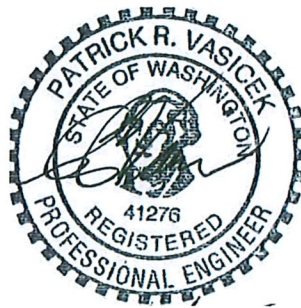


Port Orchard and Bremerton Marinas
10 Year Capital Improvement and
Maintenance/Repair Programs

Final Report: 31 October 2017



October 31, 2017



ART ANDERSON ASSOCIATES
VALUE BEYOND ENGINEERING®

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Table of Contents

Executive Summary	1
Introduction	2
Port Orchard Marina.....	2
Port Orchard Marina Background	2
Results of Analysis and Visual Inspections/Measurements.....	3
Port Orchard Marina 10-Year CIP and M&R Program	5
Bremerton Marina	6
Bremerton Marina Background	6
Results of Analysis and Visual Inspections	7
Recommendations	8
General Recommendations	8
Port Orchard Marina Recommendations.....	8
Bremerton Marina Recommendations	8
Attachments.....	9

List of Attachments

1. Port Orchard Marina – Graphic History
2. Port Orchard Marina As-Built Layout
3. Site Visit Notes – 21 June 2017 (Photo log available upon request)
4. Port Orchard Marina N and E Breakwater Concept Design Report (sent separately)
5. Port Orchard Marina Depth Readings
6. Port Orchard Marina Projects List
7. Port of Bremerton Marina and Waterfront Facilities 10-Year M&R and CI Program
8. Bremerton Marina Map
9. Bremerton Marina Projects List

References

- A. Marine Facilities Study – Port Orchard Marina for Port of Bremerton, Collins Engineering, June 2016
- B. Echelon report- PO 2014
- C. Echelon report- Bremerton 2014
- D. Floating Breakwater Field Experience, USACE Report No. 82-5, dated July 1982



Executive Summary

The need was established in 2015 for a comprehensive program to maintain and upgrade the Port of Bremerton waterfront facilities, with a special focus on the Port Orchard Marina, and to a lesser extent, the Bremerton Marina. On June 5, 2017, a contract was awarded to Art Anderson Associates to develop this 10-Year program and to also develop permitting and grant funding strategies to support this program. The program, which was developed through this contract, is intended to be an input into the 2018 Port of Bremerton budget development process commencing September 1, 2017. A set of recommendations have been prepared as a result of this effort. The near-term and highest priority items include:

1. There is an urgent need for award of a 2017 contract (\$200,000) to design emergency repairs to key elements of the Port Orchard Marina.
2. The above emergency repairs (approximately \$2,000,000), to include some work at the Bremerton Marina, should be constructed as soon as possible in 2018.
3. Design of the replacement of the East and North sections of the Port Orchard Marina Breakwater should commence in 2018 (\$1,200,000).
4. Construction of the new breakwater sections should commence in 2019 (approximately \$10,000,000).



Introduction

Art Anderson Associates was retained by the Port of Bremerton to develop a time-phased, prioritized 10-Year Capital Improvement and Maintenance/Repair Program for the Port Orchard and Bremerton Marinas. Reid Middleton was included on the team to further our partnership on breakwater work that included a joint effort on the previous design work for the new Bremerton Marina Breakwater. Additionally, a permitting expert (ELS) and grant funding expert (HBB) were added to the team to assist in developing the required permit documents and to initiate the pursuit of grant funds in support of this program. The team examined many background documents, including previous marina inspections and facilities studies (references A through D), as-built drawings and Port of Bremerton maintenance documents. Several site visits were conducted at both marinas to gather additional observations and obtain critical measurements.

Port Orchard Marina

Port Orchard Marina Background

The Port Orchard Marina facility consists of six mooring float systems that extend northward from the shore. These floats are enclosed on the west, north and east sides by floating breakwaters. A graphical history of the construction and improvement of various portions of the marina was assembled in Attachment 1.

The mooring floats are constructed with individual concrete pontoons secured together with timber wales. The mooring floats are secured by float guide piles. Two of the float systems, Floats A and F, are secured with creosote treated timber piles. The remaining Floats B, C, D and E, are secured with galvanized steel pipe piles. The float guide piles in each float have been identified numerically from the shore on the graphic plan from reference B, included in Attachment 2.

The West Breakwater, which also serves as a fuel dock and pump-out facility and provides moorage for larger vessels, is constructed using galvanized steel pipe piles to secure the 15-foot-wide concrete floats. The 12-foot-wide North and East breakwater protects the north and east sides of the marina and is constructed of concrete floats secured by an anchor system of 72 mooring lines attached to anchor/stake piles. Each mooring line consists of an upper length of chain that typically extends down from the chain locker in the concrete float to a depth of approximately 10 to 15 feet. At this point the line transitions to a braided nylon rope that extends down to near the mudline, where it connects with another length of chain that is secured to an anchor or stake pile. On 14 of the anchors, a supplemental chain bridle is connected at the upper chain / nylon rope connection and extends diagonally away from the mooring line and is secured to the inside of the float. The moorings have been numbered sequentially from shore as indicated in the graphic in Attachment 2.



The original construction of the shore-side wharf structures that house the port office, the laundry/workshop building, and the restrooms consisted of timber piles supporting timber superstructure and wood-framed buildings. Several rounds of maintenance repairs have been conducted to damaged timbers using steel pile posts repairs, bracing and replacement steel superstructure members. The ramp support structures No. 1, 2 and 3 are also constructed using timber piles and superstructure. The piles supporting the buildings and ramps are identified in a standard grid format with the bents identified alphabetically and pile rows identified numerically as indicated in the graphic in Attachment 2.

Results of Analysis and Visual Inspections/Measurements

Based on our analysis of reference A and B reports, it appeared that a more in depth visual inspection of the marina was required to ensure current conditions were documented. Our initial visual inspection of the Port Orchard Marina is documented in Attachment 3 (Including Photos). There are many significant findings in that initial inspection and follow-up inspections that are not mentioned in the reference A report: Key additional findings are highlighted below:

1. The West Breakwater has a 5" differential western list along its entire length.
2. Spalling on virtually all the floats in the marina is likely a sign of concrete failure, and while it can be cosmetically repaired from the top, the cause of the corrosion is from the rebar/wire mesh corrosion inside the concrete that is a result of infiltration of salt water into the concrete from the saturated Styrofoam.
3. Anecdotal information from Port of Bremerton maintenance personnel indicate that the East, North and West Breakwaters' performance during significant storms points to concerns with respect to wave heights exceeding the float freeboard.
4. Significant corrosion of steel guide piles in the pile guide/splash zone points to the need for immediate action to determine how to improve the cathodic protection systems marina-wide.
5. The breakwater floats do not appear to be built per the design drawings prepared by Reid Middleton, which had indicated steel channel walers. Original Reid Middleton drawings also indicated a dead load freeboard of 15". Shop drawings do not show dimensioned profile views of the floats, however, subsequent information detailed below appears to indicate that they were not built as designed and thus were not documented as capable of fully performing their function.

Additional research, attempting to understand exactly how the breakwater pontoons were built, yielded reference D which states that the Port Orchard breakwater pontoons were built by Bellingham Marine Industries and designed by Reid Middleton using 3'X12'X20' Styrofoam core units with an initial freeboard of 1.8' (22"). This 1982 report also indicates that the breakwater pontoons were likely under-designed, with reported storm damage due to two storms that produced 4' waves from the west. Because of the continuing differences between what the as-built and shop drawing records indicated regarding breakwater



construction versus what was observed, and the very low freeboards and listing problems observed in our inspections, AAA decided to measure the depth of the floats.

With a simple wooden jig, we were able to measure the depth of the floats on the breakwater, which consistently measured out at 3' overall top deck to bottom depth. This measurement causes a concern about the potential remaining lifecycle of the breakwater floats, and possibly, the same assessment applies to all the original era floats in the marina. 3-foot-deep floats with minimal thickness concrete walls and decks means that the typical maximum life cycle that can be expected from this type of float construction is 25 years.

For the above reasons, the life cycle extension recommendations for the breakwaters indicated in Reference A are deemed not feasible without extensive repairs and floatation modifications, and are not considered to be reasonably viable alternatives. While certain upgrades have occurred over the years, and new sections have been built as depicted in Attachment 1, a significant portion of the marina now stands at year 43 of its lifecycle, when it was built to last only 25 years. Except for the newer sections of the marina (floats B-E), the Port Orchard Marina needs to be replaced via a systematic upgrade program. All repair work that is accomplished until the floats are replaced will be only as needed to keep the floats from sinking and provide a safe walking surface. The building of the replacement and M&R program will constitute the remaining effort of this report.

On July 24, 2017, a Value Engineering Team Study (VETS) meeting was convened at the Port of Bremerton offices at the Bremerton Airport. The focus of this meeting was to refine alternatives for upgrade or replacement of the breakwater sections at the Port Orchard Marina. An added breakwater replacement idea (to support the breakwater with guide piles in lieu of moorings) was offered at the VETS session. Because the West Breakwater is guide pile supported, it would seem that this idea provided a potential viable alternative. In fact, as reflected in the meeting minutes (provided in Appendix A to Attachment 4), the guide pile scheme turns out to have the lowest life cycle cost of all alternatives. A follow-on meeting rated and ranked various elements and based on a trade-off analysis in the Concept Design Report (attachment 4), new breakwater floats with guide pile anchorage is the recommended alternative for the future upgrade/replacement of the North and East breakwater sections.

The consideration of this new breakwater replacement alternative required a review of the bathymetry data for the Port Orchard Marina. The state of and trending of the bathymetry for this marina remains a concern, since there do not appear to be any records documenting bathymetry readings for the marina area over time. The concern being that there is no way to be sure if certain areas are silting up (perhaps in need to consideration for dredging) or getting deeper, which would affect the design of any mooring system, including guide piles. In order to complete a concept design on the newly recommended guide piling system, a series of simple depth soundings were obtained and are shown in Attachment 5.

In the future, it is recommended that a bathymetric survey be conducted on a regular basis. The periodicity of this survey would be determined based on the trends discovered in the first two surveys. The first two surveys could be 5 years apart. The costs of these surveys are small (about \$5,000) and will be added to the projected design costs for years 1 and 5.

Port Orchard Marina 10-Year CIP and M&R Program

The key result of the VETS effort was that the East and North Breakwater replacements are the highest priority Capital Improvement projects, requiring implementation as soon as practicable, and that urgent, deferred maintenance will need to be conducted marina wide in the next two years to avoid the potential of losing use of selected float sections and to maintain safe operations.

All deficiencies discovered during review of documentation and from reports developed during several site inspections, were then assembled into logical project groupings. These projects then were prioritized, and assembled prioritized list was used to develop the project listing in Attachment 6.

The project listing aided in the assembly of the Port Orchard Marina portion of the Attachment 7 Program and Funding Plan. This plan and the project listing has been reviewed and commented on by Port of Bremerton Staff and by key people from all three AAA subcontractors.

This plan was the subject of a preliminary meeting held on-site on 10 August 2017 at the Port Orchard Marina Office with Karl Jacobs of the Washington State Recreation and Conservation Office. The goal of the meeting was to gain insight into how the team might improve our chances of obtaining various RCO administered grants in support of the Program at both marinas, but with a special focus on the near-term requirement to replace the North and east Breakwaters at the Port Orchard Marina.

Attachment 8 displays the estimated costs, the execution year and the potential source of funding for each project. The funding strategy shown is our best estimate of how the program should be executed and our assessment of the potential funding sources, but we believe that we will need to have backup strategies, both for execution schedule and funding sources in order to ensure that we keep the program moving forward, despite uncertainties.

These alternate strategies will include incrementation of the larger projects, alternate funding sources for the projects, and the emergency maintenance actions that will be required in the event key projects must be deferred. These alternate strategies will be employed during the next month in line with the Port of Bremerton Budget process.



Bremerton Marina

Bremerton Marina Background

The Bremerton Marina is located on Sinclair Inlet adjacent to the Washington State Ferry Terminal. Adjacent to the Washington State Ferry terminal, the A-Float and B-Float access, owned by Kitsap Transit, serves as portion of the breakwater protecting the marina from the south. The marina layout is shown on Attachment 8.

The Bremerton Marina facility was upgraded in 2009. The marina has six mooring floats that are interconnected by a main walkway that parallels the shore. Marina Floats A and B were part of the original marina facility. Floats C through E were added during the upgrade of the marina. The central float, Float P, that runs through the center of the marina provides a walkway from the shore to the floating breakwater on the offshore (east) side of the marina.

The floating breakwater along the east side of the marina is secured by a system of mooring lines. Additionally, the marina is separated from the adjacent Washington State Ferry terminal and Kitsap Transit B-float access to the A-Float/B-Pontoon by a fixed wave wall that is located immediately north of the passenger only ferry slip. At the north end of the marina, the Naval Museum vessel the USS Turner Joy serves as part of the breakwater protection for the marina. The north entrance for the marina is located between the bow of the Turner Joy and the north end of the floating breakwater. The south entrance is located between the south end of the floating breakwater and the end of the Kitsap Transit A-Float/B-Pontoon passenger ferry terminal.

The floating breakwater is constructed with large concrete pontoons that are configured in a flat "U" shape and secured in place by 51 mooring line assemblies. Each assembly is composed of a length of chain extending from a chain locker through a hawse pipe down to a socket connection to a length of wire rope. The wire rope extends to near the mudline where a second socket connection is secured to a lower length of chain. This chain runs along the mudline to a stake pile that has been driven into the sea bed. All connections are made with large shackles. The shackle pins have double nuts and a cotter pin to secure the connection. Each mooring line typically has a total of four sacrificial anodes secured to the mooring line with U-bolts. These anodes have been numbered consecutively with the first located at the upper chain to cable connection; the second anode is located at the approximate 1/3 the distance down the cable; the third anode is located at approximately 2/3 the distance along the cable, and the fourth anode is located at the lower cable to chain connection.

The original Floats A and B in the marina are held in place by galvanized steel pipe piles. Each pile is protected by a sacrificial anode. Four of the guide piles were located in Floats A and B.



The newer mooring floats within the marina are held in place by large diameter spiral welded steel pipe piles. These piles are coated with a black epoxy compound that extends from the pile top to the mudline. There are no anodes on these piles. Six of the inspected pilot piles were located in the newer sections of the marina.

The fixed wave wall or wave break attenuator is located at the south end of the marina and consists of 12 driven wide flange (W24x162) steel piles and a series of pre-cast concrete baffles. The piles are epoxy coated.

The Turner Joy moorings consist of four mooring lines secured by conventional ship anchors and a fixed mooring dolphin. Two of the mooring lines are located off the port and the starboard bow. The anchor systems are comprised of three components: the upper chain section (1.5-inch chain) that descends from the foredeck of ship down to a connection triangle; a 3000-lb. clump weight shackled to one arm of the triangle; and two shots of 2.75-inch chain shackled to the third arm of the triangle connection. This then runs out to a 20,000-lb. ship anchor. A 42-inch diameter buoy is tethered to the top of the clump weight with a section of 3/4-inch chain and a shackle connection. The stern is secured by a fixed concrete mooring dolphin located off the starboard side. The dolphin is supported by eight epoxy coated pipe piles. Each pile has supplemental corrosion protection from one or more galvanic anodes.

Results of Analysis and Visual Inspections

The Bremerton Marina and Breakwater are unquestionably a significant waterfront amenities and attractions, for both residents and tourists. Art Anderson Associates' employees are present on the marina on a regular basis, using the marina berths and enjoying the breakwater.

Because it was built to have a 50-year lifecycle and it is relatively new, the Bremerton Marina is in excellent material condition, but as with any marine facility, it needs constant attention. Aside from the daily care required to deal with minor repairs to walking surfaces and the occasional vessel collision, the single biggest maintenance challenge for this marina involves dealing with corrosion.

Because most of the guide piles are large, they could not be galvanized. Many of the larger guide piles suffer from extensive corrosion in the splash zone, which is exacerbated by the abrasion from movement through the pile hoops. The cathodic protection system for these guide piles must be upgraded and a coating replacement program established. Additionally, the older section of the marina will need to be replaced in the next 10 years.

A project listing was developed in Attachment 9. This serves as input to the Bremerton Marina section of the CIP and M&R program document in Attachment 7. A listing of the program to maintain and upgrade other Port of Bremerton Waterfront facilities was developed by Brian Robinson and added to Attachment 7.



Recommendations

General Recommendations

1. The program established in Attachment 7 is considered a living document, and is subject to review by the Port of Bremerton Commissioners.
2. An active effort is required to seek additional fund sources, including grants funding, state appropriated funds and other federal programs.
3. As soon as possible, award of a design contract, estimated at \$200,000, to allow conduct of emergency repairs (approximately \$2,000,000 construction cost) in 2018 is required.
4. A corrosion analysis and design recommendations contract (for both marinas) should be awarded without delay – this is included in the item 3 design contract estimate.

Port Orchard Marina Recommendations

1. The North and East Breakwaters require replacement as soon as practicable. The program has this slated for 2019 execution (approximately \$10,000,000 estimated construction cost), requiring design to start in 2018.
2. A systematic replacement of all older float systems and wooden piling is necessary in order to extend the lifecycle of this marina.

Bremerton Marina Recommendations

1. The corrosion protection aspects of the program should be done via contract on an annual basis.
2. Augmented cathodic protection of the larger guide piles is recommended.



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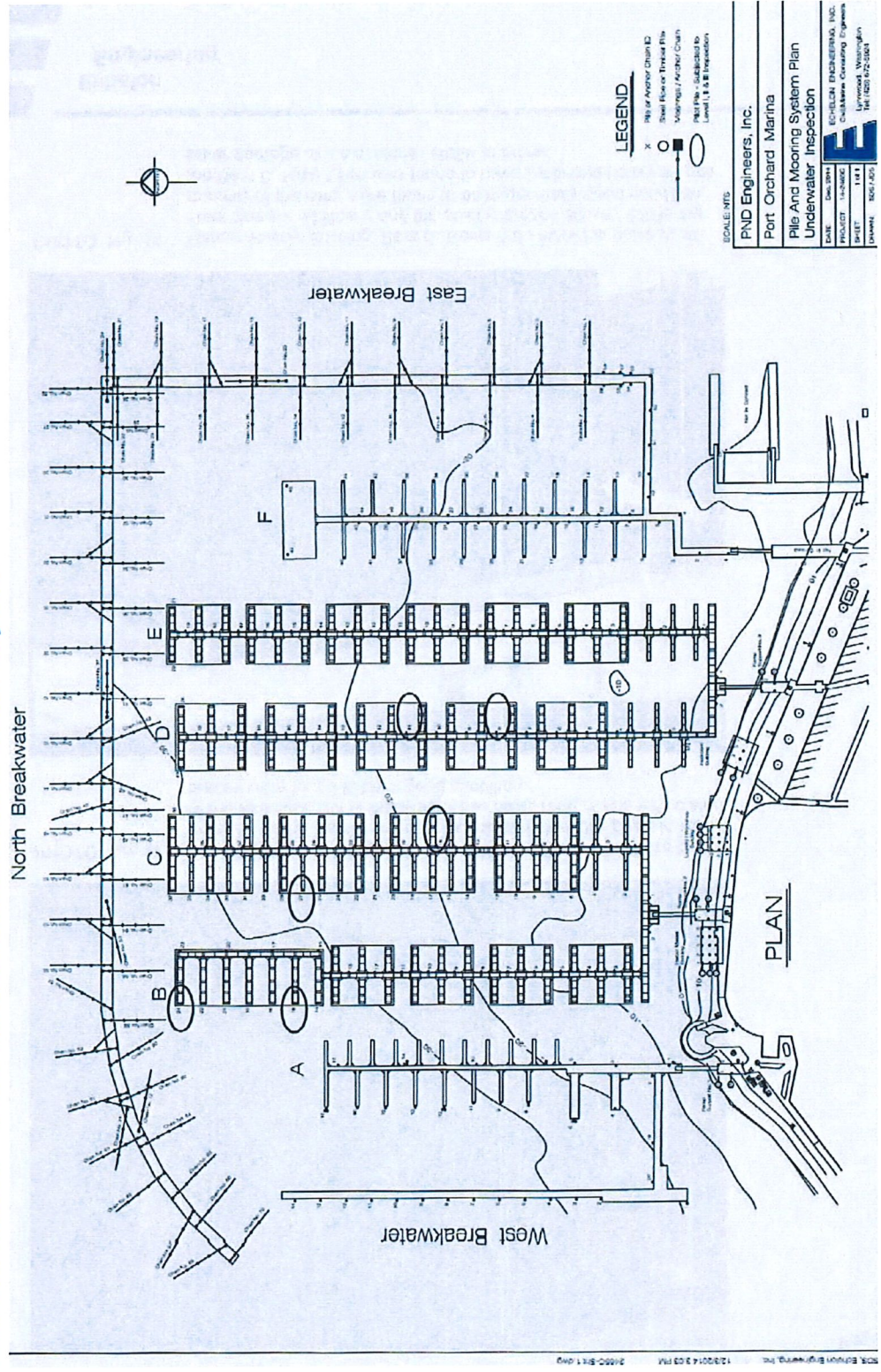
PORT OF BREMERTON MARINAS - 10 YEAR CIP/M&R
PROGRAMS

AUGUST 15, 2017

Attachments



Attachment 1 – Port Orchard Marine As-Built Layout



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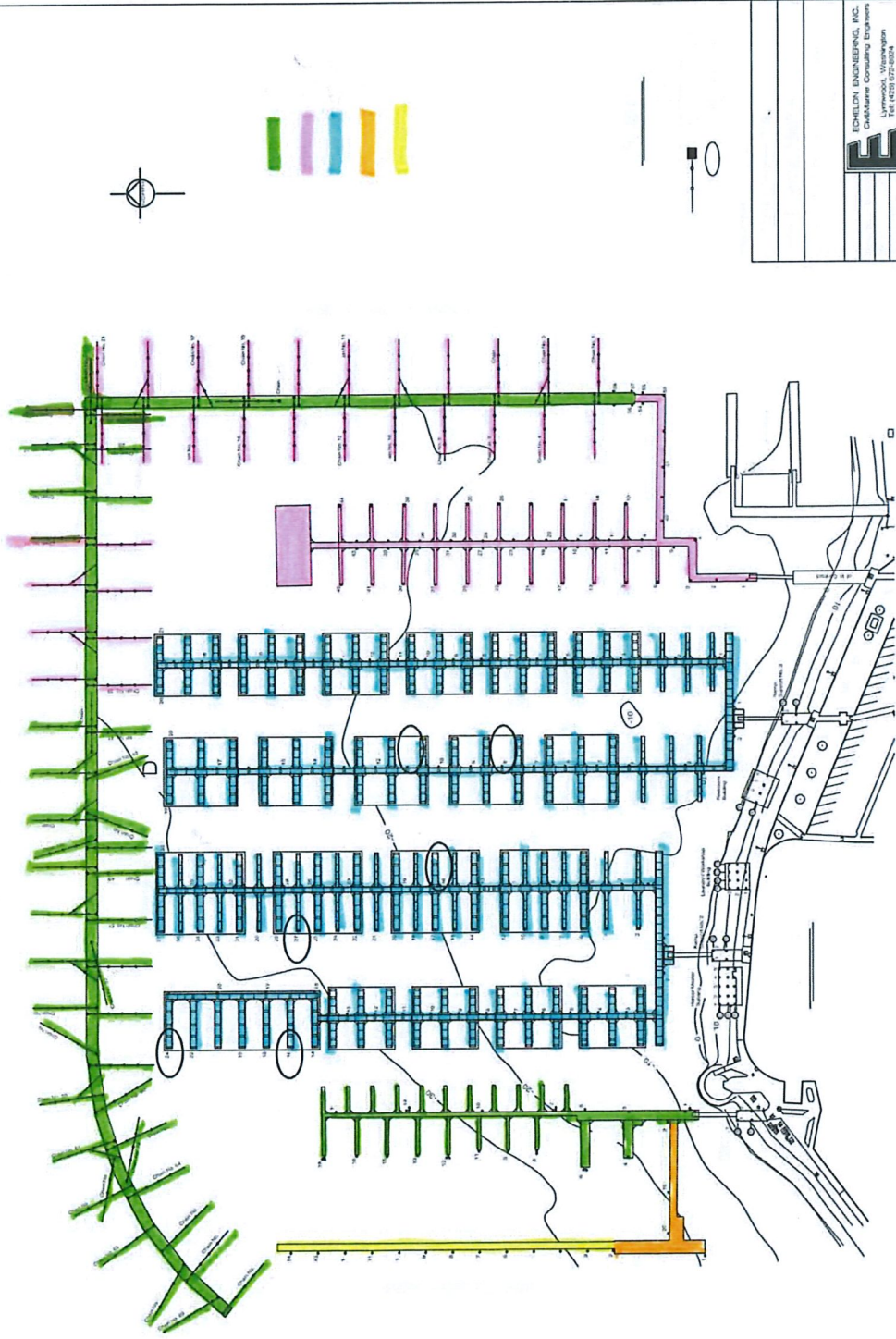
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Attachment 2 – Port Orchard Marina – Graphical History





Attachment 3 - Site Visit Notes – 21 June 2017



SITE VISIT NOTES

Date : 2017-Jun-21
AAA Ref : FWPOB099
Client Ref :

To : File: FWPOB099
Cc :
From : Conor Shannon
Subject : Port Orchard Marina Walk Trough - 20 JUNE 2017

REFERENCES

[a] N/A

ATTACHMENTS

[a] N/A

1. INTRODUCTION

On 20 June 2017, I conducted a walk-through of the Port Orchard Marina docks to gain an initial perspective on the construction and current condition of the above water components. This document is a summary of my notes and observations.

2. FUEL FLOAT AND WEST BREAK WATER

The fuel dock and west breakwater are accessed by an east-west running float. The surface condition of this float was good. It had several surface cracks, few rust spots, and a small amount of spalling, but none of these looked alarming. The float did list to the south and had free boards of approximately 13 inches on the north side and 11 inches on the south side. There is a centerline duct covered by fiberglass grating (IMG_2070/1) which runs the length of the float. I believe these are the fuel lines. The float is held by three wooden piles in steel guides lined with UMHV. The west end of the float contains a sanitary pump out station (IMG_2023/4) and firefighting station with a hose (IMG_2021/2072). The transition ramps on both ends appear to be in good condition.

The fuel float contains a small house with three fuel pumps covered by an awning with a galvanized steel structure and corrugated plastic roof. Identifying pump information can be found in IMG_2035/6. The float is about 15 feet wide and slopes inboard from both sides into a centerline duct/drain covered with steel grating (IMG_2038). The pump bases are showing signs of corrosion (IMG_2037). The float is held by two steel piles, each fastened through square guides that extend off the float. The northern most guide (IMG_2041) is

severely corroded. The north end of the float has a fire stand pipe in a red box. The bracket supporting the stand pipe and the stand pipe fittings are severely corroded, as are the other brackets supporting piping in this area where the fuel float transitions to the west breakwater (IMG_2040).

The overall condition of the west breakwater's concrete appears to be good and of the same era as the fuel float. However, the dock does have a western list along its entire length. The east freeboard is approximately 19 inches and the west freeboard is approximately 14 inches. The float is 15 feet wide. The south end of the float has a sanitary pump out station (IMG_2043/4). There is power, water, and cleats on both sides of the breakwater along with two fire stand pipes. There are also two street lamps on the breakwater. The floats are held in place by steel piles set through guides lined with UHMW and are integral to the floats (IMG_2049). The major discrepancy found on the west breakwater is that all the steel components on the west side (which is exposed to the weather) have significant amounts of rust and corrosion. This is likely because of exposure and the breakwater sloping to that side. Several images show different components suffering from this: IMG_2044, 2052, 2060, 2061, 2063.

3. A-FLOAT

The first section of A-float is much wider than the far section and houses a small building, oil boom box and large electrical box (IMG_2074/8, 2089). This larger platform then transitions to a 5-foot-wide float with less freeboard. The finger floats for this latter section are 4 feet. The concrete is similar on both sections and appears to be of the same era. Minor cracking and spalling was found throughout and the overall condition appears to be good. The center float is level and maintains about 11 to 12 inches of free board. However, many of the finger floats are not level and slope down towards their ends to as little as 7 inches of freeboard (IMG_2102/3). All of A-float is secured using wood piles of approximately 12-inch diameter. There are 5 dolphins and the rest are single piles. All the single piles appear to be leaning and pretty worn. They are all fastened to the floats using steel "D" shaped guides with wood bumpers. The guides all appear to be in good condition with minimal wear. Many of the bumpers are severely worn or broken (IMG_2077, 2105). Where the piles contact steel, many of them have significantly reduced section areas due to rubbing (IMG_2077, 2094, 2104). The pile at the end of slip 23 is unusually thin (IMG_2107).

A-Float has electricity and water at each slip as well as cable TV, although I'm not sure how many slips are wired for it. There are 4 street lamps which pull power directly from their adjacent power boxes (IMG_2080/1). Three fire stand pipes are on the west side of the dock and fastened using steel brackets. Their connections are in good condition with minimal surface rust (IMG_2095). There is one stand pipe on the east side of the dock that does not contain the pressure valve like the others (IMG_2108). All the stand pipes are connected to flexible hoses. What is visible of the hoses are in good condition. There are several safety ladders that extend into the water. They are fastened to the dock with steel brackets. The ladders themselves are a composite type material. The red fire boxes on the dock contain a fire extinguisher.

4. B-E FLOATS

B through E floats will be grouped together as their construction and conditions are all similar. The overall condition of these floats is very good. The concrete appears to be in excellent condition and all floats are level and maintain freeboards of approximately 19 inches. The center floats are about 6 feet wide and the finger floats are about 6.5 feet wide. The floats closest to the shore seem to show more wear (IMG_2148, 2218). Each slip has electricity, water, and phone. Additionally, there is Wi-Fi services with equipment mounted throughout the floats. Each float has a large white box mounted, which I am not sure of its purpose (IMG_2167, 2170). Two lights are fastened in the roof structure for each covered section (IMG_2151, 2171).

The floats are all secured using ~16-inch steel piles which are fastened to the docks with steel guides (IMG_2145). The guides all appear to be in very good condition with the exception of a few that are showing signs of deterioration (IMG_2159). The piles appear to be in good condition. About half of them are suffering from surface rust approximately 8 feet from the top (IMG_2206/7). On D and E floats, the top ~6 feet of the piles are coated (IMG_2205/6).

The boat cover structures are in good condition. They consist of a supporting structure made of galvanized steel and a roof and northern and southern most side made of corrugated metal (IMG_2139). The sides in between sections are partially covered by a mesh material which is mounted to the structure (IMG_2223). The vertical supports at the center and on the ends of the roof structures are 7-inch square while the outer vertical supports along the finger docks are 4-inch square. Additionally, between sections of each cover, there is a covered canopy over the dock (IMG_2150).

There are about 5 or 6 fire stand pipes on each dock and all are configured as in IMG_2156/7/8. The steel fittings above the waterline appear to be in good condition. Additionally, each dock has a float mounted pump (IMG_2161/2/3, 2210). One of the few areas of corrosion I identified were on many of the pipe hangers that support the service lines below the dock (IMG_2177).

5. F-FLOAT (GUEST MOORAGE)

The F float appears to be older as its condition shows many signs of deterioration. It consists of an access float which takes you to the guest moorage and to the east breakwater. Attached and accessed from the north end of the guest moorage is a party float. The access float shows many cracks and signs of rust, especially near the pile guides (IMG_2230, 2282). It is also uneven and lists to the south (IMG_2280). There also tends to be a general unevenness among the concrete slabs and the floats' wood frames between the slabs. The floats themselves also look worn compared to the other docks (IMG_2244).

Each slip has electricity and water (IMG_2238). The electricity boxes are in good condition as they are made of stainless steel. There are 4 stand pipes which all appear to be in good condition (IMG_2245/6). The three electrical boxes are showing signs of wear, especially

the southernmost one (IMG_2235, 2251).

The guest center docks are about 5.5 feet wide and the finger docks are about 3 feet wide. Freeboards on the center dock tend to be about 13 inches. The centerline floats are level, however, many of the finger floats are very unstable and show significant list and sinkage towards their ends (IMG_2275/5). The floats are secured by wood piles which have steel hoops on the centerline floats and integrated square guides on the finger float ends (IMG_2253, 2247). The piles and their guides show similar wear as on A float (IMG_2237, 2247, 2254). Some of the wood guides have been replaced recently (IMG_2248).

The north end of the guest moorage transitions to the party float. This transition is about 6 inches up (IMG_2255, 2260). The party float appears to be in excellent condition. Its concrete shows few signs of cracking or spalling, it has UMW bumpers around all sides, and it maintains a freeboard of about 19 inches. There are 4 electrical boxes with water on the party float along with its own main power box (IMG_2258, 2272/3). There is a three-sided enclosure used for entertaining (IMG_2262). Its structure is galvanized steel covered with corrugated metal roof and sides. Two steel piles secure the party float through steel hoop inserts which are integral to the float (IMG_2255, 2268). There is a single street light on the float (IMG_2269, 2270) and a tent structure that measures 21 feet square and is made of a galvanized steel frame and fabric roof (IMG_2261, 2271). There are no fire stand pipes on the party float.

6. EAST AND NORTH BREAK WATERS

The east and north breakwaters are by far in the worst condition of all the docks. The first section of the east break water is secured using 4 wood piles while the rest use an anchoring system (IMG_2283). The steel guides are in poor condition (IMG_2291). The breakwaters float with no list and are relatively flat with the exception of 1-2 inch height differences between several sections of floats on the north break water (IMG_2311). The transition plates are generally worn and show many missing bolts and worn edges (IMG_2306, 2311, 2313). However, when the north break water begins curving to the south, a different type of transition plane is used, all of which seem to be in better condition (IMG_2319). The concrete has frequent spots where large gouges have been taken out, sometimes 1-2 inches deep (IMG_2297/8, 2312, 2315/6). The freeboard for the east breakwater is approximately 9-10 inches to the cement and another 9 inches to the top or the base rail. When transitioning onto the north break water the level drops to a freeboard of approximately 7-8 inches to the cement. Both break waters are 12 feet wide.

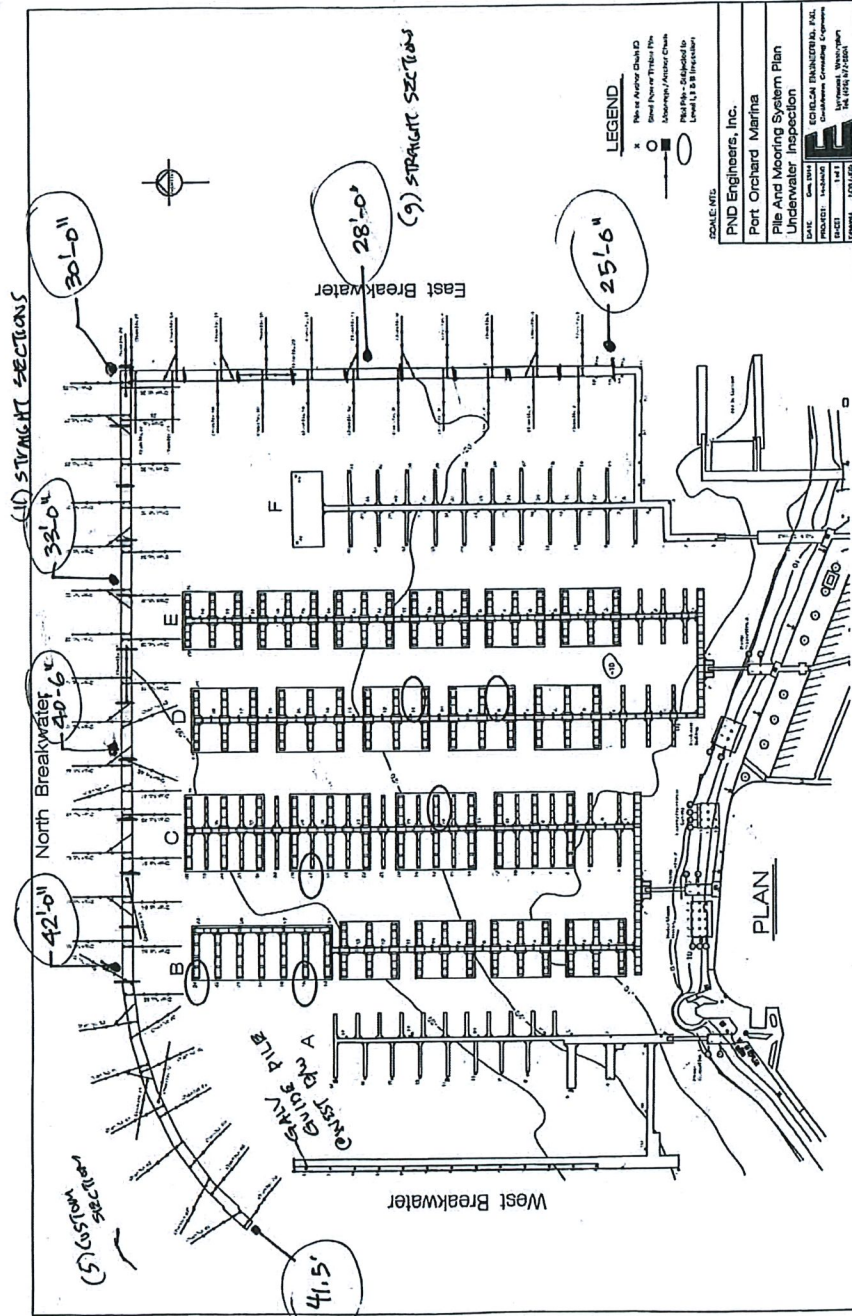
The marina sides of the breakwaters have electricity and water their entire length. However, the water stops on the 5th slab of the north breakwater (IMG_2298, 2300). The electrical boxes on the east break water and the first few on the north break water are stainless steel and show little signs of corrosion. However, they transition to steel and become very corroded at the base (IMG_2320, 2326). There are 3 transformer boxes and 3 circuit breaker boxes on the east breakwater (IMG_2294, 2299). There are no fire stand pipes on these breakwaters. Street lights line both break waters (IMG_2288). In general, most of the fittings and bases of equipment are severely corroded. The following images show a sample of this

along the length of both break waters: IMG_2292, 2301, 2303, 2308, 2310, 2317, 2320.



Attachment 5 - PO Depth readings - 7/28/17

READINGS @ 7/28/17 11:00 AM 7.3 - 7.4 TIDE



Attachment 6 - Port Orchard Marina Projects List

PORT ORCHARD MARINA -- CIP & M&R PROJECTS

1. **North Breakwater:**

Age and condition of floats along with the remaining freeboard that ranges from only 7-8" dictates an apparent need to replace the breakwater floats within the next 2-3 years unless extensive repairs and added floatation is performed. The north and northwest sections are a priority as they have more deterioration, but as all the electrical and water utilities run through the east breakwater, replacement in phases is problematic. Replacement of the anchorage cables/chains along with the floats is also recommended. In the interim, the top surface requires patch and repairs on the large cracks and spalled concrete areas to minimize further water intrusion and deterioration of the floats. Replacement of floats would also include new light poles/fixtures and service pedestals at spacing to suit breakwater design.

2019 Project

Estimated Costs:

Replace north breakwater floats and use Guide Pile Moorings: \$5,970,000
(12,240 sf surface area + 34 - 30" Diameter Guide Piles)

2018 Project

Interim Repairs: \$140,000

Includes:

- a. Patch & Repair cracks/spalls annually until replacement allow \$100,000
(Equals approximately 2000 sf x \$50/sf)
- b. Interim Add Floatation Bladders to maintain/improve interim freeboard:
\$40,000 (Allow for lift bag at selected floats + diver/compressor)

2. **East Breakwater:**

Age and condition of floats along with the remaining freeboard that ranges from only 9-10" dictates an apparent need to replace the breakwater floats within the next 2-3 years unless extensive repairs and added floatation is performed. The east breakwater is not as deteriorated as the north, but as all the electrical and water utilities run through the east breakwater, replacement in phases is problematic. The 8' wide approach walkway linking the shore to the breakwater also lists to one side and has wood piles. Replacement of the anchorage cables/chains along with the floats is also recommended. In the interim, the top surface requires patch and repairs on the large cracks and spalled concrete areas to minimize further water intrusion and deterioration of the floats. Replacement of floats would also include new light poles/fixtures and service pedestals at spacing to suit

breakwater design. The four creosoted wood piles at the south end should be replaced with new galvanized steel piles and pile guides at time of replacement.

2019 Project

Estimated Costs:

Replace east breakwater floats and Guide Pile moorings: \$4,470,000
(7,460 sf surface area + 11 – 24" steel piles – Includes new walkway to F-Dock Walkway)

2018 project.

Interim Repairs: \$70,000

Includes:

- a. Patch & Repair cracks/spalls annually until replacement - allow \$50,000 (Equals approximately 1000 sf x \$50/sf)
- b. Interim Add Floatation Bladders to maintain/improve interim freeboard: \$20,000

(Allow for lift bag at selected floats + diver/compressor)

3. North and East Breakwater - Replace Corroded Electrical Service Equipment:

North and East Breakwater electrical service equipment includes several transformers and main panelboard enclosures that have rusted out at the bottoms or at their attachments. Some pedestals are missing their circuit breaker covers, have corroded breakers, and light pole bases at the western areas are heavily corroded at the base attachments. Electrical systems should be replaced and upgraded along with the breakwater replacement.

Unprogrammed project. (required if BW not replaced in 2019)

Replace all service equipment, conduits and wiring : \$300,000

(Reference POM Electrical Distribution Sys report. Light poles and pedestal replacements would be part of the breakwater floats replacement costs). Cost for this project is included in the above north and east breakwater replacement costs. If the breakwater system is not replaced, the \$300K cost needs to be programmed as a stand-alone cost.

4. F Dock Repairs or Replacement:

Similar to the North & East Breakwater, but not as deteriorated. The 3 foot wide finger floats are listing, and the overall system freeboard is considered low, as well as having creosoted wood piles. Near term repairs include

resurfacing the concrete decks, added floatation bladders and correcting listing finger floats. 5-10 year planning would be to replace F Float main walkways and finger floats. Includes replacing the (40) wood piles with galvanized steel piles and pile guides. For replacement, recommend consideration of wider finger floats for improved safety and future maintenance of listing issues. Party float at end of F Dock would remain/be reinstalled as it is newer and in good condition.

2018 project.

Interim Repairs: \$25,000

Includes:

1. Patch & Repair cracks/spalls annually until replacement
- allow \$15,000 (Equals approximately 300 sf x \$50/sf)
2. Interim Add Floatation Bladders to maintain/improve
interim freeboard: ___ \$10,000 (Allow for lift bag at selected floats + diver/compressor)

2021 Project.

Replace Walkway and Finger Floats: \$970,000

(2000sf + 2160sf = 4,160sf total)

Remove wood piles and install steel piles and guides: \$720,000

(Total of 40 piles x @\$18,000/ea)

Total project: \$1,690,000

2022 Project.

ADA Gangway from Gate 4, floats and \$600,000

New walkway (600sf total)

5. A Dock Repairs or Replacement:

The A Dock has older concrete floats with creosoted wood piles. Main walkway is 5 feet wide with 11-12" freeboard and the finger floats are 4 feet wide with several that are listing and have freeboards down to 7" at the pile ends. Many of the wood piles are worn or abraded. Near term repairs include resurfacing the concrete decks, added floatation bladders, correcting listing finger floats and making repairs to corroded electrical equipment. 5-10 year planning would be to replace A Float main walkways and finger floats.

Includes replacing the (40) wood piles with galvanized steel piles and pile guides.

2018 Project.

Interim Add Floatation Bladders to maintain/improve interim freeboard:
\$20,000

(Allow for 10 smaller lift bags + diver/compressor)

2019 Project.

Interim Patch & Repair cracks/spalls annually until replacement: \$10,000

2024 Project.

ADA Gangway from Gate 1, floats and \$600,000
New walkway (600sf total)

Unprogrammed Project (needed only is replacement not completed in 2020).

Replace Missing Ckt Brkr Covers, Corroded Brkrs, Powercenters: \$50,000

(Includes upgrading to GFI protection)

2020 Project.

Replace Walkway and Finger Floats: \$1,670,000
(6,330 sf total)

Remove wood piles and install steel piles and guides: \$360,000

(Total of 20 piles x @\$18,000/ea)

Total Project \$2,030,000

6. Repair/Replace Corroded Piping Utility Systems Supports:

All of the Docks have in varying degrees or quantities, various piping or electrical systems hangers or supports that are at the waterline or in the immediate splash zone and are heavily corroded and will eventually fail. There are a variety of electrical boxes, conduit fittings, light pole bases and power pedestal attachments at the float edges/float deck that are corroding and could lead to water intrusion into electrical junction box areas. Heavily rusted piping supports need to be scraped/grinded and recoated or replaced. Recommended approach would be to do an initial intensive effort to replace or

repair items to a non-corroded finish, and follow that up with an annual, as-needed/where found effort.

Unprogrammed project (required if replacement not on schedule).

Estimated Costs:

Initial Replace/Repair Corroded Eqpt/Items: \$50,000

(Allow \$5,000 labor + matl x 10 docks incl west + east breakwater)

7. Pile Coatings Splash Zone Repair (marina-wide):

All steel piles will have intertidal zone areas where the pile guide materials rub against the piles and will scrape or rub off the pile coatings. If left, those areas will corrode and increase the loss of the pile coatings. There are also initial fabrication and application of coatings issues that sometimes will lead to flaking and loss of the protective coatings. Pile coatings should be inspected annually and some sequence/phasing of pile coating repairs should be established. Repairs to coatings is estimated to be an every 2 to 3 year cycle. Attempting to do the entire marina in one summer cycle is not considered practicable. Recommend a sequence of marina sections be set up for what will be annual cycles of paint repairs conducted by a team of painters working during tidal cycles.

2017 Design Project.

Design Emergency Repairs \$25,000

Conduct Corrosion Protection Study – recommend Upgrades

(Note: includes underwater inspections and design of emergency repairs.)

2018 Project.

Major Underwater Inspection with Repairs \$50,000

(Note: includes underwater inspections and completion of emergency repairs.)

Annual requirements:

Prep, prime and top coat (coal-tar epoxy paint): \$40,000 per
year

(Allow @\$2,000/pile x 20 piles PER YEAR)

General maintenance – all floats): \$50,000 per
year

Generally via Port Staff

8. **Fuel Float, Pump Out Service Dock Repairs and Replacement**

The service float, and fuel float have sections of concrete floats with creosoted wood piles and the west breakwater has integral steel piles. Main walkway is 14 feet wide but has a westward list of approx 5 inches (19" freeboard at east side and 14" at west side). Steel pile guides at west side of the breakwater have significant rusting. Surface cracks and spalling are relatively minor at this time but need to be corrected. Steel piles should be included in the annual cycle of coating patch/repairs work. Electrical service equipment is corroded.

2018-2022 Projects.

Patch & Repair cracks/spalls annually until replacement: allow
\$15,000/year

(Equals approximately 200 sf/year x \$50/sf)

2018 project,

Replace corroded electrical distribution equipment: \$40,000

(Includes upgrading to GFI protection)

2018 or 2019 Project.

Remove wood piles and install steel piles and guides: \$54,000

(Total of 3 piles x @\$18,000/ea)

2023 Project.

Estimated Costs:

Replace Service floats and West breakwater+ A dock connections: \$550,000

(900 sf + piping/electrical utilities)

9. **West Breakwater, Repairs and Replacement**

The West Breakwater The floats are 15 feet wide. The south end of the float has a sanitary pump out station. There is power, water, and cleats on both sides of the breakwater along with two fire stand pipes. There are also two street lamps on the breakwater. The overall condition of the West Breakwater's concrete appears to be good and of the same era as the fuel float. However, the dock does have a western list along it entire length. The

east freeboard is approximately 19 inches and the west freeboard is approximately 14 inches. The floats are held in place by steel piles set through guides lined with UMHW and are integral to the floats. The major discrepancy found on the west breakwater is that all the steel components on the west side (which is exposed to the weather) have significant amounts of rust and corrosion. This is likely because of exposure and the breakwater sloping to that side.

2018-2020 Projects.

Patch & Repair cracks/spalls annually until replacement: allow

\$20,000/year

(Equals approximately 400 sf/year x \$50/sf)

2025 Project.

Replace Walkway and Finger Floats and utilities: \$2,690,000

(6,000 sf total)

10. B- E Docks.

These docks provide permanent covered moorage berthing and have been recently renovated. However, as sited in the 2014 Echelon Dive inspection report, the cathodic protection on the pilings appears to be under performing and is allowing section loss to occur. This situation must be corrected without delay. This project will serve as the catch all for conducting emergency repairs, and is included in section 7 above.

Annual requirement,

Conduct Minor repairs B-E Docks: \$20,000 per
year

(Include repair of roof systems)

2026 Project.

ADA Gangway from Gates 2& 3, floats and \$1,000,000
New walkway (1,200sf total)

2026 Project.

Renovate floats, B-E Docks \$500,000

- 11. Shore-Side Gate Support Piles Replacement:** Based on the 2014 Echelon Inspection report and visual inspections, it is assumed that approximately 2 piles will need to be replaced at gates, 1, 2 and 4 and one pile at each of the three pile supported buildings. This work is included in the 2018 emergency repairs project above.

2017 Project

Conduct repairs on piling systems for gates 1, 2 and 3 \$30,000

2018 Project

Conduct repairs on piling systems for the Laundry Bldg \$20,000

2019 Project

Conduct repairs on piling systems for gates 1 and 4, the Harbor Master Bldg, and the Restroom Facility. \$90,000

2020 Project

Conduct repairs on piling systems for gate 2, the Laundry Bldg, and the Restroom Facility. \$390,000

Attachment 7 -PoB Marina and W/F Facilities 10-Year M&R/CI Program

Port of Bremerton Marina Capital and M&R Funding Plan (dollars X 1000)											HIGHEST PRIORITY
											MEDIUM PRIORITY
											FLEXIBLE PRIORITY
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	RCO?
Port Orchard Marina											
North BW M&R	-	140	-	-	10	10	10	10	15	15	X
East BW M&R	-	70	-	-	5	5	5	5	10	10	X
North BW Replacement	-	-	5,970	-	-	-	-	-	-	-	X
East BW Replacement	-	-	4,470	-	-	-	-	-	-	-	X
West BW M&R	-	20	20	20	10	10	10	10	-	-	X
West BW Replacement	-	-	-	-	-	-	-	-	2,690	-	-
A Float M&R	-	20	10	-	5	5	5	10	10	20	-
A Float Replacement	-	-	-	2,030	-	-	-	600	-	-	-
Fuel Dock M&R	-	76	5	5	5	7	7	7	10	10	-
Pump Out Dock M&R	-	33	10	15	10	15	-	5	5	5	-
Service Dock Replacement	-	-	-	-	-	-	550	-	-	-	-
F Dock M&R	-	25	5	5	-	-	5	10	10	15	X
F / Guest Dock Replacement	-	-	-	-	2,380	600	-	-	-	-	X
Repair Piping Utilities Systems	-	50	8	8	8	8	-	8	8	8	-
B-E Dock M&R	-	-	10	10	10	10	10	10	10	1,500	-
B-E Dock Covers M&R	-	-	10	10	10	10	10	10	10	10	-
Ramps/Gangways M&R	8	-	10	4	-	-	-	-	-	-	-
Piling Splash Zone M&R	40	40	40	40	40	40	40	40	40	40	-
Gate 1 M&R	5	-	20	-	5	-	-	-	-	-	-
Gate 2 M&R	5	-	-	20	5	-	-	-	-	-	-
Gate 3 M&R	20	-	-	-	5	-	-	-	-	-	-
Gate 4 M&R	-	-	30	-	5	-	-	-	-	-	-
Harbor Master Bldg Piles M&R	-	-	20	-	10	5	10	10	10	10	-
Laundry Building Piles M&R	-	20	-	10	10	10	5	10	10	10	-
Restroom Bldg Piles M&R	-	-	20	360	-	5	-	5	-	5	-
Marina U/W Inspect/Cor Rvw	25	-	25	-	25	-	30	-	30	-	-
Marina U/W Repairs	-	50	-	50	-	50	-	50	-	50	-
Sub Total PO Marina	103	544	10,683	2,587	2,558	790	697	800	2,868	1,708	
Bremerton Marina											
North Breakwater M&R	10	10	10	10	10	10	10	10	100	10	-
South Breakwater M&R	10	10	10	10	10	10	10	10	10	60	X
Telescoping Bridge M&R	5	5	-	-	-	5	5	50	5	5	X
Turner Joy Moorings M&R	300	5	5	10	5	300	5	5	10	20	-
Guest Floats A, B & P M&R	20	20	20	20	920	5	5	10	10	20	X
Floats C-E M&R	20	20	20	20	20	20	20	500	20	20	-
Piling Splash Zone M&R	100	100	100	100	100	100	100	100	100	100	-
Gate 1 and Ramps M&R	5	-	5	-	5	40	-	5	-	5	-
Gate 2 and Ramps M&R	5	5	-	2	-	-	-	-	100	-	-
Marina U/W Inspect/Cor Rvw	25	-	25	-	25	-	30	-	30	-	-
Marina U/W Inspection w/ Rprs	-	50	-	50	-	50	-	50	-	50	-
Sub Total Bremerton Marina	500	225	195	220	1,097	540	185	740	385	290	
Marina Design/Engineering Fees	200	1,200	488	470	249	221	290	413	300	200	-
Sub-T POB Marina Spending Plan	803	1,969	11,366	3,277	3,904	1,551	1,172	1,953	3,553	2,198	
Other Harbor Facilities											
Marina Park M&R	15	20	10	10	10	10	10	10	10	10	-
Marina Park RR Replacement	-	-	-	210	-	-	-	-	-	-	-
Marina Park Upgrades	30	20	-	-	-	-	-	-	-	-	-
Harper Pier M&R	4	4	4	15	4	4	4	4	4	4	-
Harper U/W Inspect/ Cor RVW	5	-	5	-	5	-	5	-	5	-	-
Harper Cathodic Protection	-	25	-	-	-	-	-	25	-	-	-
Water Street Boat Launch M&R	-	10	5	20	5	5	5	5	5	5	-
Water Street Cathodic Protection	-	4	-	-	-	-	-	4	-	-	-
Chico Boat Launch M&R	-	3	3	3	3	3	3	3	3	3	-
Gorst Rehab M&R	-	3	-	3	-	-	-	-	-	-	-
Sub Total Harbor Other	54	89	27	261	27	22	27	51	27	22	
Other Fac.Design/Engineering Fees	9	3	26	3	2	3	5	3	2	2	-
Total POB Waterfront Fac. Spending	866	2,061	11,419	3,540	3,933	1,576	1,204	2,007	3,582	2,222	

Port of Bremerton Marina Capital and M&R Budget Input
(dollars X 1000)

HIGHEST PRIORITY
MEDIUM PRIORITY
FLEXIBLE PRIORITY

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	RCO?
Port Orchard Marina											
North BW M&R	-	140	-	-	10	10	10	10	15	15	X
East BW M&R	-	70	-	-	5	5	5	5	10	10	X
North BW Replacement	-	-	4,500	-	-	-	-	-	-	-	X
East BW Replacement	-	-	3,000	-	-	-	-	-	-	-	X
West BW M&R	-	20	20	20	10	10	10	10	-	-	X
West BW Replacement	-	-	-	-	-	-	-	-	1,470	-	
A Float M&R	-	20	10	-	5	5	5	10	10	20	
A Float Replacement	-	-	-	1,840	-	-	-	100	-	-	
Fuel Dock M&R	-	40	5	5	5	7	7	10	10	10	
Pump Out Dock M&R	-	15	10	15	10	15	-	5	5	5	
Service Dock Replacement	-	-	-	-	-	-	100	-	-	-	
F Dock M&R	-	25	5	5	-	-	5	10	10	15	X
F Dock Replacement	-	-	-	-	970	100	-	-	-	-	X
Repair Piping Utilities Systems	-	50	8	8	8	8	-	8	8	8	
B-E Dock M&R	-	-	10	10	10	10	10	10	10	700	
B-E Dock Covers M&R	-	-	10	10	10	10	10	10	10	10	
Ramps/Gangways M&R	8	-	10	4	-	-	-	-	-	-	
Piling Splash Zone M&R	40	40	40	40	40	40	40	40	40	40	
Gate 1 M&R	5	-	20	-	5	-	-	-	-	-	
Gate 2 M&R	5	-	-	20	5	-	-	-	-	-	
Gate 3 M&R	20	-	-	-	5	-	-	-	-	-	
Gate 4 M&R	-	-	30	-	5	-	-	-	-	-	
Harbor Master Bldg Piles M&R	-	-	20	-	10	5	10	10	10	10	
Laundry Building Piles M&R	-	20	-	10	10	10	5	10	10	10	
Restroom Bldg Piles M&R	-	-	20	360	-	5	-	5	-	5	
Marina U/W Inspect/Cor Rvw	25	-	25	-	25	-	30	-	30	-	
Marina U/W Repairs	-	50	-	50	-	50	-	50	-	50	
Sub Total PO Marina	103	490	7,743	2,397	1,148	290	247	300	1,648	908	
Bremerton Marina											
North Breakwater M&R	10	10	10	10	10	10	10	10	100	10	
South Breakwater M&R	10	10	10	10	10	10	10	10	10	60	X
Telescoping Bridge M&R	5	5	-	-	-	5	5	50	5	5	X
Turner Joy Moorings M&R	300	5	5	10	5	300	5	5	10	20	
Guest Floats A, B & P M&R	20	20	20	20	200	5	5	10	10	20	X
Floats C-E M&R	20	20	20	20	20	20	20	500	20	20	
Piling Splash Zone M&R	100	100	100	100	100	100	100	100	100	100	
Gate 1 and Ramps M&R	5	-	5	-	5	40	-	5	-	5	
Gate 2 and Ramps M&R	5	5	-	-	2	-	-	-	100	-	
Marina U/W Inspect/Cor Rvw	25	-	25	-	25	-	30	-	30	-	
Marina U/W Inspection w/ Rprs	-	50	-	50	-	50	-	50	-	50	
Sub Total Bremerton Marina	500	225	195	220	377	540	185	740	385	290	
Marina Design/Engineering Fees	200	1,200	488	470	249	221	290	413	300	200	
Sub-T POB Marina Spending Plan	803	1,915	8,426	3,087	1,774	1,051	722	1,453	2,333	1,398	
Other Harbor Facilities											
Marina Park M&R	15	20	10	10	10	10	10	10	10	10	
Marina Park RR Replacement	-	-	-	210	-	-	-	-	-	-	
Marina Park Upgrades	30	20	-	-	-	-	-	-	-	-	
Harper Pier M&R	4	4	4	15	4	4	4	4	4	4	
Harper U/W Inspect/ Cor RVW	5	-	5	-	5	-	5	-	5	-	
Harper Cathodic Protection	-	25	-	-	-	-	-	25	-	-	
Water Street Boat Launch M&R	-	10	5	20	5	5	5	5	5	5	
Water Street Cathodic Protection	-	4	-	-	-	-	-	4	-	-	
Chico Boat Launch M&R	-	3	3	3	3	3	3	3	3	3	
Gorst Rehab M&R	-	3	-	3	-	-	-	-	-	-	
Sub Total Harbor Other	54	89	27	261	27	22	27	51	27	22	
Other Fac.Design/Engineering Fees	9	3	26	3	2	3	5	3	2	5	
Total POB Waterfront Fac. Budget	866	2,004	8,479	3,350	1,801	1,073	749	1,504	2,360	1,420	

State Funding Request
(dollars X 1000)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Port Orchard Marina										
North BW M&R										
East BW M&R										
North BW Replacement			750							
East BW Replacement			750							
West BW M&R										
West BW Replacement										
A Float M&R										
A Float Replacement										
Fuel Dock M&R										
Pump Out Dock M&R										
Service Dock Replacement										
F Dock M&R										
F / Guest Dock Replacement										
Repair Piping Utilities Systems										
B-E Dock M&R										
B-E Dock Covers M&R										
Ramps/Gangways M&R										
Piling Splash Zone M&R										
Gate 1 M&R										
Gate 2 M&R										
Gate 3 M&R										
Gate 4 M&R										
Harbor Master Bldg Piles M&R										
Laundry Building Piles M&R										
Restroom Bldg Piles M&R										
Marina U/W Inspect/Cor Rvw										
Marina U/W Repairs										
0										
Sub Total PO Marina	-	-	1,500	-	-	-	-	-	-	-
0										
Bremerton Marina										
North Breakwater M&R										
South Breakwater M&R										
Telescoping Bridge M&R										
Turner Joy Moorings M&R										
Guest Floats A, B & P M&R										
Floats C-E M&R										
Floats C-E M&R										
Gate 1 and Ramps M&R										
Gate 2 and Ramps M&R										
Marina U/W Inspect/Cor Rvw										
Marina U/W Inspection w/ Rprs										
0										
Sub Total Bremerton Marina	-	-	-	-	-	-	-	-	-	-
0										
Marina Design/Engineering Fees										
Sub-T POB Marina Spending Plan	0	0	1,500	0	0	0	0	0	0	0
0										
Other Harbor Facilities										
Marina Park M&R										
Marina Park RR Replacement										
Marina Park Upgrades										
Harper Pier M&R										
Harper U/W Inspect/ Cor RVW										
Harper Cathodic Protection										
Water Street Boat Launch M&R										
Water Street Cathodic Protection										
Chico Boat Launch M&R										
Gorst Rehab M&R										
Sub Total Harbor Other	0	0	0	0	0	0	0	0	0	0
Other Fac.Design/Engineering Fees										
Total POB Waterfront Fac. Budget	-	-	1,500	-	-	-	-	-	-	-

RCO BFP Grant
(dollars X 1000)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	RCO?
Port Orchard Marina											
North BW M&R											X
East BW M&R											X
North BW Replacement											X
East BW Replacement											X
West BW M&R											X
West BW Replacement									500		
A Float M&R											
A Float Replacement											
Fuel Dock M&R											
Pump Out Dock M&R											
Service Dock Replacement											
F Dock M&R											X
F / Guest Dock Replacement					500						
Repair Piping Utilities Systems											
B-E Dock M&R											
B-E Dock Covers M&R											
Ramps/Gangways M&R											
Piling Splash Zone M&R											
Gate 1 M&R											
Gate 2 M&R											
Gate 3 M&R											
Gate 4 M&R											
Harbor Master Bldg Piles M&R											
Laundry Building Piles M&R											
Restroom Bldg Piles M&R											
Marina U/W Inspect/Cor Rww											
Marina U/W Repairs											
Sub Total PO Marina	-	-	-	-	500	-	-	-	500	-	
Bremerton Marina											
North Breakwater M&R											
South Breakwater M&R											X
Telescoping Bridge M&R											X
Turner Joy Moorings M&R											
Guest Floats A, B & P M&R											X
Floats C-E M&R											
Piling Splash Zone M&R											
Gate 1 and Ramps M&R											
Gate 2 and Ramps M&R											
Marina U/W Inspect/Cor Rww											
Marina U/W Inspection w/ Rprs											
Sub Total Bremerton Marina	-	-	-	-	-	-	-	-	-	-	
Marina Design/Engineering Fees											
Sub-T POB Marina Spending Plan					500				500		
Other Harbor Facilities											
Marina Park M&R											
Marina Park RR Replacement											
Marina Park Upgrades											
Harper Pier M&R											
Harper U/W Inspect/ Cor RVW											
Harper Cathodic Protection											
Water Street Boat Launch M&R											
Water Street Cathodic Protection											
Chico Boat Launch M&R											
Gorst Rehab M&R											
Sub Total Harbor Other											
Other Fac.Design/Engineering											
Total POB Waterfront Fac. Budget	-	-	-	-	500	-	-	-	500	-	-

RCO BIG 1 Grant
(dollars X 1000)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	RCO?
Port Orchard Marina											
North BW M&R											X
East BW M&R											X
North BW Replacement											X
East BW Replacement											X
West BW M&R											X
West BW Replacement											
A Float M&R											
A Float Replacement				190							
Fuel Dock M&R											
Pump Out Dock M&R											
Service Dock Replacement											
F Dock M&R											X
F Dock Replacement					190						
Repair Piping Utilities Systems											
B-E Dock M&R											
B-E Dock Covers M&R											
Ramps/Gangways M&R											
Piling Splash Zone M&R											
Gate 1 M&R											
Gate 2 M&R											
Gate 3 M&R											
Gate 4 M&R											
Harbor Master Bldg Piles M&R											
Laundry Building Piles M&R											
Restroom Bldg Piles M&R											
Marina U/W Inspect/Cor Rvw											
Marina U/W Repairs											
Sub Total PO Marina	-	-	-	190	190	-	-	-	-	-	
Bremerton Marina											
North Breakwater M&R											
South Breakwater M&R											X
Telescoping Bridge M&R											X
Turner Joy Moorings M&R											
Guest Floats A, B & P M&R											X
Floats C-E M&R											
Piling Splash Zone M&R											
Gate 1 and Ramps M&R											
Gate 2 and Ramps M&R											
Marina U/W Inspect/Cor Rvw											
Marina U/W Inspection w/											
Sub Total Bremerton Marina	-	-	-	-	-	-	-	-	-	-	
Marina Design/Engineering											
Sub-T POB Marina Spending				190	190						
Other Harbor Facilities											
Marina Park M&R											
Marina Park RR Replacement											
Marina Park Upgrades											
Harper Pier M&R											
Harper U/W Inspect/ Cor RVW											
Harper Cathodic Protection											
Water Street Boat Launch M&R											
Water Street Cathodic Protection											
Chico Boat Launch M&R											
Gorst Rehab M&R											
Sub Total Harbor Other											
Other Fac.Design/Engineering											
Total POB Waterfront Fac. Budg	-	-	-	190	190	-	-	-	-	-	-

RCO BIG 2 Grant
(dollars X 1000)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	RCO?
Port Orchard Marina											
North BW M&R											X
East BW M&R											X
North BW Replacement			720								X
East BW Replacement			720								X
West BW M&R											X
West BW Replacement				-					720		
A Float M&R											
A Float Replacement								500			
Fuel Dock M&R											
Pump Out Dock M&R											
Service Dock Replacement							450				
F Dock M&R											
F / Guest Dock Replacement					720	500					X
Repair Piping Utilities Systems											
B-E Dock M&R										800	
B-E Dock Covers M&R											
Ramps/Gangways M&R											
Piling Splash Zone M&R											
Gate 1 M&R											
Gate 2 M&R											
Gate 3 M&R											
Gate 4 M&R											
Harbor Master Bldg Piles M&R											
Laundry Building Piles M&R											
Restroom Bldg Piles M&R											
Marina U/W Inspect/Cor Rvw											
Marina U/W Repairs											
Sub Total PO Marina	-	-	1,440	-	720	500	450	500	720	800	
Bremerton Marina											
North Breakwater M&R											
South Breakwater M&R											X
Telescoping Bridge M&R											X
Turner Joy Moorings M&R											
Guest Floats A, B & P M&R					720						X
Floats C-E M&R											
Piling Splash Zone M&R											
Gate 1 and Ramps M&R											
Gate 2 and Ramps M&R											
Marina U/W Inspect/Cor Rvw											
Marina U/W Inspection w/ Rprs											
Sub Total Bremerton Marina	-	-	-	-	720	-	-	-	-	-	
Marina Design/Engineering Fees											
Sub-T POB Marina Spending Plan			1,440		1,440	500	450	500	720	800	
Other Harbor Facilities											
Marina Park M&R											
Marina Park RR Replacement											
Marina Park Upgrades											
Harper Pier M&R											
Harper U/W Inspect/ Cor RVW											
Harper Cathodic Protection											
Water Street Boat Launch M&R											
Water Street Cathodic Protection											
Chico Boat Launch M&R											
Gorst Rehab M&R											
Sub Total Harbor Other											
Other Fac.Design/Engineering											
Total POB Waterfront Fac. Budget	-	-	1,440	-	1,440	500	450	500	720	800	

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Attachment 9 -Bremerton Marina Projects Listing

BREMERTON MARINA -- CIP & M&R PROJECTS

1. North Breakwater:

Serves as permanent moorage for several large vessels. Built in 2007, the system is still in excellent shape, however continued underwater inspection and conduct of minor repairs on an annual basis is essential in maintaining a reasonable lifecycle.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$10,000 per year

2025 Project.

Major repairs to decks and appurtenances as required \$100,000

2. South Breakwater:

Serves as temporary moorage for several large vessels. Built in 2007, the system is still in excellent shape, however continued underwater inspection and conduct of minor repairs on an annual basis is essential in maintaining a reasonable lifecycle.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$10,000 per year

3. Telescoping bridge:

Because this feature is subject to constant movement, it is important to ensure that the wearing surfaces are inspected and repaired as necessary.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$5,000 per year

2024 Project.

Major repairs to decks and appurtenances as required \$50,000

4. Turner Joy Moorings:

The Turner Joy doubles as a crucial portion of the north breakwater. The mooring system for the vessel take the brunt of the energy from the worst storms. Maintenance of these morring systems is an annual process.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$5,000 per year

2017 and 2022 projects.

Major overhaul of mooring system: \$300,000

5. Guest floats A, B and P:

Similar to the rest of the marina, as it was built in 2007, most of the infrastructure is is very good material condition. Annual maintenance combined with a float/finger phased replacement program commencing in 2025 should keep this portion of the marina in excellent condition for many decades.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$20,000 per year

2025 project.

Replace degraded floats/fingers: \$900,000

6. Floats C - E:

Annual maintenance combined with a float/finger phased replacement program commencing in 2024 should keep this portion of the marina in excellent condition for many decades.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$20,000 per year

2024 project.

Replace degraded floats/fingers: \$500,000

7. Gate 1 and ramps:

This gate is a significant asset with several ramps, stairs and floats that support these elements. Annual maintenance combined with a float phased repair/replacement program commencing in 2022 should keep this portion of the marina in excellent condition for many decades.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$5,000 per year

2022 project.

Replace degraded floats: _ \$40,000

8. Gate 2 and ramps:

This gate is a significant asset with several ramps, stairs and floats that support these elements. Annual maintenance combined with a float phased repair/replacement program commencing in 2025 should keep this portion of the marina in excellent condition for many decades.

Annual requirement.

Annual As-Needed Repair/Replace Items: \$5,000 per year

2025 project.

Replace degraded floats: _ \$100,000

9. Pile Coatings Repair:

All steel piles will have intertidal zone areas where the pile guide materials rub against the piles and will scrape or rub off the pile coatings. If left, those areas will corrode and increase the loss of the pile coatings. There are also initial fabrication and application of coatings issues that sometimes will lead to flaking and loss of the protective coatings. Pile coatings should be inspected annually and some sequence/phasing of pile coating repairs should be established. Repairs to coatings is estimated to be an every 2 to 3 year cycle. Attempting to do the entire marina in one summer cycle is not considered practicable. Recommend a sequence of marina sections be set up for what will be annual cycles of paint repairs conducted by a team of painters working during tidal cycles.

Annual requirement,

Prep, prime and top coat (coal-tar epoxy paint): \$100,000 per year
(Allow @\$2,500/pile x 40 piles PER YEAR)

10. Underwater Inspections:

Also, an annual underwater inspection of all marina systems, including the breakwater/Turner Joy moorings, conducted on even years is a prudent way to extend the lifecycle of these systems. Repairs to cathodic protection systems and mooring lines/chains can be conducted during these inspections on an even year cycle. Because of proximity, it might be best to conduct the underwater inspections on both the Port orchard and Bremerton marinas at the same time each year.

Annual requirement,

Odd years - Conduct inspections: \$25,000 per year

Even years - Conduct inspections and repairs: \$50,000 per year