City of South Portland Stormwater Manual

Rain Garden Design Specifications

Rain Gardens
Adopted from Maine DEP Conservation Practices for Landowners Series. DEPLW0784.
http://www.maine.gov/dep/blwq/docwatershed/materials.htm

Overview:
How it Works and What it Does
Rain gardens are attractive and functional landscaped areas that are designed to capture and filter runoff from roofs, driveways, and other hard surfaces. They collect water in bowl-shaped, vegetated areas, and allow it to slowly soak into the ground. Rain gardens perform two key functions. First, they slow and retain runoff, which reduces erosion and peak flows in streams. Second, they filter runoff, removing pollutants and improving water quality.

Figure 1: Rain Garden in bloom. Source: Maine DEP.
**Difficulty Level**

Rain gardens can be designed and constructed using common materials, working by hand or with light landscaping equipment. Any stormwater management system that stores water has the potential to contribute to drainage problems if layout and design are not well thought out. Many landscaping professionals are now familiar with the rain garden concept and would be able to properly install these stormwater management features.

**Drainage Plan Requirements**

Functioning rain gardens can reduce both the volume and rate of runoff leaving a developed site and is consistent with drainage plan requirements. In combined sewer overflow areas where discharge of stormwater or sump pumps are disallowed, additional temporary storage capacity may be accomplished through the integration of a “dry-well” into your rain garden area. Maine DEP provides [basic guidance on building dry wells](http://www.pwd.org/pdf/water_resources/conservation%20fact%20sheets/dry_wells.pdf) as part of its “Conservation Practices for Homeowners” Series. Local commercial landscaping or irrigation suppliers provide manufactured “dry-wells” and installation assistance. An alternative design for dry wells is presented in Maine DEP’s [Stormwater Best Management Practices Manual, vol. 3, appendix E](http://www.maine.gov/dep/blwq/docwatershed/materials.htm).

**Site Suitability**

Rain gardens are typically constructed as infiltration systems but may be underdrained if site soils are largely clay. Organic or sand soil amendments can help clay soils absorb runoff water.

**Proximity to Structures**

To avoid flooding improperly sealed foundations or poorly draining lawn areas, build your rain garden 10’ away from existing structures, and direct water into the garden with a grassy swale, French drain, gutter extension or other device.

**Depth to Groundwater**

As rain gardens are designed to drain, the rain garden surface should be above the seasonal high groundwater table.

**General Design Guidance**

**Installation**

Rain gardens can vary in size, but are most effective when the surface area constitutes approximately 20-30% of the drainage area. Rain gardens for single-family homes will typically range from 150 to 300 square feet, but even a smaller one will help reduce water pollution.

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- The garden should be bowl-shaped, with the lowest point of the rain garden no more than 6” below the surrounding land.
- The sides should be gently sloping towards the center to prevent sudden drop-offs that could lead to erosion problems or tripping hazards.
- Rain gardens are often placed in a preexisting or created depression within a lawn, or in a location that receives roof runoff from a downspout.

**Soil Amendments**

It is also important to check the permeability of your soil. A simple test is to dig a test pit about 12-18” deep. Fill the hole with water after a thorough rain event or in the spring and determine the drain down time. If the soil pit holds water for more than 72 hours a rain garden without an underdrain may not be appropriate for the site. If the location has sandy soils, only organic amendments may be needed, but clay soils may need to be replaced with a mix (50-60% sand, 20-30% topsoil, 20-30% organic amendments). High quality compost is an optimum soil amendment but decomposed wood chips or leaves are also effective. At a minimum, clay soils should be augmented with compost or other organic material during construction. Organic material should be well mixed with parent topsoil to a depth of 12”. After construction of the garden is complete, the entire area should be covered with a thick layer of mulch, preferably Erosion Control Mix.
Planting
Rain gardens can be placed in sunny or shady regions of your lawn, but plants should be chosen accordingly, with the lowest point planted with wet tolerant species, the sides closest to the center planted with moist tolerant species, and the edges of the rain garden should be planted with subxeric (moist to dry) or xeric (dry) tolerant plants.

Materials
Replacement Soil mixes and Erosion Control Mix are available from local garden centers. Native plants can be purchased from your local nursery. Please consult a “native plants list” plant descriptions based on specific sun and soil conditions. See the Maine DEP’s list of native plants for various conditions.

Maintenance
Overall, once plants mature, the maintenance of a rain garden is typical of any other landscaped area. Watering is important during the first growing season, and some weeding is necessary after planting. As the garden matures, some of the perennials may need to be divided if plantings become too crowded.
Figure 3: Rain garden along Portland's Bayside Trail in a commercial setting.
Figure 4: Diagram showing various rain garden configurations. Source: Maine DEP.