

# City of Kirkland's Shoreline Stabilization Decision Tree



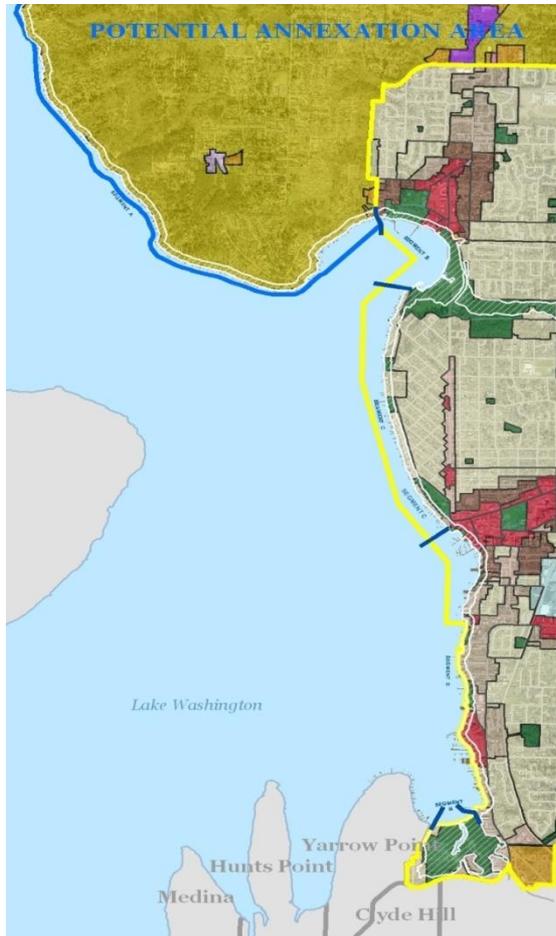
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January 28, 2010

# CITY OF KIRKLAND VICINITY



# Kirkland's Shoreline



- 6 miles of shoreline
- Fully Developed
- Land use unlikely to change

# Kirkland's Shoreline

- **Functions:**

- Juanita and Yarrow Bay wetlands retain significant ecological function
- Other areas generally have low function



- **Key issues:**

- Hardened shoreline (over 80% in developed area)
- Extent of overwater coverage
- Lack of shoreline riparian vegetation



# SMP Status

- 2005 – began work on SMP
- 2006 – public involvement started
- 2008-2009 – working drafts
- Summer 2009 – public hearings
- Fall 2009 – City Council review
- Dec. 2009 – City Council Approval
- Sent to state – DOE public hearing on Feb. 9th

# SMP Generated Considerable Property Owner Concerns

- Setbacks
- Non-Conformance status
- Bulkheads



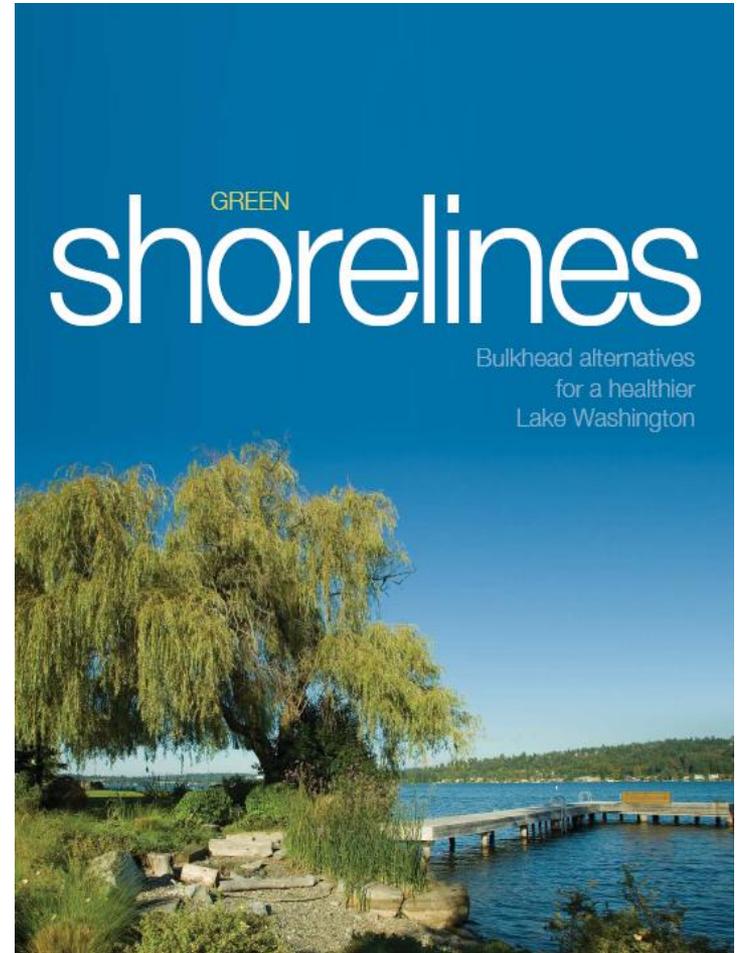
# Concerns with Bulkhead Regulations

- Fear of loss of property
- Kirkland's waterfront is unique
  - Large fetch of Lake Washington
  - Lot orientation/shallow lots
  - Prevailing winds from SW
- Skeptical that soft shorelines work
- Cost & Time
- How to evaluate need



# Green Shorelines Guidebook

- Kudos to City of Seattle (Maggie, David, et. al)
- Issued at the right time
- Provided to our Planning Commission & City Council
- Mailed to all shoreline property owners
- Available at counter



# Incorporated Decision Tree into SMP Regulations

- Intrigued by the concept
- Utilized DOE grant – funded work by The Watershed Company
- Tailor it to Kirkland's conditions

# Decision Tree Use and Benefits

- Responds to property owner comments & concerns
- Helps guide staff and public
- Starting point for property owners (use at pre-application meetings)
- Incorporated into Code – but not regulatory
- Does not prescribe outcome – provides a menu of approaches
- Does not substitute for detailed professional/technical analysis



# Site Example (Before)



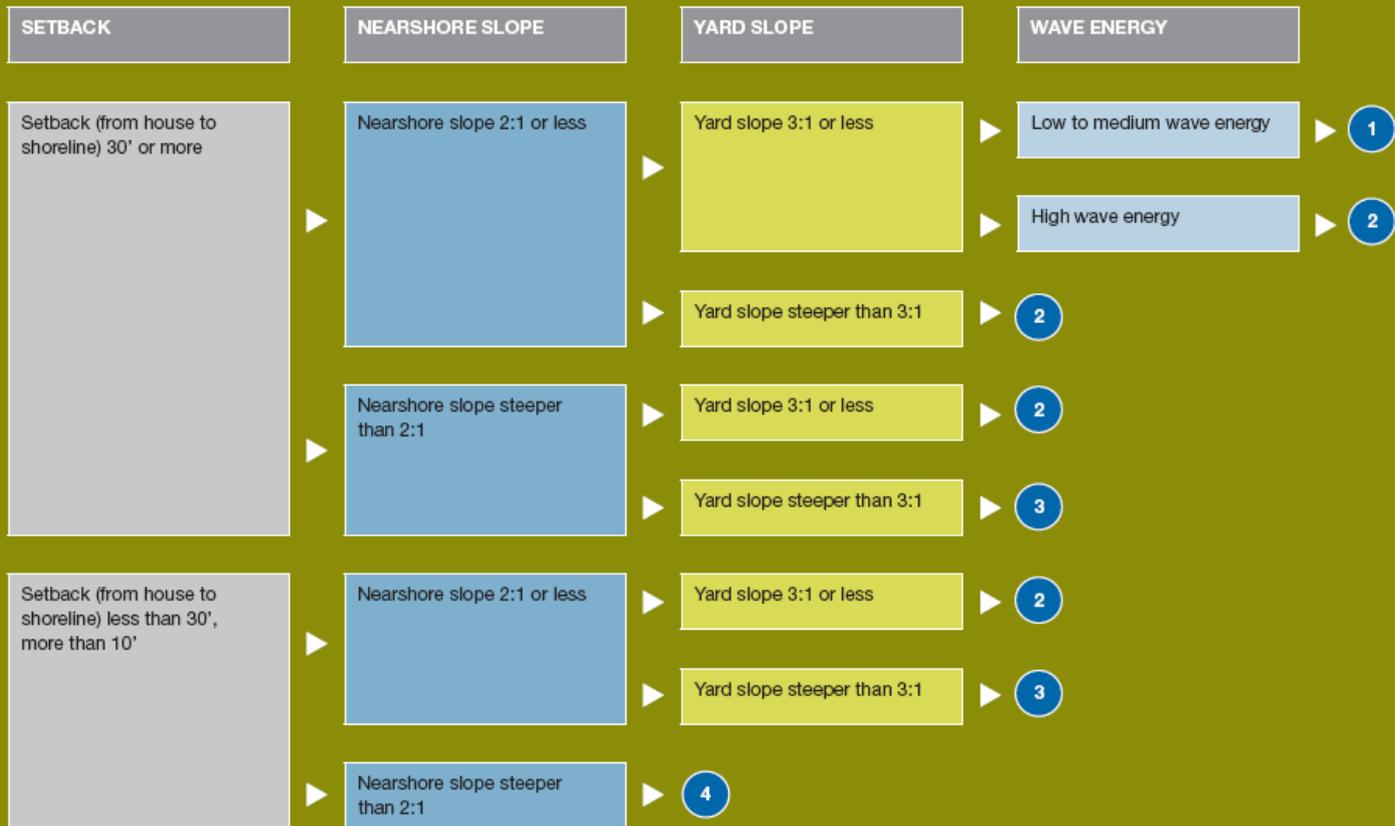
GREEN  
shorelines

Bulkhead alternatives  
for a healthier  
Lake Washington



# Green Shorelines Decision Tree

How do I know which options I can consider for my site?



**Notes:**

The use of plant buffers or logs is a viable option for any site, including those that employ hard engineering such as bulkheads.

Sites with less than a 10' setback are not included on this decision tree, because in most cases they will depend on concrete, sheetpile, or riprap. As noted above, plant buffers still may be appropriate.

- 1 full beach, beach coves, setting back bulkhead, bioengineering
- 2 beach coves, setting back bulkhead, bioengineering
- 3 setting back bulkhead, bioengineering
- 4 bioengineering

**Notes:** Sites with less than a 10' shoreline setback are not included with this decision tree as those sites will likely require some form of hard armoring. However, those sites may still benefit from the addition of an in-water gravel/cobble wedge to improve shoreline gradient along with a native plant buffer.

### SETBACK

Shoreline setback as measured from the ordinary high water mark (OHWM).

### BULKHEAD HEIGHT

As measured vertically from the toe to top elevation of earth behind bulkhead.

### DEPTH AT BULKHEAD

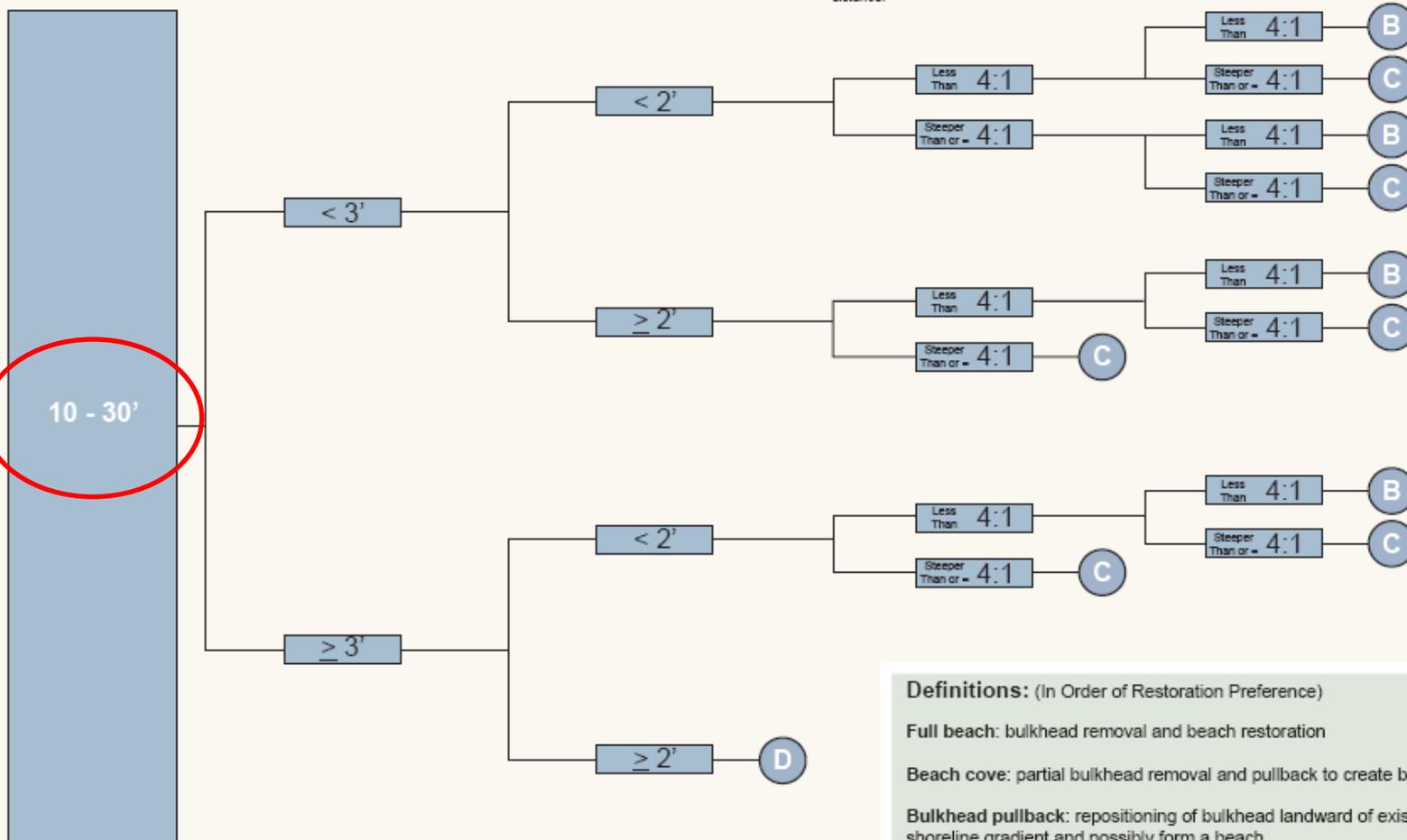
Depth of water at the bulkhead as measured from the OHWM.

### NEARSHORE SLOPE

Average in-water slope of substrate as measured for the first 30 feet waterward of the OHWM. Ratio is horizontal distance:vertical distance.

### YARD SLOPE

Average slope of upland area as measured for the first 30 feet landward of the OHWM. Ratio is horizontal distance:vertical distance.



#### Definitions: (In Order of Restoration Preference)

**Full beach:** bulkhead removal and beach restoration

**Beach cove:** partial bulkhead removal and pullback to create beach cove

**Bulkhead pullback:** repositioning of bulkhead landward of existing location to improve shoreline gradient and possibly form a beach

**Slope bioengineering:** shoreline stabilization using plant material and other biodegradable materials to hold upland soils in place

**Bulkhead enhancement:** bulkhead may stay in same general location, but modifications may include sloping back existing hard structure and/or modifying material type and layout to create potential pocket beach areas.

**Nearshore gradient improvement:** installation of gravel/cobble substrate wedge for the purposes of improving nearshore gradients

#### Typical Options:

- (A) Full beach, beach cove, pullback, bioengineering, enhancement, gradient improvement
- (B) Beach cove, pullback, bioengineering, enhancement, gradient improvement
- (C) Pullback, bioengineering, enhancement, gradient improvement
- (D) Bioengineering, enhancement, gradient improvement

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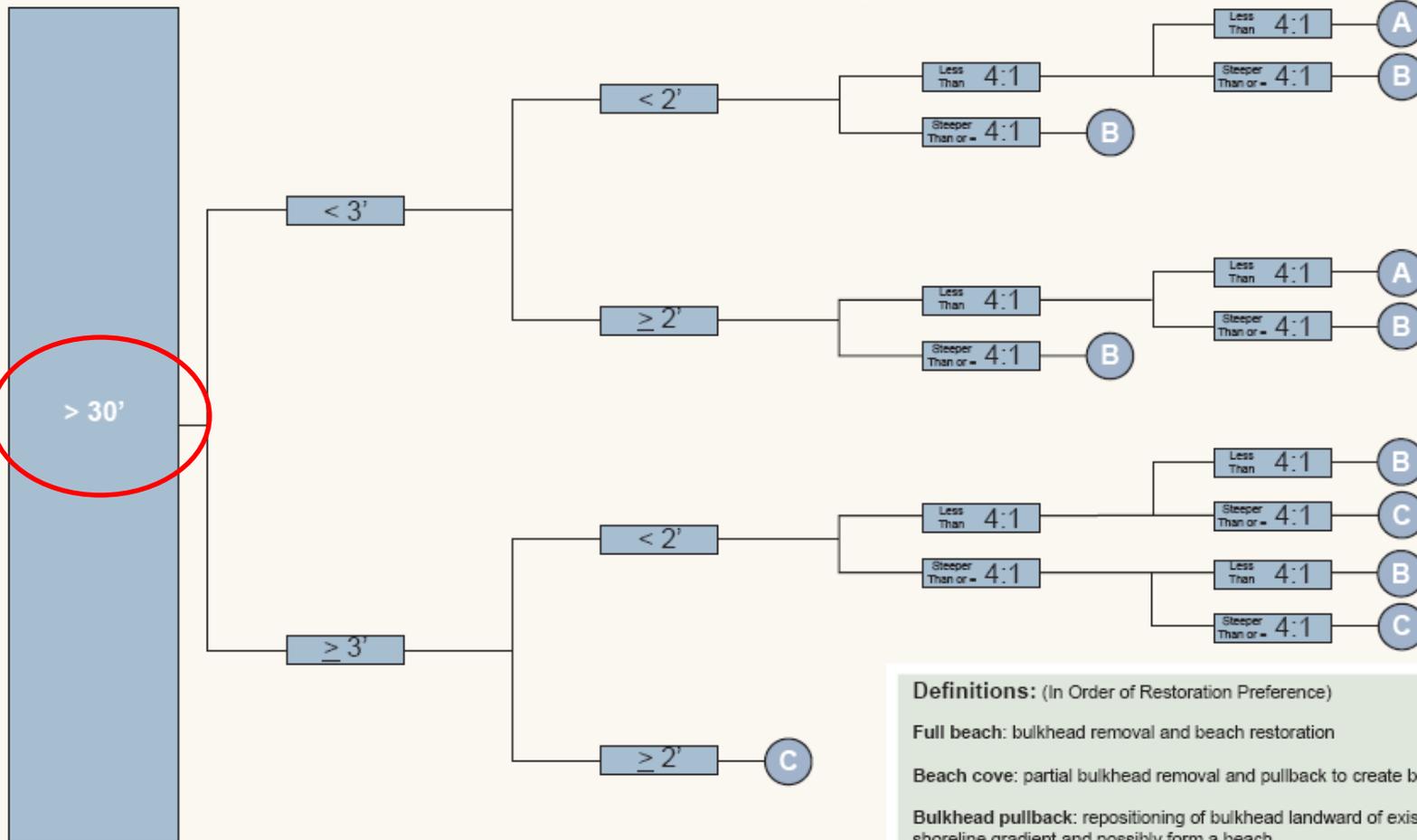
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# Bulkhead Definition

## **WAC 220-110-020 (also used in Kirkland code):**

A vertical or nearly vertical erosion protection structure placed parallel to the shoreline consisting of concrete, timber, steel, rock, or other permanent material not readily subject to erosion.

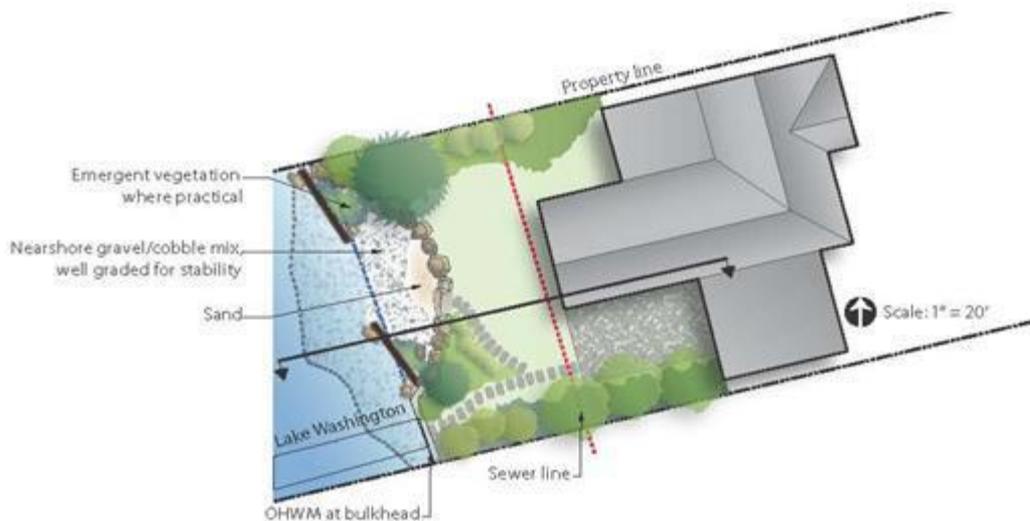
## **Hard Structural Shoreline Stabilization (Kirkland):**

Shore erosion control practices using hardened structures that armor and stabilize the shoreline from further erosion. Hard structural shoreline stabilization typically uses concrete, boulders, dimensional lumber or other materials to construct linear, vertical or near-vertical faces that are located at or waterward of ordinary high water, as well those structures **located on average within five (5) feet landward of OHWM**. These include bulkheads, rip-rap, groins, retaining walls and similar structures.

# Site Example (Before)



# Site Example (After)



*\* Figures modified by The Watershed Company from "Green Shorelines" a guidebook prepared by City of Seattle*