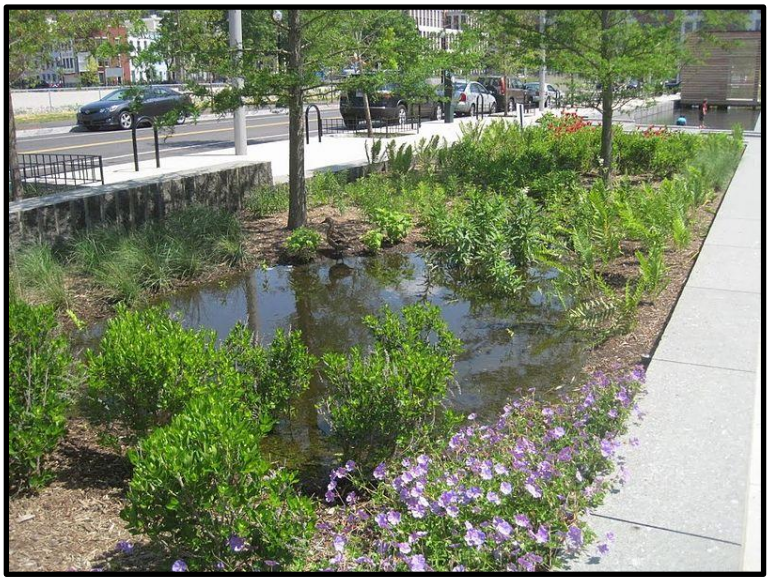
Rain Garden Building

A DIY Workbook



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Location

Locate your rain garden in an area where water from impermeable surfaces can naturally run into it and where it will improve the look of your home. Based on the characteristics of your site you might also consider building more than one rain garden, such as one on each side of your house or at two different gutter downspouts.

Assess Current Conditions

Review your location and note the following:

- What impermeable surfaces do you have? (Recall that impermeable surfaces are hard surfaces that can't soak water including areas like rooftops, patios, paved driveways, sidewalk, etc.)
- Which direction do the surfaces drain towards?
- Do you have any areas that are wet regularly or have standing water in the spring?
- Do you have an area for excess water to overflow to?

Notes:

Pick an Area:

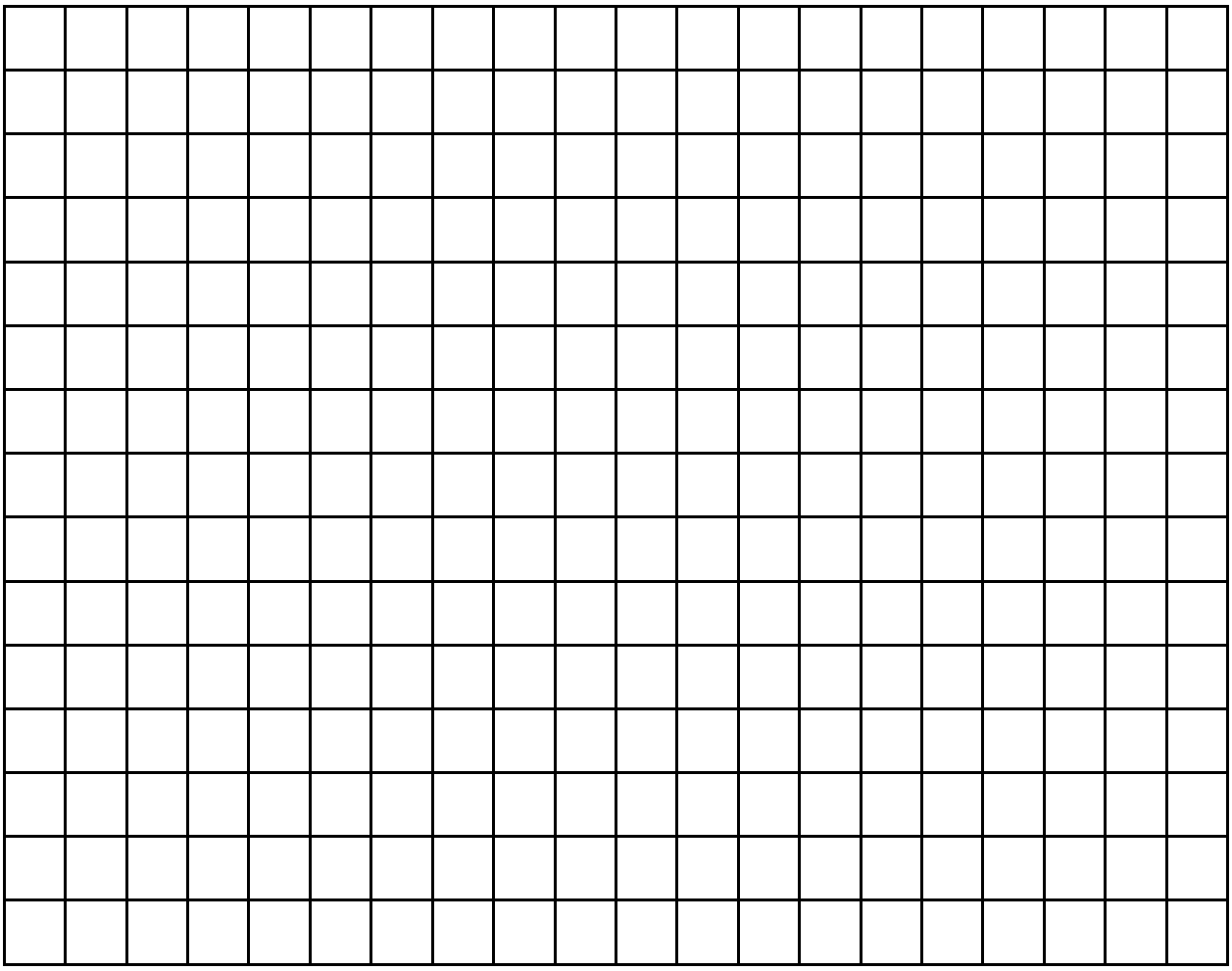
- Where water naturally drains to
- To improve the look of your home
- That has an overflow path for excess water

Do Not Locate:

- Within 10 feet of a foundation
- On steep slopes or uphill of runoff
- Near septic tanks, drainfields, or utilities

Location Features

Draw the layout of your site noting where water runs off your roof, gutter downspouts, sidewalks, driveway, and lawn. Also add any areas that need to be avoided such as septics or utilities.

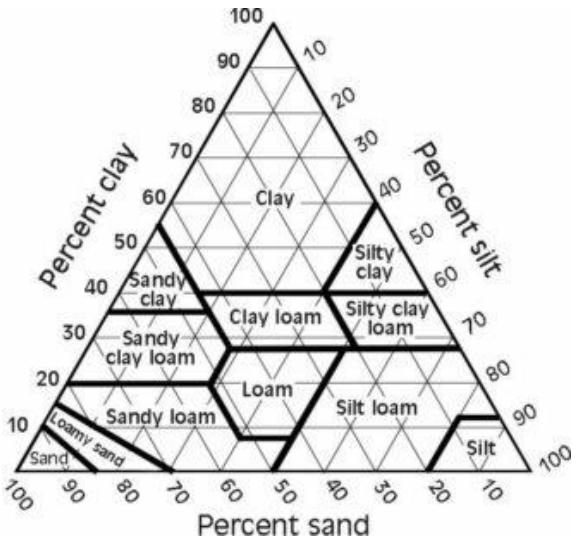


Know Your Soils

Determine Soil Type

Water moves easily through sandy soils but clay soils can prevent water from infiltrating back into the ground as quickly. If you have mostly clay-based soils you will need a larger rain garden and will likely have standing water in your garden for longer periods.

1. Collect soil from about 6-8 inches below the surface below the surface at your chosen rain garden location and fill a 1-quart mason jar half full
2. Fill the remaining half with water, leaving about 1" of air
3. Attach lid, then shake the jar vigorously until you have broken up any clumps of soil
4. Set the jar aside to rest, undisturbed, overnight (longer if the soil appears clayey)
5. After at least 24 hours the jar's contents will have settled into distinct layers (sand will be the bottom layer, then a layer of silt, and the top layer will be clay)
6. Using a ruler, measure and record the height of each layer as well as the total height of the layers. Divide each layer height by the total height to calculate the percentages.
7. Using the soil texture tracking triangle above, track the lines with the percentages calculated and find the spot on the triangle where all three lines intersect. The region where these lines intersect indicates the soil type present.



DIY Soil Type Calculations:

Height of sand layer: _____ inches/cm

Height of silt layer: _____ inches/cm

Height of clay layer: _____ inches/cm

TOTAL HEIGHT OF LAYERS: _____ inches/cm

Soil Type Percentages:

(sand height)/(total height) x 100 = _____% sand

(silt height)/(total height) x 100 = _____% silt

(clay height)/(total height) x 100 = _____% clay

Infiltration Rate

The infiltration rate is a measure of how quickly water collected in your rain garden will drain into the soil below. To function properly a rain garden must drain at a minimum rate of 0.1 inch per hour and any rate below 0.25 inches per hour could have standing water periodically.

Follow these steps to determine your infiltration rate:

1. Dig a test hole approximately 1 foot deep and 1 foot wide
2. Place a measuring stick or ruler in the hole
3. Fill the hole with at least 6 inches of water and record how long it takes to drain
4. Calculate the infiltration rate by dividing the total inches by the total hours
5. For example: 6 inches of water that drains in 12 hours has a rate of .5 inches per hour or (6/12=.5)
6. Repeat this process three times then average the results by adding and dividing by 3

DIY Infiltration Rate Calculations:

Test I: inches _____, hours _____

Rate 1 = (inches/hours) _____in/hr

Test 2: inches _____, hours _____

Rate 2 = (inches/ hours) _____in/hr

Test 3: inches _____, hours _____

Rate 3 = (inches/hours) _____in/hr

Average Rate:

Add Rate 1 + Rate 2 + Rate 3 = _____

Rate total divided by 3 = _____in/hr

Determine the Size

In order to determine the size of your rain garden, you need to recognize the size of the drainage area, recall the soil type, determine your depth, and identify how much space is available.

Drainage Area

The drainage area is the entire area of impermeable surfaces that will drain into your rain garden. A good rule of thumb for size is your rain garden to be 1/3 the size of the surfaces that drain to it.

Drainage Area Estimate: _____sq. ft. Suggested Rain Garden Size: (drainage area/3) = _____ sq. ft.

This is an estimate of what the garden size should be, but be sure to take in the other factors below.

Soil Type

Recall your soil type. If you have mostly clay-based soils you will need a larger rain garden and will likely have standing water in your garden for longer periods while sand-based soils will drain quicker and not require as large of a garden.

Soil Type: _____

Pick a Depth

A depth of 6-12 inches is recommended for rain gardens, but you can consider your visual preferences too. Ideally, the depth should match the infiltration rate to ensure that the water drains within 24-48 hours of a rain event. A shallow rain garden will require more surface area to allow for sufficient drainage, but could potentially have water overflow regularly. A deeper rain garden does not require as much surface area to drain as it can hold more water, but is more likely to have standing water for longer.

Depth Estimate: _____inches

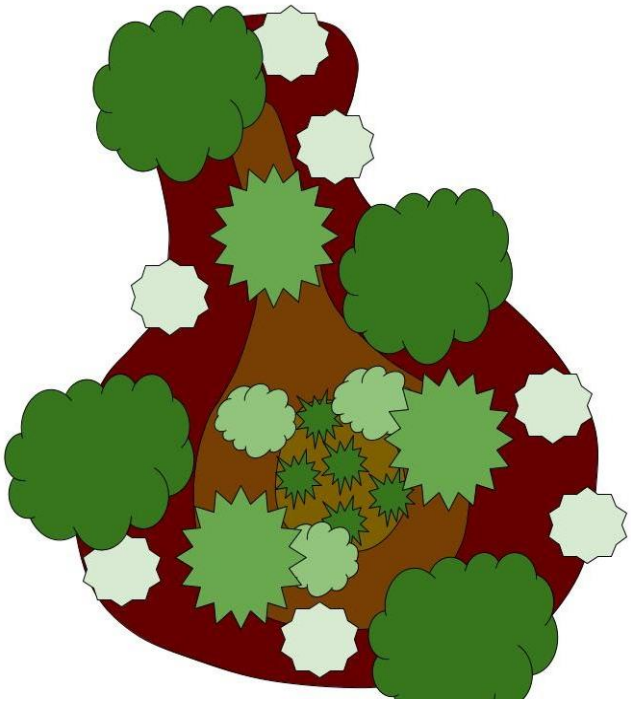
Available Space

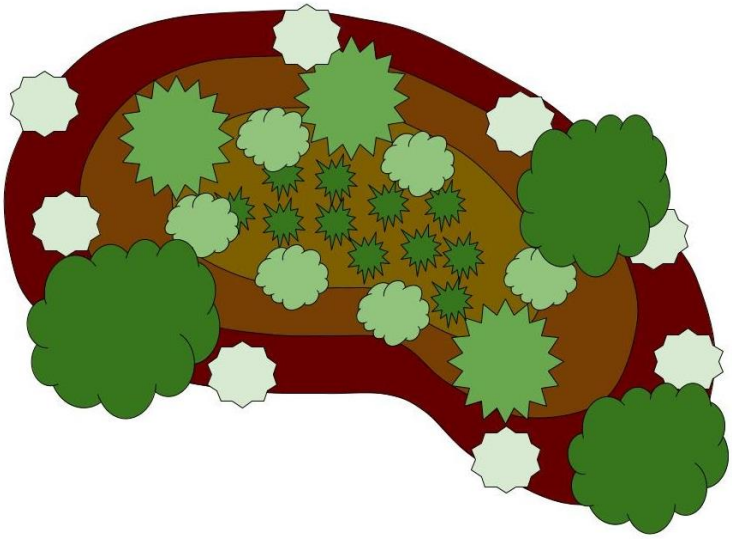
Size your rain garden to fit your landscape. Sometimes you only have so much space you can fit a garden or you can only dig so deep into your yard due to utilities, roots, or other obstructions.

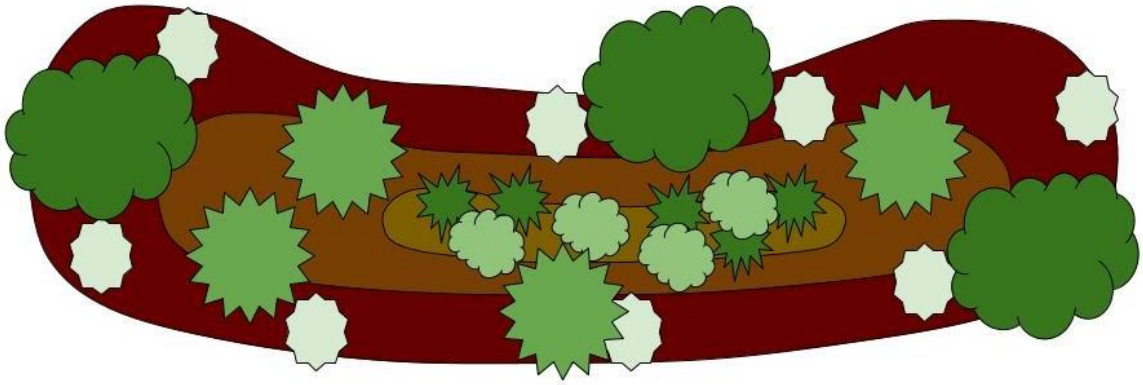
Notes:

Pick your shape

The shape of your garden will be determined by the features of your site and your personal preferences. Bean-shaped or teardrop-shaped gardens have a more natural look than a perfectly circular shape. Longer and skinnier shapes can be used on slope contours to limit the amount of excavation needed. A few shape examples are below.







Plant Selection

The plants in a rain garden must be selected for their water preferences. In the center of the garden (Zone A) choose species that are adapted for wet areas and can tolerate occasional standing water. Along the sloped banks of the garden (Zone B) choose species that like moisture but can also tolerate some dry conditions. On the outside rim of the rain garden (Zone C) select plants that prefer dry conditions. Below are a few recommendations. For a complete, comprehensive list, check out the Rain Garden Plant List.

Zone A

Skullcap

Twinberry Honeysuckle

Thick-headed Sedge

Zone B

Red Columbine

Wild Chives

Red-osier Dogwood

Zone C

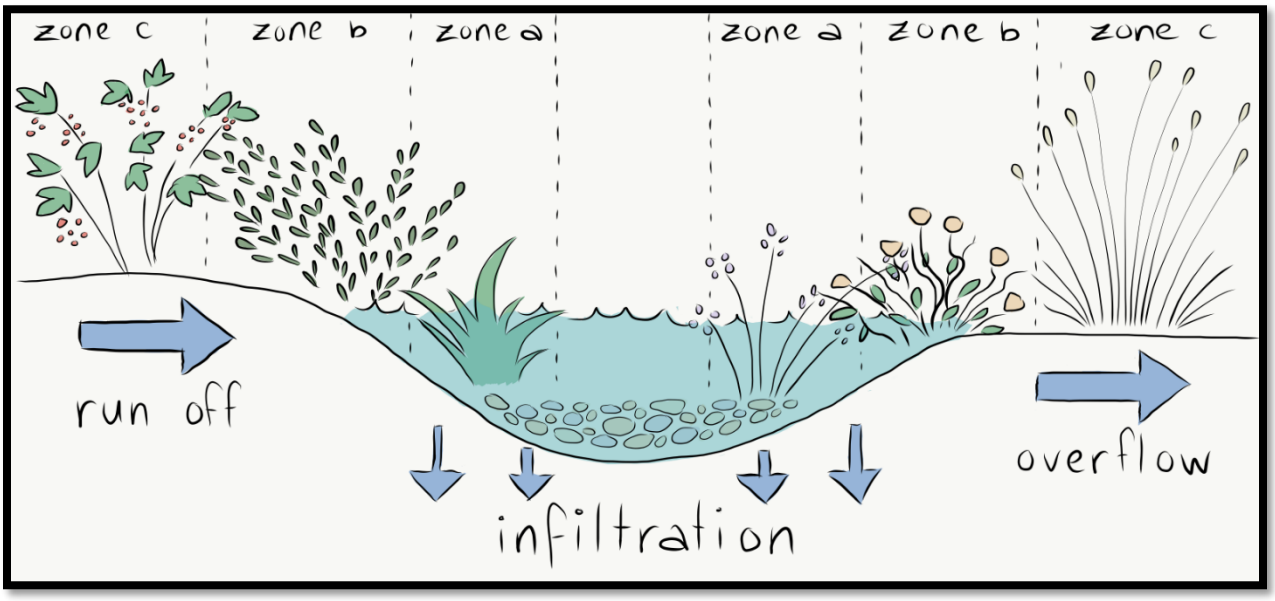
Showy Aster

Kinnikinnick

Paper Birch

Final Design Considerations

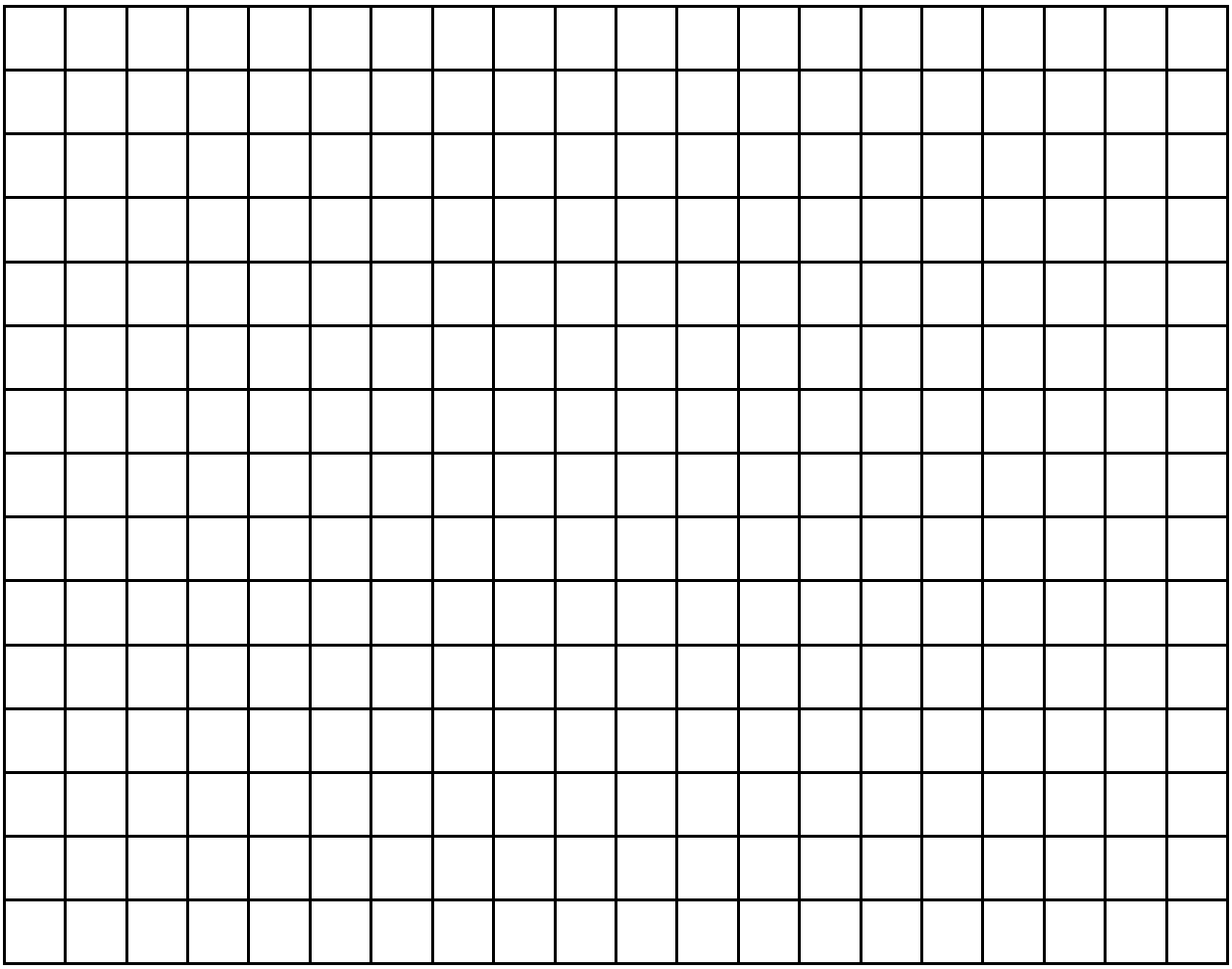
Below is an example cross-section view of a functional rain garden. The area that collects stormwater runoff from impermeable surfaces is on the left and the overflow area for excess water is on the right. The center of the rain garden is lined with rocks which can help with infiltration and the plants are located in each zone according to their preference for water. If you make sure to account for each aspect when planning your rain garden, it will function well – reducing pollution in our local waterways, conserving water, and recharging ground water supplies!



Notes:

Rain Garden Design

Draw the shape and layout you'd like for your rain garden keeping in mind your location and soil characteristics. Mark the location of the water runoff into the garden and overflow out of the garden. Define zones A, B, and C and indicate what species you'd like to plant where.



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A collaborative program created by the Flathead Conservation District and the City of Kalispell