ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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WB-11 2020

Bank and Shoreline Stabilization Projects in Non-Tidal Areas

Projects involving dredge or fill or the placement of structures on or within the banks or bed of surface waters require a permit from the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau. The Wetlands Bureau operates under RSA 482-A (Fill and Dredge in Wetlands) and the New Hampshire Administrative Rules Env-Wt 100-900, which require that impacts to these areas be minimized and avoided whenever possible. In addition, Rule Env-Wt 514 describes specific criteria for bank and shoreline stabilization projects, the purpose of which is to maintain or restore healthy and vegetated bank and shoreline systems that will:

- Provide soil stabilization of banks and shorelines.
- Establish stable and diverse ecosystems to support fish and wildlife habitats.
- Ensure runoff filtering and effective sediment-trapping functions, so that nutrients and pollutants are not carried into surface waters.
- Protect against flooding by trapping sediment and slowing floodwaters.

Types of Stabilization

Stabilization must be in accordance with the approval criteria for all banks/shoreline projects described in Env-Wt 514. The methods of stabilization identified below are listed in order of preference as established in the rules (#1 = first order or stabilization preference):

1. Soft vegetative bank stabilization, including regrading and replanting of slopes, in which all work occurs above the ordinary high water or normal high water line. Natural vegetation must be left intact to the maximum extent practicable. Where unstable banks are present, they should be replanted with native, non-invasive trees, shrubs and ground cover. If steep banks are present, jute or turf reinforcement mats should be considered in order to prepare the site to readily accept native plants and dormant woody plant cuttings called "live stakes."

***2.* Bioengineered bank stabilization or naturalized design techniques that use a combination of live vegetation, woody material, or geotextile matting and may include regrading and replanting of slopes:** For complicated projects, bioengineering techniques must be considered before deciding on the appropriate method to improve channel stability, with consideration given to the river or stream dynamics and natural stream channel design (Figure 1). Deflecting structures such as stone vanes, stream barbs and root wads combined with re-vegetation of the bank and associated area landward of the stream have been proven to trap sediment and are successful in keeping stream currents away from the bank.

Figure 1 *– Example of a successful bioengineered bank stabilization project. These pictures were taken post-construction (top pictures taken in September 2000; bottom pictures taken in August 2017). Live dogwood fascines (bundles of live plants) were used in this stabilization project, in combination with logs and other techniques. The design created a shady area above the water, which benefits native brook trout, a cold-water species known to inhabit this stream.*

3. Semi-natural form design:
Semi-natural form design is a combination of soft (e.g., vegetation) and hard-scape (e.g., rip-rap or wall) techniques. It is only allowed where the applicant demonstrates that anticipated turbulence, flows, restricted space, or similar factors render the other methods physically impractical.

4. Hard-scape or rip-rap design: Hard-scape or rip-rap design is allowed only where anticipated turbulence, flows, restricted space, or similar factors render diversional above methods physically impractical and where necessary to protect existing infrastructure.

Rip-rap is a layer of angular stones placed on a slope to prevent erosion, scour, or sloughing of the slope. If rip-rap is necessary, then the preferred technique is to use it at the base or toe of a slope, in combination with vegetative stabilization techniques used higher up the bank (Figure 2).

If the project involves the installation of rip-rap, the rip-rap must be located shoreward of the normal high water line, where practicable, and extend not more than 2 feet lakeward of that line at any point. If the project proposes rip-rap adjacent to great ponds or other surface waters where the state holds fee simple ownership to the bed, the application must include a stamped surveyed plan showing the location of the normal high water line and the footprint of the proposed project.

It is generally recommended that an engineer be consulted for any rip-rap project. Applications for rip-rap projects in excess of 100 linear feet along the bank or bed of a watercourse, including in-stream revetments, require engineering plans stamped by a professional engineer.

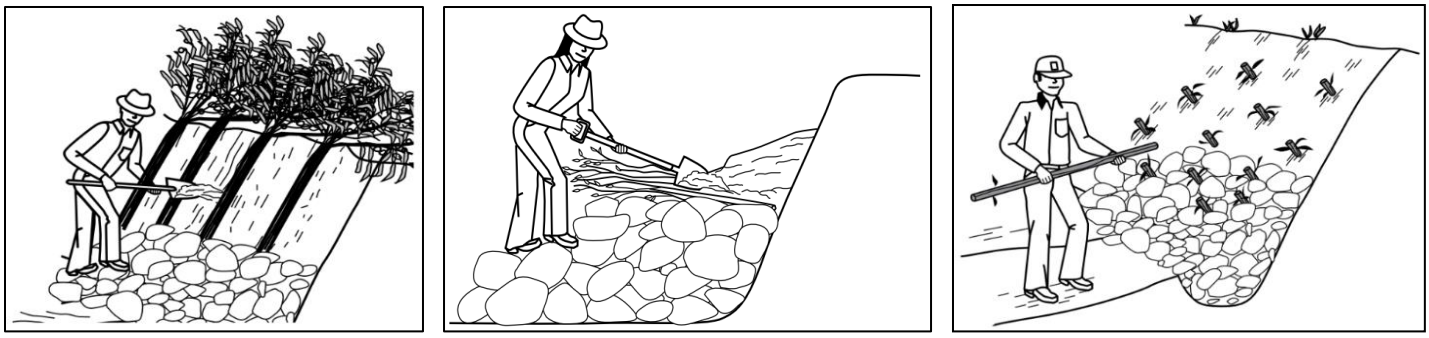

Figure 2 – *Rip-rap used at the base of the slope. Combining structural stabilization with bioengineered techniques can lead to achieving the benefits of both strategies. This example depicts three different methods for combining structural and biostabilization (i.e., vertical bundles backfilled with a stone toe (left), a brush layer over a stone toe (middle), and a stone toe supplemented with joint plantings (right)). These illustrations and associated caption were taken from the Wetlands Best Management Practice Techniques for Avoidance and Minimization (2019).*

5. Wall construction:

Construction of retaining walls is the least desirable method and the last alternative considered for bank stabilization. Before a retaining wall can be approved, it must be shown that there is a lack of space or other site limitation that makes alternative stabilization methods impractical. Wherever sufficient room exists, slopes must be cut back to eliminate the requirement for a wall.

For all proposals involving retaining walls adjacent to great ponds or other surface waters where the state holds fee simple ownership to the bed, a permit application must include a surveyed plan stamped by a licensed land surveyor, showing the location of the normal high water line and the footprint of the proposed project.

While bank stabilization is permissible in some cases, NHDES typically does not authorize the reclamation of land lost to erosion.

Additional Required Guidelines

Stream bank stabilization project plans must be developed in accordance with the following techniques, as applicable:

- Naturalized and semi-natural design techniques must be developed in accordance with the *Guidelines for Naturalized River Channel Design and Bank Stabilization* dated February 2007, by R. Schiff, J.G. MacBroom, and J. Armstrong Bonin.
- Bioengineering projects must be developed in accordance with the *National Engineering Handbook Part 654 (NEH 654), Technical Supplement 141, Streambank Soil Bioengineering*, dated August 2007, by NRCS.
- Stream restoration projects must be developed in accordance with *NEH 654, Stream Restoration Design*, dated August 2007, by NRCS.

Permitting Projects

Under specific circumstances, the repair of an existing legal wall may be permitted under a wetlands permit-by-notification (PBN). Please review the PBN form and the Repair of an Existing Legal Retaining Wall PBN Checklist to determine if your project is eligible for this permitting process.

For other bank/shoreline stabilization projects, either use the Standard Dredge and Fill Wetlands Permit Application or Expedited (EXP) Minimum Impact Wetlands Permit Application depending on the size, scope and impacts of the proposed project. For more information, please review the Bank/Shoreline Stabilization Project-Specific Worksheet for Standard Application.

More Information

For more information regarding stabilization techniques, please consult Chapter 8 of the Wetlands Best Management Practice Techniques for Avoidance and Minimization (2019). For more information regarding permitting, please visit www.des.nh.gov or call the Wetlands Bureau at (603) 271-2147.