RURAL PROTECTION (RP1 & RP2) STORMWATER MANAGEMENT PERMIT

Town of Brunswick

CODES ENFORCEMENT OFFICE

85 UNION STREET
BRUNSWICK, MAINE 04011
(207) 725-6651 FAX (207) 725-6663

For Office Use
Appl #_____
Date_____
Fee $0
MAP_____
LOT_____
Appr By:_____
Permit #_____

LOCATION OF CONSTRUCTION

SHORELAND PROTECTION OVERLAY
☐ **YES** ☐ **NO**

APPLICANT

NAME _____
ADDRESS _____
CITY, STATE, & ZIP _____
TELEPHONE _____
EMAIL _____

MAIL PERMIT TO (CHOOSE ONE):
☐ APPLICANT ☐ CONTRACTOR ☐ OWNER

OWNER

NAME _____
ADDRESS _____
CITY, STATE & ZIP _____
TELEPHONE _____
EMAIL _____

SAME AS APPLICANT ☐

ENGINEER **MAINE P.E. #** _____ ☐ **N/A**

NAME _____
ADDRESS _____
CITY, STATE & ZIP _____
TELEPHONE _____
EMAIL _____

PROPOSED CONSTRUCTION ACTIVITY (Land area measured horizontally from coastal wetlands or the bankfull edge of a stream)

COASTAL

☐ **AREA 1 – ≤ 125 FEET**
☐ **AREA 2 – ≤ 250 FEET (& > 125 FEET)**

INLAND*

☐ **AREA 1 – ≤ 75 FEET**
☐ **AREA 2 – ≤ 200 FEET (& > 75 FEET)**

DECRIPTION OF PROJECT _____
_____
_____

**Where a stream and its associated Inland Area are located within 250 feet, horizontal distance, of the above Coastal Areas, that Inland Area shall be regulated under the terms of the Coastal Area.*

CONTRACTOR ☐ **SAME AS APPLICANT**

NAME _____ ADDRESS _____
CITY, STATE, & ZIP _____ TELEPHONE _____

I certify that the information contained in this application and any related submissions to be true and accurate to the best of my knowledge. I understand that I am responsible for compliance with all applicable town, state and federal regulations and that failure to comply may result in the imposition of fines, legal fees, and the abatement of any violations to include abandonment of use and occupancy and corrective action such as the removal or modification of improvements if setbacks or other requirements have not been met and satisfied. I understand that this is an application and that I shall not begin any improvements until the appropriate permit (s) is/are issued nor will I make use of the improvements without first having obtained an occupancy permit. I further understand that any associated plumbing, electrical, and heating work to be undertaken in connection with this request requires separate permits. ***In addition, I understand that if this project involves the creation of a new lot, a subdivision, as defined in Title 30-MRSA, Section 4401(4), as amended, has not been created without first obtaining the required approvals***

SIGNATURE OF OWNER / APPLICANT **DATE**

The purpose of the Rural Protection Stormwater Management Overlay (RPSMO) District is to protect and preserve coastal watersheds within the Rural Protection (RP) districts from the potential negative impacts of storm water runoff associated with development activities.

- All development activities within the RPSMO shall require a permit pursuant to subsection 5.2.12.
- All site features constructed or (2) installed as required by this subsection shall be maintained in good repair, and replaced if damaged or destroyed, or in the case of living materials, if they die or are effectively destroyed after installation.
- If plant material dies or becomes diseased, it shall be replaced by the property owner on or before October of the year the dead or diseased planting is discovered or such further time frame deemed reasonable by the Codes Enforcement Officer (CEO).

Town of Brunswick
Rural Protection Stormwater Management Overlay Zoning District

Stormwater Management Technical Reference

December 2019

Prepared by

CUMBERLAND COUNTY SOIL & WATER CONSERVATION DISTRICT

Stormwater Zoning District

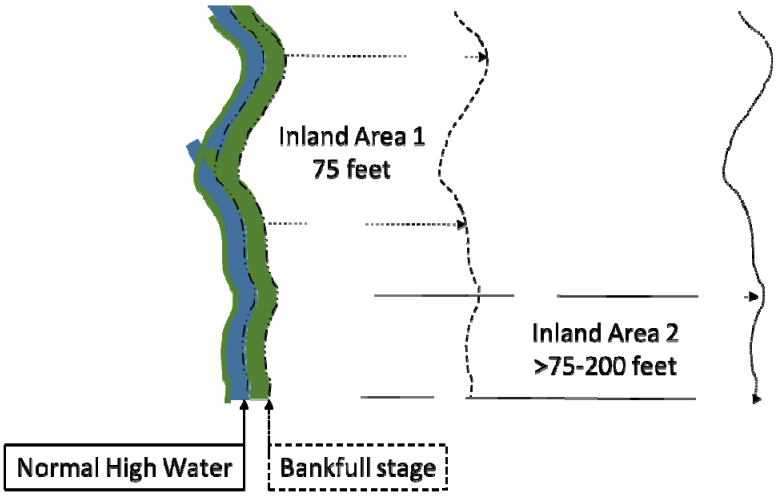
About

The **Rural Protection Stormwater Management Overlay Zoning District** is an overlay on the Town of Brunswick's Official Zoning Map. It is applicable within:

- Rural Protection 1 & 2 Zoning Districts (RP1 & RP2) AND
- Within 200 feet of streams OR 250 feet of coastal wetlands

If you are developing within this District, you will likely need to include stormwater treatments to offset the effects of adding hardened surfaces to your property. This Technical Reference provides guidance on the selection and installation of stormwater treatments. Applicability is according to the following thresholds:

For more information, please see the Town of Brunswick's website: www.brunswickme.org/.



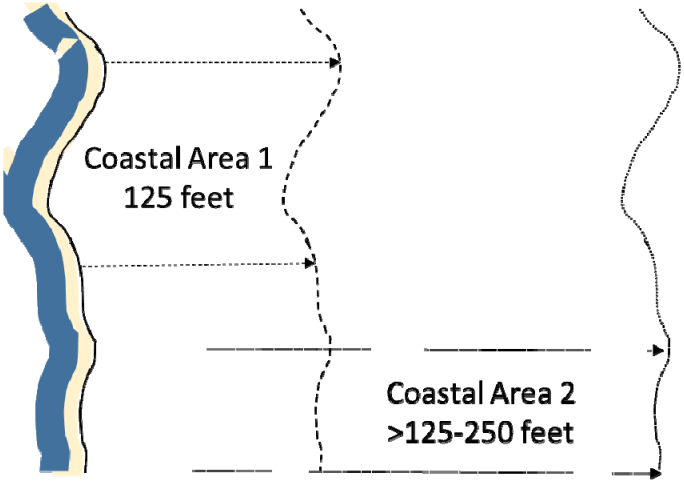
Stream measurements are taken from the bankfull stage.

Coastal area measurements are taken from the highest annual tide level.

The Area 1 stormwater treatment threshold is 5,000 or more square feet of developed area (existing plus new).

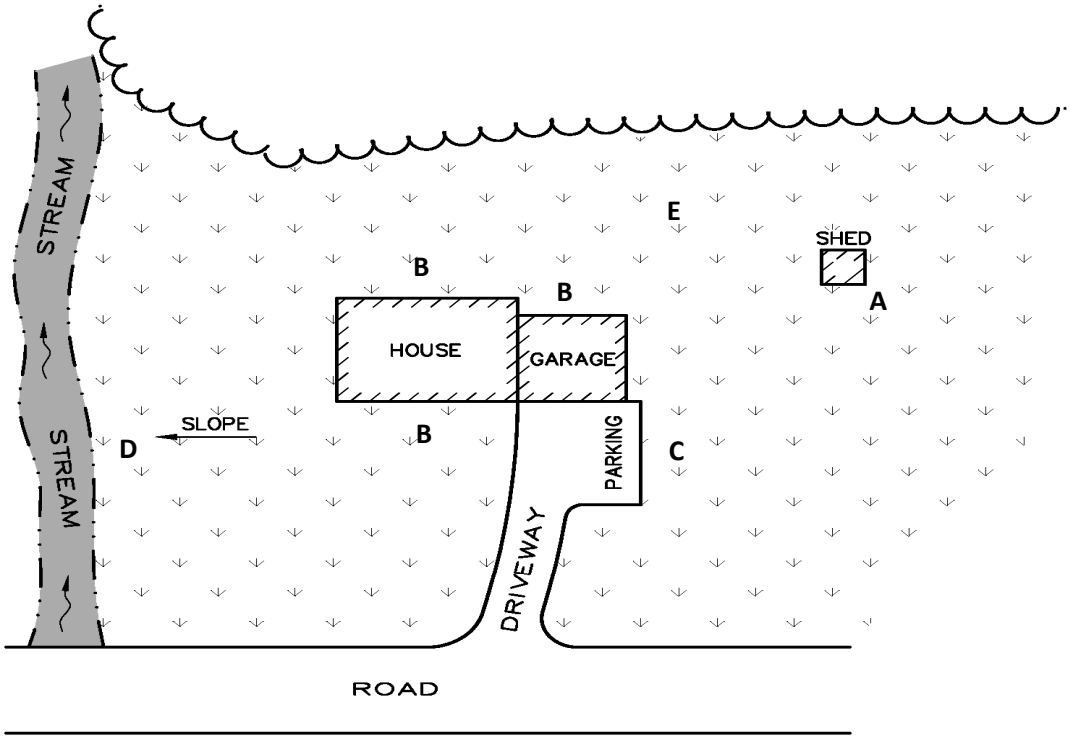
The Area 2 stormwater treatment threshold is 10,000 or more square feet of developed area (existing plus new).

Developed and impervious areas within Area 1 are to be included in Area 2 cumulative totals for determination of threshold exceedance.



Stormwater treatment must cover 95% of new impervious area and 80% of new developed area.

Overall Site Development



OVERALL SITE DEVELOPMENT

Stormwater management practices as part of overall site development: A. Rain Barrel, B. Roof Dripline Filter, C. Rain Garden, D. Forest and Meadow Buffers, E. Plunge Pool with Level Spreader

About

When developing undisturbed land (creating or adding a hardened surface), stormwater management practices must be considered in the overall site development. The above diagram shows a typical overall site development plan with stormwater management practices to address rainfall and snowmelt from developed surfaces.

Purpose

- To provide stormwater management and treatment best management practices (BMPs) for small developed areas
    - Stormwater BMPs have limitations related to the size of the drainage area
    - Stormwater BMPs can be combined to meet requirements

Overall Applicability

- Meet permit requirements

Contents

These stormwater BMPs can be used independently or in combination.

A. Rain Barrels (Cisterns)

Rain barrels are used to capture and store rainwater from your roof. Gutters and downspouts direct rainwater into the barrel where it can be used to water lawns, gardens, and indoor plants. If you do not have gutters and downspouts, find a location where water flowing off your roof is concentrated. Using collected rainwater may allow you to conserve water and may even lower your water bill.

B. Roof Dripline Filter

Roof runoff can easily erode soil along the dripline. A roof dripline filter reduces dripline erosion and is used to collect runoff from a roof, filter it, and then discharge it via an underdrain pipe to a stable location. They are suitable for use on all structures with conventional roofs. Dripline filters work best in sand and gravel soils.

C. Rain Garden

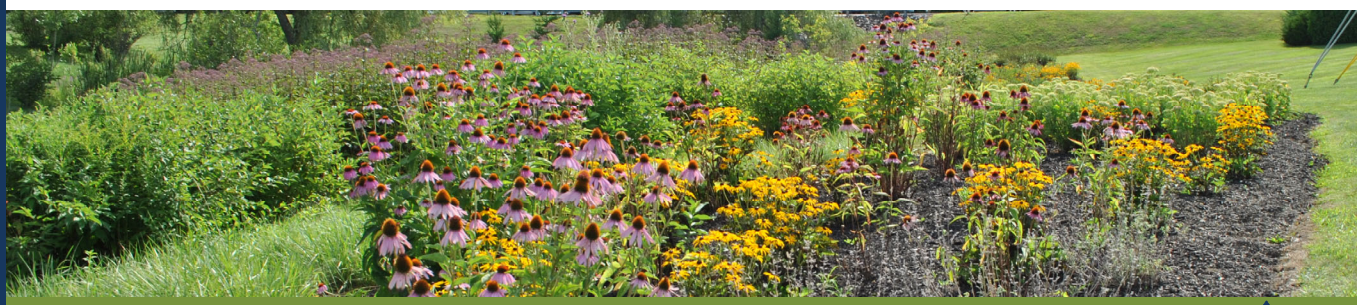
A rain garden is a bowl-shaped depression used to collect and filter rain water. Soil acts as a filter to remove some pollutants and other pollutants are taken up by the plants. Individual rain gardens can be used to manage stormwater from impervious areas up to 2,500 square feet and can be used in parallel to manage larger impervious areas.

D. Forest & Meadow Buffers

Vegetated forest and meadow buffers are trees, shrubs, and groundcover plants that catch sediment and other pollution before it leaves the property. Trees and shrubs intercept raindrops and reduce their impact on the soil. Low growing plants and the "duff" layer on the ground filter runoff. Root systems hold soil in place and absorb water and nutrients. Buffers can be used on most soil types–excluding wetland soils–and on slopes up to 15%.

E. Plunge Pool with Level Spreader

Plunge pools are designed to catch water exiting from underdrain pipes and culverts, slow the water down, and allow sediment to filter out and cleaner water to exit the pool.



Rain Barrels

Manage roof runoff

Rain barrel installation and maintenance

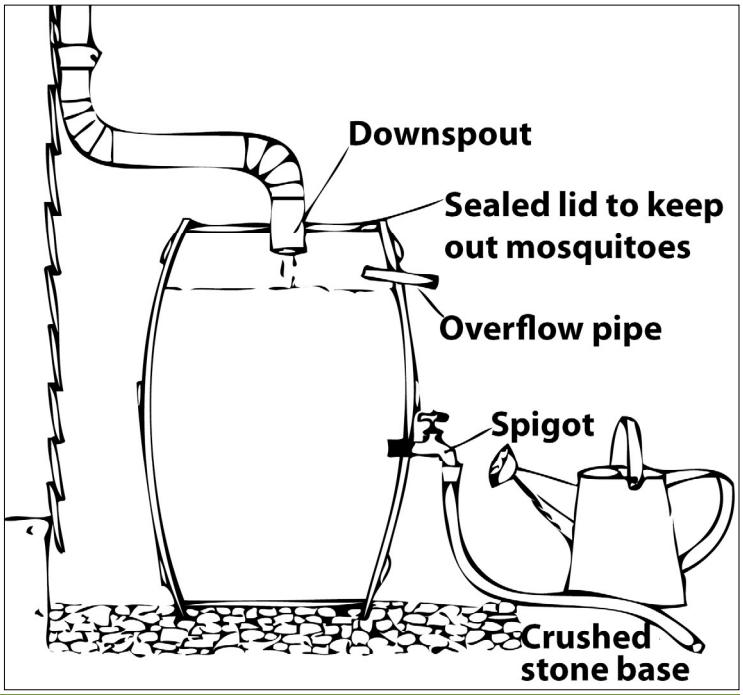
1. Once you have determined the location of your rain barrel, level the ground. Crushed stone or mulch can be used to stabilize the ground surface.
2. Place barrel on blocks or timbers to allow room for a faucet or spigot near the bottom of the barrel.
3. Connect hose to slowly release the water into gardens or allow it to soak into the ground; the higher the barrel is, the more flow and pressure through the hose.
4. Make sure your rain barrel is emptied between rain events so it doesn't overflow.
5. After each storm, remove accumulated leaves or other debris that may plug the collection screen at the top of the barrel.
6. Clear gutters and downspouts of debris on a regular basis.
7. Winter maintenance:
   - Drain the rain barrel to prevent frozen water from breaking the barrel, fittings, or hoses.
   - Store the rain barrel indoors or turn it upside down and anchor it with something heavy if storing it outside.
   - Detach or cover the faucet/spigot so that it is not broken off.

Materials List

- Pre-made or homemade rain barrel equipped with:
  - → Screened cover
  - → High and low drain/ spigot
- Mulch or crushed stone
- Blocks or timbers

For 2" rain event (common storm)

- One 50-gallon barrel can collect up to 40 square feet of roof.
- A 100 square foot roof requires 125-gallon barrel.
- Roof area and barrel size are scalable.
- Rain barrels can be used in series and connected by piping to collect larger quantities of water from one downspout.



Roof Dripline Filter

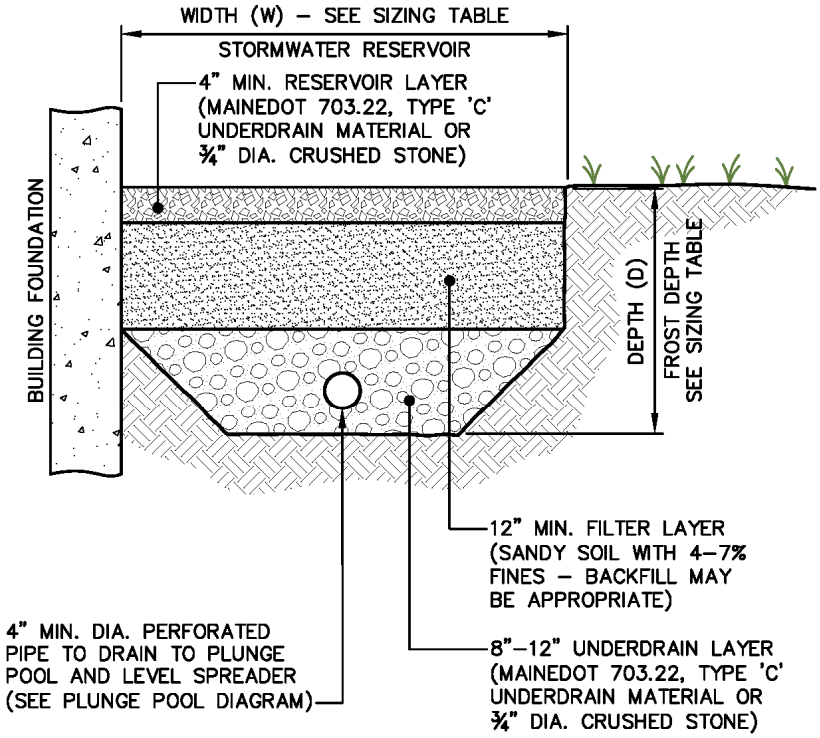
Managing roof runoff from buildings

Design essentials

The filter is sized to manage the first two-inches of runoff from a storm event. The reservoir layer should be 6 feet wide by 1 foot deep and filled with 3/4 inch crushed stone. The filter layer is 1 foot deep and composed of sandy soil. The underdrain layer is 8 inches deep and composed of 3/4 inch washed crushed stone with a 4 inch perforated underdrain pipe.

Installation guidelines

Dig a trench that is 6 feet wide and at least 32 inches deep (the width and depth can vary-see sizing table) along the drip line. Slope the bottom away from the house so that water will drain away from the foundation. Dispose of the soil in a flat area where it will not wash away. Line the sides of the trench with non-woven geotextile fabric and fill in layers as shown on the *Typical Roof Dripline Filter Section* image below. Extend the underdrain pipe to a location where it can be daylighted, draining to a stable location with a plunge pool. Fold a flap of the fabric over the stone, then fill the trench with the remaining stone. The sides of the trench may be edged with pressure treated lumber to secure the stone. The top surface can be loamed and seeded.



TYPICAL ROOF DRIPLINE FILTER SECTION

Materials List

- 3/4 inch crushed stone
- Sandy soil with 4–7% fines
- 4 inch perforated underdrain pipe
- Non-woven geotextile fabric

Maintenance

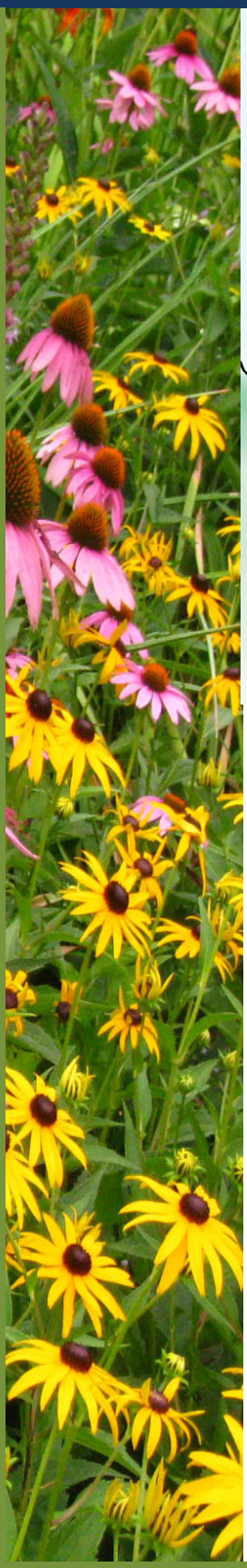
To maintain your filter, periodically remove accumulated debris and weeds from the stone. Every few years, or when the filter is draining slowly, you will need to remove the stone from the reservoir layer and dispose of accumulated sediment and debris.

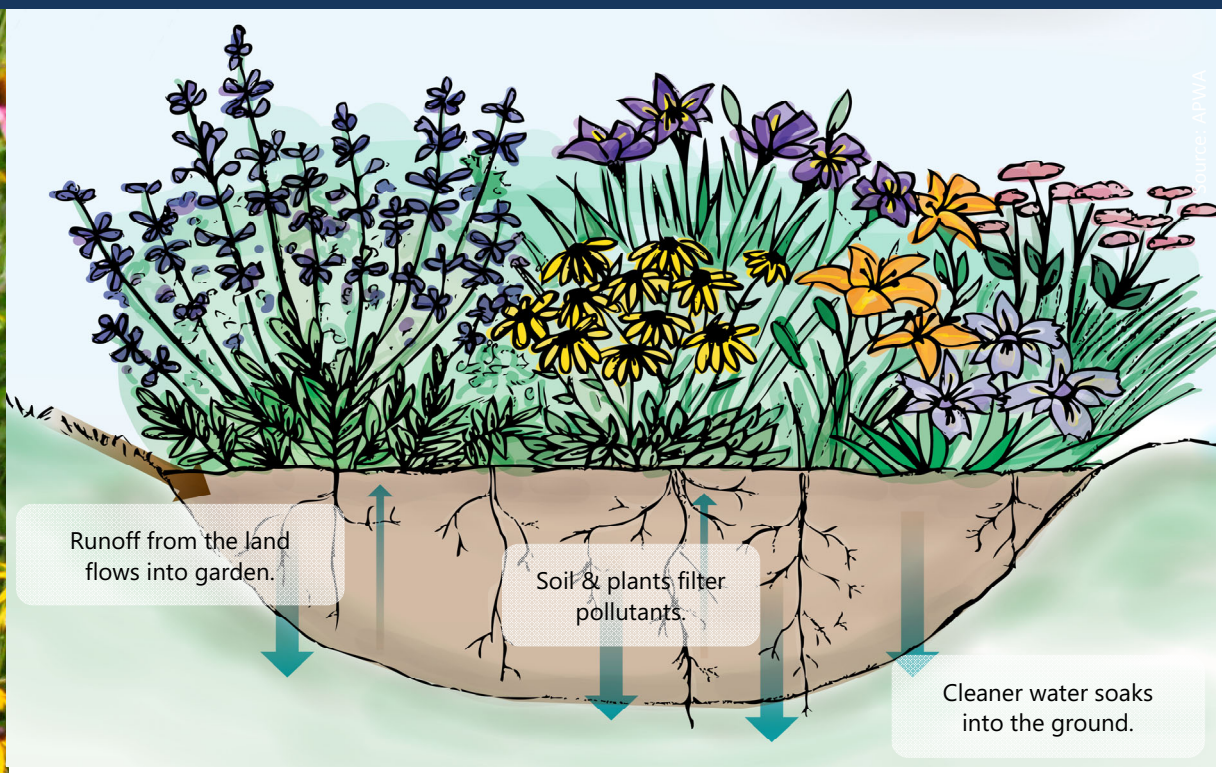
Notes:

1. It is okay to use intermediate values (e.g. 25′ depth of roof = 12.5′ square feet).
2. Scaling based off a 2″ rain event.
3. Assumes porosity of filter bed to be 33% void space.

Sizing Table		
Per Linear foot of Dripline/Roofline		
10′ depth of roof	Depth of Filter x Width of Filter	5 square feet
20′ depth of roof	Depth of Filter x Width of Filter	10 square feet
30′ depth of roof	Depth of Filter x Width of Filter	15 square feet

Rain Gardens





Collect and filter rain water

Design essentials

Select a spot at least 10 feet away from existing structures, downslope of the treatment area yet above the seasonal high groundwater table. Direct rain water into garden using grassy swale, stone trench, or gutter extension. The rain garden should be 1/3 size of the area being treated. Calculate the square feet of the treatment area and multiply by 0.3. For example, a 1,000 square foot roof area will require a 300 square foot garden. Multiple gardens may be used to collect and treat the desired amount of water. The maximum amount of impervious area being treated by one garden is 2,500 square feet.

Materials List

- Soil amendments:
  - → Compost
  - → Sand
- Plants:
  - → Moisture tolerant
  - → Moist to dry
  - → Dry tolerant
- Mulch

Installation guidelines

First call Dig Safe® at 811 to avoid underground utilities. Dig a bowl-shaped, shallow, flat-bottomed depression with gradually sloping sides no more than 6 to 12 inches deep. A berm can be created on the downhill side of the garden using excavated material. For poor draining soils, excavate to twice the desired depth and replace the soil with a mix of 50% sand, 25% topsoil, and 25% organic material. For very sandy soils which drain quickly, mix in organic material with the top 12 inches of parent soils. Stabilized a slightly lower section of the earthen berm on the downhill side with riprap (emergency spillway) to drain the garden when inundated.

Rain Gardens

Source: American Public Works Association

Choosing plants

Select native plants that can tolerate fluctuations in soil moisture with water tolerant plants planted in the center of the garden, and drought tolerant plants planted around the outer edge. Cover all areas of bare soil with mulch. Determining the number of plants to install can vary depending on the size of the plants and how quickly they spread. You can estimate the number of plants required by dividing the size of the garden by 2.25. A 300 square foot garden would then require approximately 133 native plants spaced at about 18 inches apart.

Blue Flag Iris

Sunny garden plants

Blue Flag (*Iris versicolor*)

Cardinal Flower (*Lobelia cardinalis*)

Sheep Laurel (*Kalmia angustifolia*)

New England Aster (*Aster novae-angliae*)

Shady garden plants

Turtlehead (*Chelone glabra*)

Solomon Seal (*Polygonatum commutatum*)

Columbine (*Aquilegia canadensis*)

Interrupted Fern (*Osmunda clattoniana*)

Columbine

Maintenance

Frequently water during the first growing season and during extended periods of drought. Weeding is necessary to maintain the look of the garden. As the plants grow, they may need to be divided.

There is no need to fertilize your rain garden. Using fertilizer will add unnecessary nutrients and reduce the ability for the garden to effectively remove pollution from runoff.

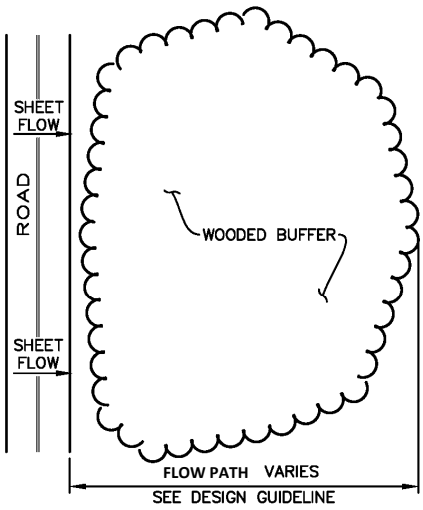
Source: Virginia Association of Soil and Water Conservation Districts

FOREST & MEADOW BUFFERS

Use natural vegetation to protect water quality

Design guidelines

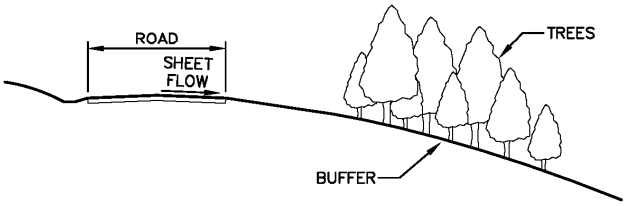
A forest buffer is a well distributed stand of trees with a complete canopy. A meadow buffer consists of a dense cover of grasses or wildflowers. The maximum size of the impervious area draining to a buffer must not exceed 1 acre. The direct upstream flow path to the buffer should not exceed 150 feet. Buffers can be located downhill of residential impervious areas and on the downhill side of roads. Buffers adjacent to residential areas should have a minimum buffer flow path of 100 feet while buffers adjacent to one lane roads should have a flow path of 50 feet and 80 feet for two lane roads.



PLAN VIEW

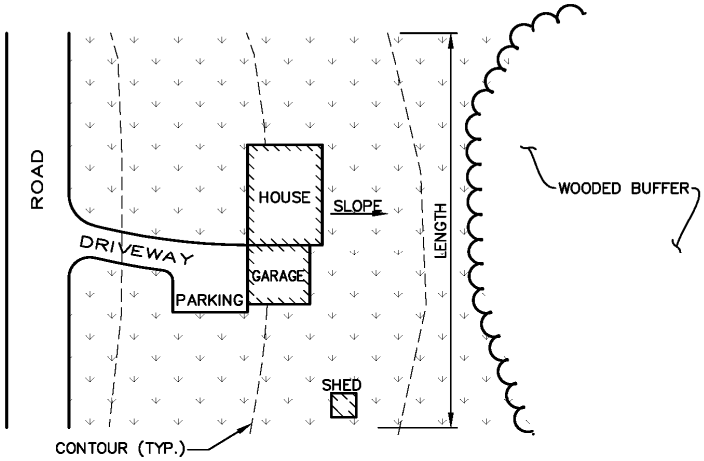
Installation and maintenance

Buffers on residential properties should have deed restrictions put on them to restrict future development and should be clearly marked in the field with signage. Inspect buffers annually for concentrated flow and erosion. Meadow buffers should not be mowed more than twice per year.

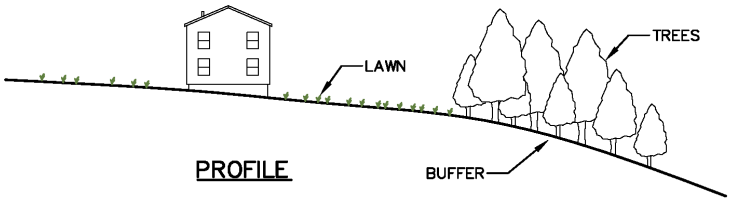


CROSS SECTION

BUFFER NEXT TO DOWNHILL SIDE OF ROAD



PLAN VIEW



PROFILE

BUFFER ADJACENT TO RESIDENTIAL IMPERVIOUS AREA

Materials List

- Native plants
- Mower (for meadow)

EOE

Plunge Pool with Level Spreader

Use to slow and filter water at pipe outlet

Design guidelines

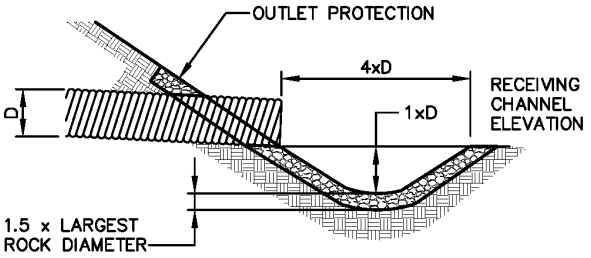
A plunge pool stabilizes the area at the outlet of a pipe or culvert. Nonwoven geotextile fabric should be placed on the banks of the pipe outlet and along the bottom of the plunge pool. Correctly sized riprap (see sizing table) is layered on top of the fabric. The riprap thickness should be more than two times the riprap group size. The slope of the pool should be 2:1 or less. The pool outlet must drain to a stable area via a level spreader.

Installation and maintenance

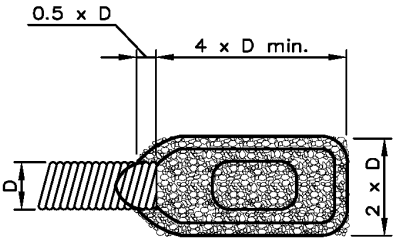
Inspect plunge pools annually to remove any collected sediment and plant materials. Inspect the site for erosion on the bank and below the level spreader.

Materials List

- Appropriately-sized riprap
- Non-woven geotextile fabric



SECTION



PLAN VIEW

NOTES:

1. RIPRAP SHALL BE UNDERLAIN BY GRAVEL BEDDING OR NON-WOVEN GEOTEXTILE.
2. REFERENCE BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL – ENERGY DISSIPATER.
3. THIS DETAIL SHALL APPLY TO PIPE DIAMETERS OF 36" OR LESS. PLUNGE POOLS FOR LARGE DIAMETER PIPES SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.

PLUNGE POOL DETAIL

Plunge Pool Sizing

Pipe Size	Riprap Group Size*	Pool Width	Pool Length
12″ or smaller	5″	3-4′	4-6′
18″	8″	4-6′	6-8′
24″	10″	6-8′	8-10′
30″	12″	8-10′	12-14′
36″	14″	10-12′	14-16′

*The diameter of the largest stone size in the riprap group should be 1.5 times the group size and the smallest stone size should be one half the group size.

Sizing chart modified from Maine Department of Environmental Protection's *Maine Erosion and Sediment Control Practices Field Guide for Contractors* (March 2015).