

## 10-Minute University™

The Clackamas County Master Gardener Association in collaboration with and in support of the OSU Extension Master Gardener™ Program



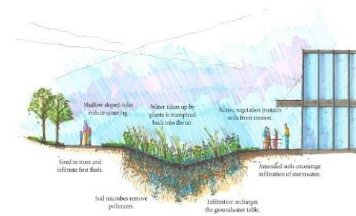
## Adding a Bioswale

In developed areas, the rainfall that lands on hard surfaces is routed into pipes, ditches, and storm drains before being discharged into creeks, streams and rivers. A bioswale is designed to collect stormwater runoff from roofs, driveways, or other impervious surfaces. It allows stormwater to soak into the ground and be filtered by plants and soil to reduce runoff and pollution into natural waterways. The linear design of bioswales makes them suitable for roadside runoff but bioswales are also used in front and back yards and beneath roof downspouts. Bioswales can also serve as substitutes for curbs or gutters.

### Potential bioswale locations should meet these requirements:

- Seasonal high groundwater is less than 24 inches from bottom of the bioswale.
- The bedrock is lower than 18 inches from bottom of bioswale.
- Underground utilities are at least 5 feet away. It is the law in Oregon to call the Utility Notification Center (1-800-332-2344) or (811) before beginning any excavation.
- Buildings are at least 10 feet away.
- Slopes of 10 percent are at least 100 feet away. Avoid installing a bioswale where the down gradient slope exceeds 30 percent.

Check with your local city or county planning department to see if they require a permit or if you will need to follow city/county requirements for installation.



**Design and Dimensions:** Design can increase the efficiency of a bioswale. A trapezoidal, “u” shaped or triangular shaped, fully vegetated bioswale is the most effective. The size of the bioswale should be at least one percent the size of the surface area draining into it. The larger the bioswale, the more storage and infiltration of stormwater is possible, allowing for control of greater rain events. It is important to consider where water will move to during very large rainfalls. A high flow bypass pipe or overflow control outlet is recommended to safely convey high flows. This could either allow water to spill over into a flat grassy area or into the storm water system. The side slopes of the bioswale should be as gently sloped as possible to prevent

erosion. Ideally, flow depth in the bioswale will not exceed 6 inches during a rain event. The bioswale should drain within 24 to 30 hours. If water does not remain in the bioswale for at least 9 minutes, little to no infiltration of water or filtering of pollutants will occur. It is recommended that the slope of a bioswale be less than 10%.

**Rocks:** It is important to place large rocks at the entry and exit of the bioswale to slow water flow and make it easier to clean up silt and other debris. For the greatest water quality benefits, place large rocks periodically along the length of the bioswale to slow the speed of water and improve absorption into the soil.

**Soil:** The top 18 inches of soil in a bioswale is often amended with organic compost. This will allow for robust plant establishment and stormwater treatment. It's important to have your soil tested for pH (5.5 – 7.5 is the goal) and porosity. Analytical Laboratories Serving Oregon can be found at <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em8677.pdf>

**Plants:** For the best infiltration and treatment you will need a variety of trees, shrubs, grasses and ground covers. Perennial flowers, native plants and ornamental grasses can add significant visual appeal. Plantings in bioswales should be dense to reduce flow velocities, prevent erosion and control weeds. Select plants based on their tolerance to flooding and ability to survive in local climate conditions without fertilizers, herbicides, or insecticides. Select water tolerant plants like sedges and grasses at the entry points and in the bottom of the bioswale. Ground covers will help prevent erosion on the slopes. Plants should need little or no watering after the first year of establishment. It is best to plant in the fall. Fall rain will help to establish the plants.

**Care and Maintenance:** Plants require supplemental water during the first summer to help them get established. Mulch 2 to 3 inches deep, using a fine woody mulch to retain moisture and reduce weeds. Inspect your bioswale after storm events to remove sedimentation buildup at the entry or exit points. Replant if needed and monitor frequently for weeds until plants fill in and are well established. Avoid the use of fertilizers, herbicides, and pesticides.

## Resources

Water-Quality Swales Low Impact Development Fact Sheet

<https://catalog.extension.oregonstate.edu/em9209>

The Rain Garden Guide

<https://seagrant.oregonstate.edu/sgpubs/oregon-rain-garden-guide>

Analytical Laboratories Serving Oregon

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em8677.pdf>

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