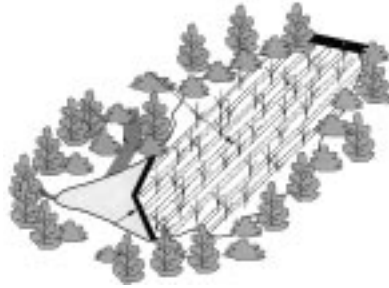


Infiltration Systems

Infiltration Basins



Description

An infiltration basin is stormwater runoff impoundment designed to capture a stormwater runoff volume, hold this volume and infiltrate it into the ground over a period of days. It does not retain a permanent pool of water. Infiltration basins are typically off-line, end-of-pipe BMPs. A flow splitter or weir is usually used to divert runoff from a storm sewer system into the infiltration basin.

Infiltration basins in this BMP Section refer to end-of-pipe infiltration systems that treat stormwater runoff from a few lots or properties as opposed to rainwater gardens which are primarily used for a single lot application (see the On-Lot Infiltration BMP Section for information on this type of BMP).

A key feature of an infiltration basin is its vegetation. It is important to vegetate the bottom of the basin with deep-rooted plants to increase the infiltration capacity of the basin. Roots create small conduits for water to infiltrate. The root penetration and thatch formation of the vegetation maintains and may enhance the original infiltration capacity. Dense vegetation will also impede soil erosion and scouring of the basin floor.

Infiltration basins are not appropriate for areas that contribute high concentrations of sediment, or suspended solids, without adequate pretreatment. Excessive sediment can clog the basin and take up storage volume.

Infiltration basins require pretreatment of stormwater in order to remove as many of the suspended solids from the runoff as possible before the water enters the basin. Pretreatment, such as grit chambers, swales with check dams, filter strips, or a sedimentation basin should be a fundamental component of any BMP system relying on infiltration. Good housekeeping measures should also be investigated (e.g., street sweeping, reduction of sanding or salting practices, etc.). Public education with respect to street and driveway sediments should be provided in areas where an infiltration basin is proposed.

Purpose

	Water Quantity
Flow attenuation	■
Runoff volume reduction	■

	Water Quality
Pollution prevention	
Soil erosion	N/
A	
Sediment control	N/
A	
Nutrient loading	N/
A	■
Pollutant removal	■
Total suspended sediment (TSS)	■
Total phosphorus (P)	■
Nitrogen (N)	■
Heavy metals	■
Floatables	■
Oil and grease	■
Other	■
Fecal coliform	■

Biochemical oxygen demand (BOD)	
■	Primary design benefit
■	Secondary design benefit
□	Little or no design benefit

Infiltration Systems

Infiltration Basins

The design storm for an infiltration basin is typically a frequent, small storm such as the 1-year event. This provides treatment for the “first flush” of stormwater runoff. Infiltration basins provide total peak discharge, runoff volume and water quality control for all storm events equal to or less than the design storm. This infiltration reduces the volume of runoff, removes many pollutants and provides stream baseflow and groundwater recharge.

Infiltration basins have limited capabilities for controlling peak discharge for storms greater than the design storm. Because infiltration basins will not significantly affect peak discharges of runoff, they are best used in conjunction with other BMPs; downstream detention is often still needed to meet peak-runoff-rate requirements.

Dissolved pollutants are effectively controlled for storm events less than the design storm, but these substances may not be removed from the runoff water as it infiltrates, and some of them could move to the groundwater. For this reason, the impact of infiltrated runoff on the groundwater should be considered, although in most cases, the magnitude of this impact is unknown. Chloride from road salt is an example of a soluble material that will not be removed during the infiltration process. Currently, there is much disagreement as to whether chlorides do indeed pose a significant threat to groundwater. A general guideline for groundwater protection is to design infiltration basins with the bottom of the basin a minimum of 3 feet above the seasonally high groundwater table. This is consistent with the MPCA’s guidelines for septic systems (MPCA, 2000). If the water table is too close to the ground surface, infiltration practices should not be used.

Figure 1 provides a schematic of a typical infiltration basin. Figure 2 shows an infiltration basin with pretreatment in the form of a settling pond.

Advantages

- Reduces the volume of runoff from a drainage area
- Can be very effective for removing fine sediment, trace metals, nutrients, bacteria, and oxygen-demanding substances (organics)
- Reduces downstream flooding and protects streambank integrity
- Reduces the size and cost of downstream stormwater control facilities and/or storm drain systems by infiltrating stormwater in upland areas
- Provides groundwater recharge and baseflow in nearby streams
- Reduces local flooding
- Appropriate for small sites (2 acres or less)

Limitations

- Potentially high failure rates due to improper siting, design and lack of maintenance, especially if pretreatment is not incorporated into the design
- Depending on soil conditions and groundwater depth, a risk of groundwater contamination may exist
- Not appropriate for treating significant loads of sediment and other pollutants due to the potential for clogging

Infiltration Systems

Infiltration Basins

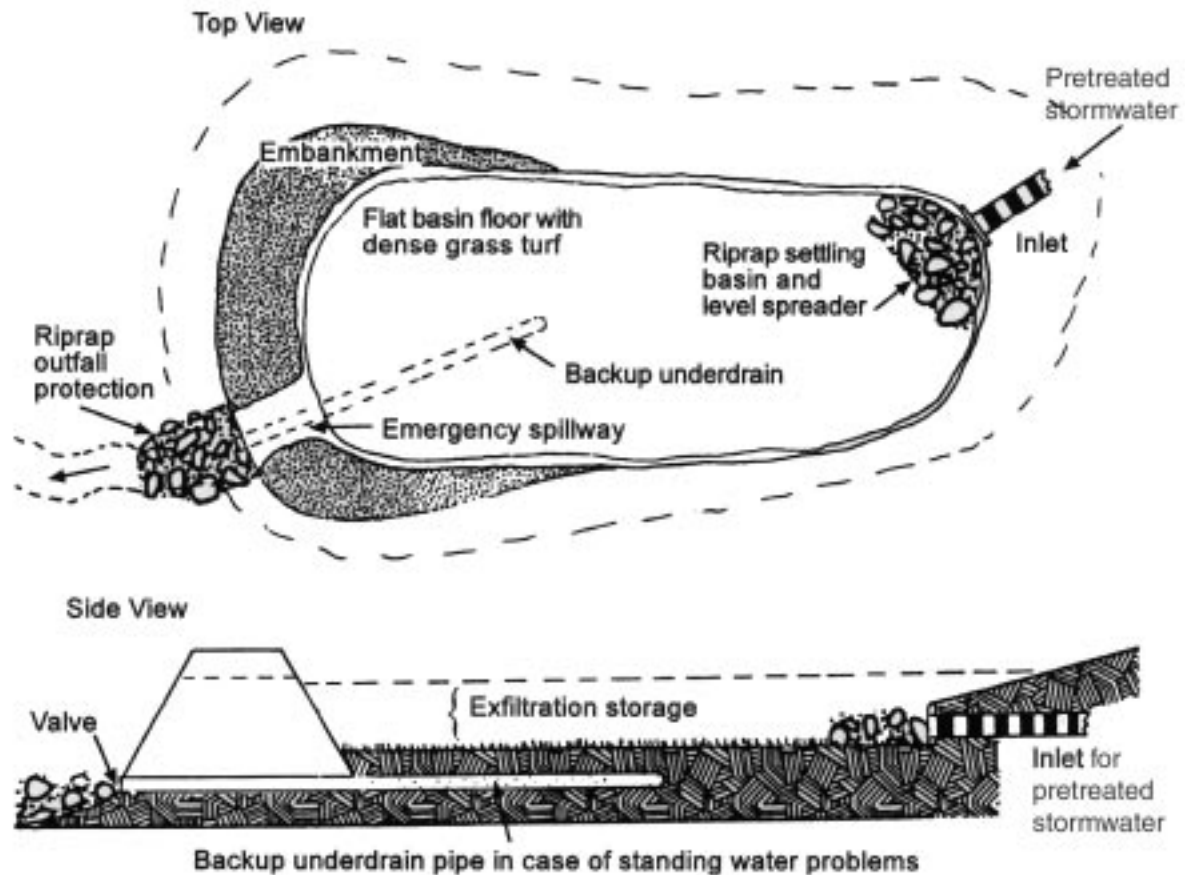


Figure 1: Typical Infiltration Basin

Source: Schueler, 1987

- Not appropriate for industrial or commercial sites where the release of large amounts or high concentrations of pollutants are possible
- Requires a flat, continuous area
- Requires frequent inspection and maintenance

Requirements

Design

Infiltration basins are generally known to have high failure rates. Such failure rates can be avoided with proper design, taking the following into consideration:

- Careful site selection (discussed later, in the Site Sensitivity Analysis section)
- Incorporation of pretreatment and a bypass for high-flow events

Infiltration Systems

Infiltration Basins

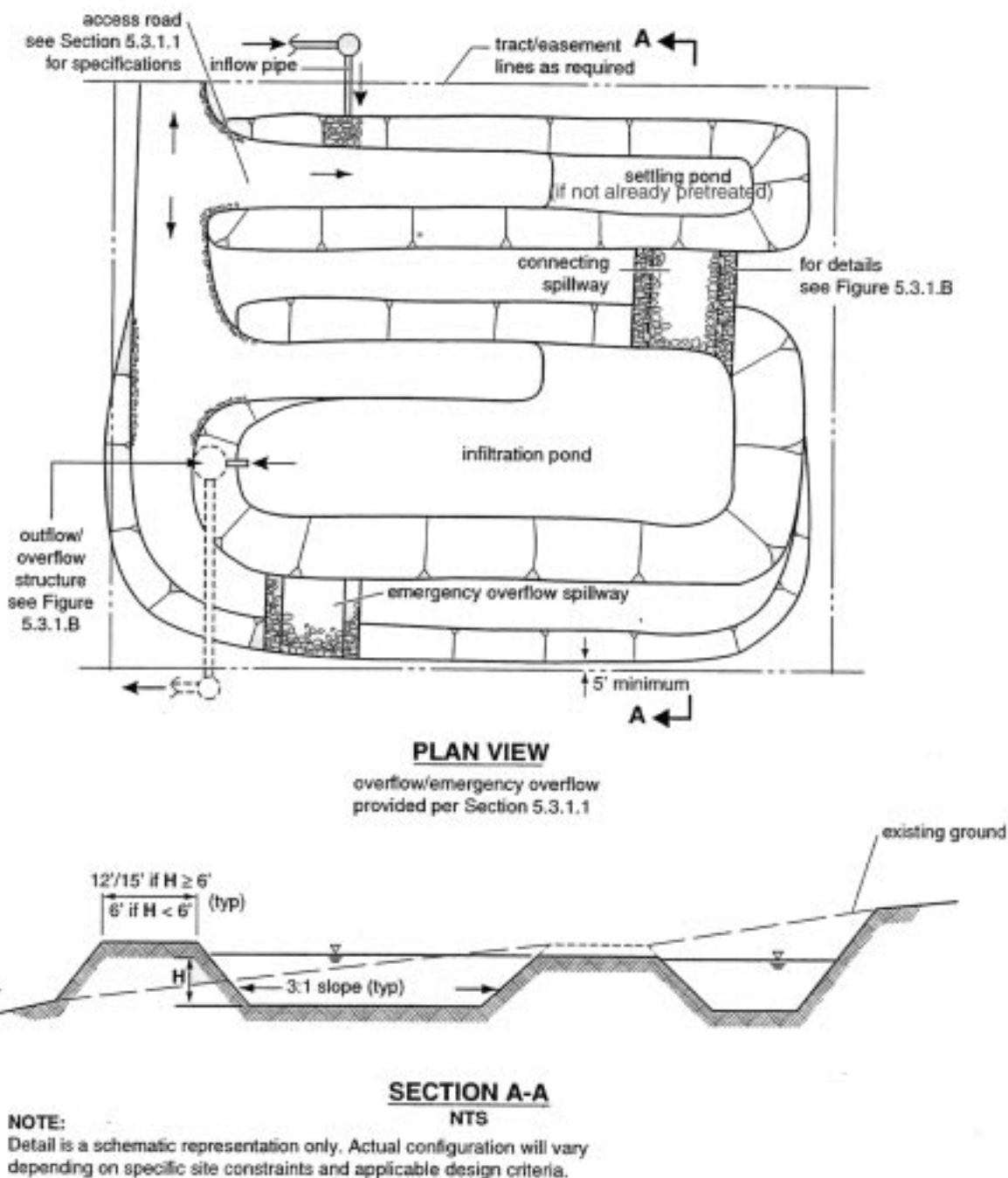


Figure 2: Infiltration Basin with Settling Pond Pretreatment

Source: Schueler, 1987

Infiltration Systems

Infiltration Basins

Requirements

Design (continued)

- Treatment of a small drainage area (lower sediment loadings)
- Careful consideration of depth of ponding and inundation times that reflect plant tolerances
- Good construction techniques that prevent smearing, over-compaction, and operation of the basin during the construction period
- Performance of regular maintenance

All of these topics are discussed in further detail below.

Site Sensitivity Analysis

Before an infiltration system can be designed, a site sensitivity analysis must be performed. This evaluation may eliminate an infiltration practice from consideration because of soil characteristics or potential effects on groundwater. Because of varying geologic settings, a site evaluation needs to be tailored to the specific site conditions. A team approach to this evaluation is recommended where various disciplines such as engineering, hydrogeology and soil science are represented.

The applicability of infiltration basins on a site depends on numerous site factors, including soils, slope, depth to water table, depth to bedrock or impermeable layer, contributing watershed area, land use, proximity to wells, surface waters, foundations, and others. Generally, infiltration basins are suitable to sites with gentle slopes, permeable soils, relatively deep bedrock and groundwater levels, and a small contributing watershed area (less than 2 acres, ideally).

When performing a site evaluation, the following items should be considered:

- **Runoff water quality:** If runoff water will contain a significant concentration of soluble pollutants that could contaminate groundwater, an infiltration basin should not be used. Specifically, infiltration basins are not recommended for industrial and commercial land uses since there is a high potential for groundwater contamination from chemical spills and maintenance (salting and sanding) activities. In site-specific cases where infiltration basins are deemed acceptable for these land uses, the design must be located off-line and incorporate some form of upstream treatment (e.g., an upstream oil-grit separator or sand filter).
- **Degree of detail:** The level of detail required for the study should be considered. For instance, a small structure receiving runoff from a rooftop will not require as much detail as a structure serving a larger area and having a higher potential pollutant load.
- **Geologic (groundwater) sensitivity:** A site with a highly sensitive geology, such as one with a carbonate or surficial sand aquifer, may eliminate this practice from consideration.
- **Depth to water table and bedrock:** The seasonally high water table must be far enough below the bottom of the infiltration basin (at least 3 feet) to allow the structure to function hydraulically and to allow trapping and treatment of pollutants by the soil. Similarly, the bottom of the infiltration basin should be at least 3 feet from bedrock, although in the case of fractured bedrock, separations up to 10 feet may be required. This minimum separation distance is required to trap or treat pollutants before they reach the groundwater or bedrock and to maintain vegetation in the basin (MPCA, 2000).

Infiltration Systems

Infiltration Basins

Requirements

Design (continued)

- Proximity to drinking water wells and building foundations: Basins should be located at least 150 feet away from drinking water wells to limit the possibility of groundwater contamination, and should be situated at least 10 feet downgradient and 100 feet upgradient from building foundations to avoid potential seepage problems.
- Soil infiltration rate: The infiltration rate of the soil must be great enough to drain the structure in a reasonable amount of time, generally 72 hours or less. Sites with clayey soils are not appropriate for infiltration basins. Infiltration rates are discussed in further detail below. If the infiltration rate of the site's soils are not acceptable, the filtration family of BMP systems should be considered.
- Size of the tributary drainage area: Although infiltration basins were originally designed to accommodate larger drainage areas, research which has been undertaken to date indicates that large-scale infiltration is not feasible. One of the main problems with centralized infiltration basins is that water from a large area is expected to infiltrate into a relatively small area. This does not reflect the natural hydrologic cycle and generally leads to problems (groundwater mounding, clogging, compaction). For these reasons, the contributing drainage area to any individual infiltration basin should be restricted to 2 acres or less.

General Design Considerations

Design Volume

Infiltration basin systems infiltrate a portion of the runoff from a rain event (usually the first flush or up to the first inch) while the remaining runoff bypasses the infiltration basin. The design infiltration volume can be calculated in many ways. Ultimately, the magnitude of the design infiltration volume depends on local authorities' practices and requirements.

Off-Line Placement

The purpose of the basin is to temporarily store surface runoff for a specific design frequency storm and allow it to infiltrate through the bottom and sides of the basin. A flow splitter or weir is usually used to divert runoff into an off-line infiltration basin. Infiltration basins provide total peak discharge, runoff volume and water quality control for all storm events equal to or less than the design storm. Storm events greater than the design storm simply continue down the larger conveyance system, bypassing the infiltration basin.

Pretreatment

Infiltration basins are susceptible to high failure rates due to clogging from sediments, and therefore require pretreatment of stormwater in order to remove as much of the suspended solids from the runoff as possible before it enters the basin. Pretreatment, such as grit chambers, swales with check dams, filter strips, or sediment forebays/traps should be a fundamental component of any BMP system relying on infiltration. Even when infiltrating rooftop runoff, it is a practical decision to implement some form of pretreatment to remove sediments, leaf litter, and debris. This pretreatment will help to ensure the proper functioning of the infiltrating facility and allow for longer periods between maintenance. When designed properly, pretreatment devices may remove some 25–30% of sediment loads. Figure 2 shows an infiltration basin with pretreatment in the form of a settling pond.

Infiltration Systems

Infiltration Basins

Infiltration Rate

The soils of a prospective site are an important consideration when determining the suitability for infiltration. County soil surveys are useful for preliminary screening of a site for soil infiltration rate. The Natural Resource Conservation Service (formerly the Soil Conservation Service) Soil Group is found in the National Engineering Handbook. Conservative estimates of infiltration rates for a range of hydrologic soil groups (A through D) have been developed for some Minnesota authorities and are shown below (Riley-Purgatory-Bluff Creek Watershed District, 1999).

Soil Group	Rate (in/hr)	Max. Water Depth (ft)
A	0.38	2
B	0.23	1.4
C	0.1	0.6
D	0.03	0.2

If these estimates are deemed too conservative for the site, a geologic investigation of the specific site should be conducted to verify higher infiltration rates. Infiltration rates should be measured in situ according to the standards presented in:

- *Annual Book of ASTM Standards*, 1997, Section 4, Vol 4.08, Soil and Rock (I): Designation D 3385-94, Standard Test Method for Infiltration Rate of Soils in Field Using a Double-Ring Infiltrometer, pp 331-337.
- *Annual Book of ASTM Standards*, 1998, Section 4, Vol 4.09, Soil and Rock (II): Designation D 5093-90, Standard Test Method for Field Measurement and Infiltration Rate Using a Double-Ring Infiltrometer with a Sealed-Inner Ring, pp 87-92.
- Johnson, A.I., 1963, "A field method for measurement of infiltration," United States Geological Survey, Water-Supply Paper, W 1544-F, p. F1-F27.

The depth of water within the infiltrometer should be maintained at the following depths:

Hydrologic Soil Type	Water Depth (Inches)
A	18
B	9
C	4
D	1

Notes on alternative infiltration measurement methods:

- Alternative methods other than reference standards should use a double-ring apparatus and be acceptable to local authorities.

Infiltration Systems

Infiltration Basins

Requirements

Design (continued)

- Proposed alternative infiltration rates must be representative of vertical water infiltration through the soil surface (values that include lateral flow are not acceptable).
- Values that should not be used as alternative infiltration rates include, but are not limited to, the following: hydraulic conductivity, saturated hydraulic conductivity, transmissivity, permeability and percolation rate.

Designers should use their best judgement to determine if the slowest or average measured infiltration rate in the proposed basin area should be used for the design of the basin.

Where feasible, larger-scale infiltration measurements are encouraged. Procedures such as the Pilot Infiltration Test are described in the State of Washington's Stormwater Management Manual (Washington State Department of Ecology, 1999). This document is currently available on the internet at www.ecy.wa.gov. This type of procedure can minimize some of the error associated with smaller-scale tests and provide an indication of a longer-term infiltration rate that better represents the future conditions of the site.

Duration of Ponding:

The depth of the infiltration basin should be adjusted so that maximum drain time is 72 hours for the total runoff volume. However, certain types of vegetation (turf, for example) will require a shorter ponding duration to survive storm events. The design ponding duration should be determined by plant inundation tolerances.

Average Depth

After the infiltration rate of the soil has been determined, the maximum depth of the infiltration basin can be calculated with the following equation:

$$d_{\max} = (f) * (T_p)$$

Where: d_{\max} = maximum design depth (inches),

f = soil infiltration rate (in/hr), and

T_p = design ponding time (hours).

The maximum depth and ponding time of the infiltration area should promote the survival of vegetation. The maximum depth should be no greater than 2 feet; the ponding time no greater than 72 hours.

In recent monitoring studies (Galli, 1992) one of the causal factors of failure was noted to be the depth of water retained in the basin. The weight of the water is thought to compact the basin, decreasing its infiltration potential. The depth of storage should be limited to a maximum 2 feet in order to minimize the compaction of the basin.

Basin Slopes:

The bottom of the basin should be graded as flat as possible to provide uniform ponding and infiltration of the runoff across the floor. The side slopes of the basin should be no steeper than 3H:1V (flatter slopes are preferred) to allow for proper vegetative stabilization, easier mowing, easier access, and better public safety. Designs for infiltration basins should emphasize accessibility and ease of maintenance.

Infiltration Systems

Infiltration Basins

Basin Shape

The length and width of the basin will be determined by the characteristics of the site in question (topography, size and shape). A desirable length-to-width ratio for an infiltration basin is 3:1 or greater.

Vegetation

A key feature of an infiltration basin is its vegetation. It is important to vegetate the bottom of the basin with deep-rooted plants to increase the infiltration capacity of the basin. Roots create small conduits for water to infiltrate. The root penetration and thatch formation of the vegetation maintains and may enhance the original infiltration capacity. Soluble nutrients are taken up during plant growth, improving the pollutant-removal capacity of the basin. Dense vegetation will also impede soil erosion and scouring of the basin floor.

Immediately following basin construction, the bottom and side slopes of the basin should be stabilized with a dense stand of water-tolerant grass. Use of low-maintenance, rapidly germinating grasses, such as red top (*Agrostis alba*) can be used. Likewise, vegetative buffers around the perimeter of the basin are recommended for erosion control and additional sediment and nutrient removal. A diversity of plant species should be planted to allow for best survivability. Plants that are tolerant of both wet weather and drought should be used. Plantings in an infiltration basin should be able to withstand periods of ponding and maintain or enhance the pore space in the underlying soils. A list on the last page of this BMP section provides some plant recommendations based on different site conditions (Rozumalski, 2001).

Inflow/Bypass

If runoff is delivered by a storm drain pipe or along the main conveyance system, the infiltration practice must be designed as an off-line practice.

To prevent incoming flow velocities from reaching erosive levels, which can scour the basin floor, inlet channels to the basin should be stabilized. Riprap may be used for this purpose. The riprap should be designed to terminate in a broad apron, which spreads the runoff more evenly over the basin surface to promote better infiltration.

A bypass system should be implemented for all infiltration basins. A bypass flow path or pipe should be incorporated in the design of an infiltration basin to convey high flows around the basin. This will necessitate the construction of a flow splitter upstream of the basin. The bypass serves several functions. Specifically, the bypass can be used as the normal outlet during 1) stabilization of the site (while the inlet to the basin is blocked off), 2) basin maintenance and 3) winter conditions.

Overflow

All infiltration basins must have an emergency spillway capable of passing runoff from large storms without damage to the impounding structure. The overland flow path of surface runoff exceeding the capacity of the infiltration system should be evaluated to preclude erosive concentrated flow. If computed flow velocities do not exceed the non-erosive threshold, overflow may be accommodated by natural topography.

Groundwater Mounding:

Calculations to determine groundwater mounding may be necessary in cases where slope stability is a concern and/or a high water table is encountered. A hydrogeologist should be consulted about the potential for groundwater mounding in these areas. The results from groundwater mounding calculations should be regarded as an indication of the mounding potential rather than as an accurate representation of the actual mounding depth.

Infiltration Systems

Infiltration Basins

Requirements

Design (continued)

Cold Weather Considerations

Consideration should be given to the operation of infiltration basins during the winter period. Winter sanding of roads can clog an infiltration basin without adequate pretreatment, and winter salting will increase the potential for the chloride contamination of groundwater.

If infiltration practices are used as a stand-alone, all-season water quality treatment facility, then oversizing (to account for reduced infiltration rates) and/or extended pretreatment should be considered. Doubling the storage volume for surface infiltration devices is recommended. Redundant pretreatment (more than one pretreatment device in series) is recommended for all infiltration facilities receiving runoff from roads.

Another option is the use of a seasonally operated facility (Oberts, 1994). A seasonally operated infiltration basin combines several techniques to improve the performance of infiltration practices in cold climates. Two features—an underdrain system and level control valves—are useful in cold climates. In the beginning of the winter season, the level-control valve is opened and the soil is drained. As the snow begins to melt in the spring, the underdrain and the level-control valves are closed. The snowmelt is infiltrated until the capacity of the soil is reached. Then the facility acts as a detention facility, providing storage for particles to settle.

Infiltration Basins Plant List

Source: Fred Rozumalski

Mesic-Dry Soils (Sunny)

Native

Butterfly Flower	<i>Asclepias tuberosa</i>
Purple Prairie Clover	<i>Dalea purpureum</i>
Purple Coneflower	<i>Echinacea purpurea</i>
Bee balm	<i>Monarda fistulosa</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Spiderwort	<i>Tradescantia bracteata</i>

Non-Native

Yarrow “Coronation Gold”	<i>Achillea “Coronation Gold”</i>
Feather Reed Grass “Karl Foerster”	<i>Calamagrostis “Karl Foerster”</i>
Daylily	<i>Hemerocallis spp.</i>
Blazingstar “Kobold”	<i>Liatris “Kobold”</i>
Silverfeather Grass	<i>Miscanthus sinensis</i>
Garden Phlox	<i>Phlox paniculata</i>
Black-Eyed Susan “Goldsturm”	<i>Rudbeckia fulgida “Goldsturm”</i>

Mesic-Dry Soils (Shady)

Native

Wild Columbine	<i>Aquilegia canadensis</i>
Wild Geranium	<i>Geranium maculatum</i>
Obedient Plant	<i>Physostegia virginiana</i>
Jacob’s Ladder	<i>Polemonium reptans</i>
Solomon’s Seal	<i>Polygonatum biflorum</i>
Zig Zag Goldenrod	<i>Solidago flexicaulis</i>
Canada Violet	<i>Viola canadensis</i>
Culver’s Root	<i>Veronicastrum virginicum</i>

Non-Native

White Comfrey	<i>Symphytum grandiflorum</i>
Tufted Hair Grass	<i>Deschamsia caespitosa</i>
Bigroot Geranium	<i>Geranium macrorrhizum</i>
Daylily	<i>Hemerocallis spp.</i>
Hosta “Royal Standard”	<i>Hosta “Royal Standard”</i>
Tigerlily	<i>Lilium tigrinum</i>

Infiltration Systems

Infiltration Basins

Wet Soil (Sunny)

Native

Giant Hyssop	<i>Agastache foeniculum</i>
Canada Anemone	<i>Anemone canadensis</i>
Marsh Milkweed	<i>Asclepias incarnata</i>
New England Aster	<i>Aster novae-angliae</i>
Turtlehead	<i>Chelone glabra</i>
Joe-Pye Weed	<i>Eupatorium maculatum</i>
Obedient Plant	<i>Physostesia virginianum</i>
Boneset	<i>Eupatorium perfoliatum</i>
Queen of the Prairie	<i>Filpendula rubra</i>
Blueflag Iris	<i>Iris versicolor</i>
Great Blue Lobelia	<i>Lobelia siphilitica</i>
Switchgrass	<i>Panicum virgatum</i>
Mountain Mint	<i>Pycnanthemum virginianum</i>
Tall Meadow Rue	<i>Thalictrum dasycarpum</i>
Culvers Root	<i>Veronicastrum virginicum</i>
Golden Alexander	<i>Zizia aurea</i>

Non-Native

Joe-Pye “Gateway”	<i>Eupatorium purpuescens</i> “Gateway”
Daylily	<i>Hemerocallis spp.</i>
Siberian Iris	<i>Iris sibirica</i>
Tigerlily	<i>Lilium tigrinum</i>
Switchgrass “Heavy Metal”	<i>Panicum virgatum</i> “Heavy Metal”

Wet Soils (Shady)

Native

Cardinal Flower	<i>Lobelia cardinalis</i>
Ostrich Fern	<i>Matteuccia struthiopteris</i>
Virginia Bluebells	<i>Mertensia virginica</i>
Sensitive Fern	<i>Onoclea sensibilis</i>

Non-Native

Pink Turtlehead	<i>Chelone layonii</i>
Daylily	<i>Hemerocallis spp.</i>
Obedient Plant	<i>Physostegia virginiana</i>

Shrubs (Sunny)

Black Chokeberry	<i>Aronia melanocarpa</i>
Red-Osier Dogwood	<i>Cornus serotina</i>
Low Bush Honeysuckle	<i>Diervilla Ionicera</i>
Annabelle Hydrangea	<i>Hydrangea arborescens</i> “Annabelle”
Pussy Willow	<i>Salix discolor</i>
High Bush Cranberry	<i>Viburnum trilobum</i>

Shrubs (Shady)

Black Chokeberry	<i>Aronia melanocarpa</i> “alata”
Red-Osier Dogwood	<i>Cornus serotina</i>
Low Bush Honeysuckle	<i>Diervilla Ionicera</i>
Annabelle Hydrangea	<i>Hydrangea arborescens</i> “Annabelle”

Infiltration Systems

Infiltration Basins

Requirements

Sequencing

Care should be taken during construction to minimize the risk of premature failure of the infiltration basin. This failure is caused by the deposition of sediments from disturbed, unstabilized areas. This can be minimized or avoided by proper sequencing.

- Ideally, construction of the infiltration basin should take place after the site has been stabilized.
- No runoff should enter the infiltration basin prior to completion of construction and the complete stabilization of the tributary areas.
- Diversion berms or silt fence should be placed around the perimeter of the infiltration basin during all phases of construction. Sediment and erosion controls should be used to keep runoff and sediment away from the infiltration basin.
- Initial excavation of the basin should be carried out to within one foot of the final grade of the basin floor. Final excavation of the basin floor should be delayed until all disturbed areas in the drainage area are stabilized. All excavation should be performed by equipment with tracks exerting relatively light pressures. This will prevent compacting of the basin floor, which would reduce the infiltration capacity.
- In order to avoid soil compaction, absolutely no equipment should be driven in the area of the basin before and after its construction.
- After final grading, the basin floor should be tilled to a depth of at least 6 inches to provide a well-aerated, porous surface texture. Six inches of compost should be tilled in at this time if soils are even the slightest bit compacted. This will help to facilitate infiltration and root growth.
- During and after excavation, all excavated materials should be placed downstream, away from the infiltration basin, to prevent redepositing during runoff events.
- Immediately following basin construction, the bottom and side slopes of the basin should be stabilized with a dense stand of appropriate plants.

Construction

Experience has shown that the longevity of infiltration practices is strongly influenced by the care taken during construction. The construction sequence and specifications for each infiltration practice must be precisely followed.

- Infiltration basins should not be used as temporary sediment traps during construction.
- Infiltration basins will operate as designed only if they are constructed properly. There are three main rules that must be followed during the construction of an infiltration basin:
 - Basins should be constructed at the end of development construction
 - Smearing of the soil at the interface with the basin floor must be avoided and/or corrected by raking or rototilling
 - Compaction of the basin during construction must be minimized

Infiltration Systems

Infiltration Basins

- Before the development site is graded, the area of infiltration basin should be roped off to prevent heavy equipment from compacting the underlying soils.
- Light earth-moving equipment should be used to excavate the infiltration basin. Use of heavy equipment causes compaction of the soils beneath the basin floor and side slopes, resulting in reduced infiltration capacity. Since some compaction of soils will occur during construction, the basin floor should be tilled with a rotary tiller to restore infiltration rates after final grading.

Maintenance

Maintenance is required for the proper operation of infiltration basins, as it is with all BMPs. Plans for infiltration basins should identify owners, parties responsible for maintenance, and an inspection and maintenance schedule. The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin.

- Pretreatment devices associated with basins should be inspected and cleaned at least twice a year, and ideally every other month.
- Once the basin has gone on-line, inspections should occur after every major storm for the first few months to ensure proper stabilization and function. Attention should be paid to how long water remains standing in the basin after a storm; standing water within the basin more than 72 hours after a storm indicates that the infiltration capacity may have been overestimated. Factors responsible for clogging (such as upland sediment erosion and excessive compaction of soils) should be repaired immediately. Also, the newly established vegetation should be inspected several times to determine if any remedial actions (reseeding, irrigation, etc.) are necessary.
- Thereafter, the infiltration basin should be inspected at least twice per year. Important items to check include: differential accumulation of sediment, erosion of the basin floor, condition of riprap and the health of the vegetation. Eroded or barren spots should be replanted immediately after inspection to prevent additional erosion and accumulation of sediment.
- Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor. This also prevents smearing of the basin floor.
- Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.
- Vegetation should be maintained to control weed growth and maintain the health of the vegetation in the basin. Weed once monthly during the first two growing seasons. After that, weeding two or three times per growing season may suffice.

Infiltration Systems

Infiltration Basins

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