Bioretention

43rd Avenue & Logan Avenue

Background

Bioretention areas are shallow depressions in the landscape designed to capture runoff and encourage temporary ponding to help filter storm water runoff. As runoff collects in the bioretention areas, it slowly filters through the soil to remove sediment, trash, metals and other pollutants. By incorporating native plants, bioretention areas can further reduce pollutants through uptake of contaminants by both plants and natural microbes in the soil.

Bioretention is effective for removing:

- Sediments
- Trash
- Bacteria
- Organics
- Metals
- Oil and Grease

Site Assessment

Bioretention can easily be incorporated into parking lot islands and edges, street rights-of-way and medians, roundabouts, or building drainage areas. Use curb cut outs or drain pipes to direct runoff into the bioretention area. Storm drain inlets within the bioretention area should be raised to encourage ponding and infiltration while still capturing overflow. Underdrains should be included for sites with lower drainage rates. Bioretention is not recommended for sites with known soil contamination, such as former gas stations.

Drainage area	Soil infiltration rate	Water table separation	Depth to bedrock	Facility slope	Inflow rate
< 5 acres	> 0.5 in/hr *(if < 0.5 in/hr, install UD*)*	> 10 ft *(if > 2 but < 10 ft, install UD*)*	> 10 ft *(if > 2 but < 10 ft, install UD*)*	< 2%	Mulch: 1 cfs, Grass: 3 cfs

Pollutant Removal			Runoff volume reduction	Groundwater recharge
	Sediments: High	Nutrients: Medium	High no UD*; Medium with UD*	High no UD*; Low with UD*
	Trash: High	Metals: High		
	Bacteria: High	Oil and Grease: High		
	Organics: High			

**UD = Underdrain system*

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Existing Buildings: Assess building effect (runoff, solar shadow) on the site. Bioretention systems must be set away from building foundations at least 10 feet.

Shallow ponding area: Drainage area should be less than 5 acres. Designed to control peak flow velocities and enhance sedimentation. Ponded water must completely drain into the soil within 24 hours, with 12 hours preferred as a safety factor. Ponding depth should be less than 12".

Vegetation: Vegetation is crucial to both the function and appearance. Consider native plants resilient to variable flow. Mimic nature with a high diversity of plant types. Plants must be tolerant of summer drought, ponding fluctuations, and saturated soil conditions.

Media layers: The soil media provides a beneficial root zone for the chosen mix of plants. It also provides adequate water storage for the volume anticipated. The top, organic mulch layer is designed to filter and bond finer particles. Lower planting layers provide nutrients and water for vegetation. A final sand bed filter is suggested for areas susceptible to runoff of finer particulates.

Underdrain system: Below the media layers, the underdrain system is designed to further dissipate flow. Combining traditional conveyance, a perforated pipe is embedded in the gravel layer; flow filters through the gravel layer, into the pipe. The pipe can either connect to the structural storm drain system or route to surface conveyance. Underdrains should have a 6 inch minimum diameter and a minimum slope of 0.5 percent.

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To report storm water pollution, call (619) 235-1000