



2023

Dine & Discuss Living Shorelines

- Welcome & Introductions
- What is a living shoreline?
- Galveston Bay Case Studies
- Permitting
- Breakout Discussions



**What is a
“Living”
Shoreline?**

An aerial photograph showing a wetland area with a stone wall in the foreground. The wetland is filled with water and various types of vegetation, including tall grasses and shrubs. In the background, there is a house with a red roof and a driveway with a car. The text is overlaid on a white rounded rectangle in the upper left quadrant.

Living shorelines incorporate **natural or nature-based features**, potentially combined with hard structural components, to provide shoreline protection and stabilization while **maintaining shoreline ecosystem functions**.

Hard Stabilization



Living Shoreline





- ✓ Absorb wave energy
- ✓ Restore land by trapping sediments
- ✓ Allow natural coastal processes to take place
- ✓ Filter pollutants from runoff
- ✓ Create/maintain vital habitat for fish and shellfish
- ✓ Provide nesting and foraging areas for birds
- ✓ Enhance long-term coastal resiliency



Types of Living Shorelines in Texas



SOFT Stabilization

- Non-structural
- Usually involve planting marsh grass along the existing shoreline



HYBRID Stabilization

- Use hard features for additional erosion control
- Incorporate materials used in “soft” technique



RETROFIT: Soft Stabilization

- Existing hard structure such as a bulkhead or revetment, paired with marsh plantings



RETROFIT: Hybrid Stabilization

- Existing hard structure such as a bulkhead or revetment, paired with a hybrid stabilization option



Galveston Bay Case Studies



TRINITY BAY
Retrofit Stabilization
High Profile Breakwater

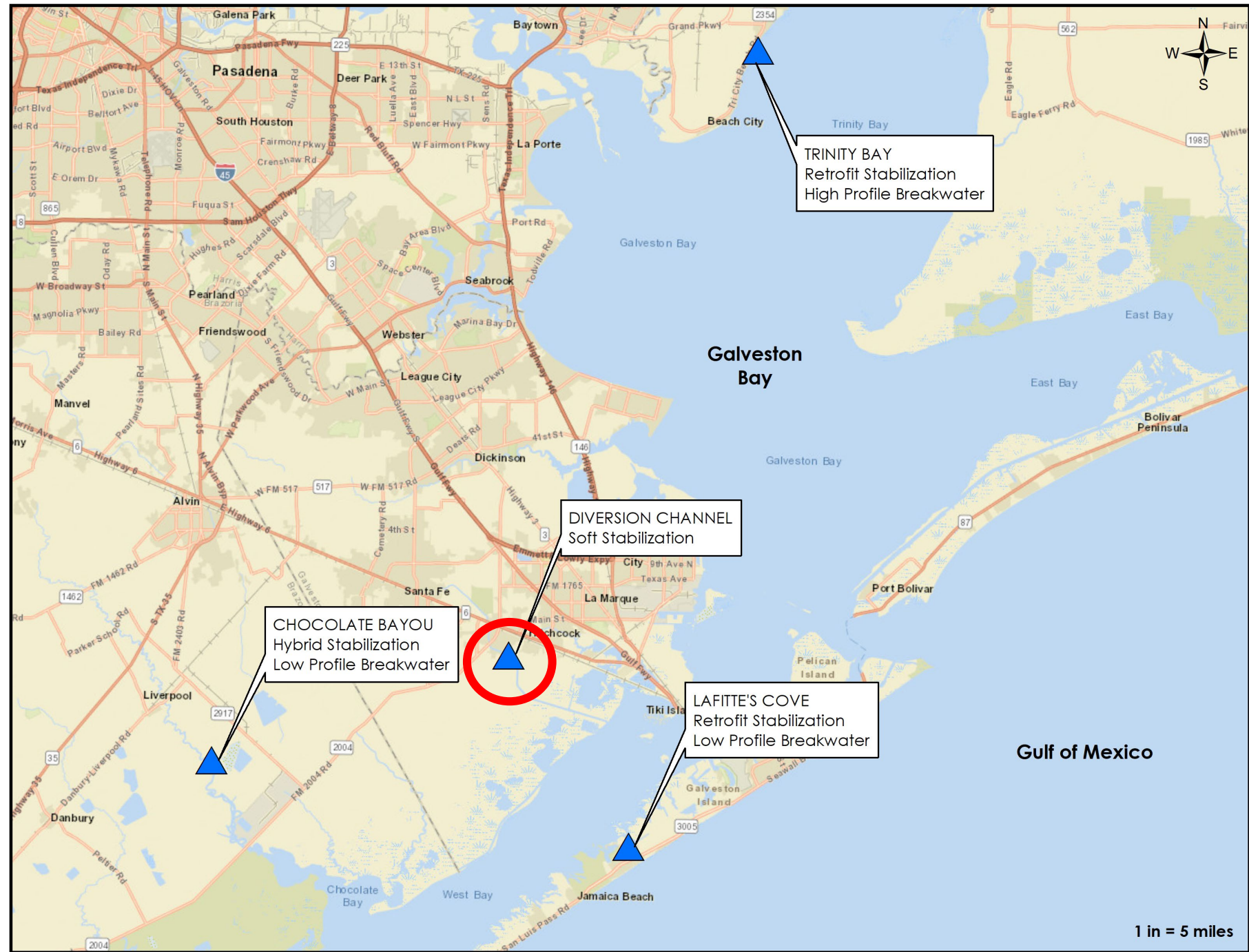
CHOCOLATE BAYOU
Hybrid Stabilization
Low Profile Breakwater

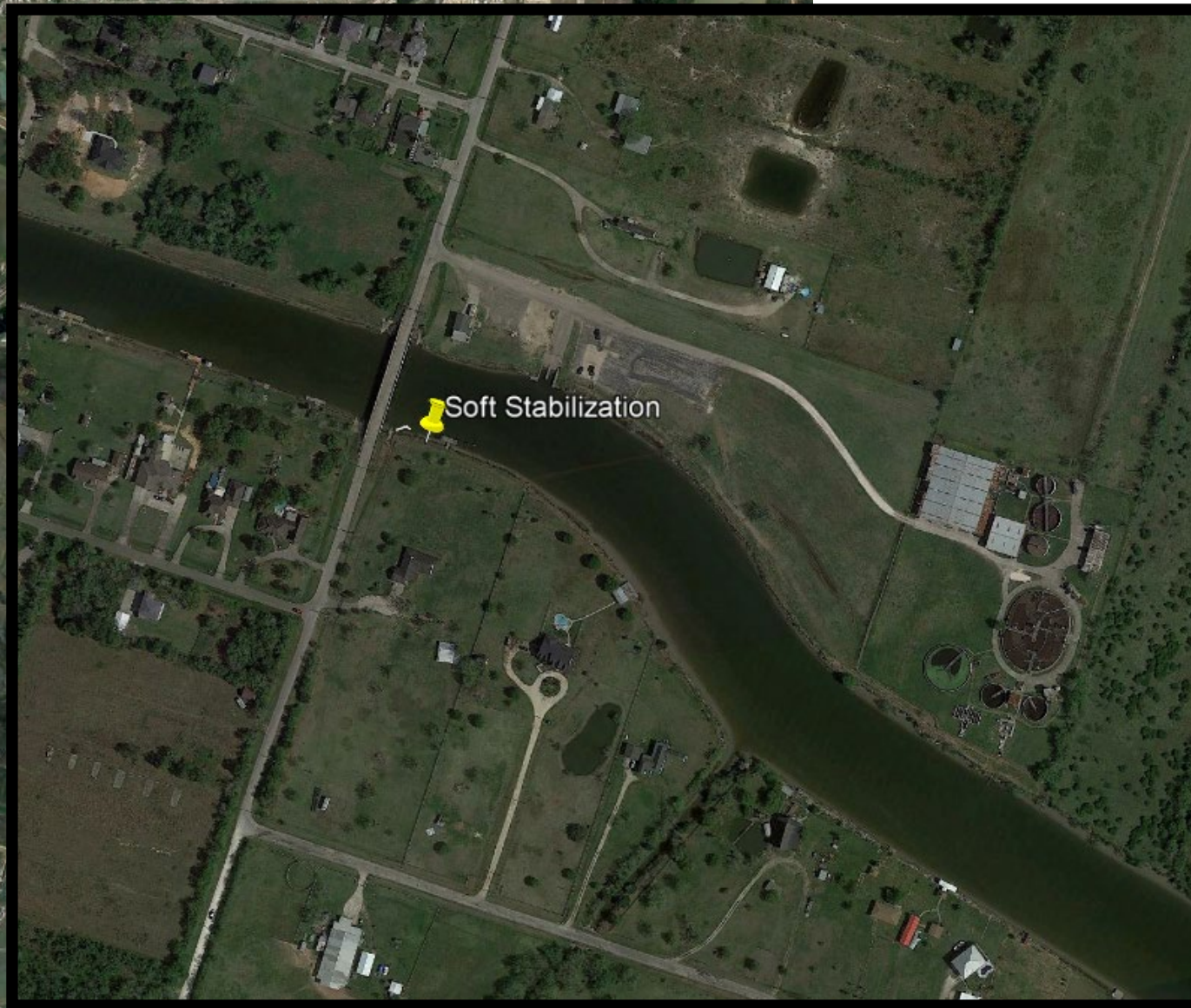
DIVERSION CHANNEL
Soft Stabilization

LAFITTE'S COVE
Retrofit Stabilization
Low Profile Breakwater

1 in = 5 miles

Diversion Channel Soft Stabilization

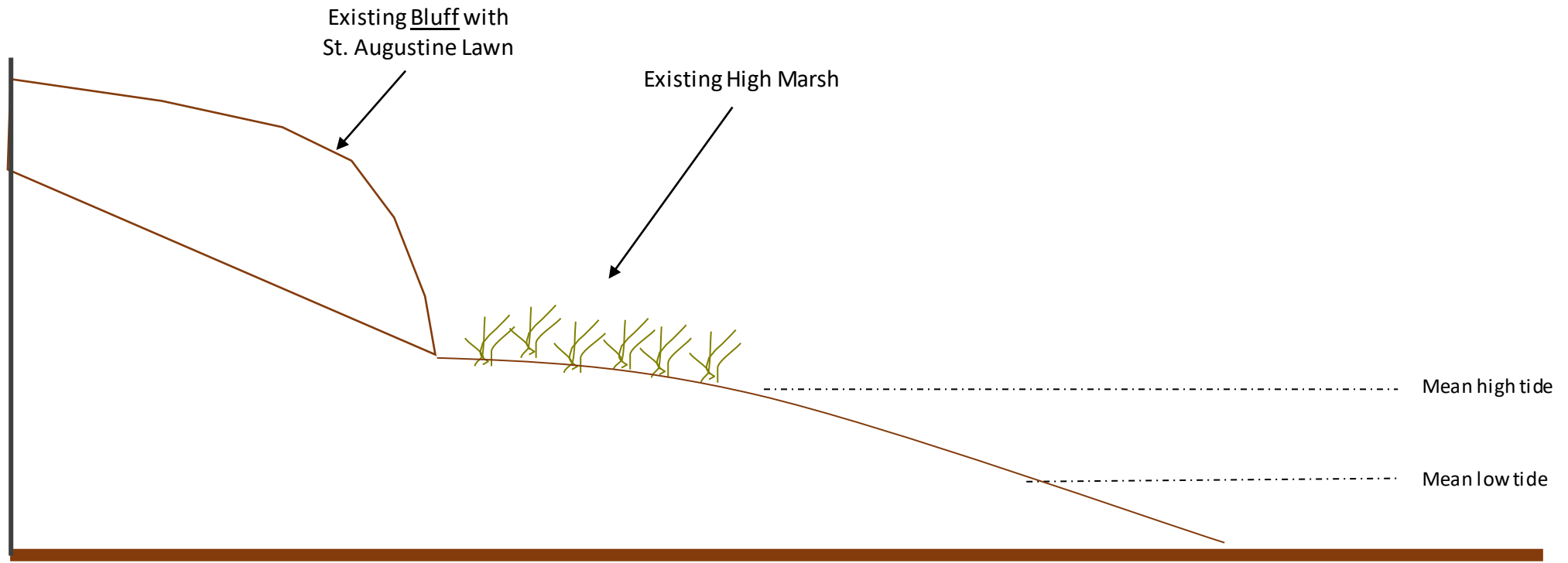




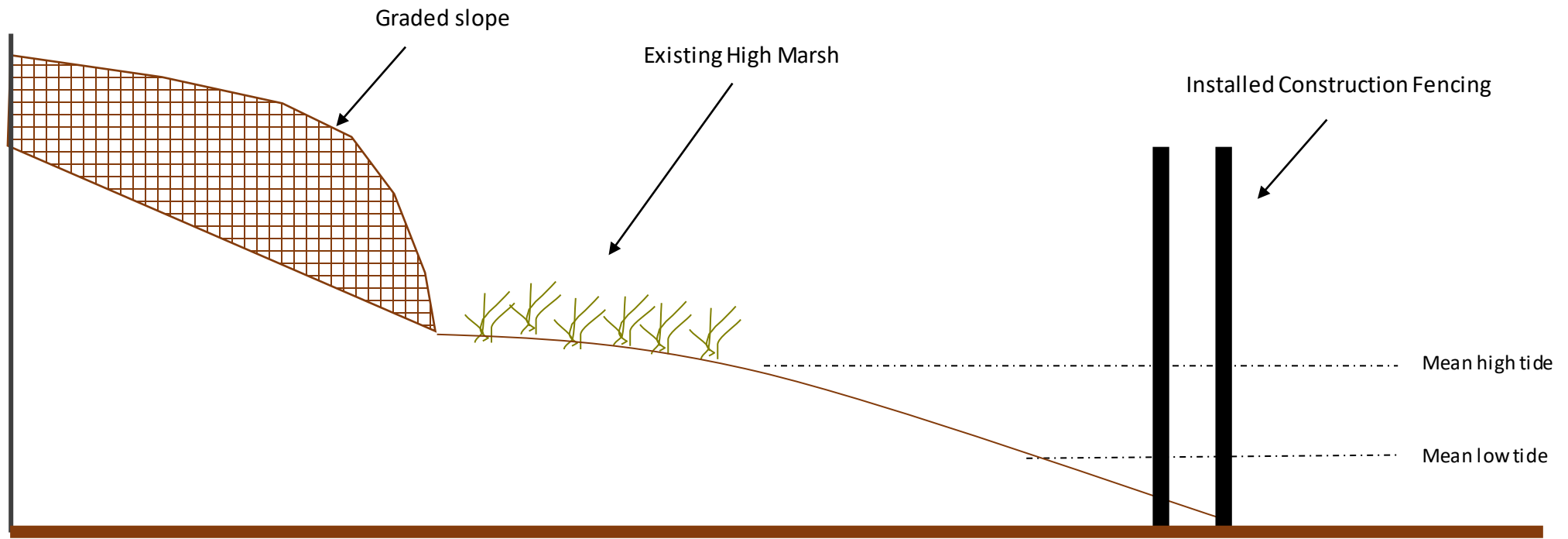
Diversion Channel

Year Constructed	2009
Technique	Soft
Materials	Construction Fence
Plants	<i>Spartina alterniflora</i>
Permits	USACE NWP 27 TPWD Intro Permit <i>*No CBS or GLO lease required - manmade channel</i>
Shoreline Protected	180 feet
Marsh Restored	1,800 sq ft (0.04 ac)
Project Cost	\$1,822

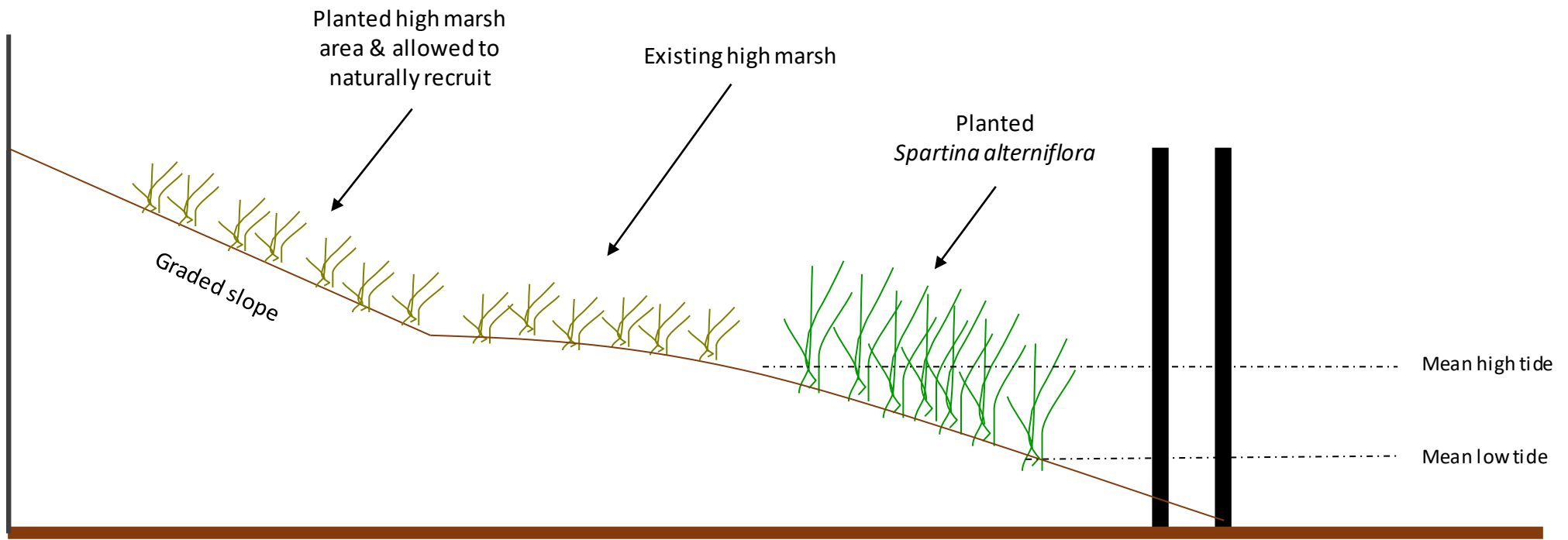




BEFORE



DURING

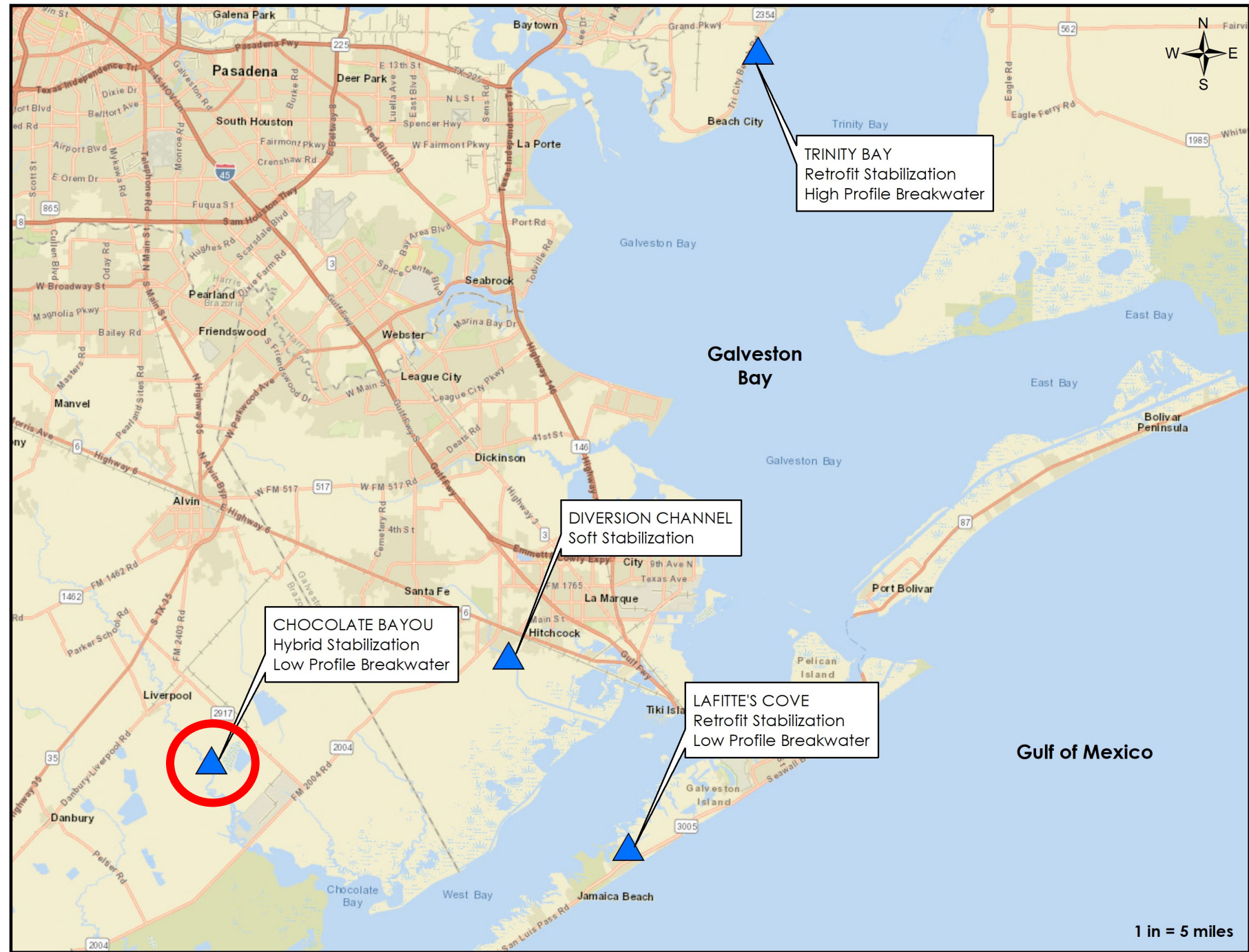


Tom & Joetta Scarborough Property Hitchcock, TX



Photo: Tom Scarborough

Chocolate Bayou Hybrid Stabilization





Chocolate Bayou

Year Constructed	2012
Technique	Hybrid
Materials	Sacrete Bags Construction Fence
Plants	<i>Spartina alterniflora</i>
Permits	USACE NWP 27 GLO Lease TPWD Intro Permit
Shoreline Protected	600 feet
Marsh Restored	6,000 sq ft (0.14 ac)
Project Cost	\$12,421



Legend

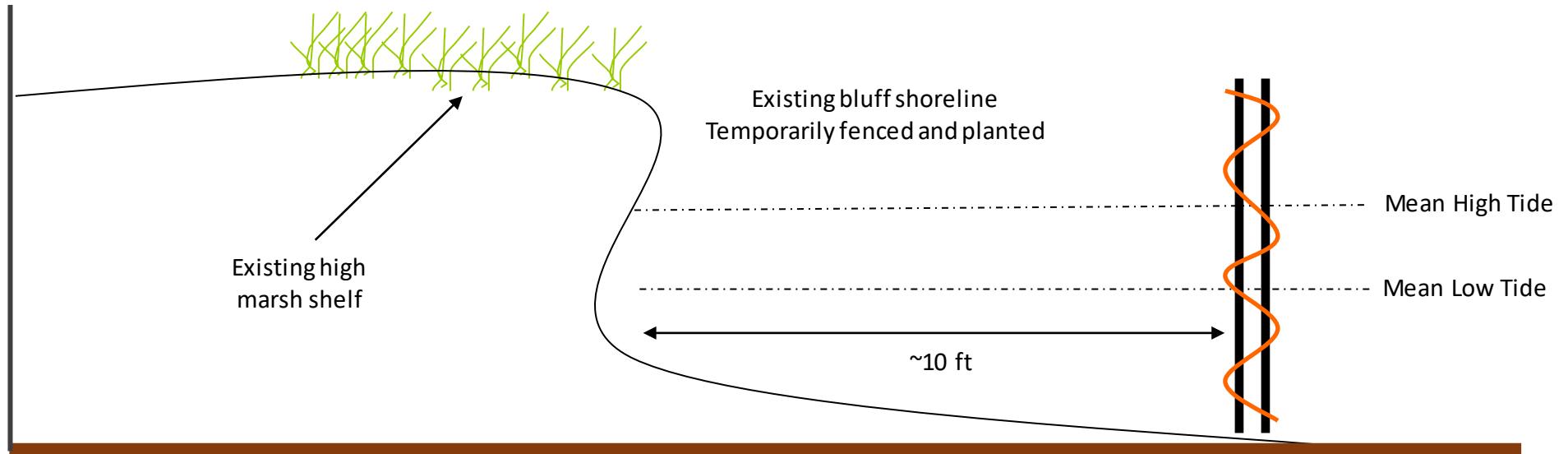
- Construction Fencing
- Sacrete Bags



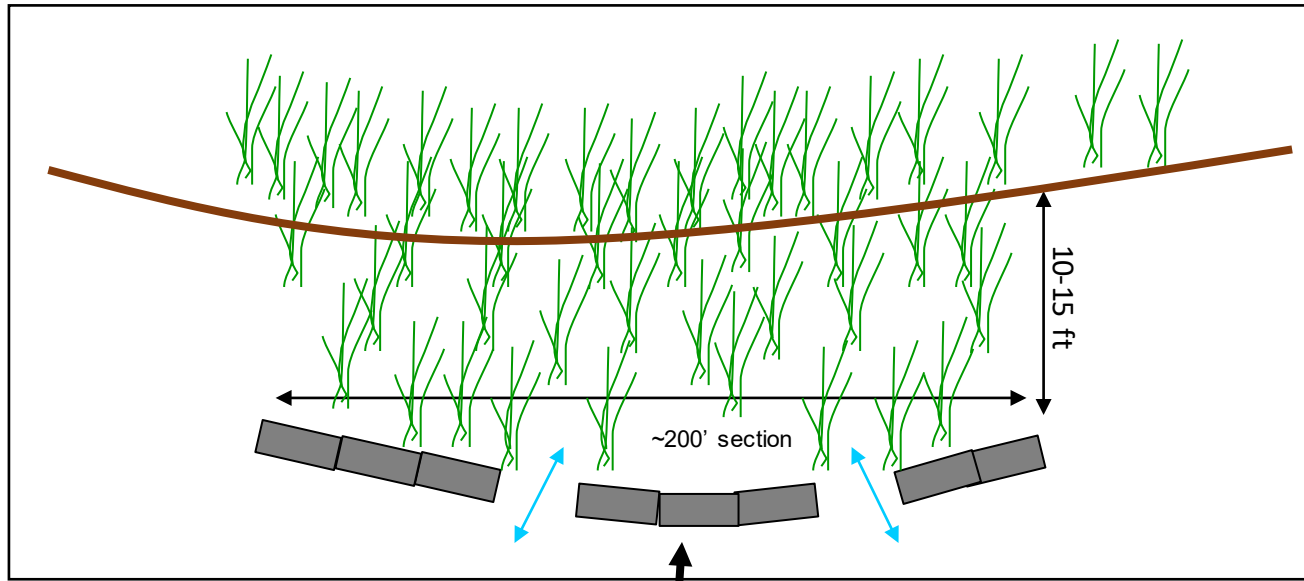
Google Earth

400 ft

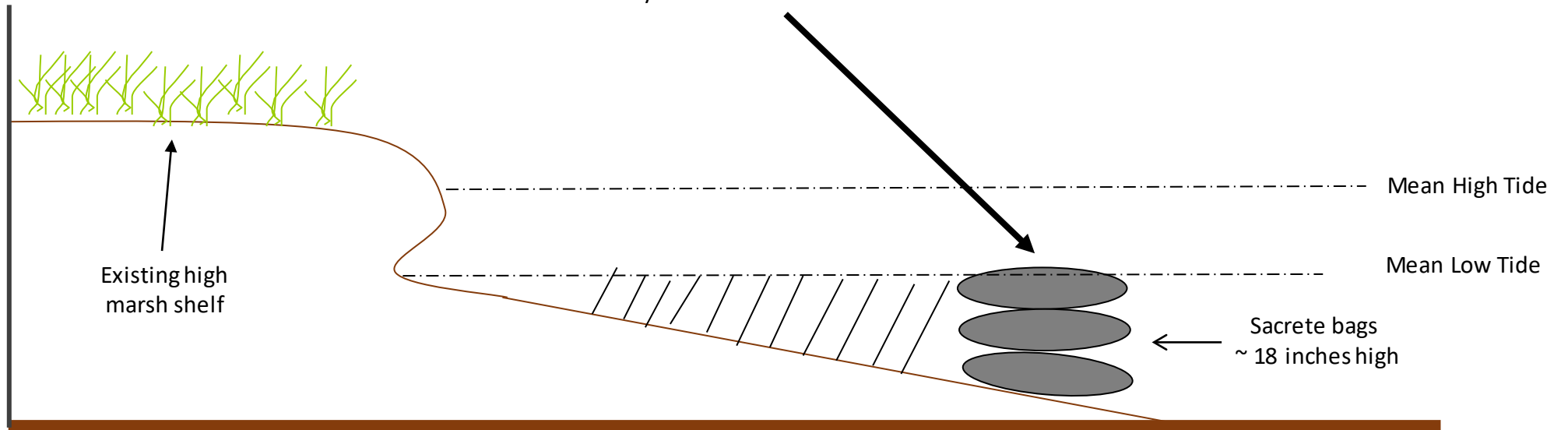








200-foot breakwater section with 1 foot breaks every 50 feet for water circulation





Eckert Bayou Hybrid Stabilization



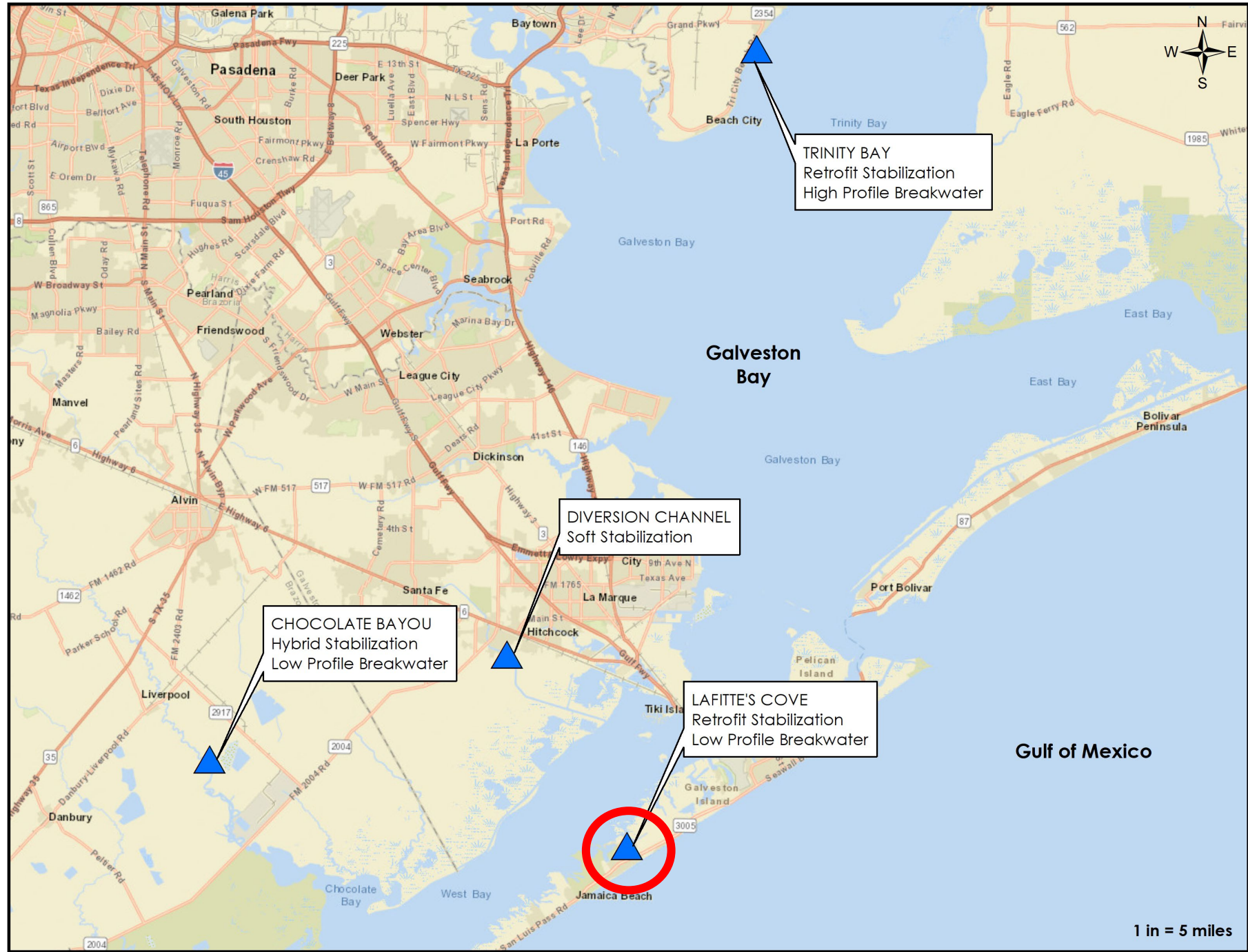


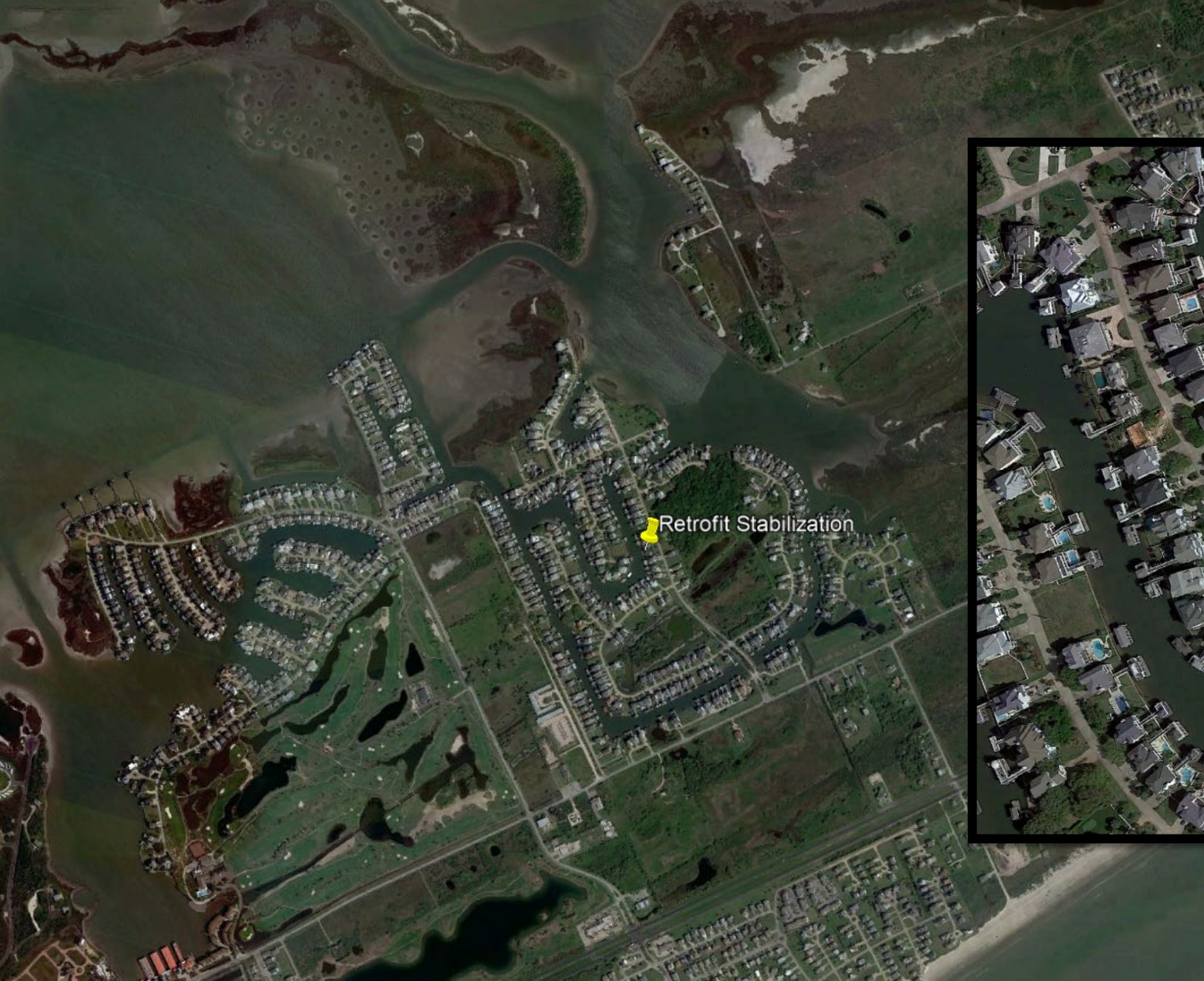






Lafitte's Cove Retrofit Stabilization





Lafitte's Cove

Year Constructed	2006
Technique	Retrofit Hybrid
Materials	Vinyl Sheet Pile Clean Fill Material
Plants	<i>Spartina alterniflora</i>
Permits	USACE NWP 27 TPWD Intro Permit HOA Approval <i>*No CBS or GLO lease required - manmade canal</i>
Shoreline Protected	180 feet
Marsh Restored	2,700 sq ft (0.06 ac)
Project Cost	\$34,800 materials & labor

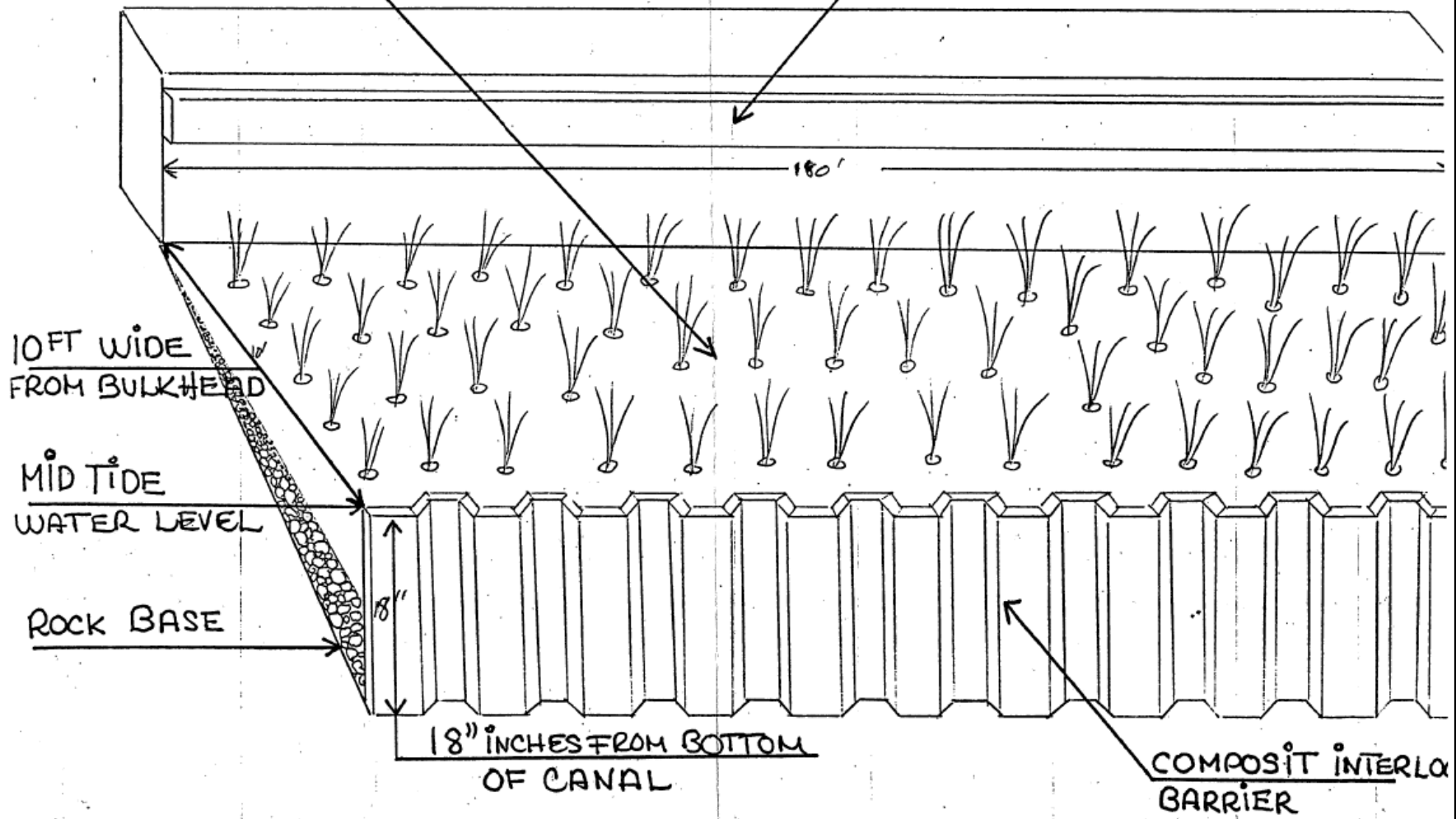


Juan Alonso
3007 Crossview Drive
Houston, Texas 77063-5008
D-17935 3 of 3

PERMITTED PLANS

SAND/GRASS MARSH AREA

ORIGINAL CONCRETE
BULKHEAD



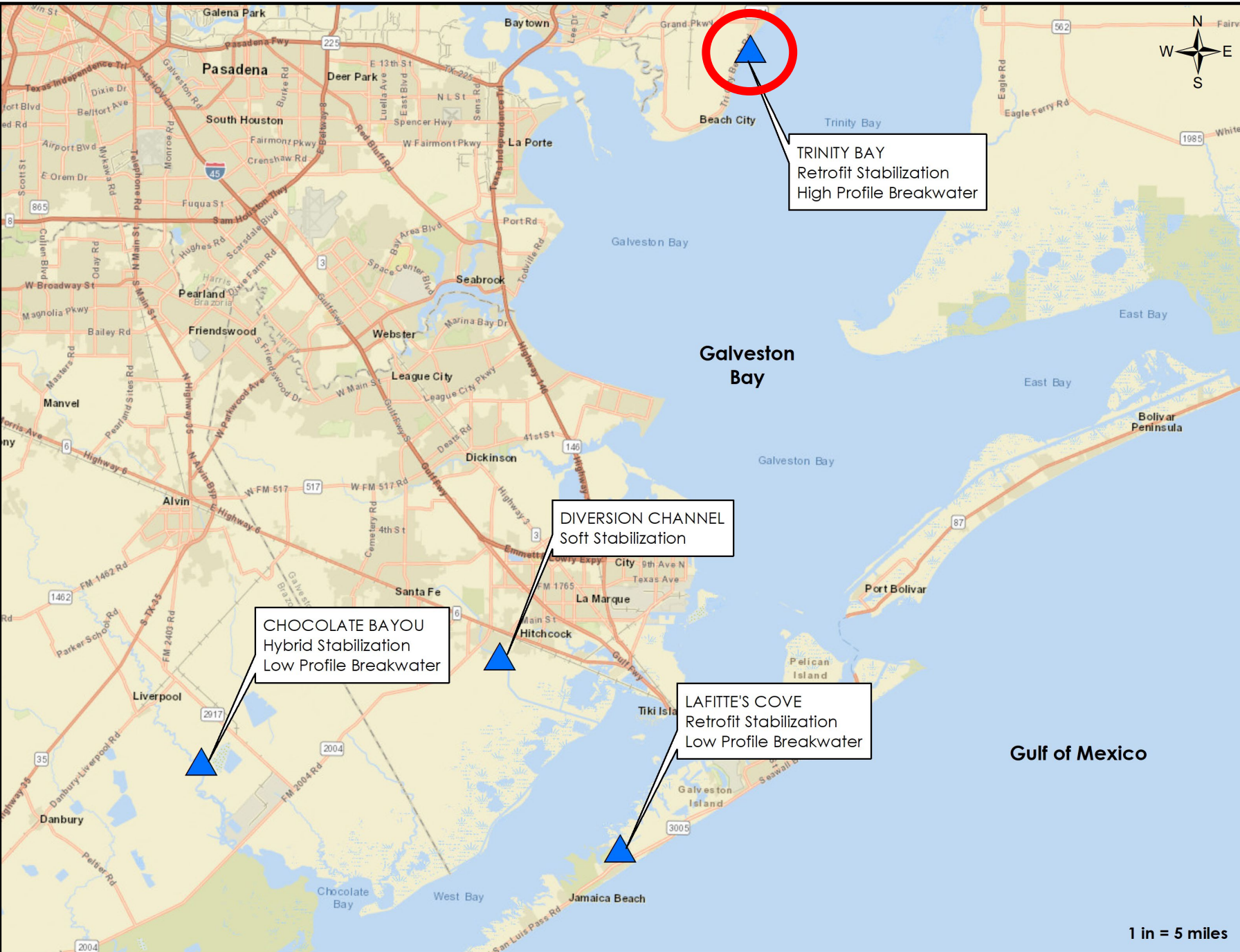








Trinity Bay Retrofit Stabilization



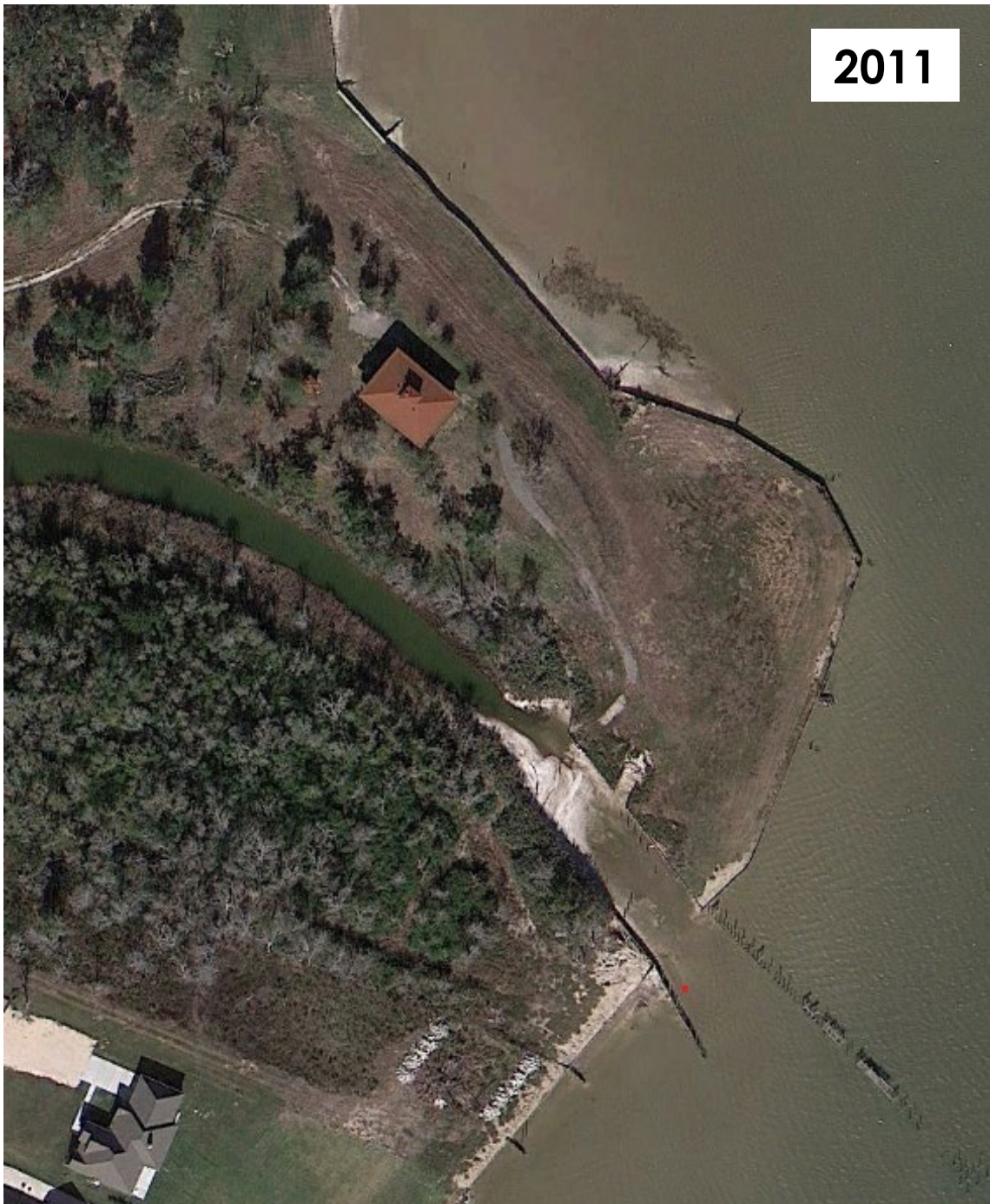


Trinity Bay

Year Constructed	2018
Technique	Retrofit - Hard
Materials	Concrete rip-rap
Plants	<i>Spartina alterniflora</i>
Permits	USACE NWP 27 GLO Lease TPWD Intro Permit
Shoreline Protected	880 feet
Marsh Restored	2.0-acre complex
Project Cost	\$175,000+



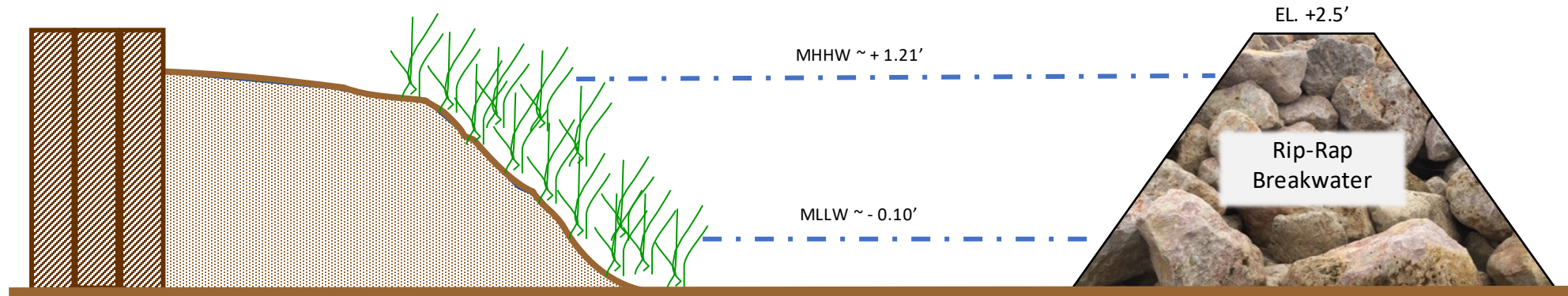
2011



2018



Proposed Rip-Rap Breakwater
Trinity Bay Discovery Center
Shoreline Protection & Habitat Creation



Average Elevation of Bay Bottom ~ - 1.5'

Proposed Breakwater Elevation = + 2.5' NAVD 88

Proposed Breakwater Height = 4.0'







2019





2020



2021



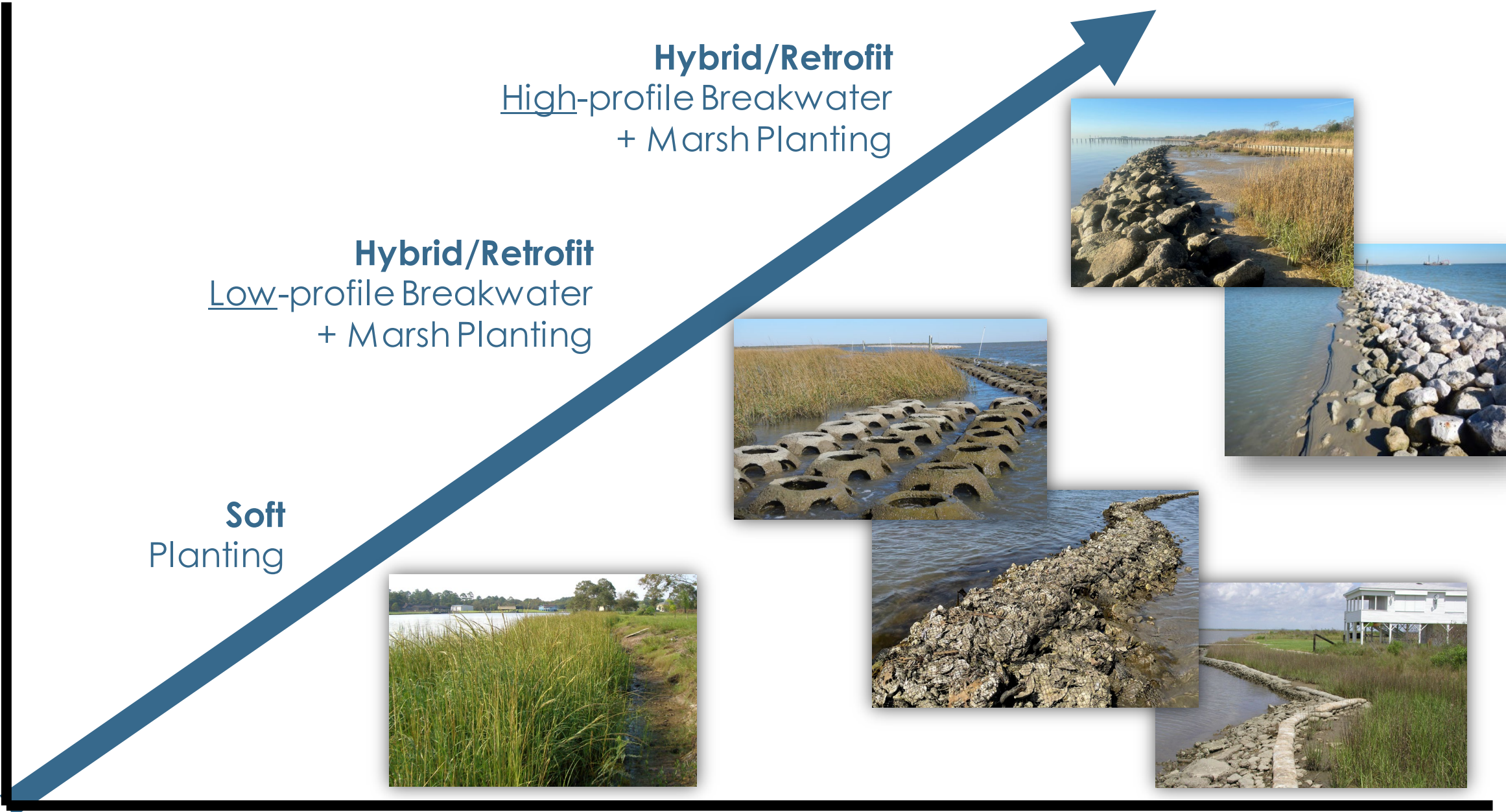


2023



2023

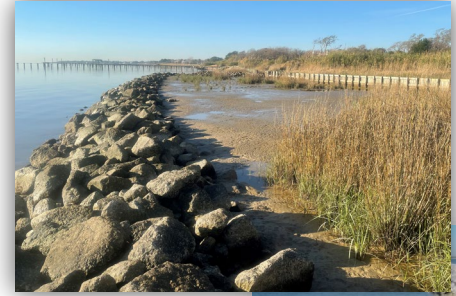
Project Cost



Soft Planting

Hybrid/Retrofit
Low-profile Breakwater
+ Marsh Planting

Hybrid/Retrofit
High-profile Breakwater
+ Marsh Planting



Energy/Erosive Forces

Galveston Bay Living Shoreline Case Studies

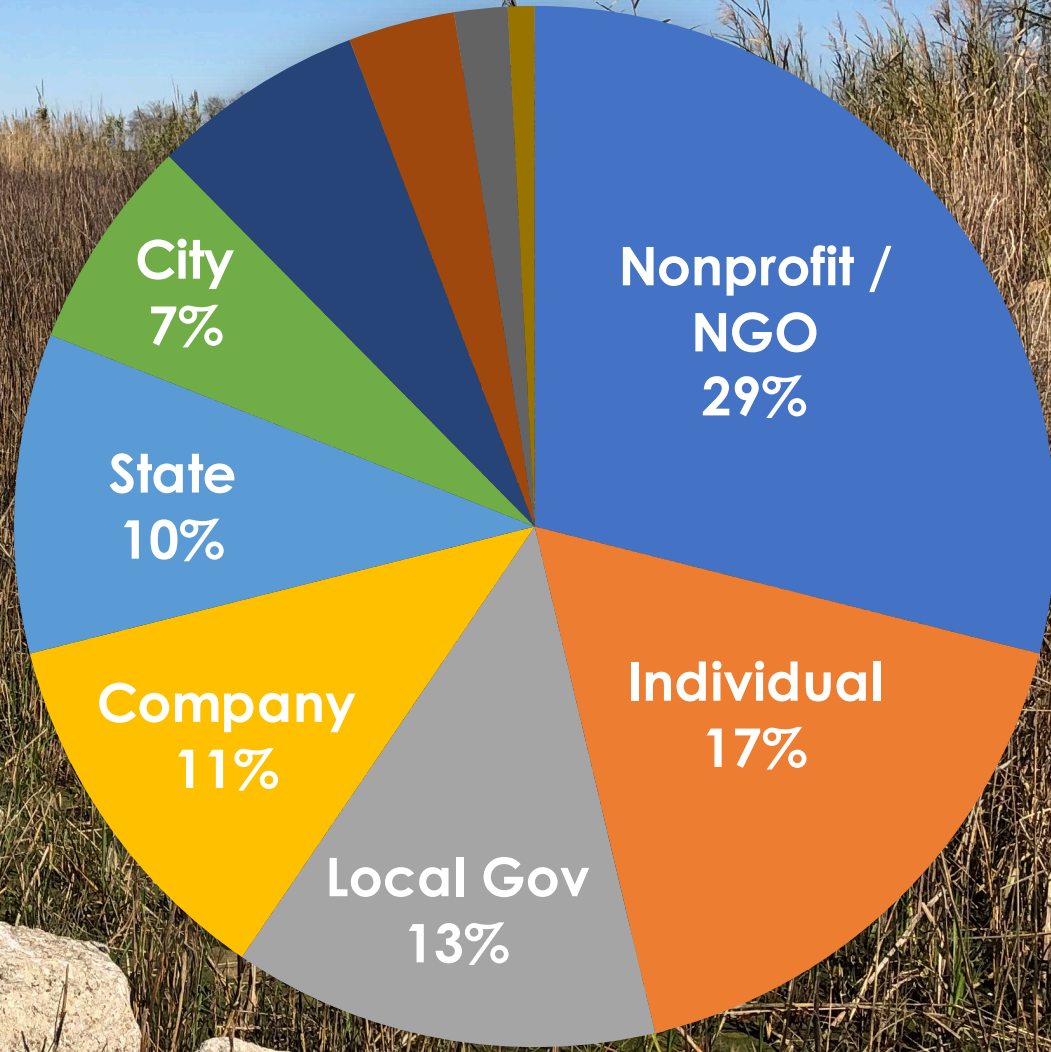
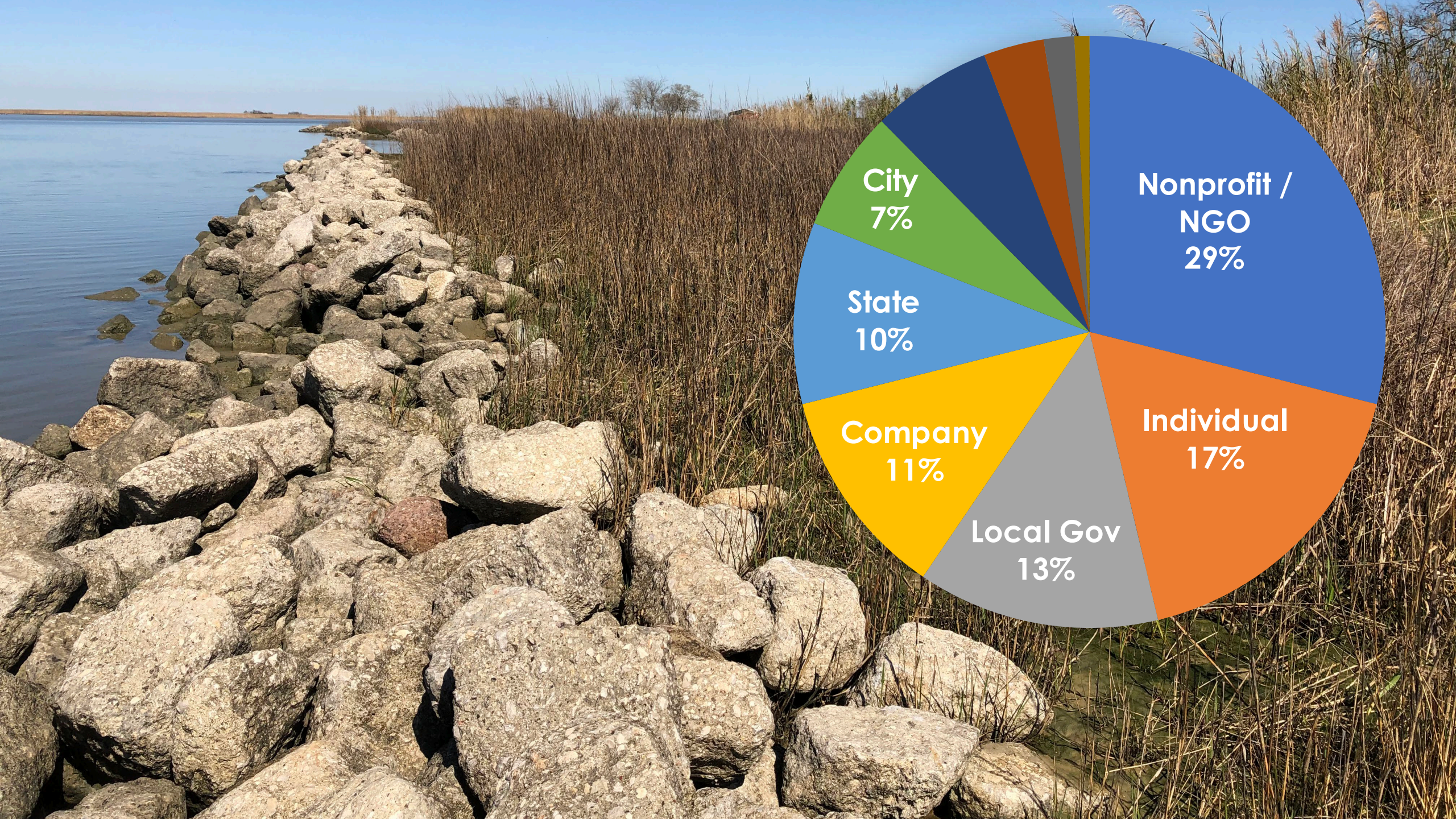
Site	Year Constructed	Stabilization Technique	Structure	Shoreline Protected	Marsh Restored	Bathymetric Survey	Coastal Bnd. Survey (CBS)	Construction	TOTAL
Diversion Channel	2009	Soft	None	180 ft	0.04 ac	No	Not Required	\$1,822.00	\$1,822.00
Chocolate Bayou	2012	Hybrid	Sacrete Bags 200 ft	600 ft	0.14 ac	No	\$6,050.79	\$6,370.92	\$12,421.71
Lafitte's Cove	2006	Hybrid	Sheet Pile 210 ft	180 ft	0.06 ac	No	Not Required	\$34,800.00	\$34,800.00
Trinity Bay	2018	Retrofit Hybrid	Rip-Rap 180 ft	880 ft	2.00 ac	\$4,870.00	\$5,190.18	\$160,080.00	\$170,140.18

Galveston Bay Living Shoreline Case Studies

Site	Year Constructed	Stabilization Technique	Structure	Shoreline Protected	Marsh Restored	Bathymetric Survey	Coastal Bnd. Survey (CBS)	Construction	TOTAL
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Galveston Bay Living Shoreline Case Studies

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**Permitting
Living Shorelines**

PERMITTING





PERMITS, LEASES, & AUTHORIZATIONS

Authorizations needed are dependent on project scope, components, and location.



- GLO: Coastal Boundary Survey and lease



- USACE permit*

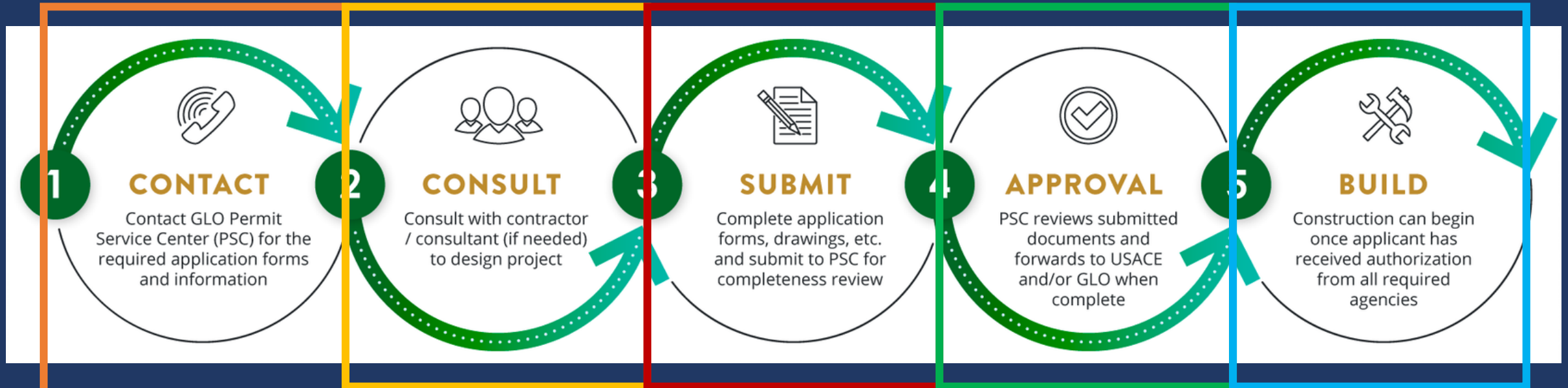
*Other agencies may be involved through the USACE permitting process.



- TPWD: species introduction permit and/or sand gravel permit

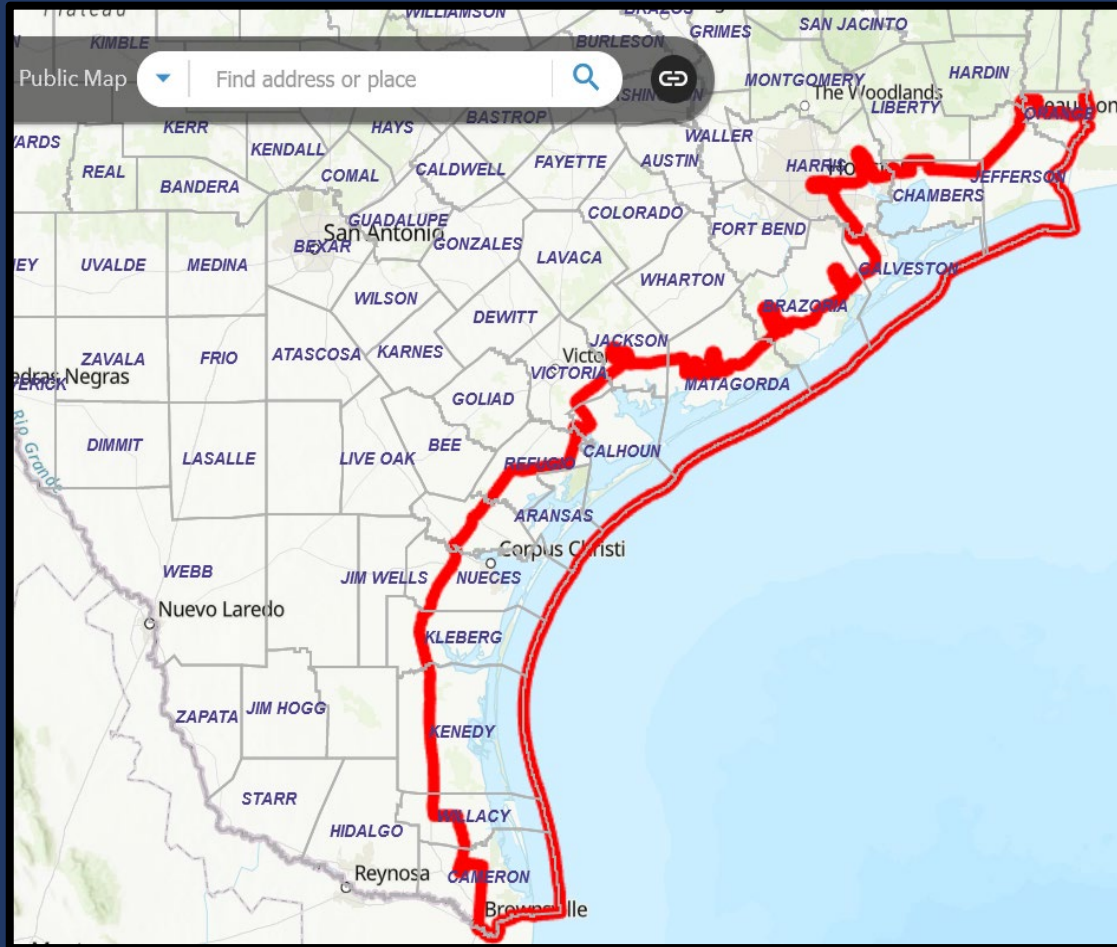


LANDOWNER PERMITTING STEPS



- Lower coast office: Corpus Christi
- Upper coast office: Galveston

GLO COASTAL BOUNDARY SURVEY



1. Do you need one? Verify
2. Hire licensed state land surveyor (LSLS) or county surveyor of the county in which the land is located
<https://pels.texas.gov/>
3. Surveyor coordinates with GLO Survey division regarding location, scope, and methodology.
4. Surveyor conducts coastal boundary survey, submits preliminary plat to GLO Survey for review
5. GLO Survey reviews, returns with corrections as needed and/or approves
6. Plats must be filed with County Clerk and GLO

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



GLO COASTAL BOUNDARY SURVEY

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



- Cost based on scope: size, complexity, location
- Estimated timeline 6+ months





Photo Courtesy GBF

GLO COASTAL EASEMENTS (LEASE)



Where are you building it?
What are your site conditions?
What are the project components?
What is the design?



Residential Application Packet, which is a Joint Permit
Application Form (JPAF) of the GLO and USACE

Texas General Land Office
Commissioner Dawn Buckingham, M.D.





RESIDENTIAL APPLICATION PACKET

This application packet applies to construction of residential (single-family use) noncommercial structures, including normal appurtenances such as fish cleaning tables, watercraft storage facilities, stairways, and finger piers, etc.

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



US ARMY CORPS OF ENGINEERS APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Fonn Approved -
OMB No. 0710-0003
Expires: 30-SEPTEMBER-2015

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

FOR G
Worki



STATE OF TEXAS GENERAL LAND OFFICE RESIDENTIAL APPLICATION

APPLICANT

Applicant Name:	<input type="text"/>		
Entity Contact:	<input type="text"/>	Cell Phone:	<input type="text"/>
Email Address:	<input type="text"/>	Fax:	<input type="text"/>
Home Phone:	<input type="text"/>	Work Phone:	<input type="text"/>
Mailing Address:	<input type="text"/>	City, State, Zip:	<input type="text"/>

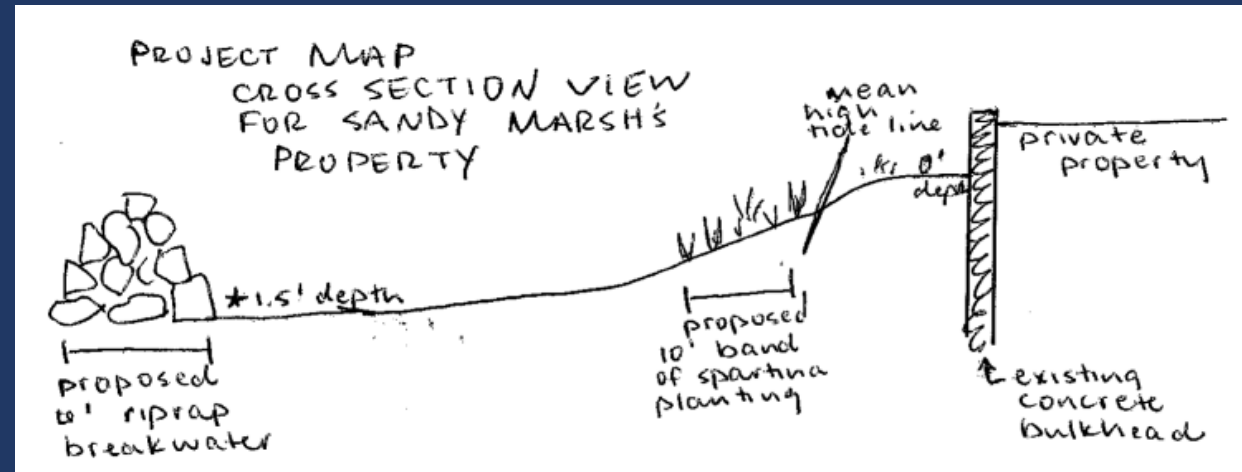
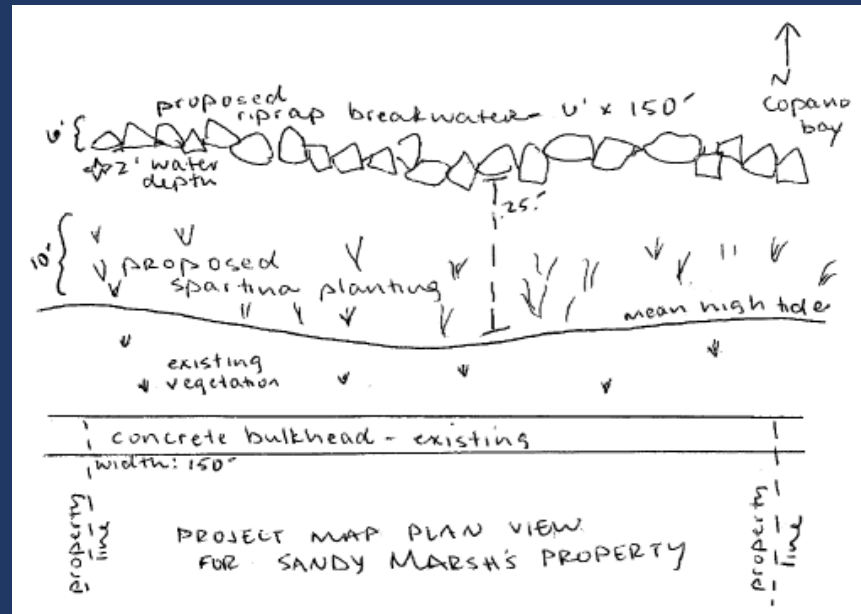
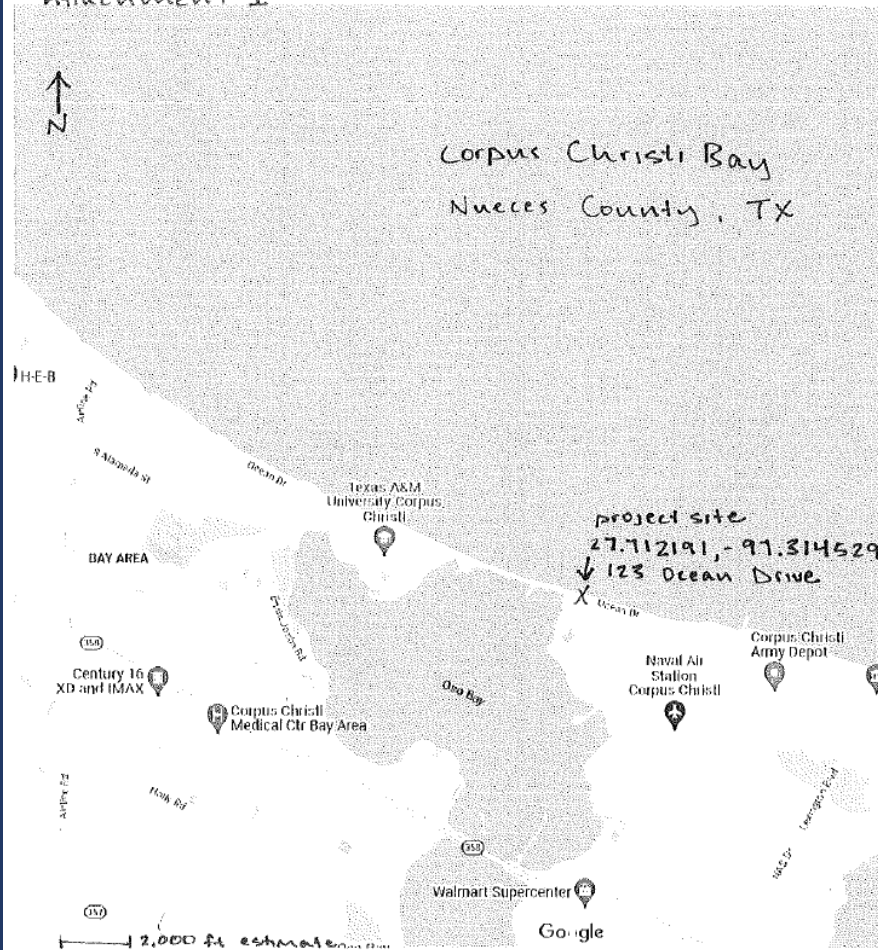
- ~ 3 months
- \$25 application
- Potentially no rent for lease



RESIDENTIAL APPLICATION PACKET

This application packet applies to construction of residential (single-family use) noncommercial structures, including normal appurtenances such as fish cleaning tables, watercraft storage facilities, stairways, and finger piers, etc.

Vicinity Map for Sandy Marsh
pg 1 of 1
3/16/2023
Attachment 1





PERMITS, LEASES, & AUTHORIZATIONS

Authorizations needed are dependent on project scope, components, and location.



- GLO: Coastal Boundary Survey and lease



- USACE permit*

*Other agencies may be involved through the USACE permitting process.



- TPWD: species introduction permit and/or sand gravel permit



USACE

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



- USACE NWP 54 – Living Shoreline
- USACE NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities
- USACE NWP 13 – Bank Stabilization
- IP – Individual Permits

NWP: note, limitations on project scope apply

- Maximum 30 ft from mean low water line, no more than 500 linear feet





PERMITS, LEASES, & AUTHORIZATIONS

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TPWD

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



**TPWD Application for Permit to Introduce Fish, Shellfish, or Aquatic Plants into Public Waters*

Marl, Sand, Gravel, Shell or Mudshell Permit



Photo by GBF

- Species
- When
- Where
- Purpose

~2 month approval time



Application for Permit to Introduce Fish, Shellfish or Aquatic Plants into Public Waters (No Fee Required)

For assistance completing this form, please call 512-389-4742 or email IFpermits@tpwd.texas.gov.

NOTE: This application will not be considered unless fully completed and must be received by the Department at least 30 days before the proposed introduction. Consultation with local or regional fisheries biologists before application submission is required for aquatic resource relocations and recommended for all applicants. If you have not yet consulted the local biologist, please call or email the permits office for their contact information.

1. APPLICANT INFORMATION:

Effective September 1, 2015, Texas Parks & Wildlife is required to collect Social Security numbers for the purpose of child support enforcement under the Texas Family Code, Section 231.302 and Federal Statute 42 U.S.C. §666. Missing or incomplete information may delay application processing time.

Name: _____ Social Security #: _____

Address: _____
 Street City State Zip

Email: _____ Primary Phone: (____) _____-_____

Would you like to help us reduce paper by choosing to receive your permit by email? Yes No

2. PUBLIC WATER WHERE ORGANISMS WILL BE INTRODUCED (address or GPS coordinates):

3. EXPECTED DATE OF INTRODUCTION: ____/____/____ (MM/DD/YYYY)

For relocations or plantings—what is the expected end date of the activity? ____/____/____

4. WHAT IS THE PURPOSE OF THIS INTRODUCTION?

Fish Stocking Planting Aquatic Resource Relocation Research

Other – Please Describe: _____

5. SPECIES TO BE INTRODUCED (for aquatic resource relocations, please skip this question):

	Common Name	Scientific Name	Number	Size
1)				
2)				
3)				
4)				

5. SPECIES TO BE INTRODUCED (continued):

	Common Name	Scientific Name	Number	Size
5)				
6)				
7)				
8)				

6. SOURCE OF ORGANISMS:

7. COMMENTS:

8. AFFIDAVIT:

I certify that

(1) all the information provided above is accurate and complete and

(2) that I have received and read the rules pertaining to Introduction of Fish, Shellfish, or Aquatic Plants (31 TAC Ch. 57C:

http://texreg.sos.state.tx.us/public/readtacSext.ViewTAC?tac_view=5&ti=31&pt=2&ch=57&sch=C&r=Y).

I understand that under Texas Penal Code §37.10, it is a felony to make a false statement on this form.

Signature of Applicant

____/____/____

Date

Please return completed application to:

Permit Coordinator, Inland Fisheries

Texas Parks and Wildlife Department

4200 Smith School Road

Austin, Texas 78744

To help our office process your request more efficiently, you may email completed applications to IFpermits@tpwd.texas.gov or fax to: 512-389-4405

Texas Parks and Wildlife Department maintains the information collected through this form. With few exceptions, you are entitled to be informed about the information we collect. Under Sections 552.021 and 552.023 of the Texas Government Code, you are also entitled to receive and review the information. Under Section 559.004, you are also entitled to have this information corrected.

GLO LEASING CONTACTS

Texas General Land Office
Commissioner Dawn Buckingham, M.D.



Galveston

Permit Service Center

Texas A&M University Galveston
1001 Texas Clipper Road
Building 3025, Room 193
Galveston, Texas 77554
Phone: 409-741-4057
Fax: 409-741-4010
Toll Free: 866-894-7664

permitting.assistance@glo.texas.gov

Kristin Hames

Natural Resources Specialist,

CEPRA Project Manager

Kristin.hames@glo.texas.gov
512-463-9271

Corpus Christi

Permit Service Center & Coastal Field Operations

602 N. Staples Street, Suite 240
Corpus Christi, Texas 78401
Coastal Field Operations Phone: 361-886-1600
Permit Service Center Phone: 361-886-1630
Fax: 361-888-9305

<https://www.glo.texas.gov/coast/coastal-management/permitting/index.html>





Breakout Discussion

Tools & Resources

TX GENERAL LAND OFFICE LIVING SHORELINES WEBSITE

<https://www.glo.texas.gov/livingshorelines/>

A GUIDE TO LIVING SHORELINES IN TEXAS (GLO)

<https://cleancoast.texas.gov/documents/guide-to-living-shorelines-texas.pdf>

HRI-GLO MODEL

<https://storymaps.arcgis.com/stories/d6989e741253424584c06ead83078c5d>

GBF MODEL

<https://cmap2.vims.edu/GBShoreProtectViewer/>



A GUIDE TO LIVING SHORELINES IN TEXAS



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Corpus Christi Bay. Photo: Texas General Land Office



Local Contacts

PERMIT SERVICE CENTER: 409-741-4057

GENERAL LAND OFFICE: La Porte Field Office
281-470-1191

GENERAL LAND OFFICE: Kristin Hames
512-463-9271; kristin.hames@glo.texas.gov

GALVESTON BAY FOUNDATION: Haille Leija
832-536-2270; hleija@galvbay.org