NEWSC Filtration Workshop

Site Considerations and Systems Design

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Non Wet-Pond BMPs

Non-Proprietary

Proprietary

Filter

Settle

Infiltrate

Filtration vs Wet Detention

- Multiple devices/facilities
- Less obvious
- Easily forgotten/neglected
- More complicated maintenance
- Costs

Non-Proprietary System Options

Practice	Reference
Filter Strip	FDM 10-35-10
Vegetated Swale	TS1005
Bioretention	TS1004
Permeable Pavement	TS1008
Infiltration Trench	TS1007
Infiltration Basin	TS1003
Rain garden	TS1009

Non-Proprietary Functional Mechanisms

Practice	Primary	Secondary
Filter Strip	Infiltrate	Filter
Vegetated Swale	Infiltrate	Filter
Bioretention	Filter	Infiltrate
Permeable Pavement	Filter	Infiltrate
Infiltration Trench	Infiltrate	Filter*
Infiltration Basin	Infiltrate	Filter*
Rain garden	Infiltrate	

* With engineered soil

Proprietary Functional Mechanisms

Practice	Primary	Secondary
Upflow Filter	Filter	
Inlet Filter	Filter	
Jellyfish Filter	Filter	
StormFilter	Filter	
Filterra	Filter	Infiltrate
Hydrodynamic Separators	Settle/trap	
Perforated Pipe	Settle	Infiltrate
Chamber-Type	Settle	Infiltrate

Why filtrate and infiltrate?

Filtration reduces discharge of storm water pollutants to surface water.

Infiltration:

- Reduces discharge of storm water
- Increases groundwater recharge
- Decreases runoff peak rates and volumes
- Reduces temperature impacts
- Reduces downstream erosion
- Preserves base flows in streams

Pretreatment

Infiltration requires pretreatment of all surface runoff. Roof runoff does not need pretreatment.

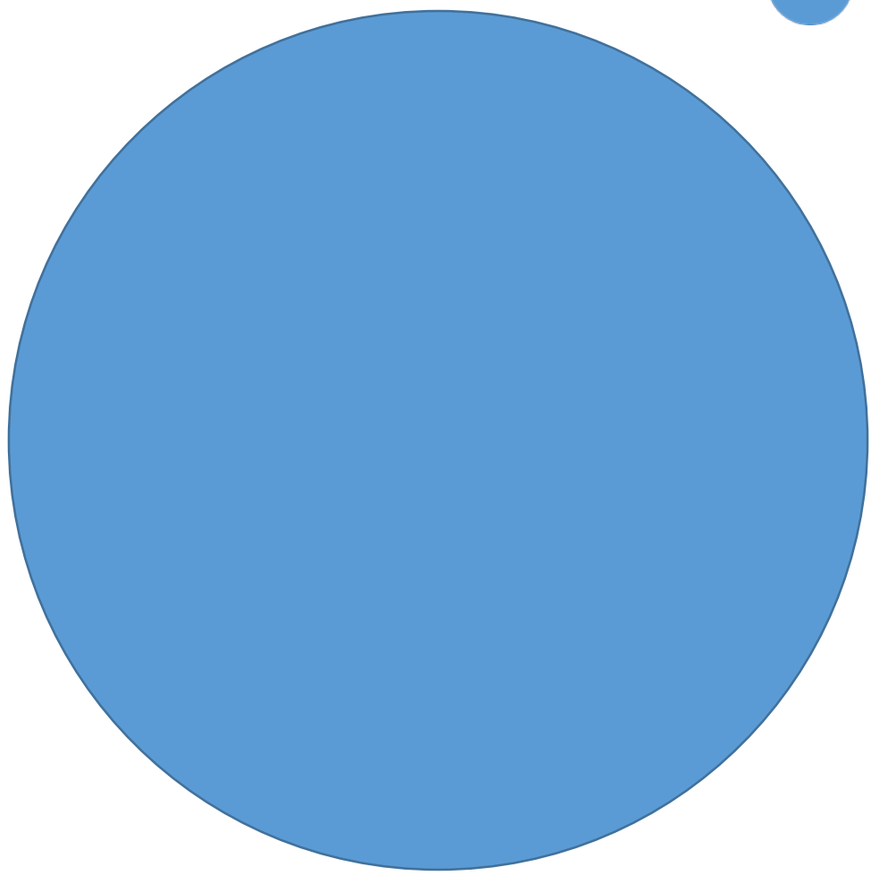
Filtration practices may provide pretreatment needed prior to infiltration.

Pretreatment Devices:

- wet ponds
- ditch checks
- catchbasins with sumps
- Oil/water separators

Tributary Drainage Areas

- Rain Garden – 0.11 acre (5,000 SF)
- Bioretention – 2 acres
- Vegetated Swale – 5 acres
- Infiltration Trench – 5 acres
- Infiltration Basin – 50 acres



Filter Strip

- Most appropriate adjacent to pavement
- Uniform distribution of flow
- Treat several highway lanes
- Good for pretreatment
- Soil amendments can improve function
- Limitation: 12’ min. flow length
- Proper design = little maintenance

Vegetated Swale

- Best with flat topography and non-erodible soils
- Tributary areas less than 5 acres
- Work well with filter strips, wet ponds, and bioretention devices
- Maintenance: vegetation management and sediment removal

How filter strips and swales work

- Rely on vegetation to filter out and trap particulates

- Rely on soil permeability to infiltrate runoff

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- Flow velocity depends on flow depth
- Flow depth related to vegetation depth and density (retardance), as well as ground slope

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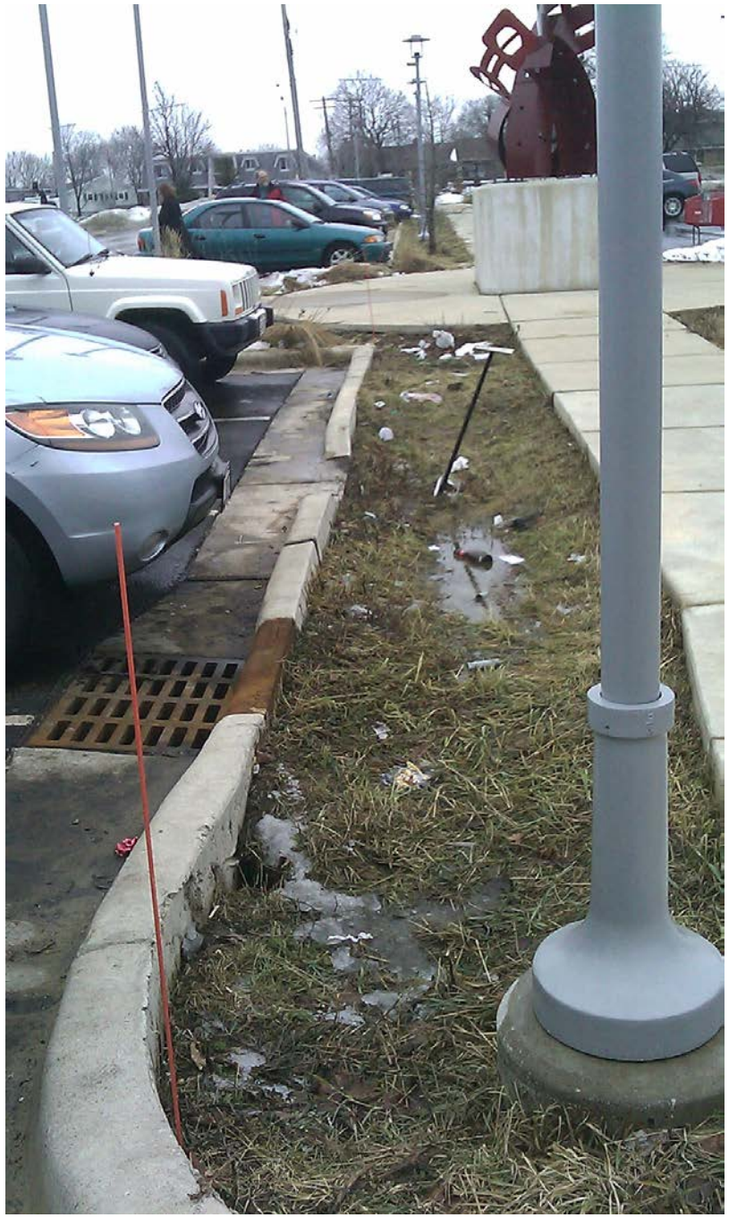
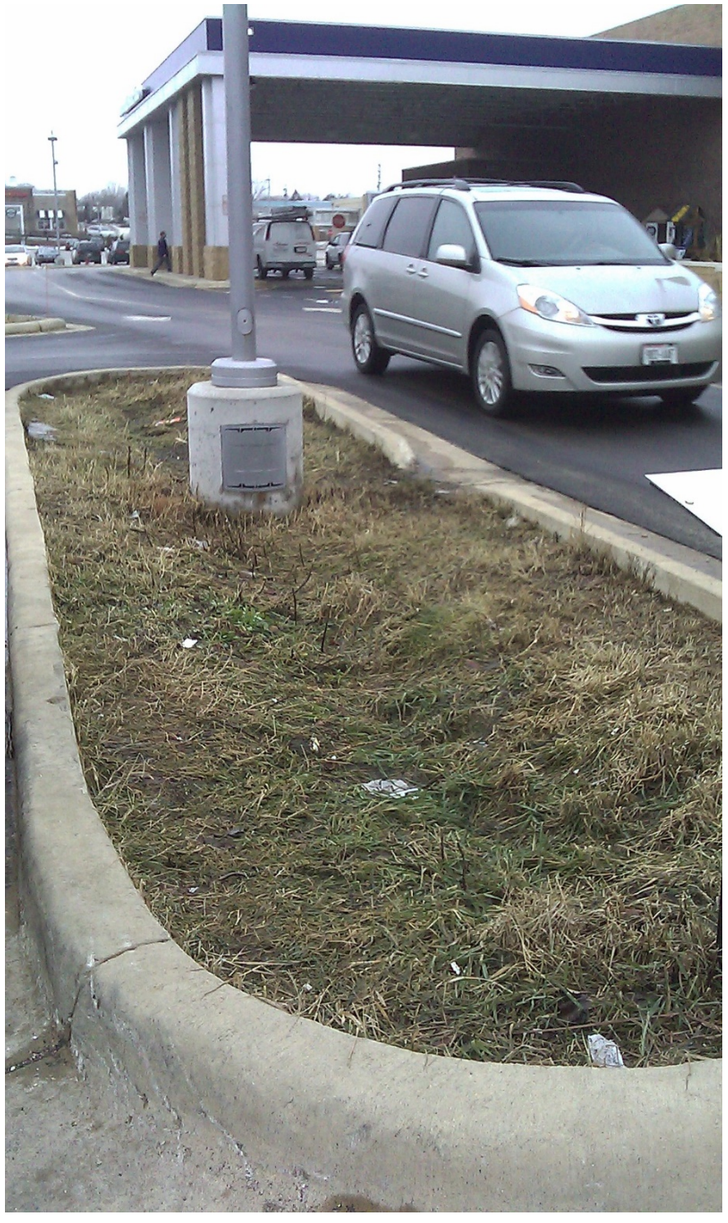
- Rely on soil permeability to infiltrate runoff
- Infiltration volume is dependent on inundation area, flow velocity and dynamic soil infiltration rate

Bioretention (biofiltration)

- Tributary area 2 acres or less
- Pretreatment by catch basins, filter strips, or vegetated swales
- Max design ponding depth 12 inches
- Max surface drain down 24 hours
- Max subsurface drain down 72 hours

Bioretention done poorly



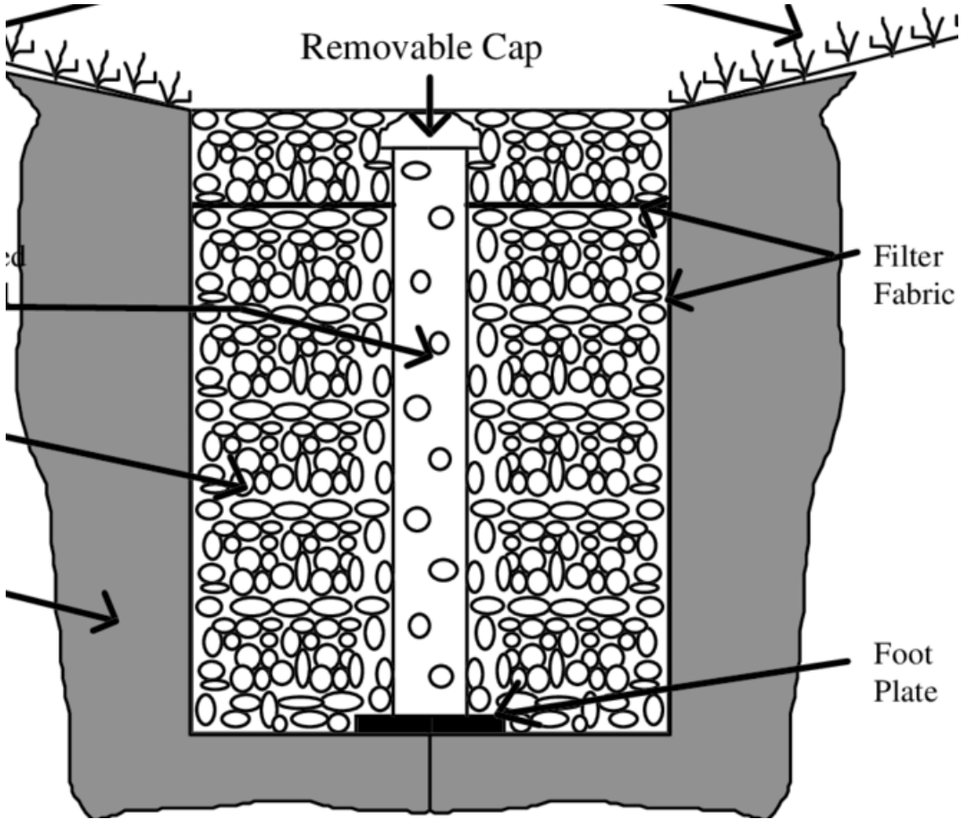


Permeable Pavement

- Highly susceptible to clogging from runoff with significant sediment
- Avoid run-on from landscaped areas
- Distribute run-on across permeable pavement area
- Maximum run-on ratio 3:1
- Minimum 10-foot setback from buildings

Infiltration Trench

- Tributary area 5 acres or less
- Less than 15 feet wide
- Depth less than width or length
- Minimum 5-foot separation from seasonally high ground water level or bedrock
- Minimum 10-foot setback from buildings
- Maximum subsurface drain down time of 72 hours



Infiltration Basin

- Tributary area 5 to 50 acres
- Maximum ponding depth 24 inches
- Maximum surface drain down time of 24 hours
- Minimum 5-foot separation from seasonally high ground water level or bedrock