

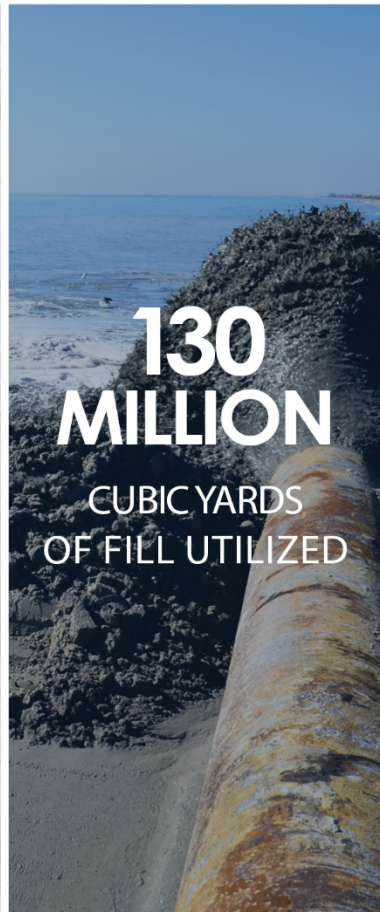


East Timbalier Island Restoration Project (TE-0118) and Terrebonne Basin Barrier Island & Beach Nourishment (TE-0143) November 29, 2018



Bureau of Ocean Energy Management (BOEM), Marine Minerals Program
Gulf of Mexico Offshore Sand Management Working Group

Since 2007...



Our Coast. Our Future.

Coastal Restoration in Louisiana Began in 1990's



Coastal Protection and
Restoration Authority of Louisiana

At that time big projects were:

- 5 miles of 30 inch dredge pipe, no booster pumps
- Create 100+ acres
- \$ 20 M - One funding source
- Using Sand From Mississippi River & Ship Shoal were dreams.



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2018:

- 22 miles of 30 inch dredge pipe
- \$ 150 M+ projects
- Create 500+ acres per project
- Combining Projects for efficiency
- Multiple funding sources
- 6 projects sand out of MS River
- 3 projects sand Ship Shoal



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Restoration Authority of Louisiana



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TODAY'S DREAMS:

- \$ 500 M Projects;
- Diversions;
- Basin-Wide Ecological Restoration;
- Increased Funding;
- ETC.

ARE TOMORROW'S REALITY



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Ship Shoal

- Ship Shoal reworked remnants of Maringouin delta complex/ Mississippi River.
- Ship Shoal estimate 900 million cubic yards sand.
- Shea Penland advocated use of Ship Shoal sand for shoreline restoration.
- Clean sand grain size ranging 0.15 to 0.20mm.

East Timbalier Island Restoration Project (TE-0118) and Terrebonne Basin Barrier Island & Beach Nourishment (TE-0143)





NFWF



Coastal Protection and
Restoration Authority of Louisiana

In Louisiana, NFWF funds be allocated solely to barrier island restoration projects and river diversion projects along the Mississippi and Atchafalaya Rivers.



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EAST TIMBALIER (TE-0118) PROJECT FEATURES

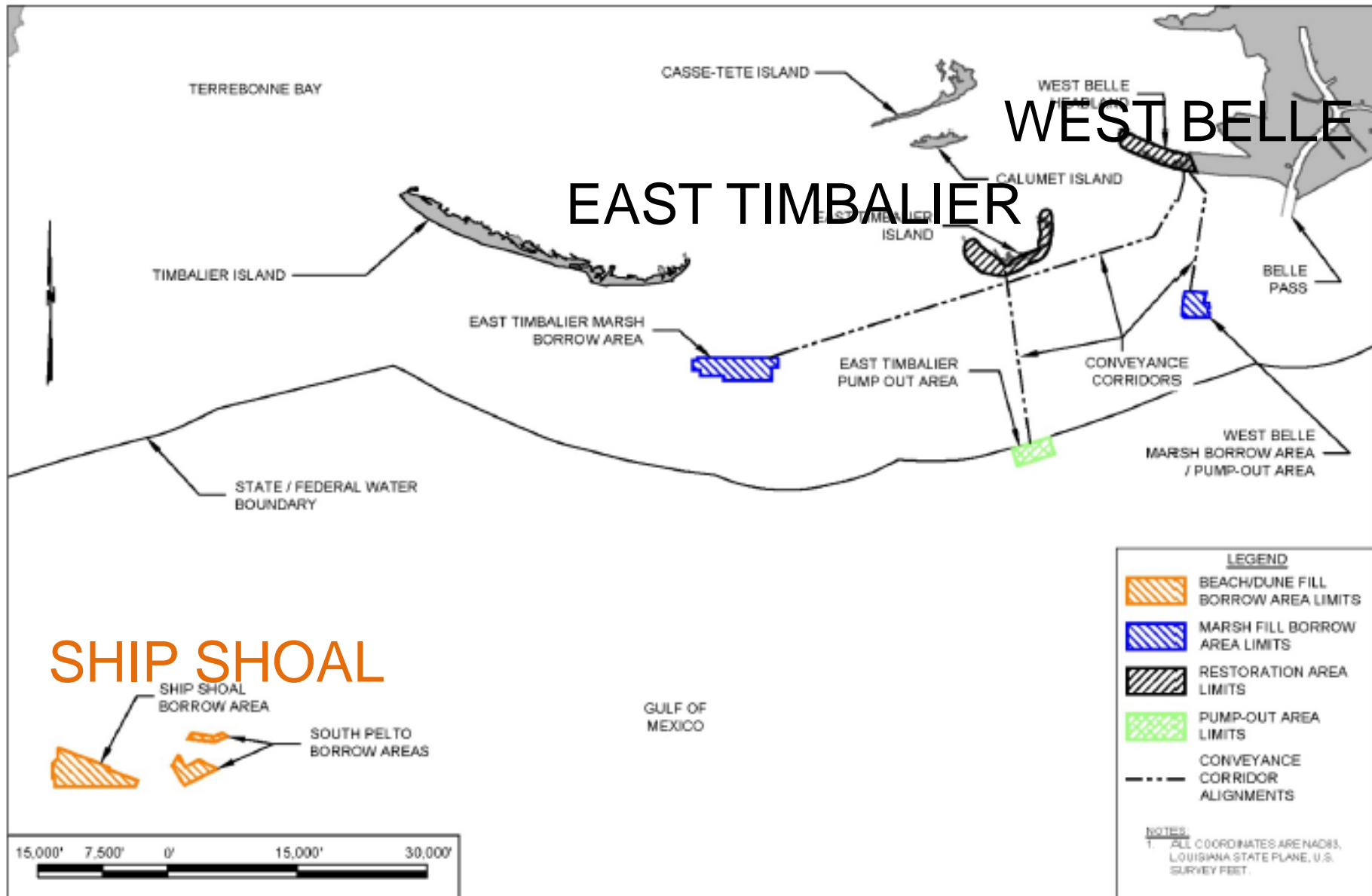
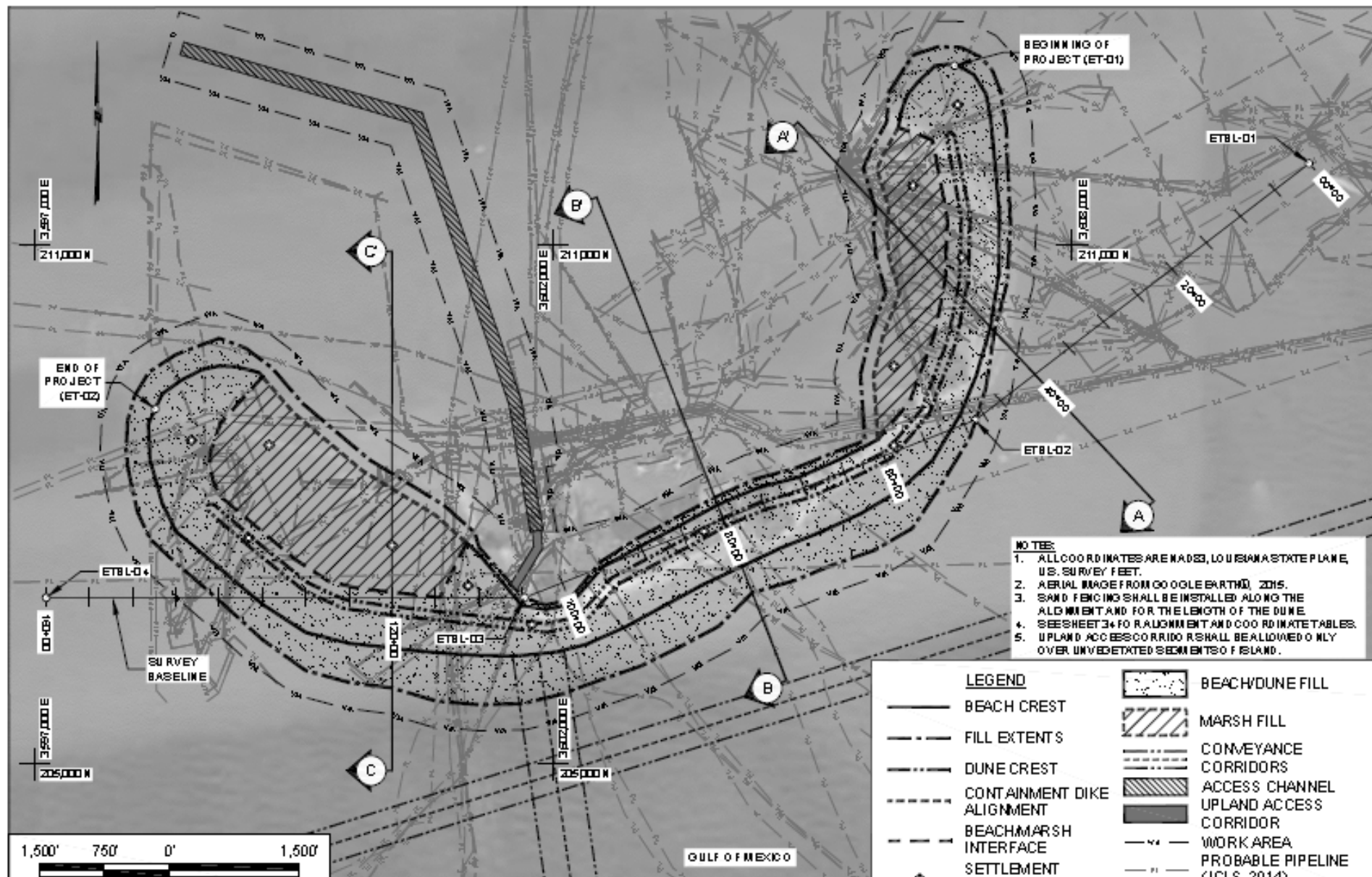


Figure 1.1 Project Area Map

EAST TIMBALIER FOOT PRINT



PIPELINES



Coastal Protection and
Restoration Authority of Louisiana

PREVIOUS 18
BARRIER ISLANDS: ~ 80 PIPELINES

EAST TIMBALIER: OVER 100 PIPELINES

TE-118

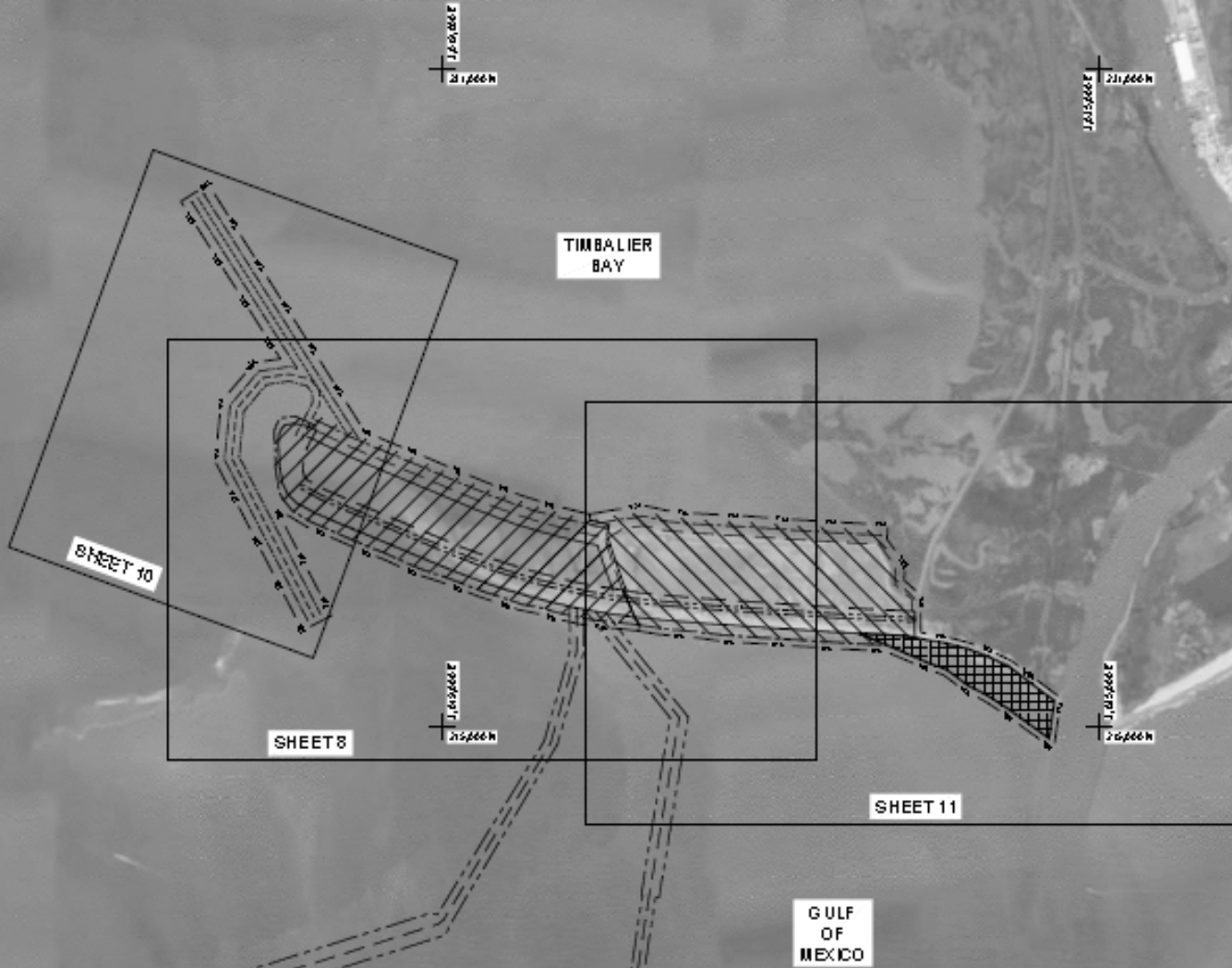


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WEST BELLE FOOT PRINT

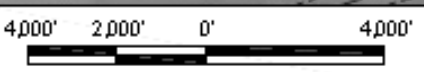


NOTES:
 1. ALL COORDINATES ARE MADE TO LOUISIANA STATE PLANE, U.S. SURVEY FEET.
 2. AERIAL IMAGE FROM GOOGLE EARTH © 2015.



LEGEND

- BEACH CREST
- FILL EXTENTS
- DUNE CREST
- BEACH/MARSH INTERFACE
- TEMPORARY SIDECAST DISPOSAL ALIGNMENT
- ACCESS CHANNEL ALIGNMENT
- EXTERIOR BORROW CHANNEL ALIGNMENT
- INTERIOR BORROW CHANNEL ALIGNMENT
- CONTAINMENT DIKE ALIGNMENT
- WEST BELLE HEADLAND RENOURISHMENT AREA
- WEST BELLE HEADLAND RESTORATION AREA
- NEARSHORE DISPOSAL AREA
- CONVEYANCE CORRIDORS
- WORK AREA



PROJECT CONSTRUCTION NEEDS



Coastal Protection and
Restoration Authority of Louisiana

- 1) PERMITS
- 2) BUDGET (SEDIMENT)
- 3) BUDGET (\$\$\$)
- 4) LAND RIGHTS



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Timeline of Breach Formation

October 7, 2013



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Restoration Authority of Louisiana

TE-0118

April 30, 2015



Coastal Protection and
Restoration Authority of Louisiana

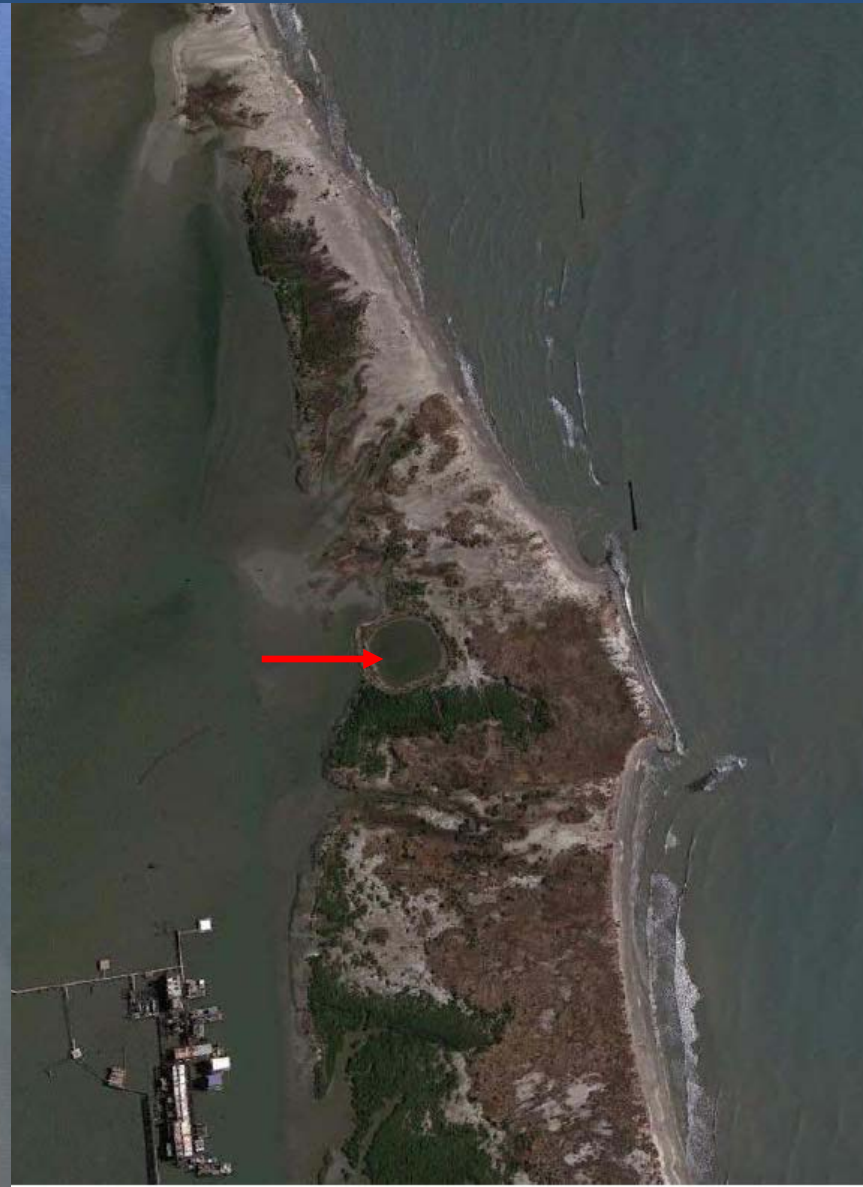
TE-0118

October 31, 2016



TE-0118

2017 Drone Photo & Google Jan 2015 Photo



June 2017 - Krewe Energy Drone Photo



October 2017 - Krewe Energy Drone Photo



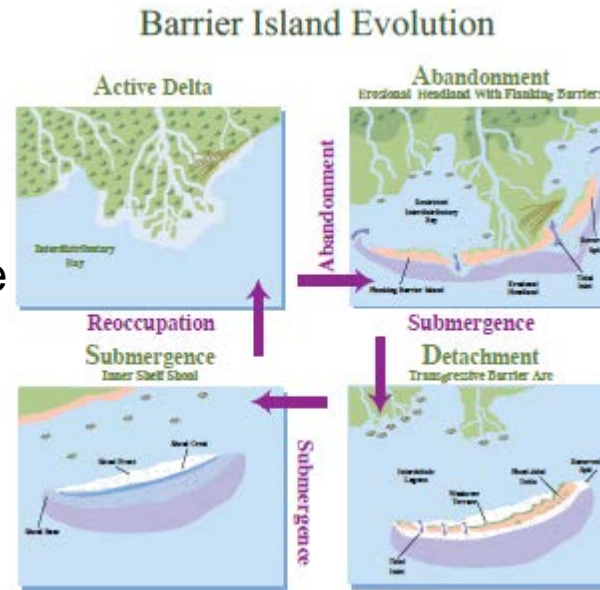
Causes of Breach



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Restoration Authority of Louisiana

TE-0118

- Regressive Barrier Island System
 - Transition from detachment to submergence
- Impacts from oil and gas infrastructure
 - Access channel dredging
- Existing Coastal Structures
 - Belle Pass Jetties
 - East Timbalier Breakwaters
- Winter and tropical storm systems



ULTIMATE CAUSE IS THE LACK OF SEDIMENT!



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BREACH IN EAST TIMBALIER



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Restoration Authority of Louisiana

**Approximately 2.3 mcy lost
Or
44% of Island lost since 2015**

TE-0118



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RECOMMENDED OPTION



Coastal Protection and
Restoration Authority of Louisiana

- West Belle Pass Headland
- Terrebonne Basin Barrier Island and Beach Nourishment (Trinity and Timbalier Islands)

TE-0118



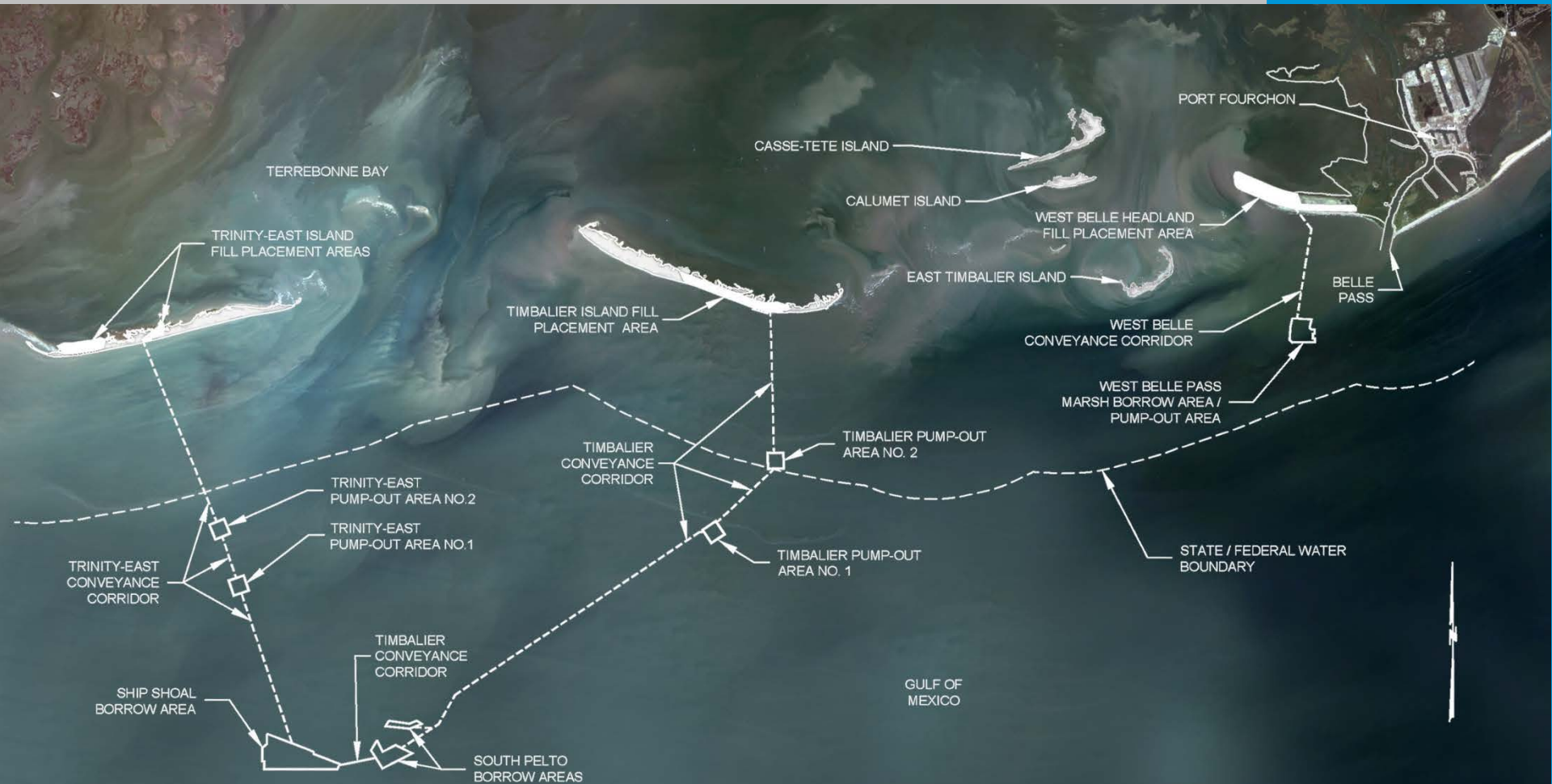
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- Nourishment of 3 sites using ~10 MCY
 - 8 MCY from Ship Shoal/South Pelto
 - 2 MCY from state waters
 - 1,310-acre footprint



Coastal Protection and
Restoration Authority of Louisiana

TE-143





Coastal Protection and
Restoration Authority of Louisiana

Timeline

Construction funding:	Oct 2018
Final EA/FONSI:	Spring 2019
BOEM lease:	Summer 2019
Land Rights:	Spring 2019
Bid Package:	Summer 2019

- Construction duration ~24 months

TE-143



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Why these islands? Why now?



Coastal Protection and
Restoration Authority of Louisiana

- Breach Criteria and Classification
(Technical Memo, CEC, 2015)
 - Raccoon to Scofield Island



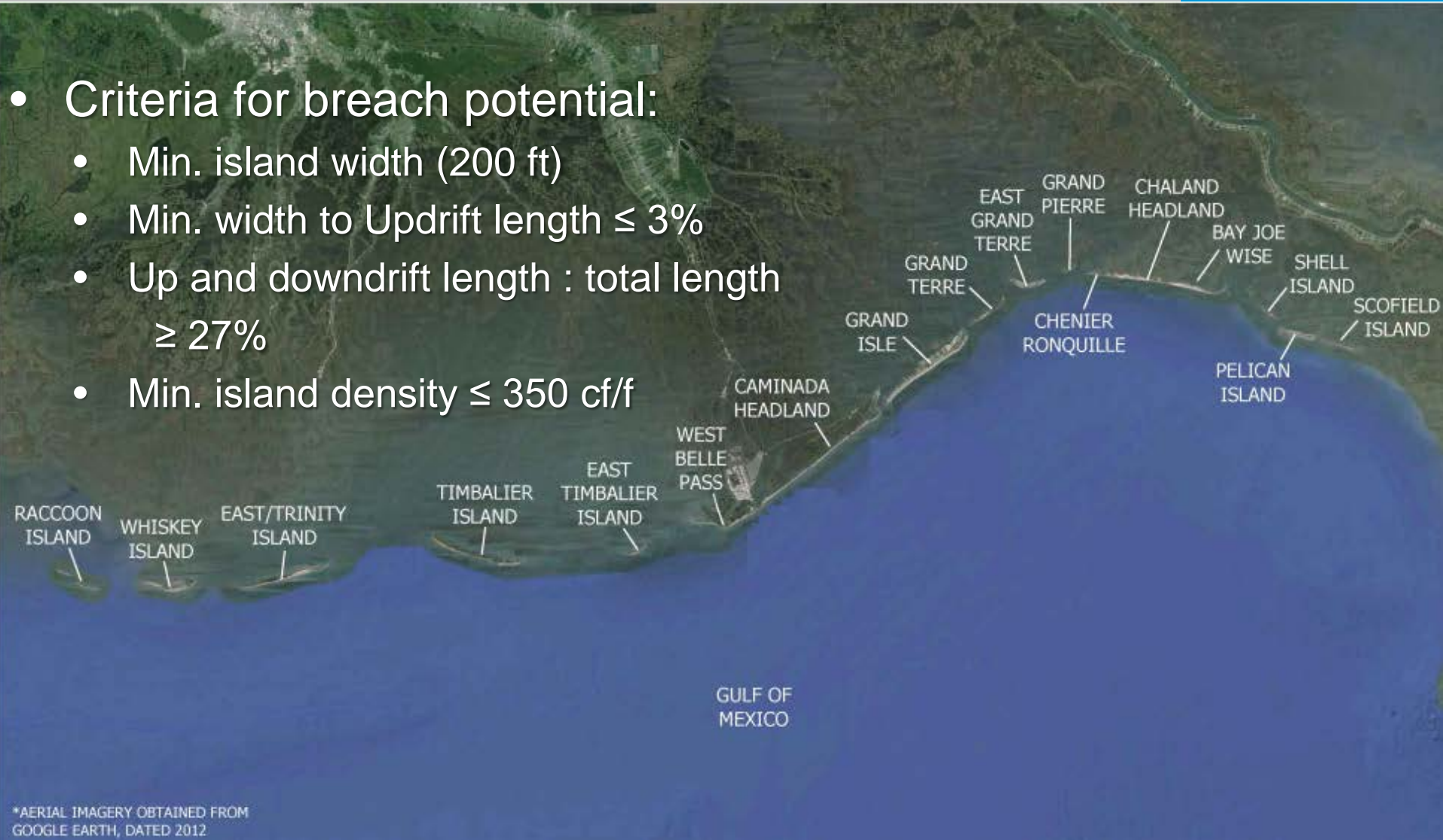
*AERIAL IMAGERY OBTAINED FROM
GOOGLE EARTH, DATED 2012

Why these islands? Why now?



Coastal Protection and
Restoration Authority of Louisiana

- Criteria for breach potential:
 - Min. island width (200 ft)
 - Min. width to Updrift length $\leq 3\%$
 - Up and downdrift length : total length $\geq 27\%$
 - Min. island density ≤ 350 cf/f

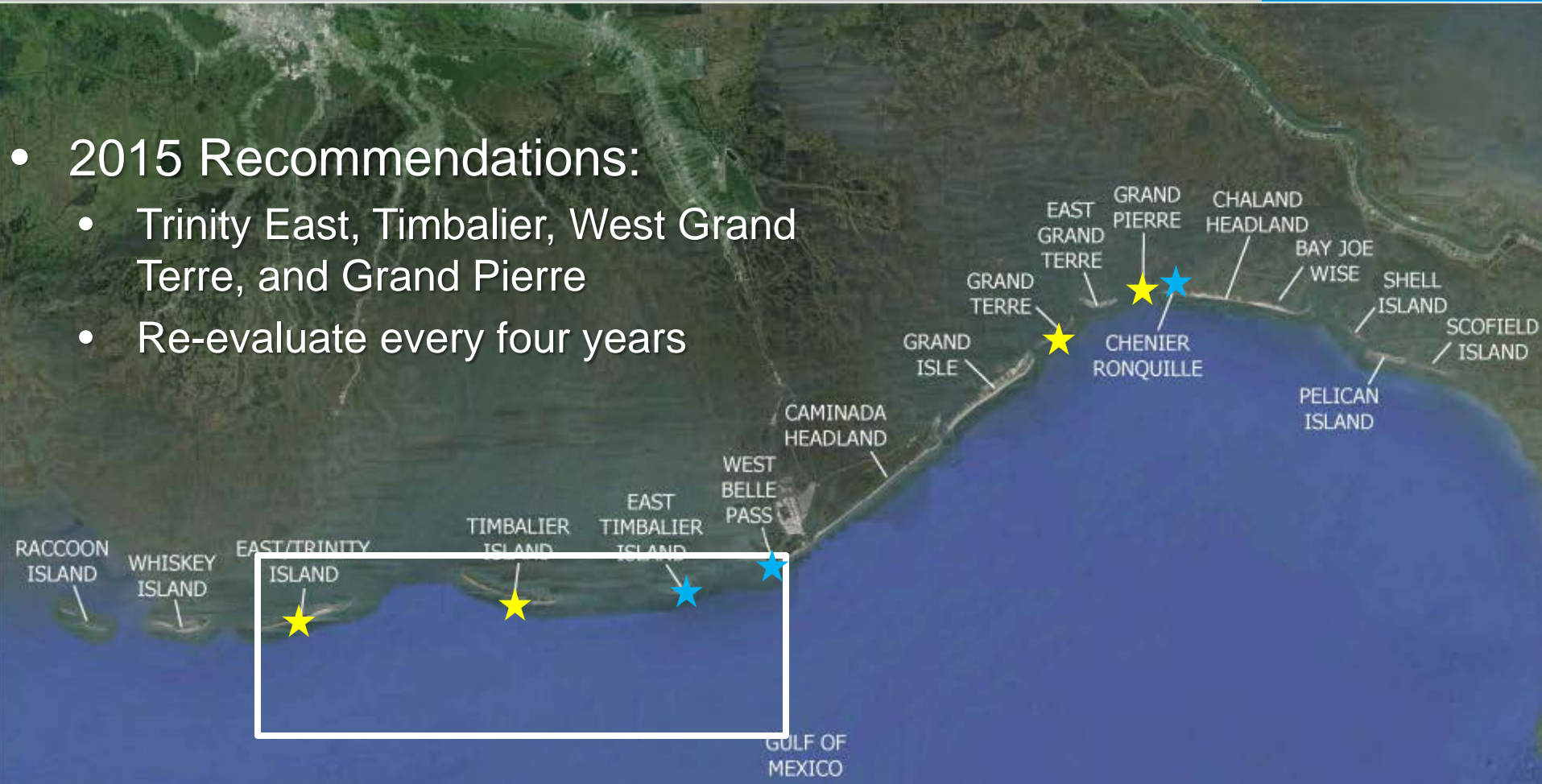


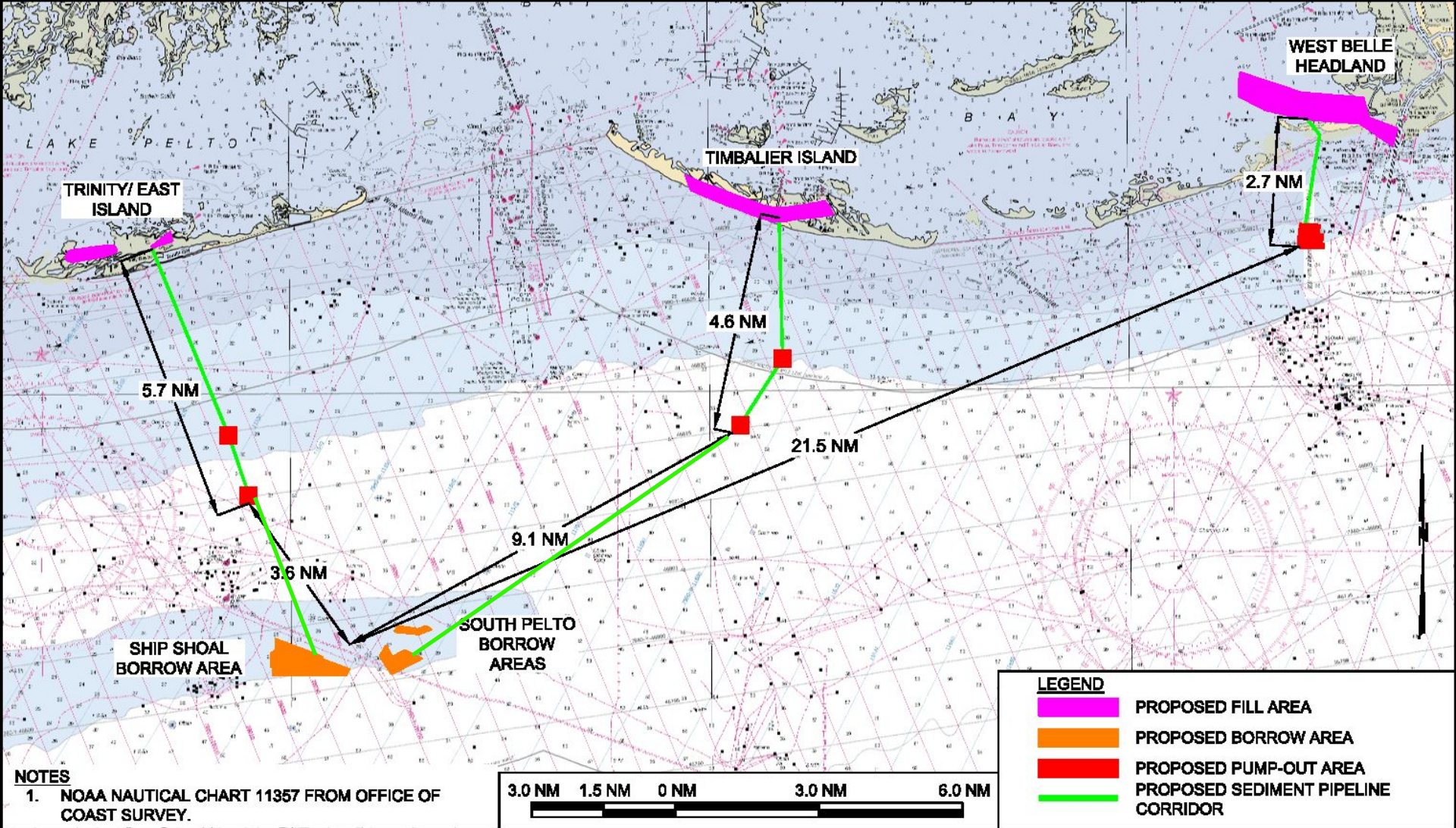
Why these islands? Why now?



Coastal Protection and
Restoration Authority of Louisiana

- 2015 Recommendations:
 - Trinity East, Timbalier, West Grand Terre, and Grand Pierre
 - Re-evaluate every four years





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West Belle Headland

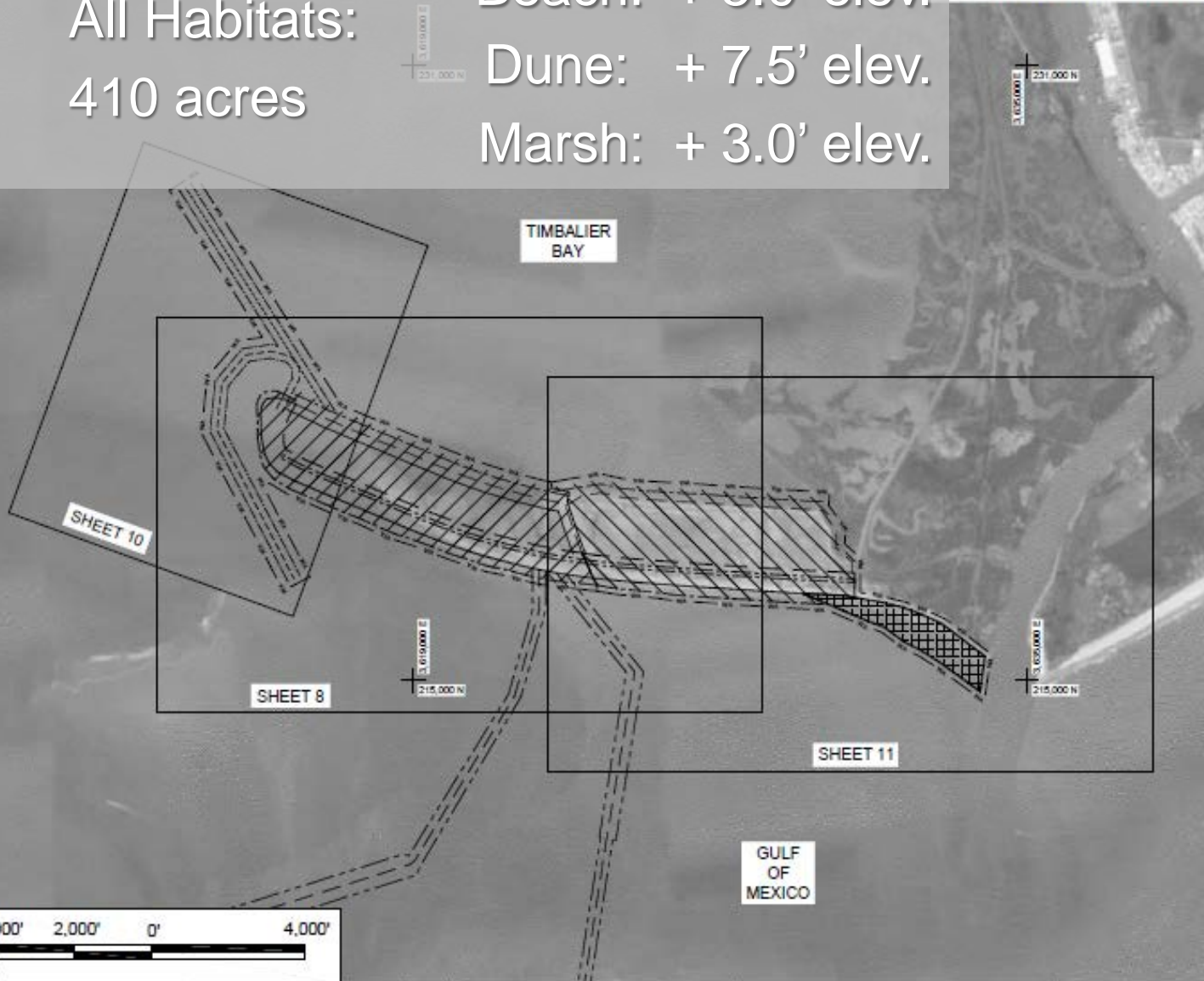
An aerial photograph of West Belle Headland, a coastal area. The land is a mix of green vegetation, brownish soil, and small water channels. The ocean is visible on the left, and a larger body of water is on the right. The sky is blue with some clouds. The text "West Belle Headland" is overlaid at the top in white, and "June 2018" is overlaid at the bottom left in white.

June 2018

All Habitats:
410 acres

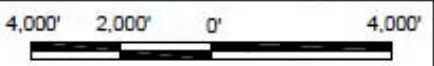
Beach: + 5.0' elev.
Dune: + 7.5' elev.
Marsh: + 3.0' elev.

NOTES:
1. ALL COORDINATES ARE NAD83, LOUISIANA STATE PLANE, U.S. SURVEY FEET.
2. AERIAL IMAGE FROM GOOGLE EARTH®, 2015.



LEGEND

- BEACH CREST
- - - - - FILL EXTENTS
- · - · - DUNE CREST
- · - - - BEACH/MARSH INTERFACE
- - - - - TEMPORARY SIDECAST DISPOSAL ALIGNMENT
- · - - - ACCESS CHANNEL ALIGNMENT
- - - - - EXTERIOR BORROW CHANNEL ALIGNMENT
- - - - - INTERIOR BORROW CHANNEL ALIGNMENT
- - - - - CONTAINMENT DIKE ALIGNMENT
- ▨▨▨▨ WEST BELLE HEADLAND RENOURISHMENT AREA
- ▧▧▧▧ WEST BELLE HEADLAND RESTORATION AREA
- ▩▩▩▩ FEEDER BEACH
- · - - - CONVEYANCE CORRIDORS
- · - - - WORK AREA



BY	DESCRIPTION	DATE
SD	NEARSHORE DISPOSAL AREA RENAMED FEEDER BEACH	5/19 2017

COASTAL ENGINEERING CONSULTANTS, INC

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
150 TERRACE AVENUE
BATON ROUGE, LA 70802

EAST TIMBALIER ISLAND RESTORATION

WEST BELLE HEADLAND OVERVIEW MAP

DRAWN BY: BRETT BORNE, E.I.

DESIGNED BY: MICHAEL T. POFF, P.E.
LICENSE NUMBER: 30048

APPROVED BY: TRAVIS BYLAND, P.E.

STATE PROJECT NUMBER: TE-118
FEDERAL PROJECT NUMBER: NFWF 43353

DATE: JANUARY 2017
SHEET 7 OF 37

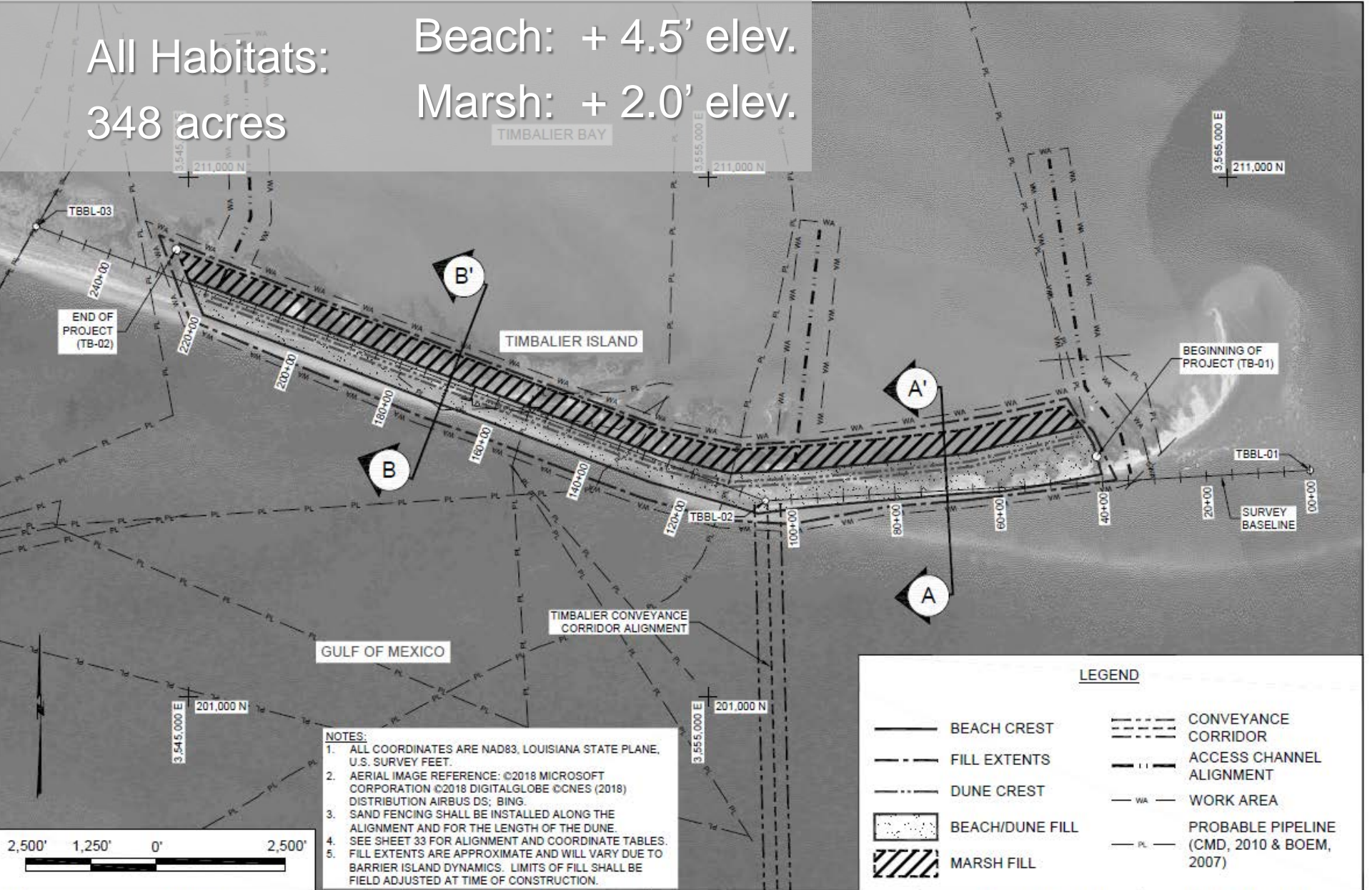
Timbalier Island



Nov 2018

All Habitats:
348 acres

Beach: + 4.5' elev.
Marsh: + 2.0' elev.



- NOTES:**
1. ALL COORDINATES ARE NAD83, LOUISIANA STATE PLANE, U.S. SURVEY FEET.
 2. AERIAL IMAGE REFERENCE: ©2018 MICROSOFT CORPORATION ©2018 DIGITALGLOBE ©CNES (2018) DISTRIBUTION AIRBUS DS; BING.
 3. SAND FENCING SHALL BE INSTALLED ALONG THE ALIGNMENT AND FOR THE LENGTH OF THE DUNE.
 4. SEE SHEET 33 FOR ALIGNMENT AND COORDINATE TABLES.
 5. FILL EXTENTS ARE APPROXIMATE AND WILL VARY DUE TO BARRIER ISLAND DYNAMICS. LIMITS OF FILL SHALL BE FIELD ADJUSTED AT TIME OF CONSTRUCTION.

LEGEND	
	BEACH CREST
	FILL EXTENTS
	DUNE CREST
	BEACH/DUNE FILL
	MARSH FILL
	CONVEYANCE CORRIDOR
	ACCESS CHANNEL ALIGNMENT
	WORK AREA
	PROBABLE PIPELINE (CMD, 2010 & BOEM, 2007)

BY	DESCRIPTION	DATE

COASTAL ENGINEERING CONSULTANTS, INC.
 PH: (225) 768-1982
 8570 ANGELMO LANE
 BATON ROUGE, LA 70810

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
 150 TERRACE AVENUE
 BATON ROUGE, LA 70802

TERREBONNE BASIN BARRIER ISLAND AND BEACH NOURISHMENT
 STATE PROJECT NUMBER: TE-143

TIMBALIER ISLAND NOURISHMENT AREA PLAN VIEW
 DATE: APRIL 2018

DRAWN BY: BRETT BORNE, P.E.

DESIGNED BY: MICHAEL T. POFF, P.E.
 LICENSE NUMBER: 30048

APPROVED BY: TRAVIS BYLAND, P.E.

FEDERAL PROJECT NUMBER:

SHEET 4 OF 36

Trinity Island

Jan 2018

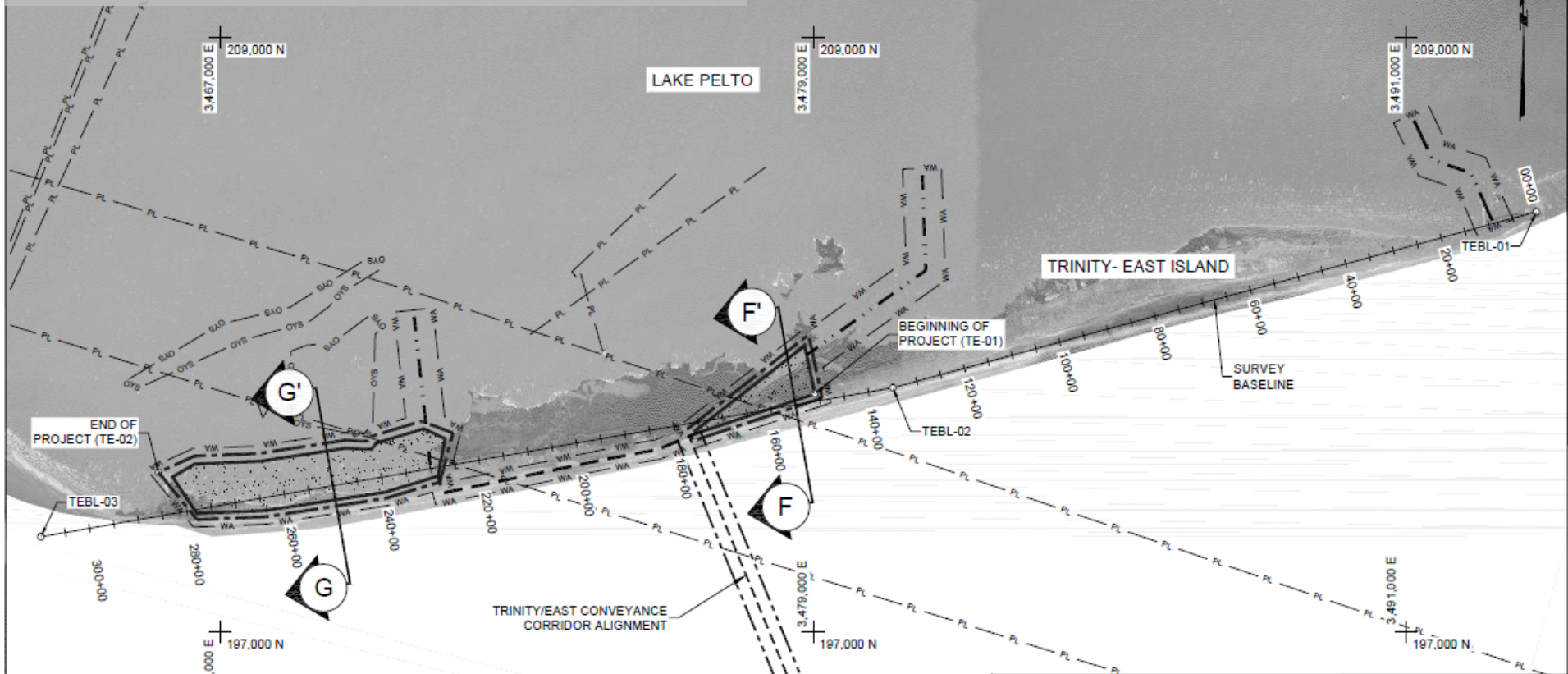


Trinity Island

An aerial photograph of Trinity Island, showing a large body of water with several smaller islands and a sandy beach in the foreground. The water is a mix of light and dark green, and the islands are covered in dense green vegetation. The sky is a pale blue.

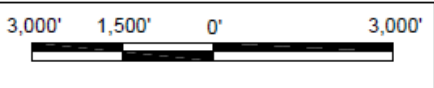
June 2018

Beach: 207 acres, + 5.0' elev.



- NOTES:**
1. ALL COORDINATES ARE NAD83, LOUISIANA STATE PLANE, U.S. SURVEY FEET.
 2. AERIAL IMAGE REFERENCE: ©2018 MICROSOFT CORPORATION ©2018 DIGITALGLOBE ©CNES (2018) DISTRIBUTION AIRBUS DS; BING.
 3. SAND FENCING SHALL BE INSTALLED ALONG THE ALIGNMENT AND FOR THE LENGTH OF THE FILL.
 4. SEE SHEET 34 FOR ALIGNMENT AND COORDINATE TABLES.
 5. UPLAND ACCESS CORRIDOR SHALL BE ALLOWED ONLY OVER UNVEGETATED SEGMENTS OF ISLAND.
 6. FILL EXTENTS ARE APPROXIMATE AND WILL VARY DUE TO BARRIER ISLAND DYNAMICS. LIMITS OF FILL SHALL BE FIELD ADJUSTED AT TIME OF CONSTRUCTION.

LEGEND	
	ACCESS CHANNEL
	BEACH CREST
	FILL EXTENTS
	BEACH FILL
	CONVEYANCE CORRIDOR
	UPLAND ACCESS CORRIDOR
	WORK AREA
	OYSTER LEASE (LDWF, 2018)
	PROBABLE PIPELINE (CMD 2010, BOEM, 2007)



BY	DESCRIPTION	DATE

COASTAL ENGINEERING CONSULTANTS, INC.
 PH: (225) 766-1982
 8570 ANSELMO LANE

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
 150 TERRACE AVENUE
 BATON ROUGE, LA 70802

TERREBONNE BASIN BARRIER ISLAND AND BEACH NOURISHMENT
 STATE PROJECT NUMBER: TE-143

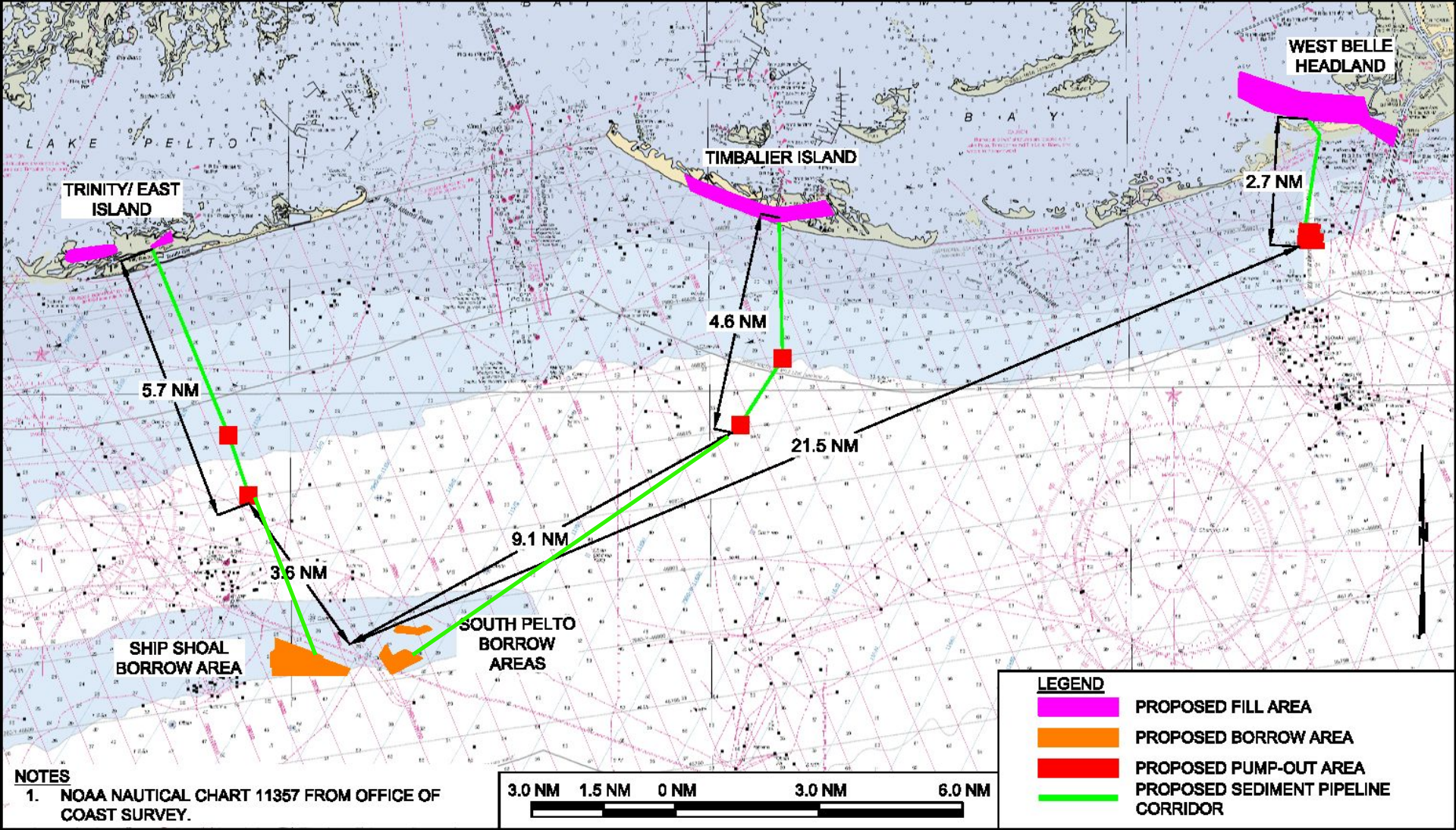
TRINITY-EAST ISLAND NOURISHMENT AREA PLAN VIEW
 DATE: APRIL 2018

DRAWN BY: BRETT BORNE, P.E.

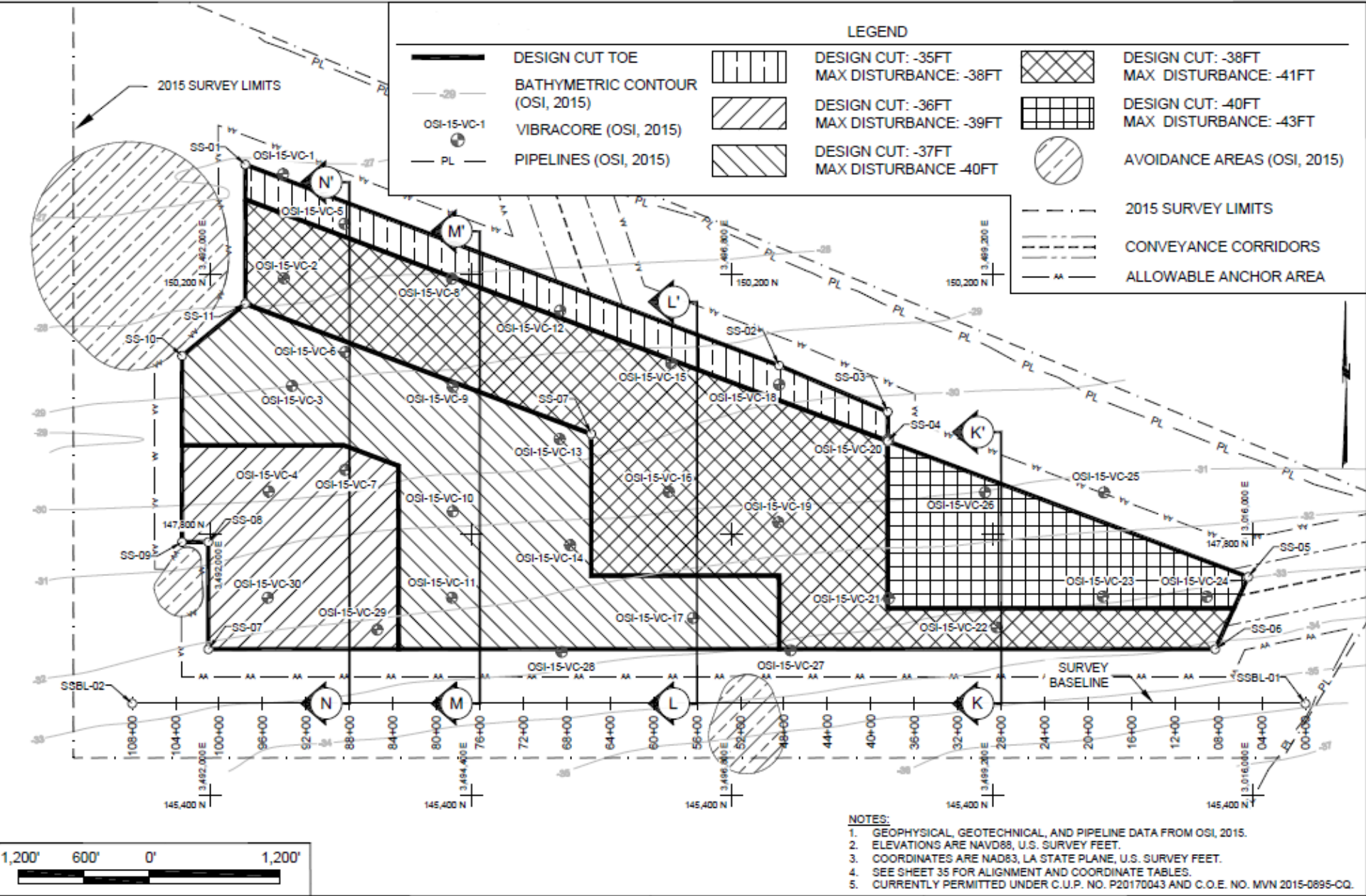
Navigation icons: mouse cursor, hand, zoom in (+), zoom out (-), 101% scale, print, and other utility icons.

PROJECT NUMBER:

SHEET 10 OF 38



committed to our coast



- NOTES:**
1. GEOPHYSICAL, GEOTECHNICAL, AND PIPELINE DATA FROM OSI, 2015.
 2. ELEVATIONS ARE NAVD83, U.S. SURVEY FEET.
 3. COORDINATES ARE NAD83, LA STATE PLANE, U.S. SURVEY FEET.
 4. SEE SHEET 35 FOR ALIGNMENT AND COORDINATE TABLES.
 5. CURRENTLY PERMITTED UNDER C.U.P. NO. P20170043 AND C.O.E. NO. MVN 2015-0895-CQ.

BY	DESCRIPTION	DATE

COASTAL ENGINEERING CONSULTANTS, INC.
 PH: (225) 768-1982
 8570 ANSELMO LANE
 BATON ROUGE, LA 70810

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
 150 TERRACE AVENUE
 BATON ROUGE, LA 70802

TERREBONNE BASIN BARRIER ISLAND AND BEACH NOURISHMENT
 STATE PROJECT NUMBER: TE-143

SHIP SHOAL BORROW AREA PLAN VIEW
 DATE: APRIL 2018

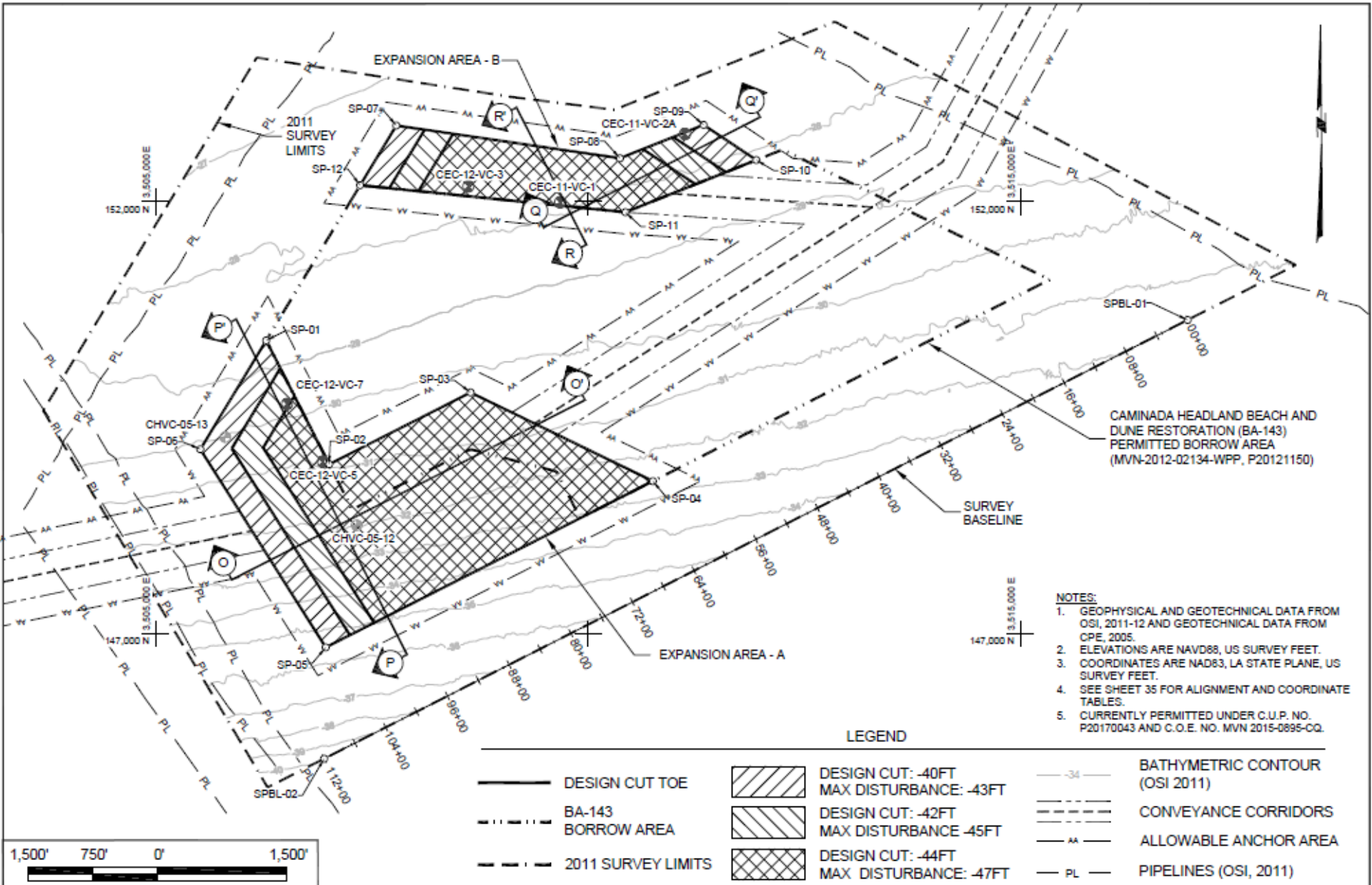
DRAWN BY: STEVE DARTEZ

DESIGNED BY: MICHAEL T. POFF, P.E.
 LICENSE NUMBER: 30048

APPROVED BY: TRAVIS BYLAND, P.E.

FEDERAL PROJECT NUMBER:

SHEET 17 OF 36

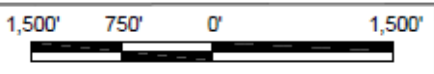


CAMINADA HEADLAND BEACH AND DUNE RESTORATION (BA-143) PERMITTED BORROW AREA (MVN-2012-02134-WPP, P20121150)

- NOTES:**
1. GEOPHYSICAL AND GEOTECHNICAL DATA FROM OSI, 2011-12 AND GEOTECHNICAL DATA FROM CPE, 2005.
 2. ELEVATIONS ARE NAVD83, US SURVEY FEET.
 3. COORDINATES ARE NAD83, LA STATE PLANE, US SURVEY FEET.
 4. SEE SHEET 35 FOR ALIGNMENT AND COORDINATE TABLES.
 5. CURRENTLY PERMITTED UNDER C.U.P. NO. P20170043 AND C.O.E. NO. MVN 2015-0895-CQ.

LEGEND

— DESIGN CUT TOE		DESIGN CUT: -40FT MAX DISTURBANCE: -43FT	—34— BATHYMETRIC CONTOUR (OSI 2011)
- - - BA-143 BORROW AREA		DESIGN CUT: -42FT MAX DISTURBANCE: -45FT	- - - CONVEYANCE CORRIDORS
- - - 2011 SURVEY LIMITS		DESIGN CUT: -44FT MAX DISTURBANCE: -47FT	— AA — ALLOWABLE ANCHOR AREA
			— PL — PIPELINES (OSI, 2011)



BY	DESCRIPTION	DATE

COASTAL ENGINEERING CONSULTANTS, INC.
 PH: (225) 758-1982
 8570 ANSELMO LANE
 BATON ROUGE, LA 70810

LOUISIANA COASTAL PROTECTION AND RESTORATION AUTHORITY
 150 TERRACE AVENUE
 BATON ROUGE, LA 70802

TERREBONNE BASIN BARRIER ISLAND AND BEACH NOURISHMENT
 STATE PROJECT NUMBER: TE-143
 FEDERAL PROJECT NUMBER:

SOUTH PELTO BORROW AREA PLAN VIEW
 DATE: APRIL 2018
 SHEET 20 OF 36

DRAWN BY: STEVE DARTEZ

DESIGNED BY: MICHAEL T. POFF, P.E.
 LICENSE NUMBER: 30048

APPROVED BY: TRAVIS BYLAND, P.E.

FEDERAL PROJECT NUMBER:

SHEET 20 OF 36

Monitoring and Adaptive Management

- Topography/bathymetry
- Borrow area surveys (Y2 and Y4)
- Vegetation Surveys
- Habitat Mapping
- Shoreline Position Surveys
- Sediment Characteristics
- Benthic Surveys
- Wintering Bird Surveys



Coastal Protection and
Restoration Authority of Louisiana

TE-143



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Barrier Island Renourishment Program

Systematic approach to categorizing, prioritizing, selecting, and funding future projects

- Develop framework
- Formalize structured decision making process
- Prepare action plan



Coastal Protection and
Restoration Authority of Louisiana

TE-143



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