RIVER-FRIENDLY LANDSCAPING COALITION



Create your own

Rain Garden

July 2013

DEPARTMENT OF WATER RESOURCES
STORMWATER UTILITY
Stormwater Quality Program

SACRAMENTO COUNTY
WATER AGENCY

Sacramento County
Rain Garden Guidelines

What's so cool about rain gardens?

Rain gardens are shallow, landscaped depressions that capture rain water that runs off roofs and/or pavement. The many benefits of rain gardens include:

- The rain water they collect slowly soaks into the ground. An average sized rain garden in Sacramento can potentially retain thousands of gallons of water every year.
- They can be landscaped with beautiful and colorful plants and shrubs.
- They provide habitat for birds and butterflies.

Design

Location

To determine the best location for your rain garden, consider these important factors:

- Build your rain garden at least 10 feet from building foundations to protect the structural integrity of your home.

Photo Credit: Metropolitan Council/ Barr Engineering Co.

- To avoid damaging underground utilities build the rain garden away from these utilities. To find out the location of any underground utilities:
  - Call 1-800-227-2600 (Underground Service Alert or USA) to have utility companies locate utilities they own or operate.
  - Check your own records or your local building department for the location of your private pipes (such as the water and sewer lines to your house from the public utilities and any irrigation lines). If you have a septic system, locate the system and its leach lines.

- Notice where your roof gutters discharge water and the direction that the water flows. If your downspout is directly connected to an underground pipe, follow the pipe and see if it drains to a landscaped area. If it does you can consider building your rain garden in that location. If your downspout doesn't drain to a landscaped area consider rerouting it to your rain garden.
- Look for any low spots on your property where the water naturally collects. If there is a location that you would prefer you can re-route the drainage to that area.
- Include the rain garden into your overall long term landscaping plan.

Check local ordinances, including your Homeowners Association (HOA) or Covenant Code and Restriction's (CC & R's) to see if you can alter your front yard landscaping. If you aren't allowed to alter the front-yard landscaping, put the rain garden in your back yard, if that is feasible.

Size

Rain garden size is based on how much water it will receive in a typical rainy season. Rain garden dimensions depend on two things: the size of the area draining to it and how quickly that water can soak into the ground. The ultimate goal is to collect the rain water and allow it to soak into the ground within a few days. Therefore, the first step in sizing your rain garden is to collect information:

- Find out what type of soil you have. To do so thoroughly irrigate the area where you want your rain garden. Come back the next day and dig a small hole, pick up a handful of the soil and squeeze it firmly in the palm of your hands. If the soil feels gritty and crumbles apart, it's sand. If the soil forms a tight ball and feels slippery, it's clay (common in the Sacramento area).
- Consider whether you will use the existing soil or replace it with an amended soil mix (2:1:1 ratio of sand, topsoil, and compost respectively). Amended soil absorbs water faster than clay soil, which means a rain garden with amended soil can be smaller than one with clay soil and still receive the same amount of water.
- Calculate the area (in square feet) of your rooftop/pavement that will drain into your rain garden by either estimating the area (# downspouts to rain garden X total sq ft of dwelling/total # of downspouts) or measuring the footprint of the area that will drain to the rain garden. Remember that different sections of your roof drain to different downspouts. Make sure to only measure the area that will drain to your rain garden. See the appendix for an example of how to calculate that.

For a rain garden in the Sacramento area, you can apply these guidelines:

- If your rain garden will be planted in sandy soil or you plan to amend/replace the soil with the soil mix (2:1:1 ratio of sand, topsoil, and compost respectively), then size the rain garden to be 17% of the size of the area that will drain to it. For example, if the area that will drain to your rain garden is 1,000 square feet (sq. ft.), your rain garden should be 170 sq. ft. (1,000 sq. ft. x 0.17 = 170 sq. ft.).
- If your rain garden will be planted in clay soil, it should be 34% of the area that will drain to it. For example, if the area that will drain to your rain garden is 1,000 sq. ft., your rain garden should be 340 sq. ft. (1,000 sq. ft. x 0.34= 340 sq. ft.).

The above recommendations are based on typical rainfall in the Sacramento area and how quickly the soil absorbs water (the infiltration rate). The ultimate goal is for the rain garden to collect water but

not to become a seasonal pond. For more information about sizing rain gardens, including other ways to check soil infiltration rates, see the rain garden website.

It is recommended that rain gardens larger than 300 sq. ft. either it needs to be broken into smaller, more manageable rain gardens or designed by a landscape design professional, such as a landscape contractor, landscape architect or a member of the association of landscape designers.

Shape and topography

Choose a shape for your rain garden. Different shapes can be used to increase visual appeal. Crescent, kidney, and teardrop shapes are some common options.

After selecting a shape for the rain garden, excavate a depression to collect the rain water (3 inches deep at the edge and 6 inches deep in the center). If your yard is flat, you can simply dig out the soil to the appropriate depth. On a sloped yard, you need to account for the change in slope. If the slope in your yard is steep consider consulting a professional landscape designer. See the diagrams in the appendix for details.

Plants

Choose plants for your garden that you like and that also meet your gardens growing conditions.

- First evaluate the growing conditions, including the amount of sun/shade, the likely temperature range, and the type of soil. Group plants according to their specific needs.
- Consider the water regime. Rain garden plants must be able to tolerate a wet environment during the rainy season. During the dry season the soil will be dry unless the rain garden is in an area you already irrigate or you plan to install irrigation. Irrigation isn't necessary if you choose the right plants; many natives and Mediterranean species tolerate dry summers with little or no irrigation.
- Select plants that are adapted to the growing conditions and that can grow to their natural size in the allotted space. Plants adapted to the growing conditions are less prone to pests or other problems. Considering ultimate plant size avoids an overcrowded garden or the need to later move plants to another location. See the Sacramento County Rain Garden webpage for links for recommended plants and for example rain garden plant layouts. You can also consult books and nursery staff.
- Consider aesthetics. If you pick a variety of shapes, sizes, colors, and blooming times, the rain garden will be interesting year round.
- Consider any other goals you may have such as attracting birds or butterflies.

Irrigation

If you decide it is essential to irrigate the rain garden during the dry season (and it isn't already in an area you irrigate), then plan the irrigation to conserve water. For example, drip lines and soaker hoses are efficient ways to irrigate. Refer to the rain garden webpage for resources to help you design a water-efficient irrigation system.

Water pathway

Either dig a small drainage path or pipe the downspout water directly to the rain garden. The small drainage path can be vegetated or you can use rocks to decorate it. If the water from the downspout drains directly to the storm drain system consider disconnecting and draining it to your rain garden.

Rain Garden Plan

Sketch out your plan for the rain garden. It is helpful to have an idea of the scope of work to be completed before beginning construction. Include the size of the rain garden, plant locations and size, plant list, water drainage pathways, irrigation, and any limiting factors. A simple worksheet is included in the appendix.

CONSTRUCTION

General considerations

Ideally, you should plant the garden during the fall or spring. The best time to plant is in the early to mid fall, since the soil is still warm and the winter rains reduce or eliminate the need for watering. Spring is also a good time for planting, but you will need to water the plants until they are established. Finally, if the rain garden is built when it is not a good time to plant, it could be covered with mulch and planted later.

Construction Steps:

1. **Outline rain garden.**

   Use a hose or rope to outline your rain garden. It should be approximately the same size (the same area) and shape as determined in your design. You can approximate the area the rain garden encompasses by using a shape that most closely matches the outline. For simplicity you can use a square or rectangle to estimate the rain garden area. See details in the appendix for calculating rain garden areas.

2. **Remove and dispose of existing sod or other vegetation.**

   If you plan to replant any removed plants elsewhere in your garden, then dig them up along with the majority roots. Try to keep the soil between the roots undisturbed. If possible, replant or compost any removed plant material. If you can't use the plant material it is essential to properly dispose of them. See the Sacramento County Rain Garden webpage for information on where to dispose of those materials properly.

Photo Credit: University of Rhode Island, Health Landscapes

3. **Excavate**

   Using existing soil: Simply dig to the final depression depth, which should range from 3" below the adjacent ground elevation on the outer edge to about 6" in the middle. The center of the rain garden should be as flat as possible for even water

distribution. The appendix includes diagrams for assistance.

Using amended soil: Dig 18 inches down and remove that soil. Fill the excavation with 12 inches of rain garden soil mix. The rain garden soil mix can either be purchased pre-mixed or you can mix it yourself. The soil composition should be 50% sand, 25% topsoil, and 25% compost (2:1:1 ratio of sand, topsoil, and compost respectively). The final depression should range from 3" below the adjacent ground elevation on the outer edge to about 6" in the middle. The center of the rain garden should be as level as possible for even water distribution. The appendix includes diagrams for assistance. See the Rain Garden Web page for a list of landscape companies that can provide the soil mix and estimated volumes needed for amended soil for the rain garden.

4. **Dispose of excess soil.**

   If possible redistribute the excavated soil on your property. If you can't use the soil on site, it is essential to properly dispose of it. See the Sacramento County Rain Garden webpage for information on where to dispose of soil properly. The appendix includes diagrams and help calculating excavation volumes.

5. **Install irrigation, downspout pipe, drainage flow path**

   If any underground irrigation is necessary or desired, install it before planting.

   Dig a shallow flow path for the water to drain from your specified roof or paved area or install a pipe to take the water from a downspout directly to the rain garden.

6. **Plants**

   Purchase plants at local nurseries or other suppliers; never harvest plants from the wild for your rain garden.

   Place your plants according to the general planting plan you created when designing your rain garden. It is helpful to first set them on the ground surface to see if you want to adjust the layout. Be sure to space plants far enough apart considering their ultimate size.

7. **Other features**

   Place mulch in the rain garden to keep out weeds and to conserve water during the summer.

   During large storms, water flowing into the rain garden can cause erosion. Placing rocks in the flow path will slow the water down and decreases erosion.

MAINTAINENANCE

Water level

During the rainy season, regularly monitor the garden for standing water. To avoid breeding mosquitoes, do not let water stand for more than five days. If the rain garden has problems with standing water consider amending the

Photo Credit: Metrocouncil.org

soil, or increasing the rain garden size so it can better accommodate the rain water.

Plant Maintenance

Plants need the most care during the first year or two; even plants adapted to dry summers need some water until they are established. When plants are small, the garden has more room for weeds to grow.

Remove weeds and manage pests in ways that reduce/eliminate the use of herbicides and pesticides. That saves you money and at the same time creates a healthier environment in your yard as well as in our creeks and rivers. Several websites listed at the end of this document have tips on maintaining gardens and managing pests in ways that minimize the use of chemicals. If you notice a plant not thriving, transplant it to a better location within your yard, if possible.

Once the garden is established, maintenance becomes much simpler. Sit back and enjoy the beauty of your new rain garden!

Resources/References

Local Rain Garden Information And Resources

- Sacramento County Rain Garden Webpage
- River Friendly Landscaping Guidelines
  http://www.sacramentostormwater.org/SSQP/Riverfriendly/Documents/RiverFriendly_Guidelines.pdf
- Regional Water Authority http://www.rwah2o.org/rwa/
- UC Davis Master Gardeners http://groups.ucanr.org/sactomg/
- UC Integrated Pest Management http://www.ipm.ucdavis.edu/
- Sacramento County Water Agency
  http://www.msa2.saccounty.net/dwr/scwa/Pages/default.aspx

References

- "Rain Gardens for Home Landscapes," Atlanta, Georgia
- "How to Install a Rain Garden," South River Federation
- "Stormwater Solutions for Residential Sites Section 6- Rain Gardens," Waitakere City, New Zealand
- "Rain Gardens of West Michigan-Saving the Great Lakes One Garden at a Time," Michigan
- "Rain Gardens: A How to Manual for Homeowners", Wisconsin Department of Natural Resources DNR Publication PUB-WT-776 2003
- "Rules of Thumb for Water Wise Gardening", Regional Water Authority

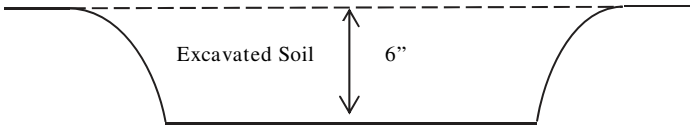
Other Rain Garden Websites

- Wisconsin Department of Water Resources —http://www.dnr.state.wi.us/runoff/rg/
- Rain Gardens of West Michigan —http://www.raingardens.org

Appendix

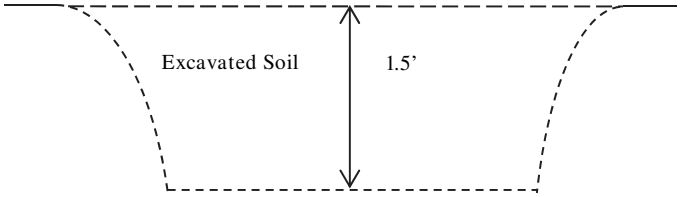
HOW TO EXCAVATE YOUR RAIN GARDEN: (SIDE PROFILES)

1. IF YOU ARE USING EXISTING SOIL AND ARE NOT AMENDING:

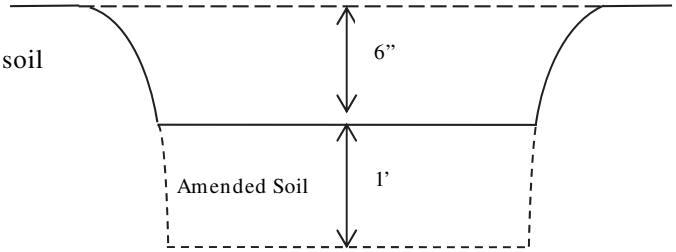


2. IF YOU WANT TO AMEND:

Step 1. Excavate your soil



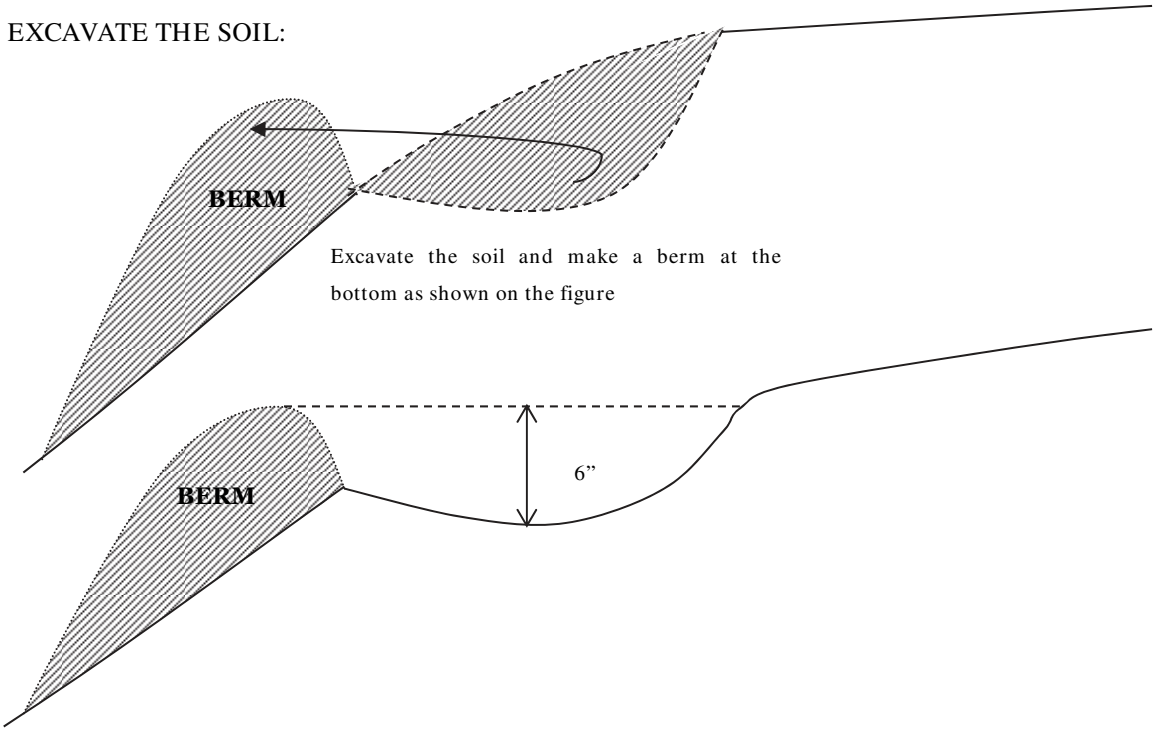
Step 2. Fill with amended soil



For rain gardens with steep slopes, consider obtaining professional assistance.

Below are general guidelines to make a rain garden with steep slopes.

EXCAVATE THE SOIL:



HOW TO CALCULATE SOIL VOLUME EXCAVATION:

Length (L) x Width (W) x Depth (D) = Volume (V)

1 cubic yard = 27 cubic feet

Using existing soil*: (soil hauled away)

_____ x _____ x 0.5 ft x $\frac{1}{27}$ = _____ cubic yards

For rain gardens with replacement with soil mixture*: (*soil hauled away*)

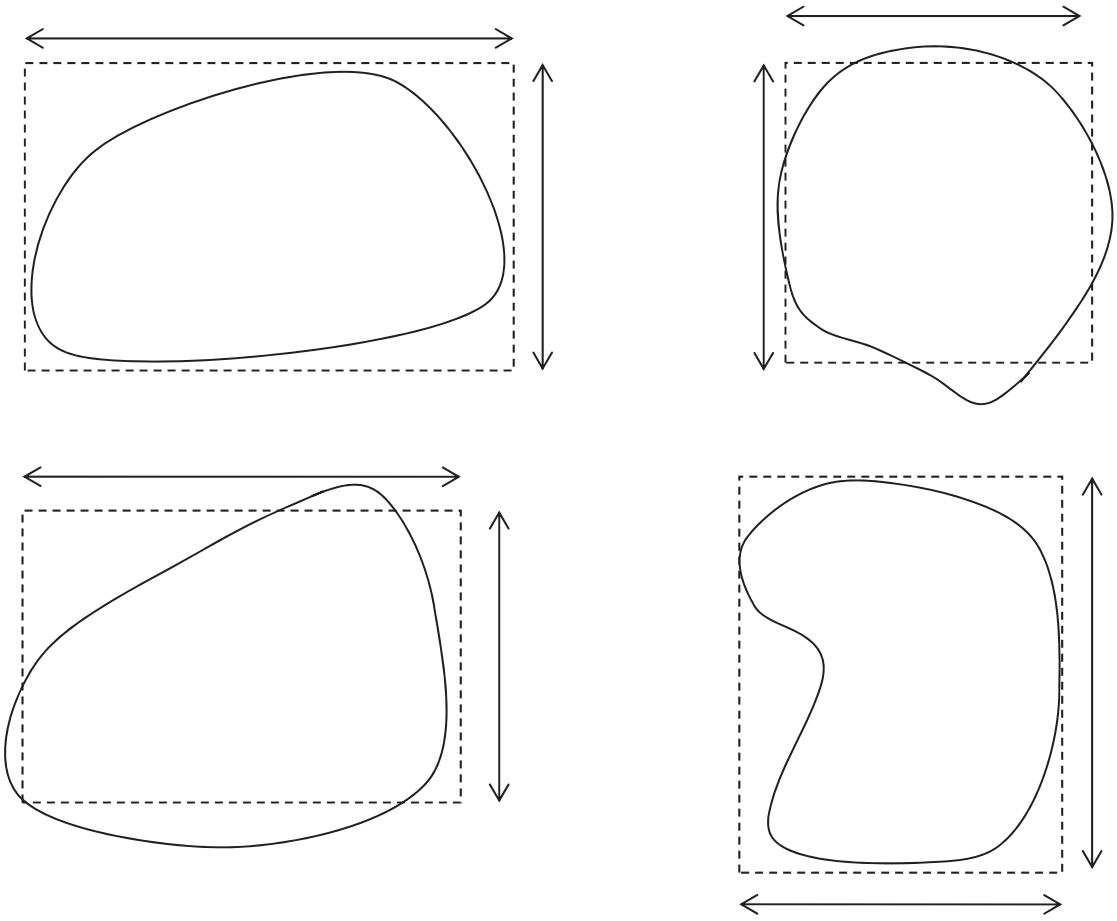
_____ x _____ x 1.5 ft x $\frac{1}{27}$ = _____ cubic yards

How to calculate rain garden soil amendment: (*soil placed back into rain garden*)

_____ x _____ x 1.0 ft x $\frac{1}{27}$ = _____ cubic yards

* Assuming you're beginning with flat ground

HOW TO CALCULATE AN ESTIMATED RAIN GARDEN AREA:



Rain Garden Sketch