

1 Structural Shoreline Armoring and Shoreline Stabilization

2 A. Policies

- 3 1. ~~Because protecting ecological functions is a primary goal of the Shoreline~~
4 ~~Management Act, t~~The County should take active measures to preserve natural
5 unaltered shorelines and ~~prevent the proliferation~~discourage of bulkheads and
6 other forms of shoreline armoring.
- 7 2. ~~Proponents of new shoreline use and development, including preferred uses and~~
8 ~~uses exempt from permits, should plan, design, locate, construct and maintain the~~
9 ~~use/development to avoid the need for structural shoreline armoring works using~~
10 ~~all methods available.~~
- 11 3. ~~Non-structural~~Shoreline stabilization measures ~~including relocating structures,~~
12 ~~increasing buffers, enhancing vegetation, managing drainage and runoff and other~~
13 ~~measures~~ are preferred over structural shoreline armoring.
- 14 4. Structural shoreline armoring should only be permitted when necessary to support
15 a primary structure associated with an approved shoreline use/development,
16 public ~~transportation~~ infrastructure, and/or essential public facilities when other
17 alternatives are infeasible.
- 18 5. ~~Where beach erosion threatens an existing use or development, proposals for new~~
19 ~~structural shoreline armoring should evaluate a range of options and designs. On a~~
20 ~~reach-specific basis, causes of erosion as well as effects should be evaluated.~~
21 ~~Beach management issues such as sediment conveyance, geohydraulic processes,~~
22 ~~and ecological relationships all should be considered in arriving at a design to~~
23 ~~minimize disturbance.~~
- 24 6. Shoreline stabilization ~~and shoreline armoring~~ for the purpose of leveling or
25 extending property or creating or preserving residential lawns, yards or
26 landscaping should not be allowed.
- 27 7. When structural shoreline armoring is determined necessary ~~to protect public~~
28 ~~infrastructure and primary structures,~~ it should be located, designed, and
29 maintained in a manner that minimizes adverse effects on shoreline ecology,
30 ~~including effects on the project site, adjacent properties, and sediment transport to~~
31 ~~downdrift areas.~~
- 32 8. ~~Before approving shoreline armoring structures, the County should require t~~The
33 ~~shoreline armoring~~ proponent ~~should~~to identify, address and mitigate probable
34 effects on shoreline processes and functions.
- 35 9. ~~Shoreline armoring structures should be located and designed based on an~~
36 ~~understanding of long-term physical shoreline processes. The structural shoreline~~
37 ~~armoring should fit the physical character and hydraulic energy of a specific~~
38 ~~shoreline reach, which may differ substantially from adjacent reaches.~~

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- 1 10. Vertical concrete or rock walls should be avoided whenever possible and only be
2 used to protect shorelines as a last resort and only when extreme measures are
3 required.
- 4 11. Structural shoreline armoring should not interfere with existing or future public
5 access to public shorelines nor with other appropriate shoreline uses such as
6 navigation, seafood harvest, or recreation.
- 7 ~~12. When seeking approval for new structural shoreline armoring, the project
8 proponent should include public access that is consistent with the Article 6 section
9 3 (Public Access) of this Program.~~
- 10 13. Proponents of new structural shoreline armoring should coordinate with other
11 affected property owners and public agencies to address ecological and geo-
12 hydraulic processes, sediment conveyance and beach management issues for the
13 whole drift sector (net shoreline-drift cell) or shoreline reach where feasible.
- 14 ~~14. Where feasible, any failing, harmful, unnecessary, or ineffective structural
15 shoreline armoring should be removed, and shoreline ecological functions and
16 processes should be restored using non-structural methods.~~
- 17 ~~15. In addition to conforming to the regulations in this Program, non-regulatory
18 methods to protect, enhance, and restore shoreline ecological functions and other
19 shoreline resources should be encouraged. Non-regulatory methods may include
20 public facility and resource planning, technical assistance, education, voluntary
21 enhancement and restoration projects, land acquisition and restoration, or other
22 incentive programs.~~

23 B. Shoreline Environment Regulations

- 24 1. Priority Aquatic: Shoreline stabilization may be permitted subject to the
25 provisions of this Program. New structural shoreline armoring is prohibited.
- 26 2. Aquatic: Shoreline stabilization may be permitted subject to the provisions of this
27 Program. ~~Structural shoreline armoring to protect existing public transportation
28 infrastructure and existing essential public facilities may be allowed as a
29 conditional use if allowed in the adjacent upland environment.~~ Structural
30 shoreline armoring to protect new residential developments is prohibited.
- 31 3. Natural: Shoreline stabilization may be permitted subject to the provisions of this
32 Program. Structural shoreline armoring to protect existing ~~public transportation
33 infrastructure and existing~~ essential public facilities may be allowed as a
34 conditional use. ~~Structural shoreline armoring is prohibited.~~
- 35 4. Conservancy: Shoreline stabilization may be permitted subject to the provisions
36 of this Program. ~~Shoreline armoring structures may be permitted as a conditional
37 use.~~

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- 1 5. Shoreline Residential: Shoreline stabilization may be permitted subject to the
2 provisions of this Program. Shoreline armoring structures may be permitted ~~as a~~
3 ~~conditional use.~~
- 4 6. High Intensity: Shoreline stabilization may be permitted subject to the provisions
5 of this Program. Shoreline armoring structures may be permitted ~~as a conditional~~
6 ~~use.~~

7 C. Regulations – Existing Structural Shoreline Armoring

- 8 1. Existing structural shoreline armoring, as defined in Article 2, may be replaced in
9 kind if there is a demonstrated need to protect public transportation infrastructure,
10 essential public facilities, and primary structures from erosion caused by currents,
11 tidal action, or waves and all of the following apply:
- 12 i. ~~The replacement structure is designed, located, sized, and constructed to~~
13 ~~assure no net loss of ecological functions.~~
 - 14 ii. The replacement structure performs the same stabilization function of
15 the existing structure and does not require additions to or increases in
16 size.
 - 17 ~~iii. The replacement structure shall not encroach waterward of the ordinary~~
18 ~~high water mark or existing structure unless the residence was occupied~~
19 ~~prior to January 1, 1992, and there are overriding safety or~~
20 ~~environmental concerns. In such cases, the replacement structure shall~~
21 ~~abut the existing shoreline stabilization structure.~~
- 22 2. Removal of older structures is required as new ones are put in place. Exceptions
23 may be made by the Administrator only in cases where removal would cause
24 more ecological disturbance than leaving the remnant structure in place.

25 ~~D. Regulations – Subdivisions and Existing Lots without Structures~~

- 26 ~~1. Land subdivisions shall be designed to assure that future development or use of the~~
27 ~~established lots will not require structural shoreline armoring.~~
- 28 ~~2. Use of a bulkhead, revetment or similar shoreline armoring to protect a platted lot~~
29 ~~where no primary use or structure presently exists shall be prohibited. Where~~
30 ~~such shoreline armoring already exists, property owners are strongly encouraged~~
31 ~~to remove it.~~
- 32 3. ~~Structural shoreline armoring for the sole purpose of leveling or extending~~
33 ~~property or creating or preserving residential lawns, yards, or landscaping shall be~~
34 ~~prohibited. Where such shoreline armoring already exists, property owners are~~
35 ~~strongly encouraged to remove it.~~

36 E.D. Regulations – New or Expanded Shoreline Armoring, When Allowed

- 37 1. ~~Structural shoreline armoring shall be prohibited in or adjacent to lakes and other~~
38 ~~low energy environments such as bays, and accreting marine shores. Where such~~

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~~shoreline armoring already exists, property owners are strongly encouraged to remove it.~~

2. New structural shoreline armoring may be permitted and existing structural shoreline armoring may be expanded only when one or more of the following apply:
 - i. When necessary to support a project whose primary purpose is enhancing or restoring ecological functions.
 - ii. As part of an effort to remediate hazardous substances pursuant to RCW 70.105.
 - iii. When necessary to protect public transportation infrastructure or essential public facilities and other options are infeasible.
 - iv. When necessary to protect a ~~water-oriented use or an existing, lawfully established, primary~~ structure, including a residence, that is in imminent danger of loss or substantial damage from erosion ~~caused by tidal action, currents, or waves.~~
3. Proposals for new or expanded structural shoreline armoring allowed under 7.7.E.2. above shall clearly demonstrate all of the following before a permit can be issued:
 - i. The erosion is not being caused by upland conditions, such as the loss of vegetation or poor drainage.
 - ii. The structural shoreline armoring design is the least environmentally damaging alternative.
 - iii. The shoreline armoring complies with the flood damage prevention regulations in JCC Chapter 18.30.070.
 - iv. Adverse impacts are fully mitigated according to the prescribed mitigation sequence such that there is no net loss of shoreline ecological functions or processes.
 - v. ~~Alternatives to structural shoreline armoring including vegetative shoreline stabilization, flexible/natural materials and methods, beach nourishment and other forms of bioengineering are~~ Shoreline stabilization is determined to be infeasible or insufficient.

~~4. When evaluating the need for new or expanded structural shoreline armoring, the Administrator shall require the applicant to examine and implement alternatives to structural shoreline armoring in the following order of preference:~~

- ~~i. No action (allow the shoreline to retreat naturally).~~
- ~~ii. Increased building setbacks and/or relocated structures.~~
- ~~iii. Use of flexible/natural materials and methods, vegetation, beach nourishment, protective berms, or bioengineered shoreline stabilization.~~

~~5. The County shall require applicants for new or expanded structural shoreline armoring to provide credible evidence of erosion as the basis for documenting~~

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1 ~~that the primary structure is in imminent danger from shoreline erosion caused~~
2 ~~by tidal action, currents, or waves. The evidence shall:~~

- 3 ~~i. Demonstrate that the erosion is not due to landslides, sloughing or other~~
4 ~~forms of shoreline erosion unrelated to water action at the toe of the~~
5 ~~slope; and~~
6 ~~ii. Include an assessment of on-site drainage and vegetation characteristics~~
7 ~~and their effects on slope stability.~~

8 F.E. Regulations – New or Expanded Shoreline Armoring, Design Standards

- 9 1. New or expanded shoreline armoring shall be designed by a state licensed
10 professional geotechnical engineer and/or engineering geologist and constructed
11 according to applicable U.S. Army Corps of Engineers requirements and/or state
12 Department of Fish and Wildlife Aquatic Habitat Guidelines.
- 13 2. The size of structural shoreline armoring shall be limited to the minimum
14 necessary to protect the primary use or structure that it is intended to protect.
- 15 3. When shoreline armoring is permitted, it shall be constructed of erosion resistant,
16 environmentally safe and durable materials that are easy to maintain.
- 17 4. Shoreline armoring shall be designed and constructed ~~with gravel backfill and~~
18 ~~weep holes~~ so that natural downward movement of surface or ground water may
19 continue without ponding or saturation that could compromise the surrounding
20 soil stability.
- 21 5. All forms of structural shoreline armoring shall be constructed and maintained in
22 a manner that does not degrade the quality of affected waters. ~~The County may~~
23 ~~require setbacks, buffers, and/or other measures to achieve these objectives.~~
- 24 6. Shoreline defense structures shall not be constructed with waste materials such as
25 demolition debris, derelict vessels, tires, concrete or any other materials which
26 might have adverse toxic or visual impacts on shoreline areas.
- 27 7. Gabions are prohibited as a means of stabilizing shorelines because of their
28 limited durability and the potential hazard to shoreline users and the shoreline
29 environment.

30 ~~8. Proposals, other than single-family residential developments of more than four (4)~~
31 ~~lots, that involve new or expanded shoreline armoring shall incorporate public~~
32 ~~access features consistent with Article 6 section 3 (Public Access) of this~~
33 ~~Program.~~

34 G.F. Regulations – Bulkheads

- 35 1. Bulkheads shall comply with the regulations noted in 7.7.B through F and this
36 section.
- 37 2. Bulkheads shall meet all of the following criteria:

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- i. They shall be located generally parallel to the shoreline. Adequate bank toe protection shall be provided to ensure bulkhead stability without relying on additional rip-rap; and
- ii. They shall be located so as to tie in flush with existing bulkheads on adjoining properties, ~~except when adjoining bulkheads do not comply with the design or location requirements set forth in this Program, or, otherwise coordinate so as to minimize ecological impact.~~

H.G. Regulations – Revetments

1. Revetments shall comply with the regulations noted in 7.7.B through F and this section.
2. Revetments shall meet all of the following criteria:
 - i. Revetments shall be placed landward of associated wetlands; and
 - ii. Revetments shall be located sufficiently landward of the stream channel to allow streams to maintain point bars and associated aquatic habitat through normal accretion; and
 - iii. Revetments shall be prohibited on estuarine shores, in wetlands, on point and channel bars, and in salmon and trout spawning areas. Point bars need to be added to Definitions.
3. Revetments or similar structures that have already cut off point bars from the stream shall be relocated if feasible.
4. When requesting a permit for a revetment along a stream or river, the applicant shall provide a geotechnical analysis of stream geomorphology both upstream and downstream of the proposed revetment site to assess the physical character and hydraulic energy potential of the specific stream reach and adjacent upstream or downstream reaches. The purpose of such analysis is to assure that the physical integrity of the stream corridor is maintained, that stream processes are not adversely affected, and that the revetment will not cause significant damage to other properties or shoreline functions and processes.

H.H. Regulations – Breakwaters, Jetties, and Seawalls

1. Breakwaters, jetties, and seawalls shall comply with the regulations noted in 7.7.B through F and this section.
2. Breakwaters, jetties, and seawalls shall only be allowed when shown to be necessary:
 - i. For purposes of navigation, or fisheries or habitat enhancement; or
 - ii. To protect from strong wave action public water-dependent uses such as a harbor, marina, or port that are located seaward of the existing shoreline; or

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1 iii. When adverse impacts on water circulation, sediment transport, fish and
2 wildlife migration, shellfish, and aquatic vegetation can be effectively
3 mitigated.

- 4 3. Fixed breakwaters shall be approved only if Open-pile, floating, portable, or
5 submerged breakwaters, or several smaller discontinuous structures that are
6 anchored in place, ~~shall be preferred over fixed breakwaters~~ are shown to be
7 ineffectice or insufficient.

8 J.I. Regulations – Application Requirements

- 9 1. To verify that the provisions of this section are fully addressed, the County may
10 require information to support a permit application for any type of shoreline
11 stabilization. Application information required pursuant to this section shall
12 address the urgency and risks associated with the specific site characteristics and
13 shall include:

- 14 i. A scaled site plan showing: 1) existing site topography and 2) the
15 location of existing and proposed shoreline stabilization, shoreline
16 armoring structures, and any fill including dimensions indicating
17 distances to the OHWM; and
18 ii. A description of the processes affecting the site and surrounding areas,
19 including but not limited to: tidal action and/or waves; slope instability
20 or mass wasting; littoral drift; channel migration; and soil erosion,
21 deposition, or accretion; and
22 iii. A description of alternatives to structural approaches, and a thorough
23 discussion of the environmental impacts of each alternative; and
24 iv. A description of any proposed vegetation removal and a plan to
25 revegetate the site following construction; and
26 v. A hydraulic analysis prepared by a licensed professional engineer that
27 describes anticipated effects of the project on water and wave
28 elevations and velocities; and
29 vi. A biological resource inventory and analysis prepared by a qualified
30 professional biologist that describes the anticipated effects of the
31 project on fish and wildlife resources; and
32 vii. A description of opportunities for providing public access to and along
33 the affected shoreline, as well as any proposed on-site recreational
34 features if applicable; and
35 viii. A description of any waste and debris disposal sites for materials
36 generated during construction; and
37 ix. Any other information that may be required to demonstrate
38 compliance with the review criteria referenced in this section.

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