



**State of Louisiana  
Coastal Protection and Restoration Authority**

**2021 Annual Inspection Report**

for

**Lake Borgne Shoreline Protection  
Project**

State Project Number PO-30  
Priority Project List 10

December 2021  
St. Bernard Parish

Prepared by:

Taylor M. Daigle, P.E.  
Coastal Protection and Restoration Authority  
New Orleans Field Office  
CERM, Suite 309  
2045 Lakeshore Drive  
New Orleans, LA 70122



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for  
Lake Borgne Shoreline Protection Project  
(PO-30)**

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## **I. Introduction**

The Lake Borgne Shoreline Protection Project (State Project No. PO-30) was approved on the 10<sup>th</sup> Priority Project List. A second Lake Borgne Project (PO-31) was approved on the 11<sup>th</sup> Priority Project List and was subsequently combined with the previously approved Lake Borgne Shoreline Protection Project. The project includes two segments along the southwestern coast of Lake Borgne, in the locations where Lake Borgne is closest to the Mississippi River Gulf Outlet (MRGO). The project features are located entirely in St. Bernard Parish, consisting of 5.7 miles of shoreline protection.

A site map showing the project boundaries is shown in Appendix A.

## **II. Inspection Purpose and Procedures**

The purpose of the annual inspection of the Lake Borgne Shoreline Protection Project (PO-30) is to evaluate the constructed project features to identify any deficiencies and to prepare a report detailing the condition of project features and recommending corrective actions needed. Should it be determined that corrective actions are needed, CPRA shall provide a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan). The annual inspection report also contains a summary of maintenance projects (See Section IV) and an estimated projected budget (See Appendix C) for the upcoming three (3) years for operation, maintenance and rehabilitation.

Due to the COVID 19 pandemic, a representative of EPA, the federal sponsor, was unable to travel to the project site for the purposes of the 2021 annual inspection. The project team decided that the post Hurricane Ida site visits conducted on September 27, 2021 and October 12, 2021 will be used as the annual inspection. Weather on September 27<sup>th</sup> consisted of mostly cloudy skies and a temperature of approximately 80°F. Taking part in the September 27<sup>th</sup> inspection were Steven Gunter, Connor Hannan, and Taylor Daigle of CPRA, the non-federal sponsor. All project features were visited. A second site visit was conducted on October 12<sup>th</sup>. Weather on October 12<sup>th</sup> consisted of cloudy skies and a temperature of approximately 80°F. Taking part in the October 12<sup>th</sup> inspection were Steven Gunter and Taylor Daigle of CPRA. During the September 27<sup>th</sup> inspection, the nearby Shell Beach gage showed a water level of approximately +1 feet NAVD 88. Except as otherwise noted, the photographs included in Appendix B were taken at the time of the September 27<sup>th</sup> site visit.

## **III. Project Description and History**

The project's objectives include preventing and/or reducing the Lake Borgne shoreline retreat in the areas adjacent to Old Shell Beach and Bayou Dupre to mitigate further joining of the lake and MRGO, reestablishing a sustainable lake rim, and preventing and/or reducing conversion of emergent marsh to open water.



The principal project features include a rock breakwater and composite sheet pile wall as shown in Appendix A. The Lake Borgne Shoreline Protection Project is divided into two segments: Shell Beach and Bayou Dupre. The Project is further divided into reaches. The Bayou Dupre segment includes Reach 1 (north of Bayou Dupre) and Reach 2 (south of Bayou Dupre). The Shell Beach segment includes Reach 3 Strong (between Fort Bayou and the Tennessee Gas Pipeline), Reach 3 Weak (between the Tennessee Gas Pipeline and Bayou Yscloskey), and Reach 4 (between Bayou Yscloskey and Doulluts Canal). Reach 3 Weak and Reach 3 Strong refer to classifications determined during the original project design according to soil shear strength profiles.

The segment at Shell Beach extends approximately 3.4 miles between Fort Bayou and Doulluts Canal. The PO-30 rock breakwater ties into the existing rock breakwater, which surrounds the perimeter of Fort Beauregard. The only openings in the breakwater occurred along the mouth of Bayou Yscloskey and across the Tennessee Gas Pipeline right-of-way.

The segment at Bayou Dupre extends approximately 1.5 miles to the north and 0.8 miles to the southeast of Bayou Dupre. At the mouth of Bayou Dupre, where maintenance dredging within the MRGO has created an unnatural water depth, sheet pile structures on each side of the bayou opening tied the rock shoreline breakwater into the existing offshore USACE rock breakwater along the MRGO to the east and west of the bayou opening.

Reach 1 and Reach 3 Weak were identified during design as having relatively weak soil foundation conditions compared to the rest of the project. These “weak” areas were designed to have rock be placed in two (2) lifts during the initial construction contract followed by a maintenance lift approximately one (1) year later.

All project features were constructed to an initial height of +4.0 feet NAVD88. Based on the initial design, a minimum feature height of +2.0 feet NAVD88 was determined to best meet project objectives.

The following describes the construction sequence and completion:

- Construction began on August 1, 2007.
- The breakwater alignment was realigned in the field to conform more closely to the new shoreline location that resulted from the land losses that were accelerated by Hurricane Katrina (which occurred between the design investigations and the start of construction).
- The second lifts were placed on the weak sections in August 2008.
- Before the access and flotation channels could be backfilled, storm surges from Hurricanes Ike and Gustav (September 2008) inundated the area and resulted in the sinking of a large portion of the Reach 1 rock breakwater. Two (2) short sections of Reach 3 “weak soils” were also affected. It was decided to address this issue during the planned maintenance lift to allow time for the team to select an effective solution (described below in Section IV).
- The project was accepted on March 11, 2009.

Annual project inspections are included in the O&M Plan. The Project has a 20 year economic life, which began at project completion in 2009.



#### **IV. Summary of Past Operations and Maintenance Projects**

There are no operable structures in the project. There have been two maintenance events over the life of the project, as described below.

Hurricanes Ike and Gustav in 2008 resulted in the sinking of large portions of the rock breakwater along Reach 1 and Reach 3 Weak. The design of the previously planned maintenance project performed in 2014 included a rock lift along 5 stretches of Reach 1 and 3 stretches of Reach 3 as well as the installation of a composite sheet pile breakwater behind portions of the rock breakwater that experienced excessive settlement: 4 stretches of Reach 1 and 2 stretches of Reach 3. The contractor placed 13,568 tons of rock as a part of this 2014 maintenance lift and additionally placed 4,563 linear feet of composite sheet pile wall using 902 timber piles, 9,027 linear feet of pressure treated walers, and 67,650 square feet of composite sheet pile. A scour protection feature at the wall toe was added to the sheet pile wall during construction utilizing 4,000 additional tons of rock. The maintenance project was accepted on September 11, 2014.

The composite sheet pile wall that was installed during the 2014 maintenance event was first noted to have damage during the 2016 annual inspection. Over the next five years, the composite sheet pile wall continued to deteriorate, creating the need for a maintenance event. Due to budget limitations that prevented the project team from replacing the damaged wall, the scope of the maintenance event included the removal of the damaged wall (all components except for the timber piles which may be used to reinstall shoreline protection if funding becomes available), enhancing the splice hardware on the intact wall, replacing two tie rods on the double steel sheet pile structure, and replacing one steel tube waler splice on the double steel sheet pile structure. The as-built drawing for Reach 1 is included in Figure 1. The maintenance project was accepted on October 12, 2021.





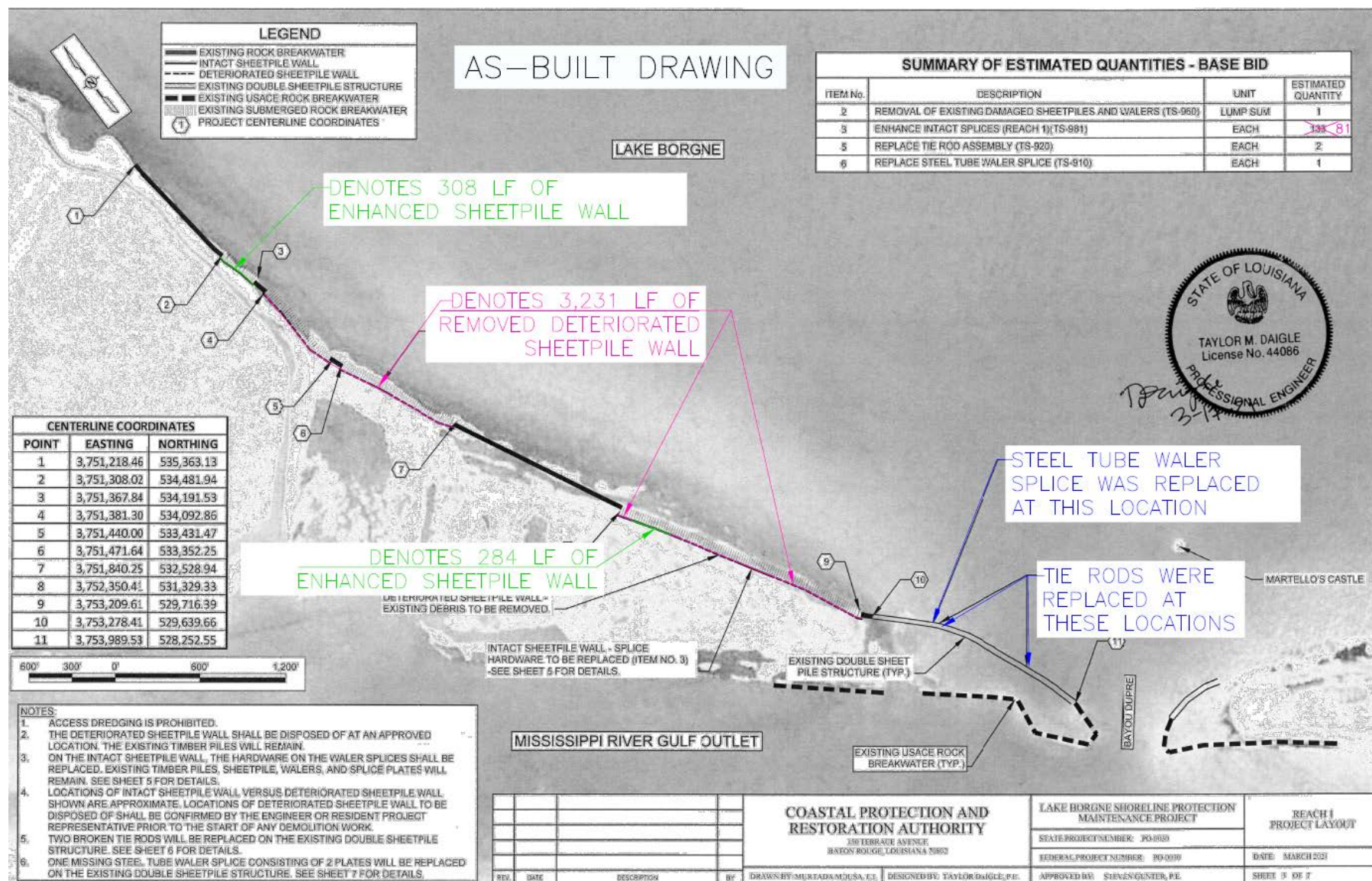


Figure 1: 2021 Maintenance Event As Built for Reach 1

## V. Inspection Results

- A. Breakwater Reach 1 (North of Bayou Dupre)** – Localized damage was noted in three (3) locations as a result of Hurricane Ida (August 2021). It appears that a vessel or debris struck the composite sheet pile wall at these locations. Aside from those three locations, the recently enhanced composite sheet pile wall appears to be in good condition. The areas that were removed during the maintenance event are no longer functioning as a breakwater. The rock breakwater has experienced some settlement but is in generally good condition.
- B. Breakwater Reach 2 (South of Bayou Dupre)** – The rock breakwater has experienced some settlement but is in generally good condition.
- C. Breakwater Reach 3 Strong (West of Tennessee Gas Pipeline)** – The rock breakwater has experienced some settlement but is in generally good condition.
- D. Breakwater Reach 3 Weak (Between Tennessee Gas Pipeline and Bayou Yscloskey)** – The rock breakwater has experienced some settlement but is in generally good condition. The recently enhanced composite sheet pile wall appears to be in good condition.
- E. Breakwater Reach 4 (East of Bayou Yscloskey)** – The rock breakwater has experienced some settlement but is in generally good condition.
- F. Double Sheet pile Wall Breakwater at the mouth of Bayou Dupre** – The double sheet pile wall breakwater appears to be in good condition. The two tie rods and one steel tube waler splice that were recently replaced appear to be in good condition. The interior rock has experienced minor settlement, but this does not appear to be impacting project performance.
- G. Warning Signs** – The warning signs at the double sheet-pile wall breakwater are present and appear to be in good condition.

## VI. Conclusions and Recommendations

### Project Condition

CPRA concludes that the Lake Borgne Shoreline Protection Project (PO-30) is achieving project objectives along approximately 89% of the project length. The other portion of the project has been removed, as described in Section IV.

While portions of the rock breakwater have experienced some settling as noted in this report, CPRA does not recommend a rock lift at this time. Because the great majority of the rock breakwater appears to be at or above the design elevation (+2.0 feet NAVD 88), the areas that would be lifted would be small, and the benefits would be limited.



### **Immediate Repairs**

No immediate repairs are planned. The locations damaged during Hurricane Ida will be considered for repair later in the project life based on recommendations from CPRA and concurrence from EPA.

### **Programmed Maintenance**

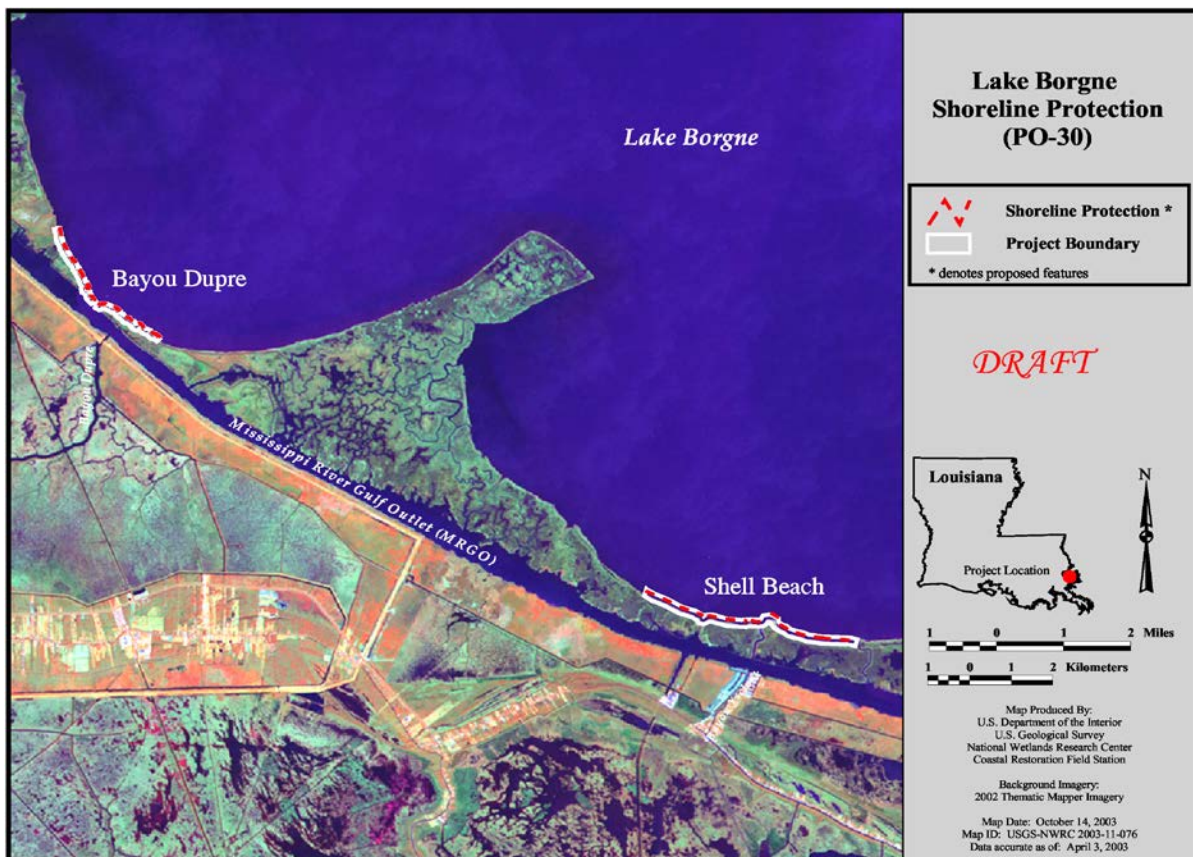
Continue to monitor the condition of the breakwaters, especially Reach 1 and Reach 3 Weak. Replace the removed portions of Reach 1 if funding becomes available.





**Appendix A**

**Project Features Map**



## **Appendix B**

### **Photographs**



**Photo 1: Reach 1**

Damage Location#1 – 40' long at 29°57'6", -89°50'37" – During Hurricane Ida, something appears to have struck the structure here. Approximately 40' of the structure should be removed at this location (measured from the last good pile on the left side of the photo to the second to last pile on the right side of the photo – this includes a stretch of about 15' in between the two gaps caused by the collision).



**Photo 2: Reach 1**

Damage Location #2 – 10' long at 29°57'40", -89°50'50" – During Hurricane Ida, something appears to have struck the structure here. Approximately 10' of the structure should eventually be removed at this location (measured as the gap between the two portions of the structure in good condition).





**Photo 3: Reach 1**

Damage Location #3 – 29°57'9", -89°50'39" – Some more minor damage was noted at this location. It is difficult to see in this photo, but the damaged location is near the center/left of this photo. A repair is feasible here rather than removal of the structure.



**Photo 4: Reach 1**

Double steel sheet pile structure appears to be in good condition.





**Photo 5: Reach 2**

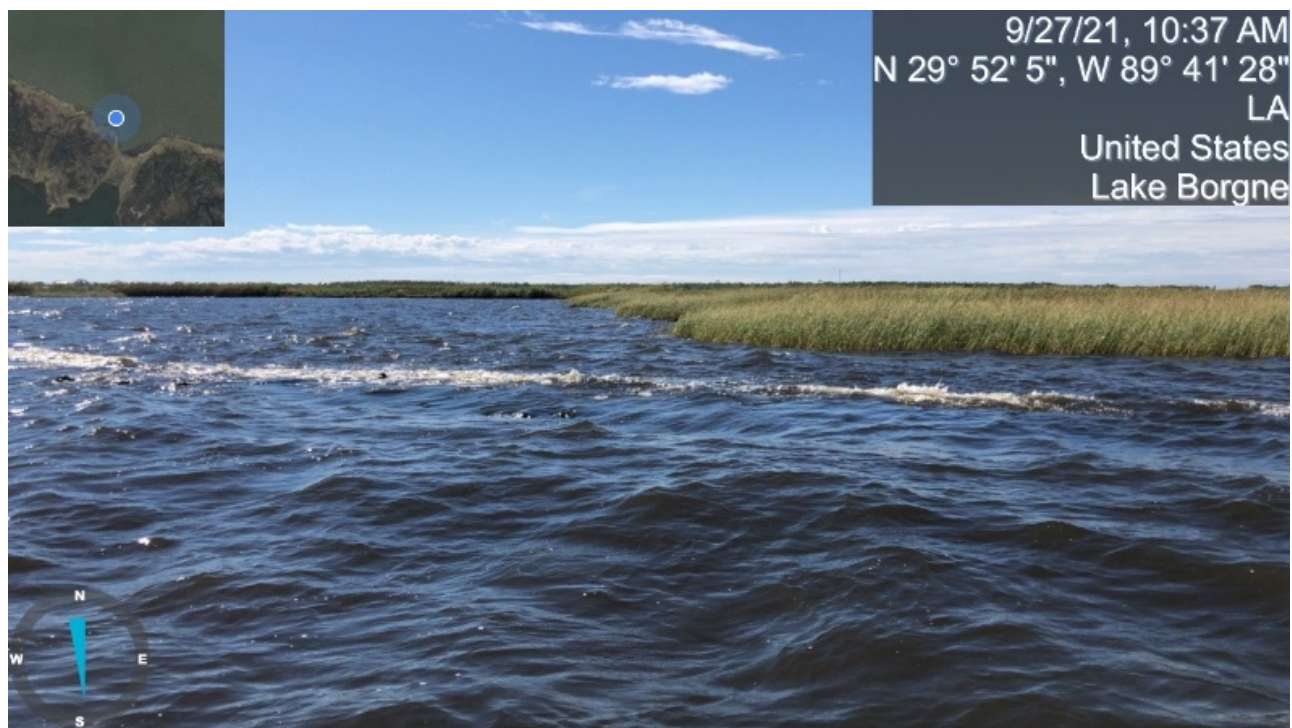
Double steel sheet pile structure appears to be in good condition.



**Photo 6: Reach 2**

Rocks appear to be in generally good condition.





**Photo 7: Reach 3**

Some rocks are low (as shown in this photo), but generally the rocks in Reach 3 appear to be in good condition.



**Photo 8: Reach 3**

Composite sheet pile wall appears to be in generally good condition.



**Photo 9: Reach 4**  
Rocks appear to be in generally good condition.

## **Appendix C**

### **Three-Year Operations & Maintenance Budget**

Lake Borgne Shoreline Protection - PO-30																						
Federal Sponsor: EPA																						
Construction Completed : April 12, 2010																						
PPL 10																						

Note: Currently Funded amount is as of the November 2020 LANA report, the most recent LANA report that CPRA has received.

## **Appendix D**

### **Field Inspection Form**



MAINTENANCE INSPECTION REPORT CHECK SHEET					
Project No. / Name: <b>PO-30 Lake Borgne Shoreline Protection Project</b>				Date of Inspection: 9/27/2021 & 10/12/2021	Start Time: <u>10:00 am</u>
Structure No. <u>N/A</u>				Inspector(s): <u>Steven Gunter (CPRA), Connor Hannan (CPRA), Taylor Daigle (CPRA)</u> Water Level: +1 feet NAVD 88 (9/27/2021), +1 feet NAVD 88 (10/12/2021)	
Structure Description: Shoreline Protection Breakwater					
Type of Inspection: Annual					
Weather Conditions: mostly cloudy (9/27/2021), cloudy (10/12/2021)					
Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Reach 1 Rock Breakwater	Good	Some settlement	N/A	3	Most rock appears to be in good condition. Some settlement observed.
Reach 1 Composite Sheetpile Const. 2013 Maintained 2021	Good	3 locations damaged in Hurricane Ida	N/A	1-3	Recently maintained wall is in good condition, except for 3 locations that appear to have been struck by vessels or debris during Hurricane Ida. Some portions of the composite sheetpile wall were removed in the 2021 maintenance event.
Reach 2 Rock Breakwater	Good	Some settlement	N/A	6	Most rock appears to be in good condition. Some settlement observed.
Reach 3 Rock Breakwater	Good	Some settlement	N/A	7	Most rock appears to be in good condition. Some settlement observed.
Reach 3 Composite Sheetpile Const. 2013	Good	None	N/A	8	Recently maintained wall is in good condition.
Reach 4 Rock Breakwater	Good	Some settlement	N/A	9	Most rock appears to be in good condition. Some settlement observed.
Reaches 1 & 2 Double Sheet-pile	Good	None	Yes	4-5	Two tie rods and one steel tube waler splice have been recently replaced. Corrosion observed throughout steel sheetpile and steel tube walers. Rock has experienced minor settlement.
Reaches 1 & 2 Warning Signs	Good	None	N/A	N/A	