

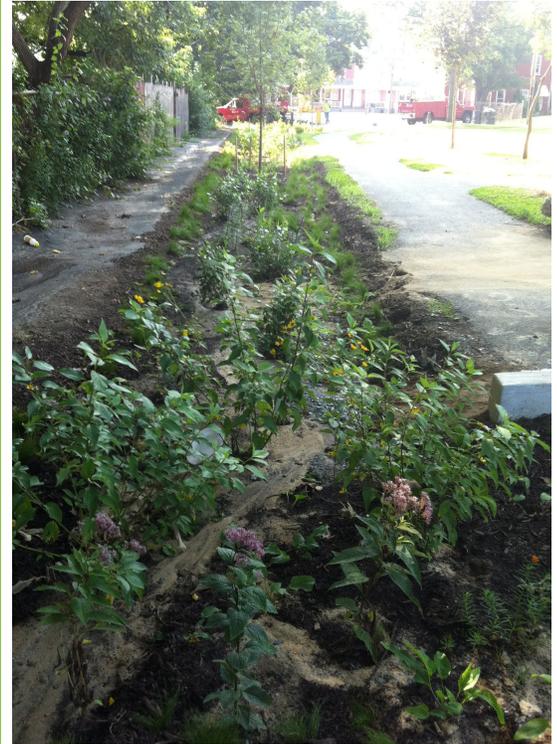
Vegetated Swale



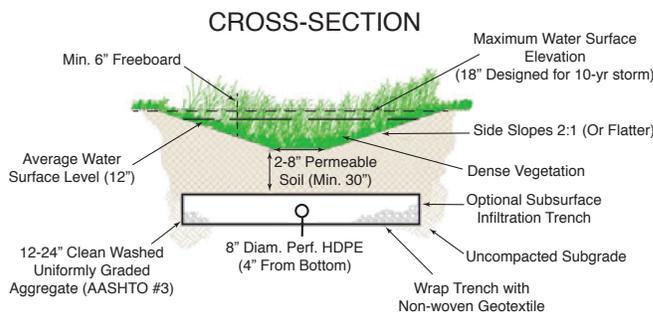
DESCRIPTION

A vegetated swale, also called a drainage swale or bioswale, is a shallow stormwater channel that is densely planted with a variety of grasses, shrubs, and/or trees designed to slow, filter, and infiltrate stormwater runoff. Vegetated swales are an excellent alternative to conventional curb and gutter conveyance systems, because they provide pretreatment and can distribute stormwater flows to subsequent BMPs.

Vegetated swales are sometimes used as pretreatment devices for other structural BMPs, especially from roadway runoff. While swales themselves are intended to effectively treat runoff from highly impervious surfaces, pretreatment measures are recommended to enhance swale performance. Check dams can be used to improve performance and maximize infiltration, especially in steeper areas. Check dams made of wood, stone, or concrete are often employed to enhance infiltration capacity, decrease runoff volume, rate, and velocity. They also promote additional filtering and settling of nutrients and other pollutants. Check-dams create a series of small, temporary pools along the length of the swale, which drain down within a maximum of 48 hours.



Vegetated swales at Milburn Park (Swarthmore, PA)



Potential Limitations

- Limited application in areas where space is a concern
- Unless designed for infiltration, there is limited peak and volume control

BENEFITS

- Can replace curb and gutter for site drainage and provide significant cost savings
- Water quality enhancement (i.e. filtration)
- Peak and volume control with infiltration
- Can fit into the layout, topography, and landscaping plans of a particular project with relative ease

Potential Applications

Residential	Yes
Commercial	Yes
Ultra Urban	Limited
Industrial	Yes
Retrofit	Limited
Highway / Road	Yes
Recreational	Yes
Public / Private	Yes

Stormwater Quality Functions		Stormwater Quality Functions		Additional Considerations	
Volume	Low / Medium	Total Suspended Solids	Medium / High (50%)	Capital Cost	Low / Medium
Groundwater Recharge	Low / Medium	Total Phosphorus	Low / High (50%)	Maintenance	Low / Medium
Peak Rate	Low / Medium	Total Nitrogen	Medium (20%)	Winter Performance	Medium
Erosion Reduction	Medium	Temperature	Medium / High	Fast Track Potential	High
Flood Protection	Low	-	-	Aesthetics	Medium

VARIATIONS

- Vegetated swale with infiltration trench
- Linear wetland swale
- Grass swale
- Check-dams

KEY DESIGN FEATURES

- Handles the 10-year storm event with some freeboard
- Two-year storm flows do not cause erosion
- Maximum contributing drainage area is 5 acres
- Bottom width of 2-8 feet
- Side slopes from 3:1 (H:V) to 5:1
- Longitudinal slope from 1% to 6%
- Check dams can provide additional storage and infiltration

SITE FACTORS

- Water table to bedrock depth – 2 foot minimum
- Soils – A&B preferred, C&D may require an underdrain
- Potential hotspots – No



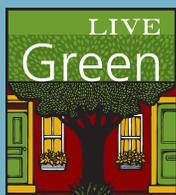
Curb opening to swale & infiltration bed
F&M College, City of Lancaster, PA

MAINTENANCE

- Remulch void areas, treat or replace diseased trees and shrubs, and keep overflow free and clear of leaves as needed
- Inspect soil and repair eroded areas, remove litter and debris, and clear leaves and debris from overflow
- Inspect trees and shrubs to evaluate health
- Add additional mulch, inspect for sediment buildup, erosion, vegetative conditions, etc. annually
- Maintenance cost: approximately \$200 per year for a 900 square foot vegetated swale

COST

- \$5-20 per linear foot depending on extent of grading and infrastructure required, as well as the vegetation used



For more information about the Green Infrastructure program please contact:

Fritz Schroeder
Fritz@livegreenlanaster.org
(717) 392-7891 ext. 207



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a city authentic