Section 300.7. Construction of Shoreline Protection Facilities

A. Definitions

1. Structural shoreline protection facilities include revetments, bulkheads, seawalls, groins, breakwaters, jetties, and other structures, the purpose or effect of which is to control the erosion of coastal features.

2. A revetment is a structure built to armor a sloping shoreline face usually composed of one or more layers of stone or concrete riprap. A revetment blankets, and generally conforms to, the contours or a coastal feature.

3. A bulkhead is a wood, steel, or concrete structure built to retain or prevent mass wasting and collapse of a bluff into the sea; it provides limited protection from damage by waves.

4. A seawall is a massive, stand alone structure built of placed or dumped stone, concrete, or steel sheetpile. Concrete seawalls often have curved, or stepped face designed to withstand the direct onslaught of ocean waves.

5. A groin is a structure built of rock, steel, timber, or concrete that extends across a beach into tidal waters and is used to entrap sand in the longshore transport system; groins are generally perpendicular to the shoreline's coastal trend.

6. Breakwaters, either exposed or submerged, usually are structures that protect a shore, harbor, anchorage, or basin by intercepting waves. Sometimes breakwaters are placed parallel to the open shoreline to retard the force of incoming waves to headland and barrier beaches.

7. Jetties are structures, usually of dumped stone in Rhode Island (rubble mound), that retard the migration of a tidal inlet (breachway) in order to provide safer passage for boats in and out of coastal lagoons and estuaries.

8. Riprap consists of stone or concrete blocks that are dumped or placed and installed without mortar.

B. Policies

1. The Council favors non-structural methods for controlling erosion such as stabilization with vegetation and beach nourishment.

2. Riprap revetments are preferred to vertical steel, timber, or concrete seawalls and bulkheads except in ports and marinas. All of these forms of structural shoreline protection are considered to be permanent, not temporary structures.

3. When structural shoreline protection is proposed, the Council shall require that the owner exhaust all reasonable and practical alternatives including, but not limited to, the relocation of the structure and nonstructural shoreline protection methods (see Section 300.7.E.1).

C. Prerequisites

1. Permits for projects with structural shoreline protection facilities located below mean high water must be obtained concurrently from the Army Corps of Engineers and the CRMC. Council and Army Corps requirements are designed to complement one another; applicants should consider the requirements of both agencies when beginning the permit process. In some cases, the Council may require an applicant to obtain applicable Army Corps of Engineers permits prior to applying to the Council. A CRMC Assent is not valid unless the applicant has received all required Army Corps of Engineers approvals.

D. Prohibitions

1. The Council shall prohibit new structural shoreline protection methods on barriers classified as undeveloped, moderately developed, and developed and in Type 1 waters.

2. The Council shall prohibit the use of limited applications of riprap to protect structures ancillary to the primary structure.

3. Filling on a coastal feature or tidal waters beyond that which is consistent with 300.7.F.1 is prohibited.

4. Structural shoreline protection facilities are prohibited when proposed to be used to regain property lost through historical erosion or storm events.

E. Additional Category B Requirements

1. Applicants for structural shoreline protection measures to control erosion shall, on the basis of sound professional information, demonstrate in writing all of the following:

(a) an erosion hazard exists due to natural erosion processes and the proposed structure has a reasonable probability of controlling this erosion problem;

(b) nonstructural shoreline protection has not worked in the past or will not work in the future because these methods are not suitable for the present site conditions;

(c) there are no practical or reasonable alternatives to the proposed activity such as the relocation of structures that mitigate the need for structural shoreline protection;

(d) the proposed structure is not likely to increase erosion in adjacent areas;

(e) the proposed structure is an appropriate solution to the erosion problem considering such things as the long term erosion rate in the area, the likely effects of storms and hurricanes, and the stability of the shoreline on either side of the project;

(f) describe the long-term maintenance program for the facility including financial commitments to pay for said maintenance; and,

(g) new breakwaters, jetties, bulkheads, revetments, and seawalls shall be designed and certified by a registered professional engineer.

2. Applicants for breakwaters and jetties in addition to (a) and (b) above shall demonstrate that the proposed structure is necessary to provide protection to a marina, port facility, public mooring area, or public beach area.

3. Applicants for breakwaters and jetties shall also provide an evaluation of the structure's potential for interrupting the longshore movements of sediment. If such an interruption is likely to be significant, the applicant shall design a sand bypass system or another measure that will assure that the effects on sediment transport shall not cause significant erosion along nearby shores.

4. Repair or reconstruction of all structures that are physically destroyed 50% or more by wind, storm surge, waves or other coastal processes shall require a new Council Assent.

F. Standards

1. All applicable standards for earthwork (Section 300.2) shall be met. The base of the seawall, bulkhead, or revetment must be located as close as practicable to the shoreline feature it is designed to protect; structural shoreline protection facilities shall be placed landward of coastal wetlands.

2. The ends of shoreline protection structures shall be tied into adjacent structures. Where there are no adjacent structures, the new structure shall gradually return to the slope of the feature and be so designed that opportunities for erosion around the back of the structure are minimized.

3. The base of all shoreline protection structures built on unconsolidated sediments shall extend to a depth equivalent to mean low water or to an appropriate depth as determined by the methods detailed in the most recent version of the U.S. Army Corps of Engineers *Shore Protection Manual*. Where practicable, the base shall extend to a depth of 3 feet below the area of disturbance.

4. To promote good drainage behind seawalls and bulkheads, and to minimize the flow of sediment into waterways and avoid the loss of backfill, all backfill must contain less than 10% silt. If sediment in the area is fine-grained, a filtering layer shall be placed behind and/or beneath the structure, consisting of suitably graded stone or rock chips or geotextile filter fabric. Weep holes shall be provided for drainage in retaining walls and bulkheads. The use of grout or concrete within, behind, or over revetments is not permitted.

5. Where feasible, the areas in back of the structure shall be level for a distance equivalent to the height of the structure.

6. The slope of revetments shall not exceed 1:1.

7. Riprap revetments shall be constructed of angular stone with a minimum unit weight of 165 lbs./cubic foot (such as granite). The size of stone shall be dependent upon the site's exposure to wave energy in accordance with the following guidelines:

Fetch (nautical miles)	Weight (lbs.)	Size (cubic yards)
1	400	1/10
2	1,000	1/4
3	2,500	½
4	5,000	1
5 & greater	8,000 & greater	2 & greater

The above assumes a 1:1 wall slope and one layer of placed stone. Equivalent designs using appropriate siting and design methods as described in the most recent version of the U.S. Army Corps of Engineers *Shore Protection Manual* may be substituted in place of the above design guidelines.

8. Applications for structural shoreline protection facilities shall be designed and stamped by a registered professional engineer. However, small revetments in low wave energy environments may be exempted from these design requirements at the discretion of the Executive Director.

9. Concrete used for wall construction along the shore and in tidal waters shall be resistant to the sulfate attack of seawater; Type 2 or Type 5 air-entraining Portland cement or an equivalent shall be used.

10. All construction activities shall minimize any adverse impact to water quality such as disturbance of sediment.

G. Maintenance and Repair

1. To the maximum extent practical there shall be no farther seaward expansion of structural shoreline protection facilities as a result of repair or maintenance activities.

2. Maintenance and repair of existing structural shoreline protection facilities shall be the minimum that is required to maintain the functional viability or structural integrity. In the case of riprap revetments, the addition of limited quantities of riprap armor stone to existing damaged revetments may be allowed as a maintenance activity provided that no impact to coastal resources or lateral access results. All maintenance shall be in accordance with the policies and standards of the Coastal Resources Management Program.

3. All maintenance and repair activities shall minimize any adverse impact to water quality such as disturbance of sediments.

4. All applicable standards for earthwork (Section 300.2.) shall be met for repair or maintenance activities.

5. Maintenance and repair activities do not normally require plans and designs to be certified by a registered professional engineer. However, at the Council's discretion applicants for maintenance or repair activities may be required to submit plans certified by a registered professional engineer. In some cases the Executive Director may waive this requirement if the application is for a minor project.