SOLUTIONS LIBRARY

Solution 3: Raingardens

"Raingardens are beauty. Raingardens are color. Raingardens are serenity. But more then anything, raingardens are an example of nature doing exactly what it was intended to do."

-Vincy Fok, Issaquah School District Student
Rain Gardens provide multiple benefits:

1. Rain gardens reduce flooding on neighboring property, overflow in sewers, and erosion in streams by absorbing water from impervious surfaces.
2. Rain gardens increase the amount of water that soaks into the ground to recharge local groundwater.
3. Rain gardens provide habitat for beneficial insects and birds.
4. Rain gardens are beautiful.

**WHAT IS A RAIN GARDEN?**

A rain garden acts like a small section of native forest by collecting, absorbing, and filtering stormwater runoff from roof tops, driveways, patios, and other areas that don’t allow water to soak in. Rain gardens are simple, shallow depressions that can be shaped and sized to fit your yard, are constructed with soil mixes that allow water to soak in rapidly and support healthy plant growth, and can be landscaped with a variety of plants to fit the surroundings. Rain gardens are one of the most versatile and effective tools in a new approach to managing stormwater called Low Impact Development (LID).

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**HOW A RAIN GARDEN WORKS?**

This diagram shows the parts and pieces of what goes into a typical raingarden.

**Explanation of Diagram**

This diagram shows the parts and pieces of what goes into a typical raingarden.

**General Notes:**

- Area and depth of facility are based upon engineering calculations and right-of-way constraints.
- Check dams may be required depending on slope and flow velocities.
- Bottom width should be a minimum of 2 feet to prevent channelization.

**Footnotes:**

1. Horizontal shelf between sidewalk or road and bioretention area slope for safety.
2. Steeper side slopes may be necessary depending on setting and require additional attention for erosion control, plant selection vehicle and pedestrian safety, etc.
3. See Section 6.1.2.2 for additional curb designs.
4. Elevated drain provides benefits compared to an under-drain placed on bottom of facility including improved stormwater retention, plant survival in drier months and nitrogen removal.

**Diagram Excerpted from the 2012 LID Technical Guidance Manual for Puget Sound**
How To Build A Rain Garden?

**STEP 1: Plan**
- Walk around your site thinking like water. Where does it flow?
- Identify the stormwater system of downspouts, catch basins and pipes that drain impervious surfaces like roof tops, driveways and parking lots.
- Choose the best location for your rain garden.
- Test the soil to see how well it infiltrates. Dig a hole 2’ deep, put a yard stick in it and fill it with a foot of water. If the soil drains faster than ½ inch per hour you have well-draining soil. If not, then your rain garden won’t work properly. If it’s the wet season, do the test once. If it’s the dry season, do the test three times and use the third test as your infiltration rate.

**STEP 2: Build**
- Determine the size and shape of your rain garden. A 100 sq ft rain garden can handle about 1,000 square feet of impervious surface area. (1 to 10)
- Excavate the soil 18-30 inches deep. Make the bottom very level so you can get as much distribution as possible when it rains. Don’t compact the soil.
- Mix compost with soil to encourage biological activity. Microbes in soil can break down pollutants.
- Place the soil mix about 6” below the top edge to make sure the water ponds briefly and stays in your rain garden as it infiltrates during a rain storm.
- Create an entry for water through a pipe or a rocky swale.

**STEP 3: Plant**
- Use a variety of small native trees, shrubs, herbs, or grasses.
- Select wet-loving plants for the bottom, medium wet-loving plants for the inside slopes and drought tolerant plants for the perimeter.
- Cover exposed soil with 2-3 inches of mulch to hold in moisture and slow down weeds.

**STEP 4: Maintain**
- Water for one hour once a week for the first summer and one hour every two weeks for the second summer until the plants can establish themselves. Native plants should do fine with little or no watering after that.
- Weed twice a year to keep native plants healthy and your garden beautiful. Mulch as needed to prevent erosion, hold moisture and control weeds.
- Keep the water inlet and outlet clear of debris and well protected with rock.
- Do not fertilize or use pesticides. Keep your soil food web healthy so it can do its job.
Fall: Decide if you need a few replacement plants or others to fill in. Although not necessary, fall is a good time to prune back shrubs and grasses, if desired. Pruning also keeps plants like Red Osier Dogwood from out-growing their red colored stems. You can use any pruned plant material directly in the garden as mulch. Remove any excess organic material (leaves) that may potentially clog the intake and outtake areas. This helps the rain garden do its job.

Winter: Periodically clean out excess organic debris at the intake and outtake areas of the garden so that the hydrological flow functions properly and can survive heavy rainstorms. Prune back shrubs, if desired, after all the leaves have dropped and the plant has entered dormancy. Leave the leaves! They make great mulch, provide nutrients for the microorganisms in the soil.

Summer: Weeding and watering will be important for the first couple of years until the plants get established. Water the plants one inch, once a week, during the first summer and one inch every other week during the second summer. It is important not to over water. Watering is only necessary for the first two growing seasons. By the third summer, the plants are on their own because they are selected for their adaptation to the weather patterns of our bioregion, our dry summers and wet winters.

Spring: Until the desired plants fill in, you’ll have to regularly weed unwanted intruders from your rain garden for about two years. Light mulching with leaves, mulch, and organic material once a year is important. Mulching prevents weeds, keeps nutrients from leaching out of the soil after the heavy rains, retains soil moisture, and helps supports diverse soil food web.

Best Effort - Grade A
- Vegetation is healthy and attractive, no bare spots
- 95% survival of establishing plants
- Little or no weeds are present
- Clean, distinct edges
- Vegetation confined to planted areas, no overgrown appearance
- Evenly distributed mulch and approximately 4” of arborist wood chip mulch

Medium Effort - Grade B, C
- Vegetation is healthy with a good appearance, occasional bare spots
- Small quantities of weeds are present
- Some vegetation overlapping with pedestrian areas, overgrown in isolated areas with some dead material
- 2”-4” layer of mulch is present
- Erosion likely unless maintenance is improved

Poor Effort - Grade D, F
- Poor planted vegetation in health and appearance, bare spots common
- Plant palette has failed more than 50%
- Weeds dominant
- Vegetation spills onto adjacent pedestrian areas
- Mulch is absent
- Substantial eroded areas

Source: “Green Stormwater Operations and Maintenance Manual” by Seattle Public Utilities

Rain gardens can range significantly based upon their size, soil type, plant selection, and location. If you choose to hire a landscape contractor, you should assume that the cost of your rain garden will increase significantly. Contractors charge not only for labor, but also for access to their equipment and their construction expertise. A contractor is not required, but the cost may be worth paying if you want the job done quicker or if you don’t want to do the labor yourself. If you choose to do the labor yourself, you may break a sweat but you’ll likely save a lot of money.

Sample Cost

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<th>Description of Cost</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Cost</th>
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<td>Excavation and soil removal (per cu yd)</td>
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<td>Soil import (per sq ft)</td>
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<td>Cut and cap drain lines</td>
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<tr>
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Project: Tahoma Rain Garden

The first significant cost in constructing a rain garden often comes from excavation. You can choose to hire a contractor or get lots of friends with shovels. Another significant cost of rain gardens is soil and plants (including transportation). You also may need to pay for materials like piping to be able to reroute downspouts to your rain garden.

Source: “Green Stormwater Operations and Maintenance Manual” by Seattle Public Utilities
State of the art Low Impact Development using nature’s own processes to clean storm water run-off before it leaves the community. Landscaped swales along the roadways use native and drought-tolerant plantings to clean run off. A community pond not only provides wonderful views and a place to walk, but also contributes to cleaning water. Special measures protect the water quality of Longfellow Creek, a recently restored salmon spawning stream leading to Puget Sound. Community managing of landscaping, using low-impact methods keep the community looking its best.

Text Source: http://www.thehighpoint.com/green_living.php

Images Sourced From: http://www.asla.org/sustainablelandscapes/highpoint.html