To: Sanh Ho, Washington State Parks and Recreation Commission
    Kinnan Murray, Washington State Parks and Recreation Commission
    Hannah Ross, Washington State Parks and Recreation Commission

From: Anna Spooner, Anchor QEA, LLC

cc: Steve Robert, DCG
    Matt Woltman, Anchor QEA
    Merri Martz, Anchor QEA
    Kathy Ketteridge, Blue Coast Engineering

Re: Draft Alternatives Analysis for the Blake Island Marine State Park Facility Improvement Project

The Washington State Parks and Recreation Commission (State Parks) is developing the Blake Island Marine State Park Facility Improvement Project (Project) to meet the following goals:

1. Support larger vessels in the marina; keep the marina usable for commercial and public users
2. Develop a long-term solution to providing an on-grade boat landing for State Park’s marine crews
3. Continue to connect the public with Blake Island’s natural and cultural heritage through recreational and education experiences, consistent with the parks mission

This memorandum provides a summary of the alternatives developed for the Project:

- Alternative 1 – No Action
- Alternative 2 – Reconstruction
- Alternative 3 – Expansion

The memorandum then provides an alternative analysis to meet the requirements in the Washington State Office of Financial Management (OFM) Predesign Report. The analysis builds off the deliverables for detailing the Project’s design criteria, design considerations and design program.
Alternative 1: No Action

The No Action Alternative assumes that no improvements would occur within the marina basin, upland area, or state parks boat launch. Figure 1 provides a base map and Table 1 provides a summary of the existing moorage. If the project area is left as is, the existing marina structures, including the east and west docks, state parks dock, and commercial dock, will continue to deteriorate. The following summarizes the potential effects of a no action project:

- The marina will continue to be difficult for commercial operators, public users, and state parks staff to navigate safely and effectively due to a narrow entrance channel, limited room to turn, and limited moorage.
- Without maintenance dredging, boats will continue to scour the entrance channel and basin and sediment build up will continue.
- The marina currently does not meet ADA standards and will continue to remain inaccessible.
- The existing boat landing for State Park’s Thunderbird vessel will continue to be constrained by a narrow tidal window with a need for its crew deploy mats along the beach prior to landing.
- The existing creosote pilings will remain.
- Over time, the marina would become unusable and potentially need to be closed to commercial and public access. This would severely limit the opportunity for the public to access Blake Island.

Table 1
Existing Moorage

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Slips</th>
<th>Total Moorage (Linear Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial dock</td>
<td>2</td>
<td>170</td>
</tr>
<tr>
<td>Commercial dock: seasonal float</td>
<td>1</td>
<td>130</td>
</tr>
<tr>
<td>State Parks dock</td>
<td>1</td>
<td>43</td>
</tr>
<tr>
<td>Public basin</td>
<td>8</td>
<td>720</td>
</tr>
<tr>
<td><strong>Total Moorage</strong></td>
<td></td>
<td><strong>1,063</strong></td>
</tr>
</tbody>
</table>

Advantages:

There are few advantages to the No Action Alternative:

- *Nearshore Habitat and Subtidal Habitat:* There would be no adverse impacts to eel grass habitat and no nearshore ecological processes will be interrupted.
- *Sea Level Rise:* The existing marina’s design, in particular the breakwater and rock slopes, is durable and could withstand rising sea levels and an increase in storm frequency and severity. The top of breakwater and top of rock slope elevations are higher than projected sea level rise scenarios for years 2070 and 2100.
Permit Feasibility: Alternative 1 requires no permitting as no work is proposed.

Disadvantages:
Because the No Action Alternative proposes to leave the marina as is, there are multiple disadvantages that will build over time, as the marina falls into further disrepair:

- **Recreation and Visitor Experience**: Commercial and public moorage would remain limited and unable to accommodate a variety of vessel sizes. Navigation of public vessels would remain difficult. Alternative 1 will not meet ADA standards.
- **State Parks Operations and Maintenance**: The existing State Parks dock will continue to deteriorate. For the boat launch, current WDFW authorization will continue to require State Parks to work around a narrow tidal window to avoid impacts to sensitive aquatic habitat. State Parks staff will be required to continue laying out temporary mats prior to boat launch use.
- **Commercial Operations**: The existing commercial dock is in poor condition and will continue to deteriorate. The existing marina width will continue to limit size and navigation of commercial vessels. Sedimentation will be not addressed, resulting in a narrower entrance channel and resulting in the commercial seasonal float to continue to ground out at low tide.
- **Flexibility**: Over time the condition of the marina will become more and more deteriorated resulting in less opportunity for marina use and less flexibility for multiple types of users.
- **Sediment Management**: Sediment accumulation impacts the commercial moorage area, and the seasonal float often grounds out. Necessary maintenance dredging will not occur and sediment accumulation in marina basin will continue. Increased propeller wash in commercial boat area will continue to scour the basin.
- **Nearshore Habitat and Subtidal Habitat**: Existing creosote treated structures and piles will remain in the nearshore environment and will continue to release toxins into the environment.
- **Value for Cost**: While Alternative 1 requires no renovation or reconstruction, deterioration over time will require high maintenance and operational costs to keep the marina operational and accessible for as long as possible. Over time, the marina would likely need to close due to safety and access issues. This could result in State Parks incurring demolition costs.
Alternative 1: No Action

Blake Island Marina State Park - Marine Facility Improvement Project
Washington State Parks and Recreation Commission

Figure 1

LEGEND:
- Existing Contours (2' & 10' Intervals)
- Project Limits
- Approximate Eelgrass Limits
- Existing Drainage Line
- Chained Driftwood
- Sheet Pile Wall
- Rubble Mound Breakwater
- Rock Slope Protection
- Channel Marker

HORIZONTAL DATUM: Washington State Plane North Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

HORIZONTAL DATUM: Washington State Plane North Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

Existing Approximate Intercept at 2H:1V from Existing Sheet Pile Wall
Restroom
Covered kitchen area
Alternative 2: Reconstruct

Alternative proposes to maximize moorage within the existing marina footprint. Figures 2 and 3 detail the proposed design and Table 2 provides a summary of the proposed moorage. It proposes to deepen the channel and basin, steepen the marina rock slopes to maximize moorage space and vessel maneuvering, make improvements to marina amenities, provide ADA connections, and improve the State Parks boat launch (see section 4.4). Alternative 2 proposes to keep all improvements and modifications within the current marina footprint to limit impacts to the nearshore environment. Alternative 2 includes the following:

- **Marina improvements**
  - New marina will maximize moorage
  - Provide ADA connections
  - Provide new boat pump out on land side
  - Remove all treated/creosote wood
- **Breakwater and sheetpile wall**
  - Replace sheetpile wall with buried rock feature transitioning off the existing breakwater
- **Entrance Channel and Basin**
  - Steepen rock slope along basin to maximize basin extent within 1988 footprint
  - Deepen entrance channel and commercial basin to -14 and line with rock (cobble or quarry spalls) – the intent here is to reduce erosion and sedimentation and reduce maintenance dredging
  - Deepen public basin to -12 and line with rock (cobble or quarry spalls) – the intent here is to reduce erosion and sedimentation and reduce maintenance dredging
- **Marine biology/Permit Feasibility**
  - Dredge design will require additional permitting since it is deeper than 1988 design

<table>
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<tr>
<th>Item</th>
<th>Total Slips</th>
<th>Total Moorage (Linear Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial dock</td>
<td>3</td>
<td>280</td>
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<tr>
<td>State Parks dock</td>
<td>8</td>
<td>270</td>
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<tr>
<td>South public basin</td>
<td>16</td>
<td>660</td>
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<tr>
<td>Middle public basin</td>
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<tr>
<td>North public basin</td>
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<tr>
<td><strong>Total Moorage</strong></td>
<td></td>
<td><strong>2300</strong></td>
</tr>
</tbody>
</table>
Advantages:

- **Recreation and Visitor Experience**: There is an increase in moorage, expanding public access to marina. The design accommodates different size and types of boats. All gangway access points are ADA accessible. A new upland pathway and picnic area are also fully ADA accessible, strengthening the connection between the marina, restroom and kitchen shelter. New vegetation areas enhance aesthetics and provide a buffer between the upland pathway and marina rock slope areas. The new boat launch area will provide a new hand carried boat launch for park users.

- **State Parks Operations and Maintenance**: The reconstructed State Parks pier will accommodate State Parks operational use. The new boat launch will extend waterward to allow for a larger window of operational use that is less impacted by tide schedules. The boat launch will also be a permanent feature and will not require State Parks staff to mobilize temporary mats prior to use.

- **Commercial Operations**: Steepening the rock slopes will increase the moorage basin and will allow for more maneuvering space for commercial vessels. The entrance channel and moorage basins will be dredged to a deeper elevation so marina floats will not bottom out at low tides.

- **Flexibility**: The marina design could be programmed for reservable or first-come-first-served slips. There are multiple slip sizes and configurations to accommodate various vessels size and types.

- **Sediment Management**: The entrance channel and moorage basins will be dredged to a deeper elevation to avoid scour from propeller wash, commercial and public use.

- **Nearshore Habitat and Subtidal Habitat**: The project footprint is entirely within the existing marina and will not impacts existing eel grass habitat. The design will remove all creosote treated wood from the marina. New floats and gangway will be grated to maximize light penetration.

- **Sea Level Rise**: The design considers sea level rise. The buried rock slope that will replace the deteriorated sheetpile wall is designed to withstand sea level rise estimates. The marina structures are designed with durable materials to withstand increased storm frequency and severity.

- **Permit Feasibility**: The project avoids impacts to existing habitat by maintaining the existing footprint. The project also identifies the mitigation opportunity to remove angular rock and debris from the western nearshore area. The project is feasible to permit. However, permitting will need to address the dredge depth as the proposed depth is deeper than previous dredging event (1988).

- **Value for Cost**: Based on a cost analysis, the cost to construct new marina structures is similar to the cost to rehabilitate the existing structures. New structures will have a longer design life and will require less regular maintenance. The value for cost for the marina structures is high.
The cost per moorage linear foot is approximately $6,782. The dredging design will also extend the time between maintenance dredging. The last dredge occurred 32 years ago, and maintenance dredging is now needed to keep the marina usable. The Alternative 2 dredge design will extend this maintenance dredge requirements to potential 50 years or more.

- **Implementation Schedule**: The project design involves defined types of work that could be sequenced to complete in-water work with an efficient approach. The Blake Island in-water work window extends from July 16 to February 15. The proposed work could be accomplished in a single in-water window, with a potential start following Labor Day to minimize impacts to park users. Upland improvements are defined and could be done following in-water work and with the goal to complete project work by the busy summer season.

- **Constructability**: The project is designed to use standard float modules and gangway designs. Precast concrete is identified for construction of the boat launch and upland pathway elements to minimize work on the island. This alternative can be sequenced to maximize constructability. For example, demolition would occur first allowing for the dredger to have full access to the marina basin to perform the dredging work.

**Disadvantages:**

- **Recreation and Visitor Experience**: While visitor moorage is increased, the number of slips is not as significant as Alternative 3. The entrance channel is improved through dredging however the approach angle of the entrance channel is the same which can result in poor sight lines for approaching and departing vessels. The existing eastern sandy area within the marina (currently used by non-motorized boaters) is removed to maximize moorage space.

- **Commercial Operations**: This alternative provides a single commercial float and additional space for maneuvering. It does not provide as much commercial moorage as Alternative 3.
Alternative 2: Reconstruct
Blake Island Marina State Park - Marine Facility Improvement Project
Washington State Parks and Recreation Commission

LEGEND:
- Existing Contours (2' & 10' Intervals)
- Project Limits
- Approximate Eelgrass Limits
- Existing MHHW (elev 11.4 MLLW)
- Existing Astronomical Tide (HAT elev 13.3 MLLW)
- Existing Lowest Astronomical Tide (LAT elev -4.3 MLLW)
- Existing Drainage Line
- Existing Rubble Mound Breakwater
- Proposed rock slope protection
- Proposed Shoreline Vegetation
- Proposed Pathway
- Proposed Split Rail Fence
- Proposed Log Edge
- Proposed Interpretive/Wayfinding Signage
- Proposed Channel Marker
- Proposed Backshore Restoration Area
- Proposed Limits of Buried Rock Protection
- Proposed Picnicking Area with Tables
- Proposed In-water Debris Removal and Nearshore Restoration Area

HORIZONTAL DATUM: Washington State Plane North Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

HORIZONTAL DATUM: Washington State Plane North Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

Figure 2
Blake Island Marina State Park - Marine Facility Improvement Project
Washington State Parks and Recreation Commission

Figure 1
Blake Island Marine Facility - Entourage and Eelgrass Model
Washington State Parks and Recreation Commission

Filepath: E:\Projects\0363-WA State Parks\Blake Island Marine Facility\0363-RP-006 (Alt2).dwg Figure 1
Alternative 3: Expand

Alternative 3 expands the marina to the west, adjusting the dredge and entrance channel to improve sight lines and boating safety. Figures 4 and 5 detail the proposed design and Table 3 provides a summary of the proposed moorage. Like Alternative 2, it also deepens the channel and basin, makes improvements to marina amenities, expands room for vessels to maneuver, increase moorage replaces the sheet pile wall with a rock feature, provides ADA connections, and improves the state parks boat launch (refer to section 4.4). Alternative 3 includes the following:

- Marina improvements
  - Expand marina to west
  - New marina with expanded moorage
  - Provide ADA connections
  - Provide new boat pump out on land side
  - Remove all treated/creosote wood

- Breakwater and sheetpile wall
  - No change to existing (except repairs as necessary)
  - New breakwater feature to provide protection for marina expansion area
  - Replace sheetpile wall with buried rock feature transitioning off the existing breakwater

- Entrance Channel and Basin
  - Dredge to 1988 design (full extent)
  - Steepen rock slope along basin to maximize basin extent within 1988 footprint
  - Deepen entrance channel and commercial basin to -14 and line with rock (cobble or quarry spalls) – the intent here is to reduce erosion and sedimentation and reduce maintenance dredging
  - Deepen public basin to -12 and line with rock (cobble or quarry spalls) – the intent here is to reduce erosion and sedimentation and reduce maintenance dredging
  - Shift entrance channel geometry to reduce sharp angle for boaters entering/exiting marina
  - Expand marina to west with new dredge

- Marine biology/Permit Feasibility
  - This alternative will require mitigation and will be challenging to permit.
  - Placement of new breakwater feature will try to avoid impacts to eelgrass
  - Overwater footprint will increase

<table>
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<tr>
<th>Item</th>
<th>Total Slips</th>
<th>Total Moorage (Linear Feet)</th>
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<td>Item</td>
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<tr>
<td>-----------------------------</td>
<td>-------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>State Parks dock</td>
<td>8</td>
<td>270</td>
</tr>
<tr>
<td>South public basin</td>
<td>16</td>
<td>680</td>
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<tr>
<td>Middle public basin</td>
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<td>390</td>
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<tr>
<td>North public basin</td>
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<td>700</td>
</tr>
<tr>
<td><strong>Total Moorage</strong></td>
<td></td>
<td><strong>3,320</strong></td>
</tr>
</tbody>
</table>

**Advantages:**

- *Recreation and Visitor Experience*: Alternative 3 has the most significant increase in commercial and public moorage of all the alternatives. Reorientation and widening of the entrance channel significantly increase visibility and enables safer and more effective navigation across diverse skill levels. The design accommodates different size and types of boats. A new breakwater features would protect the marina expansion area from large waves allowing the space to be safe and accessible for many vessels types. All gangway access points are ADA accessible. A new upland pathway and picnic area are also fully ADA accessible, strengthening the connection between the marina, restroom and kitchen shelter. New vegetation areas enhance aesthetics and provide a buffer between the upland pathway and marina rock slope areas. The new boat launch area will provide a new hand carried boat launch for park users.

- *State Parks Operations and Maintenance*: The reconstructed State Parks pier will accommodate State Parks operational use. The new boat launch will extend waterward to allow for a larger window of operational use that is less impacted by tide schedules. The boat launch will also be a permanent feature and will not require State Parks staff to mobilize temporary mats prior to use.

- *Commercial Operations*: This alternative provides more moorage for commercial operations.

- *Flexibility*: This alternative provides the most flexibility for moorage and can accommodate the largest boats.

- *Sediment Management*: The entrance channel and moorage basins will be dredged to a deeper elevation to avoid scour from propellor wash, commercial and public use.

- *Nearshore Habitat and Subtidal Habitat*: The design will remove all creosote treated wood from the marina. New moorage floats (except for the wave attenuation float) and gangway will be grated to maximize light penetration.

- *Sea Level Rise*: The design considers sea level rise. The buried rock slope that will replace the deteriorated sheertile wall and the new breakwater area designed to withstand sea level rise estimates. The marina structures are designed with durable materials to withstand increased storm frequency and severity.

**Disadvantages:**

- *Recreation and Visitor Experience*: The size of the moorage facility is considerably larger than the current marina and there will be an opportunity for many more visitors to come to Blake
Island. An increase in visitors could lead to more congestion on the island’s amenities such as campgrounds, trails, beaches, restrooms, kitchen shelters, and picnicking areas.

- **State Parks Operations and Maintenance**: This alternative includes more structures which will have more operational and maintenance requirements.
- **Nearshore Habitat and Subtidal Habitat**: Alternative 3 would result in impacts to eel grass habitat in the expansion area and in the footprint of the new breakwater. The new entrance channel location would also impact eel grass. The proposed wave attenuator float would not be grated and would be a solid structure within the nearshore.
- **Sea Level Rise**: This alternative would be designed for sea level rise. However, the increase in moorage and engineering shoreline would result in more future maintenance and potential for future issues as sea levels rise.
- **Permit Feasibility**: Alternative 3 expands impacts outside the original marina footprint, both for dredging and marina structures. It would require extensive permitting and mitigation to comply with federal, state, and local environmental regulations. Finding appropriate mitigation to offset impacts could be difficult.
- **Value for Cost**: This alternative will require high permitting, design, and construction costs to implement the proposed expansion. The cost per moorage linear foot is approximately $7,443.
- **Implementation Schedule**: The extent of in-water work for proposed dredging and the installation of a new breakwater would likely require construction over two in-water work windows. This could require State Parks to close the park’s moorage for a summer season.
- **Constructability**: The project is constructable however the extent of in-water work will be challenging, in particular the new breakwater installation. The contractor will need to identify measures to reduce turbidity and impacts sensitive habitats and species.
Alternative 3: Expand
Blake Island Marina State Park - Marine Facility Improvement Project
Washington State Parks and Recreation Commission

Figure 4

LEGEND:
- Existing Contours (2' & 10' Intervals)
- Project Limits
- Approximate Eelgrass Limits
- Existing MHWW (elev 11.4 MLLW)
- Existing Lowest Astronomical Tide (LAT elev -4.3 MLLW)
- Existing Drainage Line
- Existing Rubble Mound Breakwater
- Proposed rock Slope Protection Reconstruction
- Proposed breakwater
- Proposed Shoreline Vegetation
- Proposed Split Rail Fence
- Proposed Log Edge
- Proposed Interpretive/Wayfinding Signage
- Proposed Channel Marker

Figure 1


HORIZONTAL DATUM: Washington State Plane North Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

Puget Sound

Debris removal and nearshore restoration area

Eelgrass impacted by new entrance channel

Reconstruct rock slope protection with 2H:1V slope

Impact to Existing Eel Grass


New 12-ft wide ADA accessible crushed rock pathway to access Commercial and State Parks docks

Existing pathway to Tillicum Village

New ADA gangway

New 8-ft wide ADA accessible crushed rock pathway

New split rail fence along shoreline edge

New ADA bridge crossing at drainage channel (typ.)

Tillicum Village

New ADA accessible picnicking area

New shoreline vegetation along rock slope

Backshore restoration area

Extant of buried rock protection

Remove existing sheetpile wall at marina and replace with buried rock protection
This portion of sheetpile wall and chained logs remain in place for ongoing shoreline protection

Proposed Backshore Restoration Area
Proposed Limits of Buried Rock Protection
Proposed Eel Grass Restoration Area
Proposed Picnicking Area with Tables

Tillicum Village

New half buried log edge along pathway

New shoreline vegetation along rock slope

Proposed Picnicking Area with Tables

Proposed Channel Marker
Figure 3
Alternative 3 Sections
Blake Island Marina State Park - Marine Facility Improvement Project
Washington State Parks and Recreation Commission

LEGEND:
- Existing Grade
- Proposed Grade
- MHHW (elev 11.4 MLLW)
- Highest Astronomical Tide (HAT elev 13.3 MLLW)
- Lowest Astronomical Tide (LAT elev -4.3 MLLW)
- MLLW (elev 0 MLLW)
- Projected sea level rise estimates (year 2070: elev 12.6-12.7; year elev 13.2-13.7)
- Overdredge Allowance

SOURCE: Survey, Aerial and/or CAD file provided by...
HORIZONTAL DATUM: Washington State Plane ___ Zone, NAD83, U.S. Survey Feet
VERTICAL DATUM: MLLW

- New breakwater
- Protect existing eel grass
- Perform repair consistent with structural recommendations
- Existing breakwater
- Remove angular rock debris and restore nearshore habitat
- Re-graded rock slope
- Wave attenuator
- Dredge commercial basin to elevation -4 MLLW (operational depth)
- Elevation in Feet
- Horizontal Distance in Feet
- No Vertical Exaggeration

DRAFT
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Filepath: K:\Projects\0363-WA State Parks\Blake Island Marine Facility\0363-RP-007 (Alt3).dwg (1)
State Parks Boat Launch

Alternatives 2 and 3 present the same proposal for the State Park Boat Launch. The proposed design (see Figure 6) installs a new permanent boat launch in the location of the current boat launch. The boat launch is constructed with precast panels and extends to elevation 2 MLLW. The boat launch is connected with a 12-foot wide crushed gravel pathway to the Blake Island roadway network. When not used by State Parks operational staff, the boat launch will be open and accessible to the public as a hand carried boat launch. The area adjacent to the boat launch has proposed beach dune plantings, logs for seating and picnic tables.

Figure 6
Proposed State Parks Boat Launch
**Alternative Analysis: High-Level Summary Tables**

Table 4 provides a summary using the design criteria to compare the alternatives. Low ranking (grey) indicates that the alternative design least meets the criteria. Medium ranking (blue) indicates that the alternative design moderately meets the criteria. High ranking (green) indicates that the alternative design most meets the criteria. Tables 5 and 6 follow and provide evaluation summaries of the environmental impacts and dredging quantities.

**Table 4**

Alternatives Analysis Summary

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Alternative 1: No Action</th>
<th>Alternative 2: Reconstruct</th>
<th>Alternative 3: Expand</th>
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<tr>
<td>Recreation and Visitor Experience</td>
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<td>High</td>
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<td>State Parks Operations and Maintenance</td>
<td>Low</td>
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<td>Medium</td>
</tr>
<tr>
<td>Commercial Operations</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Flexibility</td>
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<td>High</td>
</tr>
<tr>
<td>Sediment Management</td>
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<td>High</td>
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<tr>
<td>Nearshore and Subtidal Habitat</td>
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<td>Low</td>
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<td>Sea Level Rise</td>
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<td>Medium</td>
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<tr>
<td>Permit Feasibility</td>
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<td>Value for Cost</td>
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### Table 5
Environmental Impacts Summary (Preliminary)

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<th>Alternative 1</th>
<th>Alternative 2</th>
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<td>Overwater cover (solid)</td>
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<td>Overwater cover (grated)</td>
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<td>Impacts to existing eel grass</td>
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<td>0 sf</td>
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<td>Nearshore restoration area</td>
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<td>Eelgrass restoration area</td>
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<td>18,000 sf</td>
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<td>Removal of creosote pilings</td>
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<td>29</td>
<td>29</td>
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<tr>
<td>Number of new pilings</td>
<td>n/a</td>
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<td>New breakwater area</td>
<td>n/a</td>
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### Table 6
Dredge Quantity Summary (Preliminary)

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<th></th>
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<td>Dredge volume (cy)</td>
<td>n/a</td>
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<td>69,400 cy</td>
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## Preliminary Cost Estimates for Each Alternative

Table 7 provide high level and preliminary rough order of magnitude opinion of probable cost to compare the alternatives.

### Table 7
**Rough Order of Magnitude Opinion of Probable Costs for Each Alternative**

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site preparation</td>
<td>$0</td>
<td>$40,700</td>
<td>$40,700</td>
</tr>
<tr>
<td>Demolition</td>
<td>$0</td>
<td>$525,150</td>
<td>$525,150</td>
</tr>
<tr>
<td>Dredging and in-water shoreline stabilization</td>
<td>$0</td>
<td>$4,319,800</td>
<td>$9,275,600</td>
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<tr>
<td>Waterside improvements</td>
<td>$0</td>
<td>$6,135,500</td>
<td>$8,406,500</td>
</tr>
<tr>
<td>Shoreline restoration</td>
<td>$0</td>
<td>$294,300</td>
<td>$406,800</td>
</tr>
<tr>
<td>Upland improvements</td>
<td>$0</td>
<td>$203,600</td>
<td>$309,500</td>
</tr>
<tr>
<td>Boat landing and improved circulation</td>
<td>$0</td>
<td>$216,100</td>
<td>$216,100</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$0</strong></td>
<td><strong>$11,735,150</strong></td>
<td><strong>$19,180,350</strong></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization (10%)</td>
<td>$0</td>
<td>$1,760,273</td>
<td>$2,877,053</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$0</td>
<td>$13,495,423</td>
<td>$22,057,403</td>
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<tr>
<td>Design Contingency (25%)</td>
<td>$0</td>
<td>$3,373,856</td>
<td>$5,514,351</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$0</td>
<td>$16,869,278</td>
<td>$27,571,753</td>
</tr>
<tr>
<td><strong>Total Rough Order of Magnitude (ROM)</strong></td>
<td><strong>$0</strong></td>
<td><strong>$16,869,278</strong></td>
<td><strong>$27,571,753</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Contingency (10%)</td>
<td>$0</td>
<td>$1,686,928</td>
<td>$2,757,175</td>
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<tr>
<td>Subtotal</td>
<td>$0</td>
<td>$18,556,206</td>
<td>$30,328,928</td>
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<tr>
<td>Sales Tax (9%)</td>
<td>$0</td>
<td>$1,670,059</td>
<td>$2,729,604</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$0</td>
<td>$20,226,264</td>
<td>$33,058,532</td>
</tr>
<tr>
<td><strong>Total ROM Opinion of Probable Construction Cost</strong></td>
<td><strong>$0</strong></td>
<td><strong>$20,226,264</strong></td>
<td><strong>$33,058,532</strong></td>
</tr>
</tbody>
</table>

## Preliminary Cost Estimate Assumptions

The following documents preliminary cost assumptions:

- All costs are in 2022 dollars.
- In providing opinions of probable construction cost, the State Parks understands that the Consultant (Anchor QEA, LLC) has no control over the cost or availability of labor, equipment or materials, or over market condition or the Contractor's method of pricing, and the consultant's opinions of probable construction costs are made on the basis of the Consultant's professional judgment and experience. The Consultant makes no warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from the Consultant's opinion of probable construction cost.
• Costs do not include: Design/Engineering Consultant Services Fees, Project Management, Survey, Planning & Design Review, Bidding, Construction Phase Project Management & Administration, Construction Inspection, Environmental Permitting, Permit Related Monitoring, Artwork.

• Dredging costs assume that sediment quality testing will occur prior to construction (during design development) and 50% of the dredged materials meet sediment quality standards for an approved open water disposal facility. It assumes the other 50% of the dredged materials are in exceedance of quality standards for open water disposal, and the material is disposed of at an upland facility. Table 8 provides summary of the costs difference between disposal facilities.

Table 6
Dredged Material Disposal Summary (Preliminary)

<table>
<thead>
<tr>
<th></th>
<th>Material Disposal Assuming Open Water Disposal Cost</th>
<th>Material Disposal Assuming Upland Disposal Cost</th>
<th>Dredging and In-water Shoreline Stabilization Assuming an Averaged Cost (50% of sediment is disposed of at open water facility and 50% is disposed of at upland facility)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 2</td>
<td>$16,632</td>
<td>$5,174,400</td>
<td>$2,595,500</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>$31,230</td>
<td>$9,716,000</td>
<td>$4,873,600</td>
</tr>
</tbody>
</table>

* This is the current cost assumption for preliminary opinion of probable construction costs