

LUHR BROS., INC.

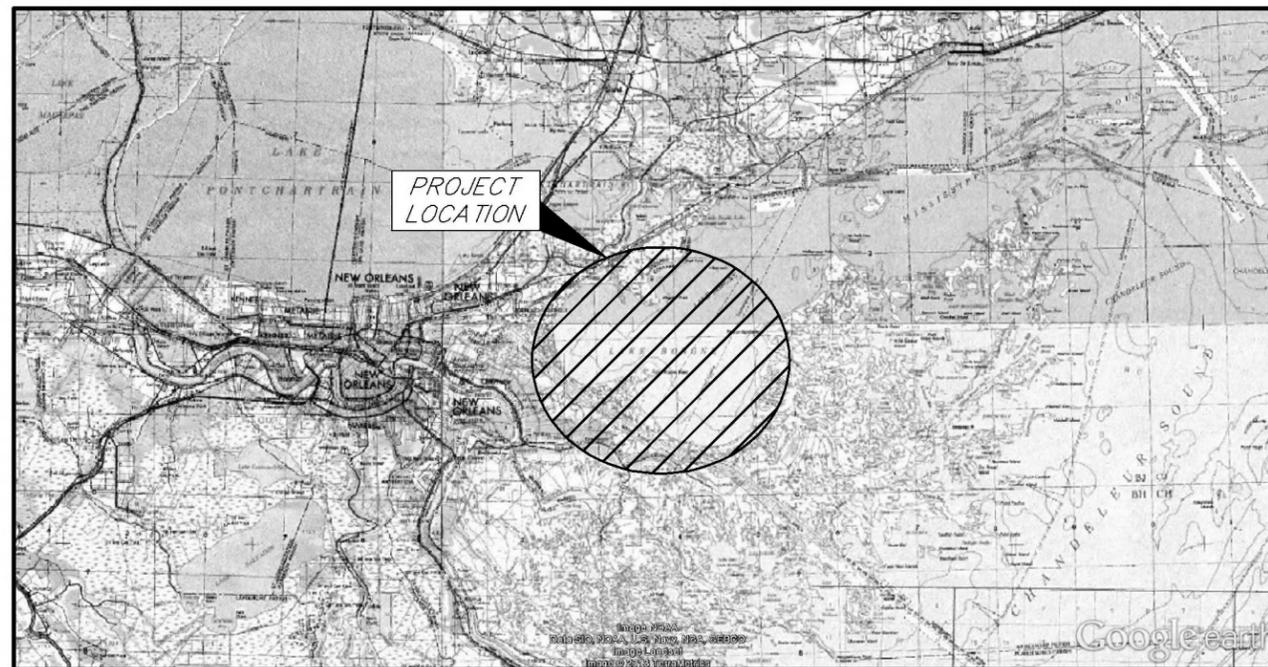
**LAKE BORGNE SHORELINE PROTECTION
MAINTENANCE PROJECT
PO-30**

REACH 3 AS-BUILT SURVEY

ST. BERNARD PARISH, LOUISIANA

INDEX TO SHEETS

| SHEET NO. | DESCRIPTION |
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VICINITY MAP (N.T.S.)



THIS MAP REPRESENTS AN ACTUAL FIELD SURVEY MADE UNDER DIRECT SUPERVISION OF THE UNDERSIGNED.

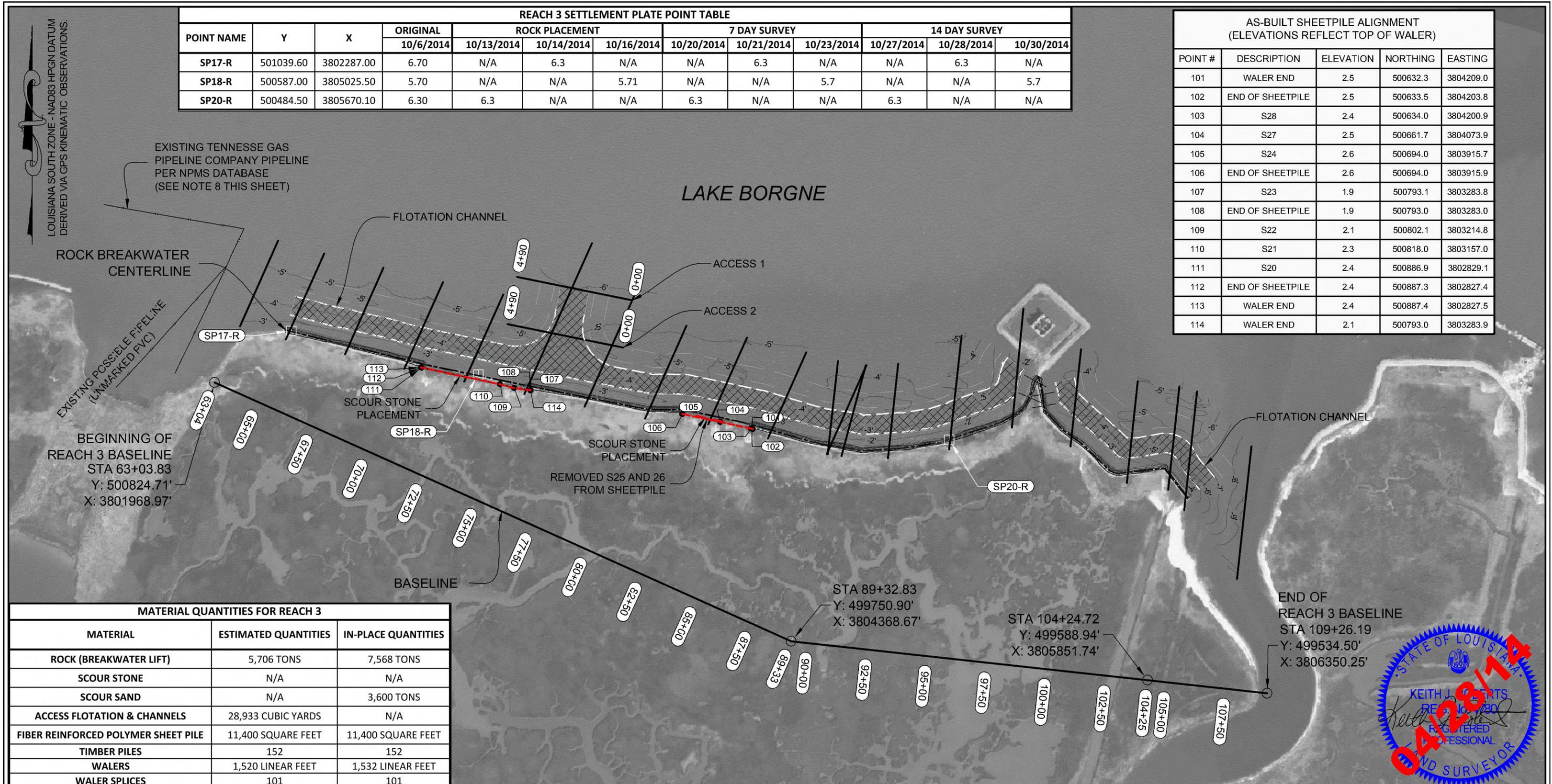
Keith J. Roberts

KEITH J. ROBERTS, PLS # 4780
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SCOTT, LOUISIANA 70583
(337) 706-8219

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| REVISED BY: | DATE: | | <p>LAKE BORGNE SHORELINE PROTECTION MAINTENANCE PROJECT PO-30</p> <p>REACH 3 AS-BUILT SURVEY</p> <p>TITLE PAGE ST. BERNARD PARISH, LA</p> |
| <p>PLAN SCALE SCALE: NTS</p> | | | |
| DATE: 04/01/2014 | JOB# 2131039 | PREPARED BY: HYDROTERRA TECHNOLOGIES, LLC. - 202 JACOBS RUN, SCOTT, LA 70583 | SHEET: 1 OF 6 |

| REACH 3 SETTLEMENT PLATE POINT TABLE | | | | | | | | | | | | |
|--------------------------------------|-----------|------------|-----------|----------------|------------|------------|--------------|------------|------------|---------------|------------|------------|
| POINT NAME | Y | X | ORIGINAL | ROCK PLACEMENT | | | 7 DAY SURVEY | | | 14 DAY SURVEY | | |
| | | | 10/6/2014 | 10/13/2014 | 10/14/2014 | 10/16/2014 | 10/20/2014 | 10/21/2014 | 10/23/2014 | 10/27/2014 | 10/28/2014 | 10/30/2014 |
| SP17-R | 501039.60 | 3802287.00 | 6.70 | N/A | 6.3 | N/A | N/A | 6.3 | N/A | N/A | 6.3 | N/A |
| SP18-R | 500587.00 | 3805025.50 | 5.70 | N/A | N/A | 5.71 | N/A | N/A | 5.7 | N/A | N/A | 5.7 |
| SP20-R | 500484.50 | 3805670.10 | 6.30 | 6.3 | N/A | N/A | N/A | 6.3 | N/A | N/A | N/A | N/A |

| AS-BUILT SHEETPILE ALIGNMENT (ELEVATIONS REFLECT TOP OF WALER) | | | | |
|---|------------------|-----------|----------|-----------|
| POINT # | DESCRIPTION | ELEVATION | NORTHING | EASTING |
| 101 | WALER END | 2.5 | 500632.3 | 3804209.0 |
| 102 | END OF SHEETPILE | 2.5 | 500633.5 | 3804203.8 |
| 103 | S28 | 2.4 | 500634.0 | 3804200.9 |
| 104 | S27 | 2.5 | 500661.7 | 3804073.9 |
| 105 | S24 | 2.6 | 500694.0 | 3803915.7 |
| 106 | END OF SHEETPILE | 2.6 | 500694.0 | 3803915.9 |
| 107 | S23 | 1.9 | 500793.1 | 3803283.8 |
| 108 | END OF SHEETPILE | 1.9 | 500793.0 | 3803283.0 |
| 109 | S22 | 2.1 | 500802.1 | 3803214.8 |
| 110 | S21 | 2.3 | 500818.0 | 3803157.0 |
| 111 | S20 | 2.4 | 500886.9 | 3802829.1 |
| 112 | END OF SHEETPILE | 2.4 | 500887.3 | 3802827.4 |
| 113 | WALER END | 2.4 | 500887.4 | 3802827.5 |
| 114 | WALER END | 2.1 | 500793.0 | 3803283.9 |



| MATERIAL QUANTITIES FOR REACH 3 | | |
|-------------------------------------|----------------------|---------------------|
| MATERIAL | ESTIMATED QUANTITIES | IN-PLACE QUANTITIES |
| ROCK (BREAKWATER LIFT) | 5,706 TONS | 7,568 TONS |
| SCOUR STONE | N/A | N/A |
| SCOUR SAND | N/A | 3,600 TONS |
| ACCESS FLOTATION & CHANNELS | 28,933 CUBIC YARDS | N/A |
| FIBER REINFORCED POLYMER SHEET PILE | 11,400 SQUARE FEET | 11,400 SQUARE FEET |
| TIMBER PILES | 152 | 152 |
| WALERS | 1,520 LINEAR FEET | 1,532 LINEAR FEET |
| WALER SPLICES | 101 | 101 |

- NOTES:
- ALL HORIZONTAL COORDINATES ARE BASED ON LOUISIANA SOUTH ZONE - NAD83 HPGN DATUM, US SURVEY FOOT AS DERIVED FROM PROJECT CONTROL VIA GPS KINEMATIC OBSERVATIONS.
 - ELEVATIONS ARE BASED ON NAVD 88 US SURVEY FEET (GEOID 99) AS DERIVED FROM "SHELL BEACH RESET."
 - TOPOGRAPHIC SURVEY DATA ACQUISITION PERFORMED WITH RTK SURVEY METHODS.
 - HYDROGRAPHIC SURVEY DATA ACQUISITION PERFORMED USING A 200kHz ODOM ECHOTRAC MKIII INTEGRATED WITH RTK TIDES.
 - THIS DRAWING INDICATES CONDITIONS AT THE TIME OF SURVEY.
 - AS-BUILT SURVEY DATA WAS PERFORMED ON MARCH 8 AND 14, 2014, AND COMBINED WITH AS-BUILT SURVEY DATA FOR ROCK BREAKWATERS PERFORMED BY LUHR BROS., INC. ON NOVEMBER 18, 2013, AND SUBMITTED AS SHOWN IN CROSS-SECTION VIEWS.
 - PVC PIPE PREVIOUSLY MARKED BY UNKNOWN ENTITY WITH ORANGE FLAGGING AND ORANGE PAINT WAS TIED-IN DURING SURVEY ON JULY 10, 2013. WITH FURTHER INVESTIGATION VIA THE NATIONAL PIPELINE MAPPING SYSTEM (NPMS), THE EXISTING PIPELINE SHOWN IN THIS MAP WAS DESCRIBED AS LABELED.
 - FLOTATION CROSS-SECTIONS WERE TAKEN PERPENDICULAR TO THE BASELINE ALIGNMENT AT EACH 25' STATION.

LEGEND

- BASELINE
- ROCK BREAKWATER CENTERLINE
- SECTION LINES
- SHEET PILE ALIGNMENT

REVISED BY: _____ DATE: _____

HORIZONTAL SCALE

DATE: 04/01/2014 JOB# 2131039

HYDROTERRA
TECHNOLOGIES, LLC
LAND SURVEY AND HYDROGRAPHIC SOLUTIONS

LUHR BROS., INC.
CONTRACTORS

PREPARED BY: HYDROTERRA TECHNOLOGIES, LLC. - 202 JACOBS RUN, SCOTT, LA 70583

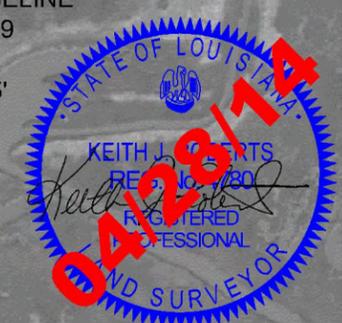
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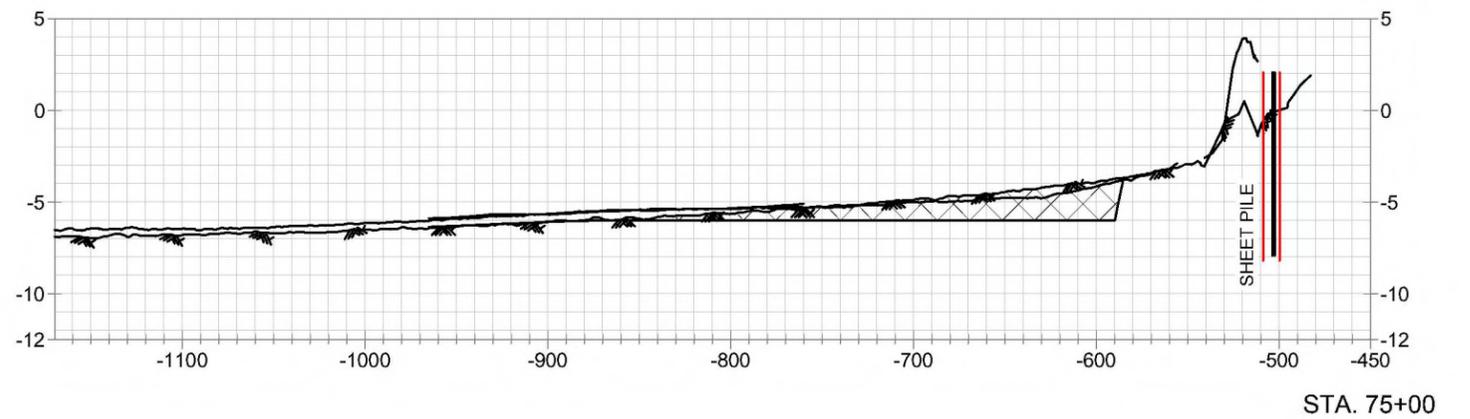
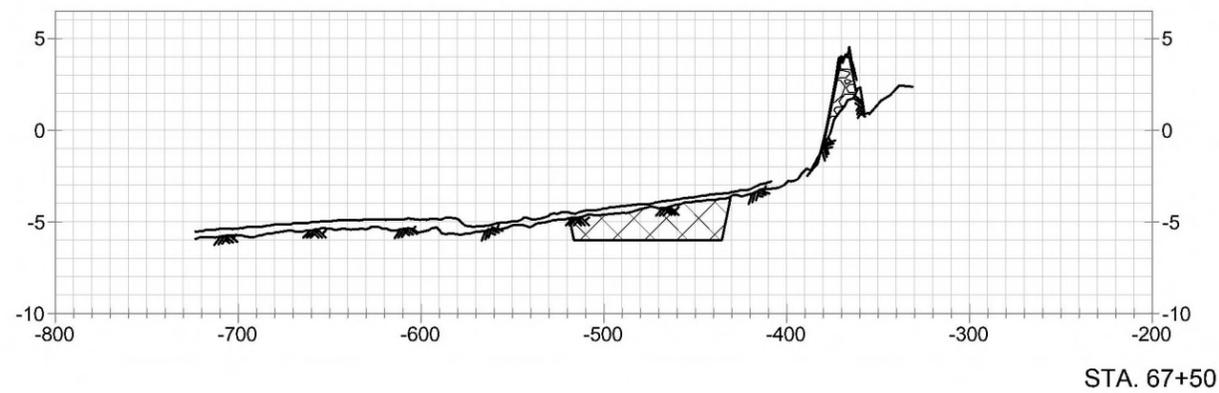
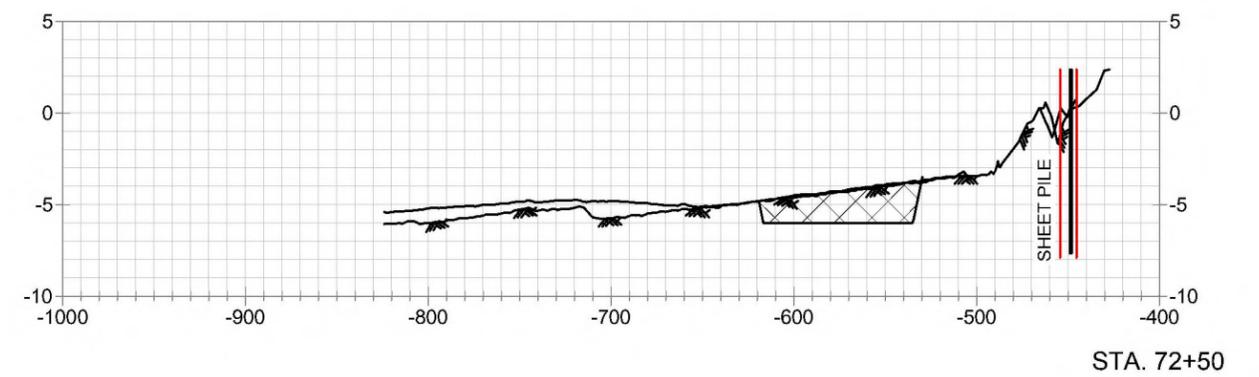
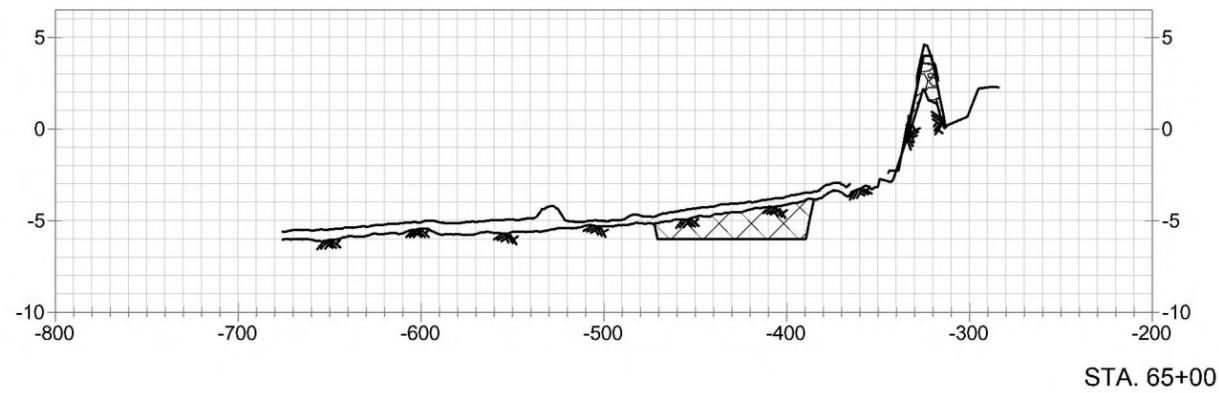
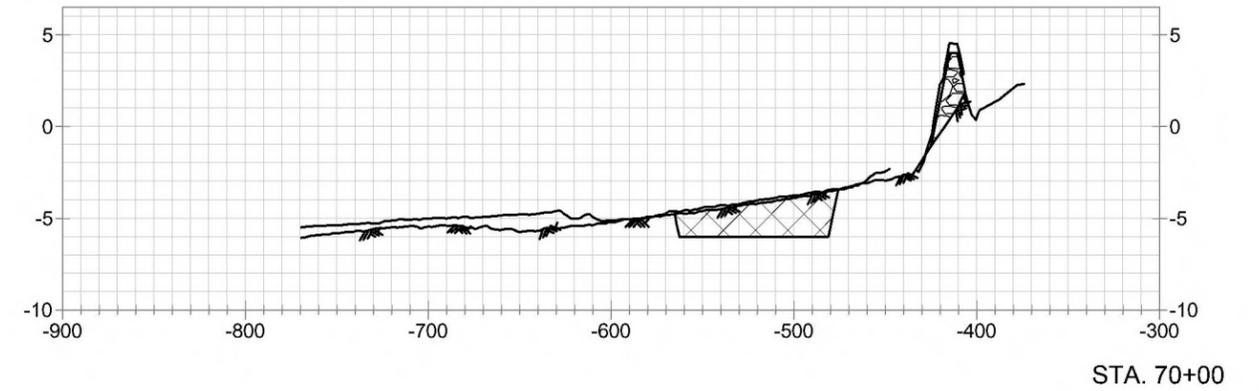
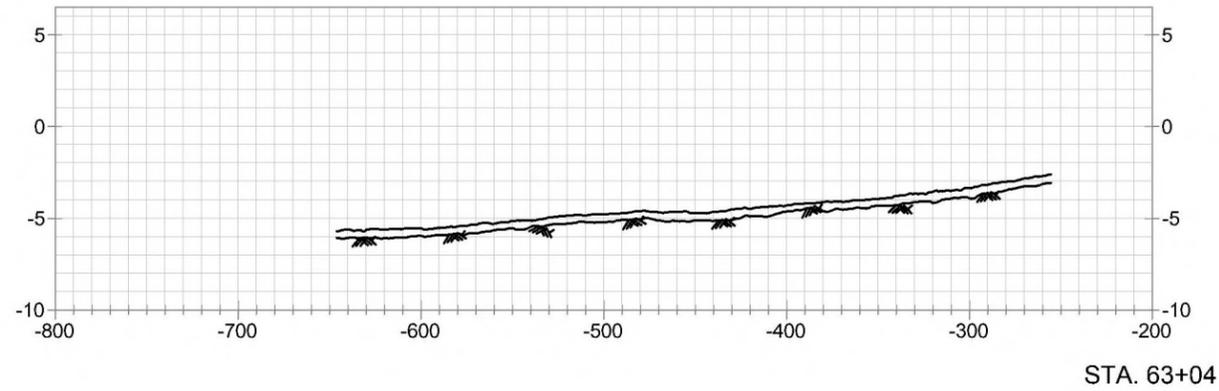
**LAKE BORGNE SHORELINE PROTECTION
MAINTENANCE PROJECT PO-30**

**REACH 3
AS-BUILT SURVEY**

SURVEY PLAN VIEW
ST. BERNARD PARISH, LA

SHEET: 2 OF 6





| LEGEND | |
|--------|-------------------------|
| | PRE-CONSTRUCTION SURVEY |
| | AS-BUILT SURVEY |
| | FLOTATION CHANNEL |
| | MAINTENANCE LIFT (TYP) |
| | SCOUR STONE LIMITS |

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| REVISED BY: | DATE: |
| | |
| HORIZONTAL SCALE | |
| | |
| VERTICAL SCALE | |
| | |
| DATE: 04/01/2014 | JOB# 2131039 |

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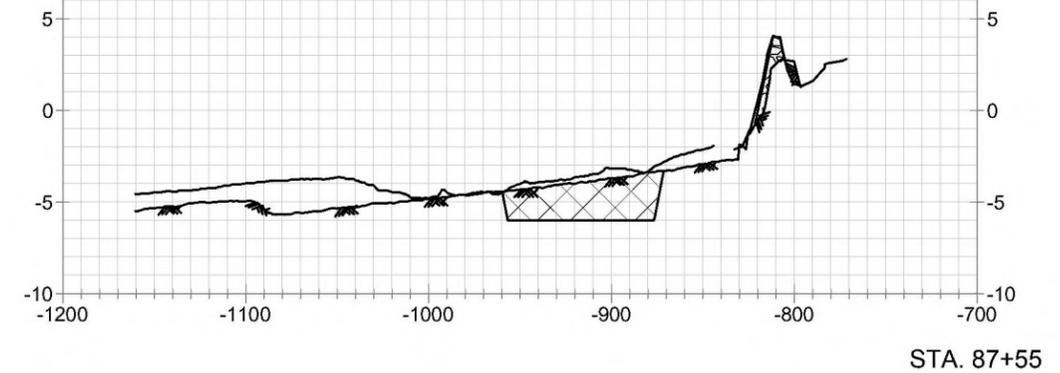
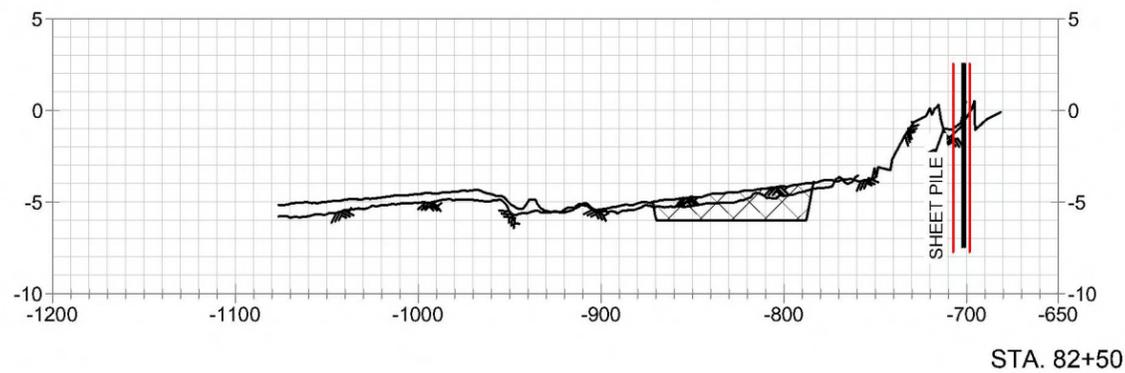
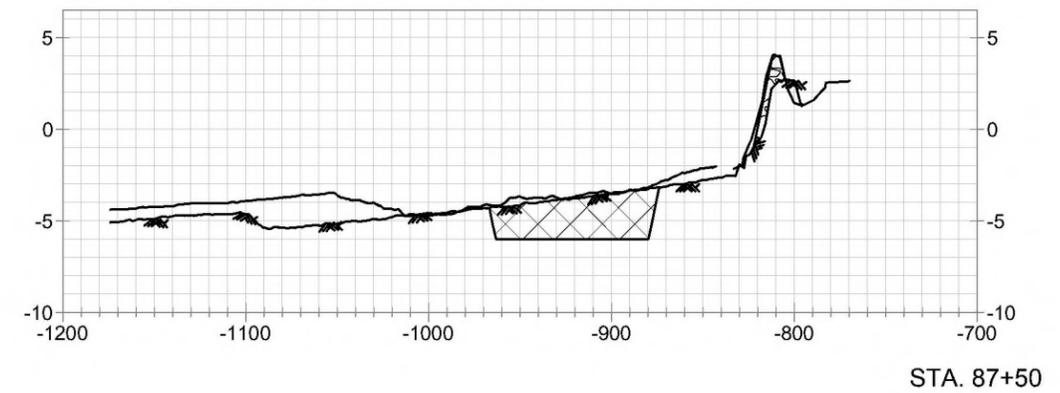
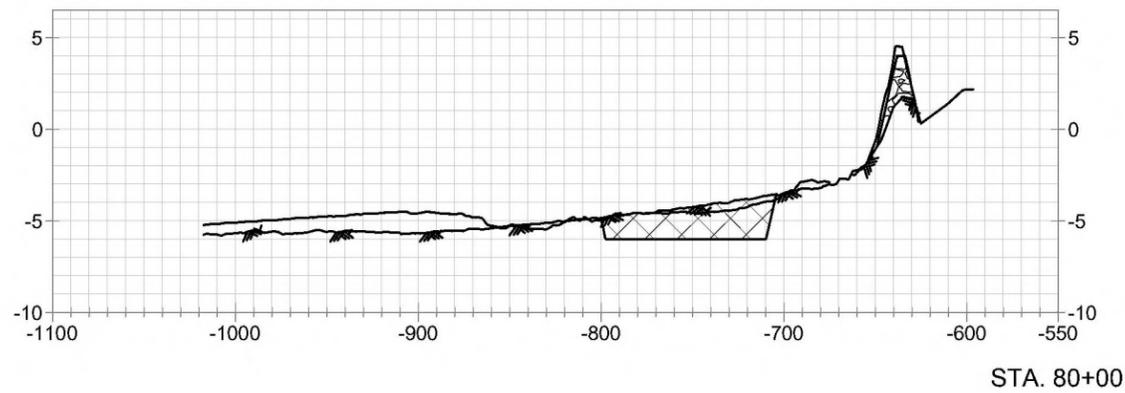
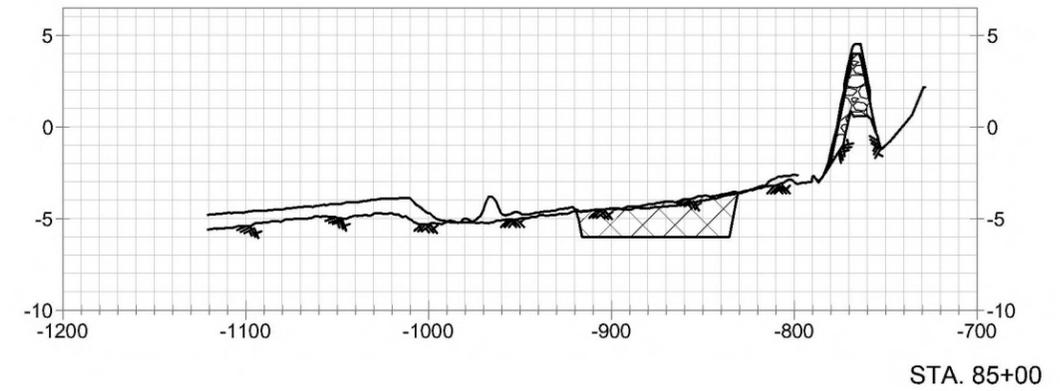
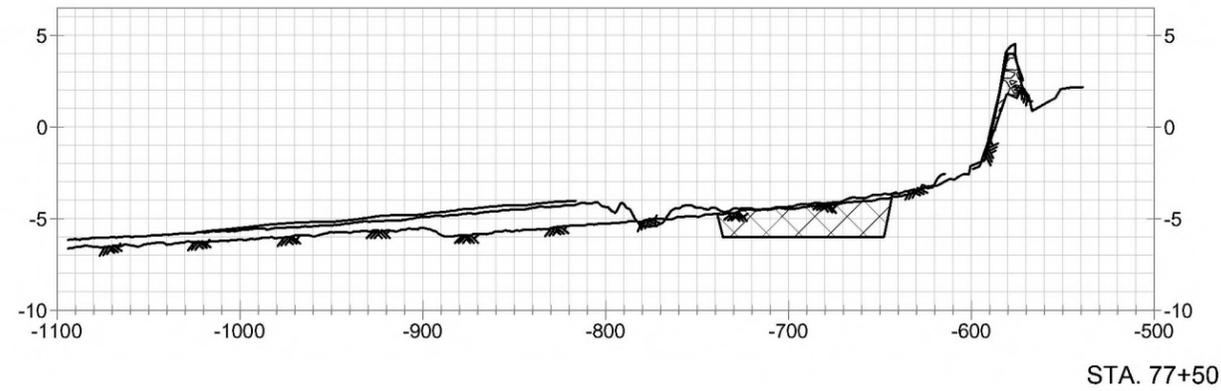
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MAINTENANCE PROJECT PO-30**

**REACH 3
AS-BUILT SURVEY**

SECTION VIEWS
ST. BERNARD PARISH, LA

SHEET: 3 OF 6



| LEGEND | |
|--------|-------------------------|
| | PRE-CONSTRUCTION SURVEY |
| | AS-BUILT SURVEY |
| | FLOTATION CHANNEL |
| | MAINTENANCE LIFT (TYP) |
| | SCOUR STONE LIMITS |

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| | |
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LAND SURVEY AND HYDROGRAPHIC SOLUTIONS



CONTRACTORS

LAKE BORGNE SHORELINE PROTECTION
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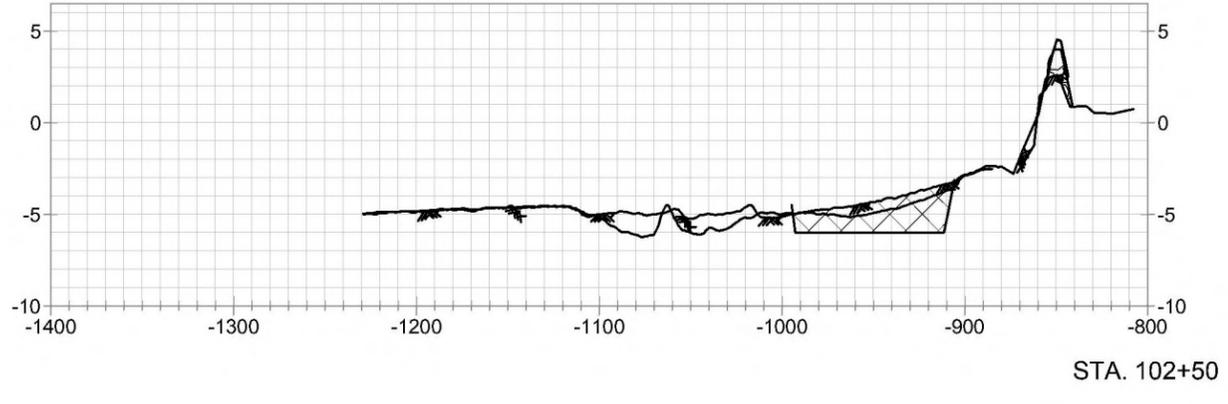
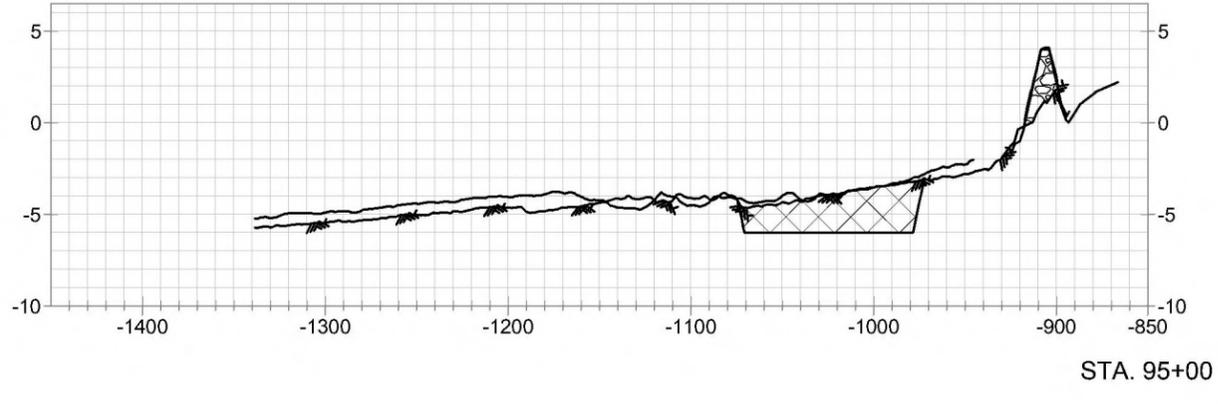
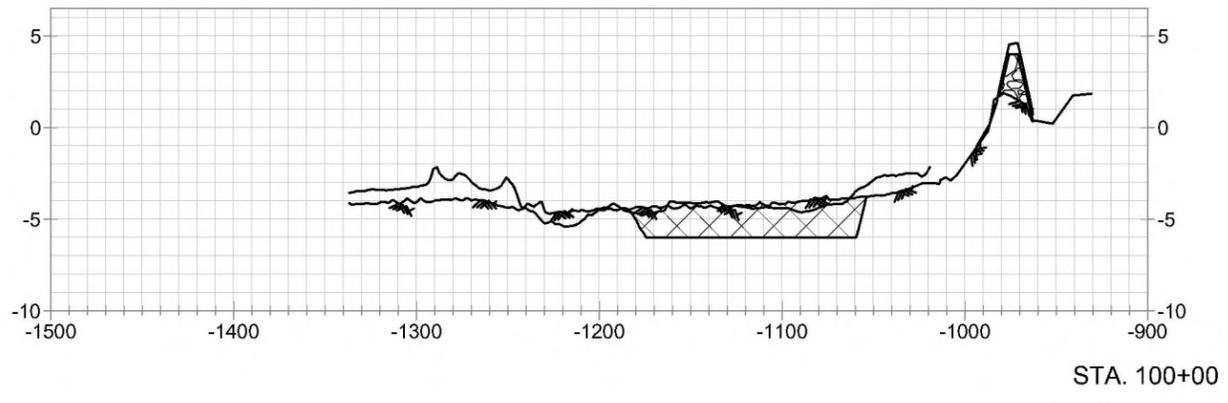
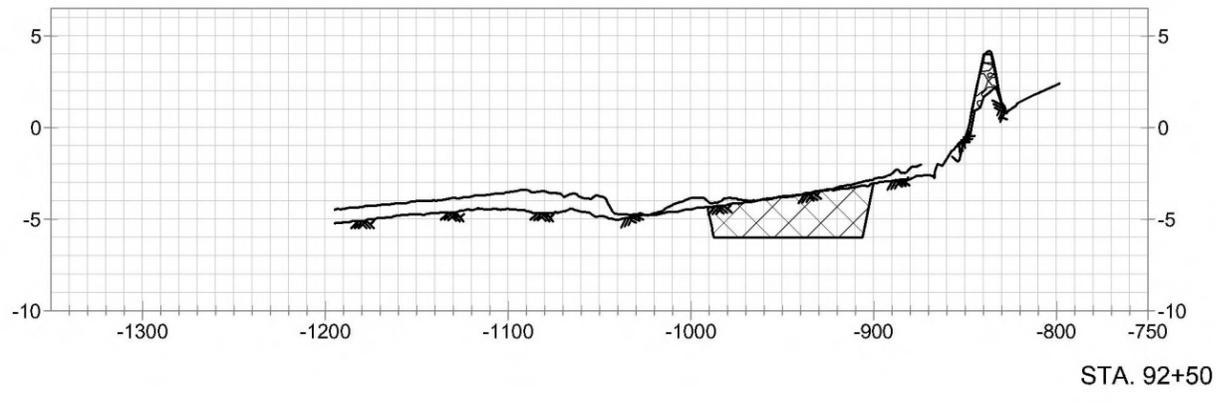
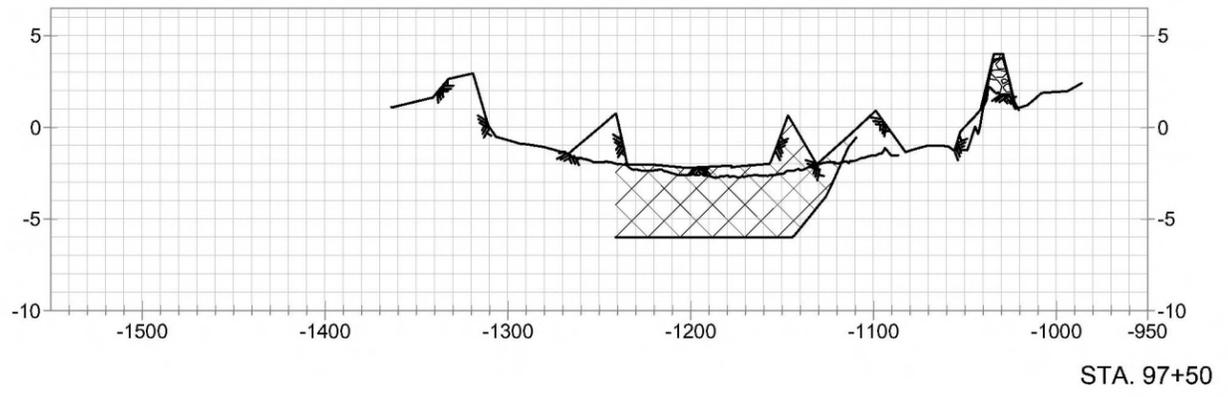
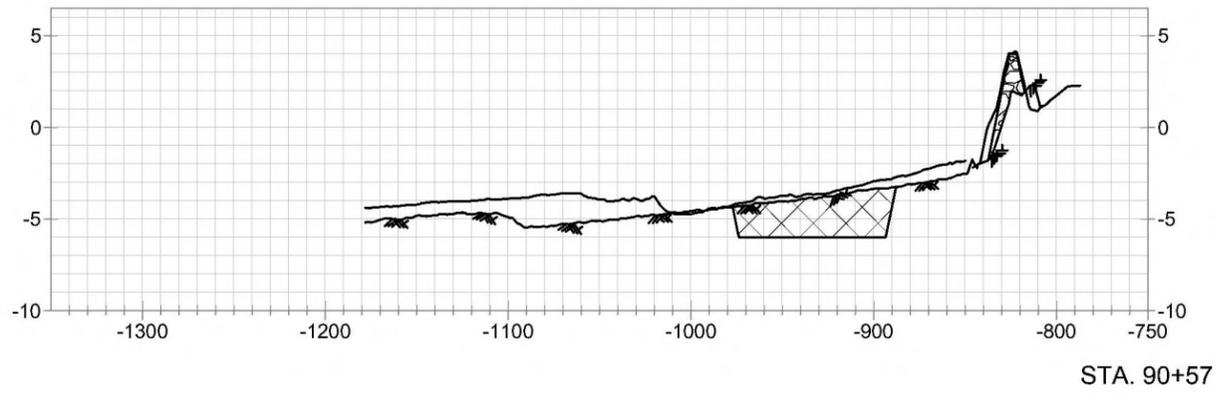
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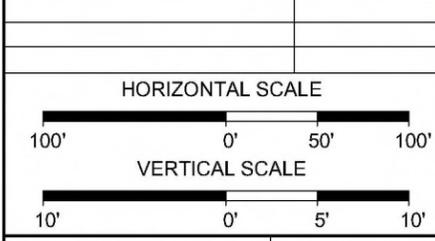
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SHEET: 4 OF 6



| LEGEND | |
|--------|-------------------------|
| | PRE-CONSTRUCTION SURVEY |
| | AS-BUILT SURVEY |
| | FLOTATION CHANNEL |
| | MAINTENANCE LIFT (TYP) |

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REACH 3
AS-BUILT SURVEY

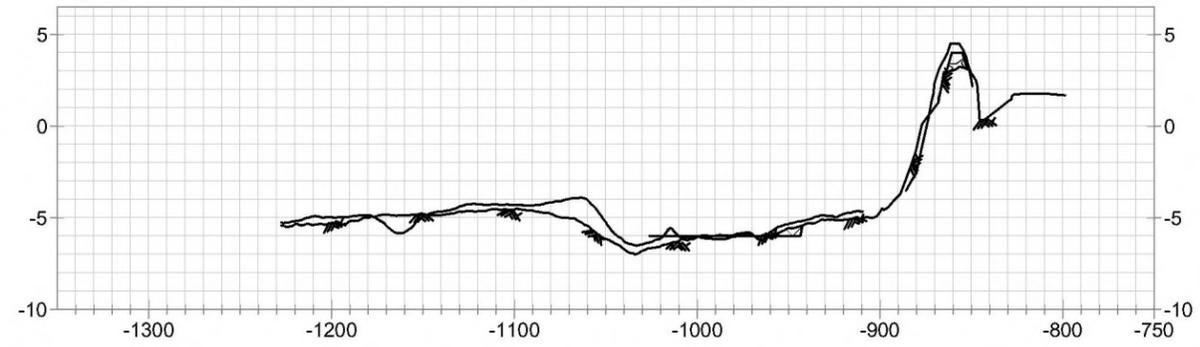
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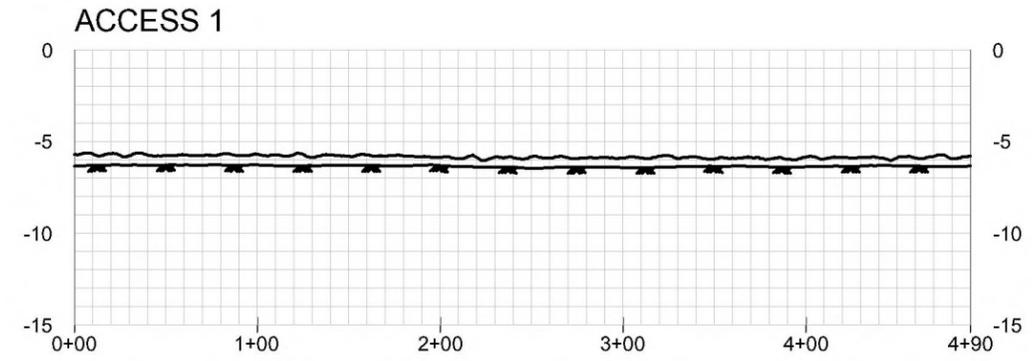
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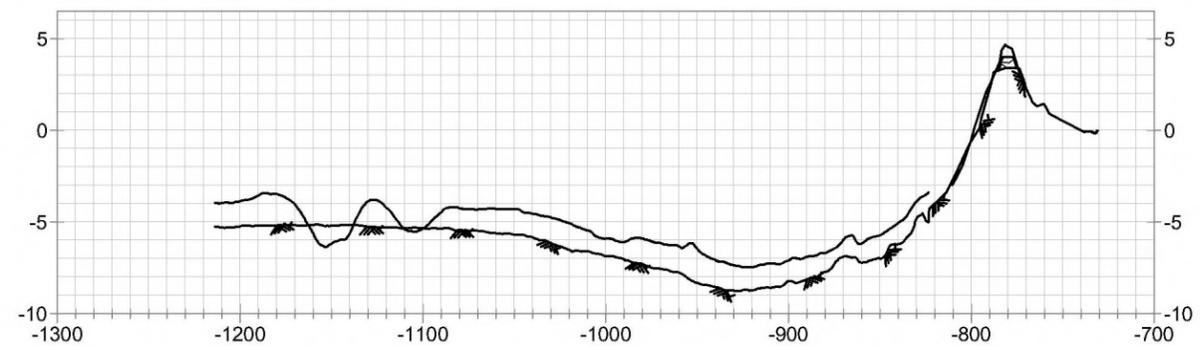
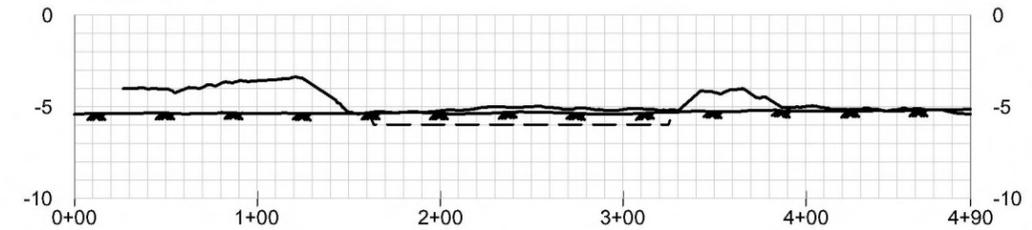
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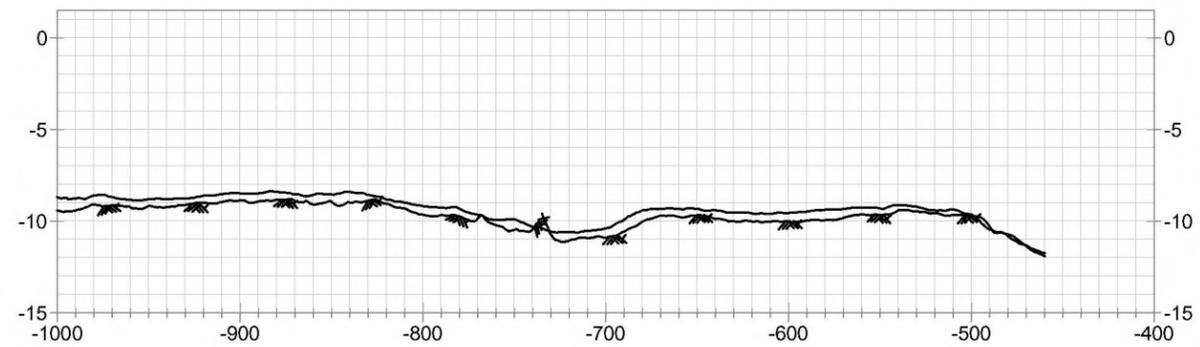
STA. 104+25



ACCESS 2



STA. 105+00



STA. 107+50



| LEGEND | |
|--------|-------------------------|
| | PRE-CONSTRUCTION SURVEY |
| | AS-BUILT SURVEY |
| | FLOTATION CHANNEL |
| | MAINTENANCE LIFT (TYP) |

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| | |
| HORIZONTAL SCALE | |
| | |
| VERTICAL SCALE | |
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 REACH 3
 AS-BUILT SURVEY
 SECTION VIEWS
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SHEET: 6 OF 6