

Shoreline Stabilization

City of Bainbridge

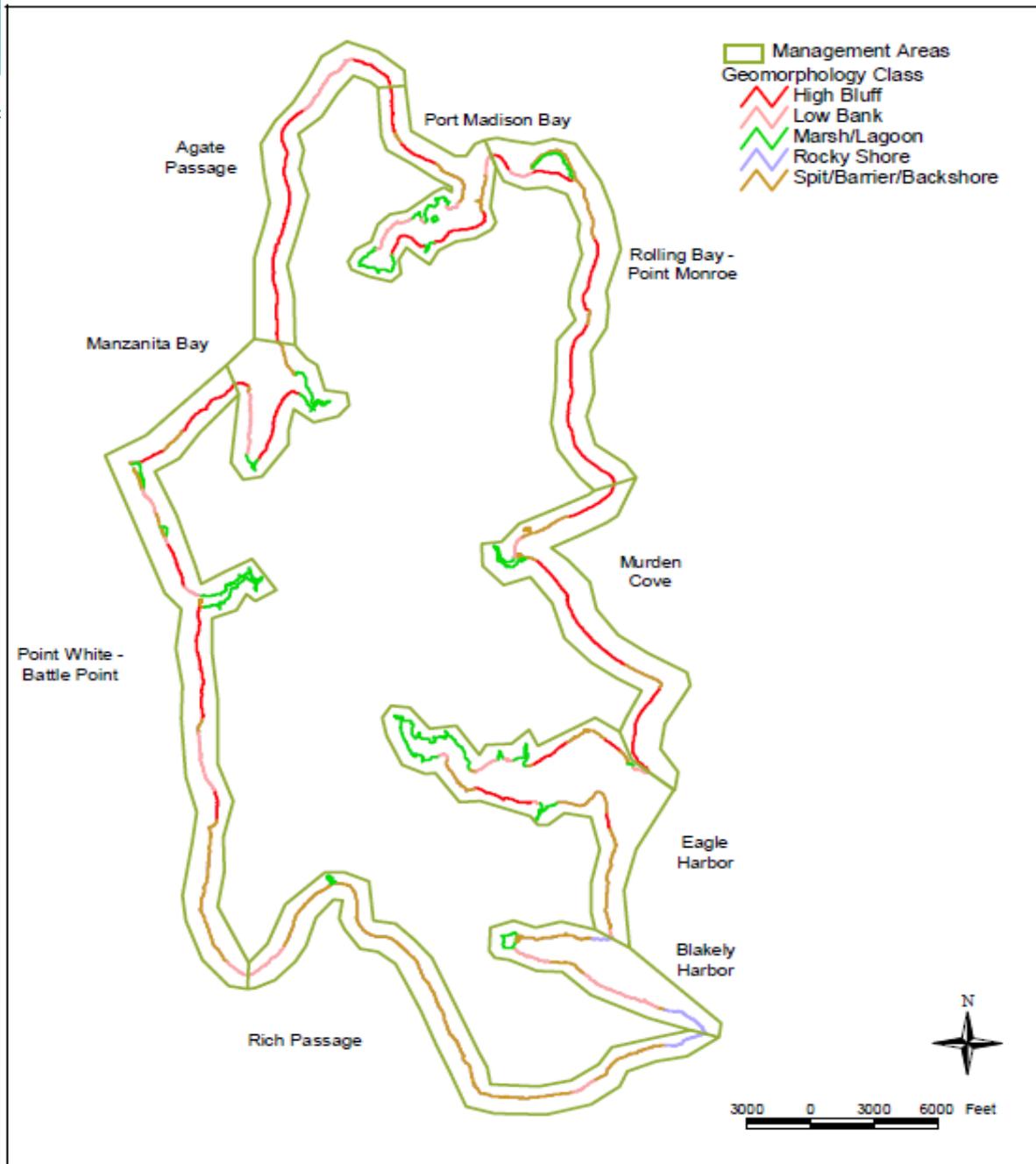


Figure 4. Bainbridge Island Geomorphic Class Distribution.

WAC Requirements for Stabilization

-- WAC 173-26-231(2) & (3)

- Reduce the adverse effects of shoreline modifications
- Limit shoreline modifications in number and extent
- Allow shoreline modifications appropriate to specific environmental conditions
- Assure that shoreline modifications do not result in a net loss of ecological functions

WAC Requirements for Stabilization

-- WAC 173-26-231(2) & (3)

- Give preference to stabilization methods with lesser impact
- Assure subdivision of land will not require shoreline stabilization in order for future development
- Require new development to be set back sufficiently so that shoreline stabilization will not be necessary
- New shoreline stabilization should not cause impacts to adjacent or down-current properties and shoreline areas

WAC Requirements for Stabilization

-- WAC 173-26-231(2) & (3)

Local Jurisdictions shall:

WAC 173-26-231(3)(a)(iii)(B)(I-IV)

- Prohibit new structural stabilization measures except when necessity is demonstrated in the following manner and all conditions are met:
 - Protection of existing primary structures
 - Development of new non-water-dependent uses, including single-family residences
 - Development of water-dependent uses
 - Restoration of ecological functions or remediation

New Development

– WAC 173-26-231(3)(a)(iii)(B)

Conditions:

- Assure the erosion is not being caused by upland conditions (Vegetation and Drainage)
- Nonstructural measures are not feasible or not sufficient
- The need to protect primary structures is demonstrated through a geotechnical analysis
- The erosion control structure will not result in a net loss of shoreline ecological functions

Existing Primary Structure –

WAC 173-26-231(3)(a)(iii)(B)(I)

Conditions:

- New or enlarged structural shoreline stabilization measures for an existing primary structure should not be allowed unless there is conclusive evidence of need through a geotechnical analysis
- Assure stabilization will not result in a net loss of shoreline ecological functions

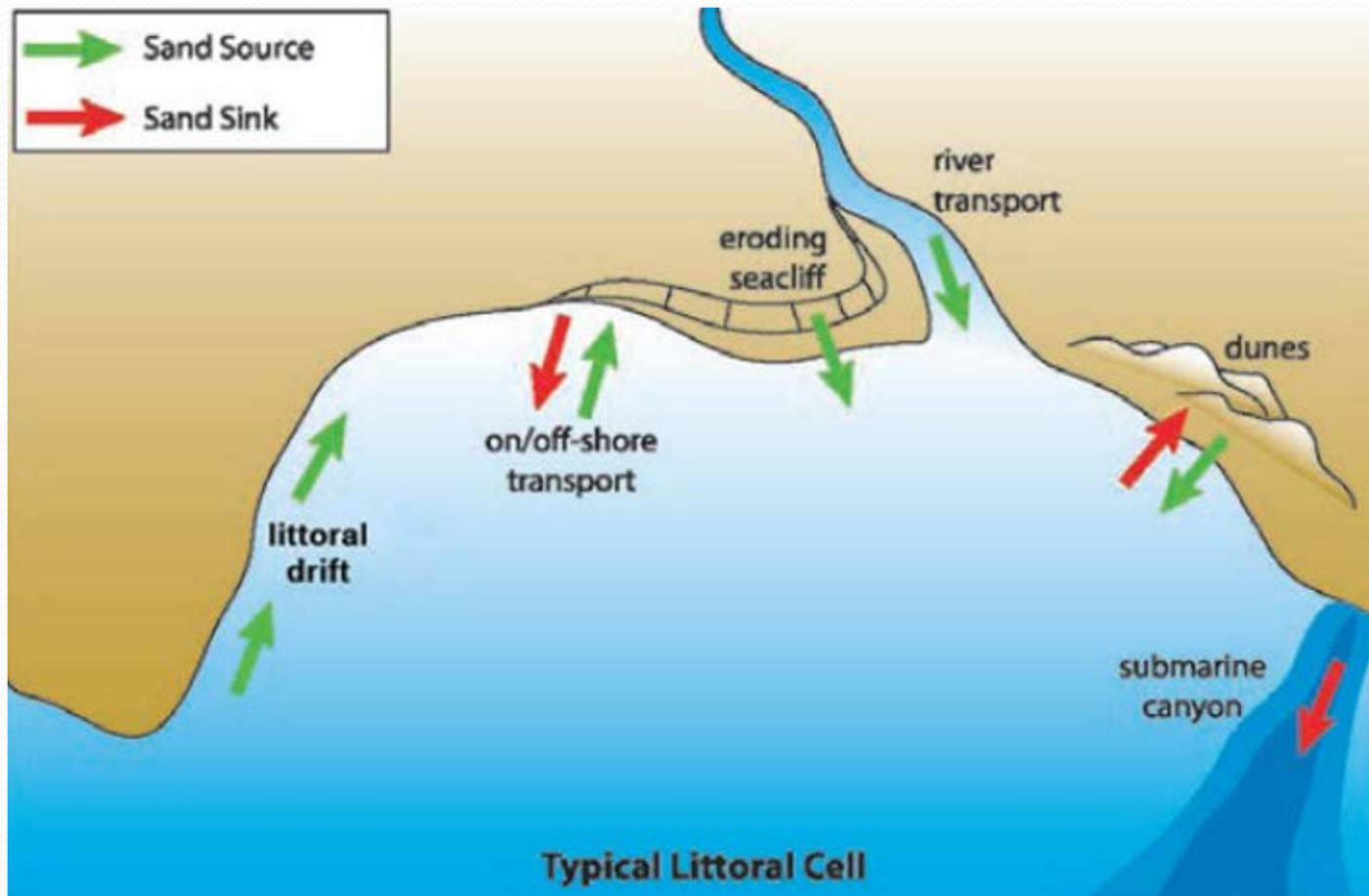
New Shoreline Stabilization – Bainbridge Proposal

- Must demonstrate need through geotech analysis that the primary structure is in danger within 3 years from erosion caused by tidal action, current, or wave
- Geotech analysis must include consideration of alternatives through a sequence – soft to hard measures
- Demonstrate or mitigate to assure no net loss of ecological functions (determined through analysis & mitigation plan)

Typical Shoreline



Typical Littoral Cell



Stabilization Alternatives –

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Sequence of Alternatives – soft to hard measures

- **Soft or Non-Structural** measures include:
 - Addressing upland drainage issues;
 - Vegetation placement;
 - Increased building setbacks;
 - Relocating or elevating structures; and
 - Bio-engineering or other soft-treatment measures
- **Hybrid Structures** – engineered stabilization that combines soft-treatment with structural measures
- **Hard Structures** – stabilization that includes bulkheads or other hard-surface structures

Natural Shoreline Stabilization



Soft Treatment



Soft Treatment



Soft Treatment?



Hard Stabilization



Existing Stabilization–

WAC 173-26-231(3)(a)(iii)(C)

- Repair and replacement allowed
- Must demonstrate the need to protect principal use or primary structure from shoreline erosion
 - Demonstrated need is not specific to 3-year danger requirement as is the case for new stabilization

Existing Stabilization – Bainbridge Proposal

- May be repaired or replaced through Shoreline Exemption (SFR)
- A geotech analysis is required to demonstrate need
 - Need must be necessary to protect primary structure and/or primary appurtenance within 5 years of danger from shoreline erosion

Special Provisions for Stabilization

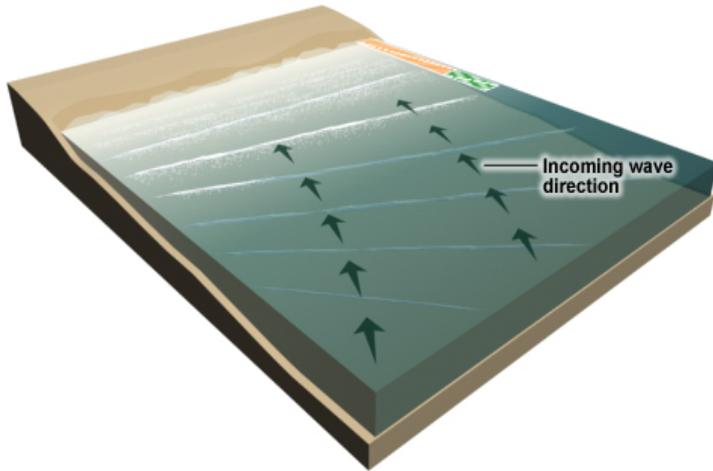
– Bainbridge Proposal

Geotech analysis not required to demonstrate need:

- SFR located within 10 feet of OHWM
- SFR located within 10 feet from top of high bluff (height > 15ft)
- Zone of Impact modifies location of hard stabilization structures, including hard components of hybrid structures

Waves

Refraction



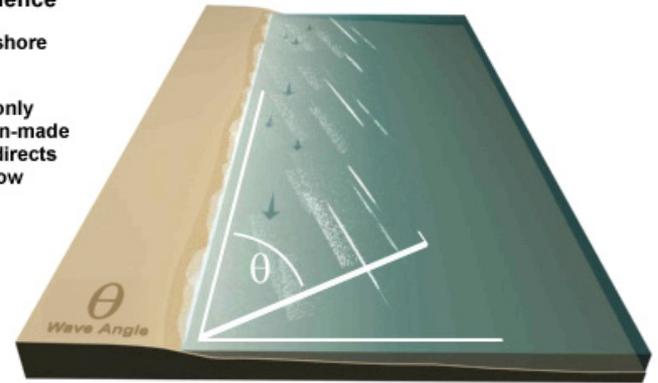
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Wave Angle Variations

Small Incidence

Strong longshore current

Rip current only occurs if man-made structure redirects longshore flow



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Stabilization Permit Processes

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Shoreline Exemption or Shoreline Conditional Use Permit (CUP) required for Stabilization Projects

- Existing Stabilization for SFR – Repair & Replacement
 - Shoreline Exemption required in most cases
 - Unless in front of a feeder bluff, then CUP required
- New Stabilization for SFR
 - Shoreline Exemption required in most cases
 - Unless in front of a feeder bluff, then CUP required
 - Unless there is no adjacent shoreline stabilization within 100 feet, then an Administrative CUP required

Details: 6.2 Shoreline Stabilization

– Bainbridge Proposal

6.22 Applicability

Shoreline stabilization includes actions taken to address erosion impacts to property and dwellings, businesses, or structures resulting from natural processes, such as currents, flood tides, wind, or wave action.

These actions include structural and nonstructural methods. Nonstructural methods include building setbacks, relocation of the structure to be protected, ground water management, and planning and regulatory measures to avoid the need for structural stabilization.

The provisions of this section apply to the construction, replacement and repair of structures intended to stabilize shorelines for protection of primary structures and primary appurtenances from shoreline erosion caused by wind, waves, and currents. For this section, repair, replacement and new stabilization are defined in Section 7.0

Details: Section 7 Definitions

– Bainbridge Proposal

- Primary Structures – A structure that includes the principal use of a property, or is intended to be occupied with the principal use of the property.
- Appurtenance, Primary – A structure or development connected to a single-family residence and considered essential to the principal residential use in terms of protecting the appurtenance structure from danger from active shoreline erosion. A garage, and/or septic drainfield are considered primary residential appurtenances.

Details: Appurtenance

WAC 173-27-040(2)(g)

- A structure or development connected to the use and enjoyment of a single-family residence and is located landward of the OHWM. An appurtenance can include a garage, boathouse, deck, driveway, utilities, fences, and grading which does not exceed 250 cubic yards.

Details: 4.1.2 Environmental Impacts

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Regulations

- Requires Impact Analysis (using mitigation sequence) & No Net Loss Standard (that impacts not result loss to ecosystem functions and processes)
- Revegetation standards when native vegetation will be altered must:
 - Replant areas of disturbance (plan)
 - Mitigation plantings must utilize order of preference
 - Specifics for shoreline stabilization projects (Replant 75% at 10' depth)
- Mitigation - sequence
 - Based on site-specific analysis
 - Offers alternative to analysis: Single Family Residential Mitigation Manual
- Bonding Surety & Monitoring
- Submittal Requirements – site specific Impact Analysis and Mitigation Plan

Details: 6.2 Shoreline Stabilization

– Bainbridge Proposal

Regulations

- Prohibited (types & locations)
- Location and design standards for new and replacement – 13 criteria for location and design
- Replacement of hard structural stabilization
- Repair of existing structural stabilization
- New or Replacement Structural Stabilization
- Specifics - Replacement of existing structural stabilization
- Specifics - New shoreline stabilization
- Subdivisions – restrictions on need for stabilization
- Submittal requirements
- Additional submittal requirements for repairs of existing stabilization

Increasing Wave Reflection

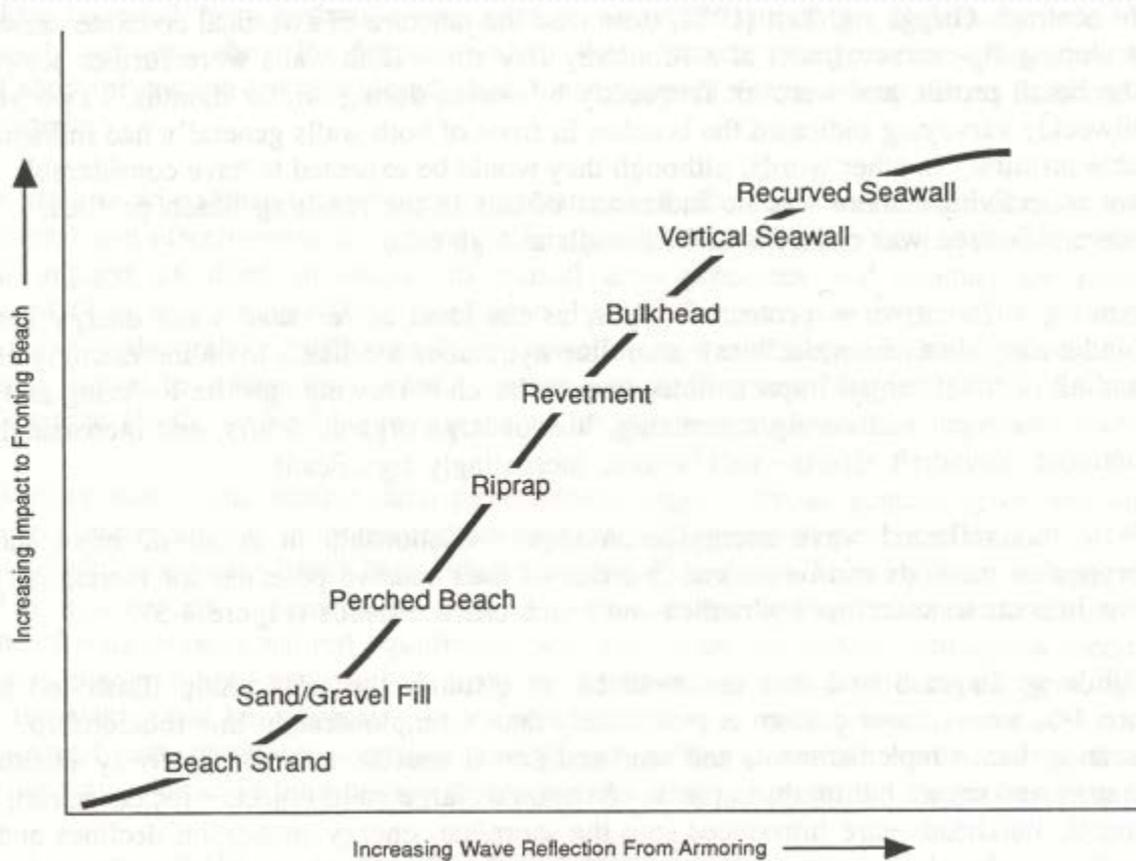


Figure VI-8. Relative beach impacts versus shore protection method (from Macdonald et al. 1994).

Details: SFR Mitigation Manual-

Appendix D – Bainbridge Proposal

Alternative to Site-specific Analysis and Mitigation

- Sites that qualify for this approach
- Types of SFR development that qualify – **Not** available for new hard stabilization or overwater structures
- SFR developments requiring mitigation
- Compensatory Mitigation Requirements
- Disturbance of Aquatic Habitat –repair or replacement of in- and over- water structures
 - when vegetation is cleared
 - when impervious area is created
- Checklist for Mitigation Guidance Approval Procedure.

Resources

City of Bainbridge Island

Shoreline Master Program Update Web Page:

http://www.ci.bainbridge-isl.wa.us/2012_smp_update.aspx

- Draft SMP – Section 6.2, Shoreline Stabilization
- SFR Mitigation Manual

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