Stabilizing Your Estuarine Shoreline

Do you want to stabilize your shoreline?

Step 1 – Ask yourself the following questions:

- Am I trying to protect my shoreline from daily erosion or storm induced erosion?
- How much erosion actually occurs here over a period of time?
- Are my personal structures in imminent danger?
- Are my neighbors experiencing the same erosion?

Step 2 – Talk to a N.C. Division of Coastal Management (DCM) field representative to find out answers to the following questions:

- What kind of stabilizing options am I allowed by current rules and regulations?

Step 2 – continued:

- What kind of wave energy (i.e. low, moderate, high) does my property receive?
- Are there any other construction restrictions for my location?

Step 3 – Talk with a Marine Contractor or Coastal Engineer to discuss stabilizing structure options, designs, permits, and cost.

Step 4 – Decide which method to use.

Step 5 – Contact DCM to apply for the Coastal Area Management Act (CAMA) permit(s) required.

Step 6 – Stabilize your shoreline.

Shoreline Stabilization Methods

Shoreline erosion is common along North Carolina's broad sounds and tidal rivers. Many waterfront owners would like to slow or prevent further erosion by stabilizing the shoreline. Shoreline Stabilization is defined as the use of engineered structures, vegetation, or land management practices to provide protection of a shoreline from future or existing erosion. Although the most commonly used method of shoreline stabilization is a bulkhead, there are many other options available. Some of the available options can actually improve the local habitat.

Structure Type	Aliases	Typical Construction Materials	Characteristics	Erosion Control Purpose
Land Planning			Live with/plan around existing conditions	Leave the land in its natural state
Vegetation Control	Wetland or Upland Plantings	Wetland or upland vegetation	Planting, replanting, or conserving exisiting vegetation	Creates a buffer to dissipate wave energy
Sills	Marsh Sill	Timber, rock, concrete pieces, vinyl	Parallel and close to shore, low elevation, associated with wetland vegetation	Reduces wave energy on shoreline. Traps sediment land-ward to rebuild/protect wetlands.
Groins	Jetties	Timber, rock, concrete, vinyl	Prependicular to shore	Trap sand on the updrift side to build out the upland
Breakwaters	Wave Attenuator	Timber, rock concrete	Shore parallel, larger and further offshore than sills	Reduces wave energy on the shoreline. Traps sand between the shore and breakwater.
Revetment	Riprap, Sloped Seawall	Concrete, rock	Sloped against a bank, parallel to shoreline	Protect land from erosion and absorb wave energy
Bulkhead	Vertical Structure, Seawall, Gravity Wall	Timber, steel, vinyl, rock, concrete	Watertight, vertical, parallel to shoreline	Hold back land

Land Planning

Definition: Land planning is designing your property around existing conditions and possible erosion. This includes utilizing the land as it exists without construction of shoreline stabilization methods. The most common practices associated with land planning include setbacks, buffers, and no action.

Pros: Allows marsh (if present) to migrate, allows the system to remain natural, minimal cost

Cons: Erosion continues

Locations: Anywhere

Permitting Options: None required

Vegetation Control

Definition: Vegetation control is the use of wetland (marsh or swamp forest) vegetation (new plantings or preserving existing wetland vegetation) to control or prevent further erosion. Vegetation may be planted or allowed to colonize naturally. A minimum width of 10 feet is preferable.

Pros: Environmentally friendly, low cost

Cons: Time required for vegetation to establish

Locations: Creeks, Canals, Rivers Tributaries, low wave action, low boat wake areas

Permitting Options: None required

Marsh Toe Protection Revetments

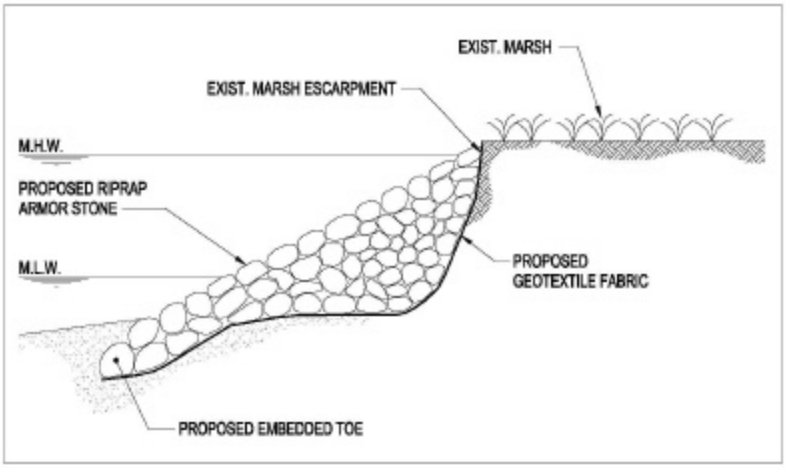
Definition: Marsh Toe Protection Revetments are a shore-parallel, sloping structure constructed against a marsh escarpment to protect the marsh wetland roots from undermining.

Pros: Protects an natural shoreline stabilizer

Cons: Doesn't stabilize the shoreline, but protects a method that does.

Location: Creeks, Canals, Rivers Tributaries, low wave action, low boat wake areas

Permitting Options: General or Major Permit



Groins

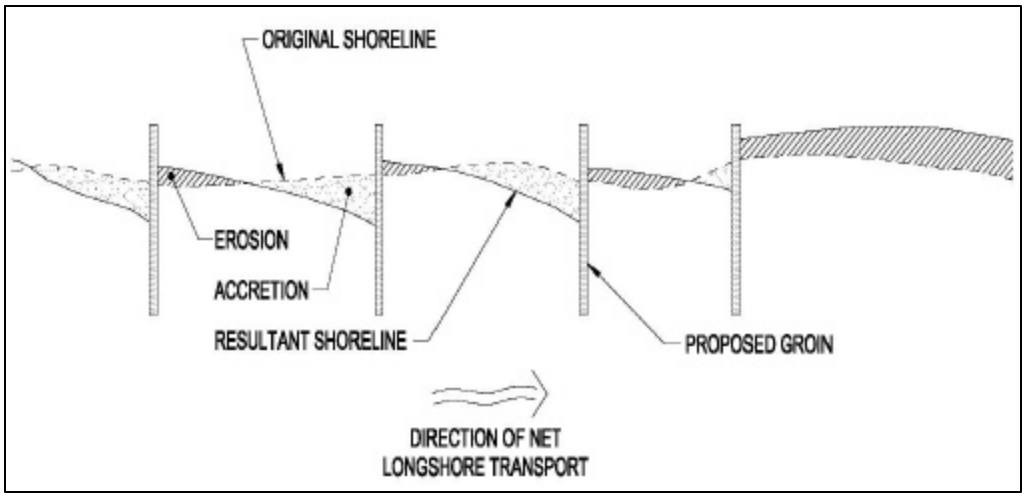
Definition: A groin is a straight and usually shore-perpendicular structure, constructed with stone or as a freestanding vertical wall to stabilize a stretch of beach against erosion. Groins can be constructed either singly or in a series. Groins function only when longshore transport occurs. Groins produce accretion of beach material along the updrift side and erosion on the downdrift side. A saw-toothed shaped shoreline is created with a series of groins.

Pros: Creation or building out of sandy beach, which acts as a wave dissipation zone.

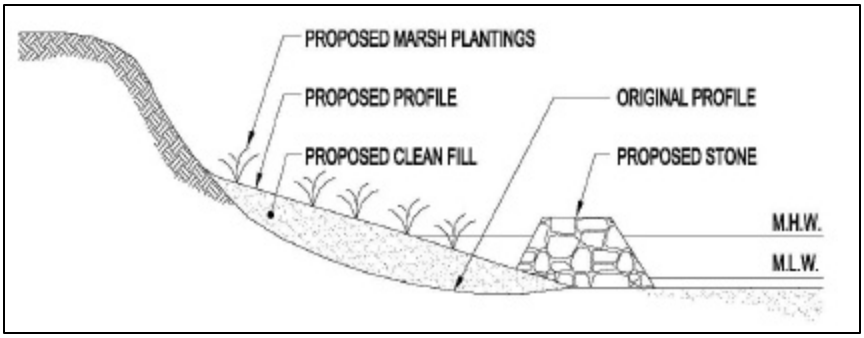
Cons: Produces erosion downdrift by starving the system of long shore transport.

Locations: Anywhere that has long shore transport.

Permitting Options: General or Major Permit



Sills



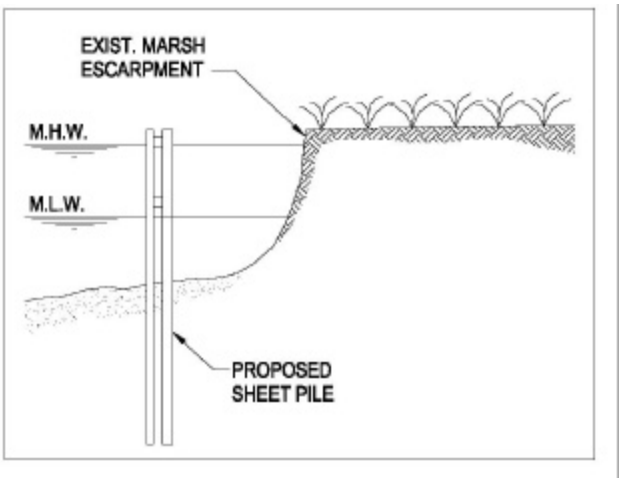
Definition: A sill is a shore-parallel, wood or rock structure that is designed to protect existing or newly planted wetland vegetation.

Pros: Protects a natural shoreline stabilizer, provides some additional aquatic habitat

Cons: Placed on aquatic bottom, time required for wetland vegetation to establish

Locations: Anywhere, moderate to high wave action, moderate to high boat wake areas

Permitting Options: General or Major Permit



Breakwaters

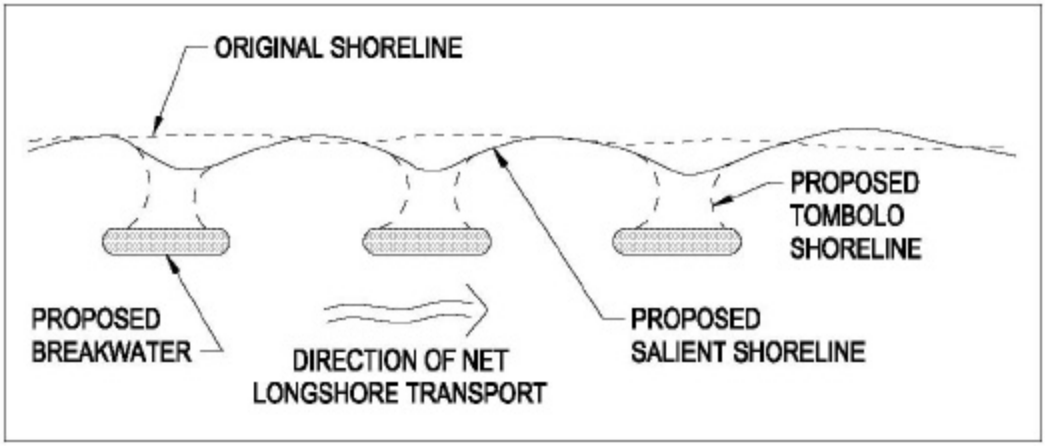
Definition: A breakwater is a shore-parallel non-shore-connected structure, designed to trap sand and to attenuate wave energy. Breakwaters are typically constructed of stone, with multiple structures detached or gapped with a distance equal to length of one individual structure. Breakwaters reflect and dissipate wave energy creating a lower wave energy area landward of the structure. A sandy beach is usually created between the structure and shore, but only when longshore transport occurs.

Pros: Creation or building out of sandy beach, dissipates wave energy

Cons: Produces erosion downdrift by starving the system of long shore transport. Large structure placed in public trust waters and possibly atop local habitat.

Locations: Good for areas with moderate wave action or boat wakes AND long shore transport.

Permitting Options: Major Permit Only



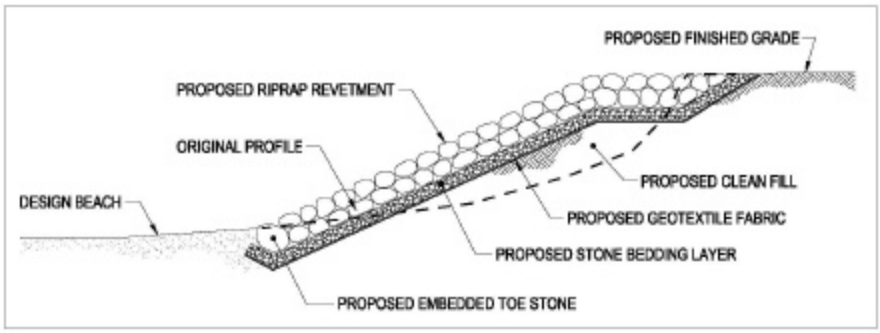
Stone Revetments

Definition: A revetment is a shore-parallel, sloping structure constructed against a bank/escarpment to protect it from erosion while absorbing wave energy. Revetments are typically constructed from stone, riprap, or concrete on a 1V: 1.5-3H slope.

Pros: Holds back the land to prevent erosion, long lasting structure, absorbs wave energy, creates some aquatic habitat.

Cons: Prevents natural landward migration of wetlands, eliminates sediment input into the system, large footprint on aquatic bottom

Locations: Any – though the size of the stone must be of a suitable to remain in place under currents and wave action.



Permitting Options: General or Major Permit

Vertical Structures

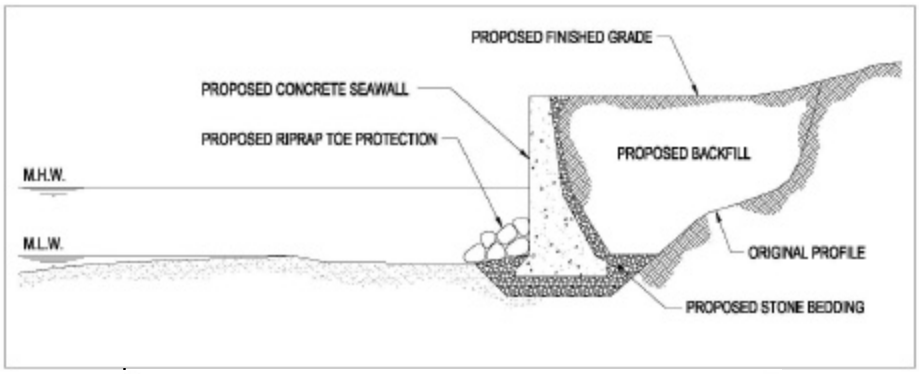
Definition: A bulkhead is any shore-parallel vertical structure designed to prevent overtopping, flooding, or sliding of the land. Bulkheads are usually placed along an eroding bank or escapement and constructed from timber, steel, concrete, or vinyl sheet pile.

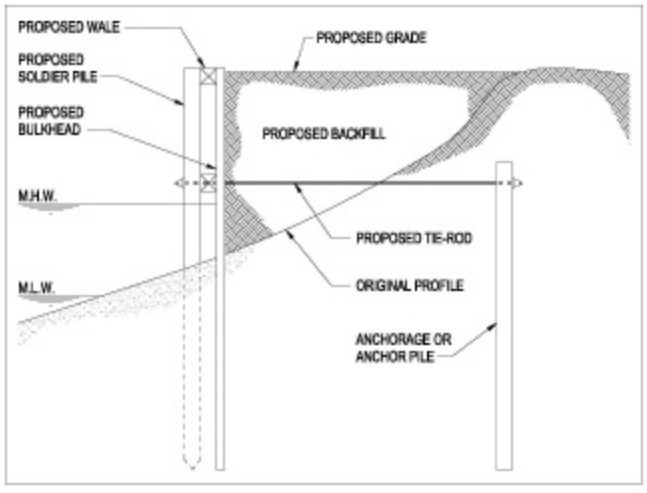
Pros: Holds back the land to prevent erosion, long lasting structure

Cons: Prevents natural landward migration of wetlands, eliminates sediment input into the system, reflects wave energy.

Locations: Any

Permitting Options: General or Major Permit





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