

Rule F – Shoreline and Streambank Stabilization

1 Policy

It is the policy of the Board of Managers to prevent erosion of shorelines and streambanks, and to foster the use of natural materials and bioengineering for the maintenance and restoration of shorelines and streambanks.

2 Regulation

A permit from the District is required to install or maintain an improvement to stabilize a shoreline or streambank, including but not limited to riprap, a bioengineered installation, a sand blanket or a retaining wall, on any watercourse or a public water. No District permit under this rule is required for:

- 2.1 Activities conducted pursuant to a project-specific permit from the state Department of Natural Resources, but the District buffer requirements apply to activity that would otherwise require a District permit;
- 2.2 activities in incidental wetlands or for utility improvements or repairs that are the subject of a no-loss determination from the relevant LGU;
- 2.3 removing accumulated sediment from a water basin; or
- 2.4 maintenance or in-kind replacement of existing public infrastructure on non-public waters that does not increase the length, width or depth of the existing infrastructure.

3 Criteria

Except for shoreline maintenance that qualifies for approval under paragraph 3.4 below, a permit will be issued on demonstration by the applicant of compliance with the applicable criteria in subsections 3.1 through 3.3.

- 3.1 An applicant for a permit under this rule must demonstrate a need to prevent erosion or restore an eroded shoreline or streambank, unless the proposed improvement is designed to restore natural shoreline or streambank.
- 3.2 **Sequencing.** Stabilization practices must be consistent with the erosion intensity or shear stress rating calculated for the property proposed to be stabilized. The District will approve proposed stabilization practices in accordance with the applicable sequencing priority:
 - a **Shoreline erosion intensity calculation.** Applications for shoreline stabilization must include a completed RPBCWD Erosion Intensity Scoresheet² to determine the erosive energy ranking for the site (low, medium, high). The

² The Erosion Intensity Scoresheet is incorporated into and a part of these rules. It may be obtained from the District office or the permitting section of the District website: www.RPBCWD.org. The website also provides guidance on how to complete the scoresheet. The scoresheet may be periodically updated, on approval of the RPBCWD Board of Managers, to account for improved understanding of shoreline-erosion factors.

proposed shoreline stabilization practice must be consistent with the shoreline erosion energy rating calculated.

- i Low-energy site means a site where the erosion intensity score is 47 or less. Low energy shorelines may be stabilized using bioengineering stabilization practices.
 - ii Medium-energy site means a site where the erosion intensity score is 48 to 67. Medium energy shorelines may be stabilized using a combination bioengineering and vegetated riprap stabilization practices.
 - iii High energy site means a site where the erosion intensity score is greater than 67. High energy sites may be stabilized with riprap and vegetated riprap practices.
- b **Streambank shear stress calculation.** Applications for streambank stabilization must include a shear stress calculation for the site.³ The proposed streambank stabilization practice must be consistent with the shear stress calculated.
- i Low energy streambanks are those where the shear stress calculated is less than or equal to 2.5 pounds per square foot and may be stabilized using bioengineering practices.
 - ii Medium energy streambanks are those where the shear stress calculated is between 2.5 and 5 pounds per square foot and may be stabilized using a combination of riprap and bioengineering.
 - iii High energy streambanks are those where the shear stress calculated is greater than 5 pounds per square foot and may be stabilized using riprap and vegetated riprap.
- c **Design flexibility.** The District may approve alternative stabilization techniques if the applicant provides sufficient evidence from an engineer registered in Minnesota to demonstrate that the proposed stabilization practice represents the minimal-impact solution with respect to all other reasonable alternatives. A detailed alternatives analysis must be provided.

3.3 Design criteria.

a **Vegetative, bioengineered and hard-armored stabilization.**

- i Live plantings must be native aquatic vegetation and/or native upland plants.
- ii The finished, stabilized slope of any shoreline or streambank will not be steeper than 3:1 (horizontal to vertical) waterward of the OHW except where necessary:
 - (a) to match existing slopes and certified by registered professional

³ Shear stress must be calculated in a manner consistent with the Natural Resources Conservation Service's National Engineering Handbook (including Technical Supplement 14I: Streambank Soil Bioengineering); Stability Thresholds for Stream Restoration Materials published by the U.S. Army Corps of Engineers; NRCS Engineering Field Handbook Streambank and Shoreline Protection (Chapter 16); or Wisconsin Supplement Engineering Field Handbook Chapter 16 Streambank and Shoreline Protection. The RPBCWD website – www.rpbcwd.org – provides guidance on how to calculate shear stress.

- engineer for continued slope stability, or;
 - (b) for bridges, culverts and other structures regulated under Rule G – Waterbody Crossings and Structures.
 - iii Horizontal encroachment from a shoreline or streambank will be the minimal amount necessary to permanently stabilize the shoreline or streambank and will not unduly interfere with water flow or navigation. No riprap or filter material may be placed more than 6 feet waterward of the OHW. Streambank riprap may not reduce the cross-sectional area of the channel or result in a stage increase at or upstream of the installation.
 - iv The design of any shoreline or streambank erosion protection will reflect the engineering properties of the underlying soils and any soil corrections or reinforcements necessary. The design will conform to engineering principles for dispersion of wave energy and resistance to deformation from ice pressures and movement, considering prevailing winds, fetch and other factors that induce wave energy.
- b Riprap**
- i Riprap to be used in shoreline or streambank erosion protection must be sized appropriately in relation to the erosion potential of the wave or current action of the particular waterbody, but in no case will the riprap rock average less than six inches in diameter or more than 30 inches in diameter. Riprap will be durable, natural stone and of a gradation that will result in a stable slope. Stone, granular filter and geotextile material will conform to standard Minnesota Department of Transportation specifications, except that neither limestone nor dolomite will be used for shoreline or streambank riprap, but may be used at stormwater outfalls. All materials used must be free from organic material, soil, clay, debris, trash or any other material that may cause siltation or pollution.
 - ii Riprap must be placed to conform to the natural alignment of the shoreline or streambank.
 - iii A transitional layer consisting of graded gravel, at least six inches deep, and an appropriate geotextile filter fabric will be placed between the existing shoreline or streambank and any riprap. The thickness of riprap layers should be at least 1.25 times the maximum stone diameter. Toe boulders, if used, must be at least 50 percent buried.
 - iv Riprap must not cover emergent vegetation, unless authorized by a Department of Natural Resources permit.
 - v Riprap must not extend higher than the top of bank or two feet above the 100-year high water elevation, whichever is lower.
 - vi Placement of riprap for cosmetic purposes alone is prohibited.
- c Retaining walls.** Retaining walls extending below the OHW of a waterbody are prohibited, except where:
- i there is a demonstrable need for a retaining wall in a public improvement project, and

- ii the design of the retaining wall has been certified by a registered engineer.
- d **Sand blankets.** The following standards apply to sand blanketing:
 - i The sand or gravel used must be clean prior to being spread. The sand must contain no toxins or heavy metals and must contain no weed infestations such as, but not limited to, water hyacinth, alligator weed, and Eurasian watermilfoil, or animal infestations such as, but not limited to, zebra mussels or their larva.
 - ii The sand layer must not exceed six inches in thickness, 50 feet in width along the shoreline, or one-half the width of the lot, whichever is less, and may not extend more than 10 feet waterward of the ordinary high water level.
 - iii Only one installation of sand or gravel to the same location may be made during a four-year period. After the four years have passed since the last blanketing, the location may receive another sand blanket. No more than two applications may be made at an individual project site.

Public beaches. Beaches operated by public entities and available to the public must be maintained in a manner that represents the minimal impact to the environment, relative to other reasonable alternatives, but otherwise are exempt from the criteria in paragraphs (b) and (c) of this section.

- e In installing or maintaining any shoreline or streambank stabilization, the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian watermilfoil, etc.) must be minimized to the maximum extent possible.

- 3.4 **Maintenance.** The District will issue a permit for maintenance of an existing shoreline stabilization in its established form if the stabilization was installed before February 1, 2015, or after that date in compliance with a duly issued District permit on submission by the applicant of plans documenting that the maintenance work will not increase the length of the stabilization along the shoreline and will comply with all applicable criteria of subsection 3.3.

4 **Required information and exhibits.**

The following exhibits will accompany the permit application:

- 4.1 One 11 inch-by-17 inch plan set, and electronic files in a format acceptable to the District, as well as a plan set 22 inches by 34 inches if requested by the District.
- 4.2 A site plan, including:
 - a Documentation, including at a minimum, photographs, of existing erosion or the potential for erosion;
 - b a survey locating the existing OHW level, existing shoreline/streambank, floodplain elevation and location of property lines;
 - c elevation contours of the upland within 15 feet of the OHW level and referenced to accepted datum; and
 - d plan view of locations and lineal footage of any proposed riprap.

The plan must show the location of an upland baseline parallel to the shoreline with stationing. The baseline will be staked in the field by the applicant and

maintained in place until project completion. Baseline origin and terminus each must be referenced to three fixed features, with measurements shown and described on the plan. Perpendicular offsets from the baseline to the OHW must be measured and distances shown on the plan at 20-foot stations. The plan will be certified by a registered engineer or landscape architect.

- 4.3 A construction plan and specifications certified by a registered engineer or landscape architect, showing:
 - a A sequencing analysis in compliance with section 3.2;
 - b materials to be used, including the size(s) of any riprap to be used;
 - c cross section detailing the proposed riprap, if any, drawn to scale, with the horizontal and vertical scales noted on the drawing. The detail should show the finished riprap slope, transitional layer design and placement, distance waterward of the riprap placement and OHW.
 - d Description of the underlying soil materials.
 - e Material specifications for stone, filter material and geotextile fabric.
- 4.4 For sites involving aquatic plantings, a separate Aquatic Plant Management permit will be obtained from the Department of Natural Resources.
 - a This provision does not apply to slope protection projects using woody species such as willow and dogwood.
- 4.5 An erosion control and site restoration plan.
- 4.6 For an application for a sand blanket, the following exhibits are required:
 - a Site plan showing property lines, delineation of the work area, existing elevation contours of the adjacent upland area, ordinary high-water elevation, and 100-year high water elevation (if available). All elevations must be reduced to NGVD (1929 datum).
 - b Profile, cross sections and/or topographic contours showing existing and proposed elevations in the work area. (Topographic contours should be at intervals not greater than 1.0 foot).
 - c A completed Sand Blanket Permit Application form.