

## DETERMINING THE DEPTH OF YOUR RAIN GARDEN

1. Set one stake at the uphill side of your rain garden and another stake at the downhill side.
2. Tie a string at ground level to the uphill stake.
3. Secure the other end of the string to the downhill stake, ensuring that the string is level.
4. Measure the width (in inches) between the two stakes. Next, measure the height (in inches) between the ground and the string of the downhill stake.
5. Divide the height by the width and multiply the result by 100. This will give you the percentage slope of the area where you wish to build your rain garden.
6. Record your percentage slope on line 1 of the worksheet, p. 18.
7. Find your percentage slope in the box below and determine the depth of your rain garden. Record that depth on line 2 of the worksheet, p. 18.

Slope	Depth
< 4%	3 to 5 inches
5% - 7%	6 to 7 inches
8% - 12%	8 inches maximum

## Rain Garden Depth and Slope

The slope of your land will greatly influence the depth of your rain garden. The ideal depth of a rain garden is between four (4) and eight (8) inches deep. A rain garden that is less than four inches deep will need to be larger in size to provide enough capacity to store water from heavy rains. However, a rain garden that is deeper than eight inches might hold water for too long. In general, slopes over 12% are not suitable for rain gardens. Installing a rain garden in a flatter part of your yard will reduce the amount of preparation needed to build your rain garden. To determine the depth of your rain garden, use the guidelines in the sidebar to the left.

## Directing Water to Your Rain Garden

There are several options for directing roof water to your rain garden. You can simply disconnect a downspout near the ground and reroute it to your rain garden. Rerouting the water from your downspout can be accomplished by creating a grassy swale, a rock-lined channel, or by extending the downspout across your lawn. Another option is to run a PVC pipe underground from your downspout to the rain garden. To slow the velocity of the routed rain water and prevent erosion, you may need to install landscape fabric, rocks or bricks at the outlet of the pipe.



Additionally, you may also want to install a rain barrel at your downspout to capture roof runoff for use in your rain garden or other parts of your yard. The overflow from the rain barrel can be directed into your rain garden by way of a grassy swale, rock lined channel or a drip hose.

*Rain barrels can also be used to collect roof runoff. Water from the barrel can be used to water plants throughout your yard and overflow can be directed into your rain garden.*



## Determining the Drainage Area of Your Rain Garden

Since you have determined the depth of your rain garden, the next step will be to calculate the area draining into your garden. The guidelines listed below will help you make the best possible estimate of your drainage area. (If you know the area of the roof that will be draining into your rain garden, disregard the guidelines below and enter your roof drainage area on line 5 of the worksheet, p. 18.)

### For all Rain Gardens

- ☞ In order to estimate the size of your roof, you will need to measure the footprint, or the outside dimension of your home. Your home's footprint will be relatively equal to the area of your roof which can be determined by multiplying the width of your home (in feet) by its length (in feet). Record your home's footprint on line 3 of the worksheet, p. 18.
- ☞ Count the number of downspouts on your home. Record the number of downspouts on line 4 of the worksheet, p. 18.
- ☞ To estimate the roof drainage area, divide your home footprint (line 3 of the rain garden worksheet) by the number of downspouts (line 4 of the rain garden worksheet). Next, multiply this result by the number of downspouts directed to your garden. Record your answer on line 5 of the worksheet, p. 18.
- ☞ If your rain garden is within 30 feet of your downspout, enter 0 on line 6 of your worksheet, p. 18. If your rain garden is greater than 30 feet from your downspout, you will need to perform the additional calculations listed below.

### Rain Gardens more than 30 feet from a downspout

- ☞ To find the area of lawn that will drain to your garden, stand where your rain garden will be and determine how much of your lawn will drain into your rain garden.
- ☞ Measure the length (in feet) and width (in feet) of the lawn that will be draining into your rain garden, and multiply them together to find the lawn area. Record your lawn area on line 6 of the worksheet, page 18.
- ☞ Add the lawn area to the roof drainage area to determine the total drainage area and record your answer on line 7 of the rain garden worksheet, page 18.

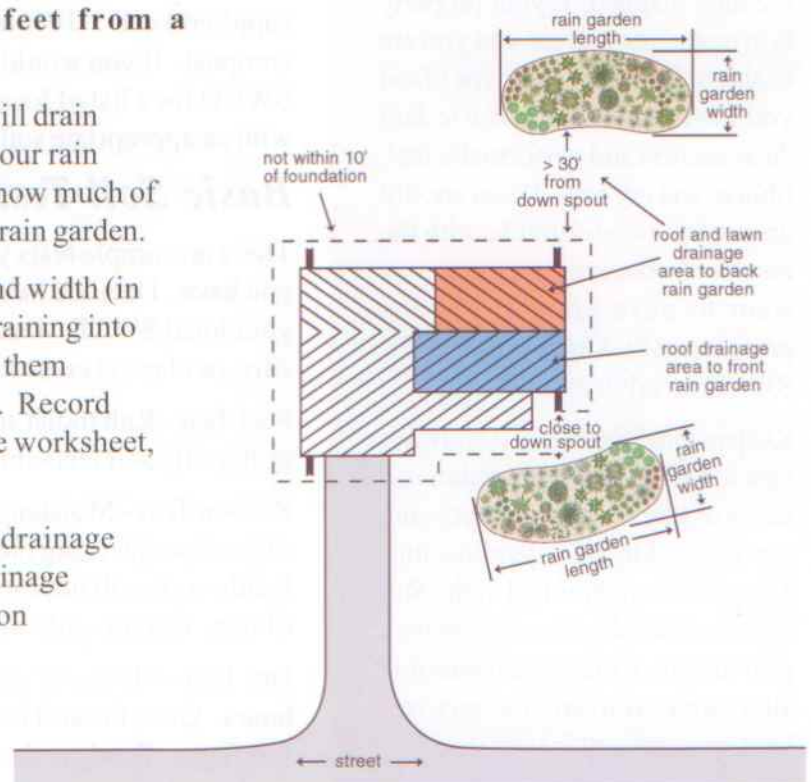


Figure 1 - Rain gardens can be placed near your home or further out in your yard.



## FURTHER RESEARCHING YOUR SOIL TYPE

The best place to begin researching your soil is to contact your local Soil and Water Conservation District (SWCD). Your local SWCD can provide you with the Natural Resources Conservation Service (NRCS) "Soil Interpretation Table." This table summarizes soil attributes related to the official soil survey such as: how acidic a soil is (pH), how fast water moves through the soil (saturated hydraulic conductivity), depth to bedrock, clay and any other restrictive layers, and high water tables. Your local SWCD can also provide you with soil survey maps.

If you find more than one type of soil on your property, choose your soil type based on the actual location of your rain garden. Unfortunately, especially in urban areas, not all soils are fully mapped. If your property is in one of these areas and you are unable to determine what type of soil you have, refer to the *Basic Soil Tests* section and perform the feel, ribbon, and dry tests. If you are still unsure or uncomfortable with the results of your soil tests you may want to have your soil tested professionally. Contact your local SWCD for advice.

Keep in mind that while it is always best to build your rain garden in a sandy or silty soil versus clayey soil, conditions don't always allow this. The soil mix mentioned in the *Soil Type and Garden Size* section may provide you with the best possible alternative to overcome any soil limitations present in your yard.

## *Soil Type and Garden Size*

Now that you have determined how deep your rain garden should be, you will need to figure out what type of soil you have in order to determine its appropriate size.

The type of soil you have will affect the movement of water through the soil profile. Therefore, the size of your rain garden will be determined by how quickly water is able to percolate or move through the soil profile. There may be restrictive soil features below your rain garden that prevent it from functioning properly. Reference the *Further Researching Your Soil Type* sidebar to the left to find out where to obtain more information about your soil.

In general, soil textures in Northeastern Ohio range from clayey to sandy. If your soil profile is sandy (coarse textured soils), you may be able to simply loosen the soil and improve it with some yard waste compost to prepare your rain garden for planting. Silty soils (intermediate textured soils) drain better than clayey soils (fine textured soils), but both types may need help to function properly.

There may be extra considerations in planning and building rain gardens containing silty, clayey or compacted soils. These soils reduce the ability of rain water to percolate. Consequently, an increase in the size of your rain garden and/or the complete replacement of soil can help combat the slow percolation problem. A recommended soil mix is 50-60% sand, 30-40% loamy topsoil (which can be purchased from local garden stores or landscape suppliers) and 5-10% organic matter derived from yard waste compost. If you would like a more exact soil mix, contact your local SWCD for a list of local suppliers who will be able to provide you with an appropriate soil mix.

### *Basic Soil Tests*

There are simple tests you can perform to figure out what type of soil you have. Detailed information on these soil tests is available through your local SWCD. Once you've determined your soil type, (sandy, silty, or clayey) enter it on line 8 of the rain garden worksheet, p. 18.

**Feel Test** - Rub moist soil between your finger tips. Sandy soil feels gritty, silty soil feels smooth, and clayey soils feel sticky.

**Ribbon Test** - Moisten soil to a putty like consistency. Make a soil ribbon by squeezing the moist soil between your thumb and forefinger. Sandy soils will not form a ribbon. Silty soils will make a short, weak ribbon. Clayey soils will form a long, strong ribbon.

**Dry Test** - Mold soil into a ball and allow it to air dry for several hours. Once the soil is dry, crush it between your thumb and forefinger. Sandy soils will crumble easily while silty soils will be moderately resistant and firm. Clayey soils will be very difficult, if not impossible, to crush.



## Determining the Size of Your Rain Garden

The general ratio of drainage area to rain garden area is 5:1 for a well drained, sandy soil profile. For example, if you had 500 square feet of drainage area, you would build a 100 square foot rain garden. Tables 1 and 2 below will give you a rain garden size factor which will help you determine the appropriate size of your rain garden. If you already know that you have compacted, clayey or otherwise poorly draining soils, a drainage area to rain garden area of 3:1 or 2:1 for building your rain garden will result in better success.

- ☞ Select the appropriate size factor table for your existing soil. Table 1 is for rain gardens less than 30 feet from your downspout. Table 2 is for rain gardens more than 30 feet from your downspout.
- ☞ Use your soil type (line 8 of the rain garden worksheet) and rain garden depth (line 2 of the rain garden worksheet) to select the appropriate size factor. Record your answer on line 9 of the worksheet, p. 18.
- ☞ Next, multiply the size factor by your total drainage area (line 7). This gives you the recommended area of your rain garden. Record this number on line 10 of the worksheet, p. 18.
- ☞ If the recommended rain garden area is more than 300 square feet, it is recommended that you divide your rain garden into a couple of smaller gardens.

**Rain Garden Size Factor Table 1**  
(less than 30 feet from downspout)

	3-5 in.	5-7 in.	8 in.
Sandy Soil	.19	.15	.08
Silty Soil	.34	.25	.16
Clayey Soil	.43	.32	.20

**Rain Garden Size Factor Table 2**  
(more than 30 feet from downspout)

	Size factor for all depths
Sandy Soil	0.03
Silty Soil	0.06
Clayey Soil	0.10



This rain garden features the following fall species: Wild Bergamot, Brown-eyed Susan, Aster, Beardtongue, and Obedient Plant.

## Determining the Shape of Your Rain Garden

After you have determined the general size of your rain garden, you will need to choose a shape that will best integrate with your landscape.

There are a few things to keep in mind when determining the shape of your rain garden. *The longer side of the garden should run perpendicular to the flow of water (along the contour). This is also referred to as the width.* This will maximize the amount of water your garden will be able to intercept.

In addition, the garden needs to be wide enough for the water to spread evenly over the whole garden. A good rule of thumb is that your rain garden should be twice as wide as long. See Figure 4 on page 12 for further clarification.

