"Brushfire Design"
P.O. Box 4142 South Colby, WA. 98384 Tel: (253) 857-2560 E-mail: MacBrog@aol.com

June 18, 2014

Mrs. Cassie Magill
Port Commissioner
Port of Illahee
PO Box 2642
Bremerton, WA. 98310

Dear Commissioner Magill:

Enclosed please find 6 copies of our survey report. Two copies have attached pictures which relate to our recommendations. I hope these will help the other Commissioners visualize our recommendations. Each of the 6 copies has a reduced drawing of the wharf and docks with all notations attached.

I have also enclosed, two full size drawings of the wharf & docks; which you can use for any presentations you plan. If you wish additional full size drawings, please let me know and I will be happy to send them to you.

I have also attached an invoice for the remaining balance. Please mail the check to the above post office box. If you have any questions, please feel free to call me.

Yours truly,

Dennis McBreen
President.

Survey of Specific Items

of

The Illahee Wharf and Floating Docks

for

The Port Commissioners - Port of Illahee

June 12th & 13th, 2014

Prepared by:

Brushfire Design
PO Box 4142, South Colby, WA. 98384
(253) 857-2560

MacBrog @ aol.com

Port of Illahee Wharf & Dock Survey

1. Scope and Methodology

This report will address the specific items outlined by the Port Commissioners in their undated letter of April, 2014 and outlined further in Brushfire's proposal. That proposal was agreed to by the Port Commissioners on May 14,2014. The details of the scope of work are shown on the attached drawing and included an examination of specific piles, pile caps and other items.

The survey was undertaken on June 12th and 13th, 2014 and covered all of the scope of work items. Additional survey work was also completed as it was felt necessary to address other structural and maintenance items to give the Commissioners sufficient data for future maintenance of the wharf and floating docks. The objective being to extend the life of the existing structure. The original scope of work items are shown in bold print on the attached drawings, the extra items are in regular print.

The survey methods used on this survey included an on the water inspection of all scope items at a very low tide. Probes were used to test the piles and the pile caps for rot and other problems. A physical inspection of pile to pile cap connections from both above and below the wharf was done. The extreme low tide allowed probing and inspection without the use of a diver as was outlined in our proposal to reduce the survey costs. The personnel used in the survey are identified in the appendix.

2. Survey Overview

The wharf is basically in good shape relative to the pilings and the pile caps. There is one critical pile that must be repaired or replaced very soon and the need for additional cross bracing should be added as soon as possible. As only one piling needs replacement at this time and as the cost of mobilizing a pile driver for a single pile is extremely costly, an interim repair method is recommended. See Section 4.

Repair of the fish plating at nearly all pile cap breaks is necessary. This will allow certain specific double pile groups where one pile is deteriorating to be used without replacement for two or three additional years. Again this is a cost saving method to maintain the dock until a number of piles need replacement to reduce the per pile driving costs.

The repair of the existing cross bracing and the construction of additional cross bracing is strongly recommend to be completed this summer. Additional cross bracing was recommended in earlier reports and was not installed. Pictures of the existing cross bracing are included following the appendix.

Pile #2 on floating dock #1 is tilting inward and is constricting the movement of the floating dock as the tide rises and falls. This is partially the reason for the SE corner of the dock to sag. It is recommended that this pile be straightened if possible. See other recommendation in Section 4.

3. Other Observations

One of the ramp wheels on floating dock #1 is missing. The wheel should be replaced as soon as possible as damage to the dock decking is being done and if the ramp end was to dig in and be stuck, major damage to the dock, ramp and wharf connection could result. In addition to replacement of the wheel, a guide track of steel angle iron is suggested to be installed under both wheels. A picture of the missing wheel and the digging into the dock is attached. DONE

Line 18, Row A, Pile A1 presently is connected to the pile cap by a single bolt. To support the dock, this connection must be improved. See the recommendations for additional details. DONE

The dock decking has algae build-up all over, but is very heavy between pile lines 3 and 13. This build-up will cause the decking to deteriorate much faster especially at the decking ends. It also causes the deck to be very slippery and thus creates a potential liability problem. See Section 4 for recommendation for cleaning the decking.

4. Recommendations

1. The pile on Line 18, Row D should be sistered with a 4"x 8" timber as soon as possible. The timber should be though bolted to the existing pile both below and above the existing holes. The sistered timber should be place directly under the extended portion of the existing pile cap and extend at least 4ft into the existing piling below the holes. This will extend the life of this critical pile (a main support of the #2 floating dock ramp) for a number of years and eliminate the immediate need to drive a single pile at high cost. DONE

2. The connection between pile A1, Line 18, Row A and the pile cap must be improved as only a single bolt now make the connection. Either the pile must be cut off and pulled in under the existing pile cap using come-alongs or the pile cut off even lower and a 6' to 8' long new pile cap be placed under and bolted to the existing pile cap. The repositioning of the pile should be attempted first as it is the most economical solution. DONE

3. At each pile cap break on Lines 16, 17, 18 and 19 new fish plating splices should be installed. The old splices should be removed one side at a time and new 1/8" steel plates be through bolted to the existing pile caps. Again, this will eliminate the immediate need to replace certain piles at this time. DONE

4. Cross bracing must be replaced as soon as possible as all existing cross bracing is basically nonfunctional. In addition, new cross bracing should be installed between lines 18 and 19 on both sides of the wharf. It is recommended that two piece cross bracing be through bolted both to the pilings and to each other and that 2"x 8" pressure treated hem/fir with as required blocking between the two pieces be used. DONE

5. The decking has in places heavy algae growth and light growth overall. This will cause more rapid deterioration of the decking and also is a potential liability. It is recommend that the entire wharf decking be pressured washed using a low pressure machine combined with manual

brushing. The low pressure washing and brushing is recommended to stop cutting in to the soft portion of the decking, The pressure washing solution used should be a eco-friendly type of which there are many on the market. Following this pressure washing, the entire deck should be examined for loose decking boards that require renailing. A number of loose boards were noted during our survey.

6. The section of deck railing adjacent to the floating dock #1 ramp needs to be stabilized, It is recommended that a second 4"x4" bottom rail be attached to the existing bottom rail and then nailed directly to the decking. A picture of this railing section is included in the appendix. Done

7. The missing wheel on the floating dock #1 ramp should be replace immediately. As noted before if the ramp was to become stuck in the decking, damage to the ramp and ramp to wharf connection could result. In addition, steel angle iron guide tracks are recommend to be installed. Done

8. The sagging of the SE corner of floating dock #1 is caused by a number of factor. The leaning piling #2 is causing the dock to tilt slightly as the tide rises. Straightening of the pile is recommended, but if not possible, then enlarging the pile hole is recommended. In addition, the installation of more floatation is recommended A small resealable poly float should be used. The float is partly filled with water for ease of installation, inserted with the vents at the bottom and then using a air compressor addition air pumped in to displace this water and raise the sagging corner. The float is then resealed. It is further recommend that the existing ladder be relocated to the north end of the dock.

Appendix

The following personal and their qualifications were used in this survey:

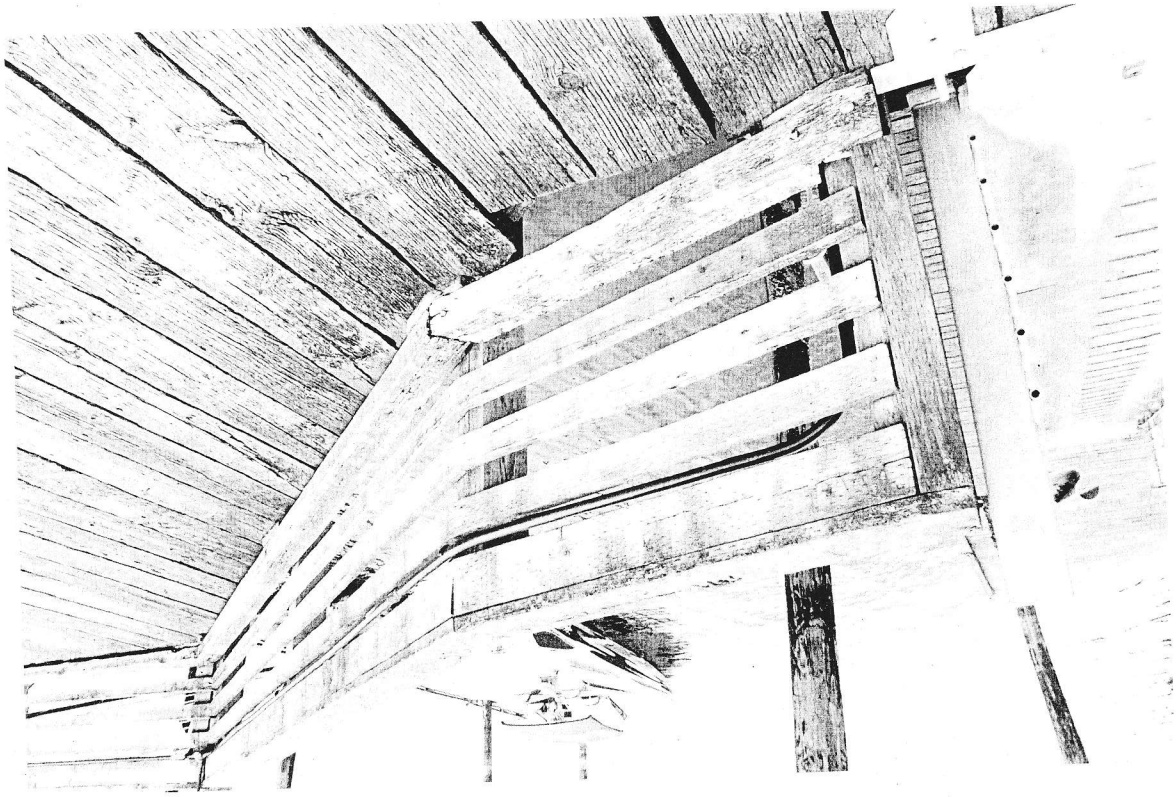
Dennis McBreen: Design engineer and former owner Seabeck Marina. Graduate University of Oregon in Architecture.

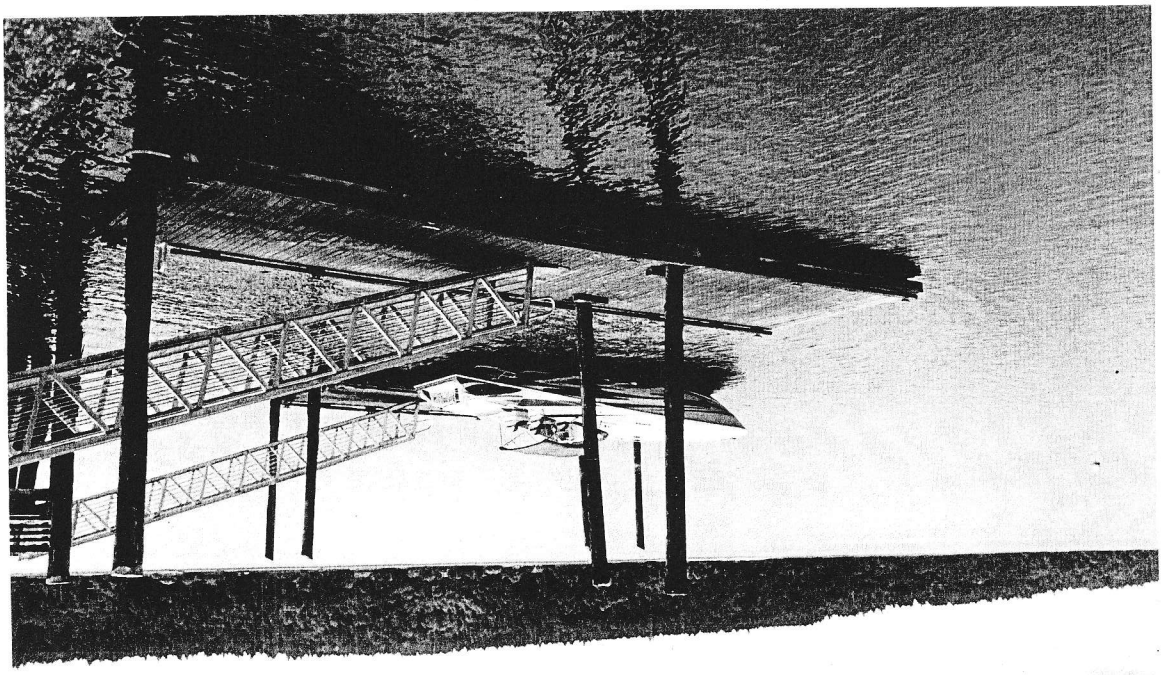
Andy Casella: Former owner Seahorse Diver LLC. Qualified underwater survey diver.

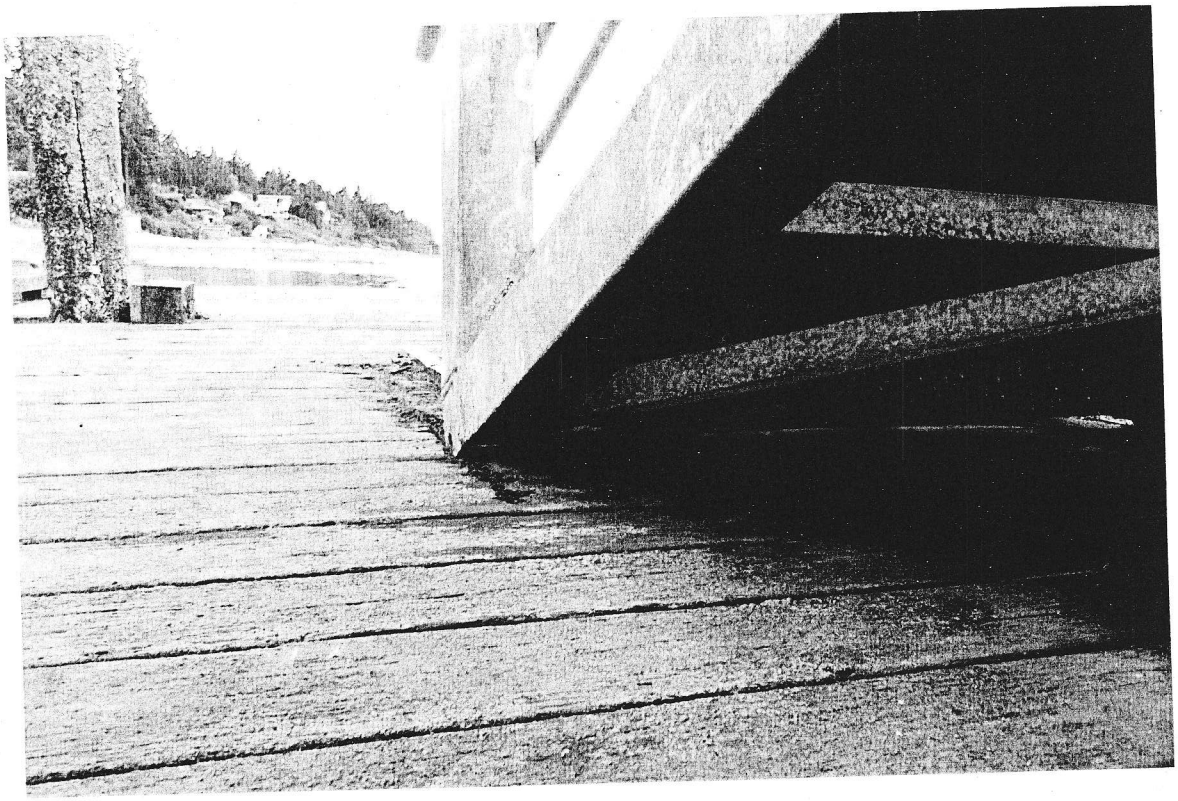
Nathan Casella: Associate of Andy Casella. Qualified dock and wharf maintenance person.

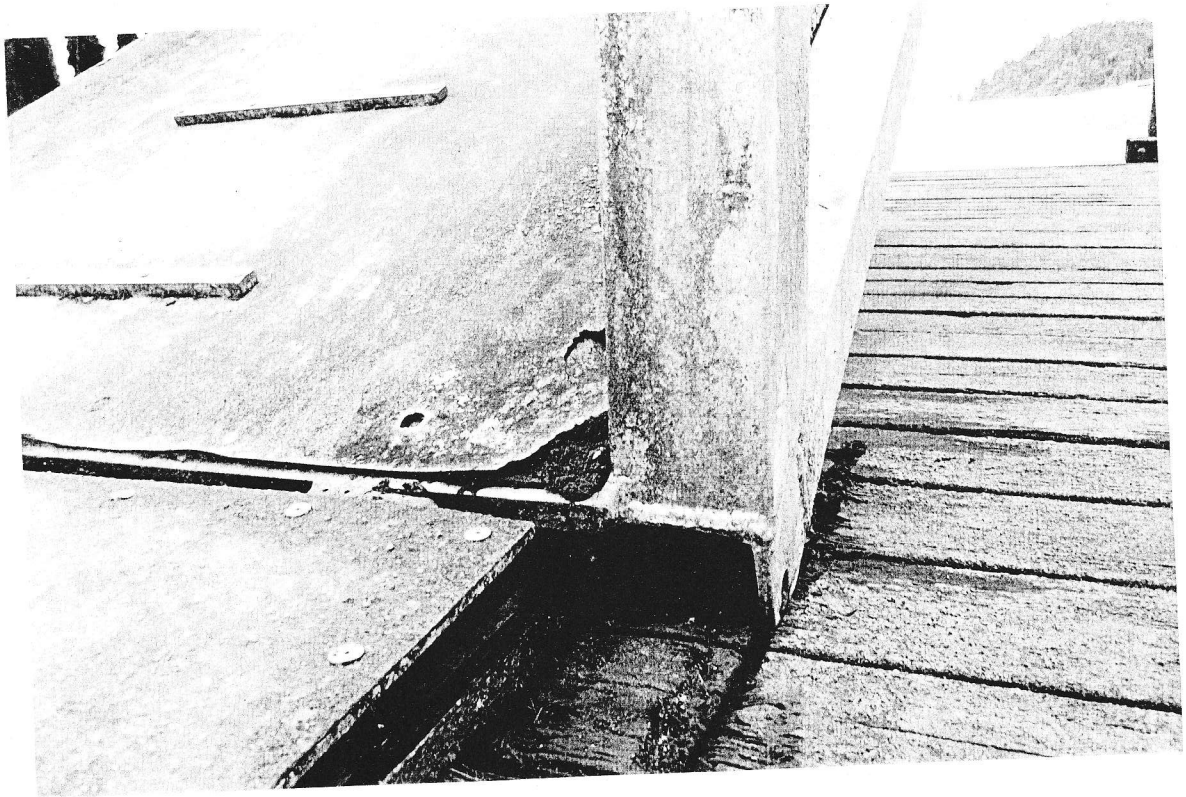
Pictures

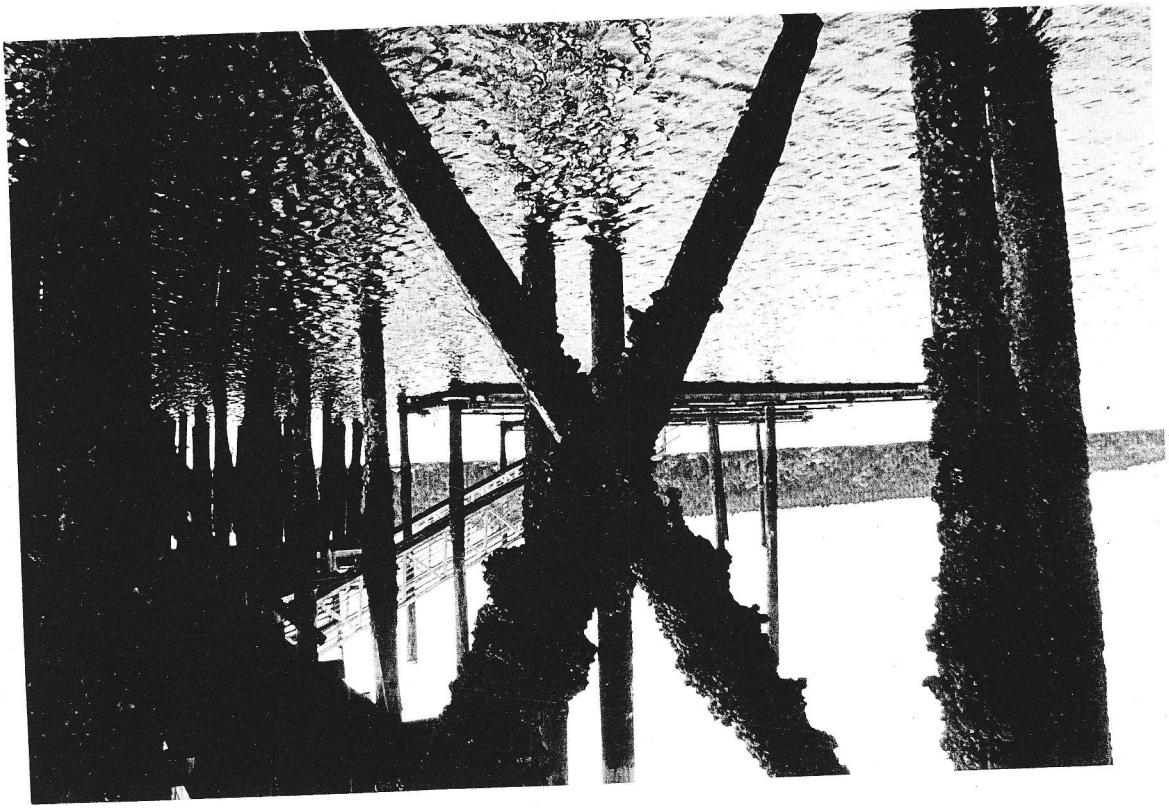
The following pictures were taken during the survey period. Two copies only are attached. If additional copies are needed they will be provided at a small cost.











STRUCTURAL SURVEY

OF

THE ILLAHEE WHARF AND FLOATING DOCKS

FOR

THE BOARD OF COMMISSIONERS
PORT OF ILLAHEE

JUNE , 2010

PREPARED BY:

BRUSHFIRE DESIGN
PO BOX 4142. SOUTH COLBY, WA. 98384
(253) 857-2560
MACBROG@AOL.COM

PORT OF ILLAHEE - WHARF SURVEY

1. SCOPE AND METHODOLOGY

The following report and drawings summarizes the results of a comprehensive survey of the wharf and the two floating docks commissioned by the Port of Illahee, Board of Commissioners. The scope of the survey included an above and below water line inspection of all piles and an inspection of all main wharf pile caps. In addition, an evaluation of the decking and other structural members was completes. An inspection of the between pile diagonal bracing was limited due to the condition of the bracing or a complete lack thereof.

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The actual survey was conducted over a three day period. Preliminary measurements were taken on June11, 2010 with the underwater portion completed on June 14, 2010 a top side survey being done on June 15, 2010

The physical investigation of each pile and pile cap was done using various types and sizes of probes. The survey was carried out above water by personnel in a small skiff and below the water line using a commercial diver. Each pile was probed or studied in at least three locations, the bottom, mid span and at the top. The probing of a pile bottom was done both at the bottom mud line and approximately 6' below the mud line. The personnel used in the survey are identified in the appendix.

2. SURVEY OVERVIEW

The wharf pile layout is shown on the drawing which is attached. The overall condition of the wooden piles varies greatly as some of the piles identified in the 2000 survey for immediate or short term replacement were not removed and remain in place with an adjacent new pile. These old piles are identified on the drawing as status "5" and while they serve no structural purpose they do not need to be removed or replace at this time.

All concrete pile have been repaired following the earlier survey and all are now in good condition with only minor spalding and cracking. No additional repairs are immediately required for any of the concrete piles.

The pile caps are also generally in very good or good condition. No pile caps required replacement at this time. Each pile caps was probed on the ends and in the middle and status is reported on that basis. The pile cap breaks are also shown on the appropriate pile line. As all cap breaks have been covered with a plywood fish plate the exact status of the cut ends could not be examined, but there was no apparent deterioration at any of the joints.

All the cross bracing on the wooden pile lines has deteriorated at every location or has become detached from the pile to which it was initially bolted. In many cases, the cross bracing simply

hangs from the upper bolt and has absolutely no structural value. The status of the cross bracing or lack there of, is also shown on the attached drawing.

3. PILES - STATUS

Pile Matrix

Line	Row A	B	C	D
1	1*	1*		
2	2*	1*		
3	1*	2*		
4	1*	1*		
5	1*	1*		
6	1**** 2***	1**** 2***		
7	1**** 3***	2*** 1****		
8	1**** 5*	5* 1****		
9	1**** 4*	4* 2***		
10	1**** 4*	4* 1****		
11	2***	1****		
12	1****	1****		
13	1****	2*** 1****		
14	1****	2***		
15	1**** 5*	2***	2***	
16	1**** 2***	3** 5*	2*** 2***	
17	1**** 2***	2*** 1****	2*** 2***	2*** 2***
18	2*** 4*	5* 2****	1**** 3***	4**
19	4* 1****	1**** 4*	4** 1****	2*** 3** 5*
	2*** 2***	1****	3***	1**** 3** 2***

TABLE 1 - PILE STATUS LEGEND

Structural Status-Wooden Piles

Structurally Sound - very good.....1
Structurally sound - good 2
Limited Deterioration -fair 3
Structurally unsound - poor.....4
Structurally unsound - no value.....5

Structural Status-Concrete Piles

Good condition-minor spalding.....(1)
Good condition-minor cracking.....(2)
Structurally Unsound.....(3)

Projected Replacement-Wooden Piles

Replacement in over 10 years.....****
Replacement in 5 to 10 years.....***
Replacement in 2 to 5 years.....**
No Structural Value-leave in place.*

Projected Replacement-Concrete Piles

Replacement in over 10 years.....***
Replacement in 5 to 10 years.....**
Replacement to be determined.....*

4. OTHER OBSERVATIONS

During the pile and pile cap inspection, a number of other items were examined simply because they were visible as we progressed. These observations are noted below.

1. The dock planking was probed in a number of locations and appears to be in very good condition though-out the entire wharf.
2. The electrical system, specifically near pile line 15 has a broken conduit and open junction box that should be removed. It does not appear to be hot.
3. The bottom corner rail blocking on both 45 degree corners at the far end of the dock need replacement.
4. The 2 pile hoops at the end of floating dock #2 will need replacement in two years of sooner.

The request for a bottom depth reading was completed and data was collected in two locations. At the end of the wharf, the depth was 9'-11 ½" at 11:38 AM and the waters edge (0 depth) at 11:44 AM both on June 14, 2010.

5. RECOMMENDATIONS:

Critical Actions:
No immediate action or repair is required relative to the replacement or repair of either the wooden or concrete piles. All piles that are noted as poor or structurally unsound are not required for the stability of the wharf. All these piles appear to have been simply left in place from the earlier replacement program. The single exception is pile 18d, which is a status "4" and should be reexamined in two years for possible replacement.

The only immediate action that is recommended is that cross bracing be replaced prior to the coming winter and the associated storms. The stability of the wharf in strong cross winds is dependent on this cross bracing and without it, major stress is places at the mud line on the piles. This results in faster deterioration of the piles. It is recommend that at a minimum cross bracing be constructed on pile lines 6, 10, 14 and 17 and between pile lines 18 and 19 at the end of the wharf. The existing bracing in all locations should be removed.

Second Stage Actions:
The wharf is in generally good structural shape and no accelerated deterioration of the concrete piles is foreseen. But, due to the nature of concrete piles and the impossibility of seeing the actual status of the encapsulated rebar, it is recommended that the concrete piles only be reexamined again in 2 years along with pile 18d.

Third Stage Actions:
At a minimum, all piles noted as pile status "3" should be reexamined for faster then projected deterioration at the bottom. This examination should take place in about 5 years. A concurrent reexamination of all pile caps is also recommended. In addition, if replacement of the any piles is required, it is strongly recommended that all old structurally unsound piles be

completely removed.

6. CONCLUSION:

The wharf in is generally good shape and with the exception of the need for cross bracing, no additional work is needed at the present time. The Commissioners are to be congratulated on following the recommendation of our previous study. The repairs done: as recommend in the 2000 study, have resulted in the wharf being structurally sound now and will be for the next 5 to 10 years.

APPENDIX:

The following personal and their qualifications used in the survey of wharf are as follows.

Dennis McBreen: Design engineer and former owner of Seabeck Marina. Qualified diver. Graduate of University of Oregon.

Andy Casella: Former owner of Seahorse Diver LLC. Qualified underwater survey diver.

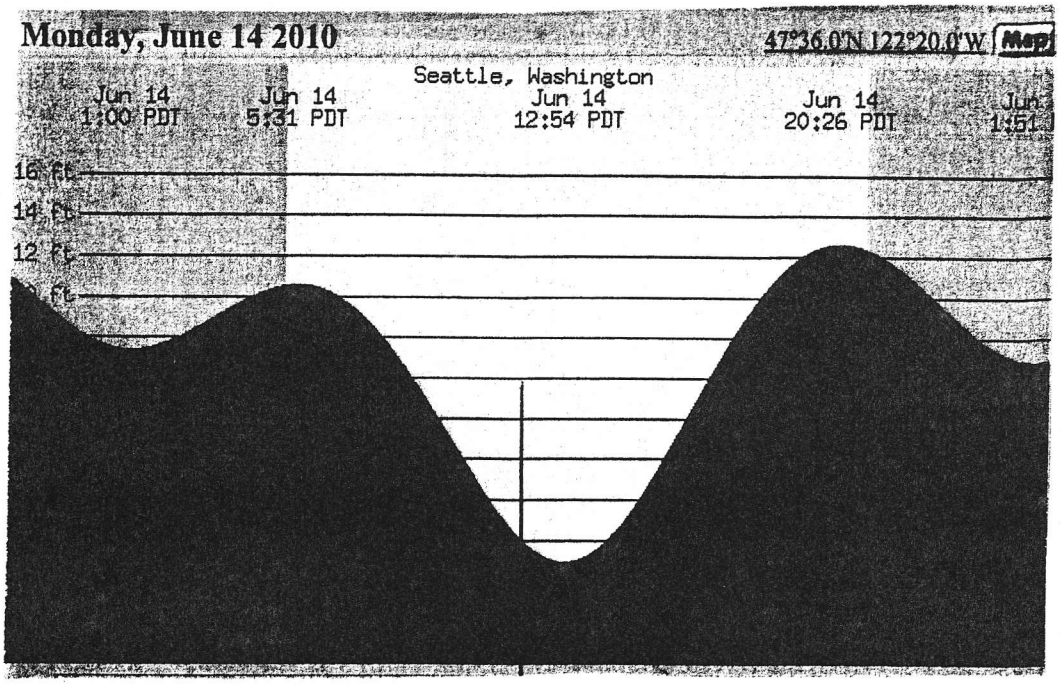
Dylan Watkins: Qualified underwater survey diver. Graduate of Divers Institute of Technology, Seattle.

WATER DEPTH DATA

End of Wharf Depth: 9'-11 ½ at 11:38 AM, June 14, 2010

Pile Line 7: 0'-0" (edge of water) at 11:44 AM, June 14, 2010

TIDE CHART FOR JUNE 14, 2010
ILLAHEE, WASHINGTON



Data Check
Time

"Brushfire Design"

P.O. Box 4142 South Colby, WA. 98384 Tel: (253) 857-2560 E-mail: MacBrog@aol.com

PROPOSAL

Client:
Port of Illahee
Board of Commissioners
c/o of Commissioner Cassie Magill
P.O. Box 2642
Bremerton, WA. 98310

Submitted: Date: 4/24/2014
Dennis McBreen

Project Location
Illahee Dock, Illahee, WA.

Project Description:
The Board of Commissioners wish to have a structural inspection of portions of the main wharf and the floating dock. The main items to be inspected and reported on were outlined in a letter received 4/20. These items included inspection of specific piles, pile caps, cross bracing, the floating dock and water measurements. Emphasis will be placed on establishing cross bracing replacement and repair requirements.

Scope of Work:
Brushfire Design proposes to undertake this survey over a two day period. Two day are required due to the need to have low tides. The inspection will take place on two of the following days, May 1st, 2nd, 13th, 27th or 28th depending on the weather conditions. The client will be advised if weather conditions cause a change in this schedule.

It is proposed to undertake the job without the use of a full time diver to reduce the cost to the Port. All bottom survey will be undertaken using remote arms and probes. All survey work will be done by myself and a qualified inspector.

Following the on-site inspection, the following documentation will be provided to the Commission.
1. A updated plan of the wharf and dock with notation as to survey details.
2. A written analysis of all items inspected and recommendations as to the repairs necessary.
3. Alternate recommendations for repair of the floating dock.

Client Responsibilities:
1.Providing access to the wharf and dock as necessary.

Documentation:
Six (6) copies of the final drawing and the written analysis will be delivered within 20 days following completion of the on-site inspection.

Schedule:
The survey will be undertake on the dates noted above upon acceptance of this proposal, again subject to weather conditions.

Cost:
Brushfire Design will undertake the tasks outline above for a cost of: Seven Hundred fifty dollars ($750.00). A deposit of $200.00 is required upon acceptance of this proposal. The remaining balance to be paid upon completion of the scope of work.

Authorization:
I accept the above proposal and authorize Brushfire Design to preform the work outlined above. I have returned a sign copy of this agreement with the required deposit. Further, I agree to be responsible for payment of all charges and understand that payment for these services is not contingent upon the actual repair of the wharf and docks.. This proposal is good for 30 days.

Authorized by: Cassie Magill **Date:** May 14, 2014
Commissioner Cassie Magill

Tikar Service, LLC

P. O. Box 1155
Tracyton, WA 98393

Estimate

Date	Estimate #
2/23/2015	007-2015

Name / Address
Port of Illahee PO Box 2642 Bremerton WA 98310

Project

Description	Qty	Cost	Total
Recommendations #1 Labor, Materials and Equipment to Sister pile as directed except using 2 4x8	1	921.98	921.98T
Recommendations #2 Labor, Materials and Equipment to repair connection as directed	1	570.75	570.75T
Recommendations #3 Labor, Materials and Equipment to replace4 sets of plates as directed except using 1/4" Stainless Steel plates	1	3,127.60	3,127.60T
Recommendations #4 Labor, Materials and Equipment to replace cross bracing at 14 locations as directed	1	12,751.34	12,751.34T
Recommendations #7 Time, Equipment and Materials	1	0.00	0.00T
Recommendations #8 Time, Equipment and Materials	1	0.00	0.00T
Mobilization / One Charge Per Work Issued	1	200.00	200.00T

360 340 5642 / wwwaterkat@comcast.net
TIKARSL988KG

Subtotal	$17,571.67
Sales Tax (8.7%)	$1,528.74
Total	$19,100.41