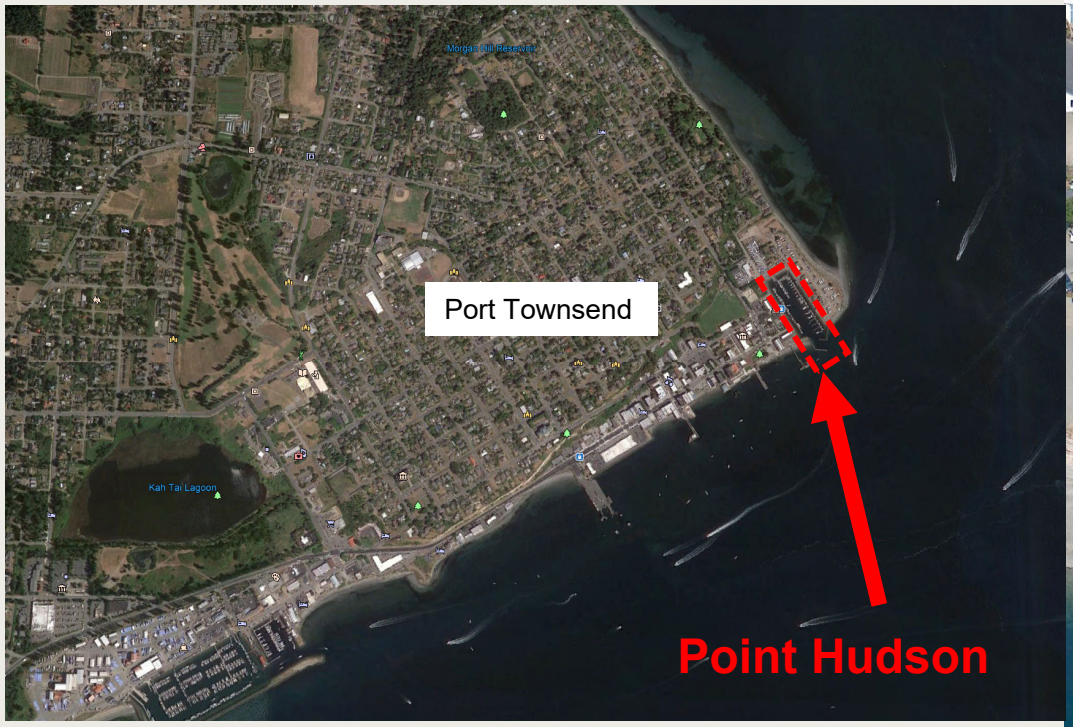
Point Hudson

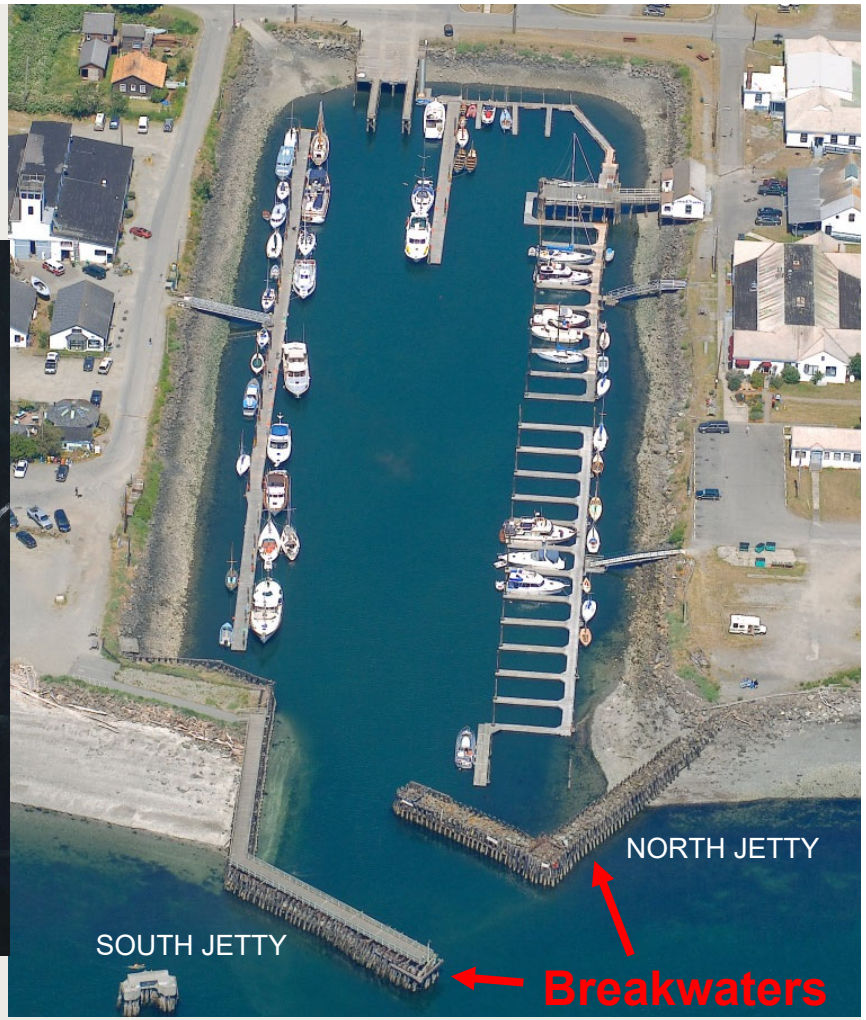
Breakwater Improvement Project

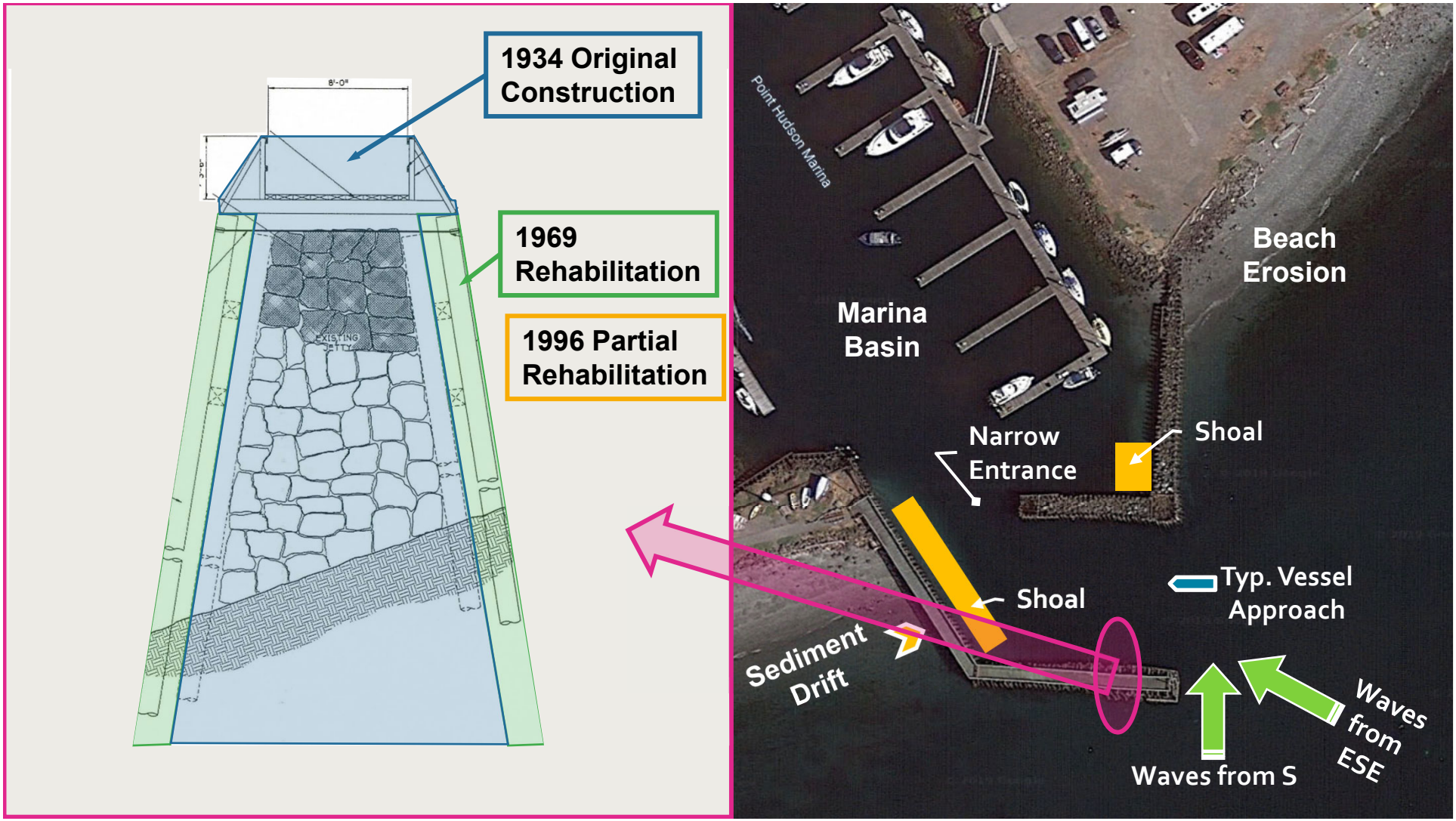
Port Commission Meeting
June 2020

Introduction

Background





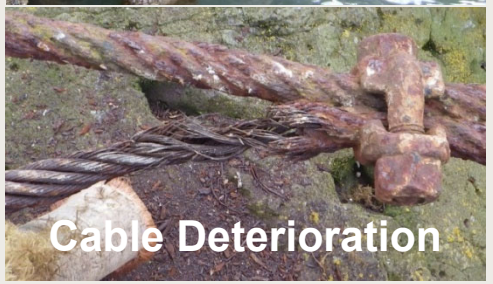

1934 Original Construction
1969 Rehabilitation
1996 Partial Rehabilitation
8'-0"
EXISTING
Point Hudson Marina
Marina Basin
Beach Erosion
Narrow Entrance
Shoal
Shoal
Typ. Vessel Approach
Sediment Drift
Waves from S
Waves from ESE

Introduction

Existing Condition

Timber piles, walers, cable tiebacks, and armor rock are at or beyond useful life. Stability of the overall structural system is compromised.

- The most advanced structural deterioration was observed at the end of the south breakwater.
- Voids in the riprap reduce the system's wave protection capability.



A Challenging Marine Environment

- A 2018 storm damaged the breakwaters, breaking pile tops, severing cable ties and further eroding the armor rock core.
- Constructing the Replacement Breakwater is the first step in building resilience for Point Hudson's future.

A December 2018 storm sweeps over the jetties and into the Point Hudson Marina.

Design Objectives

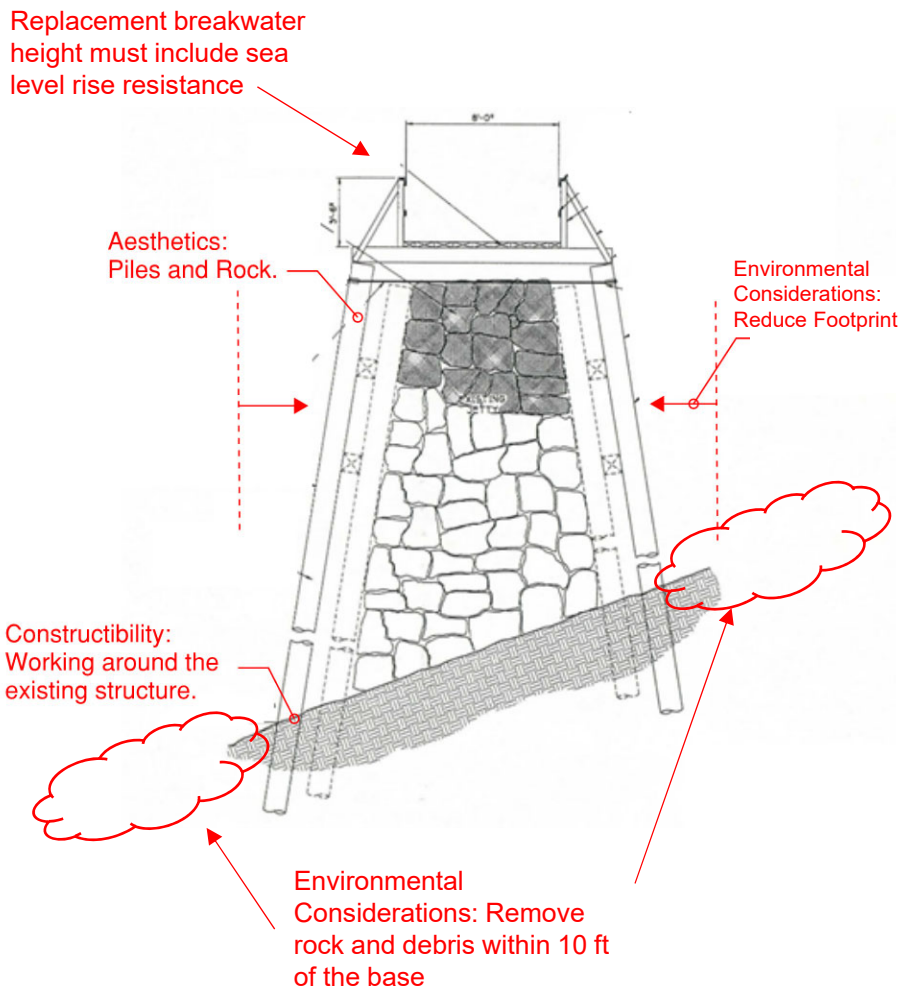
Overview

The guiding objectives are to provide a breakwater rehabilitation/replacement design that:

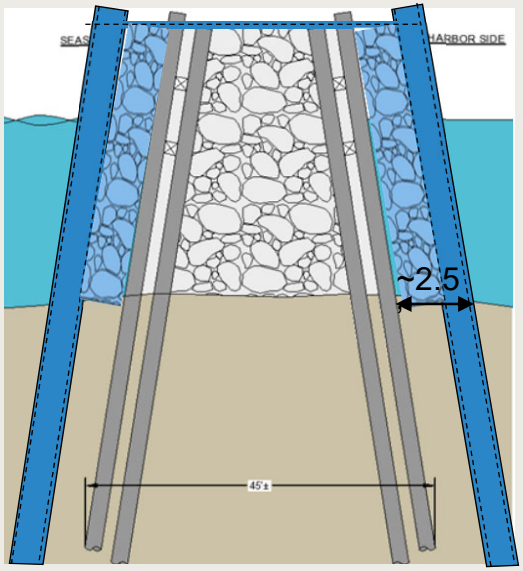
- Provides wave protection for the Point Hudson Marina for a minimum design life of 30 years.
- Responds to community concerns to maintain the aesthetic of the existing breakwater.
- Can be permitted, constructed and maintained.

Design Objectives

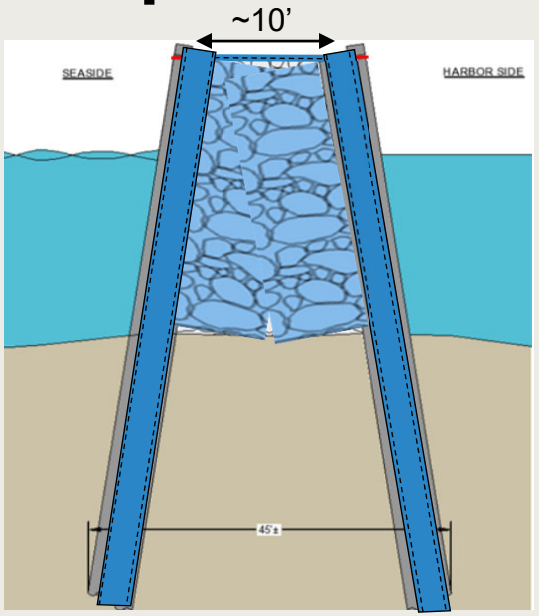
- **Engineering.** Protect existing marina and Port operations for 30 years from wind and vessel waves and **sea level rise**.
- **Aesthetics.** Similar in appearance to existing breakwater (rocks and piles) using environmentally acceptable materials.
- **Environmental Considerations.** Remove creosote, reduce breakwater footprint, and protect existing eelgrass outside of marina.
- **Constructability.** Minimize risks from potential cost overruns, delays, errors, and obstacles during construction.
- **Cost.** Efficient design that minimizes maintenance costs.



Alt. Evaluation: Encapsulation vs. Replacement



- Existing structure remains except for a few select creosote timber piles removed for permitting.
- Piles driven in a batter outside of existing structure, expand footprint by 2.5 ft each side with mesh lagging.
- Reduces demo costs but increases offsite mitigation costs.



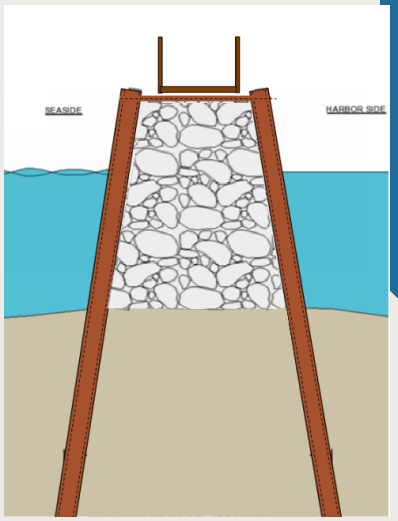
- Existing structure is completely removed including piles and rock.
- Piles driven batter with new rock installed between the rows of piling.
- Seeks to be self mitigating because of the reduction in footprint and creosote removal.

Breakwater Design

Stakeholder Input

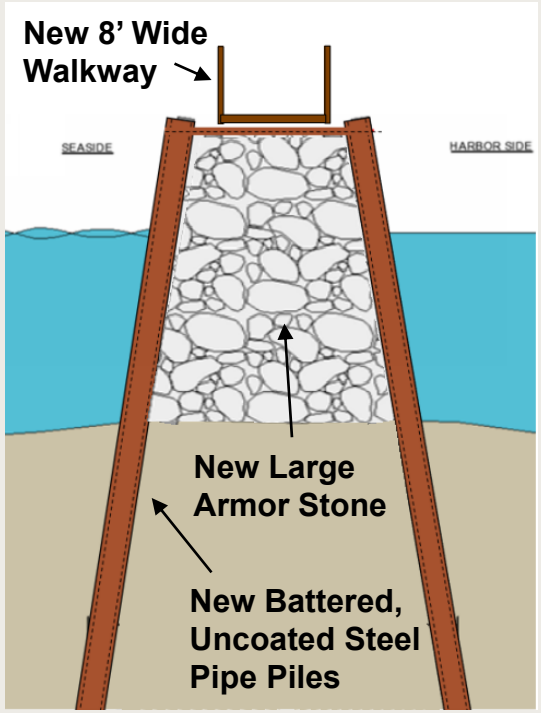
After review of the different alternatives, stakeholders selected replacement as their preferred alternative with some additional input.

Category	Input
Pile	• Piles should be closely spaced, similar to the existing • Piles should be uncoated steel pipe piles with sacrificial corrosion thickness, no composite piles • Piles should be battered to match existing aesthetics • Piles should be supported with tie rod cross-ties and potential walers
Breakwater Core	• Large high quality riprap (granite) • No mesh for rock containment
Walkway	• Design and system should allow for installation of walkway on top of the south breakwater • End of walkway waterside should incorporate a wider turnaround and look out area
Permitting	• North and south breakwaters should be designed and permitted together

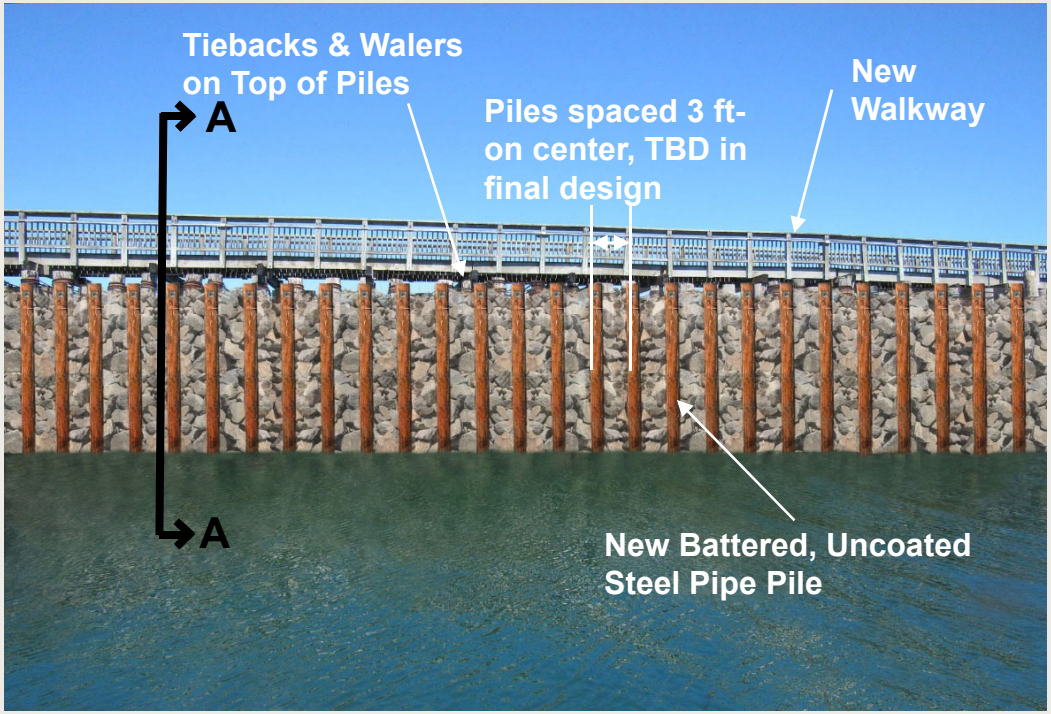


Selected Breakwater Design - Replacement

Selected Cross-Section and Elevation

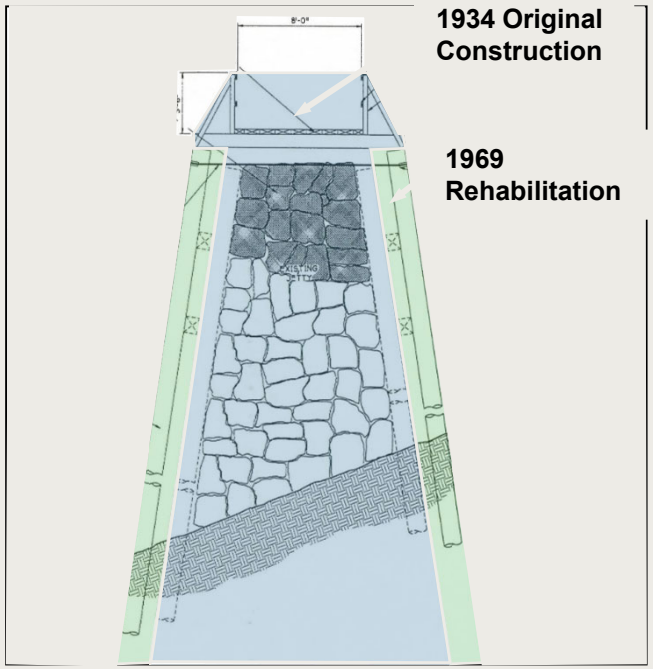


Section A - A



Elevation View

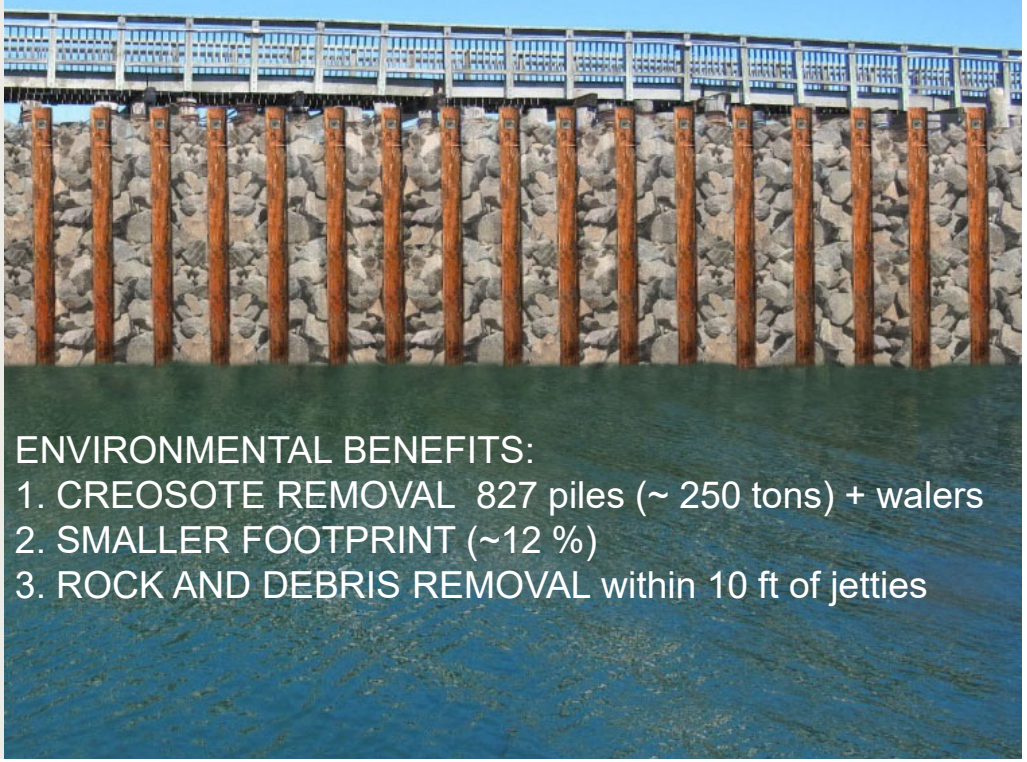
Environmental Goals and Benefits



ENVIRONMENTAL PERMIT GOALS:

1. AVOID RE-INITIATING CONSULTATION WITH NMFS

2. DESIGN A SELF-MITIGATING STRUCTURE



ENVIRONMENTAL BENEFITS:

1. CREOSOTE REMOVAL 827 piles (~ 250 tons) + walers
2. SMALLER FOOTPRINT (~12 %)
3. ROCK AND DEBRIS REMOVAL within 10 ft of jetties

Project Schedule

- Scenario 1 – Best Case (Goal)
- Construction Completion Spring of 2022

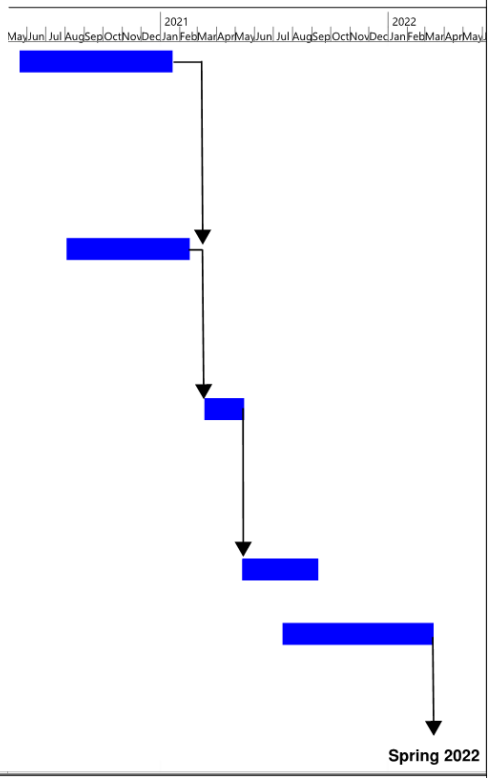
Pt Hudson Breakwater Replacement Project - Best Case Scenario

Estimated Permitting and Construction Schedule

DRAFT

MOTT MACDONALD

ID	Task Name	Duration
1	**Permitting**	**6 months**
2	Initiate permit modification	
3	Finish preliminary design	
4	Submit JARPA application	
5	Permit review	
6	Receive permits	
7	**Bid Document Creation**	**5 months**
8	80% Design	
9	80% Design submitted for review	
10	Finalize 100% draft documents	
11	Finalize for bidding	
12	**Bidding Process, Award, NTP**	**1.5 months**
13	Advertise	
14	Bidding	
15	Award	
16	NTP	
17	**Pre-Construction**	**2.5 months**
18	Submittal reviews and procurement	
19	**Construction**	**6 months**
20	In water work window	
21	Start construction on site	
22	Construction	
23	Construction complete	



Note: Permit schedule assumes that a modification to the existing Corps permit is obtained, requiring an estimated 6-months. In the event a modification to the existing permit is not obtained, a new individual Corps permit would be necessary, adding an estimated 12 months to the permitting/construction schedule.

Other Potential Permitting Scenarios/Schedules

	Scenario 1 (Best Case)	Scenario 2	Scenario 3
Description	• Existing permit is modified for current design	• Existing permit is modified but NMFS is re-engaged	• Modification is rejected and a new permit application is required.
Permitting Length	• 6 months	• 12 months	• 18 + months
Permit Submittal	• July 2020	• July 2020	• July 2020
Permit Received	• Jan 2021	• July 2021 (+6 months)	• Jan 2022 (+12 months)
Bid Advertisement	• Spring 2021	• Spring 2021	• Spring 2022 (+12 months)
Construction Start	• Fall 2021	• Fall 2021	• Fall 2022 (+1 year)
Construction End*	• Spring/Fall 2022	• Spring/Fall 2022	• Spring/Fall 2023 (+1 year)

- *Would seek to replace breakwater in one construction season however, depending on fish work window requirements, replacement may need to occur over two in water work windows.

Summary

Replacement Alternative

- Breakwater replacement alternative similar in style as existing breakwater with modern materials and walkway on south breakwater.

Permitting

- Permitting will include replacement of both breakwaters.

Final Design

- Final design will be for replacement of both breakwaters.

Project Bidding for Construction

- Bid Documents developed for replacement of south breakwater first.

Schedule

- Earliest completion of the south breakwater replacement is spring or fall of 2022.

Project Costs

Total Project Costs (South and North)

- Construction Cost - **$12.5 Million** (2020 dollars)
- Engineering, Permitting, Bid Docs - **$394,000**
- Construction Administration (South) - **$250,000**
- Construction Administration (North) - **$250,000**
- **Grand Total = $13.39 Million** (2020 dollars)

Total Project Costs (South Replacement Only)

- Construction Cost - **$7 Million** (2020 dollars)
- *Engineering, Permitting, Bid Docs - **$373,000***
- Construction Administration (South) - **$250,000**
- **Grand Total = $7.62 Million** (2020 dollars)

Variables

- Costs assume two separate construction seasons which is most likely scenario due to funding and potential fish window restrictions
- Permitting from scratch (Scenario 3) would increase permitting costs
- Costs include the new walkway on the south breakwater
- Does not include cost inflation
- Cost does not include offsite mitigation costs that could be required (0%-5% of project costs)
- Cost does not include potential repairs needed to the existing breakwaters while waiting for replacement

Next Steps

- Submit Permits
- Complete Final Design

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Questions?