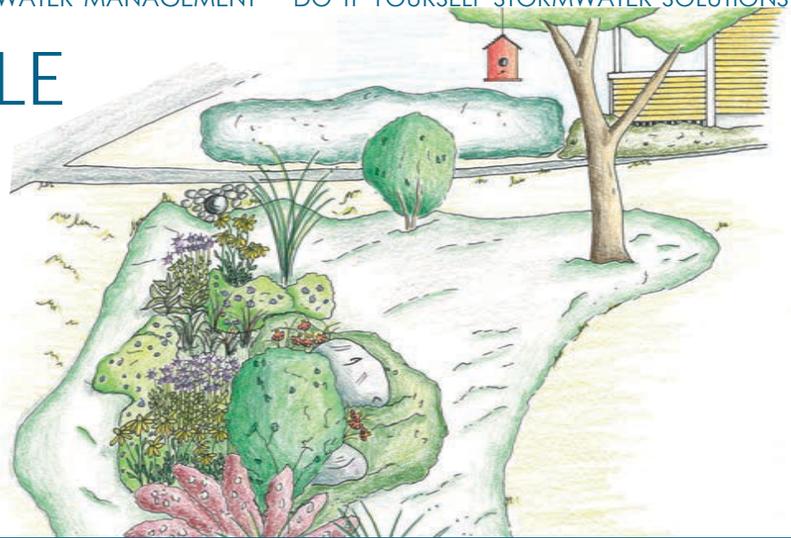


VEGETATED SWALE

A shallow vegetated channel used to direct runoff. The plants stabilize the soil, reduce erosion, slow the flow and absorb runoff.



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SIZING AND DESIGN

STEP 1 – Location. Swales are often located close to roads or driveways. They are usually built in naturally sloping areas to convey runoff safely and slowly to a vegetated area where it can infiltrate. If a vegetated area doesn't exist, consider building a rain garden, dry well or other practice at the end of the swale to encourage the runoff to soak into the ground. A slope of one inch for every foot in length is enough to slowly move the runoff through the swale. When selecting the location of your swale, consider the source of the runoff, the slope of the land, and where you want the runoff to ultimately end up. Swales should not be used to direct water off of your property, or into a road or waterbody.

STEP 2 – Length and width. Consider the natural contour of the land when deciding on the shape and dimension of the swale. A swale that meanders down a slope will convey runoff more slowly than a straight swale. The distance from the source of the runoff to the desired outlet location will dictate the length. A swale can be any width. Constraints on the site, such as buildings and property setbacks, can influence the width and how the swale fits into other landscaped features.

STEP 3 – Berms or check dams. If a swale needs to be oriented straight down a hill or on a steep slope, consider adding berms or check dams to the swale design. Berms or check dams are built across a swale, similar to speed bumps in a road. They are used to slow down the speed of runoff as it flows through the swale.

STEP 4 – Plant selection. Refer to [Native Plants for New England Rain Gardens](#) on the *Soak Up the Rain New Hampshire* program website for plant suggestions. While this list was developed for rain gardens, many of the species would do well in vegetated swales. Hardy ground covers and grasses that produce uniform, dense cover that can withstand flood and drought conditions are best. If the swale is to be located close to a road or in an area where snow will be stored, salt-tolerant plants should be considered.

STEP 5 – Identify staging and material disposal area(s). Identify an area on the site where delivered

EQUIPMENT & MATERIALS

- ✂ Measuring tape
- ✂ Shovels
- ✂ Rakes
- ✂ Plants - native grasses, sedges, and seedlings
- ✂ Mulch
- ✂ Wheel Barrow(s)
- ✂ Stakes
- ✂ String & string level

materials, such as stone, compost and mulch, can be stored temporarily while the vegetated swale is being built. Also identify an area to dispose of excess materials, like sod and soil that is excavated from the swale, where it will not wash away.

INSTALLATION

STEP 1 – Mark out location. Using stakes and string or spray paint, mark out the boundary of the swale according to the design. Be sure to identify the placement of any berms or check dams. These are areas that you will likely not need to dig as deeply, if at all.

STEP 2 – Dig. Dig out the shape of the swale. The deepest part of the swale should be about three feet deep. The width of the swale will depend on how much space you have on your site. A swale can be any size or length, but most are shaped like a trapezoid with the sides being three times wider than the width of the base. The slope of the sides should be between 1% and 4% (Figure 1).

STEP 3 – Check dams. For swales on steep slopes (5% or steeper), berms or check dams can be used to slow down the flow of runoff and reduce the potential for erosion. These can be made of compacted earth and reinforced with plantings and stone, or can be made of larger stones. Be creative. Check dams made with large stones can become beautiful landscape features. See Figure 2.

STEP 4 – Secure swale inlet. Depending on how runoff enters the swale, consider stabilizing the inlet with a splash guard, washed stone, or hardy plants to reduce erosion from fast moving water.

STEP 5 – Plant the swale. Use good planting practices, such as those listed below. Place plants while still in their pots into the buffer according to the planting plan. Make adjustments for spacing as needed. When you are ready to plant, remove one plant at a time from its pot.

- Dig a hole twice as wide as the plant's rootball and no deeper than the rootball.
- Loosen and rough up the rootball before planting, especially those rootbound in the container, to encourage healthy root growth.
- Set plants to the same depth as they were in the pot.

TIP: Be careful not to compact the soil when digging because it will reduce the ability of the swale to infiltrate runoff. For clay soils or other poorly infiltrating soils, you may want to dig down an additional 1½-inch below the bottom of the swale and create a sandy loam by mixing sand in with the existing soil, then refill the hole. This will improve infiltration.

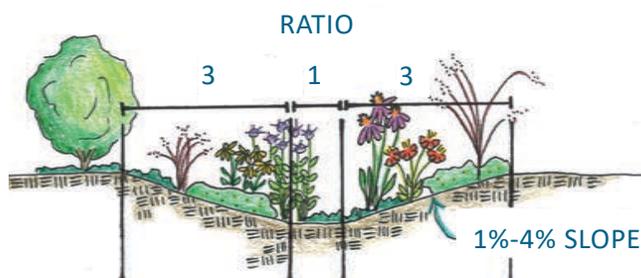


Figure 1. Profile of vegetated swale.



Figure 2. Check dams within a swale slow the flow, allowing sediments to settle out and some infiltration to occur.

- If staking trees, make sure the trunks are allowed to sway in the wind.
- Water: For landscaped or enhanced buffers, water thoroughly (to a depth of two inches) just after planting and daily during the first week. During the second week, water every other day. Then, water twice a week through the first growing season.

STEP 6 – Mulching. Spread two to three inches of mulch over the root zone of plants to provide weed suppression, slow release of nutrients, and additional moisture retention. Be sure to keep mulch a few inches away from plant stems and trunks.

MAINTENANCE

INSPECT: Seasonally and after large storms, look for signs of erosion, accumulated sediment and plant stress, such as wilting, discolored leaves, etc.

WATER: Newly planted vegetation needs regular watering for the first two growing seasons. A good rule of thumb is for trees and shrubs to get about an inch of water twice a week each time you water. Cut back to watering once a week in fall and in the next growing season.

WEED: Weed as needed, or allow native and non-invasive “weeds” like goldenrod, Queen Anne’s lace and yarrow to grow. Be on the look out for invasive plants, such as oriental bittersweet and purple loosestrife. Carefully remove invasives in a way that will not spread seeds and cause more to grow.

CLEAN: Remove accumulated sediment and replace vegetation as needed.

DESIGN REFERENCES

Vermont Department of Environmental Conservation. *Vermont Low Impact Development Guide for Residential and Small Sites*. December 2010.