



DEVELOPMENT SERVICES DEPARTMENT  
ENVIRONMENTAL COORDINATOR  
450 110<sup>th</sup> Ave NE., P.O. BOX 90012  
BELLEVUE, WA 98009-9012

## DETERMINATION OF NON-SIGNIFICANCE

**PROPONENT:** Larry Searles

**LOCATION OF PROPOSAL:** 684 Lake Sammamish Lane NE

**NAME & DESCRIPTION OF PROPOSAL:**

Searles-Bethel Bulkhead Replacement - Letter of Shoreline Exemption for a normal protective bulkhead at 684 Lake Sammamish Lane NE and a portion of 690 West Lake Sammamish Lane NE consisting of a 2-foot diameter concrete log located at or above the ordinary high water mark in order to protect the existing single-family residential structures on the properties.

**FILE NUMBER:** 11-104515-WE

The Environmental Coordinator of the City of Bellevue has determined that this proposal does not have a probable significant adverse impact upon the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(C). This decision was made after the Bellevue Environmental Coordinator reviewed the completed environmental checklist and information filed with the Land Use Division of the Development Services Department. This information is available to the public on request.

- There is no comment period for this DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's office by 5:00 p.m. on March 16, 2006.
- This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's Office by 5 p.m. on September 1, 2011
- This DNS is issued under WAC 197-11-340(2) and is subject to a 14-day comment period from the date below. Comments must be submitted by 5 p.m. on \_\_\_\_\_. This DNS is also subject to appeal. A written appeal must be filed in the City Clerk's Office by 5 p.m. on \_\_\_\_\_.

This DNS may be withdrawn at any time if the proposal is modified so that it is likely to have significant adverse environmental impacts; if there is significant new information indicating, or on, a proposals probable significant adverse environmental impacts (unless a non-exempt license has been issued if the proposal is a private project); or if the DNS was procured by misrepresentation or lack of material disclosure.

  
Environmental Coordinator

August 18, 2011  
Date

**OTHERS TO RECEIVE THIS DOCUMENT:**

State Department of Fish and Wildlife  
State Department of Ecology,  
Army Corps of Engineers  
Attorney General  
Muckleshoot Indian Tribe



**Exemption from Shoreline Management  
Substantial Development Permit Requirement**

To: Larry Searles and John Bethel

Re: 684 Lake Sammamish Lane NE and 690 West Lake Sammamish Parkway NE

File Number: 11-104515-WE

SEPA Determination: DNS



This proposal is exempt under WAC 197-11-800 3 *Repair, remodeling and maintenance activities*



A DNS was issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. Appeal period ends on September 1, 2011.



A DNS was issued under WAC 197-11-340(2) and is subject to a 14-day comment from \_\_\_\_\_.

The proposal to undertake the following development:

- **Relocation and installation of 2 foot diameter concrete log bulkhead landward of the ordinary high water mark per the attached revised project plans. The original installation location was determined to be below the ordinary high water mark and did not comply with the requirements for a normal protective bulkhead.**

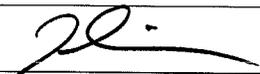
Within **Lake Sammamish** and/or its associated wetlands;

Is exempt from the requirement of a substantial development permit because:

- **Development is considered normal a normal protective bulkhead common to a single family residence. (LUC 20.25E.050.C)**

Inconsistent	Consistent	
	X	Policies of the State Shoreline Management Act (RCW 90.58)
	X	The Bellevue Shoreline Master Program and Comprehensive Plan

Date: 8-18-2011

Signed: 

**Note:** This exemption does not authorize construction to begin. All other required local, state or federal permits must be obtained before construction can begin. All land use code, building code, City shoreline code and other City regulations must be complied with.

CC: DOE, Dave Radabaugh, 3190 160<sup>th</sup> Avenue SE, Bellevue, WA 98008-5452

City of Bellevue Submittal Requirements

27a

## ENVIRONMENTAL CHECKLIST

4/18/02

If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call the Permit Center (425-452-6864) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Our TTY number is 425-452-4636.

**BACKGROUND INFORMATION**

**Property Owner:** Larry Searles & John Bethel

684 W Lake Sammamish Lane NE 690 W Lake Sammamish Lane NE

**Proponent:** Larry Searles & John Bethel

**Contact Person:** Steve Zuvela @ Waterfront Permits & Construction

SEPA Threshold Determination processing under Bellevue permit file # 11-104515-WE. Work will be reviewed and approved under Clear & Grade file # 11-104517-GH. All work is associated with Enforcement Action file # 10-126451-EA.

**(If different from the owner. All questions and correspondence will be directed to the individual listed.)**

**Address:** 10315 19<sup>th</sup> Avenue SE, Suite 106, Everett, WA 98208

**Phone:** 206-786-6455

**Proposal Title:** Searles & Bethel Bulkhead Replacement

**Proposal Location:** 684 & 690 W Lake Sammamish Lane NE, Bellevue, 98008

**(Street address and nearest cross street or intersection) Provide a legal description if available.**

See Project Drawings for Complete Legal Descriptions for Both Properties.

**Give an accurate, brief description of the proposal's scope and nature:**

1. **General description:** Proposal is to remove and replace an existing timber log bulkhead across both properties with a new pre-cast concrete simulated log bulkhead in the same location as the existing.
2. **Acreage of site:** Searles = 16,784 s/f Bethel = 14,867 s/f
3. Number of dwelling units/buildings to be demolished: None
4. Number of dwelling units/buildings to be constructed: None
5. **Square footage of buildings to be demolished:** N/A
6. **Square footage of buildings to be constructed:** N/A
7. **Quantity of earth movement (in cubic yards):** 5-10 c/y
8. **Proposed land use:** Same as the existing use; Single Family Residential
9. **Design features, including building height, number of stories and proposed exterior materials:** Proposed bulkhead replaces an existing 3' timber log bulkhead across both properties with a pre-cast concrete 3' simulated log. The original log bulkhead was pinned to the beach using 12' long #11 (1.375") rebar; the weight of the proposed concrete log will hold the bulkhead in place. Areas of the yard that were eroded prior to the removal of the old bulkhead will have filter fabric installed and backfilled using washed rounded gravel. Gravel backfill will be overlaid with sod to match grade of undisturbed yard behind bulkhead.

10. **Other**

**REVIEWED**

By Kevin LeClair at 9:40 am, Mar 03, 2011

**Estimated date of completion of the proposal or timing of phasing:** Proposed concrete log has already been installed and gravel backfill will be placed within one month of receiving permit approval. Gravel placement will take approximately 1 day.

**Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.** No plans for future construction on either site.

**List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.** None Known

**Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. List dates applied for and file numbers, if known.** None Known

**List any government approvals or permits that will be needed for your proposal, if known. If permits have been applied for, list application date and file numbers, if known.** None known

**Please provide one or more of the following exhibits, if applicable to your proposal. (Please check appropriate box(es) for exhibits submitted with your proposal):**

**Land Use Reclassification (rezone) Map of existing and proposed zoning**

**Preliminary Plat or Planned Unit Development Preliminary plat map**

City of Bellevue records show the existence of the previous wooden log bulkhead in the location of the replacement.

**Clearing & Grading Permit Plan of existing and proposed grading Development plans**

**Building Permit (or Design Review) Site plan Clearing & grading plan**

**Shoreline Management Permit Site plan**

SEPA Threshold Determination will be made under review of application for a Shoreline Exemption Letter, per Bellevue Land Use Code Section 20.25E

**A. ENVIRONMENTAL ELEMENTS**

**1. Earth**

**a. General description of the site:**

**Flat**

**Rolling**

**Hilly**

**Steep slopes**

**Mountains**

**Other** The shoreline portion of the site is fairly flat from the bulkhead back to an existing retaining wall. The yard slope up steeply from the wall to the back of the property next to W Lake Sammamish Lane NE.

**REVIEWED**

*By Kevin LeClair at 9:42 am, Mar 03, 2011*

**b. What is the steepest slope on the site (approximate percent slope)?** 45-50% +/-

**c. What general types of soil are found on the site (for example, clay, sand, gravel, peat, and muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.** Soil in the area of the proposed log bulkhead replacement is sand, gravel and muck. The area directly behind the log bulkhead becomes saturated when lake waters rise and is completely covered with water during parts of the winter rainy season. (See site photos provided with application).

**d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.**

Over the years the old timber logs had deteriorated and pieces of the log have broken off. During a storm in early November 2010 the soils behind the old log bulkhead was partially washed away causing the logs to become unstable. The new concrete log bulkhead was installed in mid November 2010. Some of the eroded areas were filled when the new concrete log bulkhead was installed but some eroded areas still need to be filled with gravel and overlaid with sod to restore yard to original elevation and to prevent additional loss of yard area upland of the bulkhead.

**e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.** 5-10 c/y of clean washed rounded gravel is needed to backfill the voids behind the concrete log bulkhead created by storm erosion.

**f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.** No

**g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?** Because the replacement concrete log bulkhead is in the same location as the original timber log bulkhead it occupies the same area; therefore there will be no change in the impervious surface coverage.

**h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:** None proposed

Erosion control measures that meet or exceed the standards required in BCC 23.76 will be implemented. Clearing and Grading permit will require CSWPPP.

## 2. AIR

**a. What types of emissions to the air would result from the proposal (i.e. dust, automobile odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.** None

**b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.** No

**c. Proposed measures to reduce or control emissions or other impacts to the air, if any:** None proposed

## 3. WATER

### a. Surface

**(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.** Yes, properties are located on the shore of Lake Sammamish and the proposed bulkhead replacement is at the shoreline.

**(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.** Yes, the existing timber log bulkhead has been removed and the proposed concrete simulated log bulkhead has been installed. Clean rounded gravel backfill is needed to fill voids behind the new bulkhead created by storm waves.

**(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.** Approximately 5-10 c/y of washed rounded gravel is required to fill voids behind replacement concrete log bulkhead to re-establish original elevation of yard. Sod will overlay gravel.

**(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.** None required

**(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**  
Yes

**(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.** No

**b. Ground**

**(1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description.** No

**(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.** No waste materials will be discharged.

**c. Water Runoff (Including storm water)**

**(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.** Storm waters follow existing grade into Lake Sammamish. No collection system for storm water is in place along the shoreline.

**(2) Could waste materials enter ground or surface waters? If so, generally describe.** Not from this project.

**d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:** None proposed

**4. Plants**

**a. Check or circle types of vegetation found on the site:**

deciduous tree: alder, maple, aspen, other evergreen

tree: fir, cedar, pine, other

shrubs grass

pasture

crop or grain

wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other

water plants: water lily, eelgrass, milfoil, other

**REVIEWED**

*By Kevin LeClair at 10:38 am, Mar 03, 2011*

other types of vegetation

**b. What kind and amount of vegetation will be removed or altered?** A small amount of the existing vegetation along the shoreline was removed during the replacement of timber log bulkhead with the concrete log bulkhead.

**c. List threatened or endangered species known to be on or near the site.** None known

**d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:** The narrow strip of lawn area behind the bulkhead will be restored to its original condition prior to the storm in November 2010.

## 5. ANIMALS

**a. Check or circle any birds and animals which have been observed on or near the site or are known to be on or near the site:**

**Birds:** hawk, heron, eagle, songbirds, **other:** ducks & geese

**Mammals:** deer, bear, elk, beaver, **other:**

**Fish:** bass, salmon, trout, herring, shellfish, **other:**

**b. List any threatened or endangered species known to be on or near the site.** Chinook & Coho salmon may pass by the site.

**c. Is the site part of a migration route? If so, explain.** Threatened salmon that spawn in Issaquah Creek may migrate along the shoreline as adults on their way up the creek or as juveniles after exiting the creek.

**d. Proposed measures to preserve or enhance wildlife, if any:** None proposed

## 6. Energy and Natural Resources

**a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy need? Describe whether it will be used for heating, manufacturing, etc.** None proposed

**b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.** No effect on adjacent properties.

**c. What kinds of energy conservation features are included in the plans of the proposal? List other proposed measures to reduce or control energy impacts, if any:** None required or proposed

## 7. Environmental Health

**a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.** There are no environmental health hazards resulting from this project.

**(1) Describe special emergency services that might be required.** None needed.

**(2) Proposed measures to reduce or control environmental health hazards, if any.** None needed or proposed.

**b. Noise**

- (1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?** None
- (2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site.** Short term construction noise only; once completed there will be no noise generated from the project.
- (3) Proposed measures to reduce or control noise impacts, if any:** None proposed

**8. Land and Shoreline Use**

- a. What is the current use of the site and adjacent properties?** Single family residences
- b. Has the site been used for agriculture? If so, describe.** N/A
- c. Describe any structures on the site.** Both sites have existing houses, detached garages, concrete retaining walls, concrete log bulkheads, and moorage piers.
- d. Will any structures be demolished? If so, what?** The existing timber log bulkhead was removed and replaced with a new concrete log bulkhead.
- e. What is the current zoning classification of the site?** R-2.5
- f. What is the current comprehensive plan designation of the site?** Residential
- g. If applicable, what is the current shoreline master program designation of the site?** Not known
- h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.**  
I don't know if Bellevue has made that designation or not.
- i. Approximately how many people would reside or work**

Bellevue considers Lake Sammamish to be a Critical Area. It is also a shoreline of statewide significance.
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- j. Approximately how many people would the completed project displace?** N/A
- k. Proposed measures to avoid or reduce displacement impacts, if any:** N/A
- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:** None proposed

**9. Housing**

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low- income housing.** N/A
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.** N/A
- c. Proposed measures to reduce or control housing impacts, if any:** N/A

**10. Aesthetics**

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?** Replacement bulkhead is level with existing elevation of yard.

- b. **What views in the immediate vicinity would be altered or obstructed?** None
- c. **Proposed measures to reduce or control aesthetic impacts, if any:** None proposed

**11. Light and Glare**

- a. **What type of light or glare will the proposal produce?** N/A
- b. **What time of day would it mainly occur?** N/A
- c. **Could light or glare from the finished project be a safety hazard or interfere with views?** N/A
- d. **What existing off-site sources of light or glare may affect your proposal?** N/A
- e. **Proposed measures to reduce or control light or glare impacts, if any:** N/A

**12. Recreation**

- a. **What designated and informal recreational opportunities are in the immediate vicinity?** Lake Sammamish is used for swimming, fishing, waterskiing, jet-skiing and boating.
- b. **Would the proposed project displace any existing recreational uses? If so, describe.** No
- b. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:** None proposed

**13. Historic and Cultural Preservation**

- a. **Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.**  
None known
- b. **Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.** None known
- c. **Proposed measures to reduce or control impacts, if any:** None proposed

**14. Transportation**

- a. **Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.** West Lake Sammamish Lane NE
- b. **Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?** Yes
- c. **How many parking spaces would be completed project have? How many would the project eliminate?** N/A
- d. **Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private.)** None proposed
- e. **Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.** N/A

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur. N/A

g. Proposed measures to reduce or control transportation impacts, if any: None proposed

**15. Public Services**

a. Would the project result in an increased need for the public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe. No increased need for public services will result from this project.

b. Proposed measures to reduce or control direct impacts on public services, if any. None proposed

**16. Utilities**

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. None proposed

**Signature**

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature.....*Steve Zurvela 2/22/2011*.....

Date Submitted.....

**REVIEWED**  
By Kevin LeClair at 10:46 am, Mar 03, 2011

July 26, 2011

Kevin LeClair  
Senior Land Use Planner  
City of Bellevue  
P.O. Box 9001  
Bellevue, Washington 98009-9012

Received  
AUG -3 2011  
Permit Processing

Subject: Searles-Bethel Bulkhead Replacement  
684 Lake Sammamish Lane NE and 690 West Lake Sammamish Parkway NE  
Bellevue Files # 11-104515-WE and 11-104517-GH

Dear Kevin:

Thanks again for meeting with us at the site and going through the various bulkhead replacement options. At this point we would like to move forward with a plan that includes moving the concrete logs back to a point where they will be located landward of the ordinary high water mark (OHWM). This will allow compensatory excavation of upland material to balance the volume of the logs such that there will be zero net rise in the lake level as a result of the project. As discussed at the meeting on July 20, the issues of placing the bulkhead waterward of the OHWM, and fill within the floodplain are the two major issues that conflict with City performance standards.

In this letter we describe the proposed action, the purpose and need for the proposed action, and the various alternatives that were considered for protecting the shoreline along the Searles, Bethel, and adjacent residences.

**Proposed Action**

Under existing conditions a 114-foot long concrete bulkhead made up of six concrete logs protects the shoreline in front of the Searles' and Bethel's properties. The six logs are approximately 2-feet in diameter, are made of solid concrete reinforced with rebar, and were formed to have the shape and roughened surface characteristics of natural tree trunks. The logs are butted end to end and lay unanchored with approximately half of each log below the OHWM elevation set by the Army Corps of Engineers at 30.56-feet (OHWM in effect when bulkhead originally installed in 1988).

Under the proposed action all six of the concrete logs will be moved landward six feet (Figures 1 and 2). The new location was selected so that the natural lake bed slope, when extended landward to the new log positions, results in the OHWM being located on the lake bed, rather than the bulkhead. The bulkhead will be located entirely landward of the OHWM and for the most part buried. Existing soils located between the current bulkhead location and the new

bulkhead location will be removed and hauled off-site to an approved upland disposal location (Figure 3). All disturbed areas on the new beach up to the face of the new bulkhead will be covered with 6 to 8-inches of an approved WDFW spawning gravel mix to consist of natural rounded river rock consistent with the material currently found in the area (Figure 4). Drain rock will also be imported and placed landward of the bulkhead to improve drainage and reduce erosion of upland soils into the lake during high water events (Figure 4).

There is no evidence that new fill material was brought in when the original log bulkhead was installed in 1988. The existing grade is equal to that observed on adjacent properties along contiguous beachfront to the north. Existing soils were probably redistributed and graded to create the existing, relatively flat terrace. However, the concrete logs that were installed as a replacement bulkhead in 2010 are considered new floodplain fill. The 114-feet of 2-foot diameter logs have a net volume of 358 cubic feet (13.3 cubic yards). By requiring a net export of soil totaling 371 cubic feet or 13.5 cubic yards, the design decreases material within the Lake Sammamish floodplain (Table 1).

**Table 1. Floodplain Material Volume Calculation**

<b>Material</b>	<b>Import Volume (ft<sup>3</sup>)</b>	<b>Export Volume (ft<sup>3</sup>)</b>
Existing soils		1509
Bulkhead	358	
Spawning gravel	393	
Drain rock	387	
	1138	1509

#### **Purpose and Need of Bulkhead**

The Searles' and Bethel's properties are located in an area subject to unusually high wave action during storm events. The southeast facing shoreline of Lake Sammamish on which the properties are located has a fetch of over 3 miles of lake to the south (Figure 5). Because prevailing storm winds come from the south, the waves that build up during peak events can exceed 3-feet, with a 2-foot wave not unusual (Figure 6). In addition to the waves, storm surges (seiches) sometimes occur when strong winds cause water to pile up at the north end of the lake. This can raise the water surface elevation by a foot or more causing the lake to surge over the bulkhead. When lake levels are high anyway as is seen after periods of very heavy rain, water may be present against the concrete retaining walls at the base of each house (Figure 7).

The concrete retaining walls at the base of the slope in front of both the Searles and Bethel's residences were designed as slope stabilization measures, not to withstand wave action. The purpose of the existing bulkhead is to dissipate wave energy before it reaches the retaining wall. This occurs due to the presence of the elevated shelf between the bulkhead and the

retaining wall. Approaching waves reach a critical height as the lake depth decreases adjacent to the bulkhead. This causes the waves to break just before or on the bulkhead (Figure 6). This allows wave energy to dissipate before the water reaches the retaining wall. However during large storms, a significant amount of energy still reaches the retaining walls and both residents report having to repair areas of undermining that periodically occur. Without the bulkhead, the waves would break closer to or on the retaining walls leading to likely failure.

### **Alternatives Considered**

Several alternatives were considered for bulkhead replacement:

1. Remove the pre-existing log bulkhead without bulkhead replacement,
2. Remove the pre-existing log bulkhead without bulkhead replacement and retrofit the retaining walls to withstand the additional wave energy,
3. Replace the pre-existing log bulkhead with a bio-engineered solution,
4. Replace the pre-existing log bulkhead with a concrete log bulkhead set back landward of OHW, and
5. Replace the pre-existing log bulkhead with a concrete log bulkhead at the same location.

### **Remove the pre-existing log bulkhead without replacement**

Elimination of the bulkhead would result in rapid erosion of the existing shoreline behind the bulkhead and up to the retaining walls. As has been experienced in the past, undercutting of the retaining walls would occur but would do so at a much higher rate. Emergency repairs would not be possible due to poor access to the site during storms. Therefore, during a very large storm, loss of a retaining wall could lead to upslope landsliding and potential loss of the homes. With loss of the existing terrace, future minor repairs would probably have to be completed fairly frequently leading to chronic and costly maintenance actions due to the need to barge in most repair materials.

The bulkhead also protects property to the north. Loss of the terrace in front of the Searles/Bethel property would let wave action continue north behind the neighbors bulkheads and lead to erosion that could threaten additional homes. The property to the south is protected by a concrete bulkhead running perpendicular to the shoreline between the two lots and is at less risk.

### **Retrofit the retaining walls to withstand additional wave energy**

A preliminary cost estimate to retrofit the retaining walls along the Searles residence was between \$100,000 and \$200,000 depending on the results of further geotechnical studies that would be needed to determine whether full replacement was required or simply extensive modifications. Trenching and/or pile driving would be necessary to extend the walls below scour depth, while additional shoring would likely be needed to temporarily protect the house. This did not include the Bethel residence or the additional homes to the north that would also be vulnerable.

These costs were not considered a reasonable option when much less expensive and equally protective options are available.

Replace the pre-existing log bulkhead with a bio-engineered solution

Bio-engineered, or “soft” solutions to bank protection can be fully protective of banks in many situations. Plant stems and branches help to dissipate wave energy and the roots stabilize underlying soils. These solutions are most effective at locations where the erosive forces acting on the shoreline are moderate to low, and the period of significant inundation is not long. Soft solutions were considered but rejected at this location for three reasons:

1. Wave energy at this south facing beach can be very high. Fetch, often called the fetch length, is a term for the length of water over which a given wind has blown. The term is usually associated with coastal or shoreline erosion. Fetch length along with the wind speed (or strength) determines the size of waves produced. The longer the fetch length and the faster the wind speed, the larger and stronger the wave will be. The fetch length determines the power and energy of the wave. If a fetch is very large, then the wave will be very large and vice versa. The longer the wind drags along a waterbody the more energy the wave will have and the more destructive potential the wave will have. The three mile fetch length to the south results in very strong waves hitting the shoreline at the Bethel/Searles property. Planting alone, or planting in combination with boulders is unlikely to adequately protect the shoreline at this location. Waves would sweep over the plants, hit the retaining wall, and bounce back over the protection measures from multiple angles. The ability to withstand these forces is doubtful. It is more likely that significant erosion would occur, resulting in loss of plants and other features.
2. As noted above, maintenance of a soft shoreline solution would likely become a long term, costly effort with no certainty of providing the protection required. Costs could become significant, especially if the erosion proceeds north into neighbor’s property as predicted.
3. Implementation of soft shoreline measures would likely require conversion of the entire shoreline to plants, logs, and boulders. Under existing conditions, the shoreline area is the only usable yard the Searles, Bethels, and many of their neighbors have.

Replace the pre-existing log bulkhead with a concrete log bulkhead set back landward of OHW

This is the proposed action as described previously. This option is reasonably expected to provide the minimal required shoreline protection (as demonstrated in the past), will result in no net loss of shoreline environmental function, and does not conflict with City performance standards for work within the floodplain and critical areas.

One modification to this option suggested by the City was to set the logs at varying angles to the shoreline rather than a straight line. In this way reflective wave energy could be further muted. The existing concrete logs were created to exactly span the 114 foot distance from the concrete bulkhead along the south side of the Searles’ property to the south side of the Bethel dock. Reconfiguring the alignment would require additional logs be formed as needed to span

the additional length that would be created if the alignment was changed. The logs were custom built and installed at great expense.

The concrete logs do not have a vertical interface with waves, thus do not create the reflective wave energy that a typical flat bulkhead does. Only the top third or so of each log will be subject to wave energy (Figure 4). This area is rough and convex shaped. Thus, waves striking the face will in the future be deflected up, rather than back waterward.

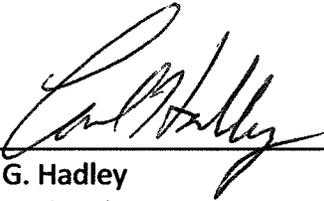
Implementing this modified option would require significant additional cost, would result in further loss of otherwise usable land, and would have only marginal environmental benefit. As such it was not further considered.

**Replace the pre-existing log bulkhead with a concrete log bulkhead at the same location**

This option would require a variance from the City of Bellevue Shoreline Ordinance and may conflict with Critical Area performance standards. The City has indicated that a variance for this option would not likely be approved under the Bellevue Shoreline Master Program. The option is not being further considered.

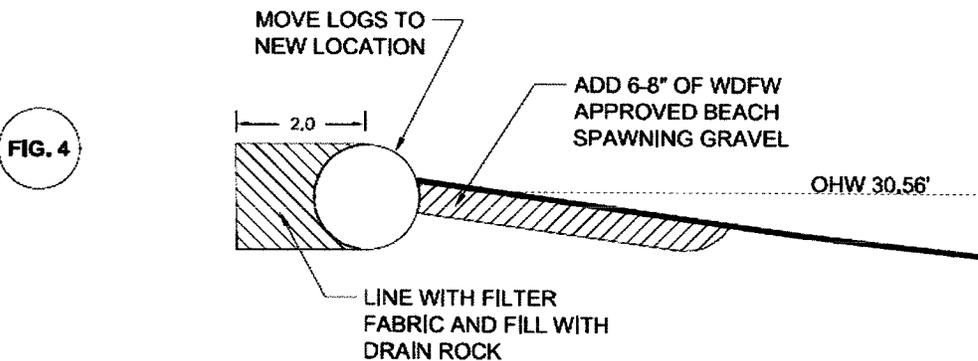
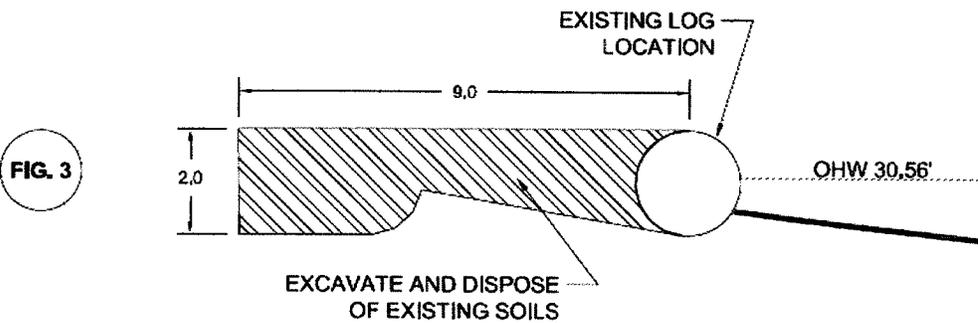
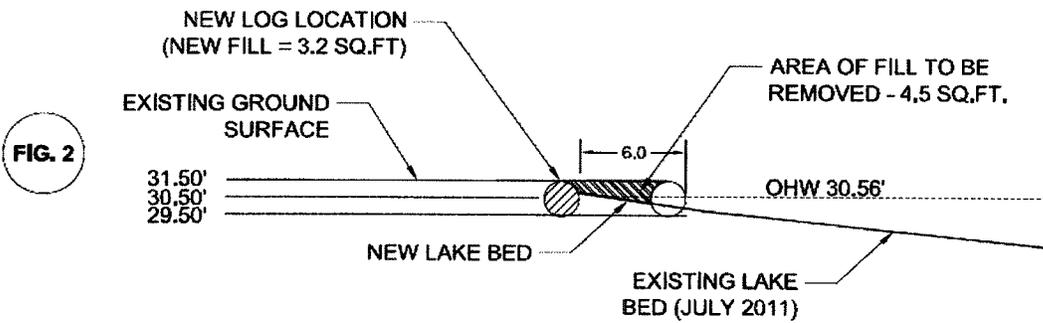
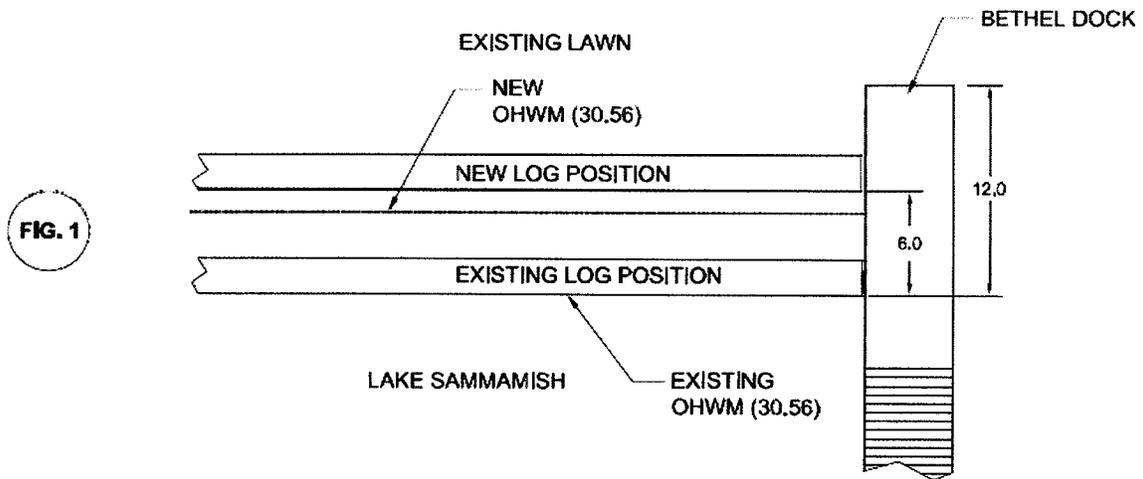
Please let me know if you have any questions.

Sincerely,



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Carl G. Hadley  
Principal Biologist  
Cedarock Consultants, Inc.





**BASIS OF HORIZONTAL & VERTICAL DATUM**

VERTICAL DATUM WAS DERIVED FROM NAVD 88 CITY OF BELLEVUE DATUM BASED ON:

VERTICAL CONTROL #510 = 116.08'

HORIZONTAL CONTROL SYSTEM BASED ON THE CITY OF BELLEVUE CONTROL

POINT #87R  
227546.843N  
1327920.965E

ALONG WITH A FAST STATIC SURVEY FROM THE FOLLOWING WSDOT MONUMENTS:

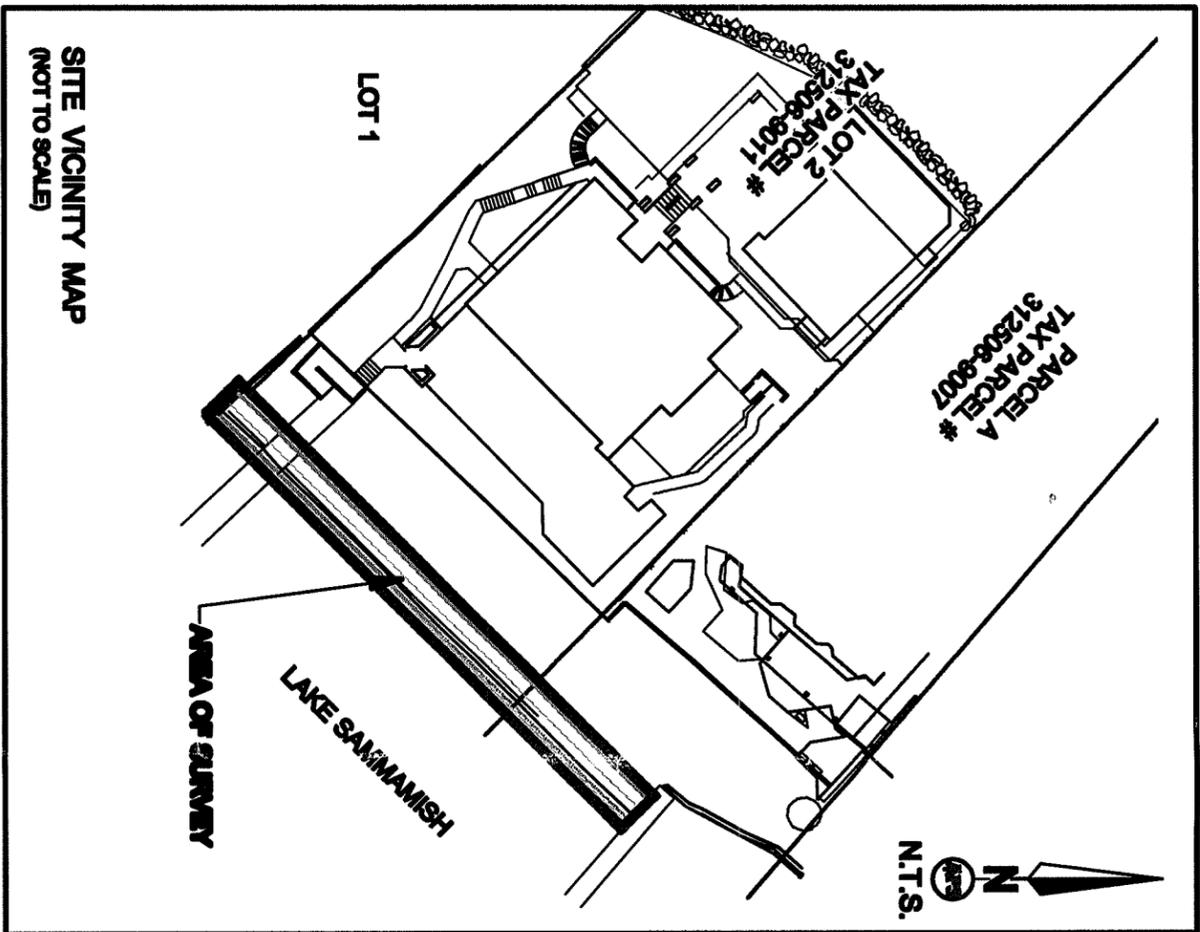
WSDOT MONUMENT 617  
GP17090-58  
NORTHING: 204179.943  
EASTING: 13334376.094  
ELEV: 42.116 U.S. FEET (NAVD88)

WSDOT MONUMENT 904  
GP17090-71  
NORTHING: 214163.883  
EASTING: 1315180.713  
ELEV: 332.056 U.S. FEET (NAVD88)

WSDOT MONUMENT 2937  
GP17090-219  
NORTHING: 214633.258  
EASTING: 1310721.814  
ELEV: 120.764 U.S. FEET (NAVD88)

**LEGEND**

-  LOWER DECK
-  UPPER DECK
-  UPPER DECK OVER LOWER DECK
-  ROCK PATIO
-  BUILDING EDGE
-  LOT LINE
-  SPOT ELEVATION



**SITE VICINITY MAP**  
(NOT TO SCALE)

**REFERENCE DOCUMENT**

BOUNDARY LINE ADJUSTMENT NO. BLA #88-269A, AFN#8806289005, BOOK 61 OF SURVEYS, PAGES 182 & 182A, DATED: JUNE 28, 1988.  
QUIT CLAIM DEED AS RECORDED UNDER RECORDING NUMBER 20080703000798 IN KING COUNTY, WASHINGTON.  
CITY OF BELLEVUE SHORT PLAT #78-20 AS RECORDED UNDER RECORDING NUMBER 197804250725 IN KING COUNTY, WASHINGTON.

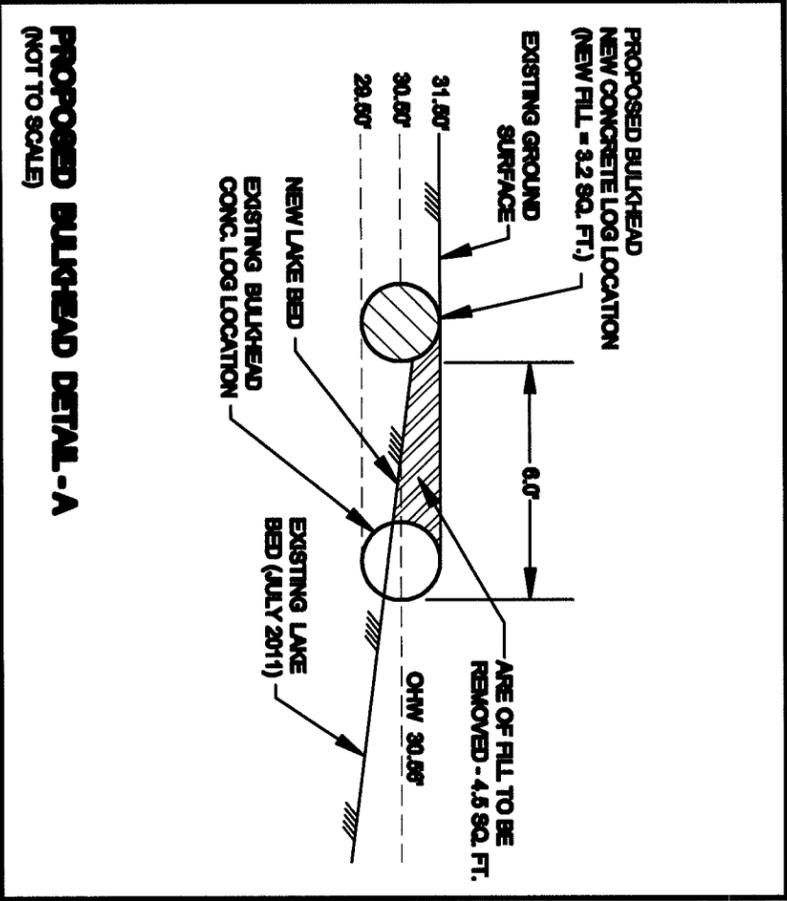


**LEGAL DESCRIPTION**

SEE BLA #88-269A  
SEE COB SHORT PLAT #78-20

**NOTES**

THE SOLE PURPOSE OF THIS EXHIBIT IS TO GRAPHICALLY DEMONSTRATE THE PROPOSED ACTION TO MOVE THE EXISTING CONCRETE LOGS LANDWARD SIX FEET, MAINTAINING EXISTING LOG ELEVATION. ELEVATIONS SHOWN IN THIS DETAIL ARE REPRESENTATIVE OF CONDITIONS FOUND ACROSS THE SITE.



**PROPOSED BULKHEAD DETAIL - A**  
(NOT TO SCALE)

**SURVEYOR'S CERTIFICATE**

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF LARRY SEARLES AND JOHN BETHEL, MAY OF 2011.  
LAND SURVEYOR: TYLER J. SWEET, P.L.S.  
STATE OF WASHINGTON CERTIFICATE NO.: 29293  
DATE: 05-03-2011

**PLAN and CROSS SECTION VIEWS**

FOR PORTIONS OF TAX PARCEL NO. 312506-9011 and TAX PARCEL NO. 312506-9007 for LARRY SEARLES and JOHN BETHEL

SCALE: NOT TO SCALE	PROJECT NO. 1114003	DRAWING FILE NAME: 1114003-shoreline2
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**APS SURVEY & MAPPING**  
1821 S.E. 20TH STREET, SUITE A  
BELLEVUE, WASHINGTON 98005  
TEL: (206) 748-8888  
FAX: (206) 748-8982

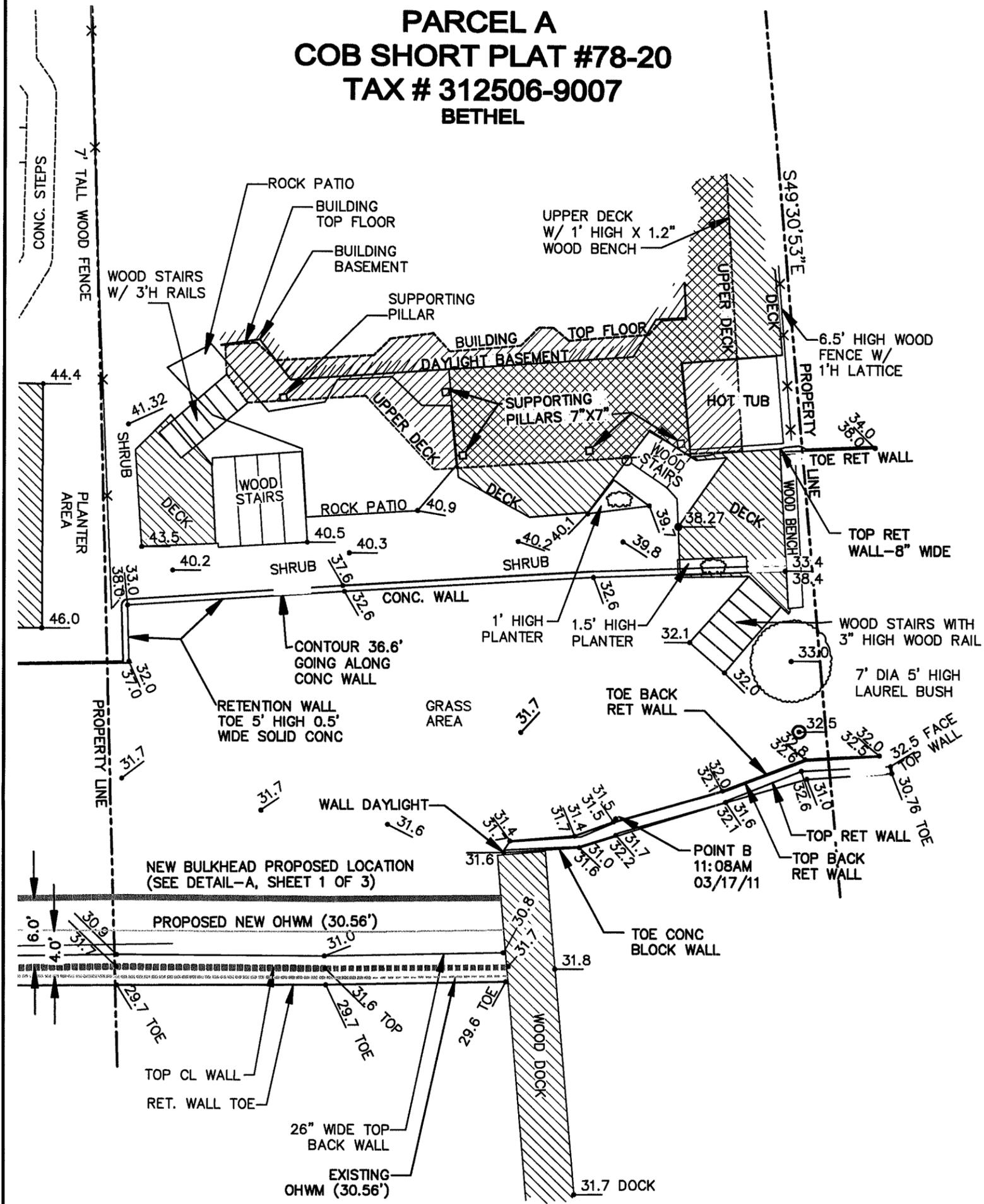
SURVEYED BY: TJS		CHK'D BY: TJS	
DRAWN BY: MAGG		APPR'D BY: TJS	
DATE	BY	REVISION	CK'D
5/12	MG	DETAILS/NOTES	TJS
8/01	MG	PROP. BULKHEAD LOCATION	TJS

1 OF 1 SHEET  
1 OF 1 SHEET

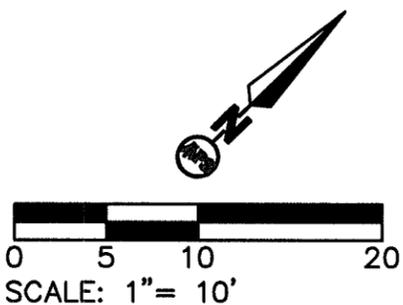
Permitted Accessible  
AUG - 5 2011



**PARCEL A**  
**COB SHORT PLAT #78-20**  
**TAX # 312506-9007**  
**BETHEL**



**LAKE SAMMAMISH**



- EXISTING CONC. BULKHEAD 2011
- NEW PROPOSED BULKHEAD LOCATION 2011
- EXISTING OHWM (30.56') - (NAVD88)
- PROPOSED NEW OHWM (30.56')

**NOT PART OF SURVEYED PROPERTY IN 2004**

SURVEYED BY: TJS		CHK'D BY: TJS	
DRAWN BY: MAGG		APPR'D BY: TJS	
DATE	BY	REVISION	CK'D
5/12	MG	DETAILS/NOTES	TJS
8/01	MG	PROP. BULKHEAD LOCATION	TJS

**PLAN and CROSS SECTION VIEWS**  
**FOR PORTIONS OF TAX PARCEL NO. 312506-9011**  
**and TAX PARCEL NO. 312506-9007**  
**for LARRY SEARLES and JOHN BETHEL**

SCALE: 1\"=10'	PROJECT NO. 1114003	DRAWING FILE NAME: 1114003-shoreline2
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**APS**  
**SURVEY & MAPPING**  
10221 S.E. 20TH STREET, SUITE A  
 BELLEVUE, WASHINGTON 98005  
 TEL: (425) 748-6200  
 FAX: (425) 748-6242

3 OF 3 SHEET RECEIVED  
 Permit Processing 2011