Filtration Overview

Filtration practices are structural stormwater controls that capture, temporarily store, and route stormwater runoff through a filter bed to improve water quality.

Lino Lakes City Hall - Lino Lakes, MN

City of Woodbury, MN

Design Criteria

- Ensure adequate space for filtration system
- Some installations require 2-6 feet of head
- Removal potential of the key pollutant
- Parent material and potential for ground water contamination

Benefits

- Good for highly impervious areas with low sediment/high pollutant load (e.g. urban land use and retrofit scenarios)
- High pollutant removal rates
- May be used in a variety of soil types
- Good for the treatment of hotspots because it can be isolated from ground water if contamination concerns exist

Limitations:

- Higher maintenance requirements
- Some installations (media filters) have higher construction costs
- Potential to cause odor problems
- Minimal treatment of soluble nutrients
- Potential for nitrification in media filters where anaerobic conditions exist

Description

Filtration systems vary in their operation and applicability, but all can be described as structural BMPs that function mainly to enhance water quality by passing stormwater through a media. The media can be made of sand, peat, grass, soil, compost or vegetation and should be assigned on a case-by-case basis. Filters can be off-line systems or designed as pre-treatment before discharging to other stormwater features.

The two main categories of filtration systems include: media filters, and vegetated filters. Media filters can be located on the surface, underground, along the perimeter or an area, or in what is called a pocket design. Vegetated channels may be grass channels, dry or wet swales, submerged gravel wetlands, or filter strips.

Filtration Practices

MANAGEMENT SUITABILITY

High	Water Quality (V_{wq})
Med.	Channel Protection (V_{cp})
Low	Overbank Flood Protection (V_{p10})
Low	Extreme Flood Protection (V_{p100})
Med./ Low	Recharge Volume (V_{re})

MECHANISMS

X*	Infiltration *with appropriate soil & site conditions
X	Screening/ Filtration
	Temperature Control
	Settling
X	Evaporation
X*	Transpiration *if vegetated
X	Soil Adsorption
X	Biological/ Micro. Uptake

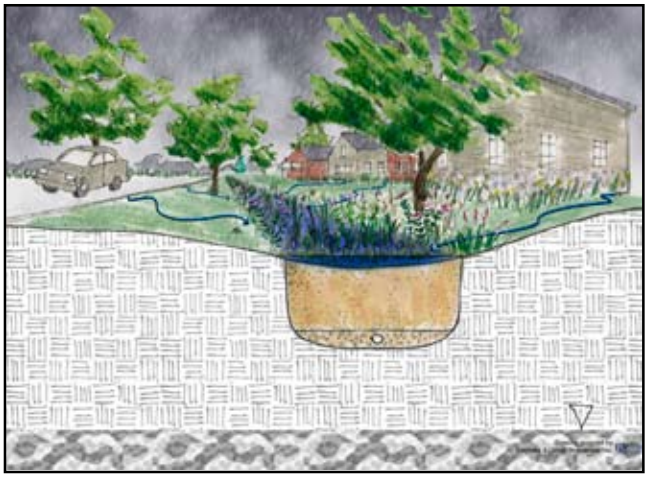
POLLUTION REMOVAL

70-85%	Total Suspended Solids
0-50%/35%	Nutrients - Total Phosphorus/ Total Nitrogen
45-85%	Metals - Cadmium, Copper, Lead, and Zinc
35%	Pathogens - Coliform, Streptococci, E. Coli
80%	Toxins - Hydrocarbon

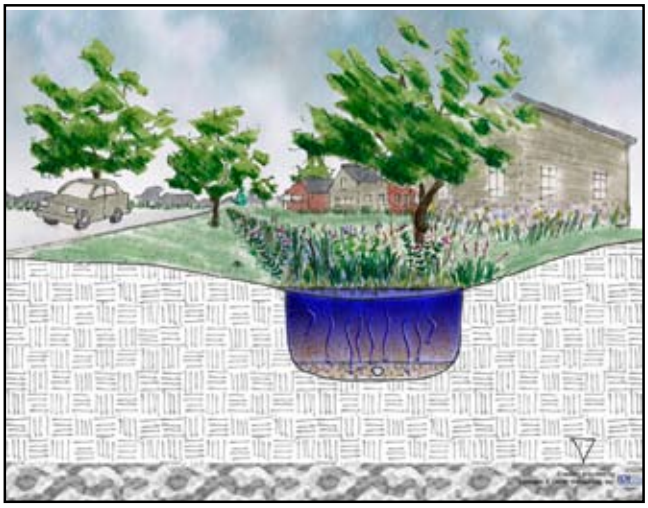
SITE FACTORS

5 AC Max	Drainage Area
20%	Max. Site Slope
3'	Min. Depth to Bedrock
3'	Min. Depth to Seasonally High Water Table
A,B,C,D	NRCS Soil Type
Poor - Good	Freeze/ Thaw Suitability
Suitable	Potential Hotspot Runoff *requires impermeable liner

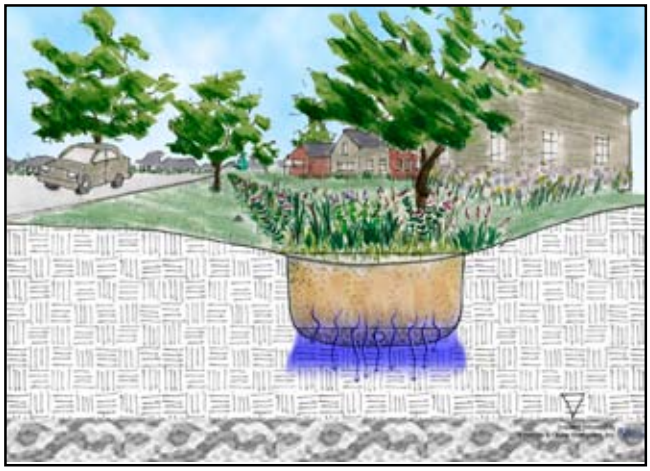
STORM SEQUENCE



Start of Storm Event - Initial runoff & storage



Duration of Storm Event - Storage & filtration/infiltration



Courtesy of Rice Creek Watershed District

Following Storm Event - Remaining storage drawdown