

Shore Protection Project Guidance



Ohio Department of
**NATURAL
RESOURCES**

OFFICE OF COASTAL MANAGEMENT

Erosion control measures along the shore of Lake Erie are exposed to severe wave and ice forces and need to be constructed of materials and in a manner that withstand those forces. General guidelines of what has or has not worked in the past are included below. Please refer to ODNR's *Coastal Regulations Guidance Sheet #1* for authorizations that may be required prior to construction of projects along the shore of Lake Erie.

Appropriate Materials: Erosion control measures should be constructed of materials that waves will not be able to move or break apart easily. Appropriate materials include limestone rock, sandstone rock, solid concrete blocks, or steel cribs filled with small stone. It is important that these materials are sized appropriately. Erosion control measures constructed along open-coast deep water areas, which includes the majority of the lakeshore, are typically constructed of large limestone rock (3 to 5 ton per rock) at a stable slope (2 horizontal to 1 vertical), or large concrete blocks (3-foot by 3-foot by 6-foot or similar) which are then connected together. In sheltered shallow-water areas such as Sandusky Bay and Maumee Bay erosion control measures typically are constructed of smaller materials (up to 1 ton per rock or block). Stones and blocks should be placed individually to avoid damaging them and to “lock” them in place.

Inappropriate Materials: Certain materials are not suitable for use along or near the shore of Lake Erie. These include but are not limited to construction or other debris, broken concrete or other rubble, asphalt, material containing re-bar, loose soil or unconsolidated materials, or fine-grained soils (ex. clay). These types of materials can create unsafe conditions at the site that threaten public health and safety, degrade the waters of Lake Erie, and are washed away by wave action.

Project Length and Width: In general, projects should be constructed along the area of shore that is experiencing erosion. Gaps between structures or abrupt changes between different types of structures and the shore should be avoided as they can cause increased erosion to those areas. Projects should only extend into the Lake the minimum distance necessary to protect the shore from erosion. In general, the total width of a seawall should be 10 to 15 feet and the total width of a revetment should be 25 to 30 feet, depending on the conditions at the project site. Structures that extend too far lakeward can cover shallow areas in the nearshore, may prevent the return of a beach, and may actually accelerate erosion on neighboring coastal properties.

Project Height: Projects should be constructed to a height that will prevent wave-based erosion and wave run up that erodes the bluff face. Typically this height is 10 feet or less above the water's edge. If the shore is already protected, erosion of the upper bluff or bank is typically caused by poor drainage of the soils and/or surface water flowing over the upper bluff, not the Lake. This type of erosion should be addressed differently than wave-based erosion along the shore. Installation of an upland drainage system and/or a retaining wall system, regrading of the bluff, not dumping grass clippings on the bluff, and allowing native vegetation to grow along the upper bluff are potential solutions to upper bluff erosion.

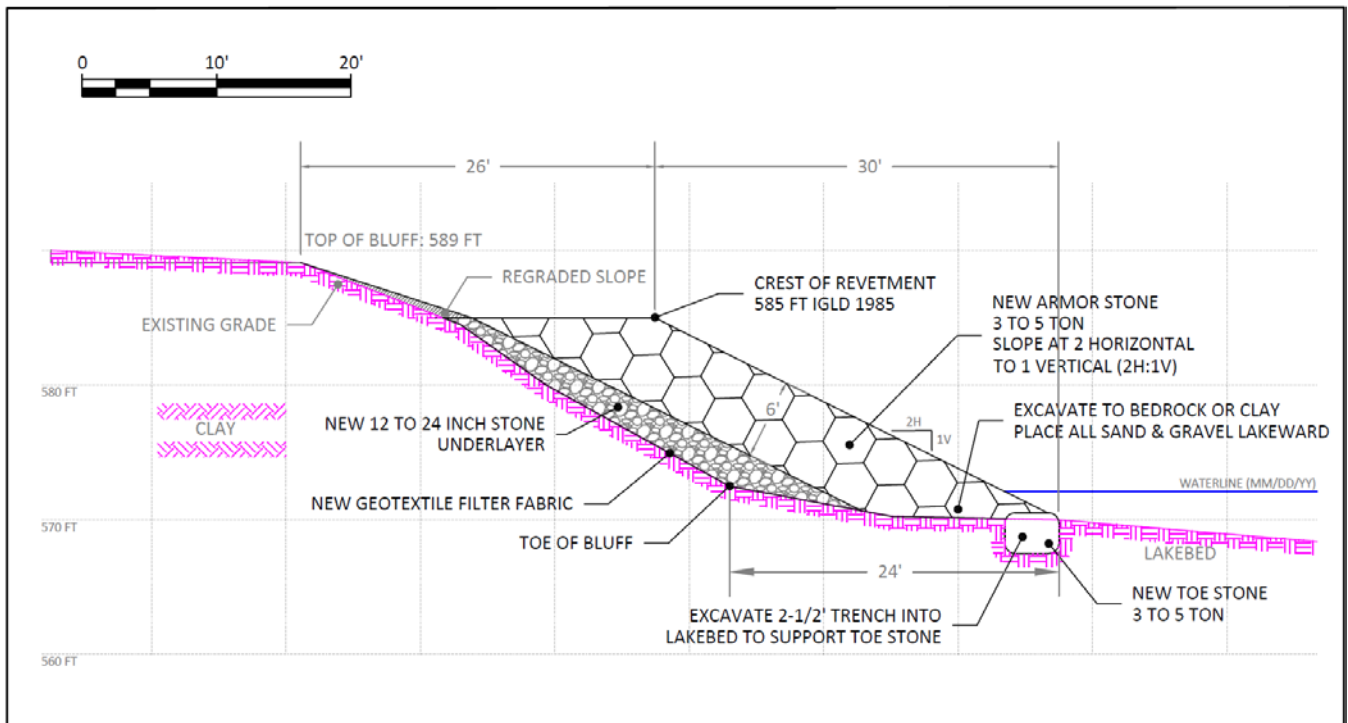
Best Management Practices: During construction, appropriate measures should be taken to protect the site from damage that could cause more erosion. If possible, vegetation on the bluff should be maintained. Native plants have root systems that help to hold the soil in place and remove water from the bluff. The bluff soils should not be disturbed unless necessary for re-grading. Soils are greatly weakened when moved and are more likely to slump or slide down the bluff if disturbed. Beach sand and gravel must be excavated and placed in the water away from the project footprint so they are not covered by the erosion control measure. Sand and gravel are natural shore protection and a valuable resource of Lake Erie. Relocating these materials allows them to form beaches in the future. Fine-grained material such as silt and clay should not be placed in or adjacent to Lake Erie. These materials can degrade water quality.

Typical Erosion Control Structure Example:

Armor stone revetments are a common erosion control structure constructed along the shore at a slope. The information below and side-view sketch shows the details of a typical armor stone revetment seen along the Ohio Lake Erie shoreline. The sketch can be used as a guide as to the fundamental components of a revetment.

What are the typical composition and design elements of armor stone revetments?

1. Armor stone layer consists of rough, angular quarry stone (Sandstone or Limestone) generally on the order of 3 to 5 tons per stone.
2. The outer slope of a stable armor layer can range between 1.5 to 3.0 horizontal units to 1 vertical unit. A common selection is 2 horizontal to 1 vertical (2H:1V).
3. Underlayer/core material consists of 12 to 24 inch stone.
4. A layer of geotextile filter fabric should separate the existing bluff and new stone.
5. Excavate toe trench 2-1/2 feet (minimum) into the bedrock or lakebed for the placement of toe stone.



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