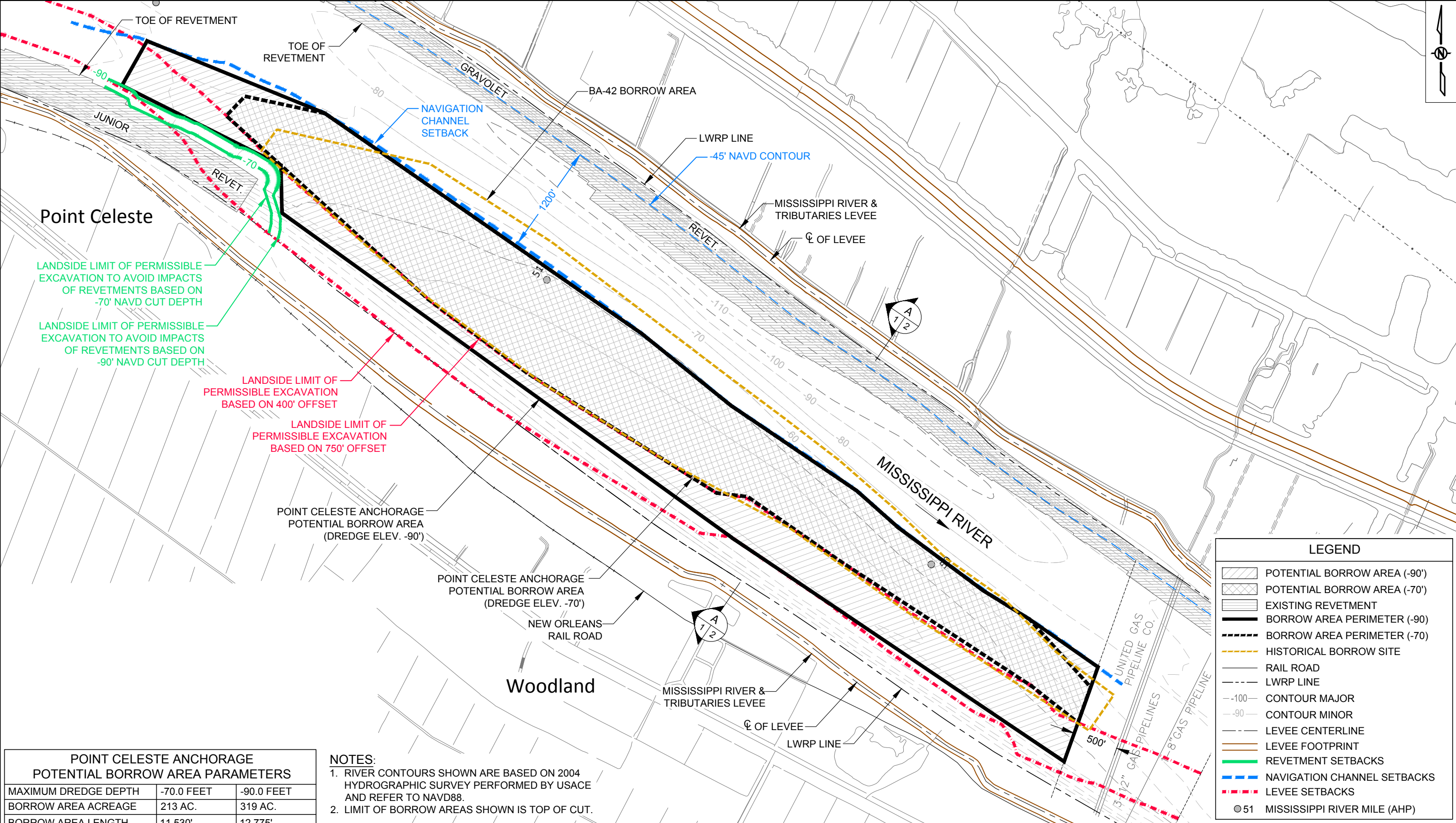
APPROVED BY:

DAVANT ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 16 OF 32





| POINT CELESTE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |                |                |
|---|----------------|----------------|
| MAXIMUM DREDGE DEPTH  | -70.0 FEET     | -90.0 FEET     |
| BORROW AREA ACREAGE   | 213 AC.        | 319 AC.        |
| BORROW AREA LENGTH  | 11,530'        | 12,775'        |
| BORROW AREA WIDTH   | 300' TO 1,085' | 560' TO 1,200' |
| BORROW AREA THICKNESS                                       | 0' TO 38'      | 12' TO 68'     |
| BORROW AREA VOLUME  | 6.8 MCY        | 19.6 MCY       |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
301 MAIN STREET, SUITE 800  
BATON ROUGE, LA 70825  
225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

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INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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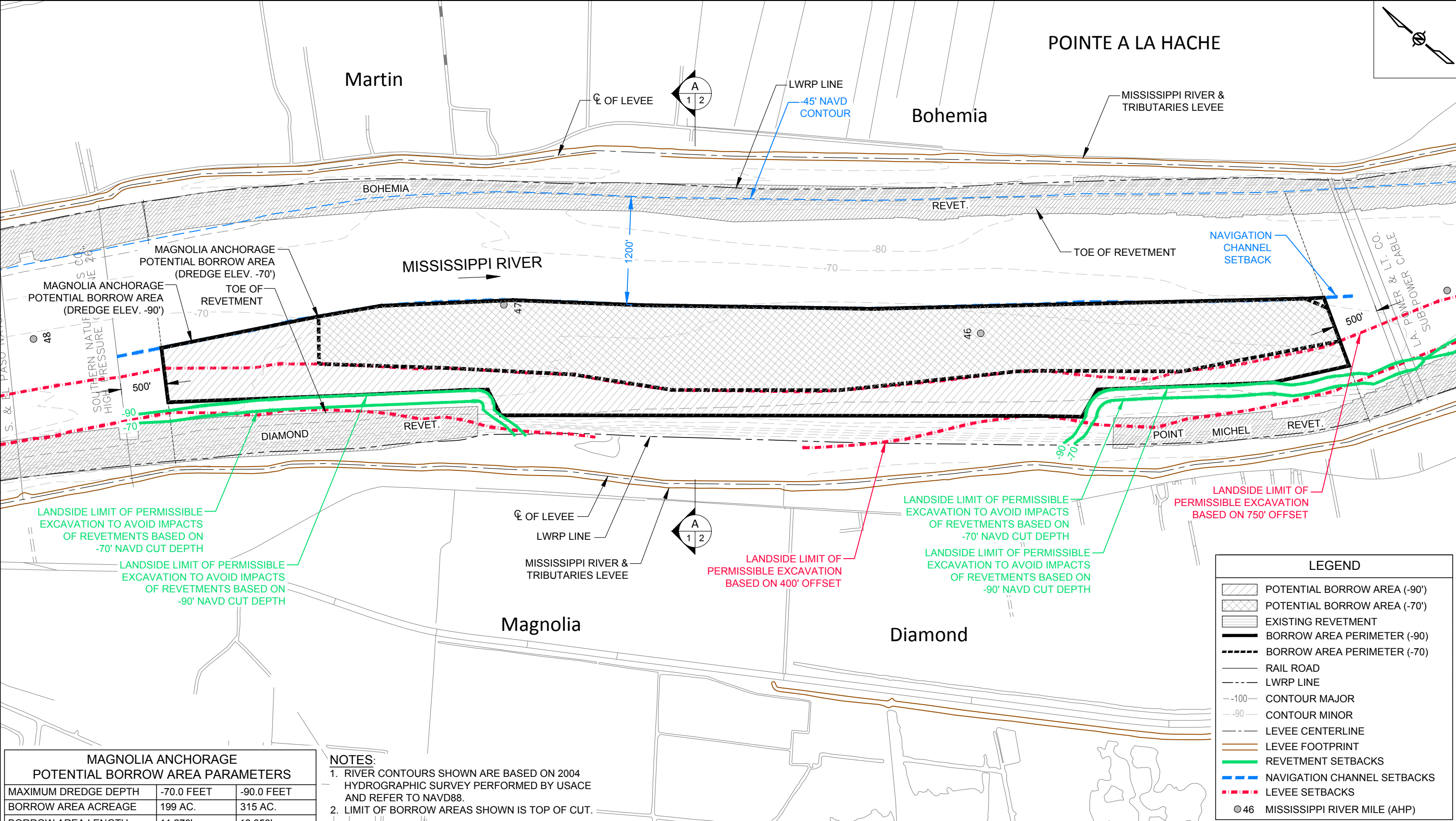
APPROVED BY:

POINT CELESTE  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 17 OF 32





| MAGNOLIA ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |                |
|--|--------------|----------------|
| MAXIMUM DREDGE DEPTH                                   | -70.0 FEET   | -90.0 FEET     |
| BORROW AREA ACREAGE                                    | 199 AC.      | 315 AC.        |
| BORROW AREA LENGTH                                     | 11,270'      | 13,050'        |
| BORROW AREA WIDTH                                      | 385' TO 940' | 610' TO 1,280' |
| BORROW AREA THICKNESS                                  | 0' TO 18'    | 16' TO 48'     |
| BORROW AREA VOLUME                                     | 3.1 MCY      | 14.2 MCY       |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

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INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

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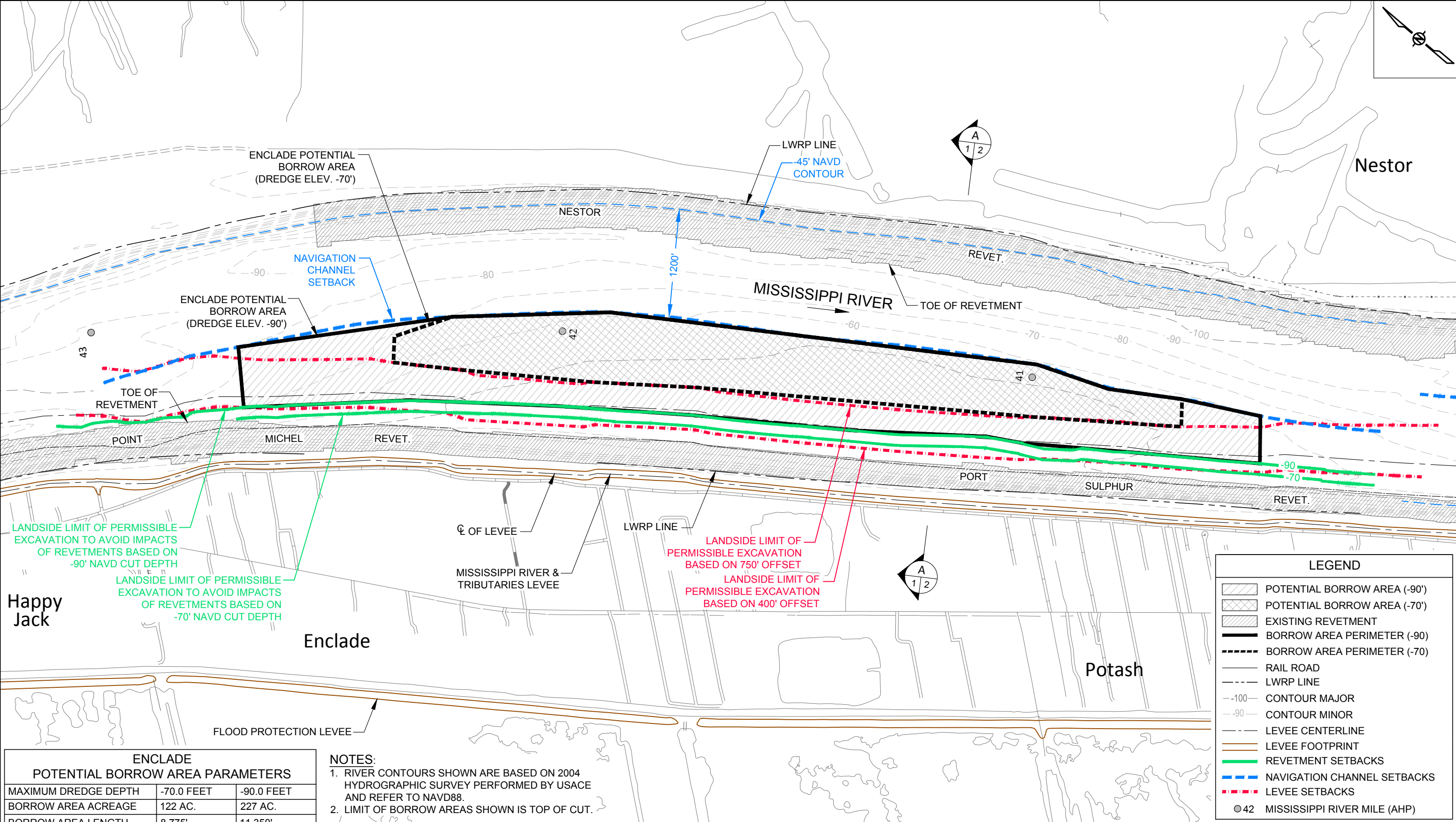
MAGNOLIA ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 18 OF 32

| LEGEND |                              |
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|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | BORROW AREA PERIMETER (-70)  |
|        | RAIL ROAD                    |
|        | LWRP LINE                    |
|        | -100' CONTOUR MAJOR          |
|        | -90' CONTOUR MINOR           |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| ENCLAVE<br>POTENTIAL BORROW AREA PARAMETERS |              |                |
|---|--------------|----------------|
| MAXIMUM DREDGE DEPTH                        | -70.0 FEET   | -90.0 FEET     |
| BORROW AREA ACREAGE                         | 122 AC.      | 227 AC.        |
| BORROW AREA LENGTH                          | 8,775'       | 11,350'        |
| BORROW AREA WIDTH                           | 300' TO 785' | 525' TO 1,080' |
| BORROW AREA THICKNESS                       | 0' TO 24'    | 10' TO 46'     |
| BORROW AREA VOLUME                          | 2.9 MCY      | 11.6 MCY       |



- NOTES:
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  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

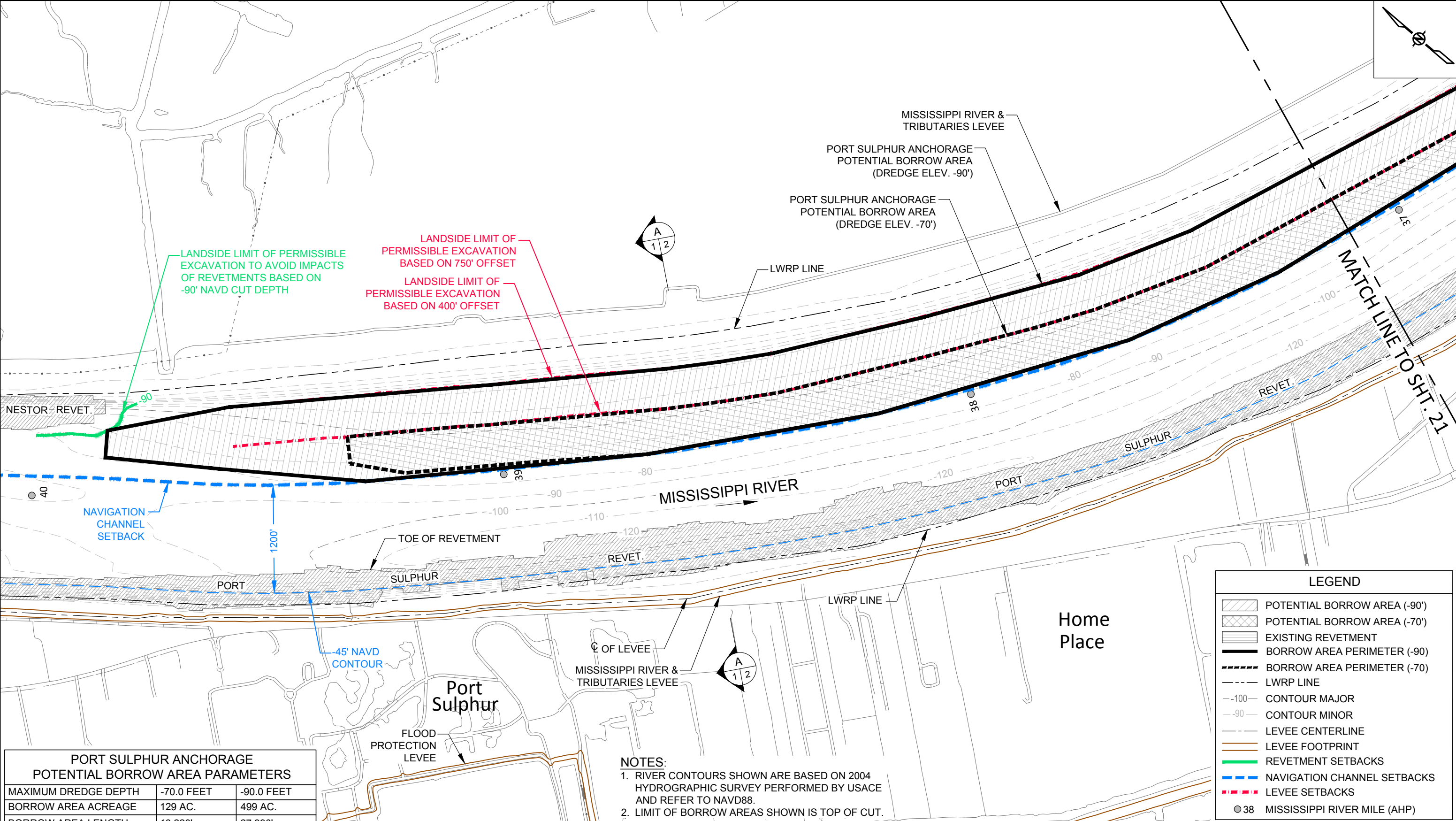
STATE PROJECT NUMBER:

APPROVED BY:

ENCLAVE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 19 OF 32



| PORT SULPHUR ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|--|--------------|--------------|
| MAXIMUM DREDGE DEPTH                                       | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE  | 129 AC.      | 499 AC.      |
| BORROW AREA LENGTH   | 13,220'      | 27,990'      |
| BORROW AREA WIDTH  | 300' TO 460' | 300' TO 950' |
| BORROW AREA THICKNESS                                      | 0' TO 24'    | 10' TO 70'   |
| BORROW AREA VOLUME   | 2.1 MCY      | 21.7 MCY     |



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ONE AMERICAN PLACE  
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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

APPROVED BY:

PORT SULPHUR  
ANCHORAGE POTENTIAL  
BORROW AREA (1 OF 2)

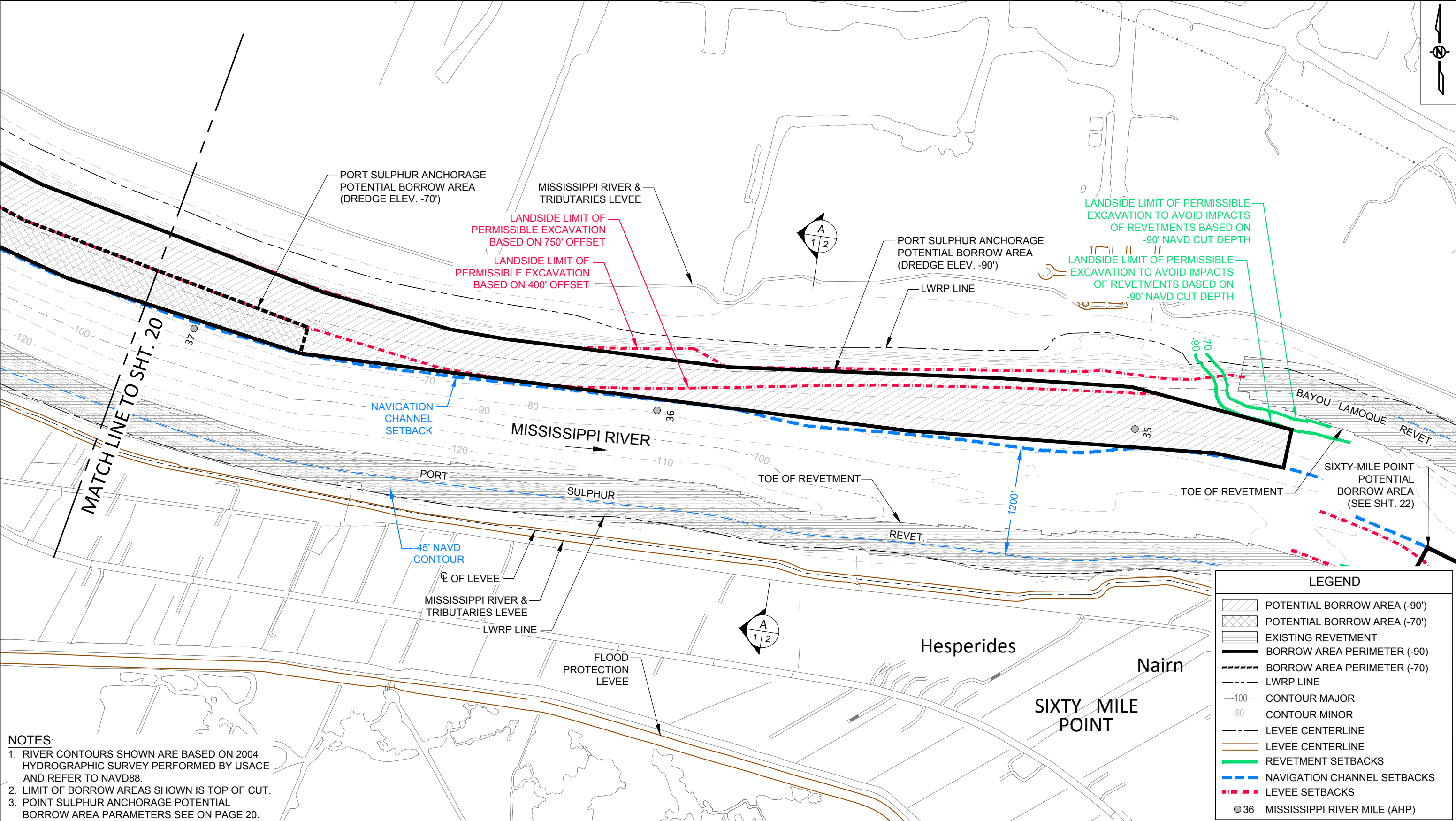
DATE: JULY 24, 2012

SHEET 20 OF 32

| LEGEND |                              |
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|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | BORROW AREA PERIMETER (-70)  |
|        | LWRP LINE                    |
|        | -100- CONTOUR MAJOR          |
|        | -90- CONTOUR MINOR           |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |

- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.





- NOTES:**
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.
  3. POINT SULPHUR ANCHORAGE POTENTIAL BORROW AREA PARAMETERS SEE ON PAGE 20.

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90)  |
|        | BORROW AREA PERIMETER (-70)  |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE CENTERLINE             |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | MISSISSIPPI RIVER MILE (AHP) |

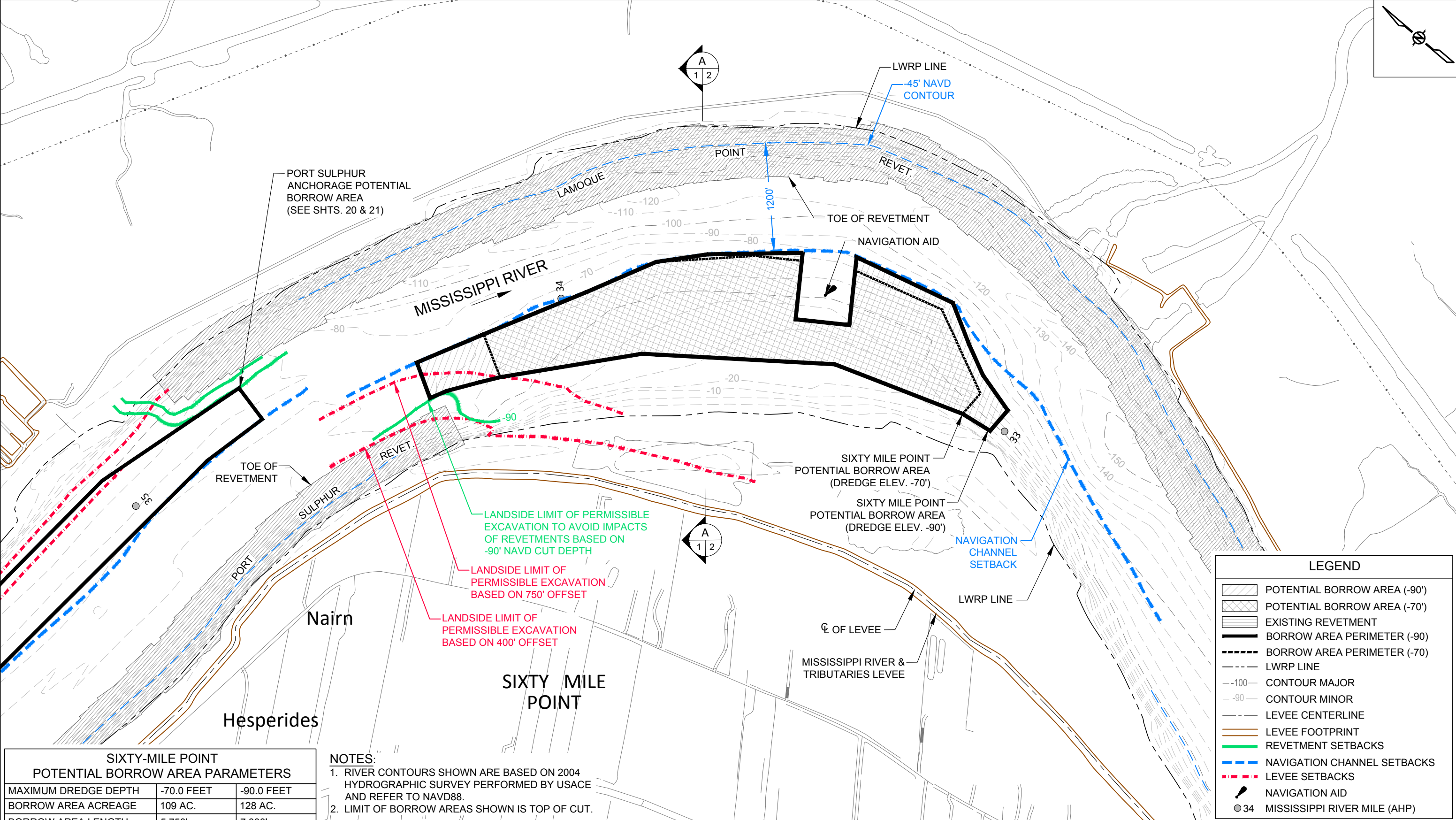


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225-927-7793

| COASTAL PROTECTION AND RESTORATION AUTHORITY      |  | INVESTIGATION OF POTENTIAL MISSISSIPPI RIVER BORROW AREAS |  | PORT SULPHUR ANCHORAGE POTENTIAL BORROW AREA (2 OF 2) |  |
|---|--|---|--|---|--|
| 450 LAUREL STREET<br>BATON ROUGE, LOUISIANA 70801 |  | STATE PROJECT NUMBER:                                     |  | DATE: JULY 24, 2012                                   |  |
| DRAWN BY: YC                                      |  | DESIGNED BY: SA   |  | APPROVED BY:  |  |
|   |  |   |  | SHEET 21 OF 32  |  |





| SIXTY-MILE POINT<br>POTENTIAL BORROW AREA PARAMETERS |                |                |
|--|----------------|----------------|
| MAXIMUM DREDGE DEPTH                                 | -70.0 FEET     | -90.0 FEET     |
| BORROW AREA ACREAGE                                  | 109 AC.        | 128 AC.        |
| BORROW AREA LENGTH                                   | 5,750'         | 7,000'         |
| BORROW AREA WIDTH                                    | 300' TO 1,130' | 300' TO 1,170' |
| BORROW AREA THICKNESS                                | 0' TO 48'      | 10' TO 64'     |
| BORROW AREA VOLUME                                   | 3.2 MCY        | 6.8 MCY        |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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ONE AMERICAN PLACE  
301 MAIN STREET, SUITE 800  
BATON ROUGE, LA 70825  
225-927-7793

COASTAL PROTECTION AND  
RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

APPROVED BY:

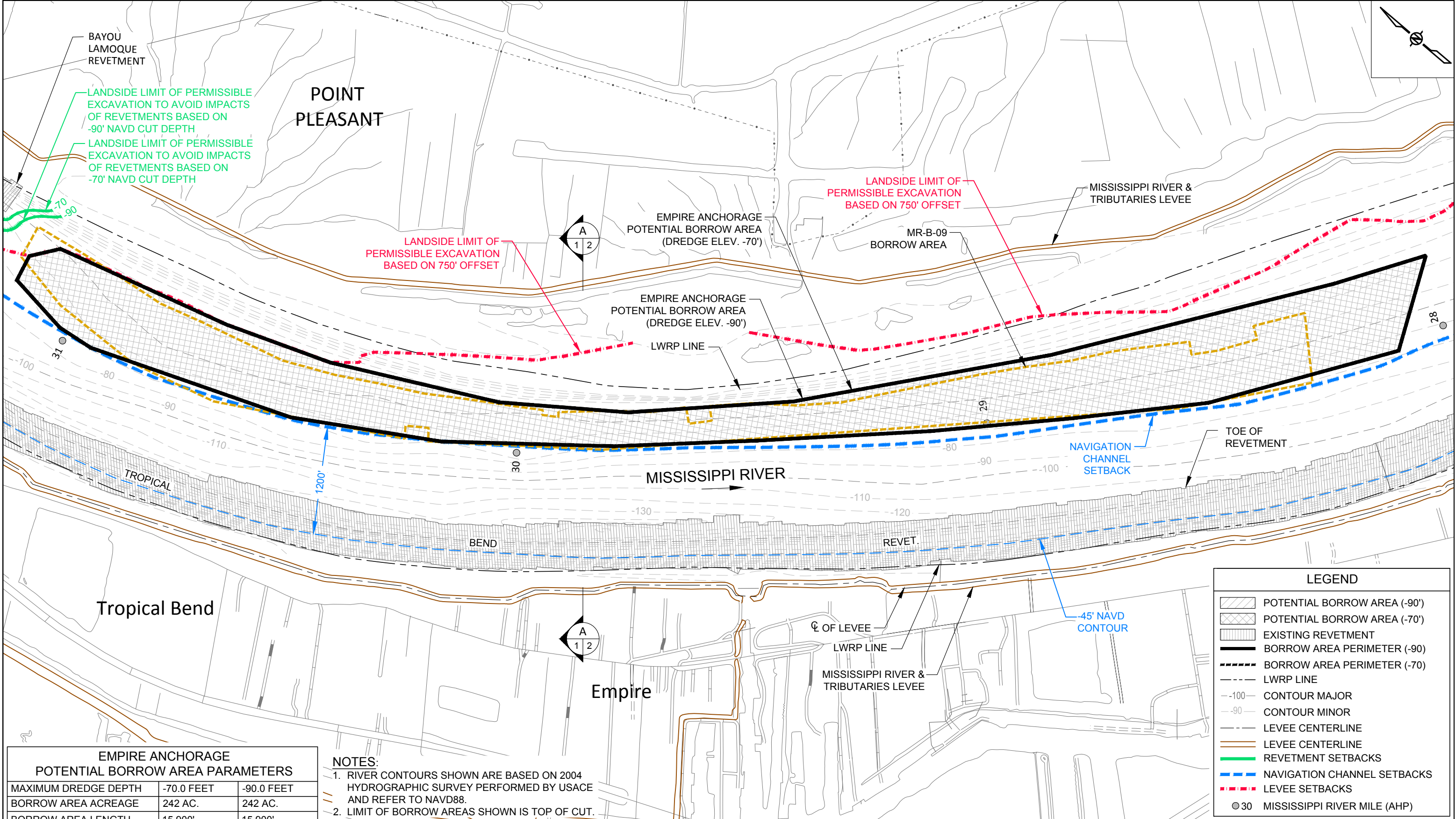
SIXTY-MILE POINT  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 22 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90') |
|        | BORROW AREA PERIMETER (-70') |
|        | LWRP LINE                    |
|        | CONTOUR MAJOR                |
|        | CONTOUR MINOR                |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | REVETMENT SETBACKS           |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | LEVEE SETBACKS               |
|        | NAVIGATION AID               |
|        | MISSISSIPPI RIVER MILE (AHP) |





| EMPIRE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |              |              |
|--|--------------|--------------|
| MAXIMUM DREDGE DEPTH                                 | -70.0 FEET   | -90.0 FEET   |
| BORROW AREA ACREAGE                                  | 242 AC.      | 242 AC.      |
| BORROW AREA LENGTH                                   | 15,900'      | 15,900'      |
| BORROW AREA WIDTH                                    | 370' TO 950' | 370' TO 950' |
| BORROW AREA THICKNESS                                | 0' TO 46'    | 20' TO 66'   |
| BORROW AREA VOLUME                                   | 5.7 MCY      | 12.2 MCY     |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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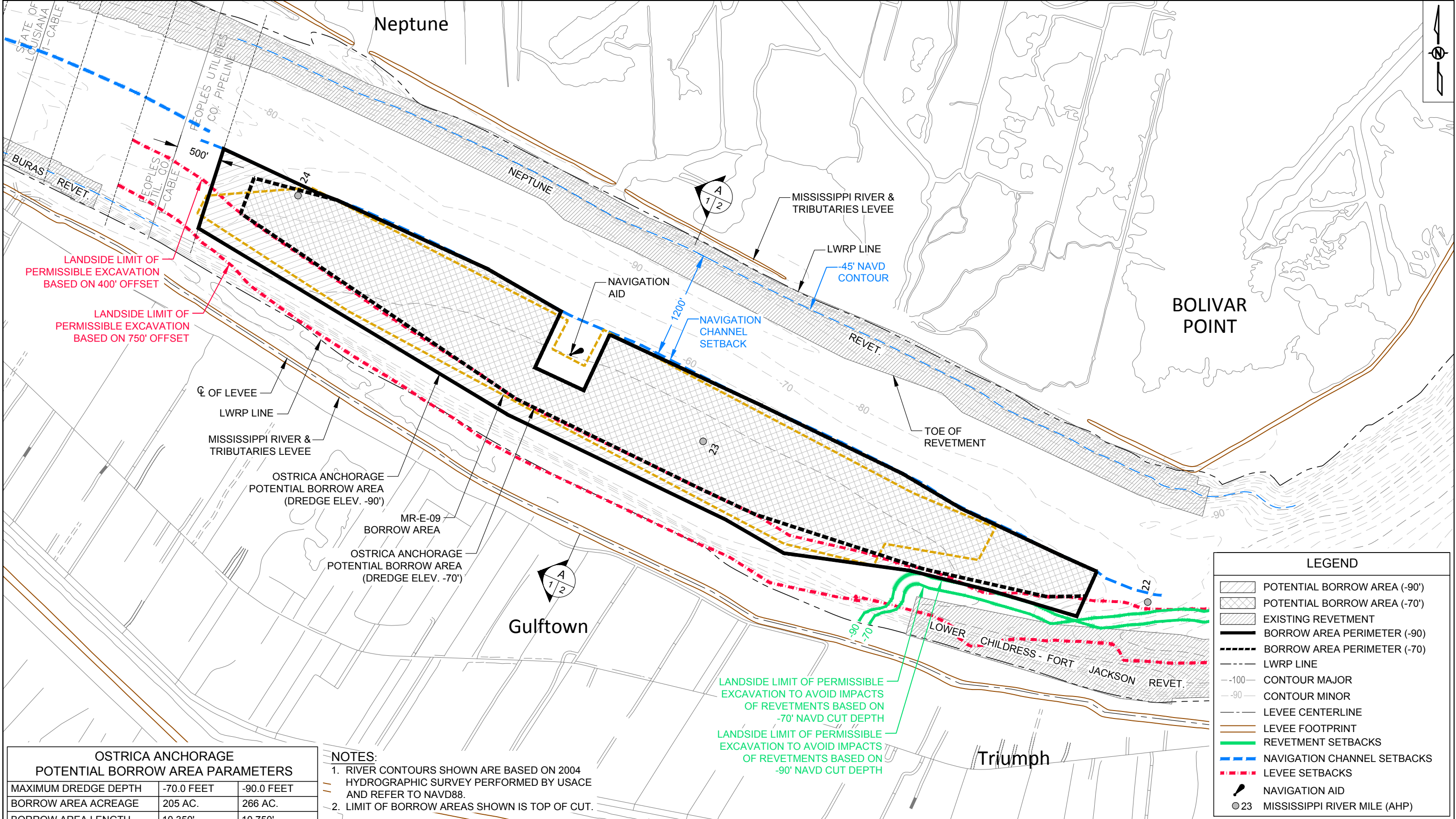
COASTAL PROTECTION AND  
RESTORATION AUTHORITY  
450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC      DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS  
STATE PROJECT NUMBER:  
APPROVED BY:

EMPIRE ANCHORAGE  
POTENTIAL  
BORROW AREA  
DATE: JULY 24, 2012  
SHEET 23 OF 32





| OSTRICA ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |                |                |
|---|----------------|----------------|
| MAXIMUM DREDGE DEPTH                                  | -70.0 FEET     | -90.0 FEET     |
| BORROW AREA ACREAGE                                   | 205 AC.        | 266 AC.        |
| BORROW AREA LENGTH                                    | 10,350'        | 10,750'        |
| BORROW AREA WIDTH                                     | 300' TO 1,120' | 550' TO 1,375' |
| BORROW AREA THICKNESS                                 | 0' TO 28'      | 12' TO 54'     |
| BORROW AREA VOLUME                                    | 5.2 MCY        | 14.6 MCY       |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

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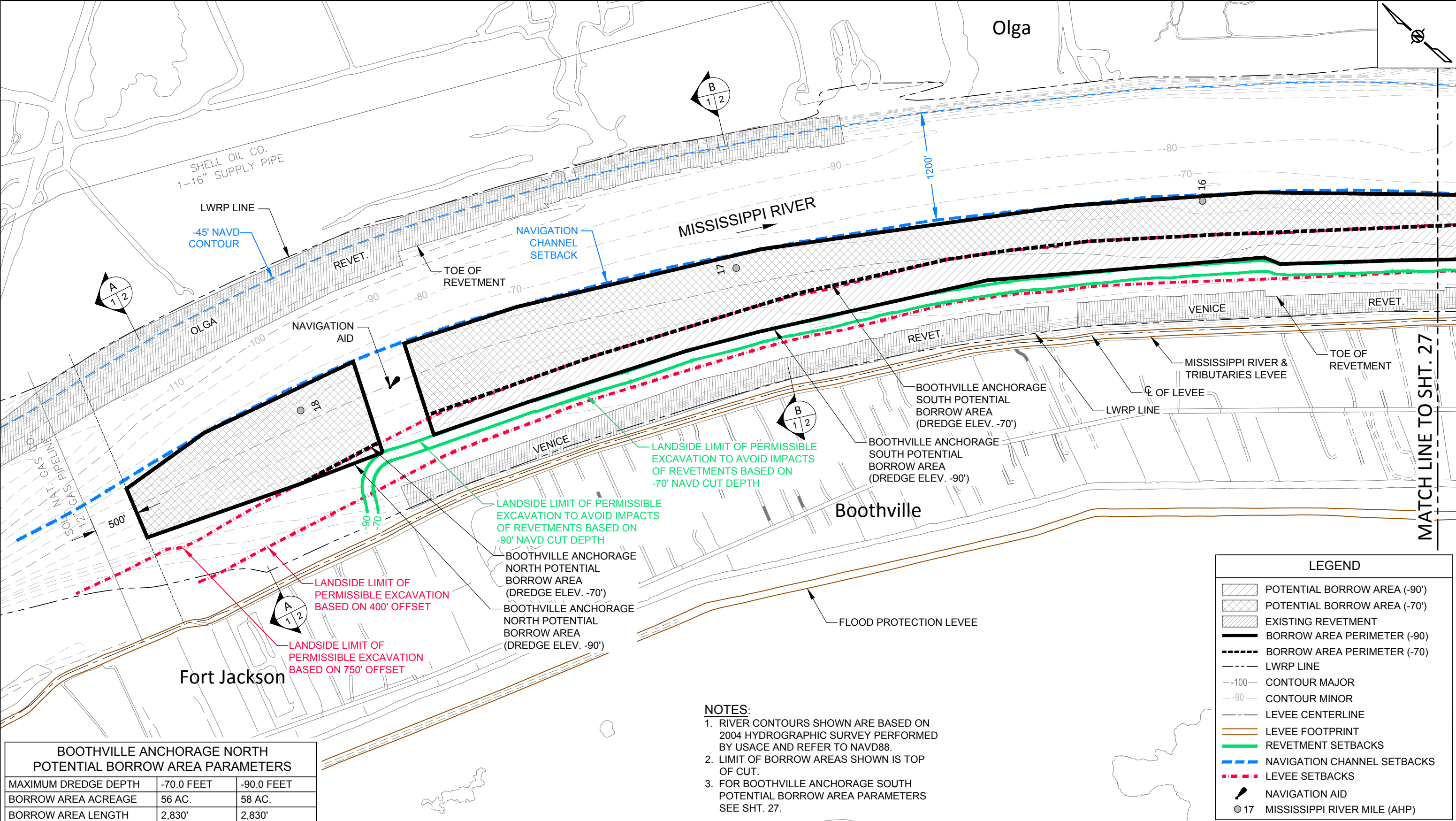
OSTRICA ANCHORAGE  
POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 24 OF 32







| BOOTHVILLE ANCHORAGE NORTH<br>POTENTIAL BORROW AREA PARAMETERS |              |                |
|--|--------------|----------------|
| MAXIMUM DREDGE DEPTH   | -70.0 FEET   | -90.0 FEET     |
| BORROW AREA ACREAGE  | 56 AC.       | 58 AC.         |
| BORROW AREA LENGTH   | 2,830'       | 2,830'         |
| BORROW AREA WIDTH  | 590' TO 970' | 590' TO 1,060' |
| BORROW AREA THICKNESS  | 0' TO 42'    | 20' TO 62'     |
| BORROW AREA VOLUME   | 1.6 MCY      | 3.2 MCY        |



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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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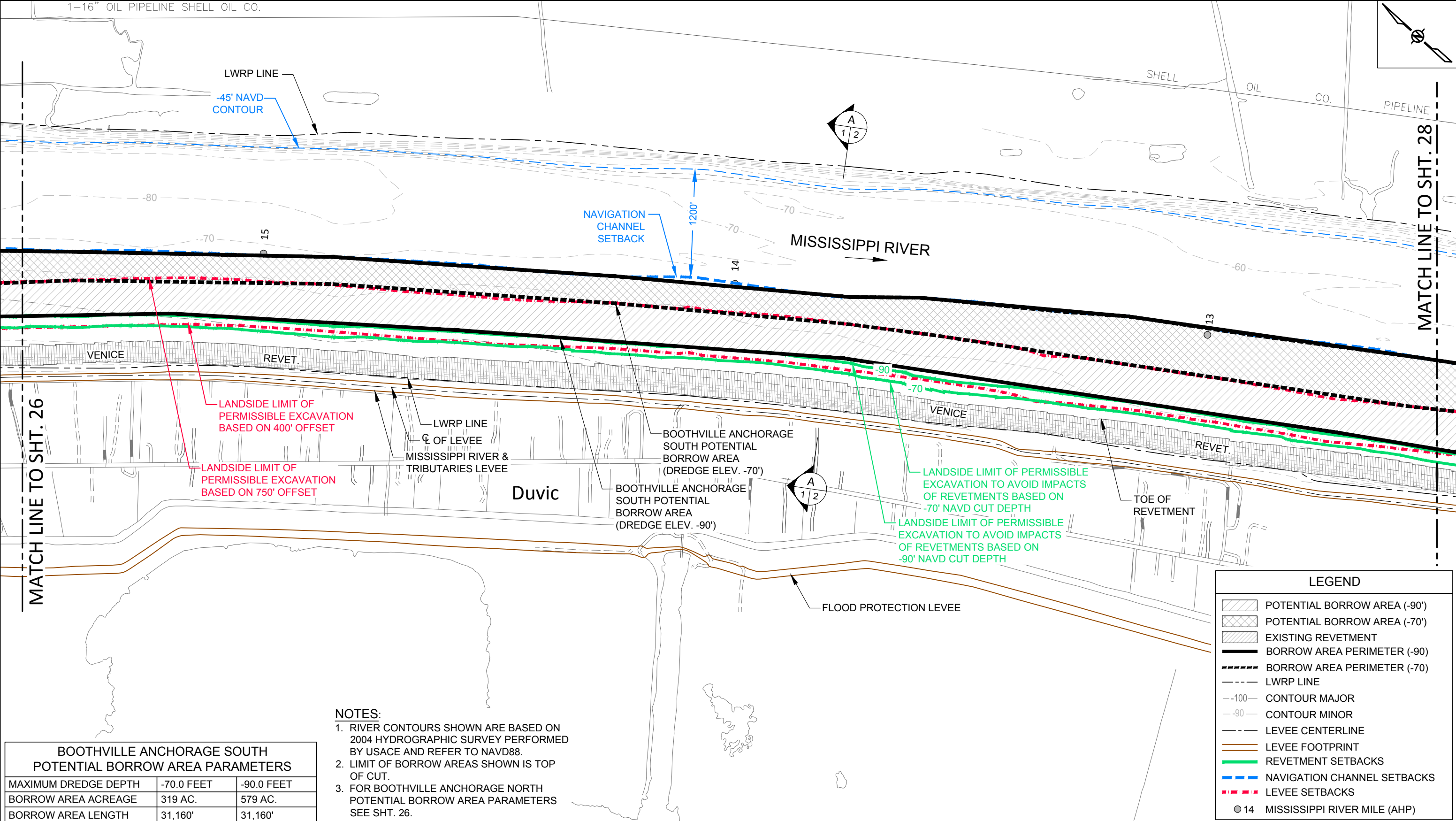
APPROVED BY:

BOOTHVILLE ANCHORAGE  
POTENTIAL  
BORROW AREAS (1 OF 2)

DATE: JULY 24, 2012

SHEET 26 OF 32





| BOOTHVILLE ANCHORAGE SOUTH<br>POTENTIAL BORROW AREA PARAMETERS |              |                |
|--|--------------|----------------|
| MAXIMUM DREDGE DEPTH   | -70.0 FEET   | -90.0 FEET     |
| BORROW AREA ACREAGE  | 319 AC.      | 579 AC.        |
| BORROW AREA LENGTH   | 31,160'      | 31,160'        |
| BORROW AREA WIDTH  | 300' TO 840' | 660' TO 1,060' |
| BORROW AREA THICKNESS  | 0' TO 34'    | 20' TO 60'     |
| BORROW AREA VOLUME   | 5.0 MCY      | 27.1 MCY       |



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COASTAL PROTECTION AND  
RESTORATION AUTHORITY

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MISSISSIPPI RIVER BORROW AREAS

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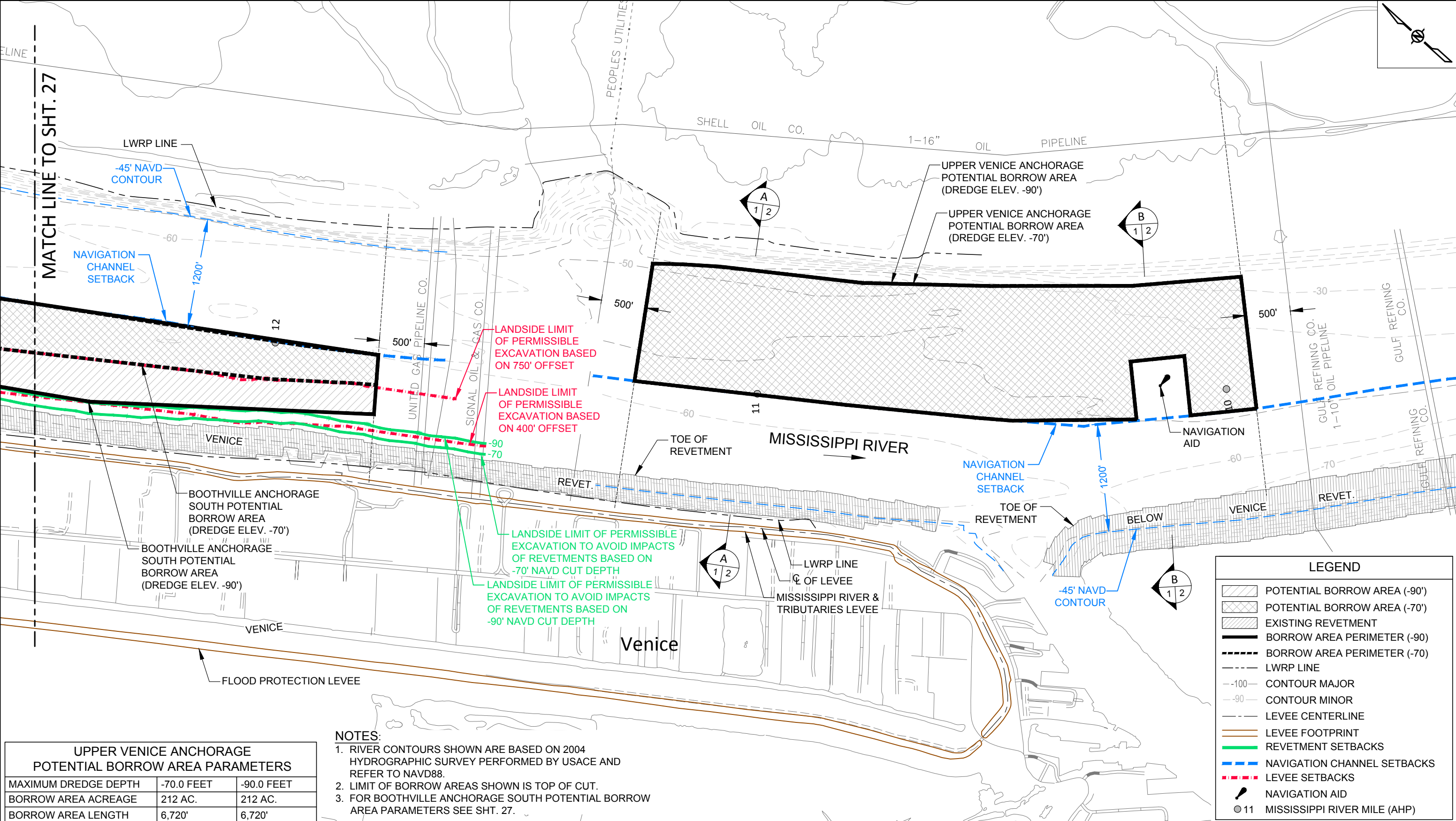
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BOOTHVILLE ANCHORAGE  
POTENTIAL  
BORROW AREAS (2 OF 2)

DATE: JULY 24, 2012

SHEET 27 OF 32





| UPPER VENICE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |                |                |
|--|----------------|----------------|
| MAXIMUM DREDGE DEPTH                                       | -70.0 FEET     | -90.0 FEET     |
| BORROW AREA ACREAGE  | 212 AC.        | 212 AC.        |
| BORROW AREA LENGTH   | 6,720'         | 6,720'         |
| BORROW AREA WIDTH  | 830' TO 1,440' | 830' TO 1,440' |
| BORROW AREA THICKNESS                                      | 0' TO 46'      | 20' TO 66'     |
| BORROW AREA VOLUME   | 6.6 MCY        | 12.6 MCY       |



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RESTORATION AUTHORITY

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DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

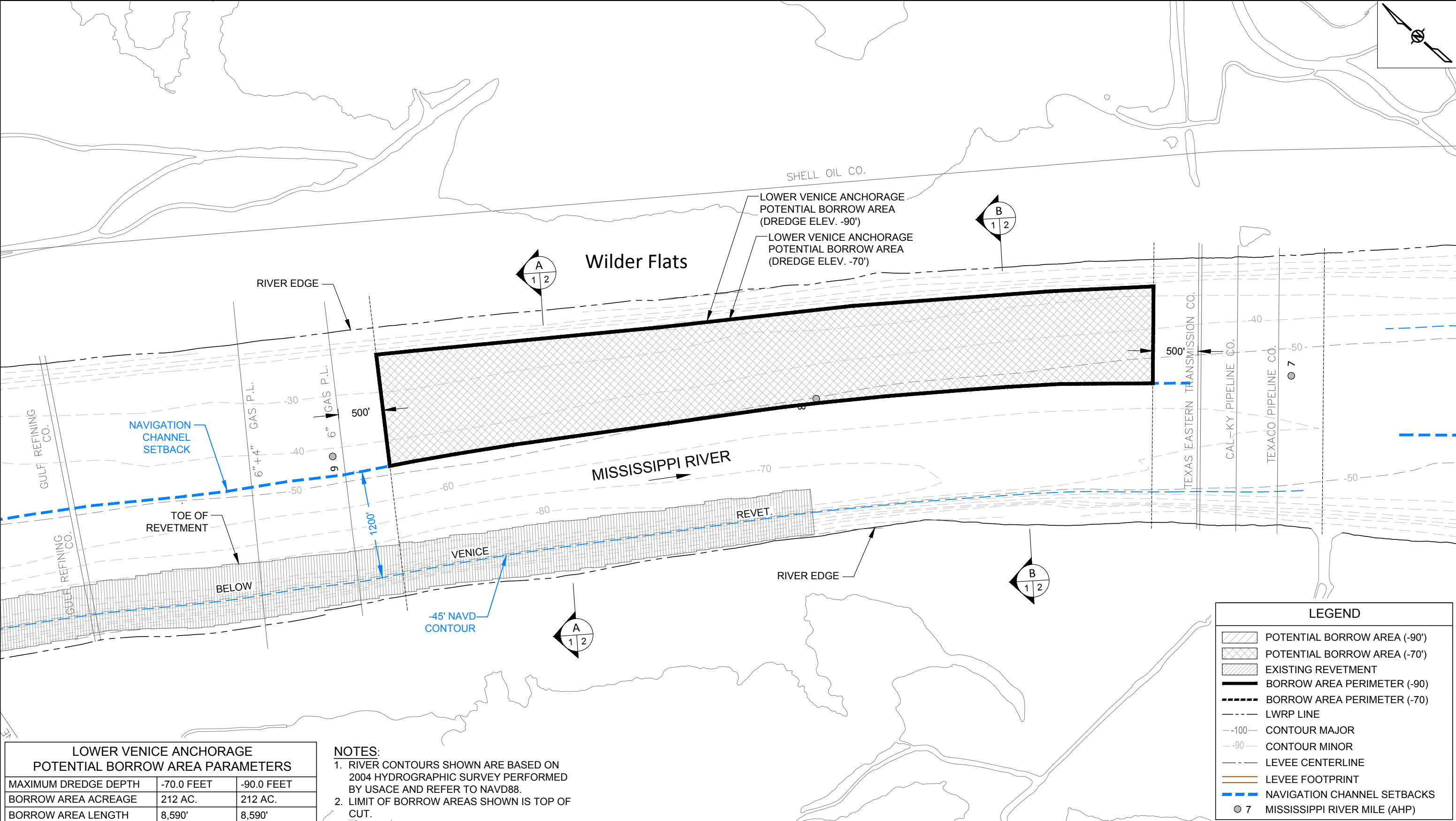
STATE PROJECT NUMBER:

APPROVED BY:

UPPER VENICE  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 28 OF 32



| LOWER VENICE ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |                  |                  |
|--|------------------|------------------|
| MAXIMUM DREDGE DEPTH                                       | -70.0 FEET       | -90.0 FEET       |
| BORROW AREA ACREAGE  | 212 AC.          | 212 AC.          |
| BORROW AREA LENGTH   | 8,590'           | 8,590'           |
| BORROW AREA WIDTH  | 1,020' TO 1,240' | 1,020' TO 1,240' |
| BORROW AREA THICKNESS                                      | 14' TO 48'       | 34' TO 68'       |
| BORROW AREA VOLUME   | 9.0 MCY          | 14.9 MCY         |



- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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DRAWN BY: YC

DESIGNED BY: SA

INVESTIGATION OF POTENTIAL  
MISSISSIPPI RIVER BORROW AREAS

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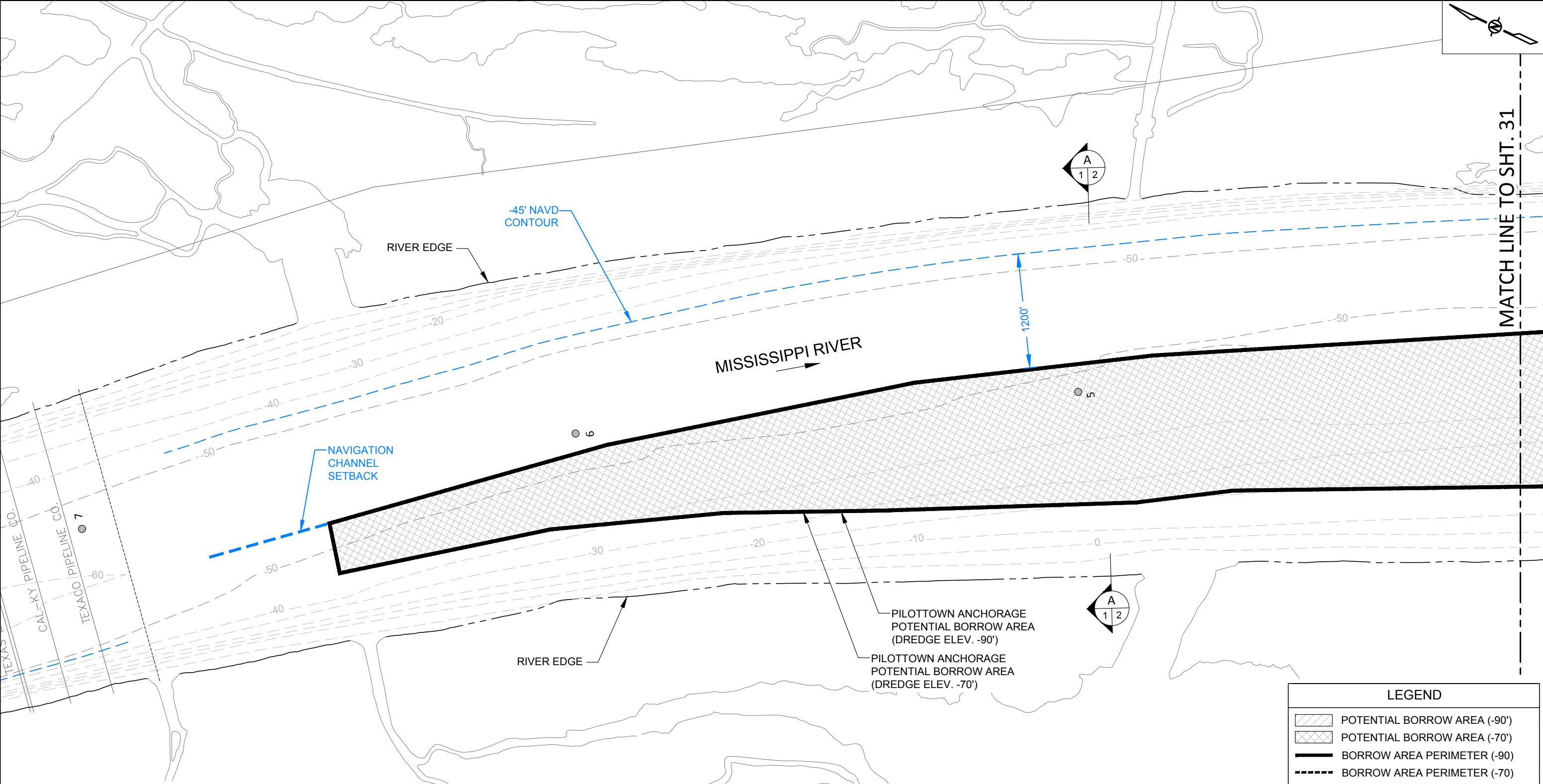
LOWER VENICE  
ANCHORAGE POTENTIAL  
BORROW AREA

DATE: JULY 24, 2012

SHEET 29 OF 32

| LEGEND |                              |
|--------|------------------------------|
|        | POTENTIAL BORROW AREA (-90') |
|        | POTENTIAL BORROW AREA (-70') |
|        | EXISTING REVETMENT           |
|        | BORROW AREA PERIMETER (-90') |
|        | BORROW AREA PERIMETER (-70') |
|        | LWRP LINE                    |
|        | -100' CONTOUR MAJOR          |
|        | -90' CONTOUR MINOR           |
|        | LEVEE CENTERLINE             |
|        | LEVEE FOOTPRINT              |
|        | NAVIGATION CHANNEL SETBACKS  |
|        | MISSISSIPPI RIVER MILE (AHP) |





| PILOTTOWN ANCHORAGE<br>POTENTIAL BORROW AREA PARAMETERS |                |                |
|---|----------------|----------------|
| MAXIMUM DREDGE DEPTH                                    | -70.0 FEET     | -90.0 FEET     |
| BORROW AREA ACREAGE                                     | 1,032 AC.      | 1,032 AC.      |
| BORROW AREA LENGTH                                      | 33,320'        | 33,320'        |
| BORROW AREA WIDTH                                       | 500' TO 1,770' | 500' TO 1,770' |
| BORROW AREA THICKNESS                                   | 20' TO 54'     | 38' TO 70'     |
| BORROW AREA VOLUME                                      | 53.1 MCY       | 83.1 MCY       |

- NOTES:
1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.

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## COASTAL PROTECTION AND RESTORATION AUTHORITY

450 LAUREL STREET  
BATON ROUGE, LOUISIANA 70801

DRAWN BY: YC

DESIGNED BY: SA

### INVESTIGATION OF POTENTIAL MISSISSIPPI RIVER BORROW AREAS

STATE PROJECT NUMBER:

APPROVED BY:

### LEGEND

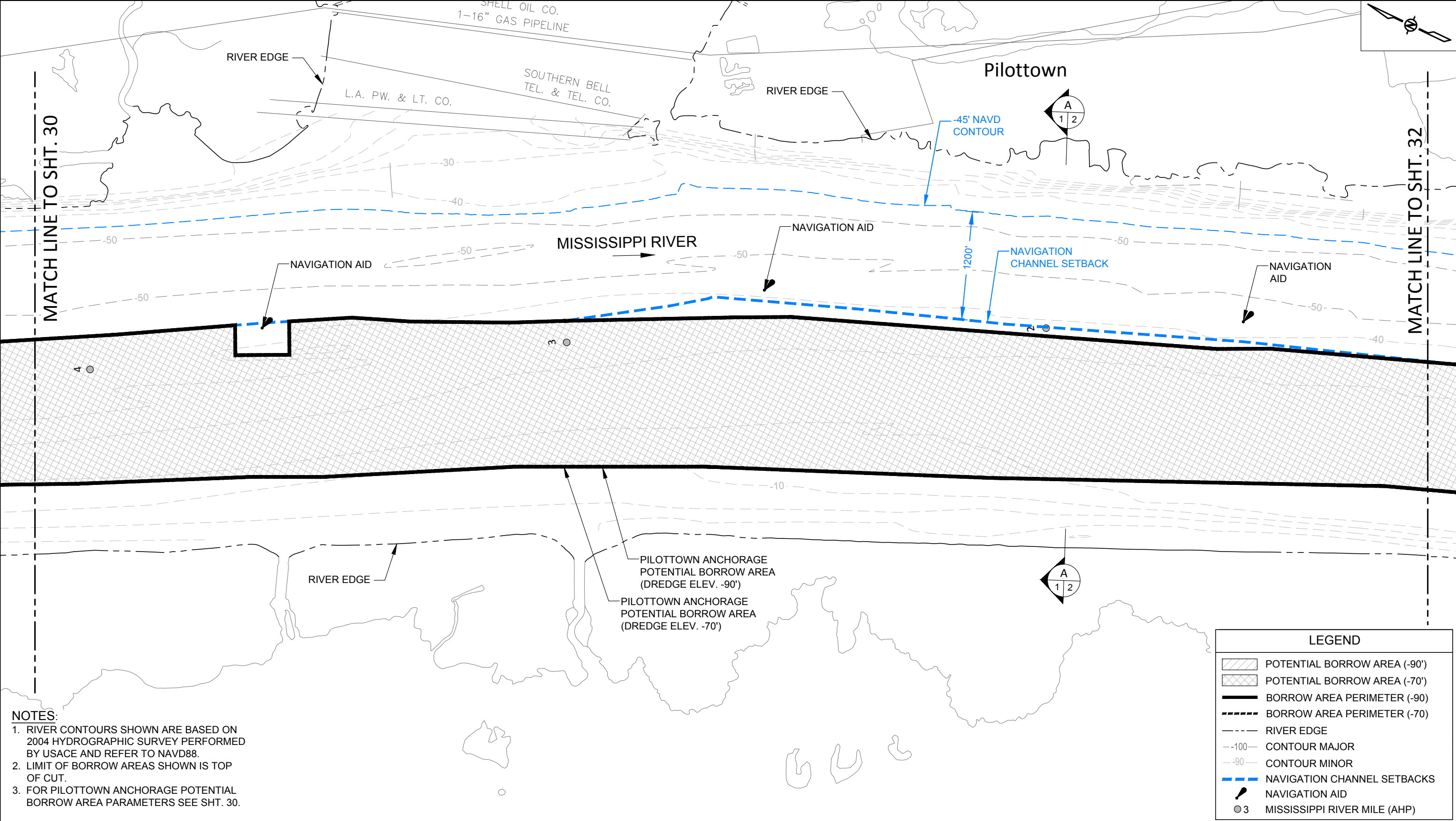
- POTENTIAL BORROW AREA (-90')
- POTENTIAL BORROW AREA (-70')
- BORROW AREA PERIMETER (-90')
- BORROW AREA PERIMETER (-70')
- RIVER EDGE
- CONTOUR MAJOR
- CONTOUR MINOR
- NAVIGATION CHANNEL SETBACKS
- MISSISSIPPI RIVER MILE (AHP)

### PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA (1 OF 3)

DATE: JULY 24, 2012

SHEET 30 OF 32





- NOTES:**
- 1. RIVER CONTOURS SHOWN ARE BASED ON 2004 HYDROGRAPHIC SURVEY PERFORMED BY USACE AND REFER TO NAVD88.
  - 2. LIMIT OF BORROW AREAS SHOWN IS TOP OF CUT.
  - 3. FOR PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA PARAMETERS SEE SHT. 30.

**LEGEND**

POTENTIAL BORROW AREA (-90')

POTENTIAL BORROW AREA (-70')

BORROW AREA PERIMETER (-90')

BORROW AREA PERIMETER (-70')

RIVER EDGE

CONTOUR MAJOR

CONTOUR MINOR

NAVIGATION CHANNEL SETBACKS

NAVIGATION AID

MISSISSIPPI RIVER MILE (AHP)



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|--|-----------------|---|--|
| <b>COASTAL PROTECTION AND RESTORATION AUTHORITY</b><br>450 LAUREL STREET<br>BATON ROUGE, LOUISIANA 70801 |                 | INVESTIGATION OF POTENTIAL MISSISSIPPI RIVER BORROW AREAS | PILOTTOWN ANCHORAGE POTENTIAL BORROW AREA (2 OF 3) |
|  |                 | STATE PROJECT NUMBER:                                     |  |
| DRAWN BY: YC   | DESIGNED BY: SA | APPROVED BY:  | DATE: JULY 24, 2012                                |
|  |                 |   | SHEET 31 OF 32                                     |



**APPENDIX B**

**LIMITS OF PERMISSIBLE EXCAVATION IN  
RIVER (USACE, 1974)**





LANDSIDE

RIVERSIDE

C/L LEVEE

750' MINIMUM

RIVERSIDE TOE OF LEVEE

C/L LEVEE

750'

LESS THAN 750'

RIVERSIDE TOE OF LEVEE

PROJECTED LANDSIDE  
GROUND SURFACE EL.

RIVER

1V ON 5H

PERMISSIBLE EXCAVATION

RIVER

1V ON 5H

PERMISSIBLE EXCAVATION

NOT TO SCALE

NOTES:

1. NORMALLY, DREDGING WILL NOT BE PERMITTED CLOSER THAN 4,000 FEET TO THE UPSTREAM SIDE OF BRIDGES CROSSING THE MISSISSIPPI RIVER.
2. EXCAVATION MADE WITHIN THE PERMISSIBLE AREA SHALL HAVE AVERAGE SLOPES NOT STEEPER THAN 1 ON 5. BOX CUTS ARE PERMITTED TO A MAXIMUM DEPTH OF 6 FEET.
3. EXCAVATION SHALL PROCEED FROM THE LANDSIDE TO THE RIVERSIDE LIMITS OF EXCAVATION TO MINIMIZE THE POSSIBILITY OF AN "OVERBURDEN FAILURE" OF THE BANK.

LIMITS OF PERMISSIBLE  
EXCAVATION IN RIVER



U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS  
CORPS OF ENGINEERS  
NEW ORLEANS, LOUISIANA

DRAWN BY: PAUL HANCOCK  
PLOT SCALE: 1" = 100' PLOT DATE: 10/1/50  
DATE: MAY 1950 FILE NO.: H-8-45755

# **APPENDIX C**

## **OVERVIEW MAPS OF POTENTIAL BORROW AREAS**



