

INFILTRATION RAIN GARDENS



CLACKAMAS SOIL AND WATER CONSERVATION DISTRICT

Introduction

Did you know northwest Clackamas County receives over 45 inches of rain each year? On a 1000 square foot roof, that amount of rainfall can generate 25,000 gallons of water! As this water (known as **stormwater runoff**) moves across the landscape, it picks up fertilizers, oils, sediment and other pollutants.

In many areas, runoff from rooftops, driveways and streets flows directly into nearby streams - not to a water treatment facility! As we all know, water pollution is a significant threat to drinking water, outdoor recreation and habitat that supports endangered fish and wildlife. While we all play a role in stormwater pollution, we also can be part of the solution!

What is a Rain Garden?

A rain garden is a shallow, vegetated depression designed to collect, absorb and filter stormwater runoff. When possible, allow rain to soak into the ground where it falls. Soil acts like a natural filter to clean and cool runoff before it enters the ground water, which replenishes our local streams.

Rain gardens promote better drainage by utilizing a specially blended soil mix along with a wetland-type plants that are adapted to the moist soil conditions. Rain gardens are an inexpensive, relatively simple way to treat stormwater on-site and promote groundwater recharge. In addition, they add an attractive feature to your landscape and create micro-habitats for local birds and pollinators.

Terms to Know:

STORMWATER RUNOFF: rainwater, plus anything it picks up, that moves across the landscape rather than soaking into the ground

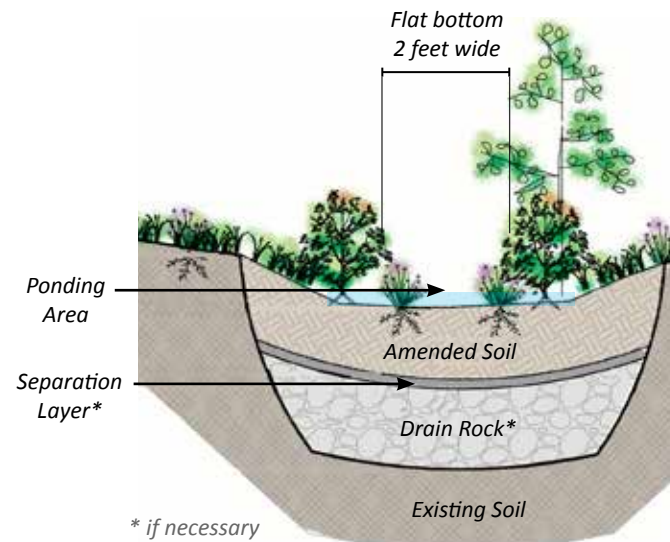
IMPERVIOUS SURFACE: materials that prohibit water from soaking into the ground

CATCHMENT AREA: a measurable surface area that collects rainfall

SQUARE FOOT: a unit of area; length x width

PONDING AREA: lower bowl of a rain garden that temporarily holds water

Cross Section of Typical Rain Garden:



Maplewood RG-NRCS

1. Site Assessment

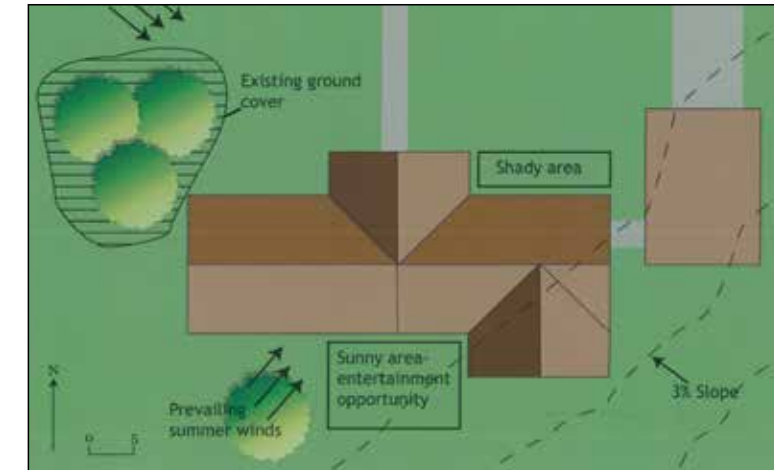
INVENTORY THE PROPERTY

- Draw a map of your property. Identify structures, property lines, trees, sunny/shady locations, slopes, and buried utility lines. Note how water currently moves across your property.
- Identify site constraints and available space for your rain garden. Do NOT build a rain garden in the following areas:
 - Sites with seasonal ponding or standing water
 - Above buried utility lines. Call 811 to schedule a FREE utility line locate service.
 - Within the dripline of a tree canopy
 - Within a designated riparian/wetland buffer
 - Above a septic drain field
- Identify and measure the impervious surfaces that will drain to the rain garden, including runoff from rooftops, driveways or patios.

TOTAL IMPERVIOUS AREA = _____ SQUARE FEET

CHECK REGULATIONS

- Confirm all setbacks and permit requirements with your local jurisdiction. Stormwater design standards are usually set by the storm sewer district (i.e. WES, Oak Lodge) or municipal public works department.
- Common setbacks include:
 - 5' from property lines
 - 10' from any foundation
 - 10' from retaining walls
 - 100' from slopes greater than 10%



Infiltration Testing:

- Soil conditions differ throughout the county. A soil drainage test will help determine the size and location of your rain garden.
- Tests are best done in the winter months when soils are wet.
- Following the steps below, perform the test 3 times and record the results of the third test. Dig at least 2 test holes in the desired garden location. IMPORTANT: Call 811 before you dig!

Watch our how-to video at www.conservationdistrict.org



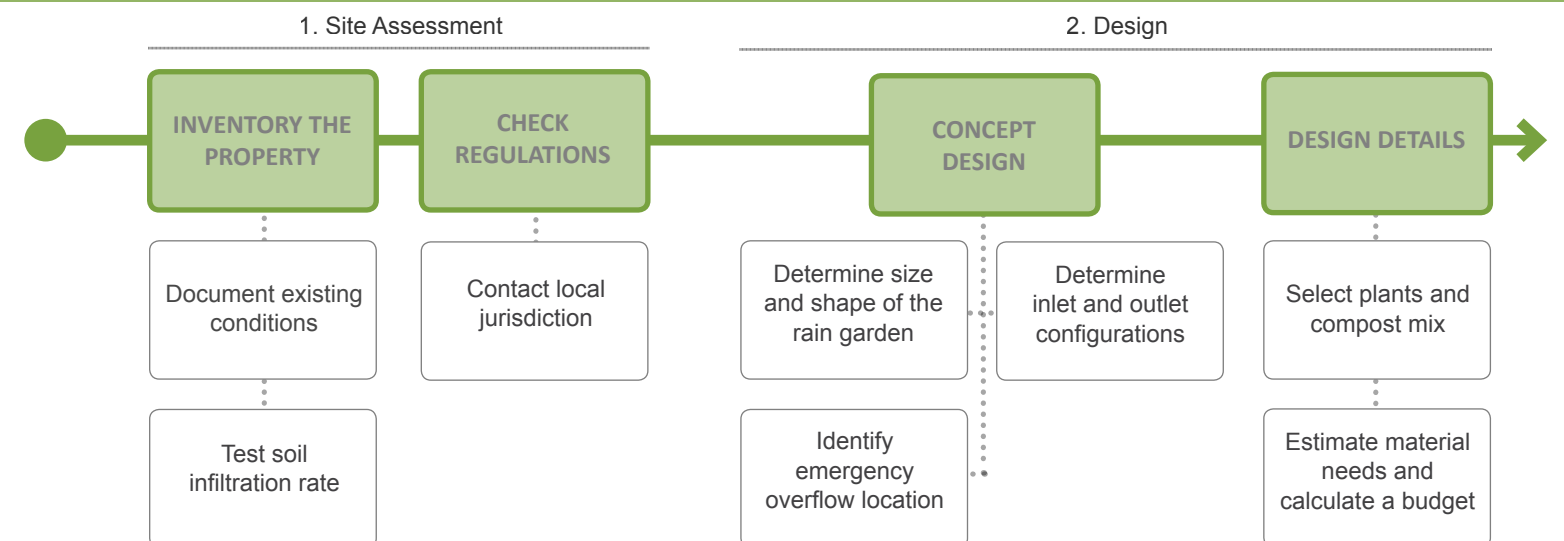
Dig a test hole 24" deep and 12" wide

Fill the hole with 8-10" of water

Measure drop in waterline per hour

INFILTRATION RATE = _____ INCHES PER HOUR

RAIN GARDEN PLANNING: STEP-BY-STEP



2. Design

CONCEPT DESIGN

- Calculate the size of your rain garden based on the infiltration rate:

If infiltration rate is...	Then, area of rain garden equals...	With ponding depth of...
• 2" per hour	• 10% of impervious area	• 12-24"
• 1.5" per hour	• 12% of impervious area	• 12-24"
• 1" per hour	• 15% of impervious area	• 12-24"
• < 1" per hour	• No build	

SIZE OF RAIN GARDEN = _____ SQUARE FEET DEPTH = _____ INCHES

- Determine how water will enter the rain garden. Options include above or below ground downspout extensions or a gravel filled trench lined with geotextile fabric.
- In the event of extreme rainfall, designate an area outside the rain garden where you can safely direct overflow. Set the overflow outlet 2" below the outer edge of the rain garden and line with drain rock to prevent erosion. Do NOT direct overflows towards neighboring properties.

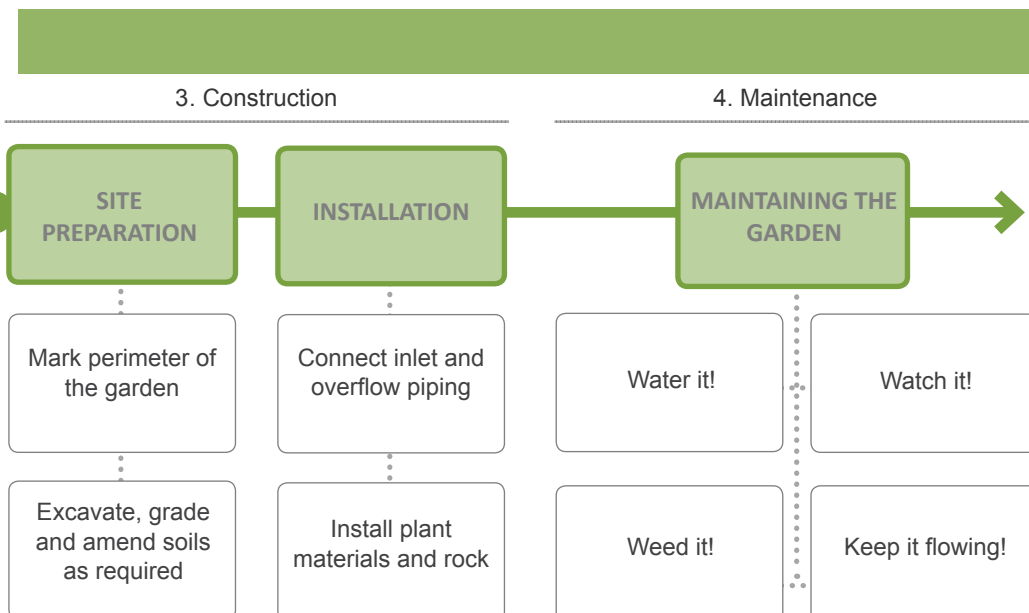
OVERFLOW WILL BE DIRECTED TO: _____

DESIGN DETAILS

- Two important components of the rain garden are compost and mulch. Many soil providers offer a compost blend specially mixed to promote good drainage in rain gardens. Compost should be used in both Zone A and B. Shredded or chipped wood mulch (not beauty bark) will help retain soil moisture during the dry summer months and suppress weeds year round. Apply mulch only to Zone B.
- How much will you need? Multiply the square footage of your work area by .25, which will equate to 3 inches of mulch/compost. Divide that value by 27 to yield the cubic yards needed for your project.

AMOUNT OF COMPOST MIX NEEDED: _____

AMOUNT OF WOOD CHIP MULCH NEEDED: _____



Rain gardens have two distinct zones:

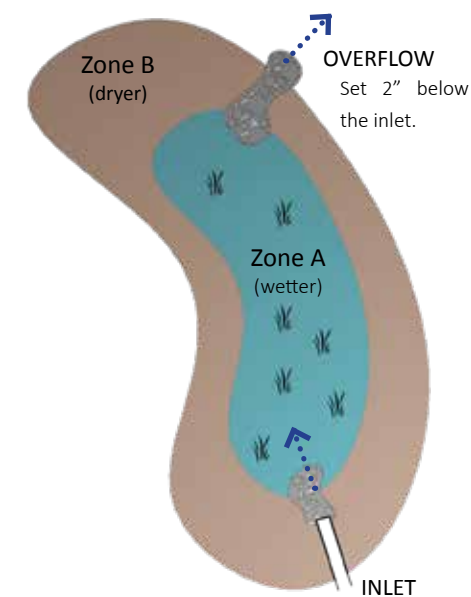
Zone A:

- The bottom of the rain garden where water ponds during larger rain events
- Flat and at least 2 feet wide
- Reserved for water-loving plants

Zone B:

- Areas of the rain garden that are above the overflow elevation
- Reserved for plants that prefer drier conditions

Plan View:



3. Construction

SITE PREPARATION

- The best times to install your rain garden is in early fall (Sept-Oct) before the rainy season begins, or during dry weather in the spring (March). Do NOT install a rain garden in the winter months. Digging in wet soils will result in soil compaction and poor drainage.
- LOCATE:** Use rope or marking paint to delineate the perimeter of the garden bed. Confirm that all setbacks and sizing guidelines have been followed.
- DIG:** Excavate to a depth of 4" below the final desired depth. Use shovels and rakes to create a gradual slope on all sides and to loosen the soil at the bottom of the rain garden.
- PLUMBING:** Disconnect downspouts and/or add extensions to carry water to the rain garden. If you plan to bury the extension pipe, plumbing code requires the use of 3" or 4" Schedule 40 ABS pipe buried 12 inches deep. Extensions should drop 1 inch for every 10 feet of length. **Confirm downspout and plumbing requirements with your local jurisdiction.**

NOTE: All excavation, grading and compost mix should be completed within 2-3 days.

INSTALLATION

- OVERFLOW:** Designate a point at the edge of the garden where overflow can safely flow into lawn or landscaped areas away from the house. Use a line level to make sure the overflow point is lower than the inlet, while still allowing for temporary ponding of water in Zone A. Avoid directing overflow towards a neighboring property.
- COMPOST:** Add 4" of compost specifically blended for rain gardens (available at your local soil provider). Mix compost 6" to 12" deep into the native sub-soil and smooth to finish grade.
- ROCK:** Armor the inlet and overflow with 2" to 4" river rock to slow water and prevent erosion.
- PLANTS:** Choose the "right plant for the right place". See insert for plant recommendations.
- MULCH:** Apply wood chip mulch to areas above the high water mark (ZONE B only).
- INLET:** If possible, wait a few months before redirecting downspouts into the rain garden. The extra time will help plant roots grow and get established in the new rain garden.



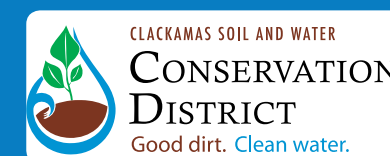
4. Maintenance

- Water it!** Young plants need water while their roots grow deep and become established. With our long, dry summers in the Willamette Valley, plan to water your new plants for at least the first two growing seasons.
- Weed it!** Weeds can spread quickly and choke out young plants. Pull weeds by hand in early spring, late spring and early fall. A wood chip mulch will help suppress weeds, conserve water and protect roots. Maintain a 2-4 inch layer of mulch throughout the rain garden.
- Watch it!** Try to maintain a 90% vegetative cover in the rain garden. Replace failing plants in late winter or early spring. Prune broken branches and keep sidewalks clear of overgrown vegetation.
- Keep it flowing!** Pull out your umbrella and watch your rain garden in action! How is the water flowing? If you have an overflow drain, make sure it's not clogged with leaf debris. After the rain stops, use a rake to softly re-grade where needed or add clean river rock at input points to slow water and reduce erosion.



Bob Spencer with Seattle Public Utilities

For more information, please contact:



www.conservationdistrict.org

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Note: This handout is not to be used as a substitute for local codes and regulations. Confirm all design specifications with your local jurisdiction.