

How to Build a Rain Garden at Your Home



Virginia gets an average of 45.22 inches of rain a year. Rain that runs off your roof or patio can flow into a sewer pipe, stream or groundwater. Why not put it to better use? You can create an attractive rain garden in your yard that captures runoff and lets it to soak into the ground. Containing rainwater from hard surfaces on your property reduces wear and tear on the sewer system and protects water quality in local streams and groundwater.

What is a rain garden?

A rain garden is a planted depression in the ground that allows rainwater from hard surfaces (roofs, sidewalks, streets and compacted lawns) to be absorbed. This reduces rain runoff by allowing the water to soak into the ground as opposed to flowing into storm drains, streams and other surface waters.

Rain gardens can blend with your existing landscape, and the design can be formal or informal. A rain garden is a great place to direct the water from disconnected downspouts or paved areas, or to capture the overflow from a rain barrel.

Why plant a rain garden?

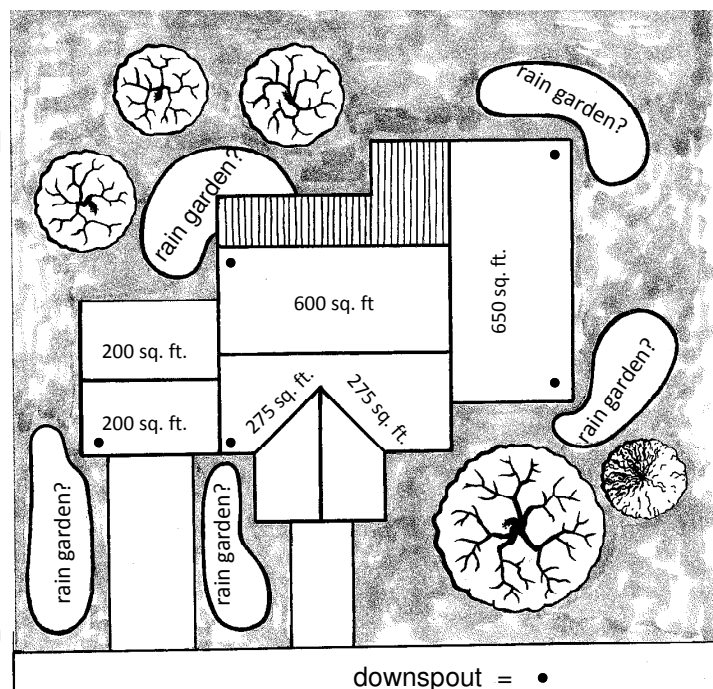
When rain falls, it washes over roofs, driveways and other impervious surfaces. If rain water runoff isn't managed properly, it can wash dirt, nutrients, oil and chemicals into rivers, streams and groundwater. A rain garden filters pollutants as water soaks into the ground, also replenishing groundwater. This helps reduce flooding and erosion in streams, keeps sewers from backing up into basements, and reduces combined sewer overflows (CSOs). Rain gardens can also provide habitat for birds, butterflies, and beneficial insects, such as honey bees.

Getting Started

Start by learning about your site and preparing a good plan to ensure that the plants in your rain garden thrive and rain water soaks into the ground. This brochure describes a four-step process to help you create your rain garden from start to finish.

Observe your site

Are your roof downspouts currently disconnected to empty into your lawn? Or, are they connected to the sewer system or a drywell? Does your driveway runoff go into your yard or into the street? Locate your rain garden where it will intercept and collect the most runoff.



Draw What You See

- Sketch a site plan. You can start by printing an aerial view of your property from <http://earth.google.com/>, or make a drawing similar to those in this manual.
- Mark the locations of downspouts and paved areas. You can always move a downspout and re-grade gutters so the rain drains to a suitable location to build your rain garden, such as landscaped or lawn areas.
- Determine the square footage of the roof area and pavement that will drain to the rain garden.
- Map out where you might construct a rain garden.
- Choose a location that is down slope of the downspouts or paved areas that will drain to the rain garden. Thanks to gravity, water will flow to the lowest point.

Safety Considerations

- **Call before you dig.** Call Miss Utility (dial 811 in Virginia) at least 48 hours before you dig. Make sure you do not damage underground utilities when digging out the rain garden.
- You may need to add or remove soil to make sure that the slope of the ground allows water to flow away from buildings, including your house and garage.
- Water discharged from disconnected downspouts should drain at least six feet from a building's basement and two feet from a building's crawl space or concrete slab foundation.
- Keep the water in your rain garden at least five feet away from neighboring properties and three feet away from public sidewalks.
- Do not locate the rain garden over a septic system, drain field or underground oil tank unless they have been decommissioned.
- Avoid building a rain garden in an area that is too small for good drainage or too close to a retaining wall.

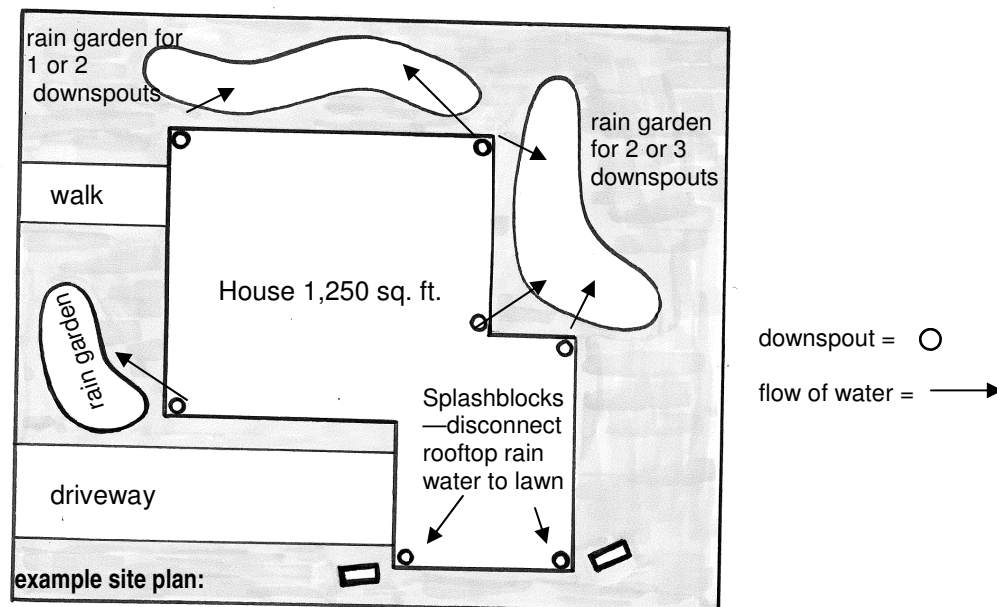
Other Factors to Consider

- It's easier to build a rain garden in a relatively flat area.
- A naturally low spot with good drainage is ideal for a rain garden because water already flows in that direction.
- Avoid building a rain garden where water ponds—ponding water is a likely indicator that the soil does not drain well.
- Consider removing paved surfaces to create space for a rain garden, or replacing pavement or concrete with pavers or gravel where appropriate.
- Avoid placing rain gardens underneath the canopy of existing trees.

Permits

Be sure to check with your local planning or public works department to find out if you need a permit to build a rain garden. The amount of square footage you will disturb for a residential rain garden will likely **NOT** result in the need for a permit, assuming you do not install underground drainage pipes. If you do install underground piping (such as an underdrain system, soakage trench or French drain), you might need a permit.

Design your rain garden



Show your rain garden on your existing site plan. Mark where you might move downspouts, where storm water comes from and flows to, and where you might add or move plants.

Make sure your rain garden is large enough to drain the water directed to it within 36 hours. This keeps water from becoming stagnant and mosquitoes from breeding. Size your rain garden to be at least 10% of the area that drains to it.

For example, if 500 square feet of rooftop drains to your rain garden, the rain garden should be at least 50 square feet.

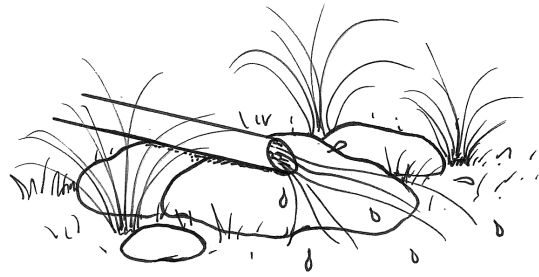
$$\begin{array}{rclcl} \text{Roof area} & \times & \text{Sizing factor} & = & \text{Rain garden size} \\ 500 \text{ sq. ft.} & \times & 10\% & = & 50 \text{ sq. ft. (or } 5' \times 10') \end{array}$$

If your soils drain slowly, your rain garden may need to be larger or you can amend your soil.

Test Your Soils

Dig a hole two feet deep and two feet wide where the deepest part of the rain garden will be. Fill the hole with water and let it drain completely. Fill it again and monitor how fast the water drains. If it drains within 24 hours, this is a good spot to locate a rain garden. It's a good idea to dig a couple of holes to see if drainage in your yard is uniform.

Sand, gravel or compost can improve infiltration. Till in a mix of two thirds sandy loam topsoil and one third compost to improve conditions for plant growth. Blend it well to a depth of 18 inches to loosen compacted soil and allow plant roots to establish more quickly.



Direct water away from your house with a pipe; allow the rain water to splash onto a large rock or into a group of smaller rocks. This helps keep soil from eroding under the pipe.

Direct Water Away From Your House

An above-ground pipe is the easiest way to move water from your downspout to your rain garden.

Metal downspout material is durable and easy to find at hardware stores. Make sure the materials you use are sturdy and made for outdoor conditions (no dryer hose or indoor tubing). Suggested materials include cast iron and Schedule 40 ABS or PVC. If you are draining less than 1,500 square feet of roof to your rain garden, you should use 3-inch diameter pipe. If you are draining more roof area, use 4-inch diameter pipe.

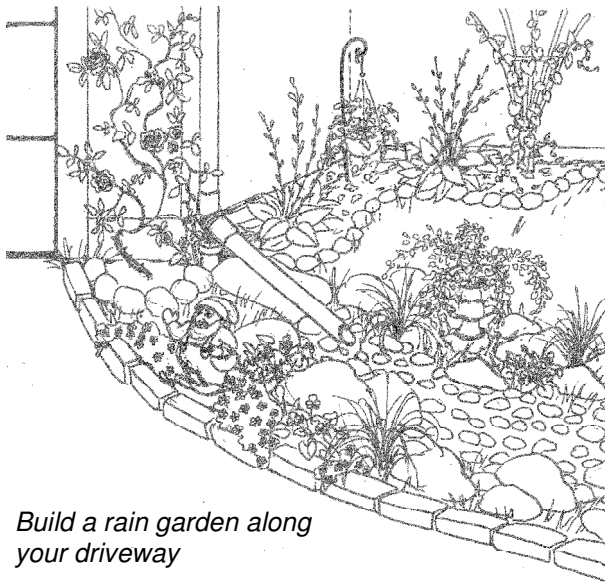
You may want to:

- Direct the water into a shallow conveyance swale.
- Build a rock-lined swale that looks like a dry creek bed.
- Use a concrete or plastic splash block.

Plan where the rain garden will overflow when it's full. Make sure excess water will flow away from buildings and neighboring properties.

Choose Your Plants

Plants are important living feature of rain gardens. They filter pollutants and keep soil in place. Plant root systems loosen soil and improve drainage. They stimulate biological activity that helps the soil break down pollutants and increase runoff infiltration and retention. There are a wide variety of native plants that resist disease and provide wildlife habitat.



Build a rain garden along your driveway

Choose plants suitable for the different water levels of your rain garden. In the bottom two thirds, use plants like wetland rushes and sedges that can tolerate a lot of water. Upland plants that need less water will do well in the upper one third. Red twig dogwood, inkberry holly and Joe Pye weed are good choices. Keep in mind the height and width of the plants when they mature when you make your selections. Native plant nursery professionals or the Virginia Native Plant Society can help you choose plants that are best suited for your garden based on soil, sunlight and your design. Take your site sketch with you when you purchase your plants.

Build It

- Use string and stakes to outline the area you're going to dig.
- Moisten hard soils with a garden hose to make digging easier. Dig up existing grass and plants. Set aside any plants you might be able to use in the rain garden.
- Dig the entire rain garden about 18 inches deep to loosen soil, then add a few inches of soil, sloping the sides at about 20% (or at a ratio of 3:1) to reduce the risk of erosion and soil falling back into the bottom of the rain garden.
- Amend the soil with sand and compost to increase infiltration. For every bag of compost, till in 2 comparable-size bags of sand. If not in bags, use a ratio of 1:2.
- Plant your rain garden. Use a variety of species and plant densely to make it difficult for weeds to take root and to reduce potential soil erosion. Consider using mulch for moisture retention, weed control and a soil filter. Replace mulch one to two times a year, depending on the amount of soil build up. *A clogged rain garden will provide no benefit of water quality protection.*
- Disconnect your downspouts and direct them to the rain garden. This provides water to the plants in your new rain garden. If weather is dry, water the plants regularly until they are established, usually within an 8 to 12 week period, longer if dry periods persist.

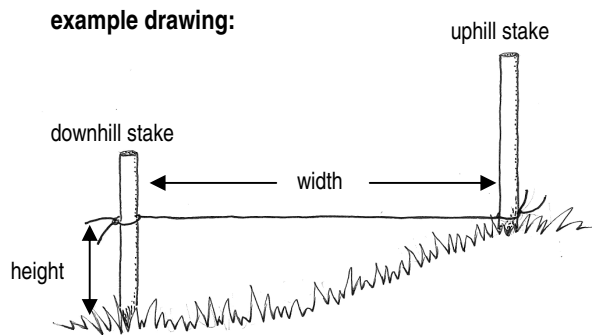
Measuring a slope

Tie a level string from a stake pounded into the ground at an uphill spot to a stake pounded into the ground downhill. Measure the distance between the stakes (width) and from the string to the ground at the downhill stake to the ground (height). Divide the height by the width to get the slope in decimal format. Multiply this by 100 to obtain the percent.

$$\frac{H}{W} = \text{Slope}; \text{slope}(100) = \% \text{ slope}$$

*If the width is 10 feet and height is 6 inches,
then your slope is 5%*

$$\frac{6 \text{ inches}}{120 \text{ inches}} = 0.05(100) = 5\%$$



- Make the main basin of the garden as level as possible so that water spreads evenly.
- If the garden is on a slight slope, make a berm or dirt wall on the downslope edge that will retain the rainwater.
- Use plastic or concrete splash blocks, rocks or boulders at the end of downspouts to direct flow and control erosion.

Maintenance

Maintain your rain garden regularly as you would with any other kind of garden. After one to three years, maintenance should be minimal as the rain garden plants will have spread out, leaving little room for weeds. Inspect your rain garden periodically, especially after a heavy rain.

- Dry months: Irrigate deeply once a week to encourage root growth and keep plants strong, especially while plants are getting established.
- Avoid chemical weed killers or fertilizers. Pull weeds by hand before they become a problem.
- Remove sediment and debris, watch for erosion, and replace plants as needed.
- Add or replace mulch 3" deep once a year to boost rain water infiltration and trap soil.

Be Flexible

If a plant isn't thriving where you first placed it, move it to another part of the rain garden. Some areas in a rain garden will be wetter or drier than others. Sometimes it isn't easy to tell where a plant will grow best until it has rained a few times. A rain garden is a living system, so go with the flow.

For More Information...

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Protecting America's Founding River

The mission of the James River Association is to be guardian of the James River.

We provide a voice for the river and take action to promote conservation and responsible stewardship of its natural resources.



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Funding for this publication was generously provided by Dominion and Altria. We appreciate their financial support that helps protect the health of the James River.



The text of this document was inspired by a series of publications created by City of Portland Environmental Services. For more information, visit www.portlandonline.com/bes/index.cfm?c=50090.