UNIVERSITY OF GEORGIA MARINE EXTENSION SERVICE

CoastScapes

Bioretention

Bioretention uses the chemical, biological and physical properties of plants, microbes and soils to remove pollutants from stormwater runoff. Bioretention is one of the many integrative Low Impact Development (LID) techniques, which is designed to encourage the natural processes that detain and filter pollutants by mimicking the natural predevelopment hydrology of a land development site.

Bioretention employs a simplistic, site integrated design that provides the opportunity for runoff infiltration, filtration, storage and for water uptake by vegetation. A major advantage of bioretention facilities is their ability to provide physical (sedimentation) and biological (pollutant degradation) treatment while being almost self-sufficient and low maintenance systems.

Bioretention has many purposes—water quality treatment and quantity control, but also is an aesthetically pleasing alternative to traditional curb and gutters or stormwater ponds.

Bioretention cells are shallow, constructed depressions in the landscape that typically include deep-rooted native plans and a mulch layer or ground cover. They are located to receive runoff from impervious surfaces, such as roofs, sidewalks, driveways, roads and parking lots. Bioretention cells slow down the rush of water from these impervious surfaces, holds the water for a short period of time and allows it to naturally infiltrate the ground. In addition to providing increased groundwater recharge, they provide pollutant treatment attributed to adsorption, filtration, plant uptake, microbial activity, decomposition, sedimentation and volatilization.

Biortention Island in Parking Lot

Photo courtesy of Wilkes University

Streetside Bioretention Swale

Photo courtesy of City of Seattle

Residential Rain Garden

Photo courtesy of NC State University.

Bioretention

Applications:

- Parking lot landscape islands
- Roadway median strips
- Traffic islands
- Highway drainage
- Parking lot runoff
- Residential (Rain Gardens)
- Can be designed to capture runoff from just about any impervious surface!

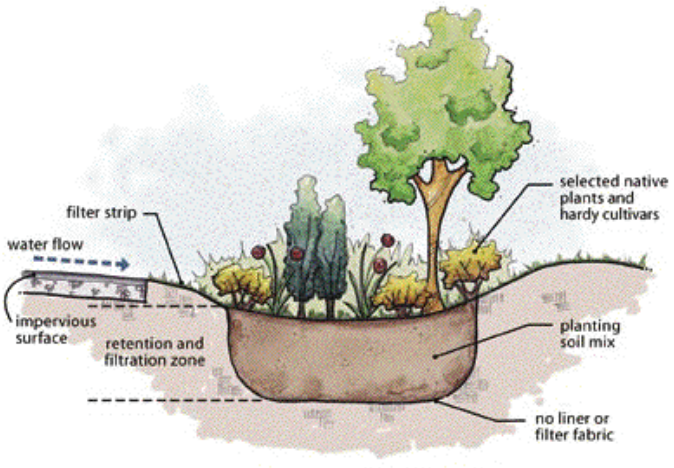

Image courtesy of the Low Impact Development Technical Guidance Manual for Puget Sound

Benefits:

- Applicable to small drainage areas
- Good for highly impervious areas, particularly parking lots
- Good retrofit capability
- Relatively low maintenance requirements
- Can be planned as an aesthetic feature
- More efficient pollutant removals
- Increases groundwater recharge
- Minimal installation and maintenance costs
- Reduces strain on stormwater infrastucture

Major Components of a Bioretention Cell:

- Pretreatment
- Flow Entrance
- Ponding Area
- Plant Material
- Organic Layer or Mulch
- Planting Soil and Filter Media
- Pea Gravel Diaphragm
- Underain and outlet
- Surface Overflow

For maximum performance, it is recommended to use a soil mixture of top soil (20-30%), leaf compost (20-30%) and coarse-grained sand (50%), which produces an ideal filter media to maximize infiltration, filtration and storage. The key to a well-designed bioretention facility is a depressed bowl-shaped topography which creates a ponding area. The ponding area allows for surface storage of runoff when the soil storage is at capacity; promotes evaporation; and allows sedimentation of particulate matter prior to infiltration. Bioretention facilities can be designed to handle not only peak discharges but also the volumetric control of all storms by mimicking existing hydrologic conditions.