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ENGINEERS, INC.

July 28, 2011 PND No. 084074.10

Steve Slaton
Director of Marine Facilities
Port of Bremerton
8850 SW State Hwy 3
Port Orchard, WA 98367

RE: Harper Dock – Future Planning

Dear Steve:

The following letter provides a discussion on the potential operations of Harper Dock as a function of future repairs or replacement of the facility. This work effort is in response to Task 10 of our on call services agreement and follows a meeting with the Port, Makers Architects and PND where we preliminarily presented potential scenarios for the future. We understand that this is a public access dock and that no commercial use or heavy load public requirements need to be considered. We have taken into account known permitting issues, upland constraints and budget considerations in development of the concepts.

Recent Inspection

The last inspection for the facility was done in early 2009. Based on that survey we found a series of cross brace members that needed replaced and noticed piles being downgraded from the previous survey. Experience suggest, noting that the maintenance effort is gaining momentum again, that the deterioration of the remaining components will begin to accelerate and a need to begin to replace substantial substructure will be required.

Facility Assessment Opinion

The Harper Dock timber components are realistically at the end of their useful life. At this stage, continued use is at best a year to year assessment contingent on if any damage happened during the previous storm events. With current sentiment suggesting that "nursing" the structure along to maintain its existence, the previously presented methodology is as follows: 1) drive new piles, 2) replace the pile caps and 3) repair stringers and decking as necessary over the length of the structure. This process will eventually result in a convoluted structure with questionable reliability required for public facilities. The randomness of this method is already apparent as one looks at the repairs accomplished to date.

Alternatives

In developing different alternatives, it became apparent that there are limitless permutations that can be considered. Therefore, in order to provide a decision tool document, we decided to discuss the

two extreme alternatives and then provide possibilities to do partial work as potentials for consideration. Therefore, the alternatives to be discussed are as follows:

1) Do Nothing
2) Repair Using Existing Components
3) Repair by Replacing for Future Plan
4) Total Replacement

Do Nothing

This alternative consist of not engaging in any further repairs for the facility. With the last inspection in 2009 a new inspection is forth coming in the near future. It is anticipated that one of the support piles along the length of the dock will have been damaged to an extent that it can no longer be considered an adequate structural support. At that time PND would recommend that a barrier be placed at that location so the public would be stopped from traversing across the area. There is no way of estimating at this time what location that might be. In review of past survey, several bents already have reduced capacity piles.

Cost for this alternative consist of the inspection. Inspection cost for 2009 was just under $ 6,000. Assuming a modest increase for wage increases and installation of a barrier, PND estimates this to be $ 7,000 to $ 8,000.

Repair Using Existing Components

This alternative consist of continuing to repair the facility as damage or deterioration is discovered. Past work included 1) replacement of treated timber piles, 2) cap upgrades using galvanized steel to span to adequate timber pile supports at a cap location and 3) longitudinal beams to support caps between existing piles at different caps.

Treated timber pile replacement was done many years ago and now is almost totally gone from construction in the Puget Sound. Any new piles will need to be steel or concrete. When replacing in the current bent spacing and configuration, it is very uneconomical. Both are expensive compared to the timber pile and provide much more capacity than needed at a single location. If all were replaced at some time in the future through several repairs, the foundation would be three to four times what it needed to be.

Replacement of caps and stringers present the next challenge. As completed recently, providing steel members along the sides of caps and as cross bracing is easily accomplished. Replacing the stringers and deck now requires a choice to keep a timber appeal or change to more modern materials. Since this alternative is in keeping with the old timber facilities, the repairs will most likely be timber components where the public has the most contact. However, there is an increasing sentiment from some groups, that even treated timber placed over the water, should be limited. Agencies in some regions are pushing this agenda on first round proposals. Current research shows that when the timber is properly treated, the resulting leaching into the water is minimal. So no hard fast laws on this issue currently exist.

The Port may want to consider replacing full spans when piles and caps need replacement and marginal deck and stringers coincide at the same location.

The cost of this alternative is difficult to estimate. The following are some basic unit cost that can be applied for repairs assuming that several would occur at one time. For smaller projects, mobilization and demobilization become a larger factor.

12 inch steel pile, 60 feet long, purchase - each	$ 2,000.00
12 inch steel pile, drive - each	2,000.00
Structural Steel Cap Material – per pound	3.00
Timber Stringers – per board foot	3.00
Timber Decking – per board foot	2.50
Timber Railing – per linear foot	100.00

As an example of how to apply this information, to replace one span of the dock which is 6 feet wide by 15 feet long it would cost approximately.

Item	Quantity	Unit	Unit Cost	Final Cost
Piles, Purchased	4	ea	2,000	8,000
Piles, Driven	4	ea	2,000	8,000
Cap	2,000	lbs	3	6,000
Stringers	500	bm	3	1,500
Decking	500	bm	2.50	1,250
Railing	30	lf	100	3,000
Subtotal				$ 27,750
Mob/DeMob	2	days	5,000	10,000
Contingencies	15	%		4,250
Engr/Admin	35	%		10,000
Total Estimated Budget				$ 52,000

If there were four such spans that required repair, the cost would be approximately:

Subtotal	4	x	27,750	$ 111,000
Mob/DeMob	2	days	5,000	10,000
Contingencies	15	%		17,000
Engr/Admin	35	%		39,000
Total Estimated Budget				$ 177,000

Repair by Replacing for Future Plans

This alternative also consist of continuing to repair the facility as damage or deterioration is discovered. The difference here is that a desired total replacement option is designed so that a future template is established. Then, when a bad portion of the dock is discovered a phased approach is undertaken. Instead of only replacing one or two spans at a time, perhaps 4 spans would be

demolished and one span of 60 feet would be reconstructed. It would be anticipated that some additional minor repairs would be needed, but the eventual total replacement would be at the better value. An estimate for this work at 60 feet

Item	Quantity	Unit	Unit Cost	Final Cost
Piles, Purchased	4	ea	2,000	8,000
Piles, Driven	4	ea	2,000	8,000
Cap	2,000	lbs	3	6,000
Long Span Truss	1	ea	50,000	50,000
Railing	120	lf	50	6,000
Subtotal				$ 78,000
Mob/DeMob	2	days	5,000	10,000
Contingencies	15	%		12,000
Engr/Admin	35	%		27,000
Total Estimated Budget				$ 127,000

This obviously becomes cost effective because of the better use of the pile capacity and strength combined with a long span steel structure. Slightly more expensive would be using long span timber stringers as seen at the NWMC in Port Townsend. (Picture below.)

Total Replacement

This alternative consist of total demolition and replacement. Obviously the potential developments come in many shapes and sizes. Attached is a series of options that most likely could be considered that would maintain the same general shape and size of the current facility. Cost ranges for these solutions would be between $ 1,000,000 and $1,500,000 depending on amenities and permitting

requirements. We also provided some alternative ideas on how the upland might be upgraded and then the potential for enhancement of the roadway so that safer public access from the county road could be realized. (See attachments.)

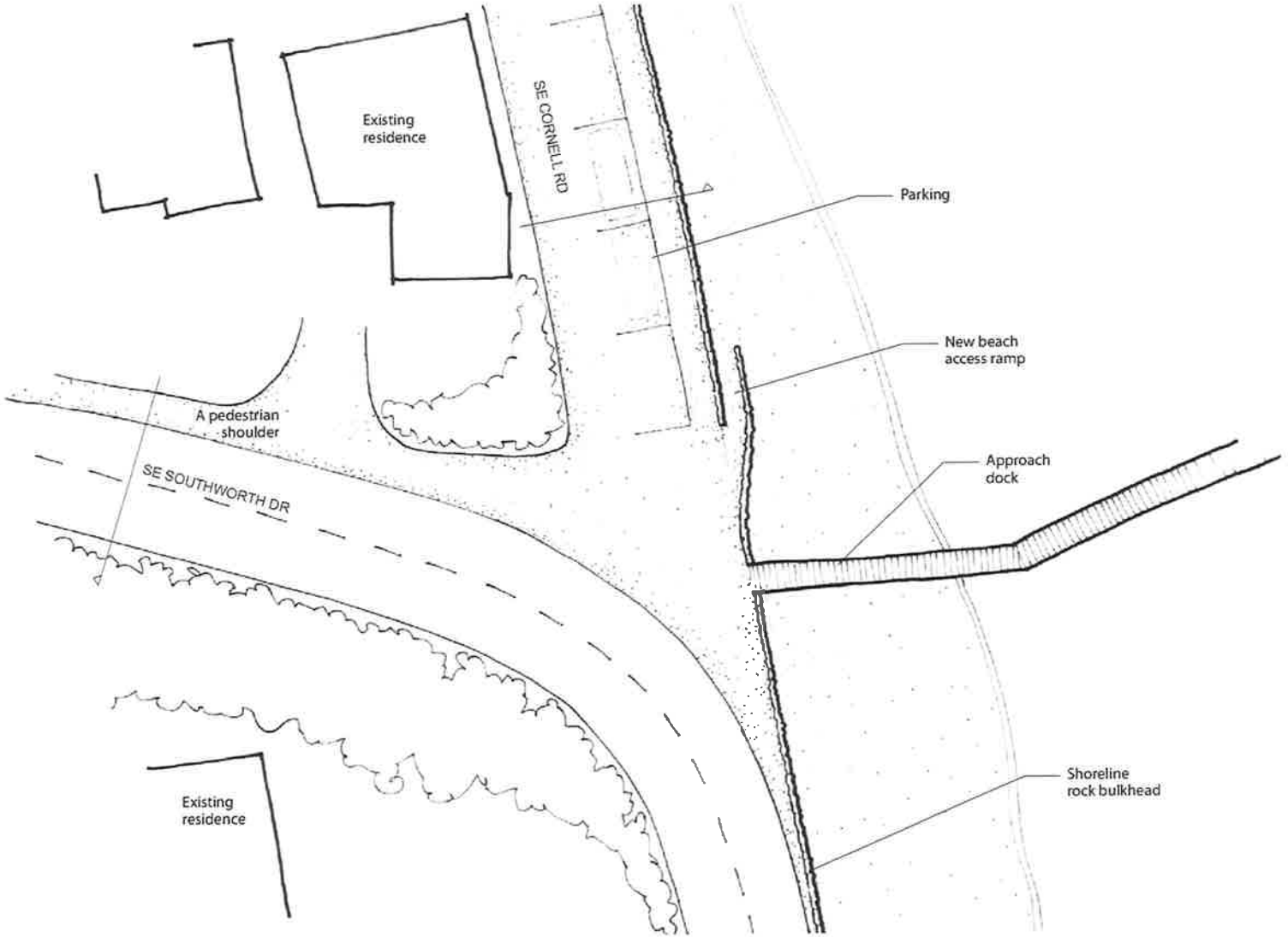
If you have any questions, please contact me at any time.

Sincerely,
PND Engineers, Inc. | Seattle Office

David Pierce.

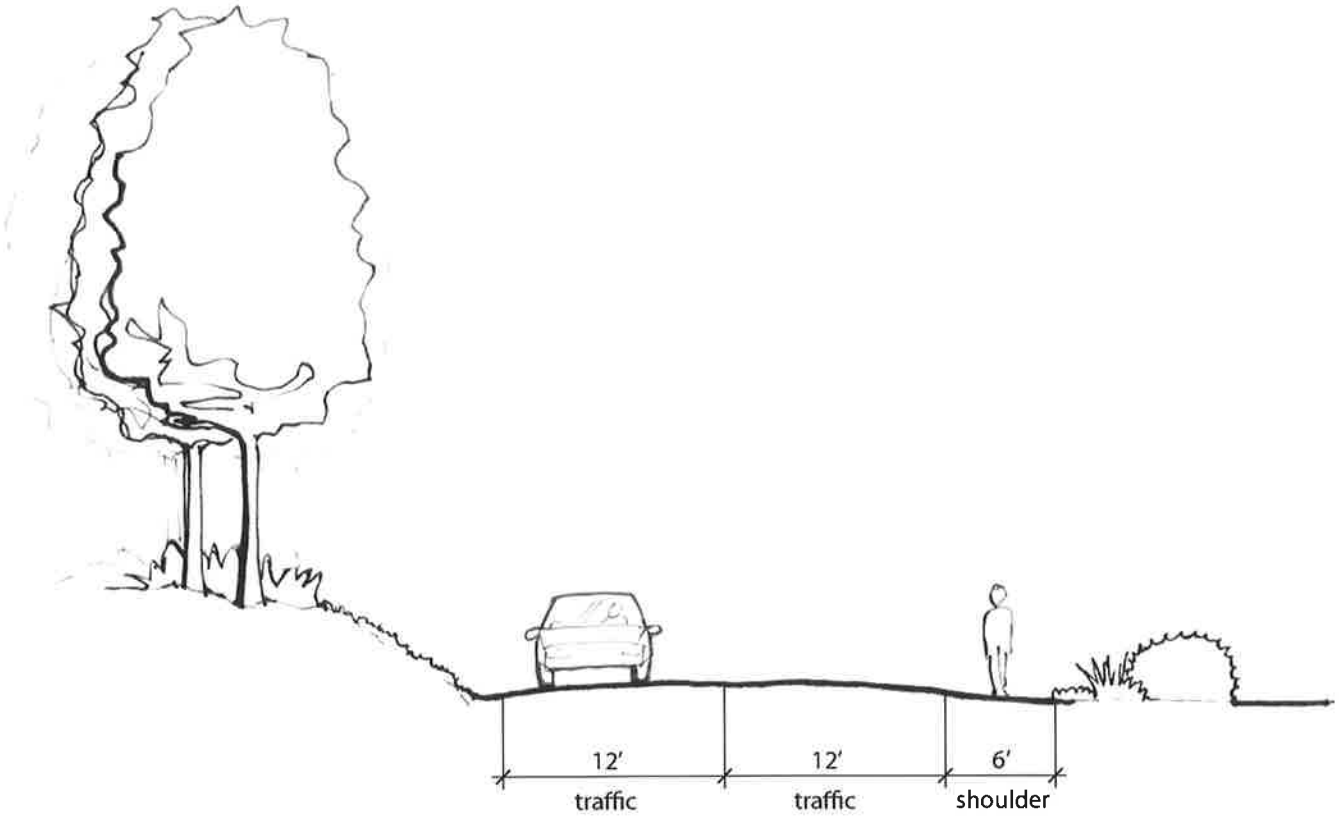
David Pierce, P.E., S.E.
President

Harper Dock
PORT OF BREMERTON

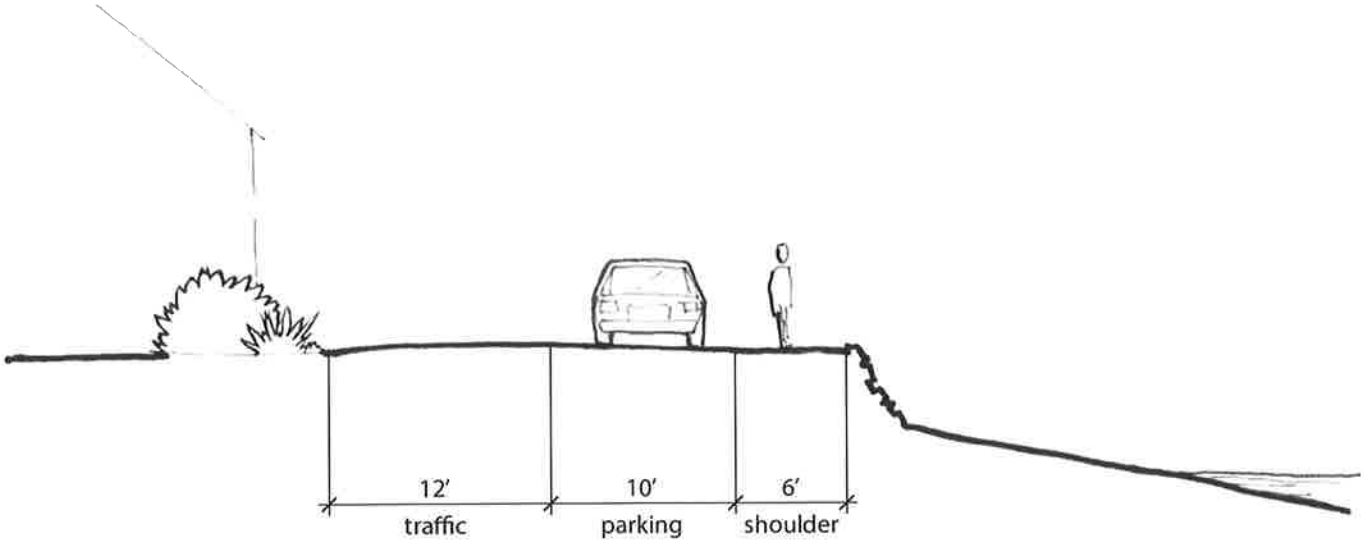


Harper Dock

PORT OF BREMERTON



SE Southworth Dr Section - *facing west*



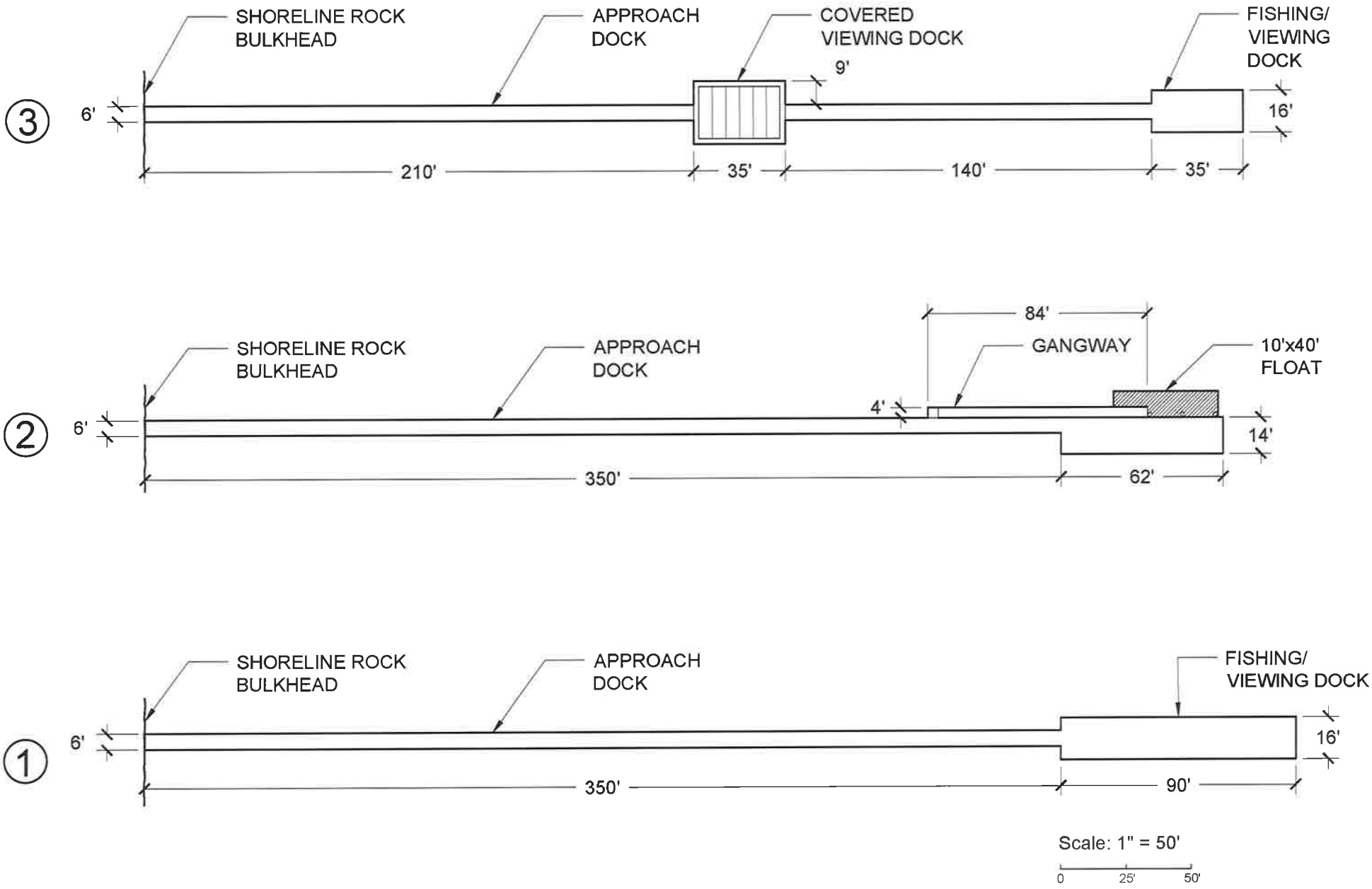
SE Cornell Rd Section - *facing north*

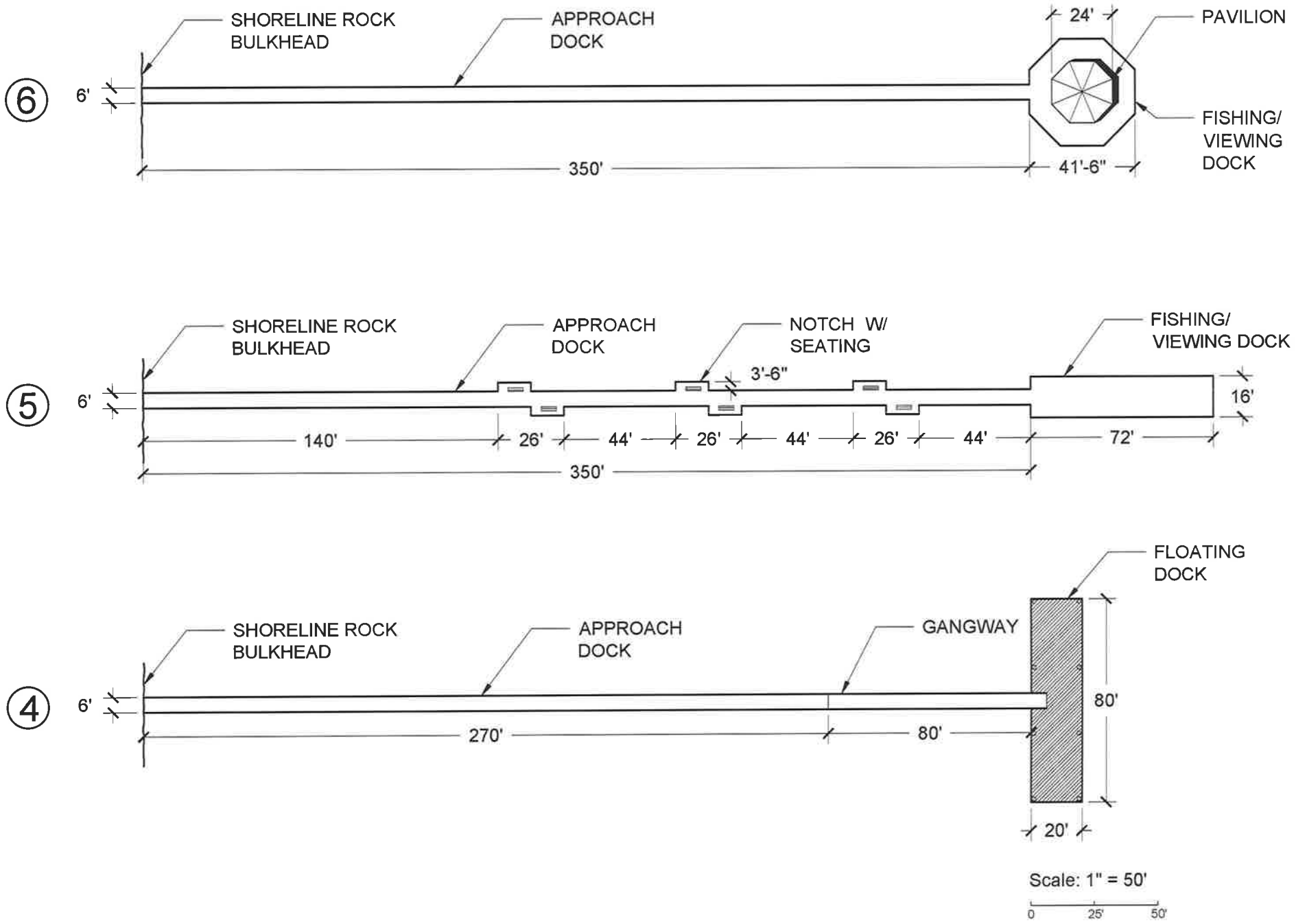
Harper Dock

PORT OF BREMERTON

0 10′ 20′

Scale: 1″ = 10′


3
SHORELINE ROCK BULKHEAD
APPROACH DOCK
COVERED VIEWING DOCK
FISHING/ VIEWING DOCK
9'
6'
16'
210'
35'
140'
35'
2
84'
SHORELINE ROCK BULKHEAD
APPROACH DOCK
GANGWAY
10'x40' FLOAT
4'
6'
14'
350'
62'
1
SHORELINE ROCK BULKHEAD
APPROACH DOCK
FISHING/ VIEWING DOCK
6'
16'
350'
90'
Scale: 1" = 50'
0
25'
50'


⑥
SHORELINE ROCK BULKHEAD
APPROACH DOCK
24'
PAVILION
6'
FISHING/ VIEWING DOCK
350'
41'-6"
⑤
SHORELINE ROCK BULKHEAD
APPROACH DOCK
NOTCH W/ SEATING
FISHING/ VIEWING DOCK
3'-6"
6'
16'
140'
26'
44'
26'
44'
26'
44'
72'
350'
④
SHORELINE ROCK BULKHEAD
APPROACH DOCK
GANGWAY
FLOATING DOCK
6'
80'
270'
80'
20'
Scale: 1" = 50'
0
25'
50'

Alternative 1 Representative Photos

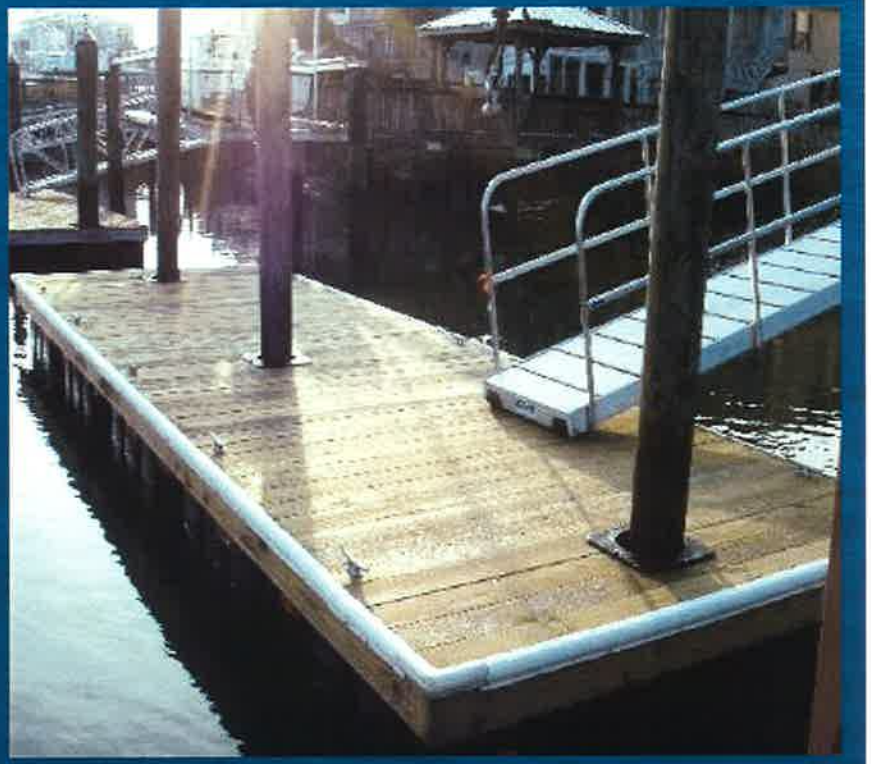
P N D

Alternative 2 Representative Photos

Alternative 3 Representative Photos

P N D

Alternative 4 Representative Photos



Alternative 5 Representative Photos

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