

Plan a rain garden

Smart rainwater management pays close attention to where water goes naturally, the slope of the land and the absorbency of surfaces. Rain Gardens are best located in areas where they can collect water from impervious surfaces (like a roof or parking lot). Naturally low lying or bowl shaped areas can be perfect for rain gardens, as long as they have good drainage. You can put a rain garden on a slight slope or in a flat area, it will just require more excavation and shaping of the garden. If you already have swales (ditches that carry stormwater), you can easily plant larger plants in them to increase their water absorbing powers.

The basic steps in planning a rain garden are:

1. Find a good spot (water moves to it naturally and the soil drains well).
2. Calculate how much water is moving to that area in a 1" rain (could include water you direct there from a roof, driveway, sidewalk, etc).
3. Figure out the size and shape of a rain garden that could handle that amount of water.
4. Choose plants that will work well in a rain garden and look good on the site.

Step 1: Find a good spot

Look at the topography of your site and choose a couple of spots that you think would be good places for a rain garden. Conduct a percolation test in each area to see if the soil will be able to drain water collected in the rain garden within 24 to 48 hours.

Conduct a Percolation Test

Dig a circular hole 8" in diameter and 8" deep (the size matters, so measure carefully!). Fill the hole with water and let it drain (this may take awhile). If it has just rained and the ground is already wet, you can skip this step. Fill the hole with water again and poke a stick or pencil into the side of the hole to mark the water level (length of stick should be resting on top of water). Record the time. Check the hole periodically (hourly is convenient) and measure how far the water has sunk each time.

Calculate how many inches of water drain in one day (24 hours), and per hour (on average). If your soil drains all 8 inches in 24 hours, then your rain garden could be 8" deep. If it is a slower draining soil, you may need to make a shallower rain garden.

While you have soil excavated, use the [Soil Texture Feel Test Key](#) sheet to figure out what kind of soil is in your site. Sandier soils tend to drain quickly while clay soils tend to be the slowest to drain.

Step 2: Calculate runoff to the proposed rain garden location

Where will the garden be collecting water from? Only surfaces that are uphill from the rain garden and not blocked by a curb will send water to it. Calculate the area of the different surfaces draining to your rain garden. This area is the “watershed” for your rain garden. When you are calculating surface area, measure distances from a flat bird’s eye perspective, not along slopes. If directing water from a roof, calculate how much surface area drains to the particular downspout you will be using.

Use your area measurements to calculate the number of gallons of runoff coming off each type of area in a typical 1” rain (1” = 1/12 foot of rain) using the table below. The runoff coefficient takes into account that there is an average amount of water that is absorbed or evaporates off of each surface type and therefore does not run off the surface.

Type	Area (ft ²)	x	Rainfall (ft)	x	Gallon/ft ³	x	Runoff coefficient	=	Gallons of runoff
Lawn		X		X	7.48 gal/ft ³	x	0.2	=	
Paved		X		X	7.48 gal/ft ³	X	0.9	=	
Roof		x		x	7.48 gal/ft ³	x	0.9	=	
Forest		x		x	7.48 gal/ft ³	x	0.05	=	
Total									

Step 3: Calculate the size of your rain garden

The depth and area of your rain garden will be influenced by the slope of the surface it is on and how quickly the soil drains.

Calculate Slope

1. Set one stake at the highest point on the uphill side of the rain garden site. Tie one end of the string at the base of the stake so it is sitting on the ground.
2. Measure 10 feet along the string, holding the string so it is horizontal as you move downhill. Put the other stake in the ground once the string is extended 10 feet. Tie the string to the top of the second stake so the string stays level (use a level to check). If your stick isn't tall enough, have someone hold the string at the bottom so it is level.
3. Measure the distance between the ground and the downhill end of the string. This is your rise.
4. Double check the length of the string. This is your run.
5. Calculate the percentage slope of the surface:

Determine Rain Garden Depth

If your slope is:

Less than 4%

5 to 7%

8 to 12%

Then your rain garden depth should be:

3 to 5 inches deep

6 to 7 inches deep

8 inches deep

Use Rain Garden Depth and Soil Type to Find a Soil Factor

Use what you have discovered about your soil type and garden depth to select a soil factor, which will be used to help you calculate the area of your rain garden.

Soil type	4" deep RG	6" deep RG	8" deep RG
Sandy	0.19	0.15	0.08
Silty	1.35	0.25	0.06
Clayey	0.43	0.32	0.20

Calculate Rain Garden Area

Multiply total area draining to the rain garden by the soil factor from the table above to get the total surface area of your rain garden.

$$\begin{array}{c}
 \underline{\hspace{2cm}} \text{ ft}^2 * \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ ft}^2 \\
 \text{(total drainage area)} \qquad \qquad \text{(soil factor)} \qquad \qquad \text{(rain garden surface area)}
 \end{array}$$

Sketch some shapes and dimensions that would have the area you just calculated. If you are working on a bioswale, it is going to have a long, narrow shape (probably rectangular). Rain gardens typically have an oval or kidney shape.

Step 4: Choose Plants and Develop a Planting Plan

The main purpose of rain gardens is to absorb rain. Like any kind of garden, they can serve other purposes as well, including: beautify the landscape, provide food sources for birds, butterflies, bees and other wildlife, be organized around a theme like scents, textures, colors, herbs, history or other educational purpose. Brainstorm purposes you would like your rain garden to serve.

Lists of plants that work well in rain gardens can be found at:

- Read OSU Extension's [Rain Garden Guidelines for Southwest Ohio](#), which includes a detailed list of plants well-suited to rain gardens
- The University of Wisconsin-Madison's Arboretum has an excellent [spreadsheet](#) of rain garden plants with key plant descriptions included.

The plants we are using in rain gardens and bioswales at the Green Learning Station include:

Arkansas Blue Star, Amsonia 'Blue Ice'

First Light Swamp Sunflower, Helianthus angustifolius 'First Light'

Dense Blazing Star, Liatris spicata

Red Sprite Winterberry Holly, Ilex verticillata 'Red Sprite'

North Wind Switch Grass, Panicum virgatum 'Northwind'

Green and gold, Chrysogonum virginianum

Ice Ballet Swamp Milkweed, Asclepias incarnata 'Ice Ballet'

Joe Pye Weed, Eupatorium maculatum 'Gateway'

Swamp Rose-mallow, Hibiscus moscheutos