



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

**2020 Annual Inspection Report**

for

**Lake Borgne Shoreline Protection  
Project**

State Project Number PO-30  
Priority Project List 10

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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 2020 annual inspection. The project team decided that the site visit conducted on November 24, 2020 to assess impacts due to Hurricane Zeta will be used as the annual inspection. Weather on November 24<sup>th</sup> consisted of partly cloudy skies and a temperature of approximately 75°F. Taking part in the November 24<sup>th</sup> inspection were Steven Gunter, Connor Hannan, and Taylor Daigle of CPRA, the non-federal sponsor. Reach 1 was visited. Reaches 2, 3, and 4 were not visited as a part of this inspection. It should be noted that Reach 1 has historically been the reach that has been most impacted by wave action from Lake Borgne, hence the emphasis on this reach for this inspection/Zeta damage assessment. The nearby Shell Beach gage showed a water level of approximately +1 feet NAVD 88. Photographs of the inspection are included in Appendix B of this report.

## **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 occur 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. At the time of this inspection, there had been one maintenance event over the life of the project, as described below. At the time of the writing of this inspection report, a second maintenance event has been completed, which will be described in the 2021 annual inspection report.

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.

## V. Inspection Results

- A. Breakwater Reach 1 (North of Bayou Dupre)** – There is significant deterioration of this feature, as described below from north to south. See Figure 1 for point coordinates.



Table 1: Breakwater Reach 1 Summary

Start Point	End Point	Length (LF)	Type	Condition
R1	R3	890	Rock	Good
R3	R4	290	Sheet pile	Good. Some sheets appear to be detaching from the structure. The performance of the feature does not appear to be affected.
R4	R5	110	Rock	Good
R5	R6	660	Sheet pile	This entire section is badly deteriorated. None of this section appears to be salvageable aside from the piles. A maintenance event is being planned to rehabilitate this segment.
R6	R7	90	Rock	Good
R7	R8	905	Sheet pile	Approximately 9% of the length of this segment will be able to remain, and approximately 91% of the length of this segment will need to be rehabilitated, with only the piles to remain. From north to south, the first 305 feet will need to be rehabilitated, followed by 80 feet that can remain, and the remainder of approximately 525 feet will need to be rehabilitated. A maintenance event is being planned to repair this segment.
R8	R9	1310	Rock	This segment has experienced some settlement.
R9	R10	1850	Sheet pile	Approximately 40% of the length of this segment will be able to remain, and approximately 60% of the length of this segment will need to be rehabilitated, with only the piles to remain. From north to south, the first 110 feet can remain, followed by 180 feet that will need to be rehabilitated, followed by 310 feet that can remain, followed by 330 feet that will need to be rehabilitated, followed by 200 feet that can remain, followed by 180 feet that will need to be rehabilitated, followed by 110 feet that can remain, and the remainder of the approximately 420 feet will need to be rehabilitated. A maintenance event is being planned to rehabilitate this segment.

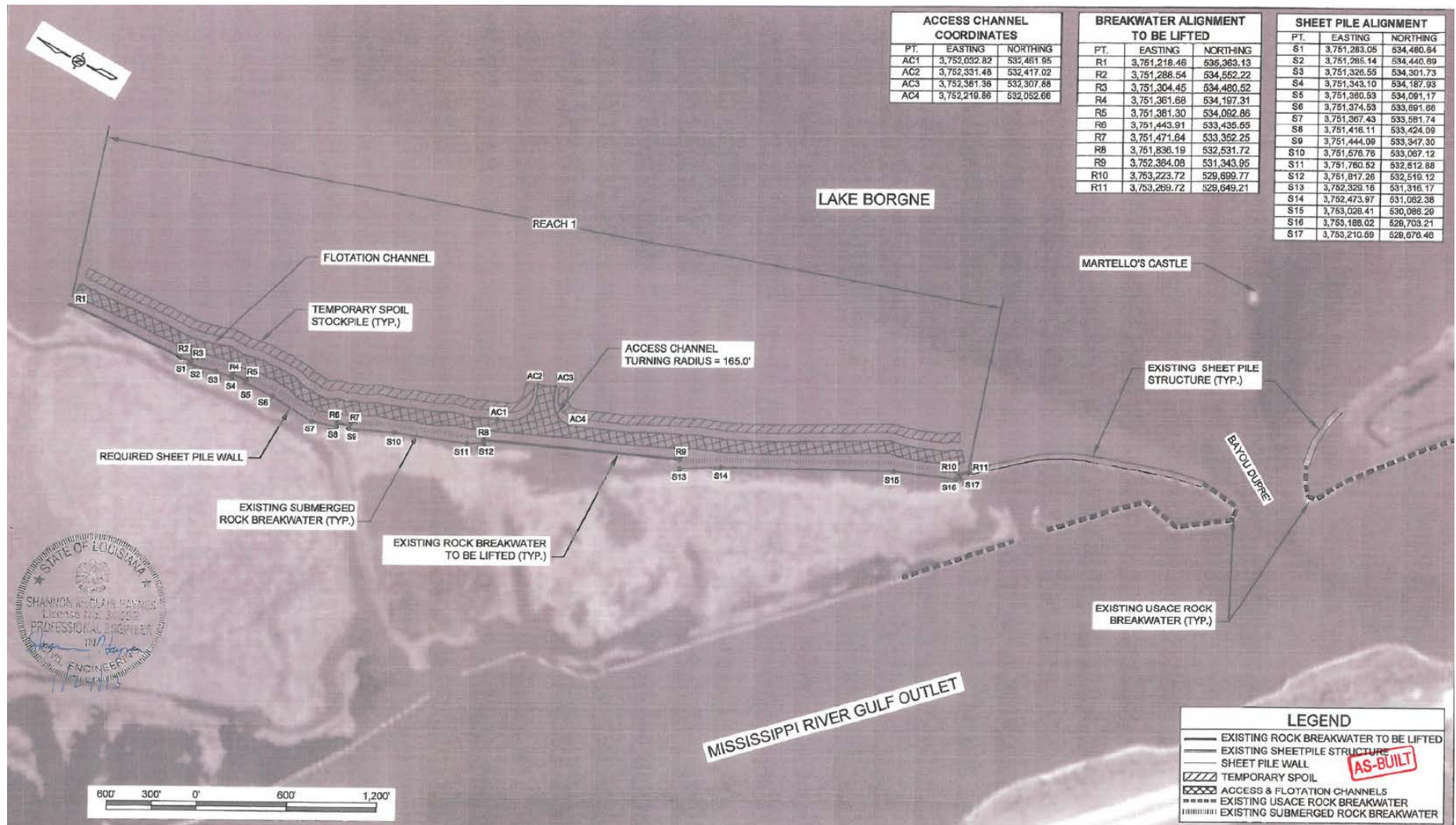


Figure 1: 2013 Maintenance Event As Built for Reach 1

- B. Reaches 2, 3, and 4** – Reaches 2, 3, and 4 were not visited during the 2020 annual inspection. The 2019 and 2021 annual inspection reports include information on these sections.
- C. Double Sheet pile Wall Breakwater at the mouth of Bayou Dupre** – The double sheet pile wall breakwater appears to be in good condition. One tie rod has failed. A maintenance event is being planned which will include replacement of the tie rod. The interior rock has experienced minor settlement. The performance of the feature does not appear to be affected.
- D. 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 91% of the project length, with significant deterioration along the remaining length that should be repaired as soon as possible.

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 design elevation (+2.0 feet NAVD 88), the areas that would be lifted would be small, and the benefits would be limited.

### **Immediate Repairs**

CPRA is currently planning a maintenance event to rehabilitate segments along the sheet pile wall in Reach 1, replace the failed tie rod on the double sheet pile wall breakwater, and enhance the remaining intact waler splices by replacing hardware with more durable alternatives.

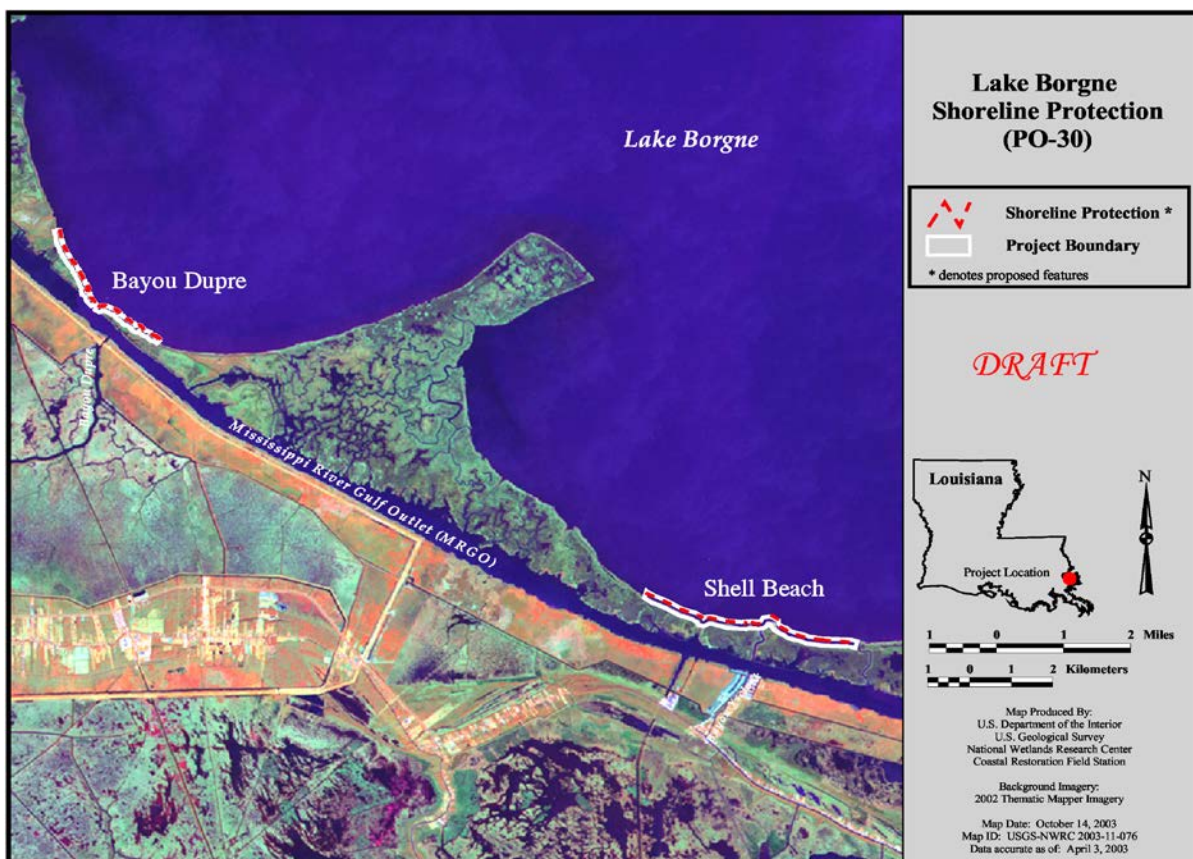
### **Programmed Maintenance**

Continue to monitor the condition of the breakwaters, especially Reach 1 and Reach 3 Weak.



**Appendix A**

**Project Features Map**



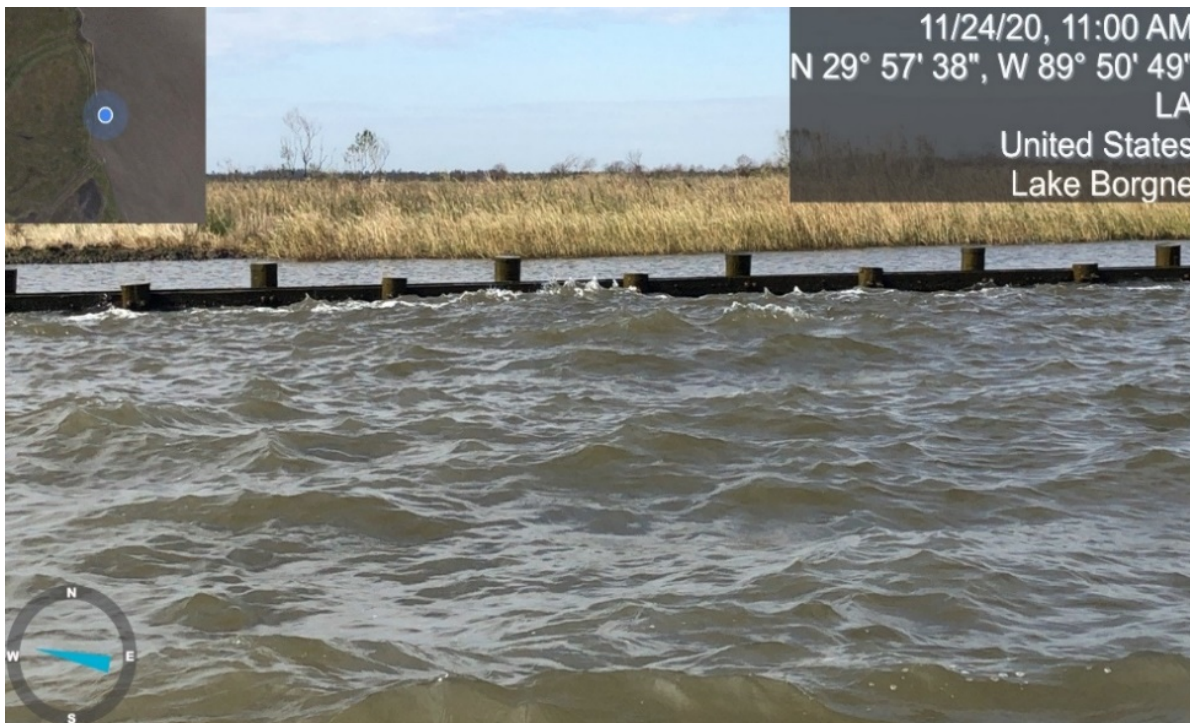
## **Appendix B**

### **Photographs**



**Photo 1**

Example of Vinyl sheet pile wall that is still pinned at its bottom edge but detached at its top edge. This photo was taken near the most northwestern extent of PO-30 Reach 1.



**Photo 2**

Example of a section of sheet pile wall that is fully intact



**Photo 3**

Battered section of PO-30 with displaced water depicted as well as a clear depiction of a degraded vinyl sheet pile.



**Photo 4**

Section of sheet pile wall where only the timber piles remain standing



**Photo 5**

Another section of intact sheet pile wall occurring behind a section of existing rock shoreline protection.



**Photo 6**

This depicts a portion of the section of sheet pile wall that suffered additional damage due to Hurricane Zeta.



**Photo 7**

This photo depicts the double sheet pile wall aspect of PO-30. It can be seen that there is a missing tie-rod that was used for lateral support between the horizontal walers.



**Photo 8**

Zoomed view of the double sheet pile wall consisting of two steel sheet pile walls braced on their respective outside faces by horizontal walers. The walers are then tied together by tie-rods sheathed in PVC pipe. Rock was then placed within the walls after the structure was constructed.



**Photo 9**

Section of double sheet pile wall where the tie-rods are completely covered by rock, making it difficult to locate damaged or missing tie rods.

## **Appendix C**

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

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

Note: This budget is reflective of projections at the end of 2020, not actual costs of the 2021 maintenance project.

## **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: 11/24/2020      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: <u>+1 feet NAVD 88</u>	
Structure Description: <u>Shoreline Protection Breakwater</u>					
Type of Inspection: <u>Annual</u>				Weather Conditions: <u>partly cloudy</u>	
Item	Condition	Physical Damage	Corrosion	Photo #	Observations and Remarks
Reach 1 Rock Breakwater	Good	Some settlement	N/A	5	Most rock appears to be in good condition. Some areas have experienced settlement.
Reach 1 Composite Sheetpile Const. 2013	Poor	Deteriorating Sheetpile Wall	N/A	1-6	Significant damage noted. A maintenance event is being planned to rehabilitate this feature. Some areas remain intact. There are four segments of sheetpile in this area. The northernmost segment is intact and does not require any rehabilitation. The second segment from the north is completely deteriorated and will need to be fully rehabilitated aside from the piles. The third segment from the north requires approximately 91% rehabilitation. The southernmost segment requires approximately 60% rehabilitation.
Reach 2 Rock Breakwater					This feature was not visited during the 2020 inspection. The 2019 and 2021 annual inspection reports include information on this reach.
Reach 3 Rock Breakwater					This feature was not visited during the 2020 inspection. The 2019 and 2021 annual inspection reports include information on this reach.
Reach 3 Composite Sheetpile Const. 2013					This feature was not visited during the 2020 inspection. The 2019 and 2021 annual inspection reports include information on this reach.
Reach 4 Rock Breakwater					This feature was not visited during the 2020 inspection. The 2019 and 2021 annual inspection reports include information on this reach.
Reaches 1 & 2 Double Sheet-pile	Good	Minor	Yes	7-9	One tie rod has failed. Rock has experienced minor settlement.
Reaches 1 & 2 Warning Signs	Good	None	N/A	N/A	