

Cameron Parish Shoreline Restoration Project

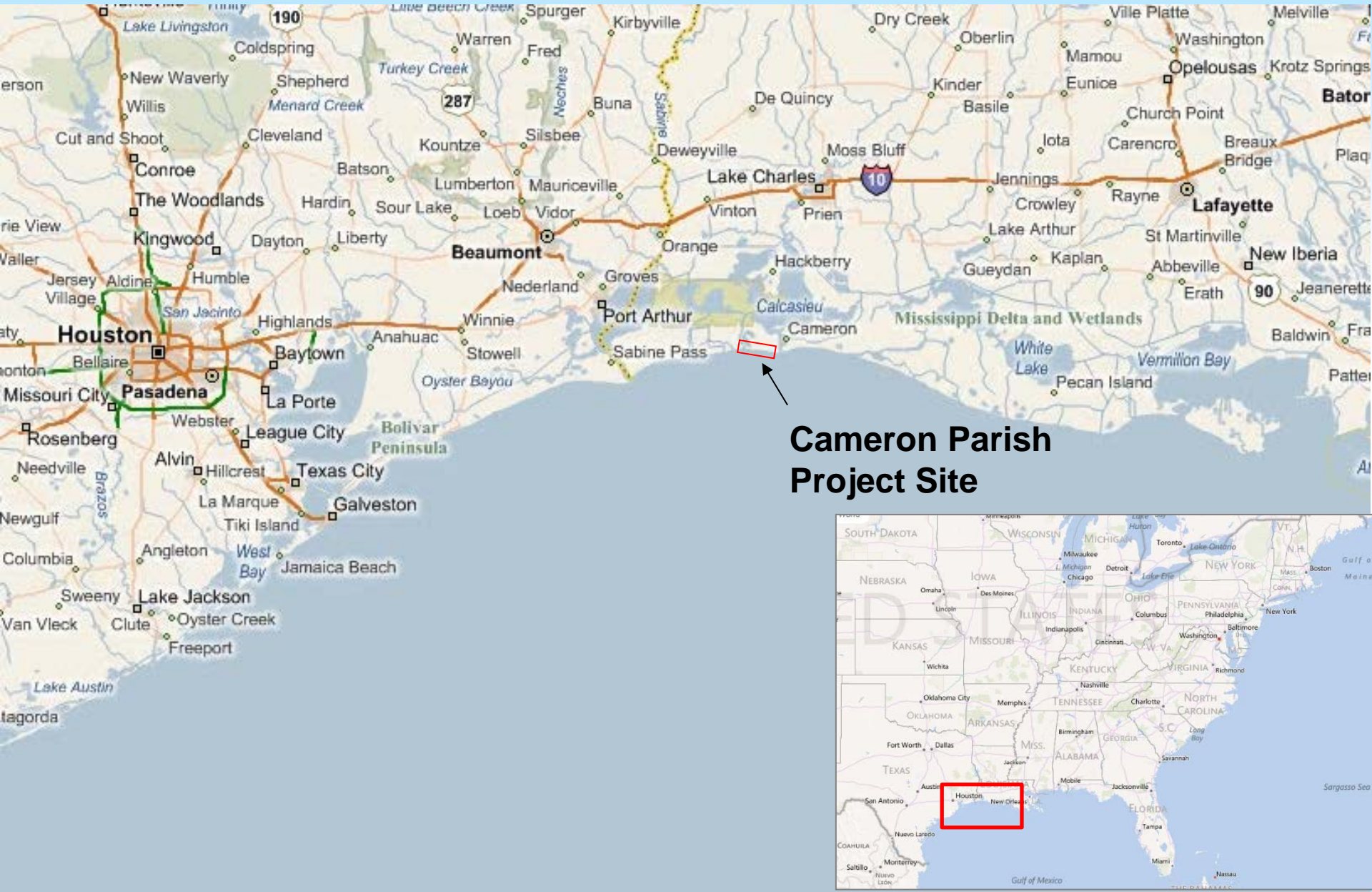


WEDA Gulf Coast Chapter
Josh Carter, P.E.

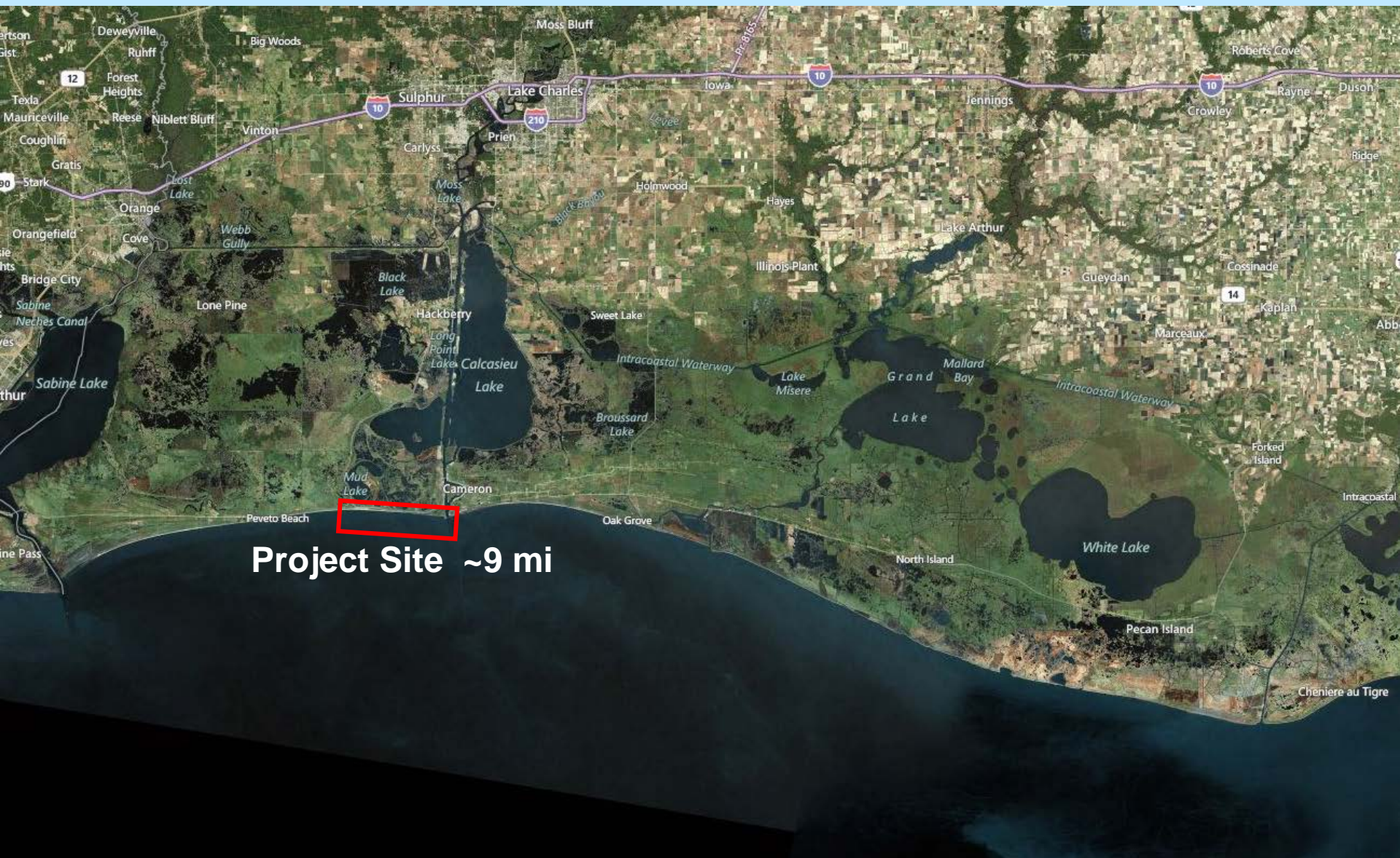
November 20, 2014



Project Vicinity



Project Vicinity



Project Goals

Restore the Cameron Parish Barrier Headland for the next 20 years by placing approximately 2M cy of sand on the beach. Sand Source is Sabine Banks, 20 mi offshore.

Project will help protect 40,000 acres of freshwater wetlands as well as State Highway 82/27 which serves as a Hurricane Evacuation Route.

Project Information

- Completely Funded by State Surplus Funds
- Engineering and Design initiated June 2009
- Start of construction: August 2013
- Construction completion February 2014

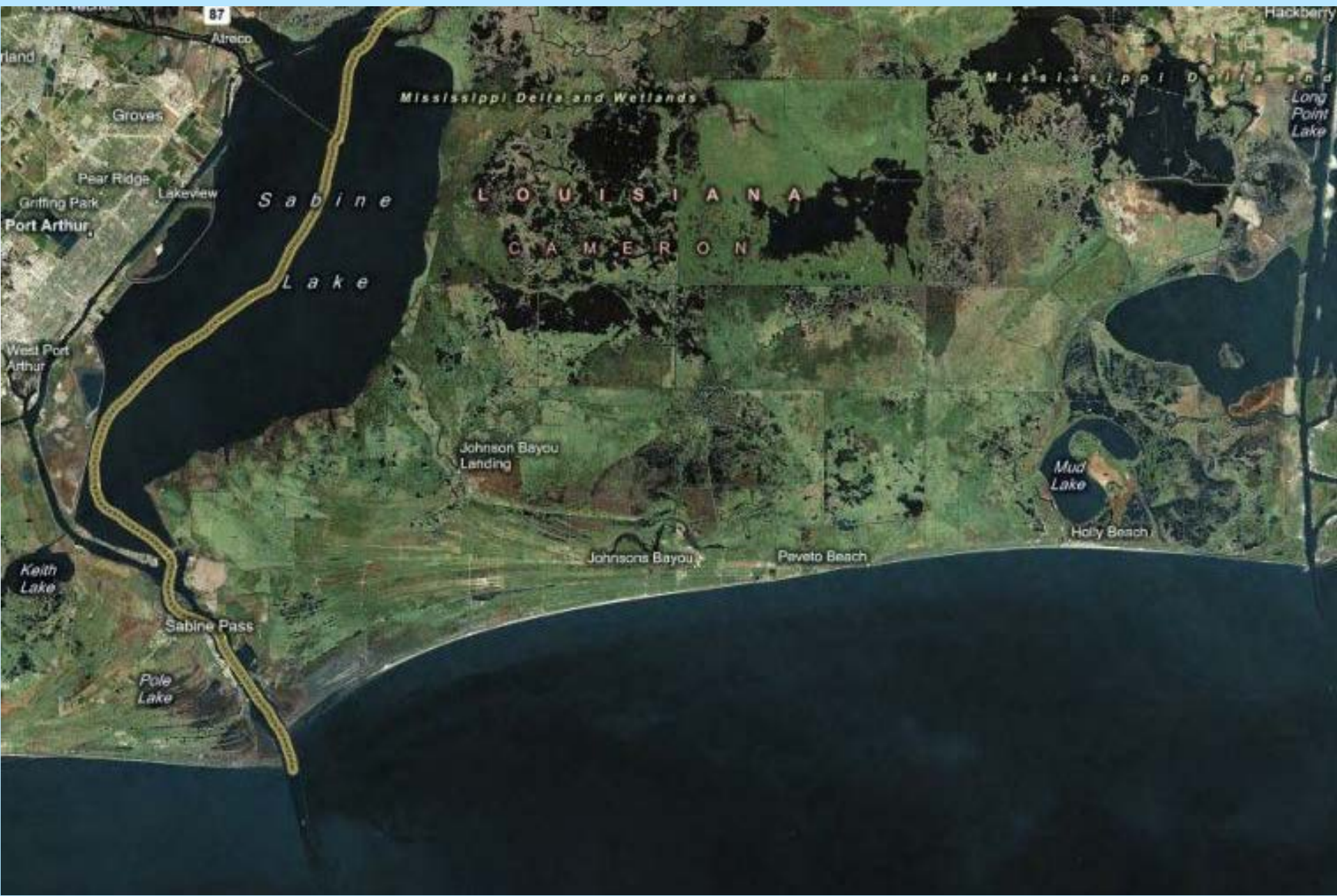
Project Site Overview



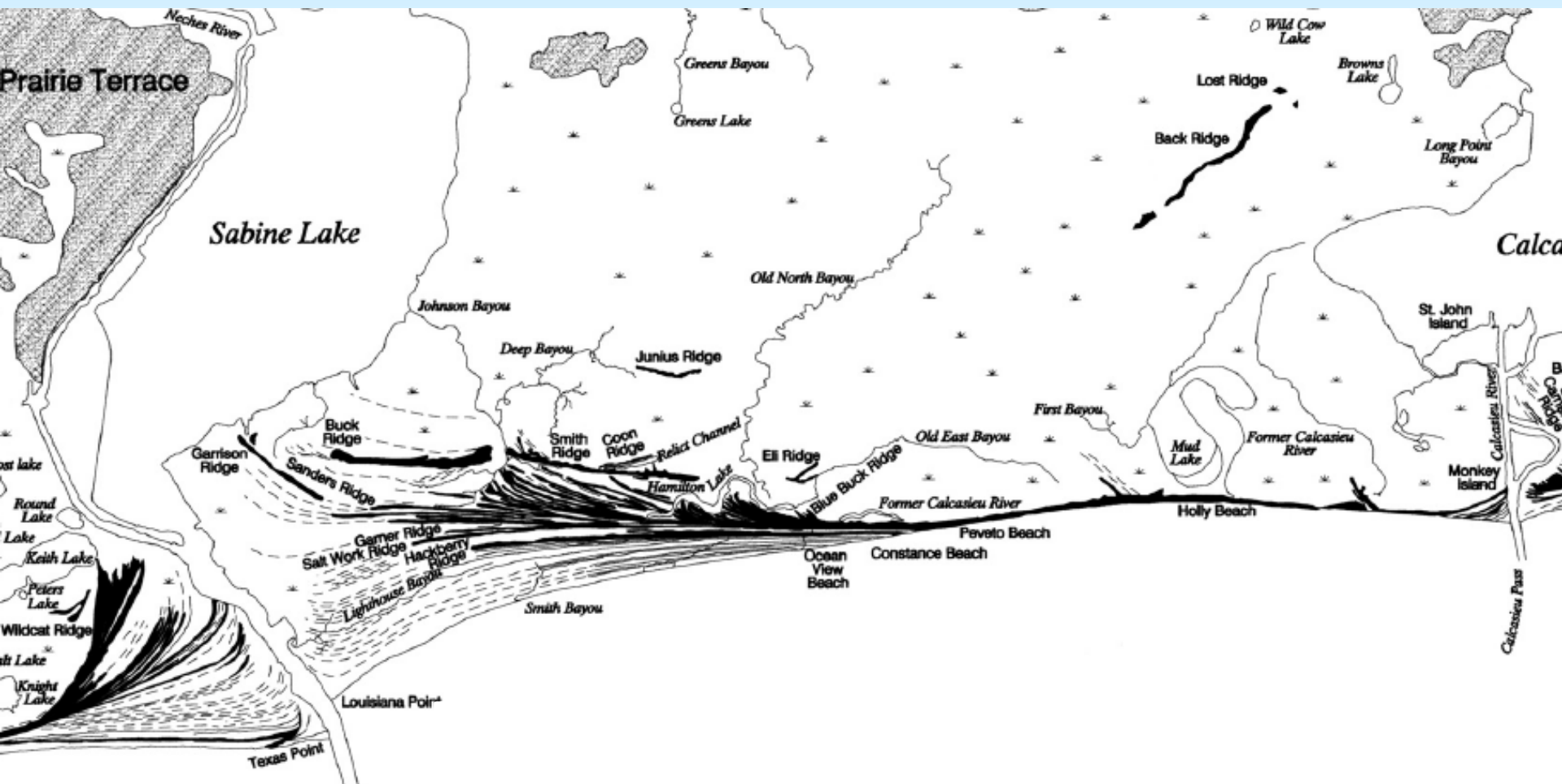




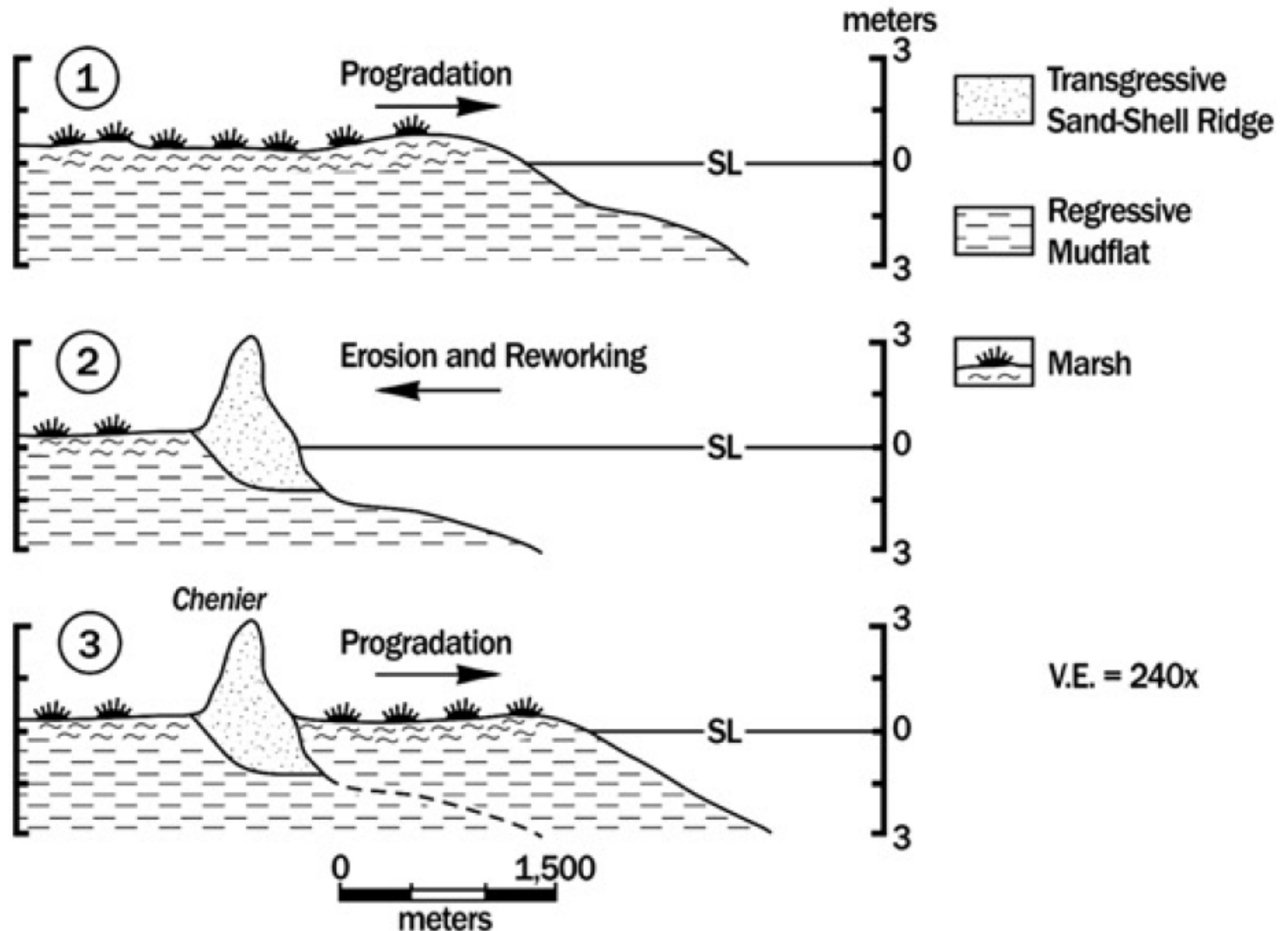
Site Geology



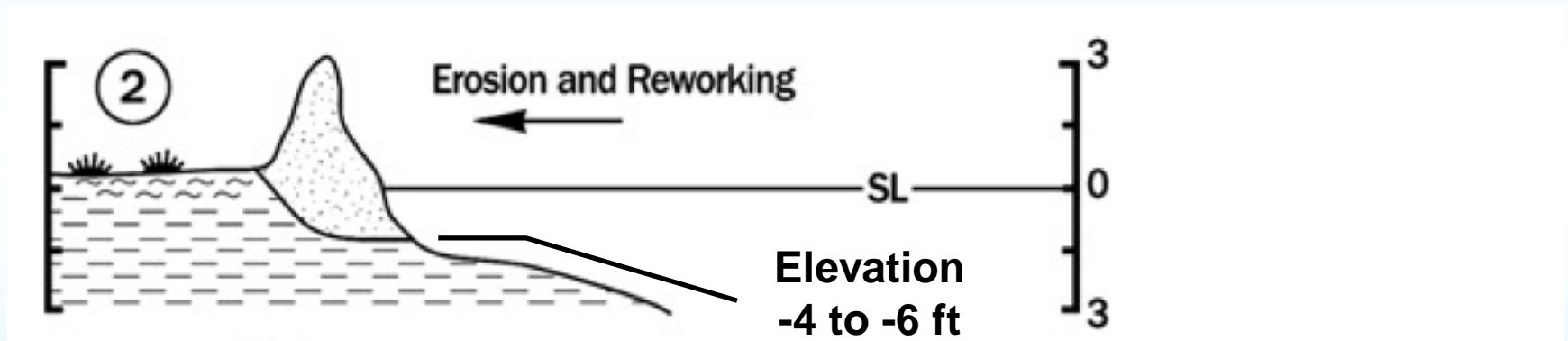
Site Geology



Site Geology

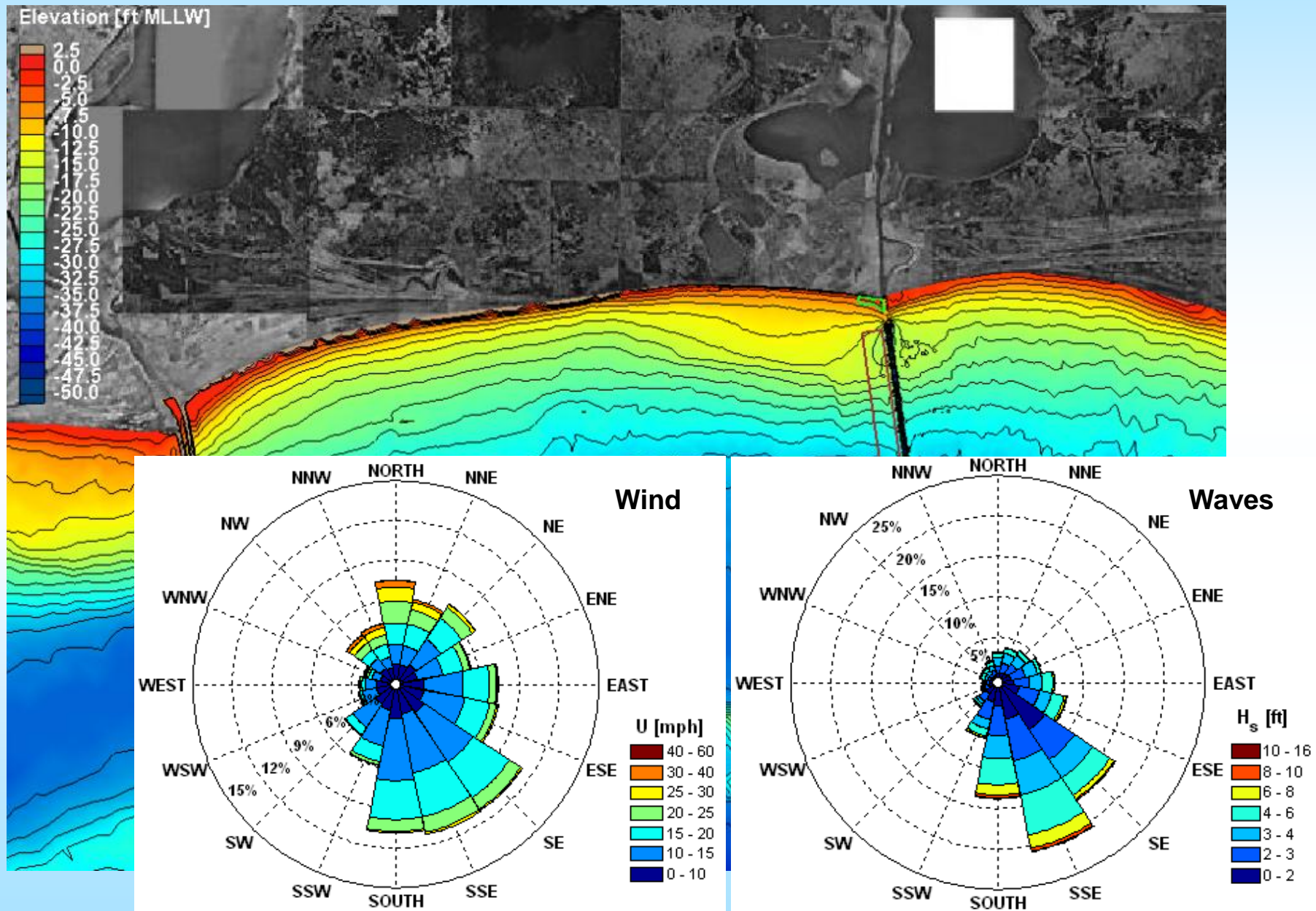


Site Geology





Coastal Processes at Project Site

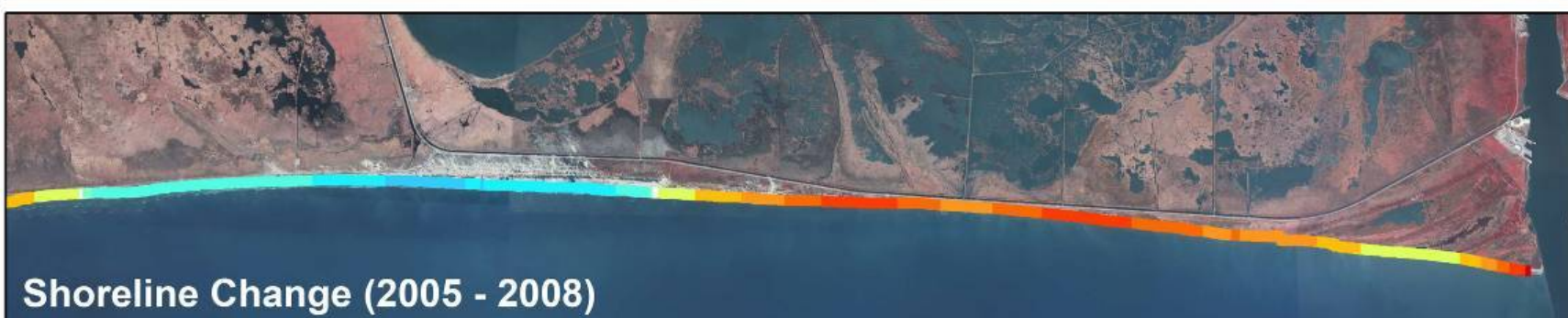
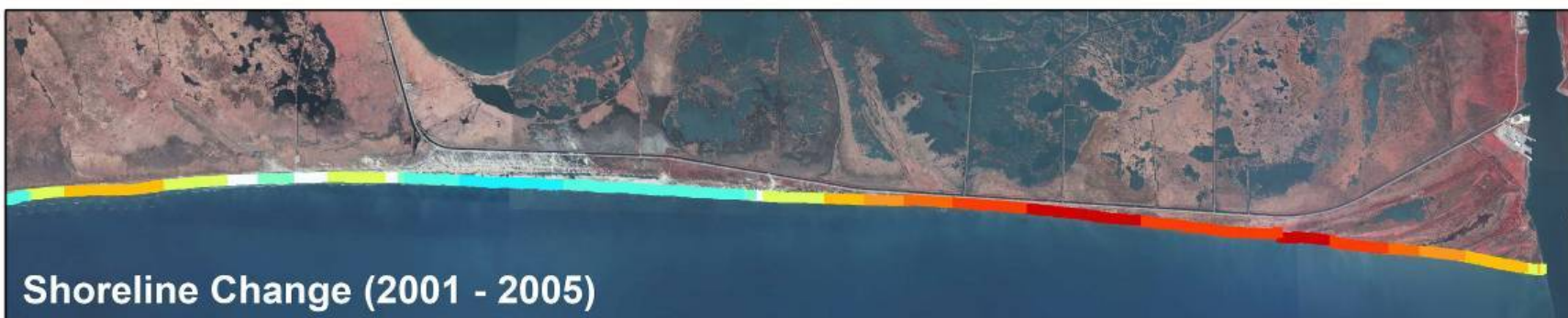


Project Site Morphology - 1933 to 2008



Project Site Morphology - 1933 to 2008





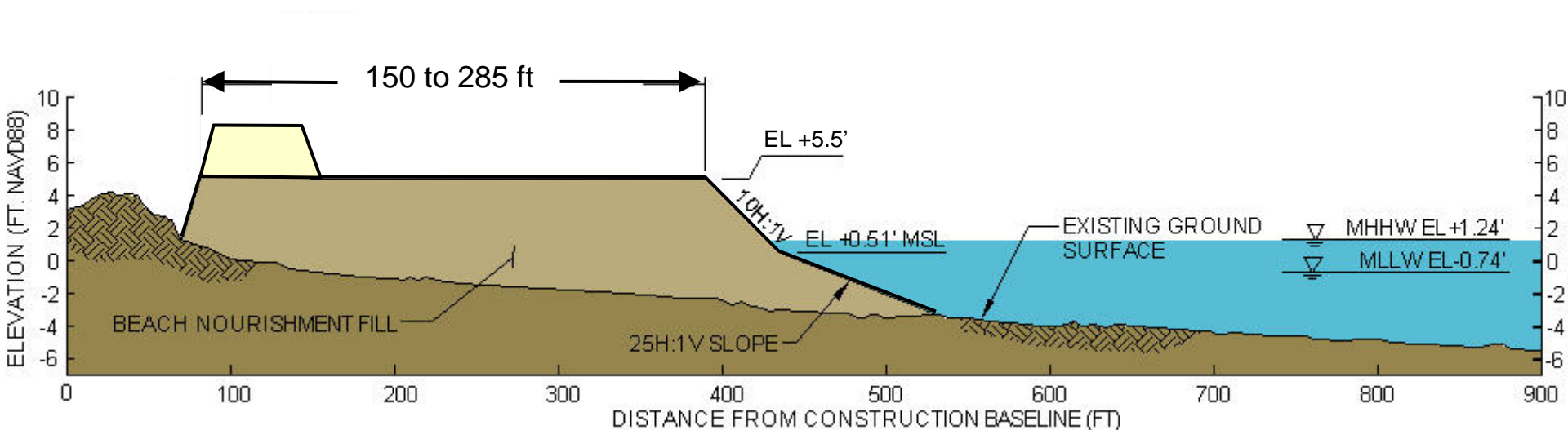
FT/YR



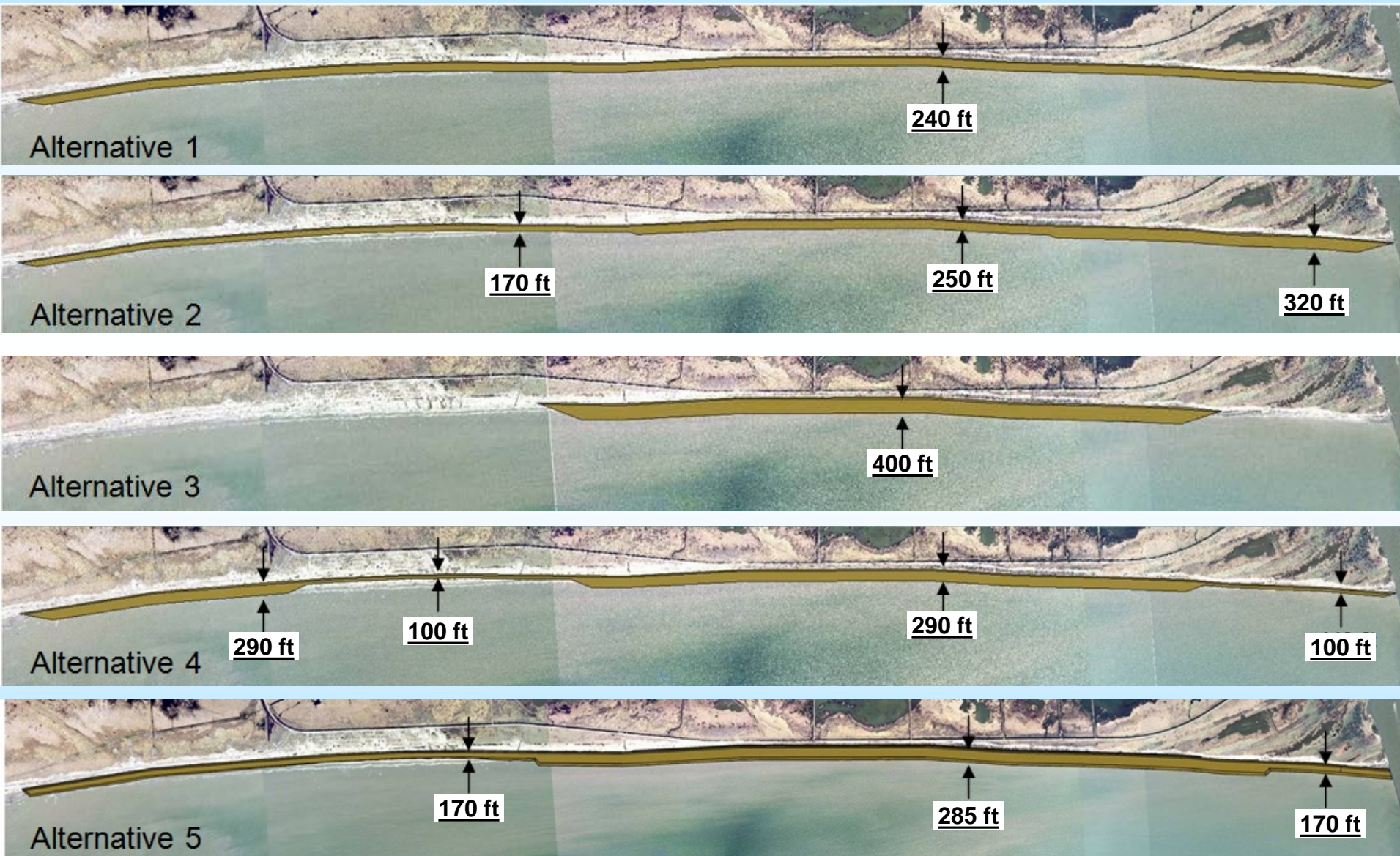
Beach Fill Cross Section Assumptions

- Beach fill volume is 2 million cubic yards
- Beach elevation is typical to natural conditions and equal +5.5 ft
- Fill area is prioritized by current shoreline distance to Highway 82/27 (areas closer to the highway receive more fill) and on understanding of site morphology
- Additive Alternate dune feature

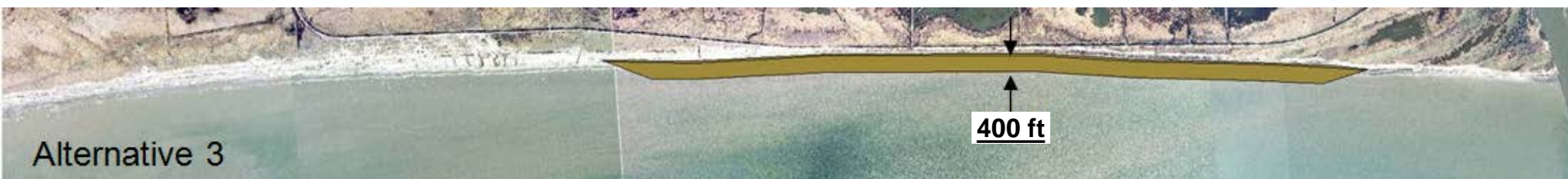
Typical Cross-section of Nourishment Alternatives.



Beach Nourishment Alternatives

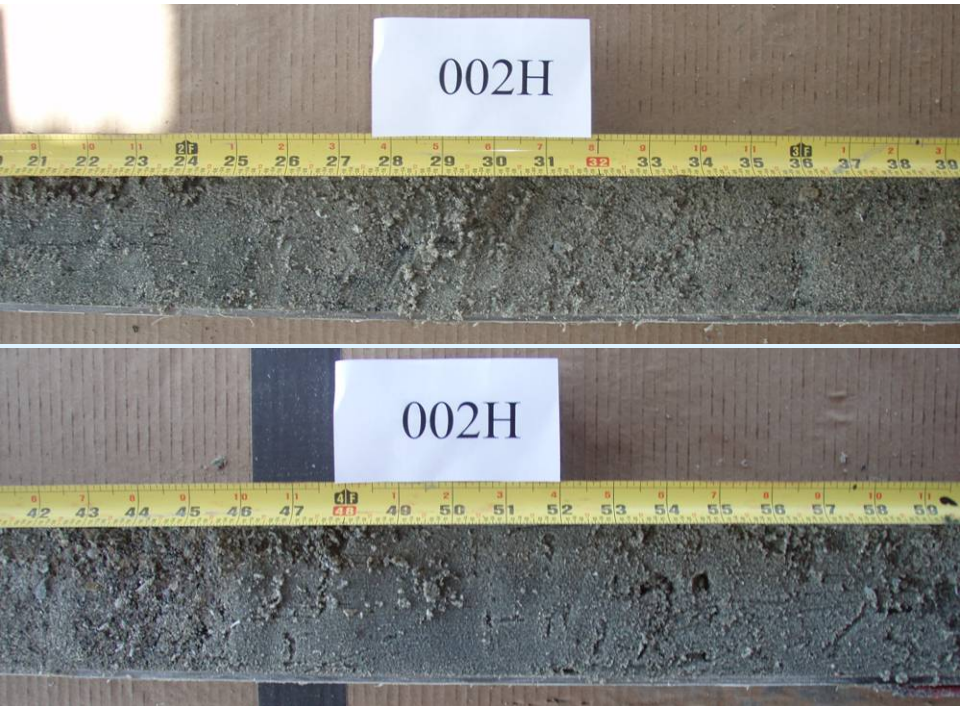


Beach Nourishment Alternatives



Borrow Source Investigation

Vibracore to get stratigraphy and actual sample of material over bore depth

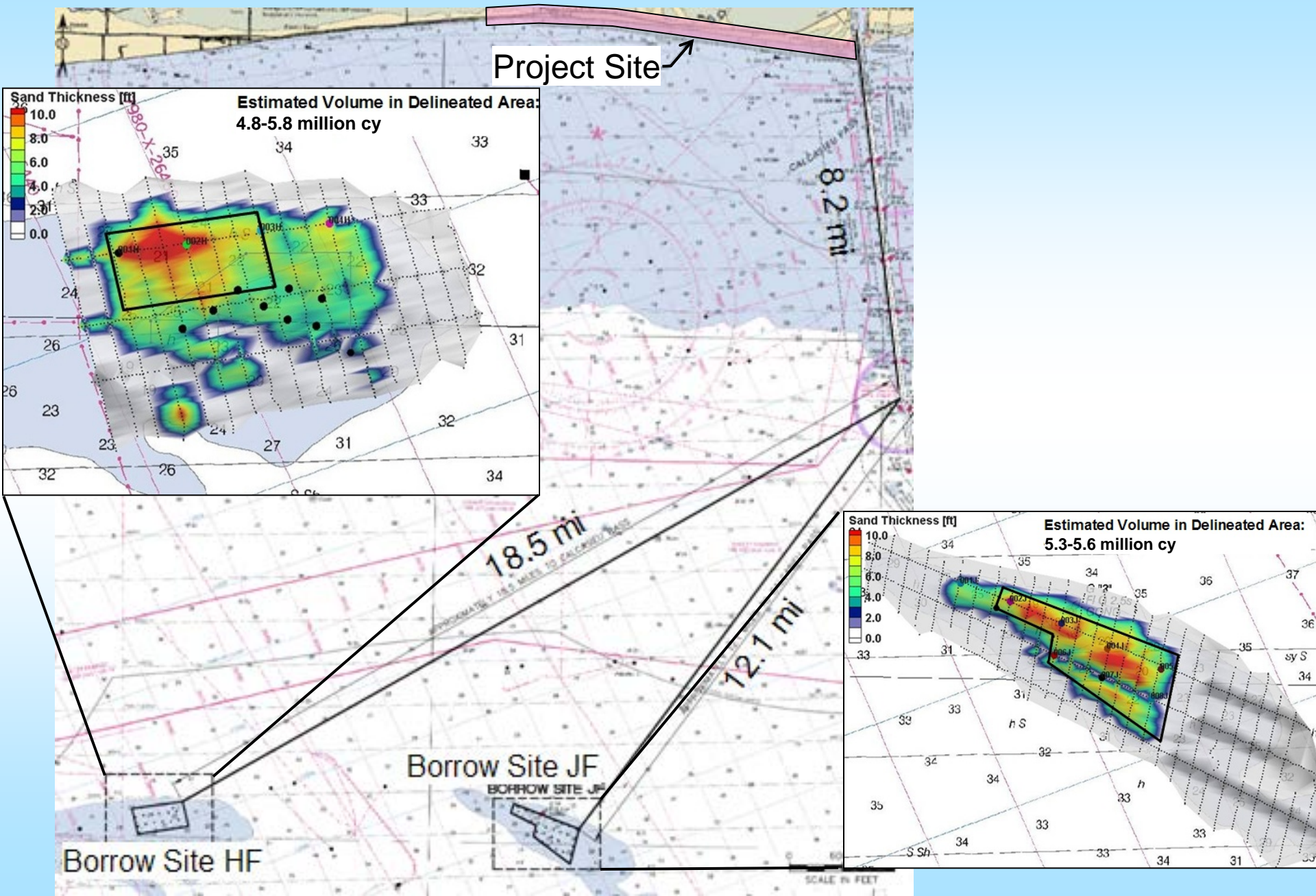


Borrow Source Investigation

Borrow Site Field Investigation included:

- 245 miles of geophysical data collection
 - subbottom profiler (stratigraphy)
 - sidescan sonar (bottom image)
 - Fathometer (depth)
 - Magnetometer (metals: pipelines, wrecks)
- 79 vibracore borings
- 307 grain size analysis tests

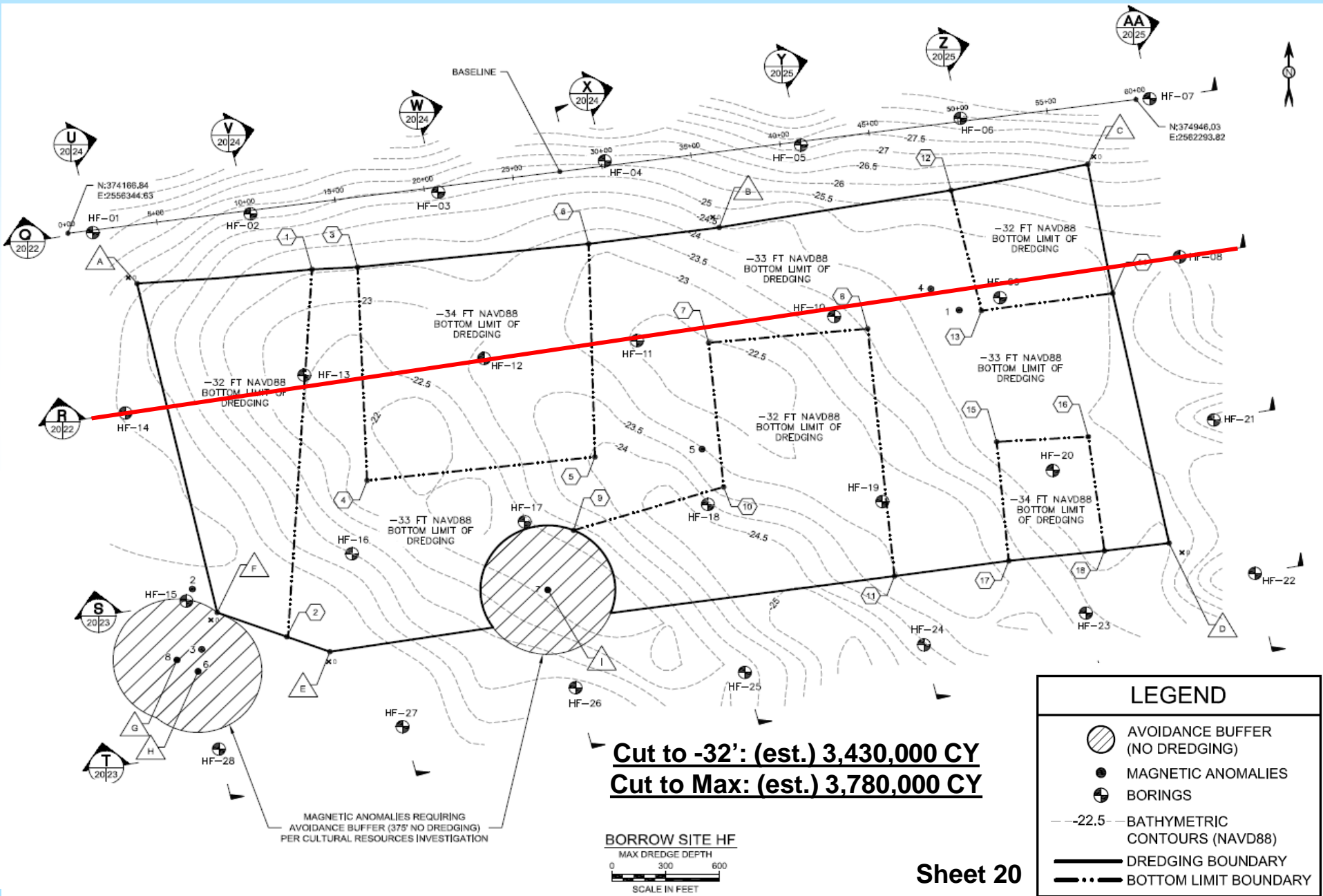
Borrow Source for Beach Nourishment



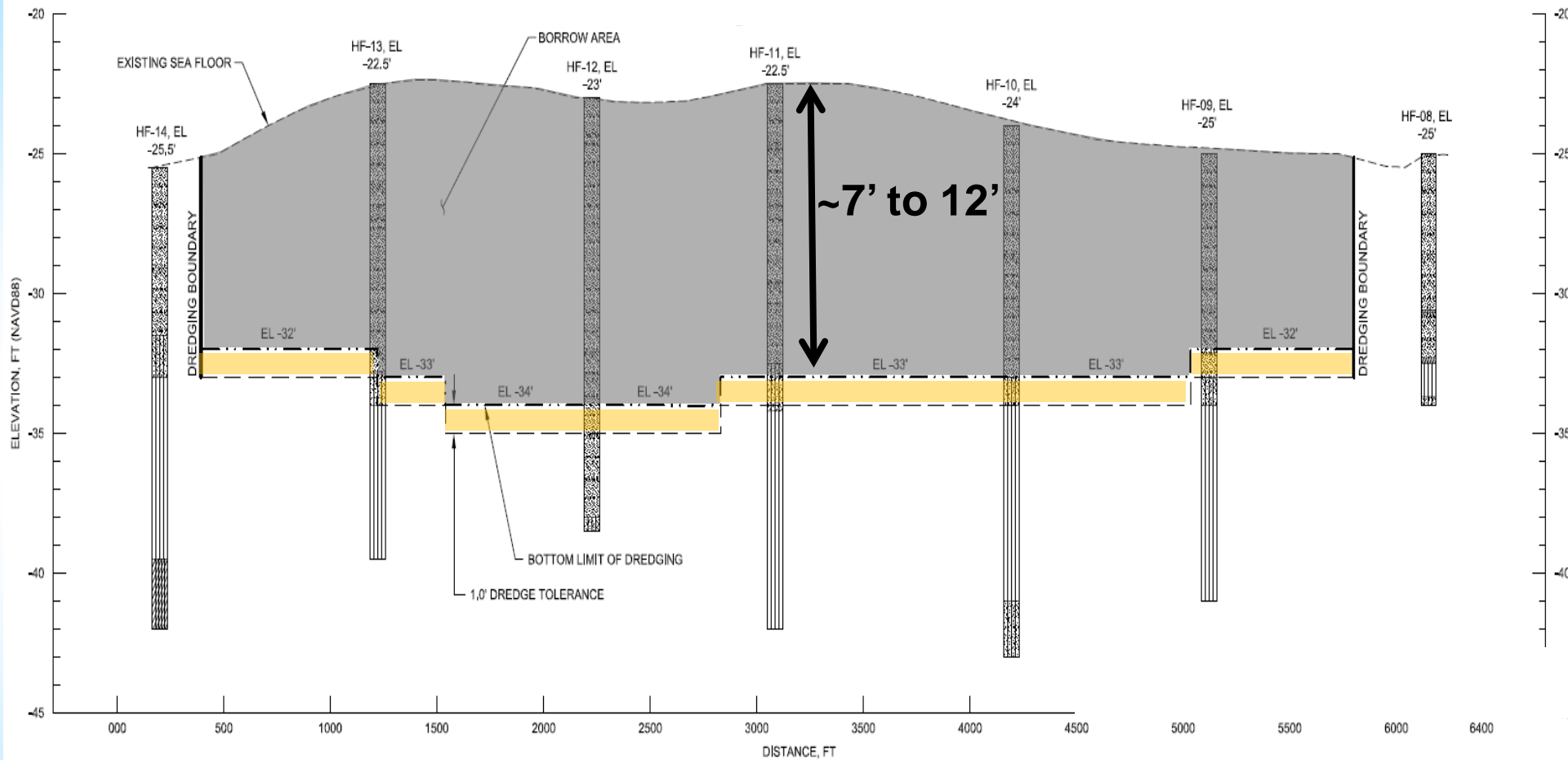
Preliminary Investigation: Site H Core 002H



Borrow Site HF



Borrow Site HF

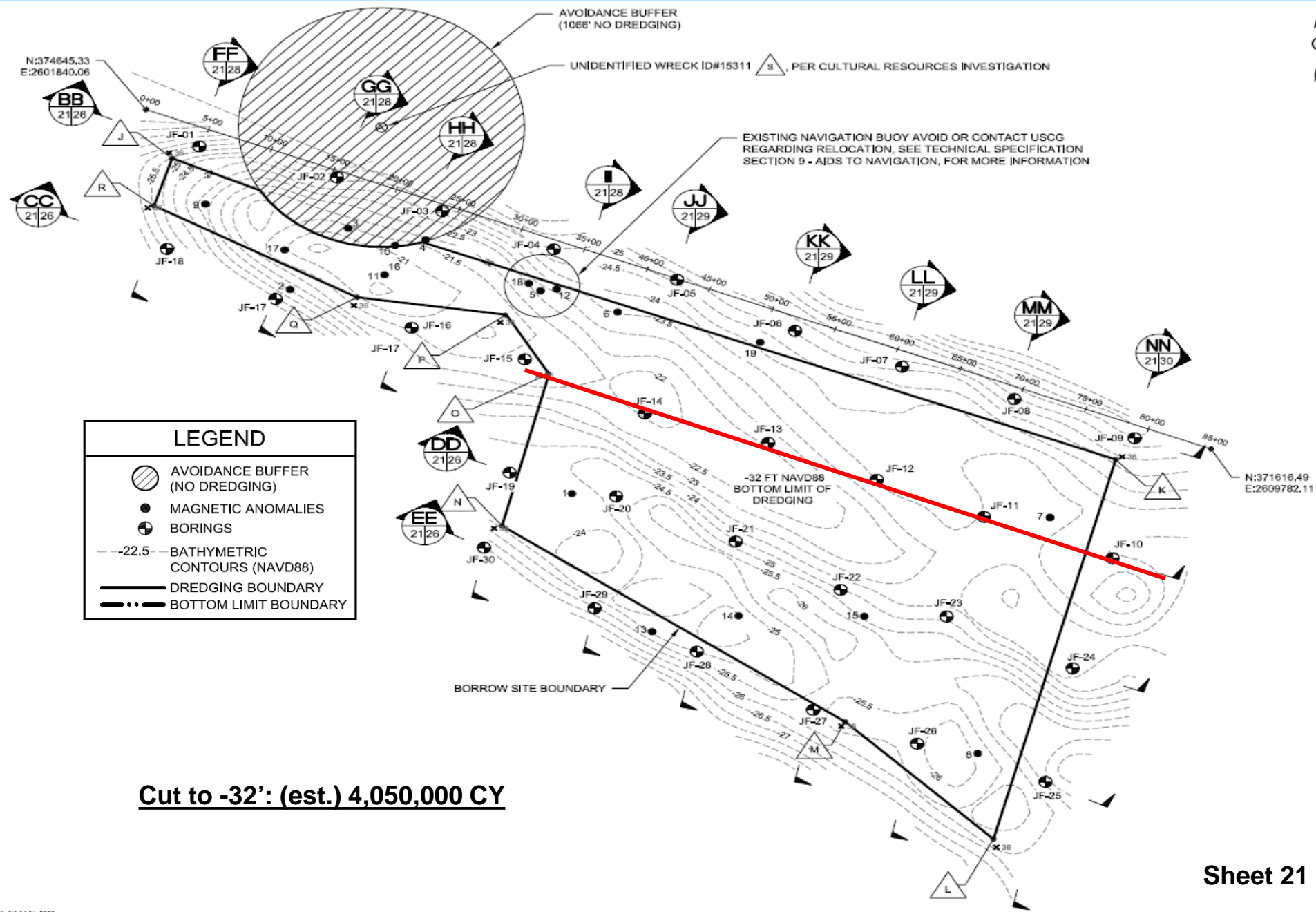


LEGEND

	GRAY TO BROWN STIFF CLAY		GREEN TO BROWN DENSE SILT
	GRAY FINE TO MEDIUM SAND		GRAY VERY FINE SAND, TRACE SILT
	GRAY SILT CLAY		SHELL HASH
	DARK GRAY SILT/CLAY		DREDGING BOUNDARY
	GRAY SOFT SILT, TRACE FINE SAND		DREDGE TOLERANCE
	TRANSITION FROM GRAY FINE SAND TO SANDY SILT		BOTTOM DREDGING LIMIT

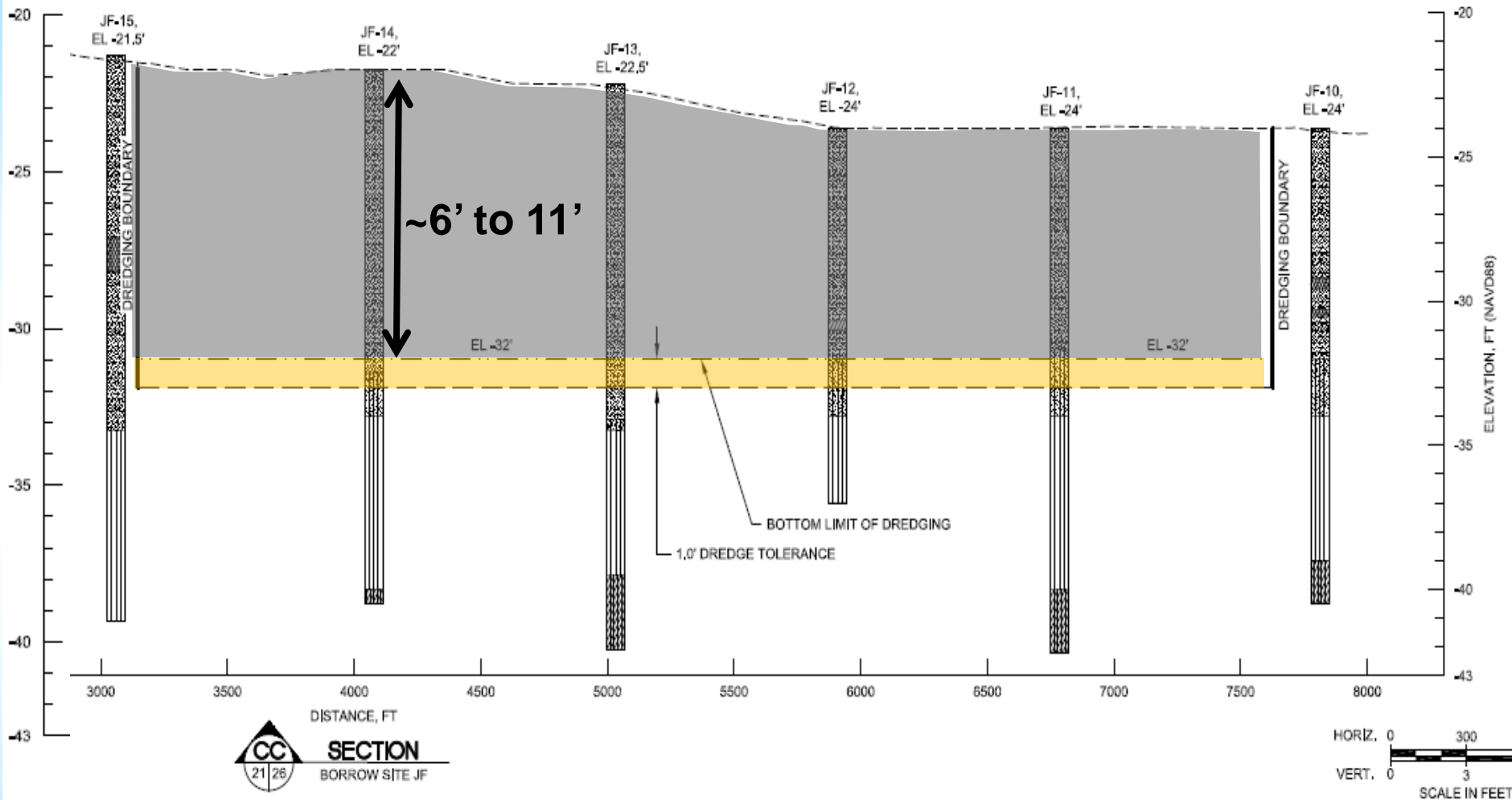


Borrow Site JF



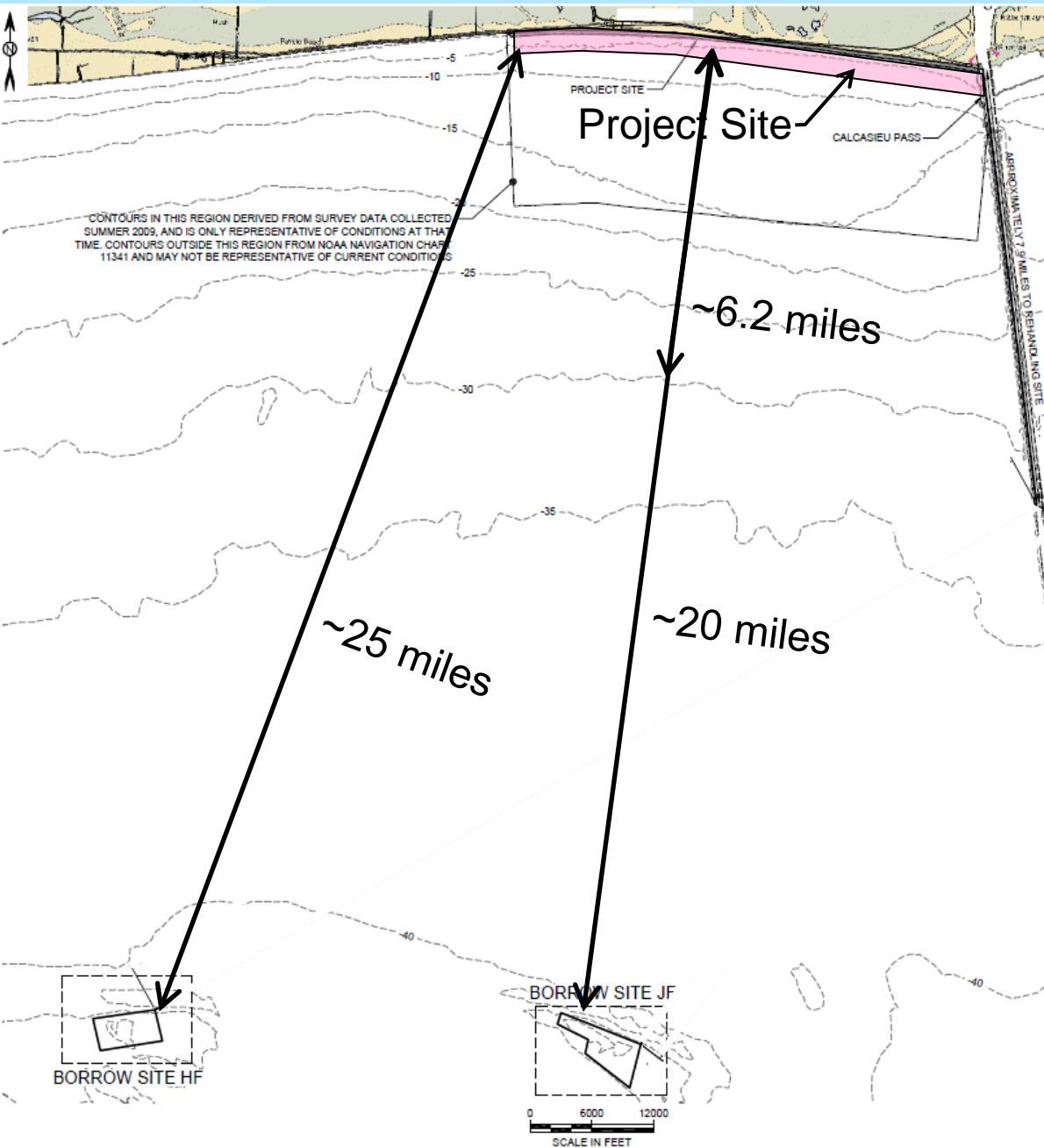
Cut to -32': (est.) 4,050,000 CY

Borrow Site JF





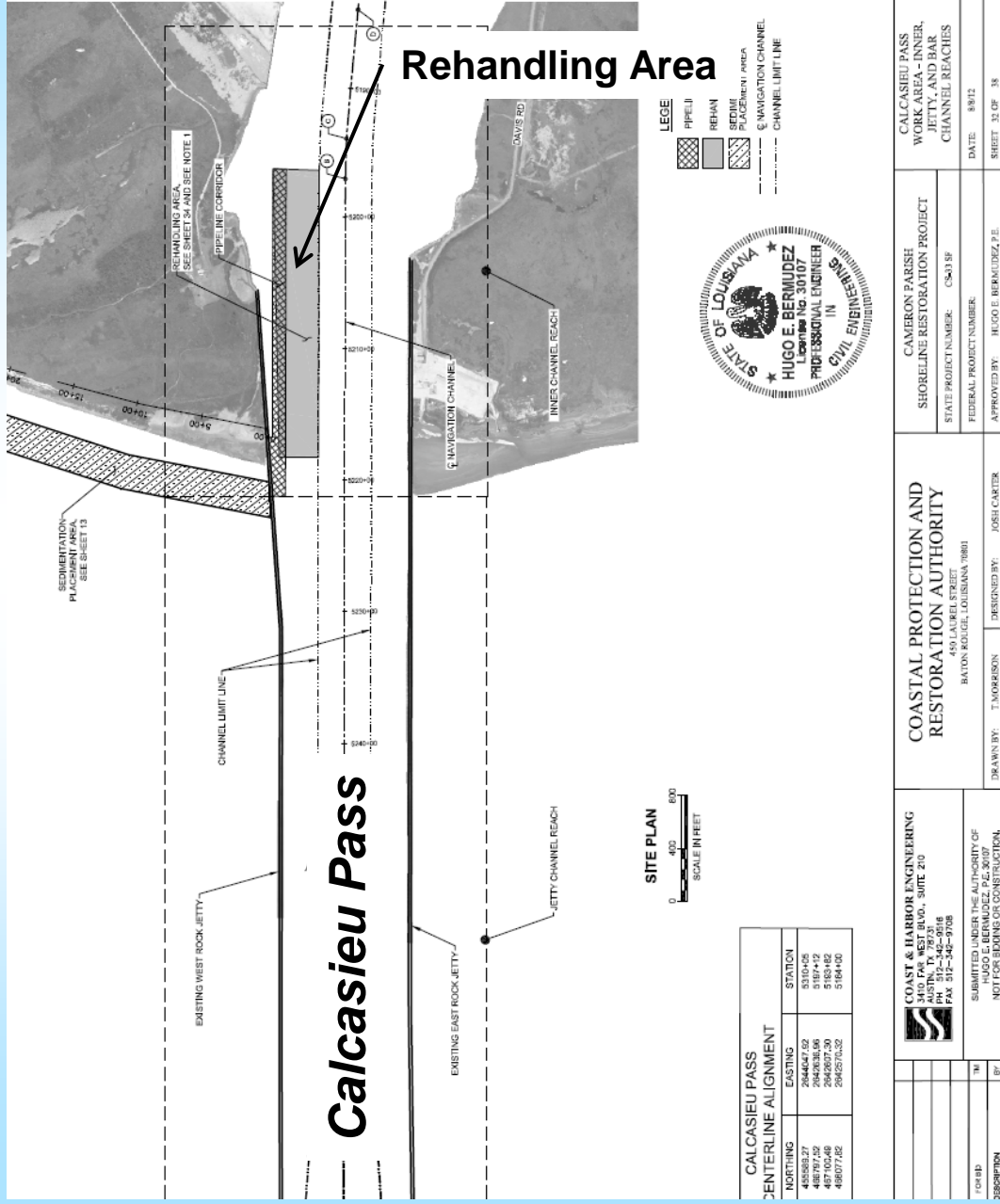
Sediment Delivery to Project Site



Five Delivery Options:

1. Dredge and Direct Pump
2. Offshore Pumpout
3. Offshore Rehandling
4. Calcasieu Pass Pumpout
5. Calcasieu Pass Rehandling

Calcasieu Pass Work Area



Coordination of Calcasieu Pass Rehandling Site

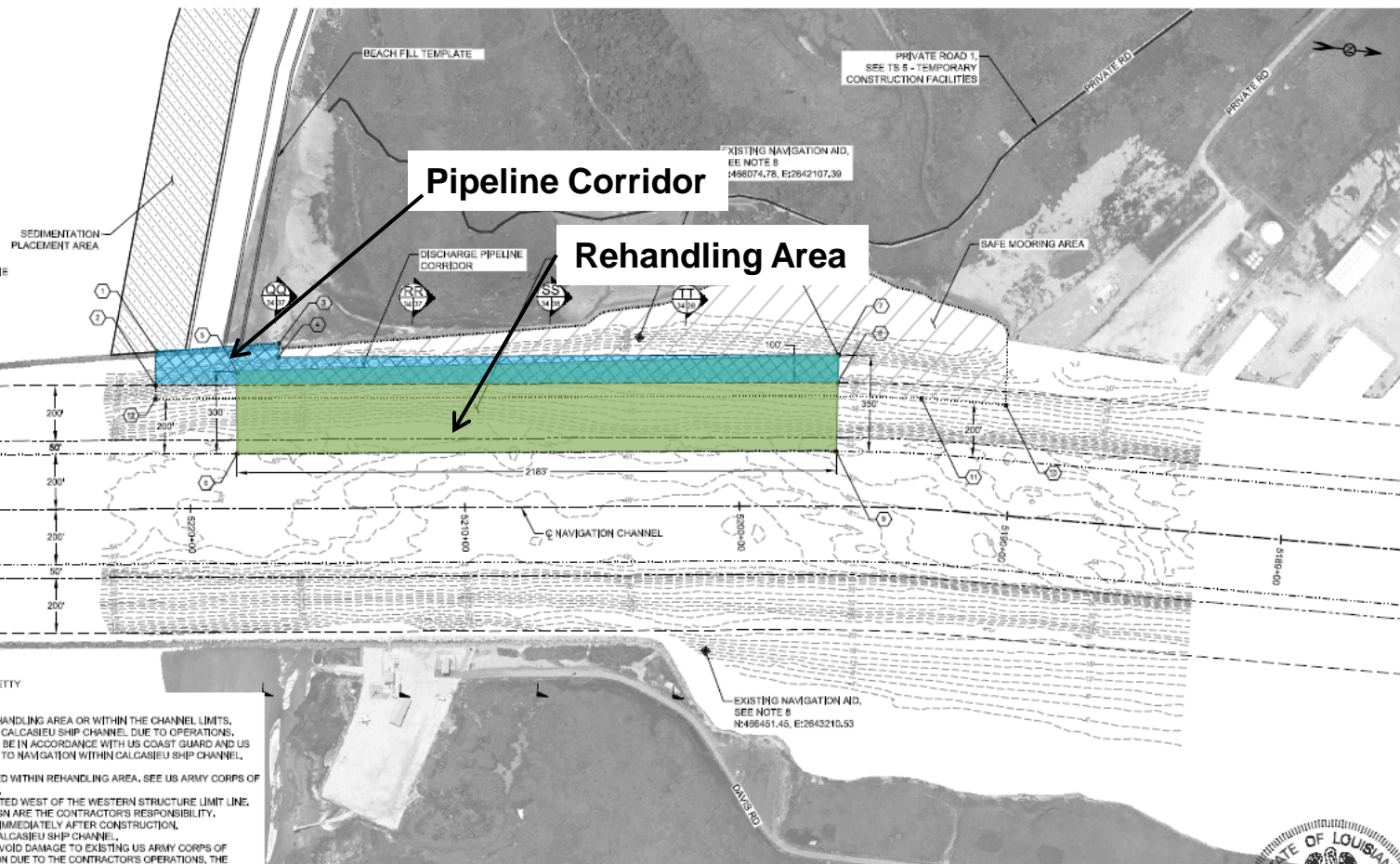
- USACE – Calcasieu Pass O&M; Regulatory
- Port of Lake Charles
- Lake Charles Pilot's Association
- West Cameron Port Commission
- Calcasieu River Waterway Navigation Safety Committee
- US Coast Guard
- Cameron Parish
- Local property owners
- Local fishing interests

Calcasieu Pass Site Plan Rehandling Site

CALCASIEU PASS DISCHARGE PIPELINE CORRIDOR AND REHANDLING AREA WORKING POINTS (1)

POINT	NORTHING	EASTING
1	464336.21	2642370.44
2	464345.95	2642482.02
3	464774.45	2642286.85
4	464777.76	2642336.87
5	464833.63	2642405.41
6	464871.07	2642702.82
7	466935.04	2642563.76
8	466912.78	2642163.31
9	466837.14	2642432.12
10	467435.86	2642159.24
11	467122.55	2642204.96
12	464352.19	2642541.63

GULF OF MEXICO



NOTES:

1. NO DREDGED MATERIAL SHALL BE DEPOSITED OUTSIDE THE REHANDLING AREA OR WITHIN THE CHANNEL LIMITS. THE CONTRACTOR SHALL NOT CREATE RISKS TO NAVIGATION IN CALCASIEU SHIP CHANNEL. DUE TO OPERATIONS, DREDGING AIDS, PILING, WIRES, CABLES, AND ANCHORS SHALL BE IN ACCORDANCE WITH US COAST GUARD AND US ARMY CORPS OF ENGINEERS REGULATIONS TO AVOID IMPACTS TO NAVIGATION WITHIN CALCASIEU SHIP CHANNEL.
2. TEMPORARY MOORING STRUCTURE REQUIREMENTS:
 - A. UP TO 8 TEMPORARY MOORING STRUCTURES ARE ALLOWED WITHIN REHANDLING AREA. SEE US ARMY CORPS OF ENGINEERS PERMIT FOR FURTHER DETAILS IN APPENDIX C.
 - B. ALL TEMPORARY MOORING STRUCTURES ARE TO BE LOCATED WEST OF THE WESTERN STRUCTURE LIMIT LINE.
 - C. TEMPORARY MOORING STRUCTURE LOCATIONS AND DESIGN ARE THE CONTRACTOR'S RESPONSIBILITY.
 - D. TEMPORARY MOORING STRUCTURES SHALL BE REMOVED IMMEDIATELY AFTER CONSTRUCTION.
3. SEE SP 26 - SITE PHYSICAL DATA FOR TYPICAL CONDITIONS IN CALCASIEU SHIP CHANNEL. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO AVOID DAMAGE TO EXISTING US ARMY CORPS OF ENGINEERS JETTY, IF DAMAGE OCCURS DURING CONSTRUCTION DUE TO THE CONTRACTOR'S OPERATIONS, THE CONTRACTOR SHALL IMMEDIATELY REPAIR ANY DAMAGE TO THE SATISFACTION OF USAGE.
4. THE CONTRACTOR SHALL IMPLEMENT MEANS AND METHODS NECESSARY TO AVOID LOSS OF BEACH FILL MATERIAL DURING OFF-LOADING AND RE-LOADING IN THE REHANDLING AREA. SEE TECHNICAL SPECIFICATION 12 - BEACH FILL REHANDLING FOR MORE INFORMATION.
5. THE CONTRACTOR IS REQUIRED TO MOVE HIS VESSEL(S) TO THE WEST OF THE SAFE MOORING AREA LIMIT LINE NO LESS THAN 30 MINUTES PRIOR TO PILOTED VESSEL PASSAGE AND REMAIN WEST OF THE SAFE MOORING AREA LIMIT LINE UNTIL THE PILOTED VESSEL HAS PASSED. CONTRACTOR SHALL MAINTAIN CONTINUOUS COMMUNICATIONS WITH THE LAKE CHARLES PILOTS ASSOCIATION. SEE TS 12 - BEACH FILL MATERIAL, REHANDLING FOR MORE INFORMATION.
6. NO UPLAND ACCESS TO PIPELINE CORRIDOR EXCEPT FROM BEACH FILL WORK AREA.
7. NAV AID DETAILS FOUND IN NOAA NAUTICAL CHART 11347, 36TH ED., JULY 2011 AND USCG LIGHT LIST, VOL. IV, 2012.

LEGEND

	PIPELINE CORRIDOR		STRUCTURE LIMIT LINE
	REHANDLING AREA		NAVIGATION CHANNEL
	SAFE MOORING AREA		CHANNEL LIMIT LINE
	SEDIMENT PLACEMENT AREA		FAIRWAY LIMIT LINE
			CONTOUR EL F1 (NAV08)

REV.	DATE	DESCRIPTION	BY
A	8/8/12	FOR BIDD	TM

COAST & HARBOR ENGINEERING
3410 FAR WEST BLVD., SUITE 210
AUSTIN, TX 78731
PH: 512-342-9516
FAX: 512-342-9708

SUBMITTED UNDER THE AUTHORITY OF
HUGO E. BERMUDEZ, P.E. 30107
NOT FOR BIDDING OR CONSTRUCTION.

**COASTAL PROTECTION AND
RESTORATION AUTHORITY**

419 LAUREL STREET
BATON ROUGE, LOUISIANA 70801

DRAWN BY: T. MORRISON DESIGNED BY: JOSH CARTER

**CAMERON PARISH
SHORELINE RESTORATION PROJECT**

STATE PROJECT NUMBER: CS-03 SP

FEDERAL PROJECT NUMBER:

APPROVED BY: HUGO E. BERMUDEZ, P.E.



CALCASIEU PASS
WORK AREA -
REHANDLING SITE PLAN

Sheet 34

Calcasieu Pass Site Plan Rehandling Site

CALCASIEU PASS DISCHARGE PIPELINE CORRIDOR AND REHANDLING AREA WORKING POINTS (4)

POINT	NORTHING	EASTING
1	464336.21	2642370.44
2	464345.95	2642482.02
3	464774.45	2642286.85
4	464777.76	2642336.87
5	464833.63	2642405.41
6	464871.07	2642702.82
7	466893.04	2642063.76
8	466812.78	2642163.31
9	466837.14	2642432.12
10	467435.86	2642159.24
11	467122.55	2642204.96
12	464352.19	2642541.63

GULF OF MEXICO

SEDIMENTATION
PLACEMENT AREA

STRUCTURE LIMIT LINE

EXISTING ROCK
JETTY, SEE NOTE 4

FAIRWAY LIMIT LINE

CHANNEL LIMIT LINE

CALCASIEU PASS

CHANNEL LIMIT LINE

FAIRWAY LIMIT LINE

STRUCTURE LIMIT LINE

EXISTING ROCK JETTY

200 ft

BEACH FILL TEMPLATE

DISCHARGE PIPELINE
CORRIDOR

REHANDLING AREA

EXISTING NAVIGATION AID,
SEE NOTE 8
N496074.78, E2642107.39

**Dredge and Equipment
Safe Mooring Area during
Vessel Passage**

SAFE MOORING AREA

**No Dredge and Equipment
Mooring during Vessel
Passage**

EXISTING NAVIGATION AID,
SEE NOTE 8
N486451.45, E2643210.53

SITE PLAN

REHANDLING

0 200 400
SCALE IN FEET



- NOTES:**
- NO DREDGED MATERIAL SHALL BE DEPOSITED OUTSIDE THE REHANDLING AREA OR WITHIN THE CHANNEL LIMITS. THE CONTRACTOR SHALL NOT CREATE RISKS TO NAVIGATION IN CALCASIEU SHIP CHANNEL. DUE TO OPERATIONS, DREDGING AIDS, PILING, WIRES, CABLES, AND ANCHORS SHALL BE IN ACCORDANCE WITH US COAST GUARD AND US ARMY CORPS OF ENGINEERS REGULATIONS TO AVOID IMPACTS TO NAVIGATION WITHIN CALCASIEU SHIP CHANNEL.
 - TEMPORARY MOORING STRUCTURE REQUIREMENTS:
 - UP TO 6 TEMPORARY MOORING STRUCTURES ARE ALLOWED WITHIN REHANDLING AREA. SEE US ARMY CORPS OF ENGINEERS PERMIT FOR FURTHER DETAILS IN APPENDIX C.
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LEGEND

	PIPELINE CORRIDOR		STRUCTURE LIMIT LINE
	REHANDLING AREA		NAVIGATION CHANNEL
	SAFE MOORING AREA		CHANNEL LIMIT LINE
	SEDIMENT PLACEMENT AREA		FAIRWAY LIMIT LINE
			CONTOUR EL. F. (NAV08)

REV.	DATE	DESCRIPTION	BY
A	8/8/12	FOR SPD	TM

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CALCASIEU PASS
WORK AREA -
REHANDLING SITE PLAN

Sheet 34

Calcasieu Pass Site Plan Rehandling Site

CALCASIEU PASS
DISCHARGE PIPELINE CORRIDOR
AND REHANDLING AREA



BEACH FILL TEMPLATE

PRIVATE ROAD 1



0 200 400
SCALE IN FEET

HUGO E. BERMUDEZ
License No. 30107
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

- REHANDLING FOR MORE INFORMATION
- THE CONTRACTOR IS REQUIRED TO MOVE HIS VESSEL(S) TO THE WEST OF THE SAFE MOORING AREA LIMIT LINE NO LESS THAN 30 MINUTES PRIOR TO PILOTED VESSEL PASSAGE AND REMAIN WEST OF THE SAFE MOORING AREA LIMIT LINE UNTIL THE PILOTED VESSEL HAS PASSED. CONTRACTOR SHALL MAINTAIN CONTINUOUS COMMUNICATIONS WITH THE LAKE CHARLES PILOTS ASSOCIATION. SEE TS 12 - BEACH FILL MATERIAL. REHANDLING FOR MORE INFORMATION.
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	REHANDLING AREA		CHANNEL LIMIT LINE
	SAFE MOORING AREA		FAIRWAY LIMIT LINE
	SEDIMENT PLACEMENT AREA		CONTOUR EL. FT. (NAVD83)

REV.	DATE	DESCRIPTION	BY
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CALCASIEU PASS
WORK AREA -
REHANDLING SITE PLAN

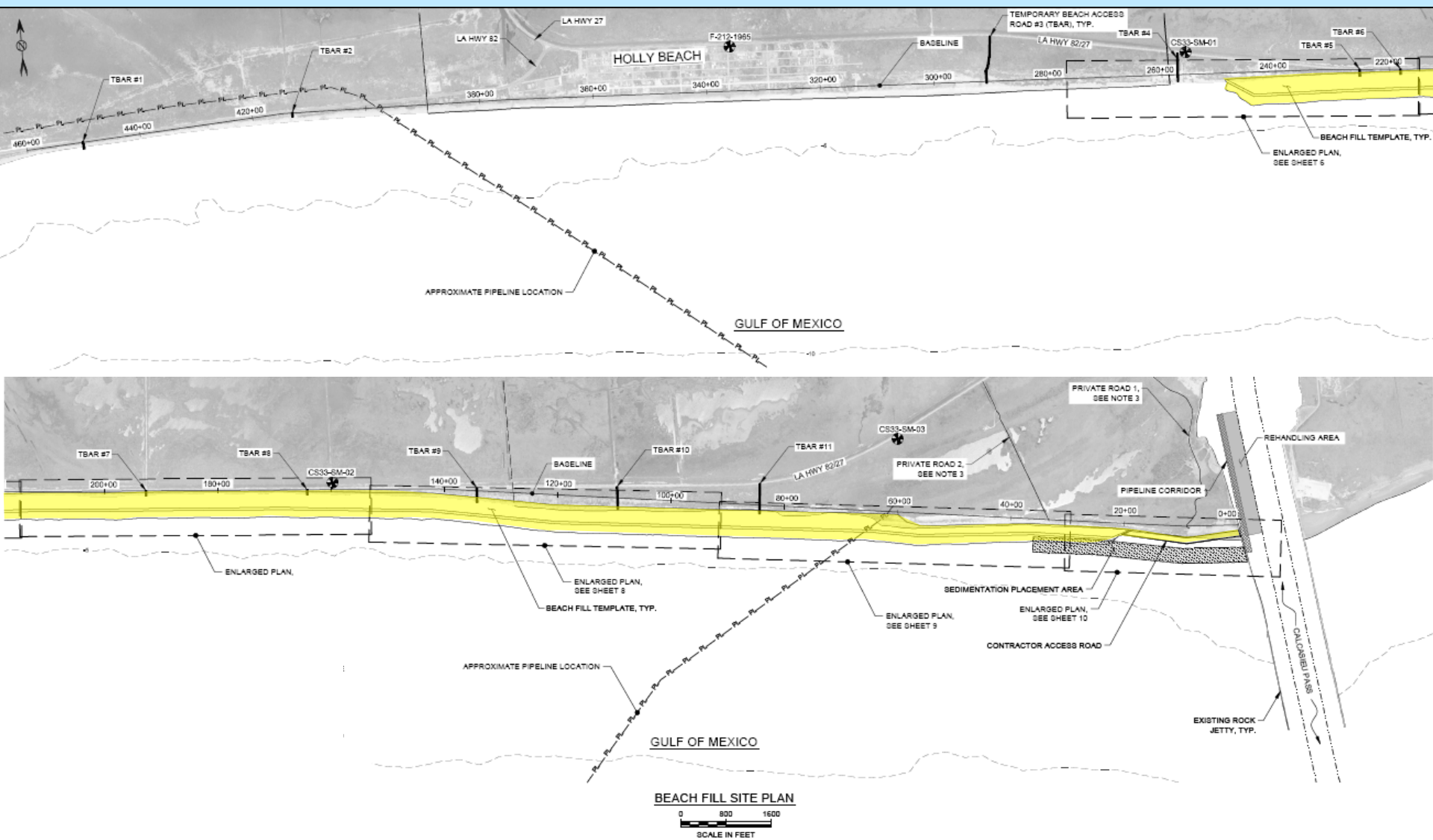
Sheet 34

Calcasieu Pass Site Plan Rehandling Site

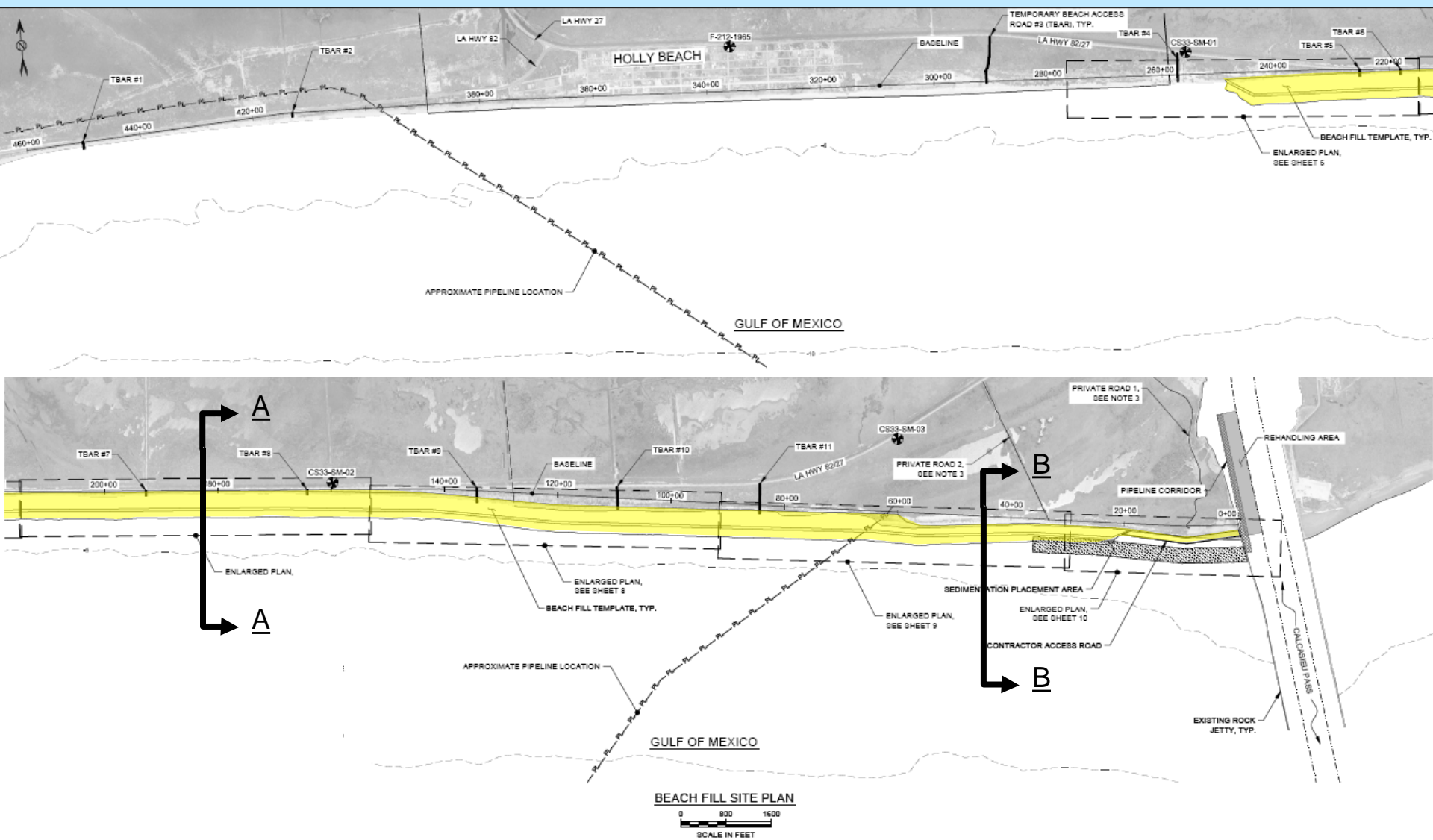


 SEDIMENT PLACEMENT AREA		---○--- CONTOUR EL. FT. (NAVD83)		<table><tr><td>A</td><td>8/8/12</td><td>FOR SP</td><td>TM</td></tr><tr><td>REV.</td><td>DATE</td><td>DESCRIPTION</td><td>BY</td></tr></table>		A	8/8/12	FOR SP	TM	REV.	DATE	DESCRIPTION	BY	SUBMITTED UNDER THE AUTHORITY OF HUGO E. BERMUDEZ, P.E. 30107 NOT FOR BIDDING OR CONSTRUCTION.		DRAWN BY: T. MORRISON		DESIGNED BY: JOSH CARTER		APPROVED BY: HUGO E. BERMUDEZ, P.E.		Sheet 34
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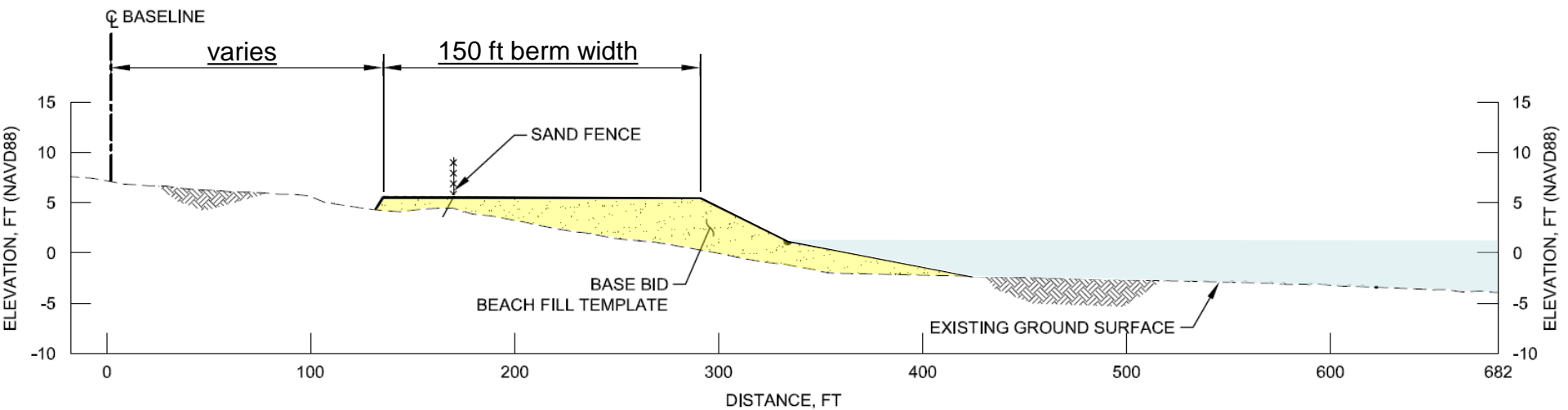
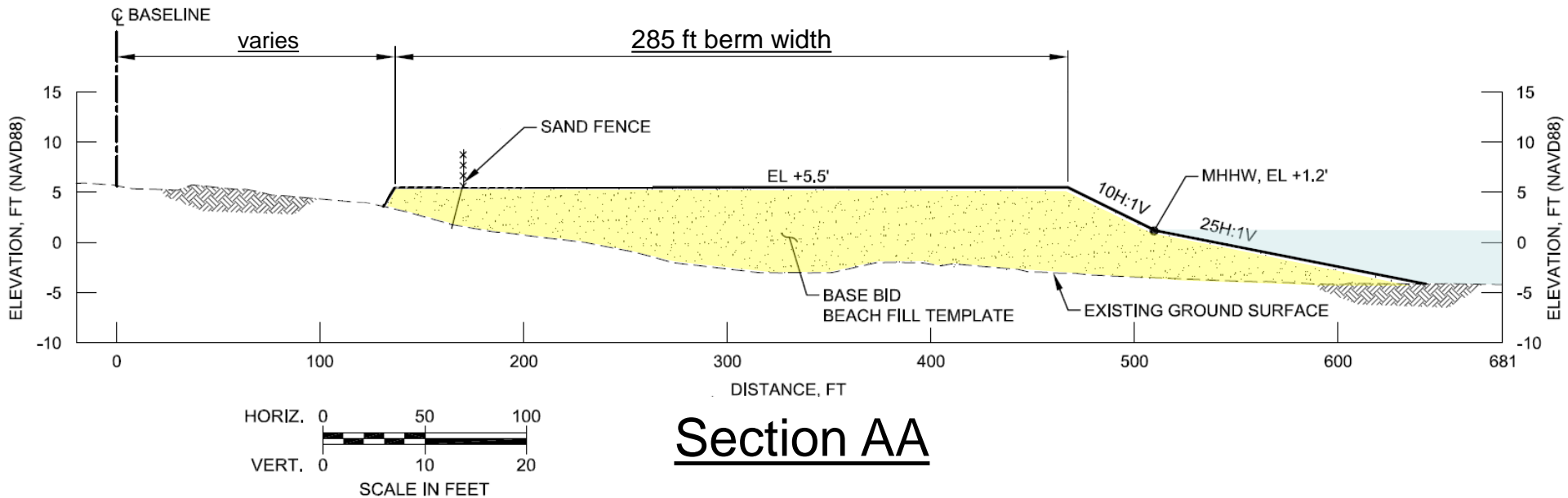
Beach Fill Layout



Beach Fill Layout



Beach Fill Sections



Section BB











Monsour's
PHOTOGRAPHY

Pre-Construction



Post-Construction



Pre-Construction



Post-Construction



Construction Summary

- 1.94M cubic yards placed for \$20.87/cy
- Sand material placed is medium sized sand with a low fine content ($< 2\%$), required short to no training dikes
- Measurement and Payment was on fill site using pre-con and acceptance reach surveys
- During times of high wave action, WMI utilized compensating slope method
- Net overfill ratio $\sim 7\%$
- Averaged 11,000 cy/day of sand on beach
- Installed 27,260 ft of sand fence

Construction Challenges

- Nesting shorebirds at start of project – start abatement measures prior to start of nesting season!
- Weak soils
 - Challenging access (needed fill to access)
 - Some interference with M&P from silt waves
- Endangered species conservation measures:
 - Sea turtle trawling required at all times during dredging; trawl shut down (weather, bunkering) required dredge shutdown
 - 2800 trawl tows completed; 7 turtles relocated

Cameron Parish Shoreline Restoration Project



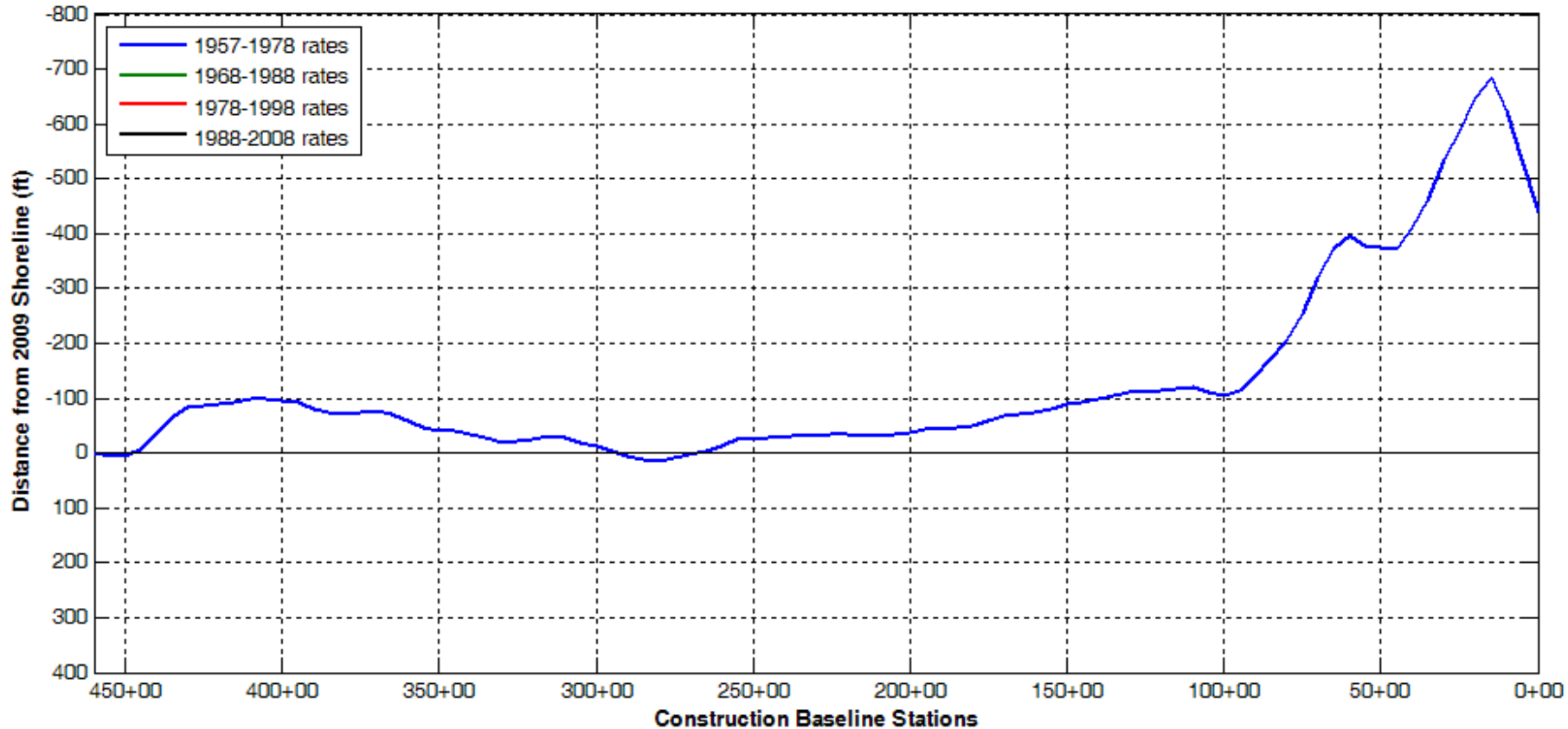
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November 20, 2014



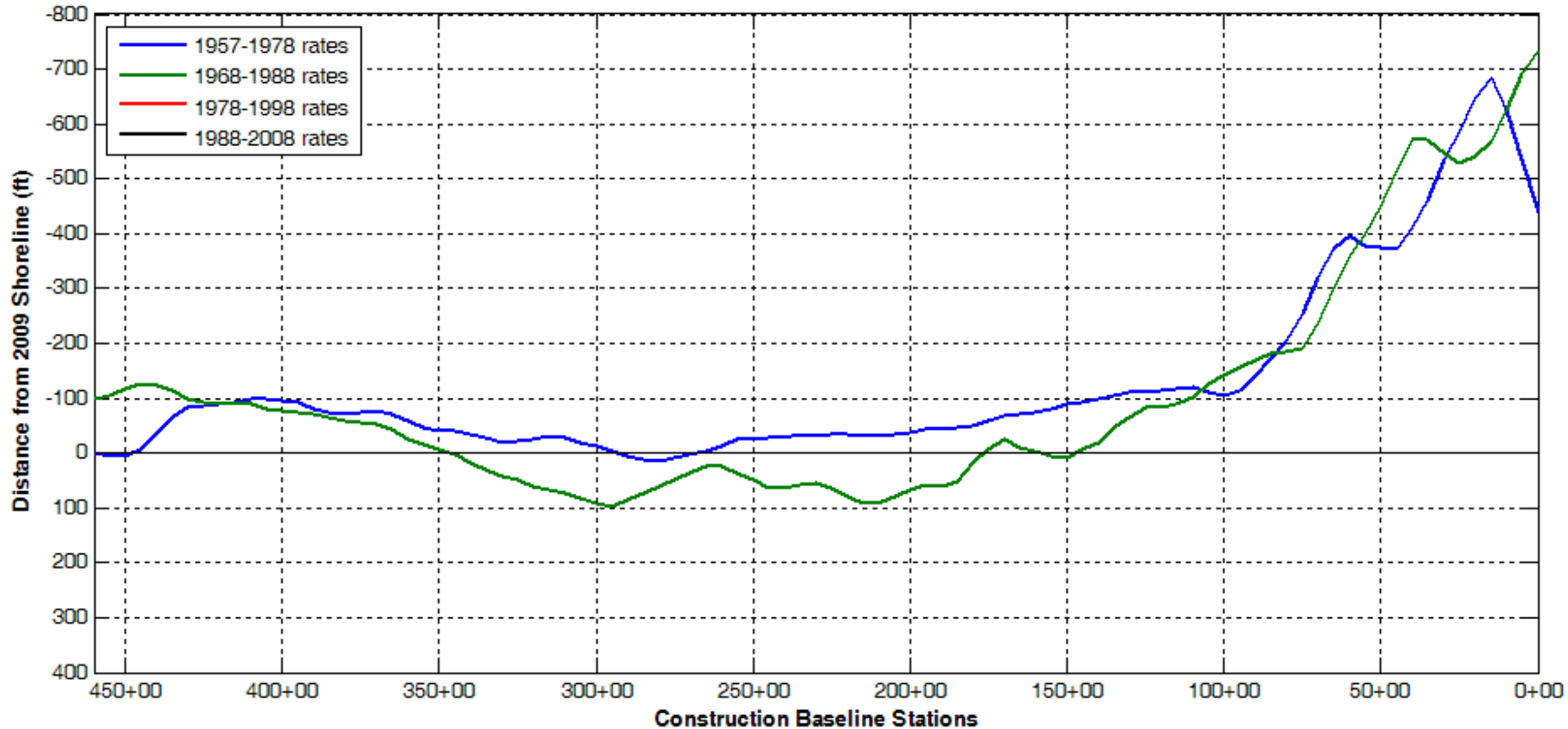
Project Site Morphology

2029 shorelines computed using shoreline change rates from 20 yr periods



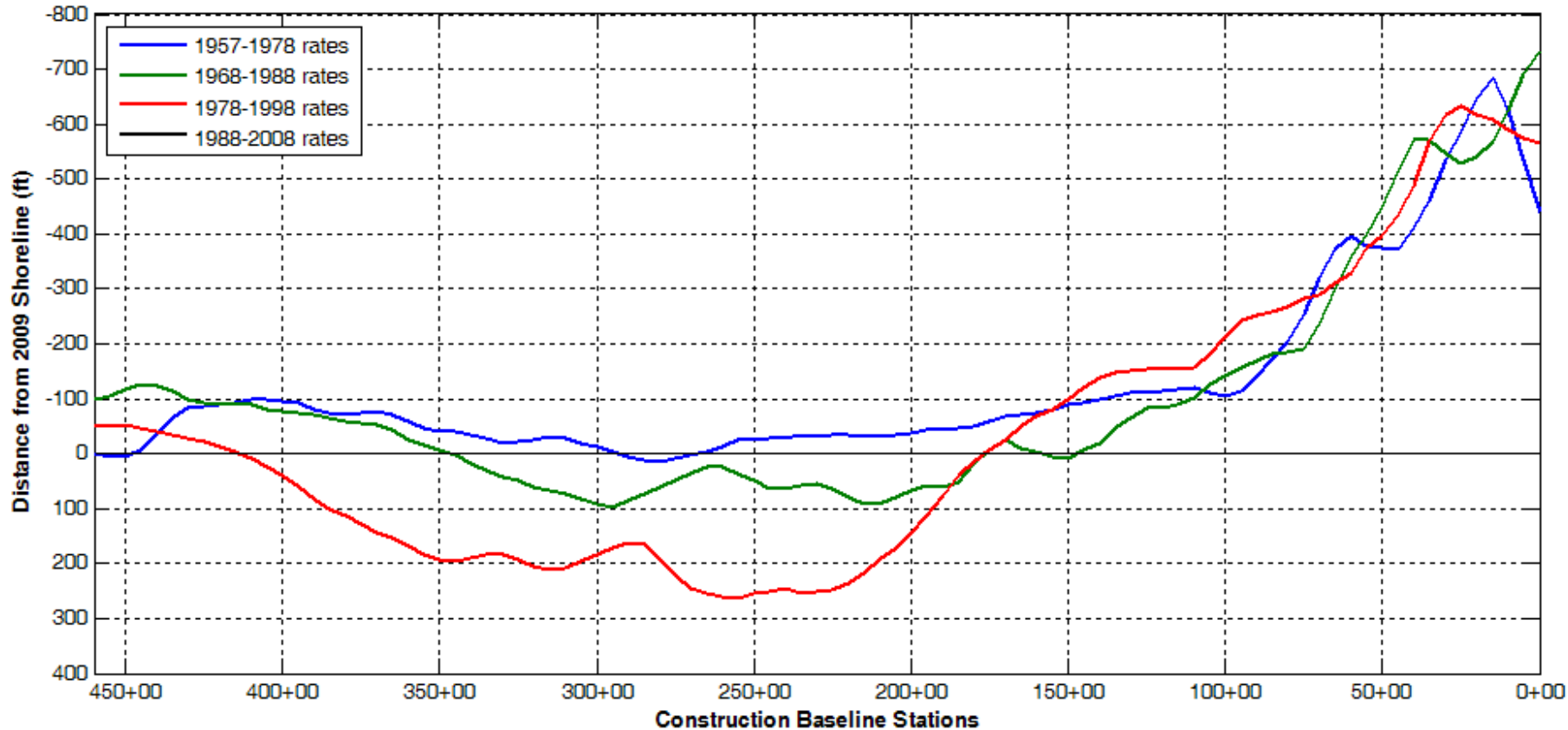
Project Site Morphology

2029 shorelines computed using shoreline change rates from 20 yr periods



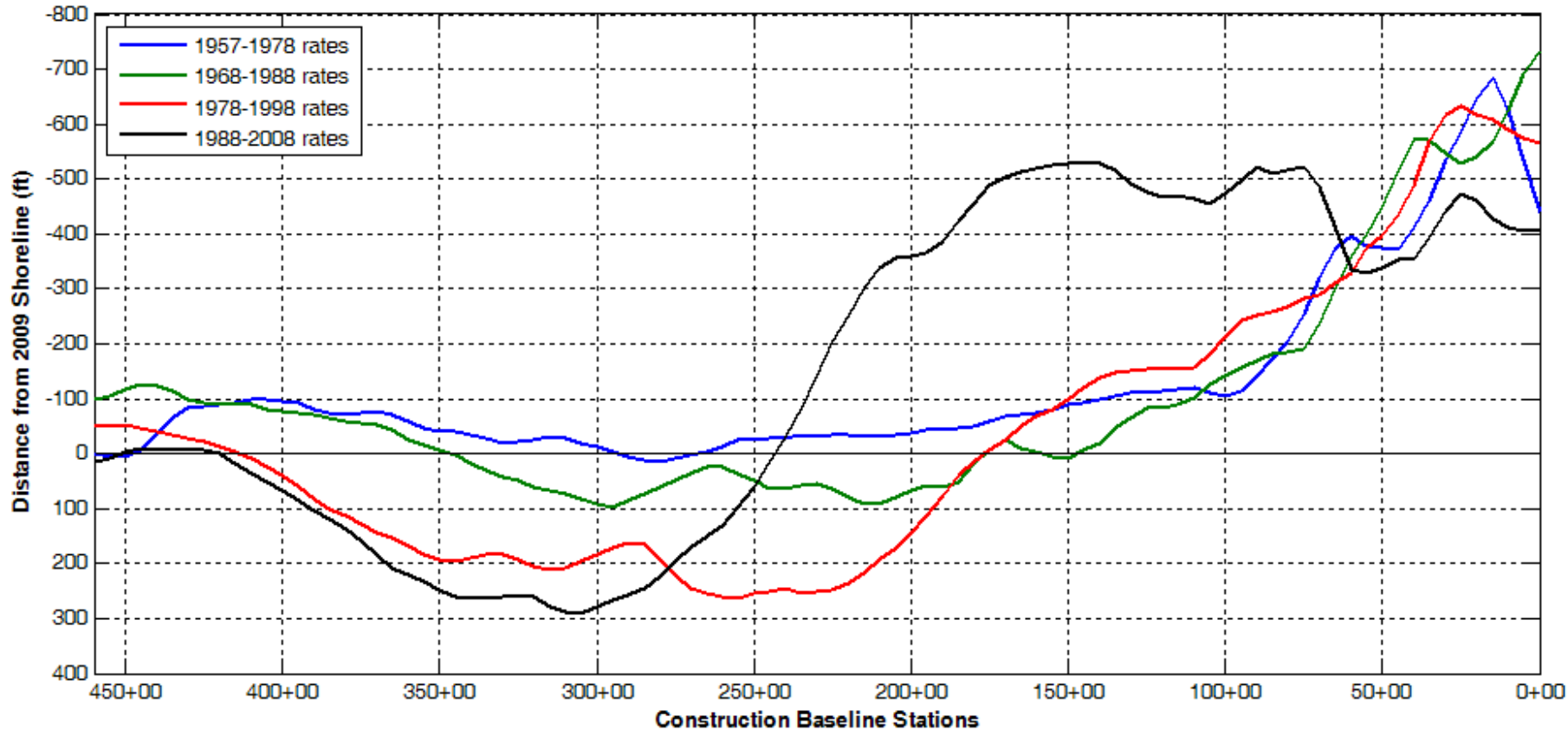
Project Site Morphology

2029 shorelines computed using shoreline change rates from 20 yr periods

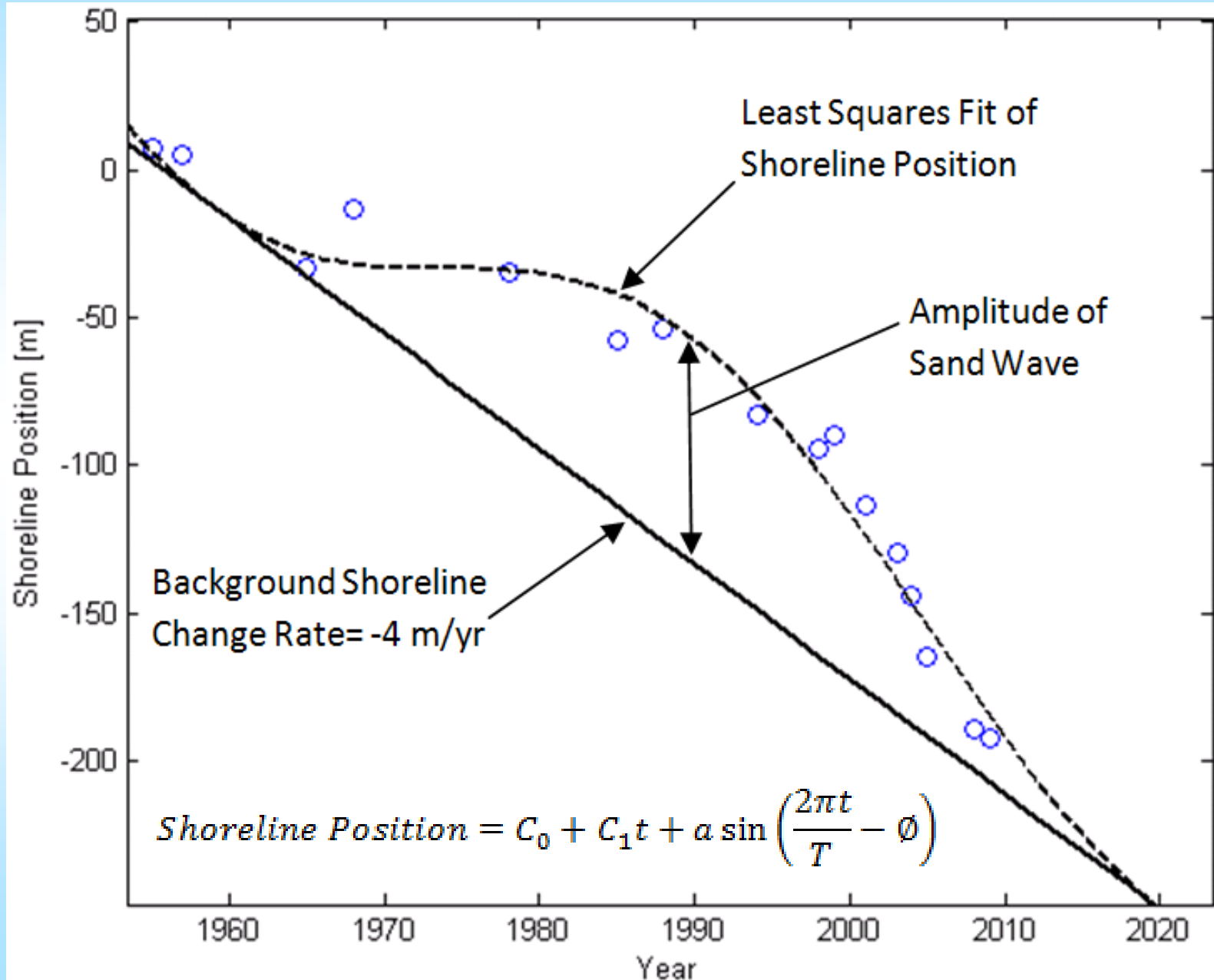


Project Site Morphology

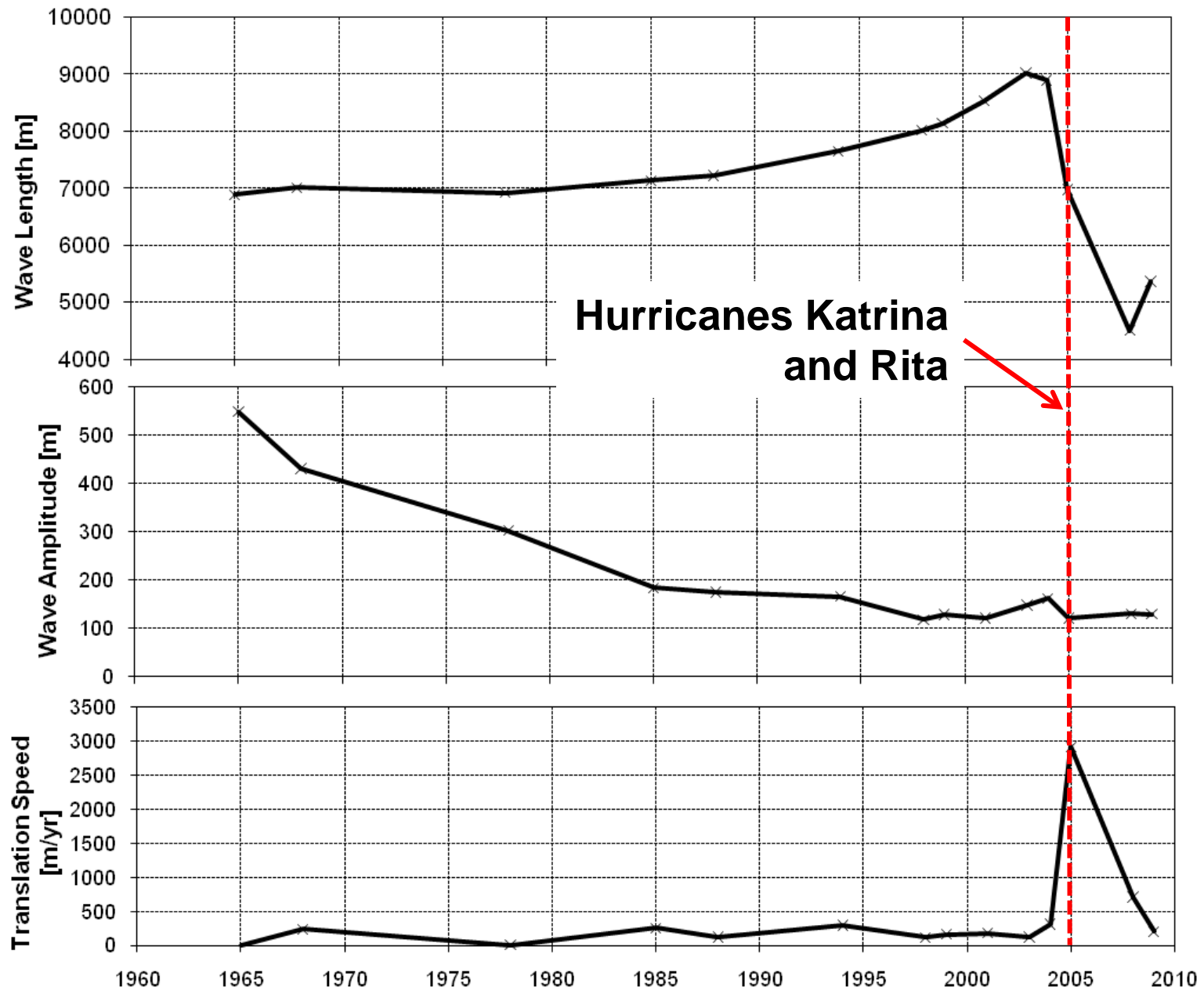
2029 shorelines computed using shoreline change rates from 20 yr periods



Sand Wave Isolation



Sand Wave Isolation



Sand Wave Isolation

Shoreline Change Rates for 1953 – 2009
including the Sediment Wave



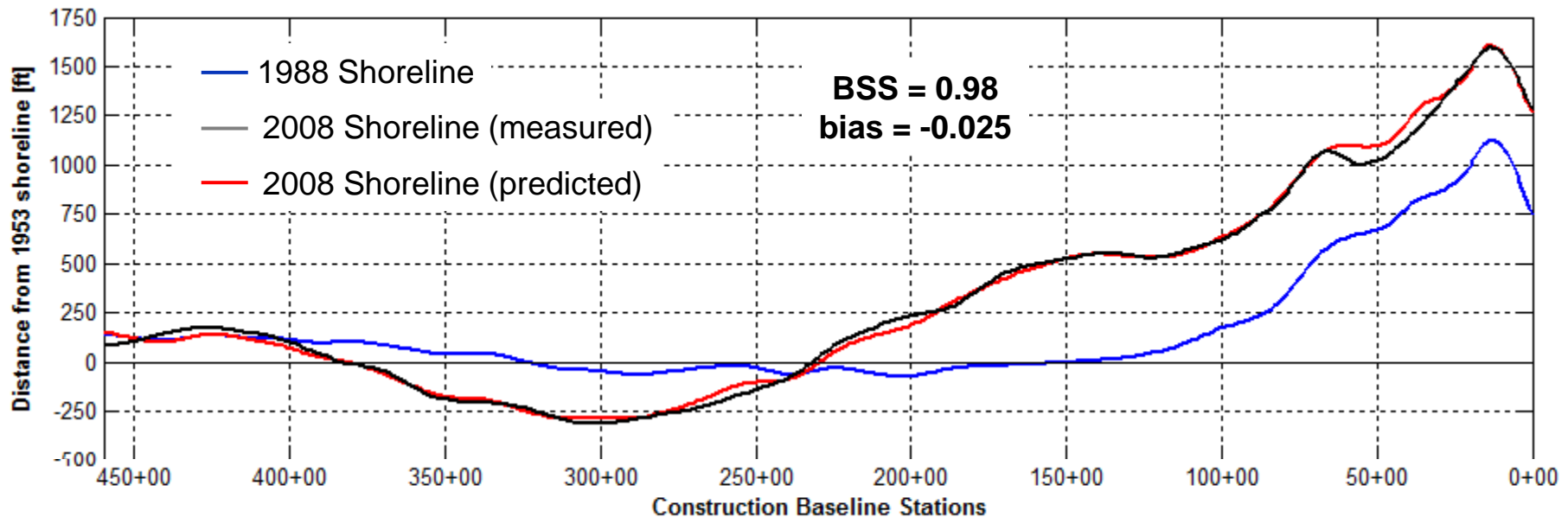
Long-term Shoreline Change Rates for 1953 – 2009
Sediment Wave effects removed



$$V_{LT} = \Delta V_{total} - V_{RSLR} - V_{OW} - V_{silt}$$

Validation of Dynamic Sediment Budget

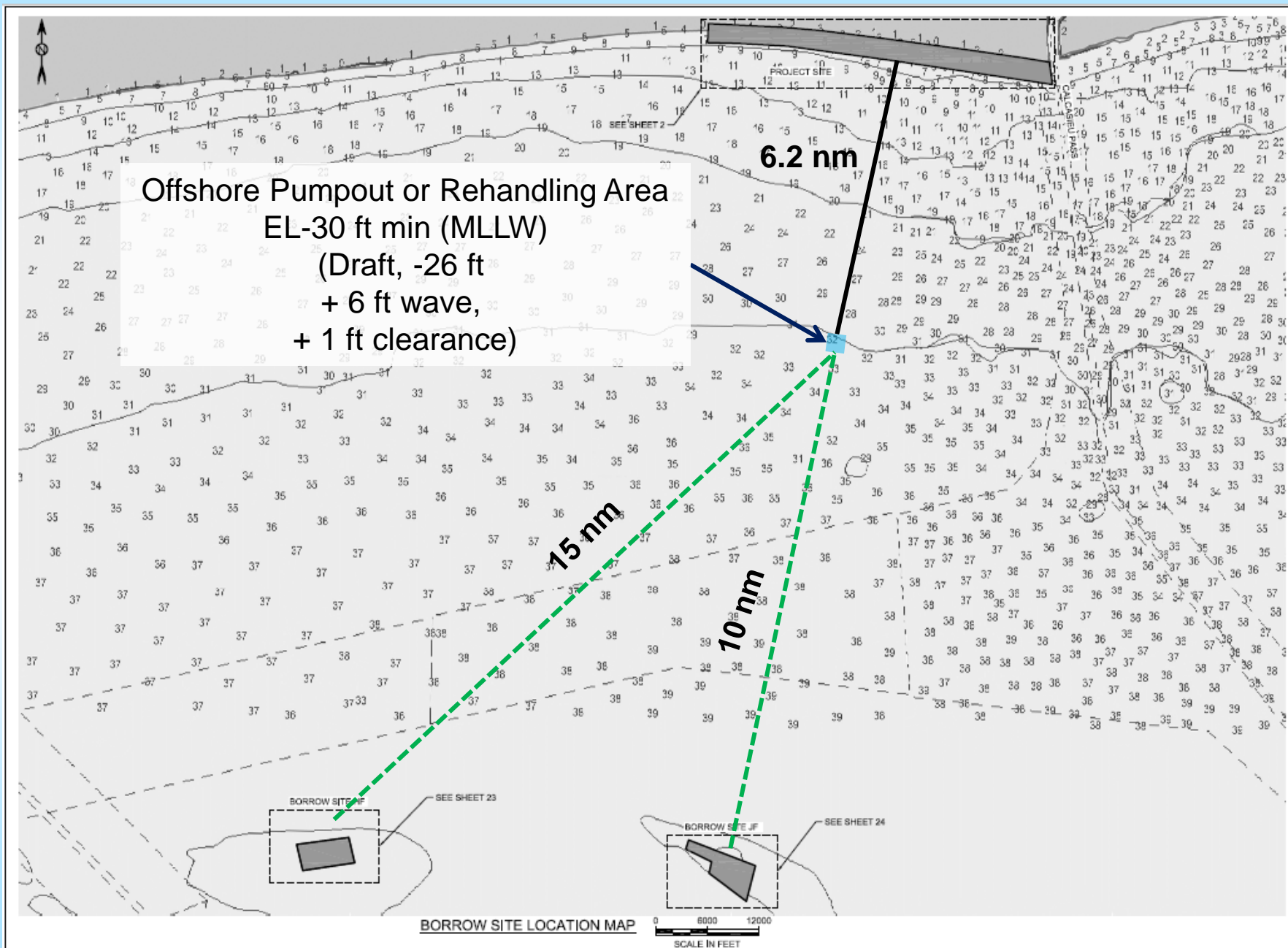
Predicted v/s Measured shoreline in 2008 using the dynamic sediment budget approach
(including the moving sediment wave)



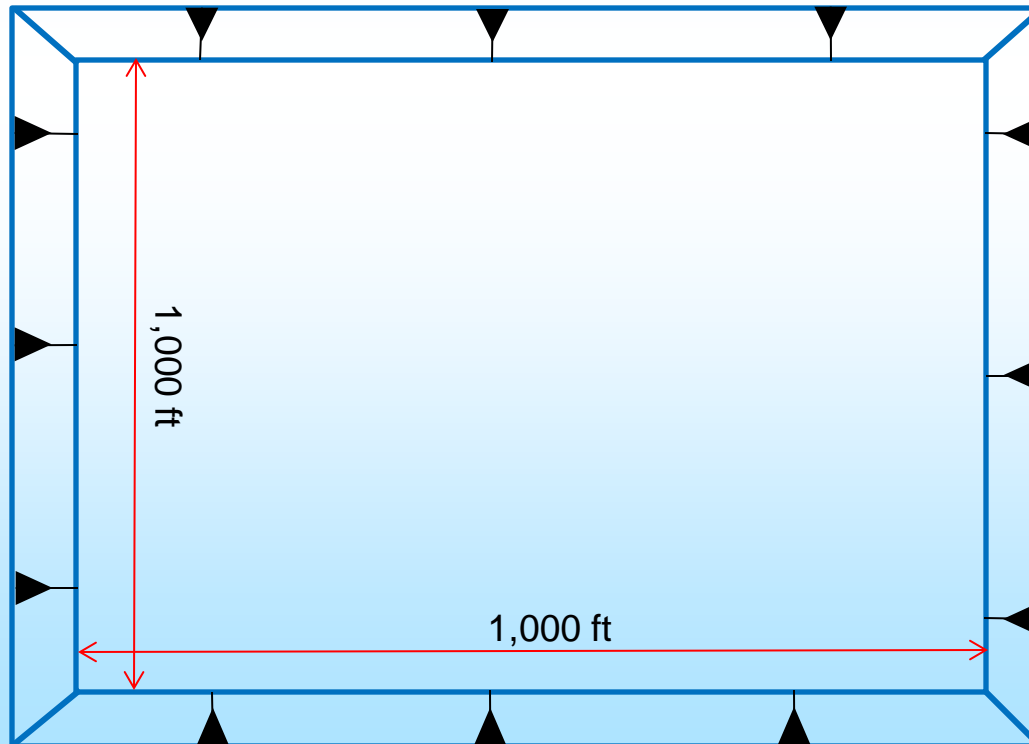
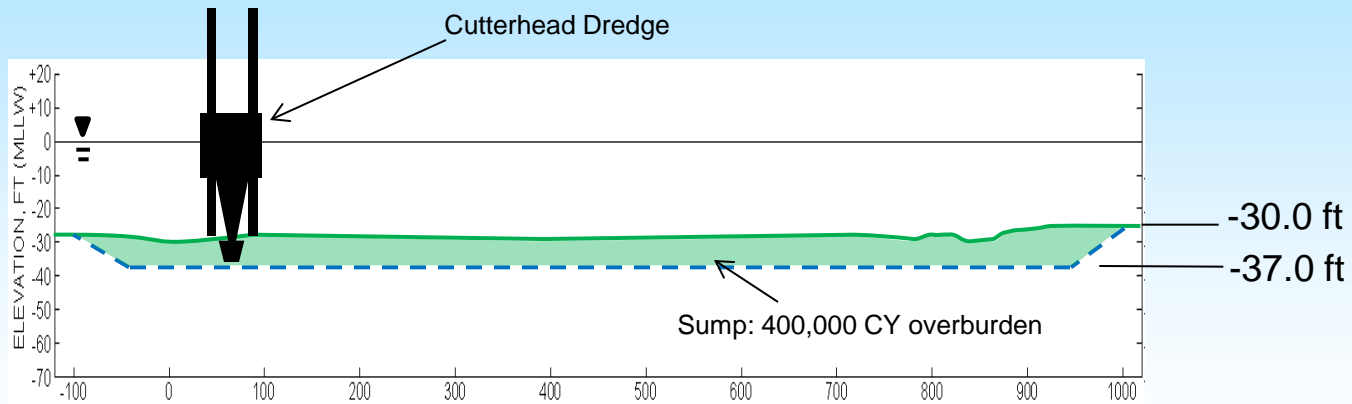
Sediment Delivery Alternatives Analysis

- Alternative 1: Calcasieu Pass Rehandle (CPR)
- Alternative 2: Calcasieu Pass Pumpout (CPP)
- Alternative 3: Offshore Rehandle (OR)
- Alternative 4: Offshore Pumpout (OP)
- Alternative 5: Direct Pumpout (DP)

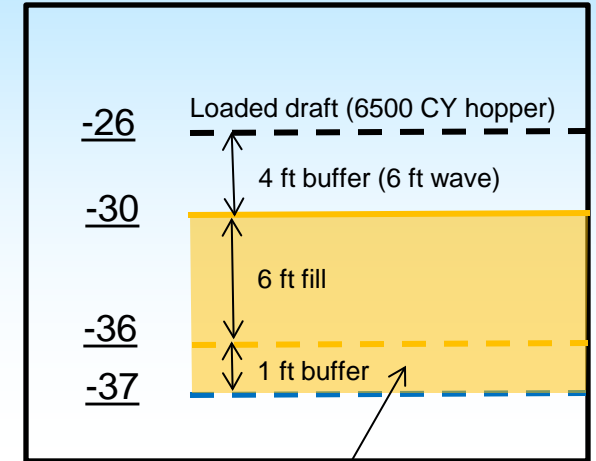
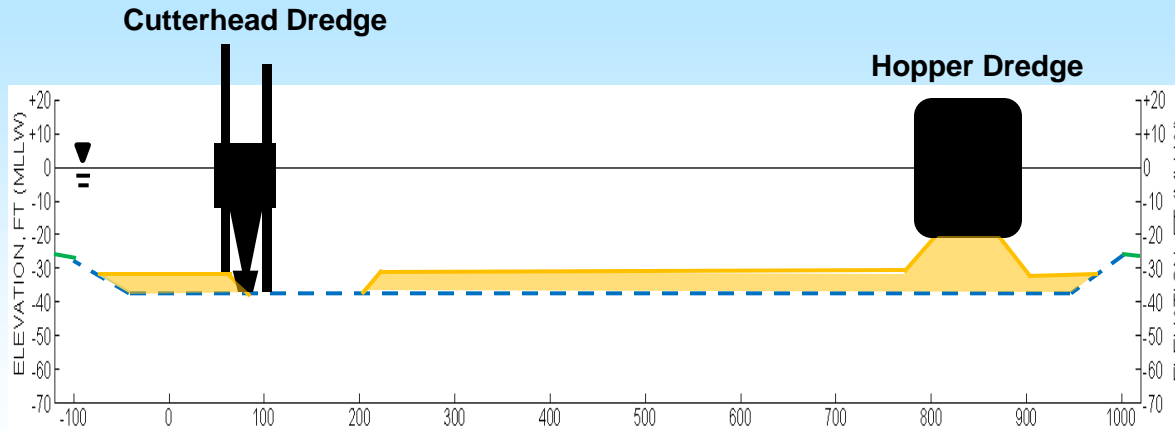
Offshore Pumpout or Rehandling Option



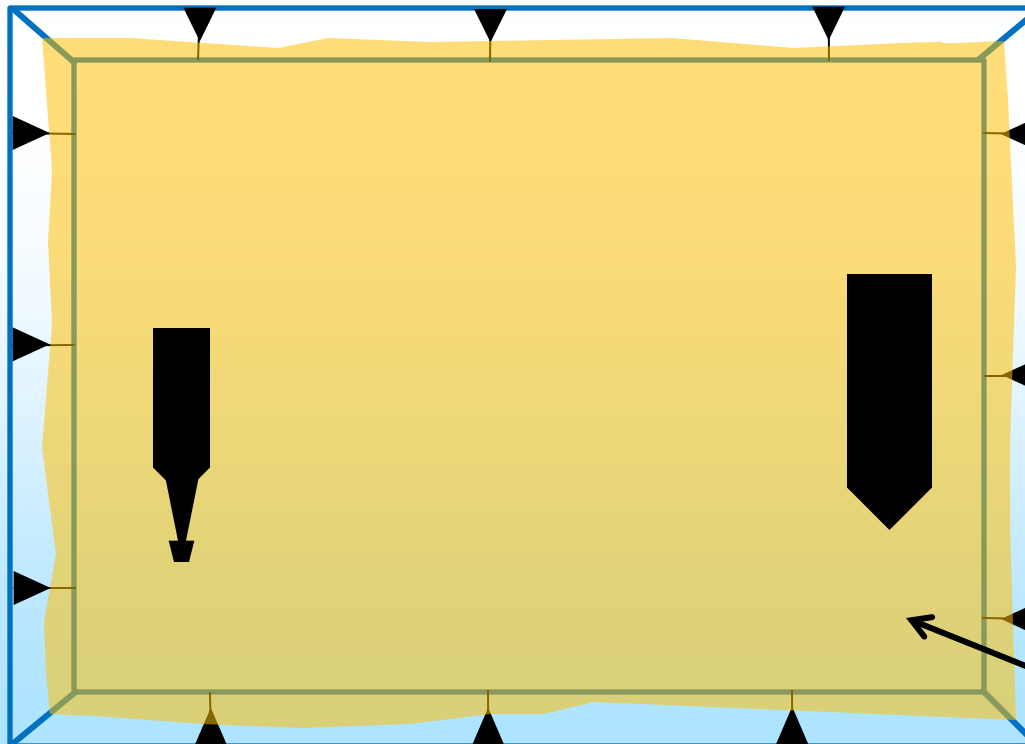
Offshore Rehandling Area



Offshore Rehandling area in operation



Layer to prevent mixing with silt



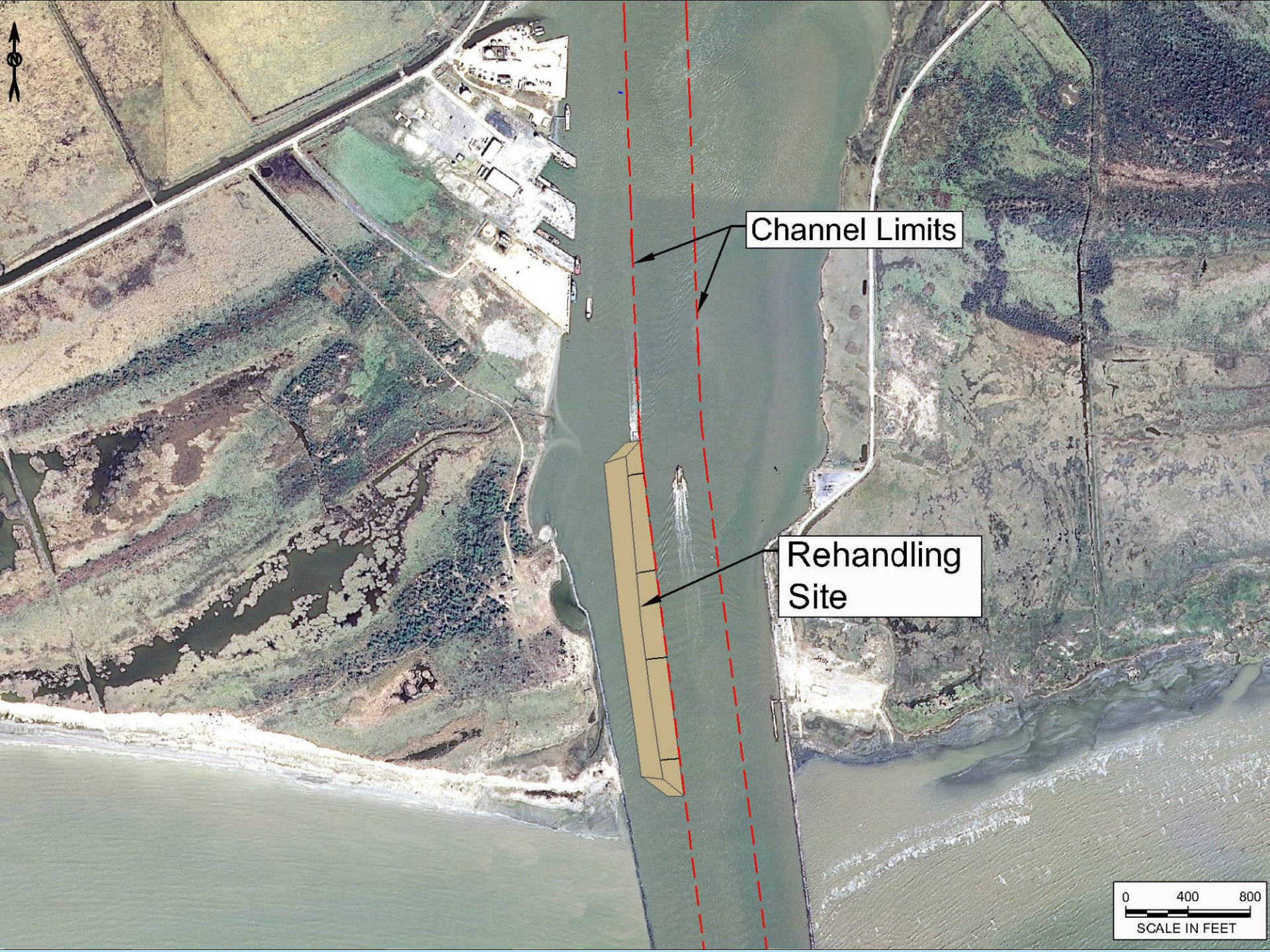
Capacity:
200,000 CY

Calcasieu Pass Pumpout method



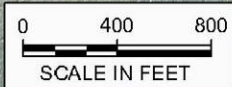
Calcasieu Pass Rehandling method

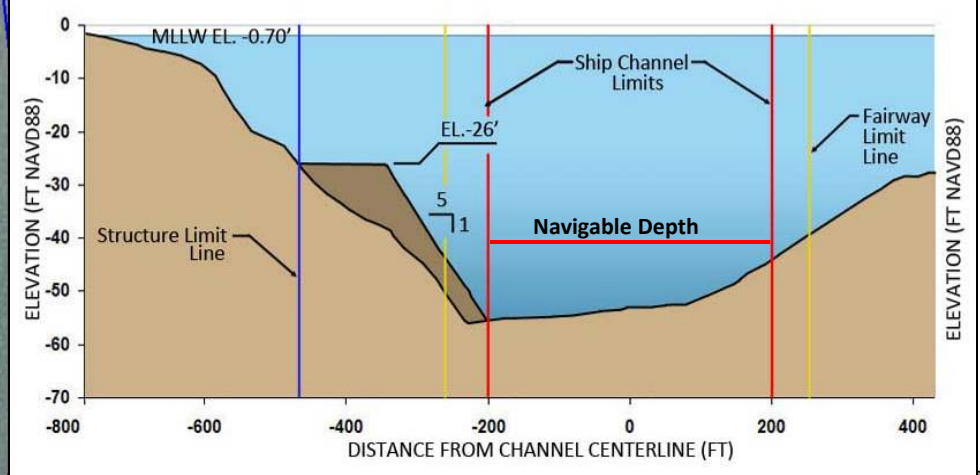
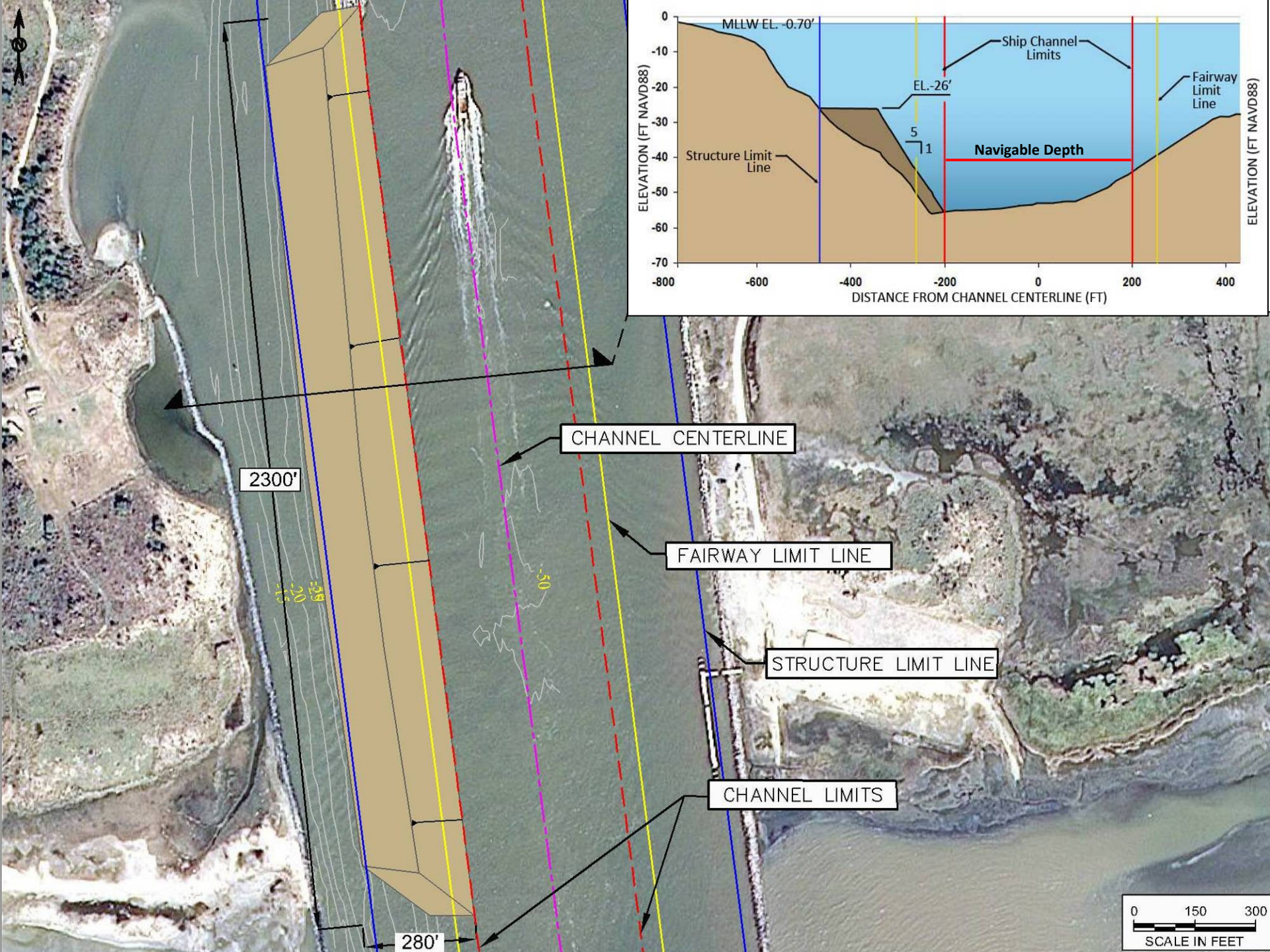




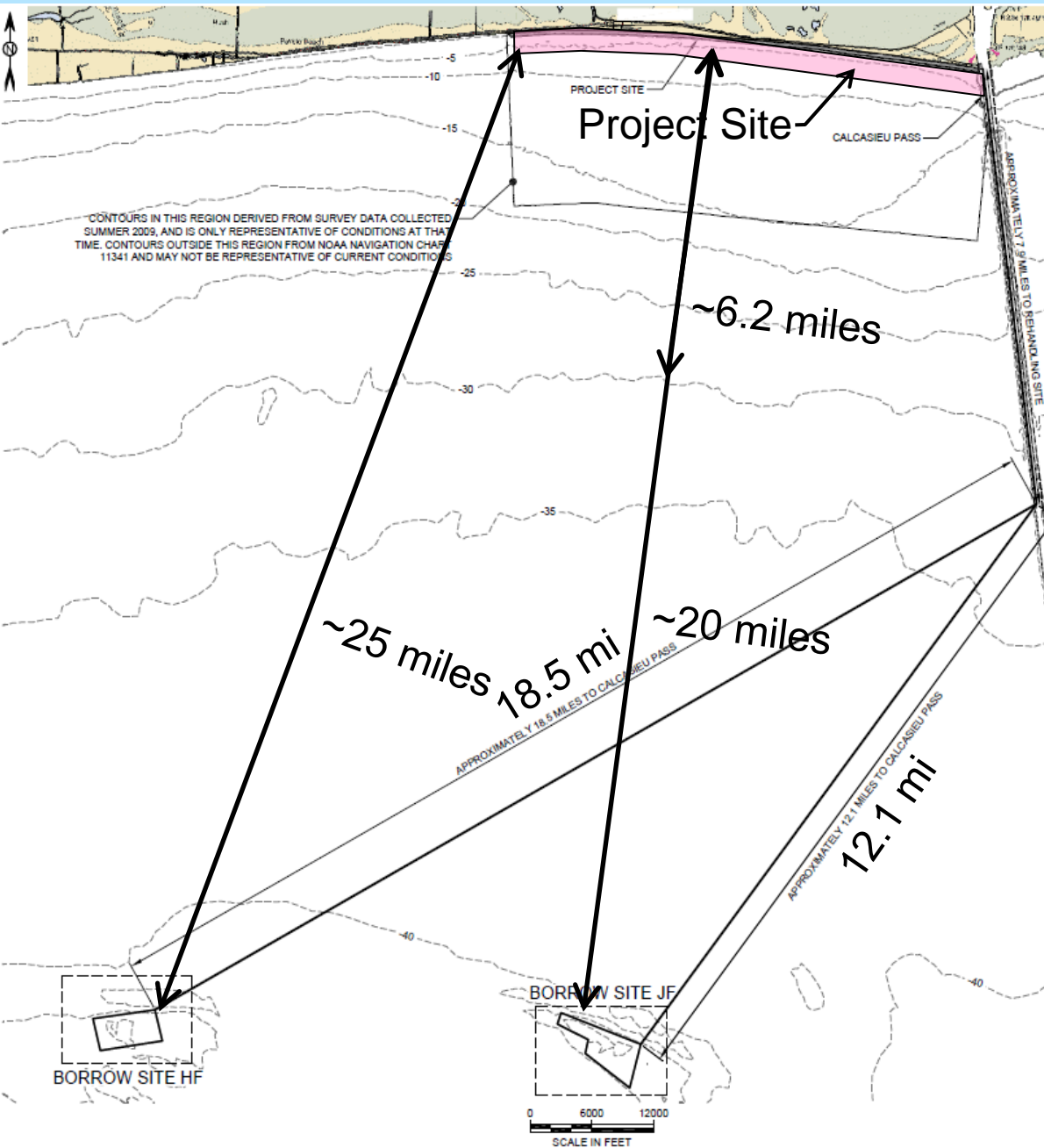
Channel Limits

Rehandling
Site





Sediment Delivery to Project Site



Five Delivery Options:

1. Dredge and Direct Pump
2. Offshore Pumpout
3. Offshore Rehandling
4. Calcasieu Pass Pumpout
5. Calcasieu Pass Rehandling

Glenn Edwards, Largest US Dredge

Hopper Capacity: 13,500 yd³ / 10,300 m³

Maximum Digging Depth: 90 ft / 27.5 m

Loaded Draft: 28 ft / 8.53 m

The “Glenn Edwards” in
Mobile Bay, AL



Bayport

Hopper capacity: 4,855 cy

Max digging depth: 85 ft

Loaded draft: 22 ft



Liberty Island

Hopper capacity: 6,500 cy

Max digging depth: 108 ft

Loaded draft: 25.5 ft



Typical Cutterhead Dredge in South Louisiana: Ponchartrain

Dimensions

Length: 170 ft (51.8 m)
Breadth: 39 ft (11.9 m)
Depth: 10 ft (3.0 m)
Overall Length: 243 ft (74.1 m)
Draft: 7 ft (2.1 m)

Operating Parameters

Dig Depth Range: 10 to 65 ft
(3.0 to 19.8 m)
Suction Diameter: 28.5 in (724 mm)
Discharge Diameter: 27 in (686 mm)
Ladder Weight: 175 tons (158,760 kg)

Machinery & Power

Fuel Capacity: 60,000 gal (227,124 l)
Main Pump Power: 4,000 hp (2,983 kW)
Total Installed Power: 6,000 hp (4,474 kW)



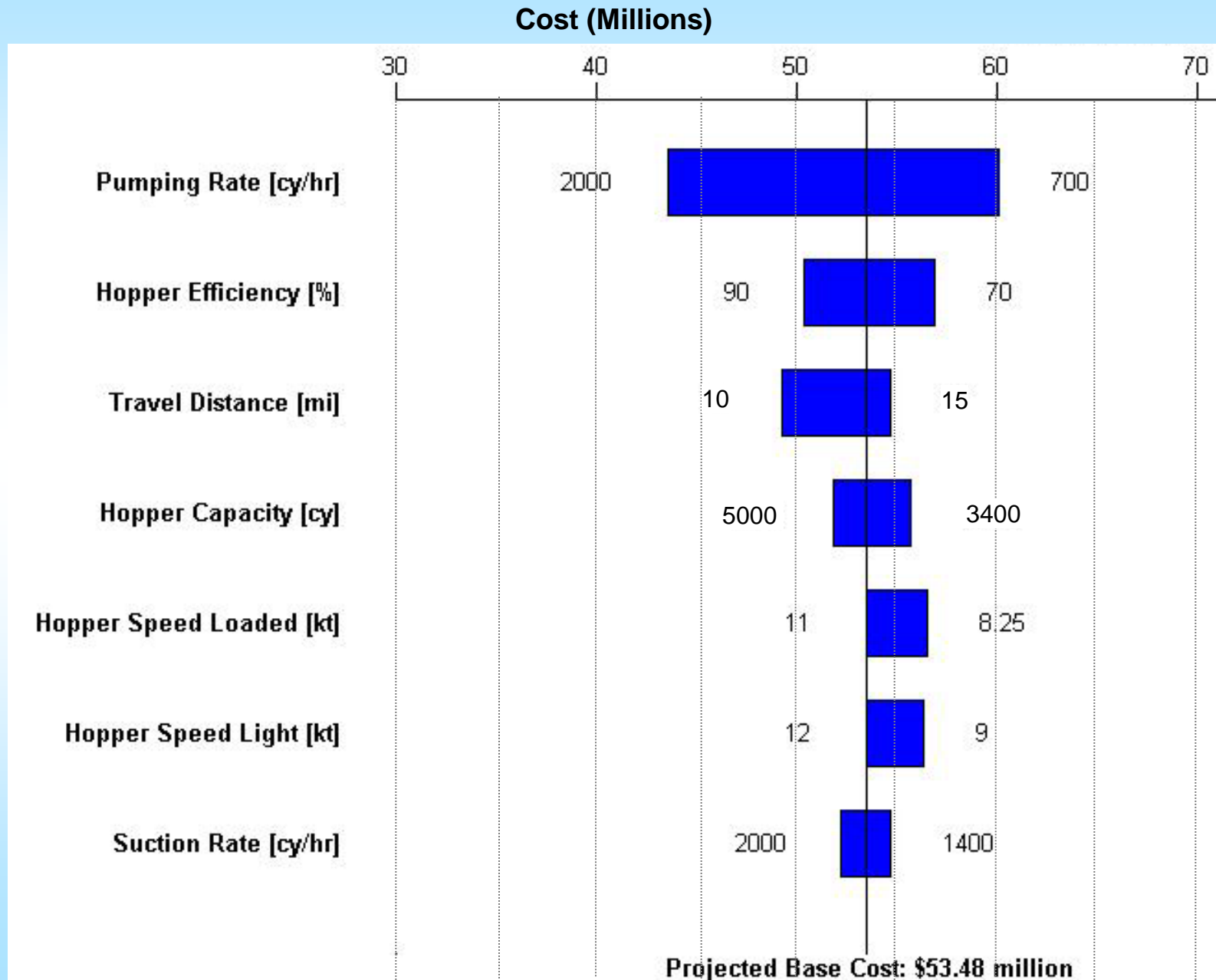
Sediment Delivery Alternatives Analysis

- Alternative 1: Calcasieu Pass Rehandle (CPR)
- Alternative 2: Calcasieu Pass Pumpout (CPP)
 - 2A: one large hopper dredge (4500 cy capacity)
 - 2B: one medium hopper dredge (2800 cy capacity)
 - 2C: two large hopper dredges (4500 cy capacity)
 - 2D: two medium hopper dredges (2800 cy capacity)
- Alternative 3: Offshore Rehandle (OR)
- Alternative 4: Offshore Pumpout (OP)
 - 4A: one large hopper dredge (4500 cy capacity)
 - 4B: two large hopper dredges (4500 cy capacity)
- Alternative 5: Direct Pumpout (DP)

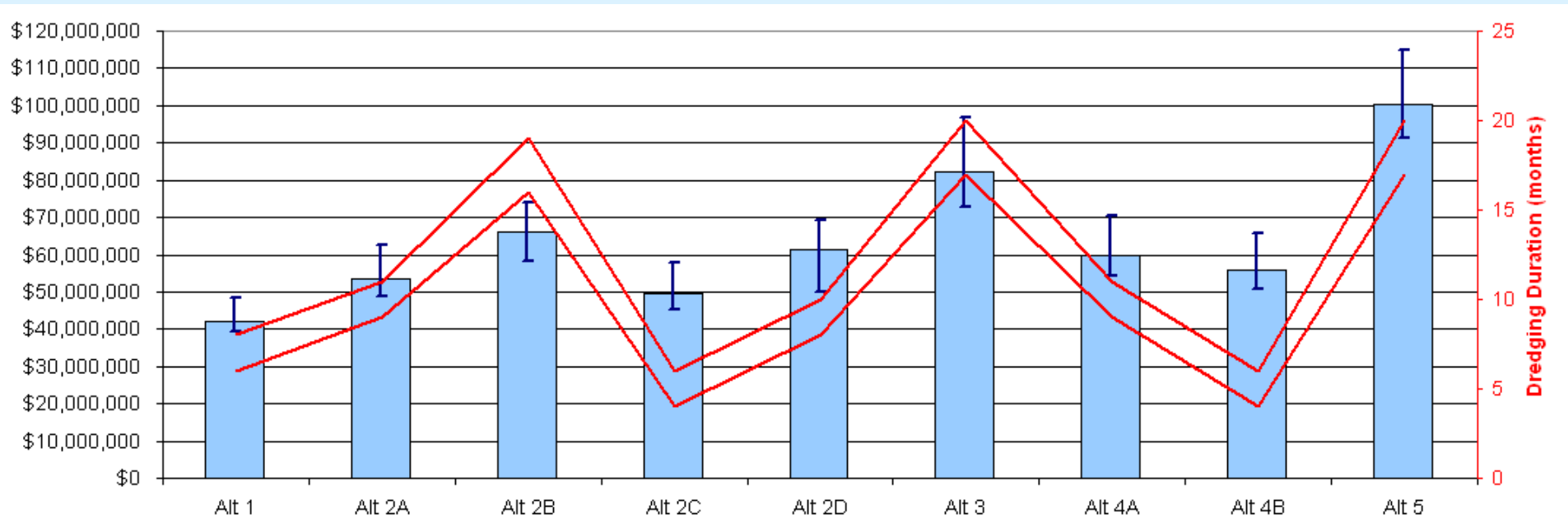
Sediment Delivery Alternatives Analysis

Parameter	Value (Range)	
Hopper Dredge	Medium Hopper	Large Hopper
Hopper Capacity [cy]	2800 (2500 - 3000)	4500 (3400 - 5000)
Production Rate (dredging) [cy/hr]	1700 (1400 - 2000)	2500 (2000 - 3000)
Production Rate (pumpout) [cy/hr]	950 (700 - 1500)	1500 (1000 - 2000)
Sailing Speed, loaded [kts]	11 (8.25 - 11)	14 (10.5 - 14)
Sailing Speed, light [kts]	12 (9 - 12)	15 (11.4 - 15)
Cutterhead Dredge Production Rate [cy/hr]		
From CPR site	1634 (1470 - 1797)	
From OR site	998 (898 - 1098)	
From Borrow Site	968 (871 - 1064)	
Travel Distance [mi]		
Borrow Site to CPR/CP site	25 (20 - 27)	
Borrow Site to OP/OR site	13 (10 - 16)	
Average Pumping Distance [mi]		
Borrow Site to Project Site	21.2	
CP to Project Site	4.9	
OP/OR Site to Project Site	11	

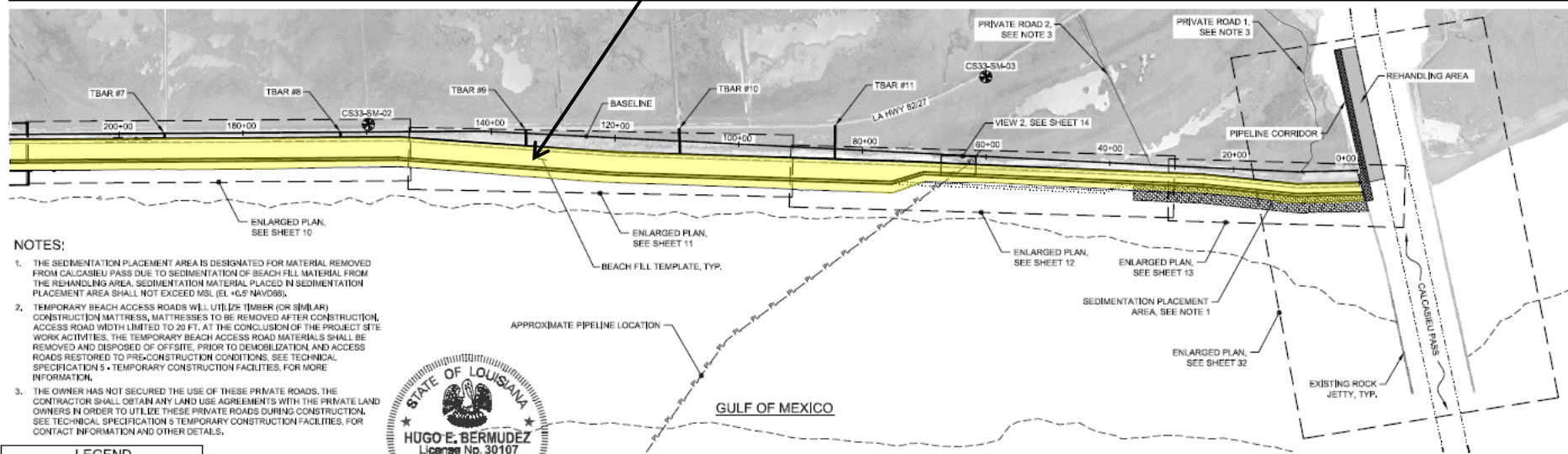
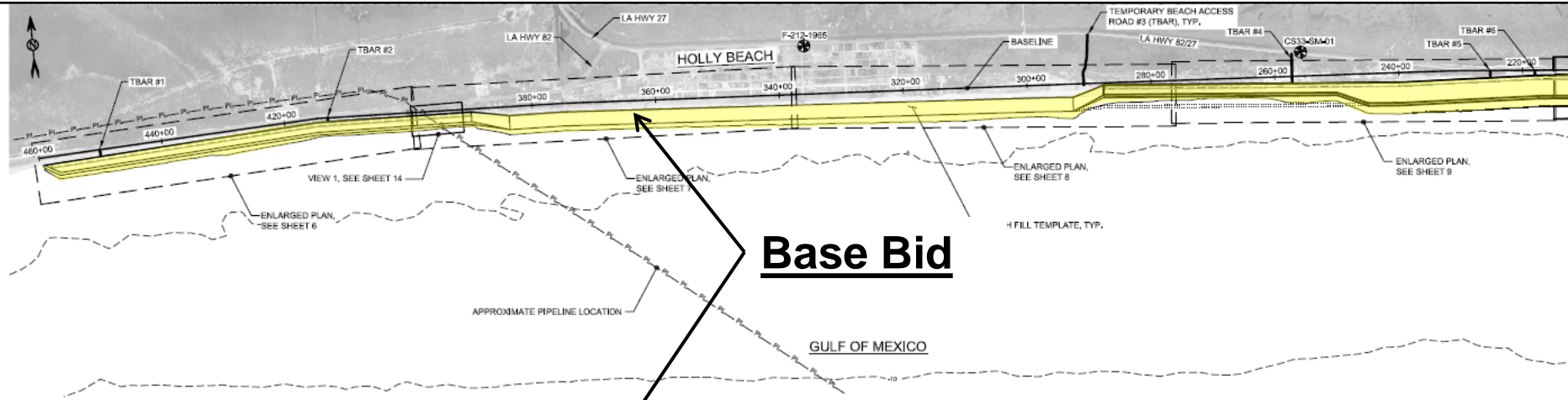
Sediment Delivery Alternatives Analysis



Sediment Delivery Alternatives Analysis



Beach Fill Site Plan



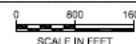
NOTES:

1. THE SEDIMENTATION PLACEMENT AREA IS DESIGNATED FOR MATERIAL REMOVED FROM CALCASIEU PASS DUE TO SEDIMENTATION OF BEACH FILL MATERIAL FROM THE REHANDLING AREA. SEDIMENTATION MATERIAL PLACED IN SEDIMENTATION PLACEMENT AREA SHALL NOT EXCEED MSL (EL +0.5 NAVD83).
2. TEMPORARY BEACH ACCESS ROADS WILL UTILIZE TIMBER (OR SIMILAR) CONSTRUCTION MATRESS, MATRESSES TO BE REMOVED AFTER CONSTRUCTION, ACCESS ROAD WIDTH LIMITED TO 20 FT. AT THE CONCLUSION OF THE PROJECT SITE WORK ACTIVITIES, THE TEMPORARY BEACH ACCESS ROAD MATERIALS SHALL BE REMOVED AND DISPOSED OF OFFSITE, PRIOR TO DEMOBILIZATION, AND ACCESS ROADS RESTORED TO PRE-CONSTRUCTION CONDITIONS. SEE TECHNICAL SPECIFICATION 5 - TEMPORARY CONSTRUCTION FACILITIES, FOR MORE INFORMATION.
3. THE OWNER HAS NOT SECURED THE USE OF THESE PRIVATE ROADS. THE CONTRACTOR SHALL OBTAIN ANY LAND USE AGREEMENTS WITH THE PRIVATE LAND OWNERS IN ORDER TO UTILIZE THESE PRIVATE ROADS DURING CONSTRUCTION. SEE TECHNICAL SPECIFICATION 5 TEMPORARY CONSTRUCTION FACILITIES, FOR CONTACT INFORMATION AND OTHER DETAILS.

LEGEND	
	PIPELINE CORRIDOR
	REHANDLING AREA
	SEDIMENTATION PLACEMENT AREA
	CONTROL POINT
	PIPELINES
	CONTOURS FT (NAVD83)
	CALCASIEU SHIP CHANNEL
	BASE BID
	ADDITIVE BID 2 AND 3



BEACH FILL SITE PLAN



REV.	DATE	DESCRIPTION	BY
A	5/5/12	FOR BID	TM

	COAST & HARBOR ENGINEERING	
	3410 FAR WEST BLVD., SUITE 210 AUSTIN, TX 78731 PH. 512-342-9516 FAX 512-342-9708	
SUBMITTED UNDER THE AUTHORITY OF HUGO E. BERMUDEZ, P.E., 30107		NOT FOR BIDDING OR CONSTRUCTION.

COASTAL PROTECTION AND RESTORATION AUTHORITY	
450 LAUREL STREET BATON ROUGE, LOUISIANA 70801	
DRAWN BY: T. MORRISON	DESIGNED BY: JOSH CARTER

CAMERON PARISH SHORELINE RESTORATION PROJECT	
STATE PROJECT NUMBER: CS-33 SF	FEDERAL PROJECT NUMBER:
APPROVED BY: HUGO E. BERMUDEZ, P.E.	

BEACH FILL - OVERALL SITE PLAN
Sheet 5

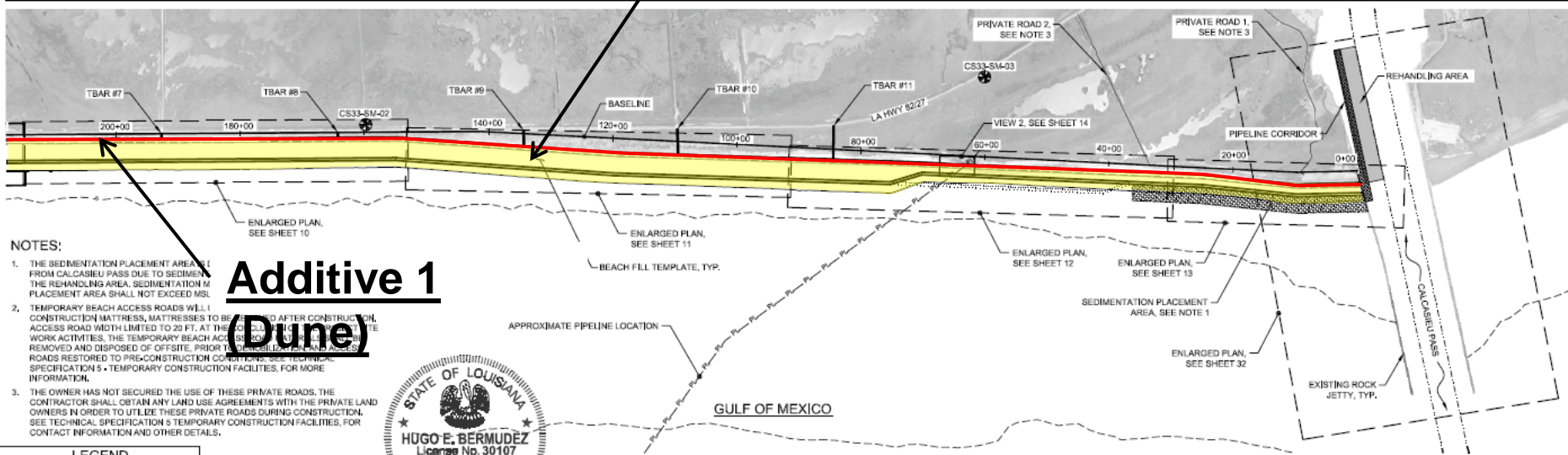
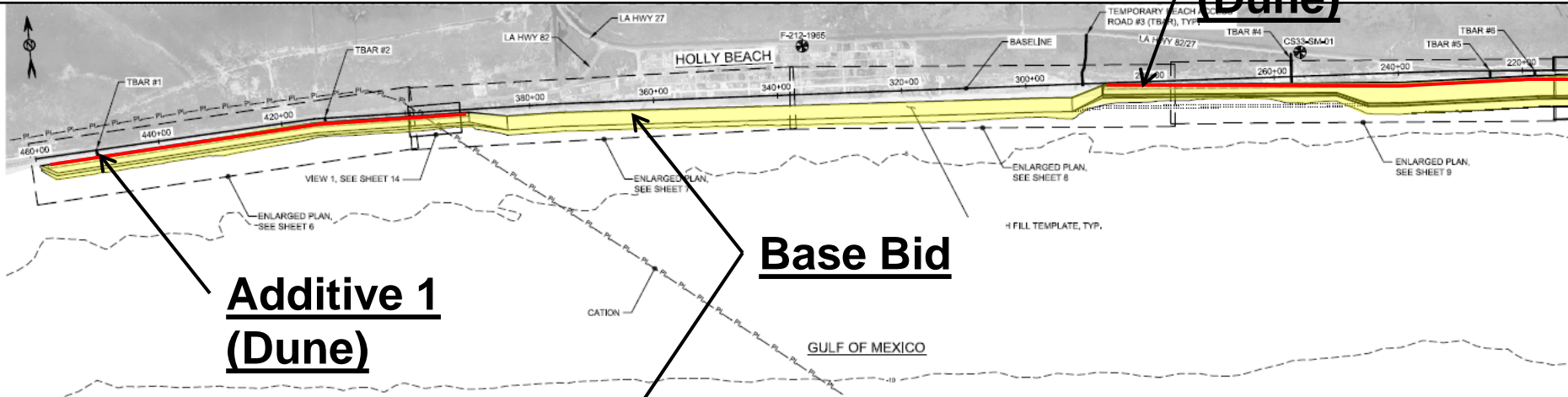
Beach Fill Site Plan

**Additive 1
(Dune)**

**Additive 1
(Dune)**

Base Bid

**Additive 1
(Dune)**



NOTES:

1. THE SEDIMENTATION PLACEMENT AREA IS FROM CALCASIEU PASS DUE TO SEDIMENT. THE REHANDLING AREA, SEDIMENTATION PLACEMENT AREA SHALL NOT EXCEED NSL.
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	PIPELINES
	CONTOURS FT (NAVD88)
	CALCASIEU SHIP CHANNEL
	BASE BID
	ADDITIVE BID 2 AND 3



BEACH FILL SITE PLAN
0 800 1600
SCALE IN FEET

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DRAWN BY: T. MORRISON DESIGNED BY: JOSH CARTER

**CAMERON PARISH
SHORELINE RESTORATION PROJECT**
STATE PROJECT NUMBER: CS-33 SF
FEDERAL PROJECT NUMBER:

APPROVED BY: HUGO E. BERMUDEZ, P.E.

BEACH FILL -
OVERALL SITE PLAN

Sheet 5

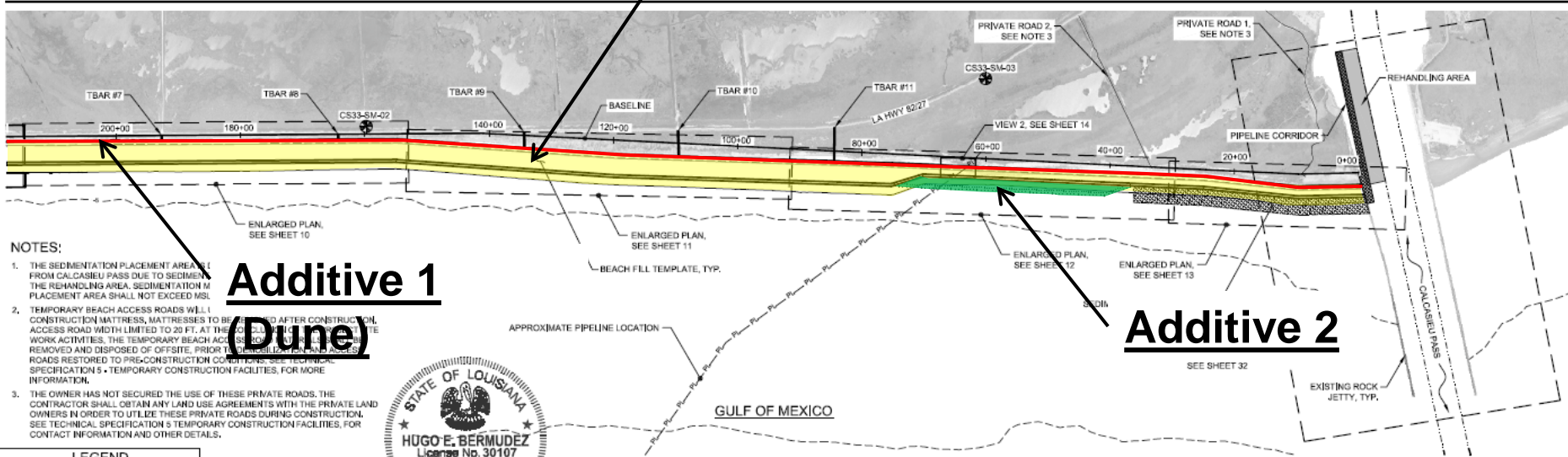
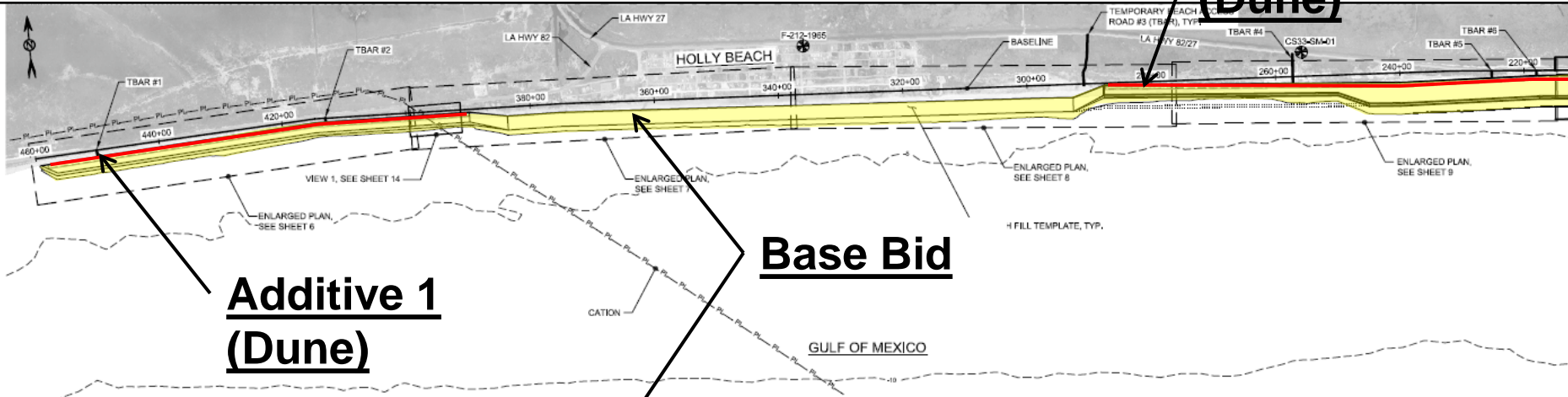
Beach Fill Site Plan

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(Dune)**


**Additive 1
(Dune)**

Base Bid

Additive 2



BEACH FILL SITE PLAN
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SCALE IN FEET

		 <div>COAST & HARBOR ENGINEERING 3410 FAR WEST BLVD., SUITE 210 AUSTIN, TX 78731 PH 512-342-9516 FAX 512-342-9708</div>		<div>COASTAL PROTECTION AND RESTORATION AUTHORITY</div> <div>450 LAUREL STREET BATON ROUGE, LOUISIANA 70801</div>		<div>CAMERON PARISH SHORELINE RESTORATION PROJECT</div> <div>STATE PROJECT NUMBER: CS-33 SF</div> <div>FEDERAL PROJECT NUMBER:</div>		<div>BEACH FILL - OVERALL SITE PLAN</div>	
A 6/6/12		FOR BID		TM					
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								Sheet 5	

Beach Fill Site Plan

**Additive 1
(Dune)**

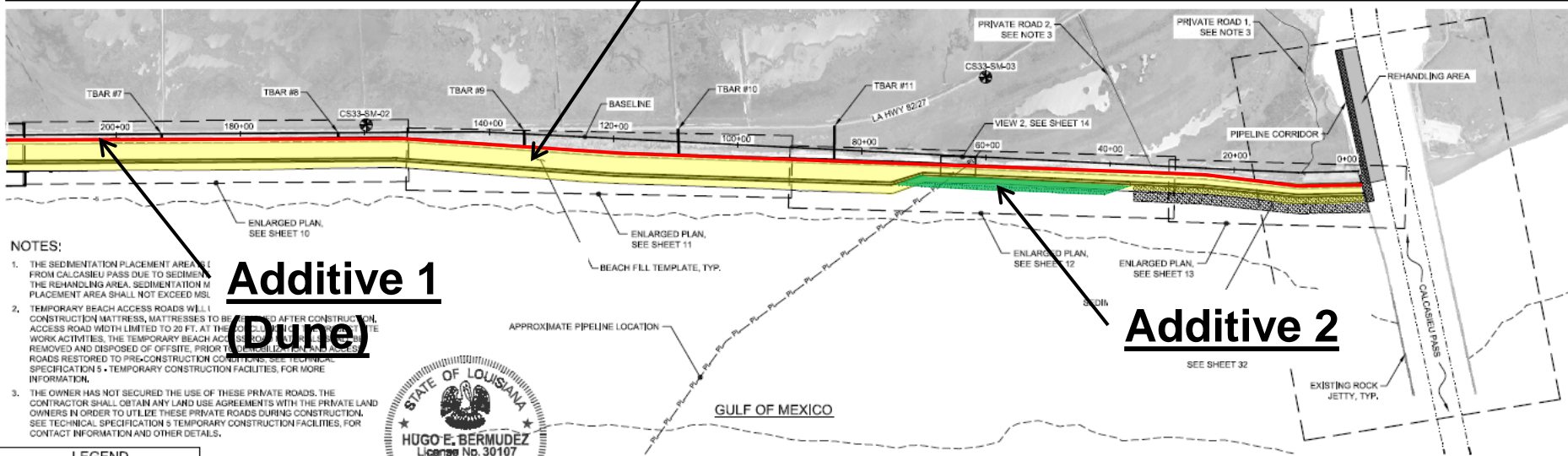
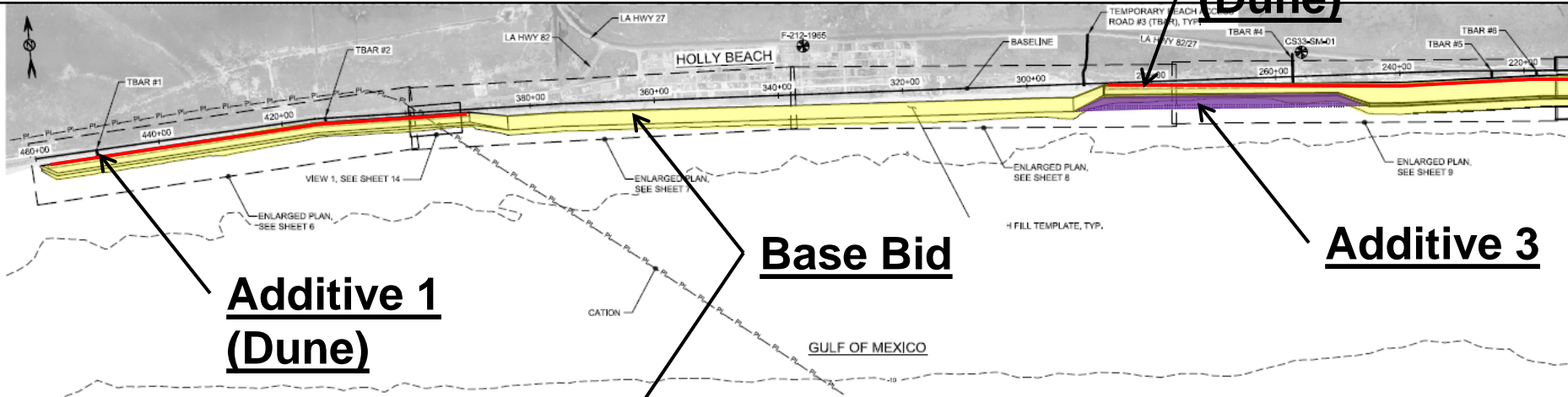
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(Dune)**

Base Bid

Additive 3

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(Dune)**

Additive 2



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BEACH FILL SITE PLAN
0 800 1600
SCALE IN FEET

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**CAMERON PARISH
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APPROVED BY: HUGO E. BERMUDEZ, P.E.

BEACH FILL -
OVERALL SITE PLAN

Sheet 5

Beach Fill Section

