

Understand the role of trees in updated stormwater regulations



Road-related erosion is recognized as a nonpoint source of sediment and phosphorus pollution in Vermont’s waterways.

To comply with the Municipal Road General Permit issued in 2018, municipalities are completing road erosion inventories that outline multiyear strategies to correct erosion patterns along roads that are hydrologically connected to streams, ponds, and other water bodies. While stone-lined ditches and other hardscaping are effective tools for mitigating sediment and phosphorus transportation, trees and other vegetation play a large role in controlling erosion and protecting water quality.

Deciduous tree canopy cover can reduce rainfall intensity by 15%–21%¹ and coniferous canopy by

21%–52%.² On rural roads, this canopy can diminish the impact of water droplets on dusty roads and the erosive power of running surface water during rainfall. Additionally, tree and plant root systems reinforce the shear strength of soil and extract water from the soil for plant growth, reducing soil erosion and its causes. Ensuring that road shoulders are lower than the traveled lane allows stormwater to flow into neighboring vegetated land instead of down the road. However, towns will need to carefully note where ditching is the required method for stormwater control, even at the expense of existing vegetation.

1. Trimble & Weitzman, *Effect of a Hardwood Forest Canopy on Rainfall Intensities* (1954), referenced in USDA Forest Service, *Give Me the Numbers: How Trees and Urban Forests Really Affect Stormwater Runoff*, bit.ly/USDA_TreesAndStormwater.

2. Keim and Skaugset, *Modeling Effects of Forest Canopies on Slope Stability* (2003), referenced in USDA Forest Service, *Give Me the Numbers: How Trees and Urban Forests Really Affect Stormwater Runoff*, bit.ly/USDA_TreesAndStormwater.

Recommendations

Refer to the [Municipal Roads Program](#)¹ for information on the [Municipal Roads General Permit](#),² reporting requirements, and funding assistance.

Understand where waivers in the permit preclude the removal of trees or other vegetation. These include areas where roadside construction would impact significant environmental and historic resources (including historic landscapes) or landscapes or vegetation within 250 feet of a lakeshore.

1. “Municipal Roads Program,” Vermont Department of Environmental Conservation, bit.ly/VermontMunicipalRoads.

2. Vermont Department of Environmental Conservation, *Vermont Pollutant Discharge Elimination System General Permit 3-9040 for Stormwater Discharges from Municipal Roads*, bit.ly/VT_MRGP.

Review the updated recommendations in the [Vermont Better Roads Manual](#)³ and look for places where clean water goals can be met through carefully balanced construction and vegetation preservation. Techniques include stone turnouts (as pictured below in the *Vermont Better Roads Manual*), the filling of incision ditches with gravel and stone armor (also pictured below), the installation of dry wells or French drains to capture or transport runoff, or the use of [bioretention areas](#).⁴

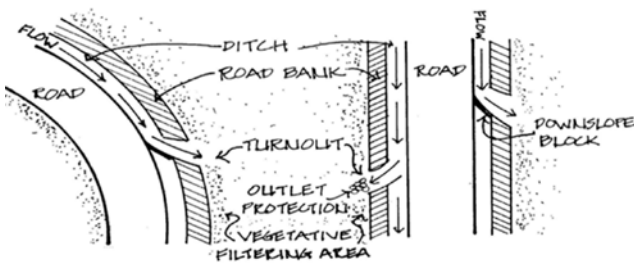
Review updated [Town Road and Bridge Standards](#)⁵ that outline construction standards that towns can adopt to reduce stormwater runoff and improve the resiliency of town roads.

3. Vermont Agency of Transportation, *Vermont Better Roads Manual* (January 2019), bit.ly/VT_BetterRoadsManual.

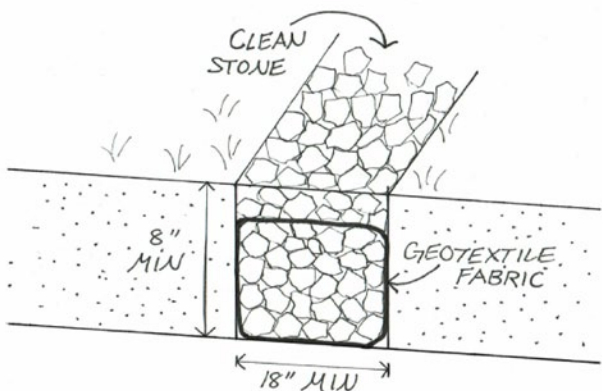
4. Winooski NRCD, UVM Extension, and Lake Champlain Sea Grant, *The Vermont Rain Garden Manual*, bit.ly/VT_RainGardenManual.

5. Town Road and Bridge Standards, Municipality of ____, Vermont (fillable form) (2019), Vermont Agency of Transportation, bit.ly/VT_RoadAndBridge.

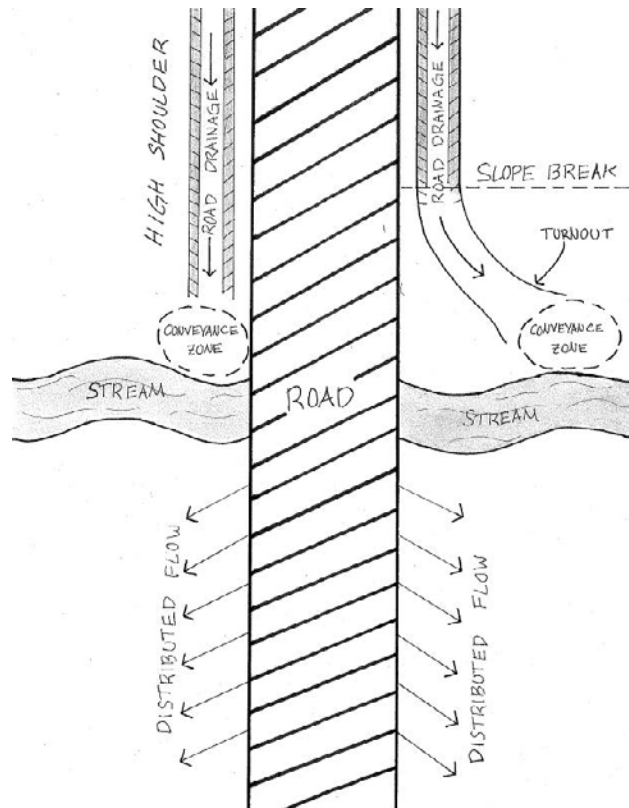
Stormwater management in the right-of-way



Stone turnouts direct water away from road edges into existing forest cover or other vegetation. All drawings from the [Vermont Better Roads Manual](#) (2019).



Infiltration trenches catch runoff before water travels down the road. They should be installed with a vegetated filter strip to reduce clogging of the trench.



The Municipal Roads General Permit requires that road drainage be disconnected from a waterbody via distributed drainage into a grass or forested area or into a stabilized conveyance zone.