NJ's Stormwater Management Regulations

ANJEC Commissioner Training

March 13, 2024
Virtual Class

RUTGERS
New Jersey Agricultural Experiment Station

water.rutgers.edu

2004 Stormwater Management Regulations

- Reduce peak flows and flooding

…and….

- Maintain infiltration and groundwater recharge
- Reduce pollution discharged to local waterways

ABC Action News, August 27, 2012

2021 Stormwater Management Regulations

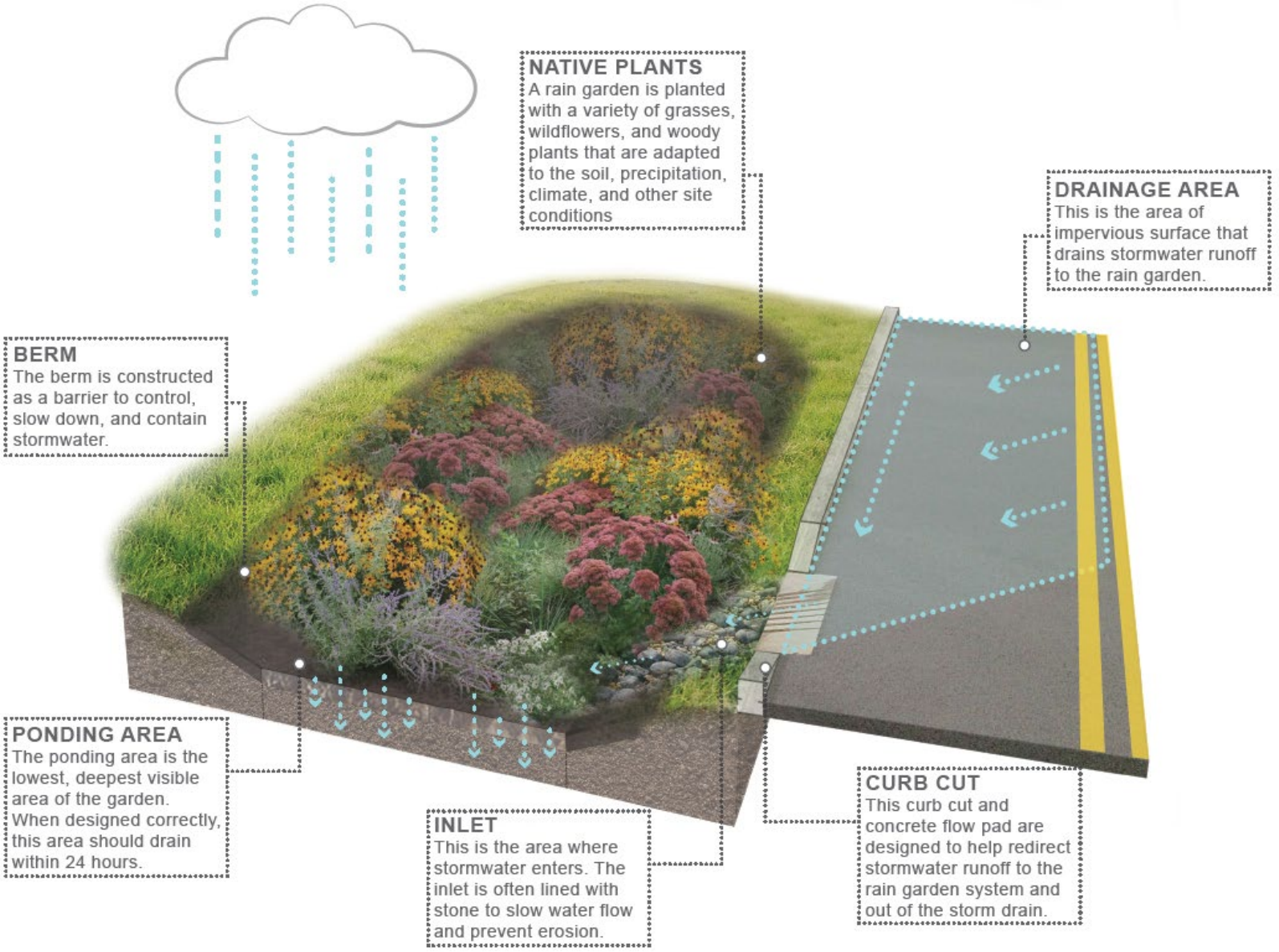
- All major development must use green infrastructure to comply with the New Jersey Stormwater Regulations

NJDEP Green Infrastructure Definition

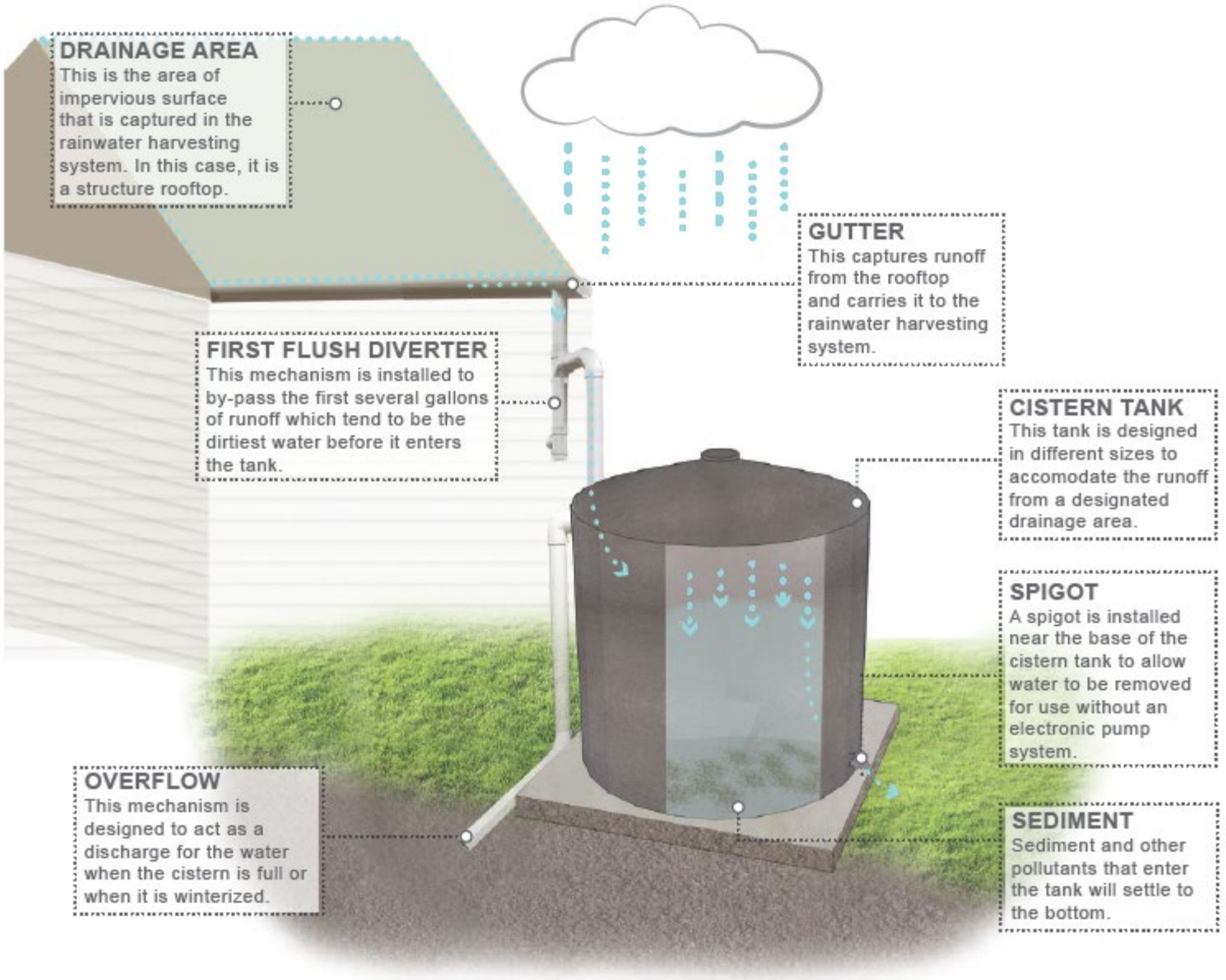
A stormwater management measure that manages stormwater close to its source by:

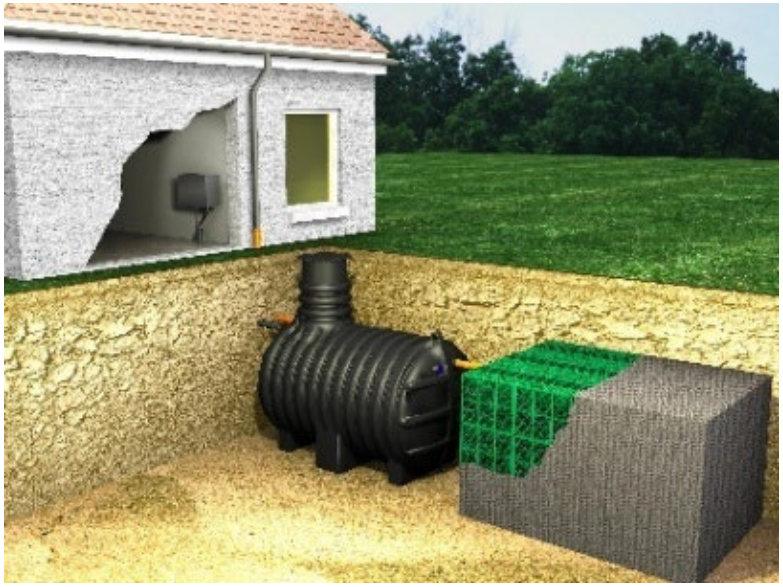
1. Treating stormwater runoff through infiltration into subsoil
2. Treating stormwater runoff through filtration by vegetation or soil
3. Storing stormwater runoff for reuse

Bioretention Systems (Rain Gardens)

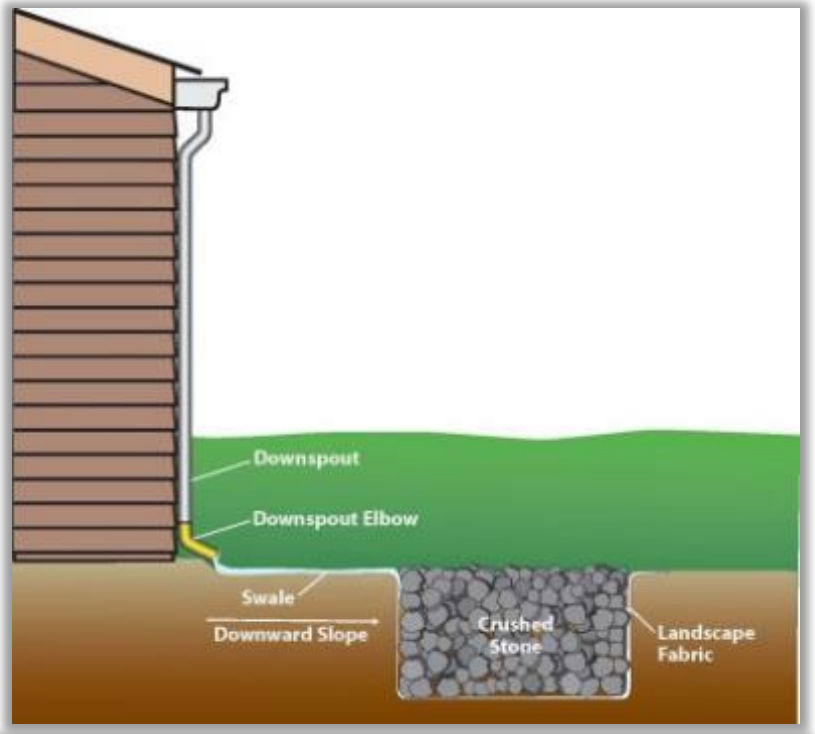


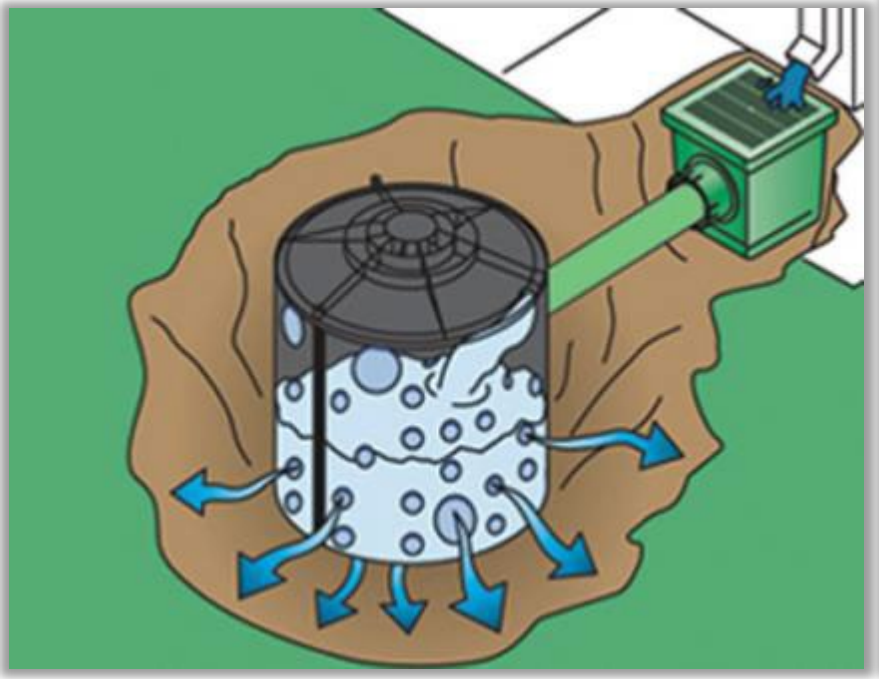
Cisterns


DRAINAGE AREA
This is the area of impervious surface that is captured in the rainwater harvesting system. In this case, it is a structure rooftop.
GUTTER
This captures runoff from the rooftop and carries it to the rainwater harvesting system.
FIRST FLUSH DIVERTER
This mechanism is installed to by-pass the first several gallons of runoff which tend to be the dirtiest water before it enters the tank.
CISTERN TANK
This tank is designed in different sizes to accomodate the runoff from a designated drainage area.
SPIGOT
A spigot is installed near the base of the cistern tank to allow water to be removed for use without an electronic pump system.
OVERFLOW
This mechanism is designed to act as a discharge for the water when the cistern is full or when it is winterized.
SEDIMENT
Sediment and other pollutants that enter the tank will settle to the bottom.



Dry Wells


Downspout
Downspout Elbow
Swale
Downward Slope
Crushed Stone
Landscape Fabric

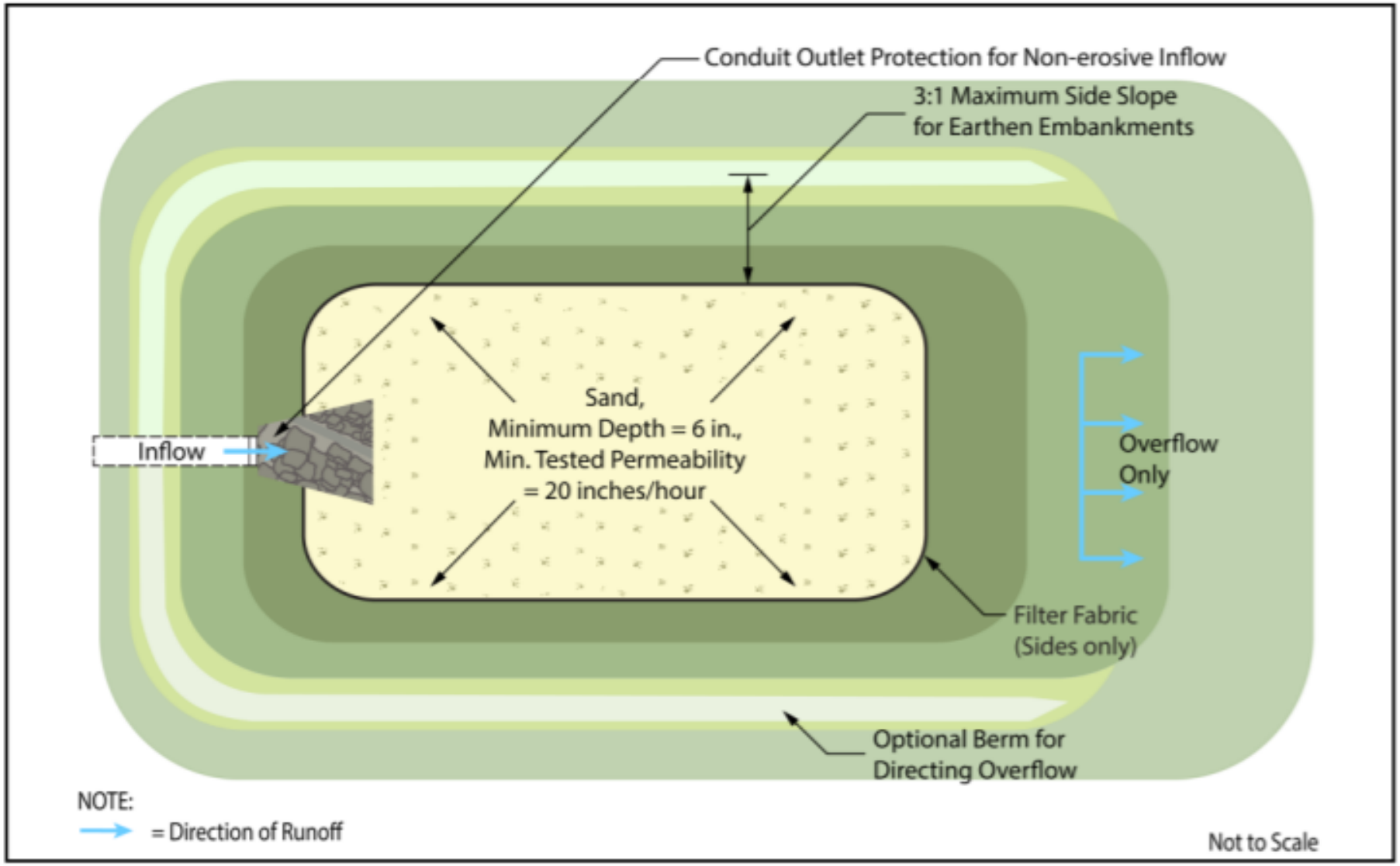


Grass Swales

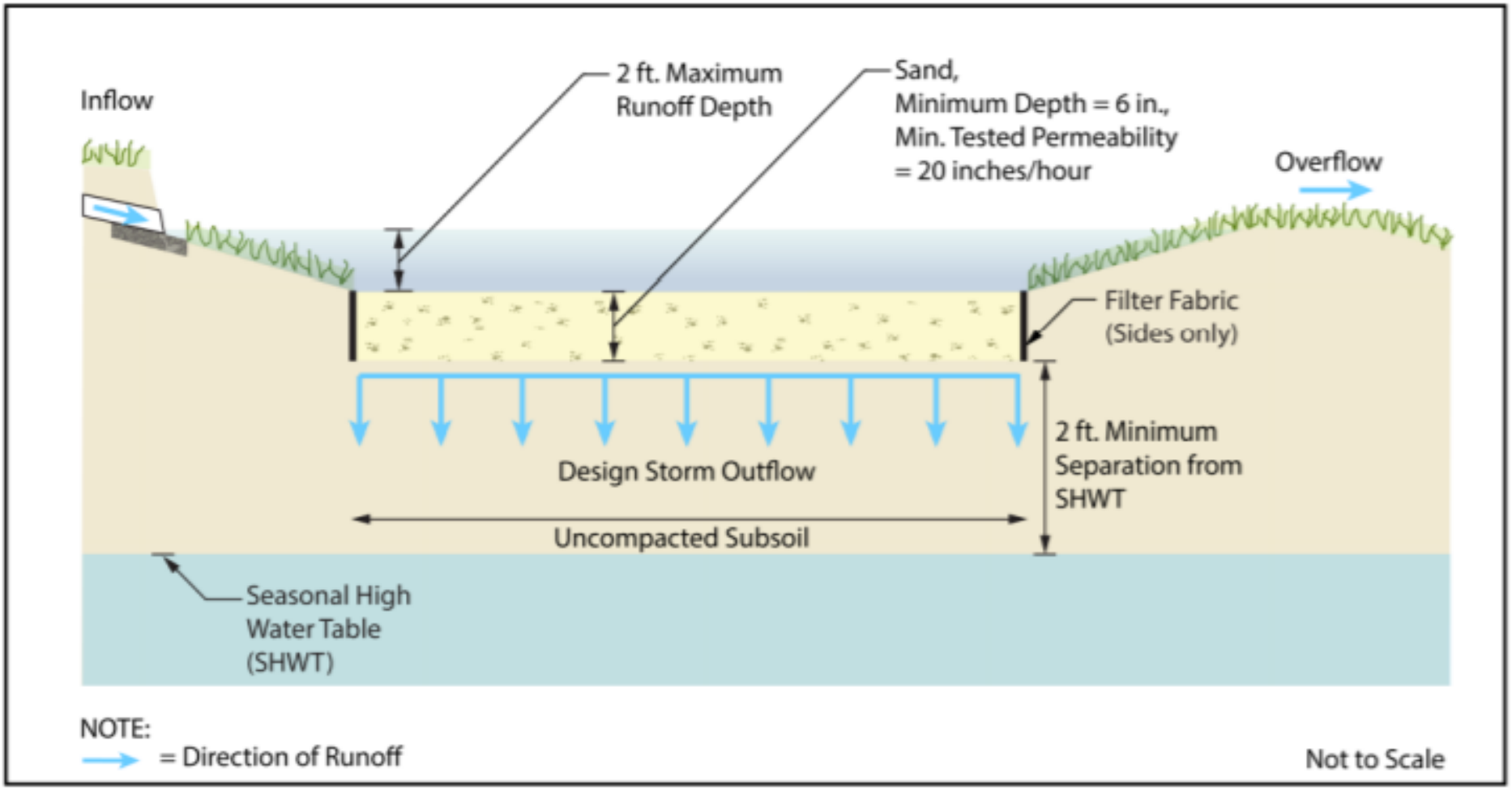
Green Roofs

Infiltration Systems

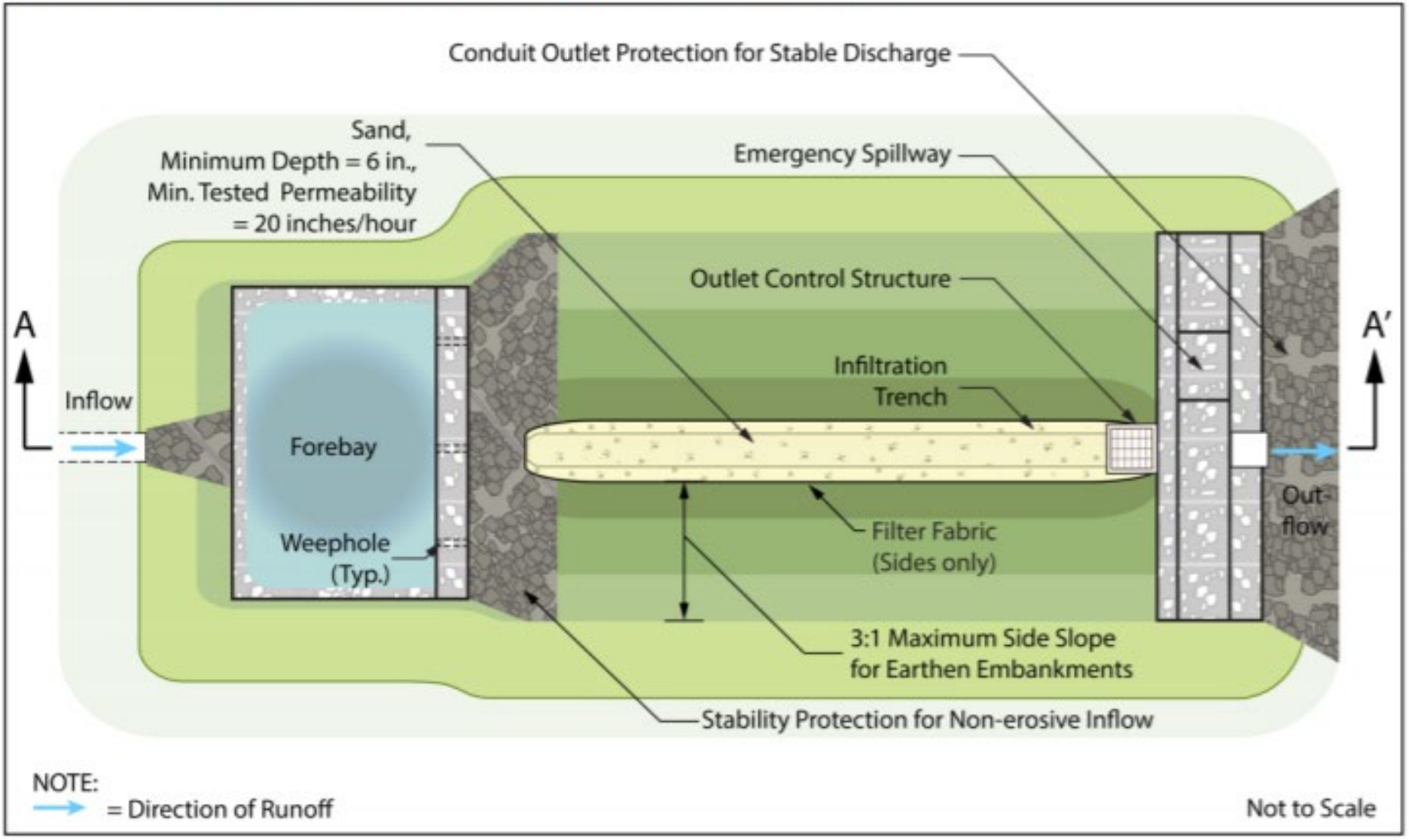
Surface Infiltration Basin – Plan View



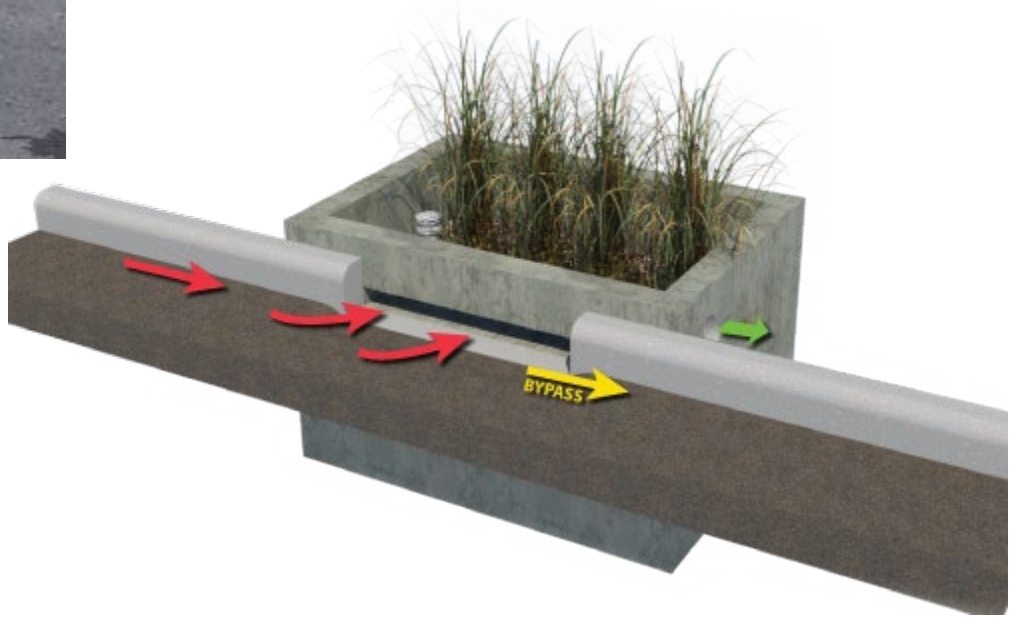
Surface Infiltration Basin – Profile View



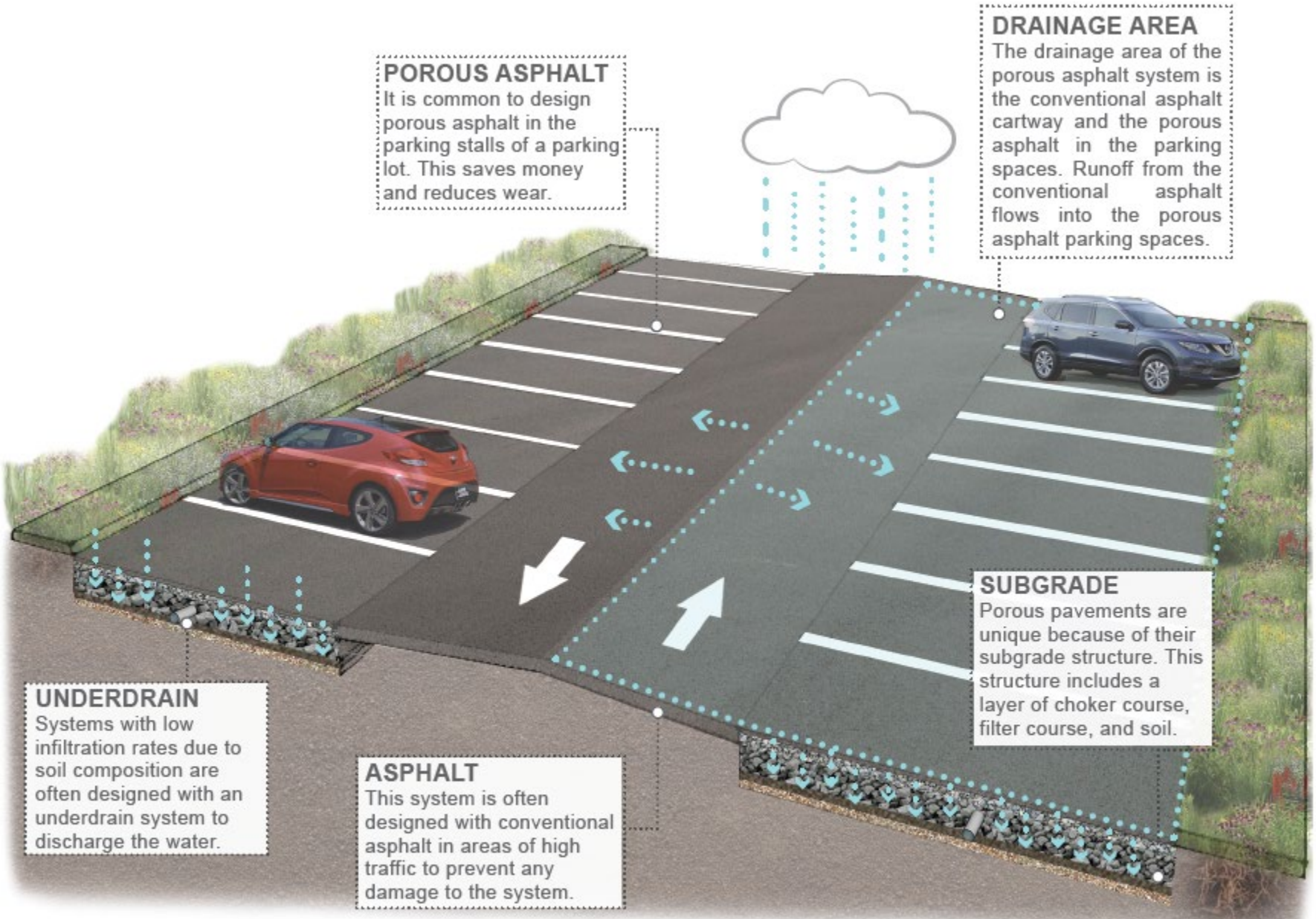
Infiltration - Extended Detention Basin: Plan View



Green Infrastructure Manufactured Treatment Device



Permeable Pavement



Porous Asphalt

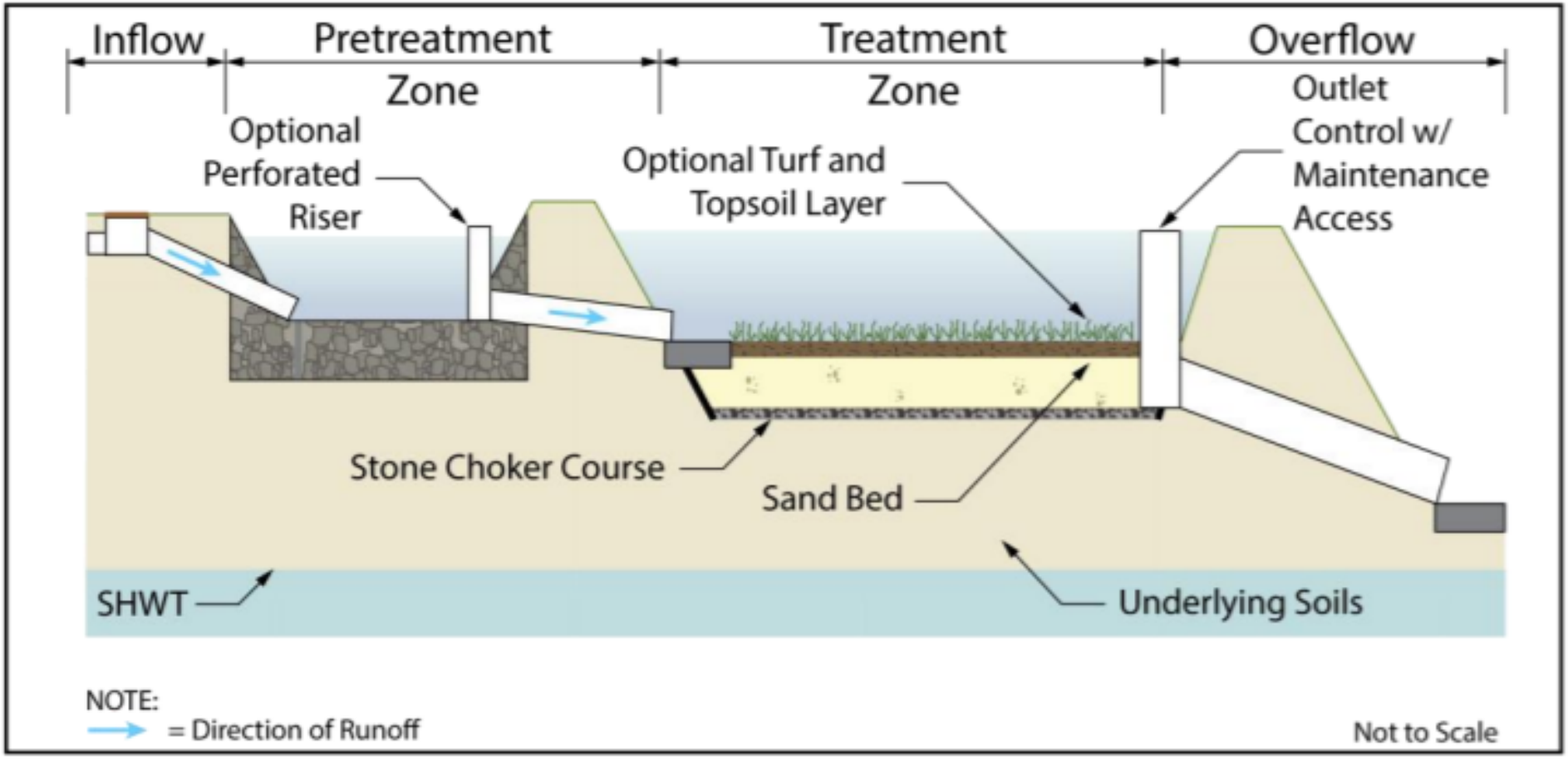

Pervious Concrete


Permeable Pavers

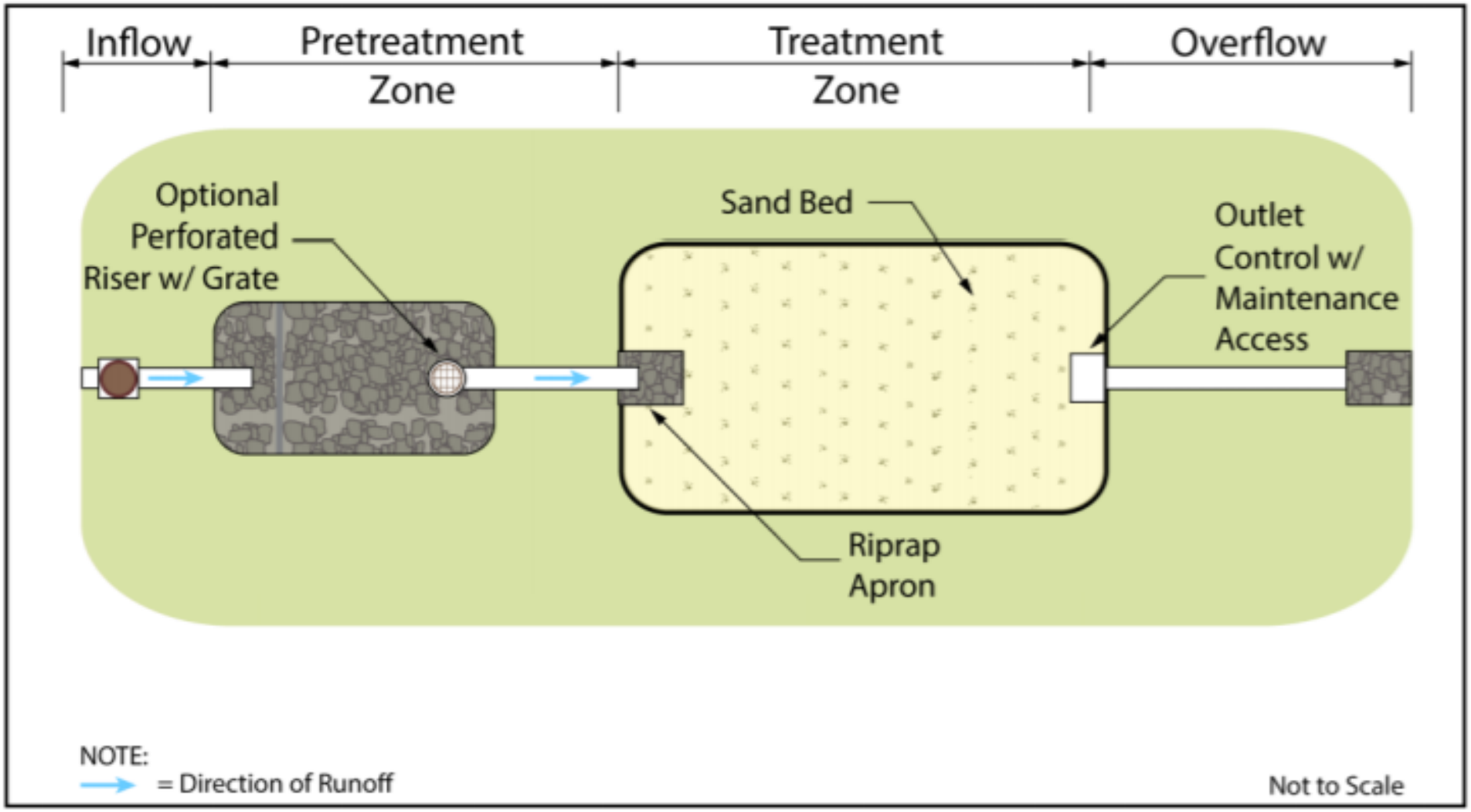

Grass Pavers

Sand Filter

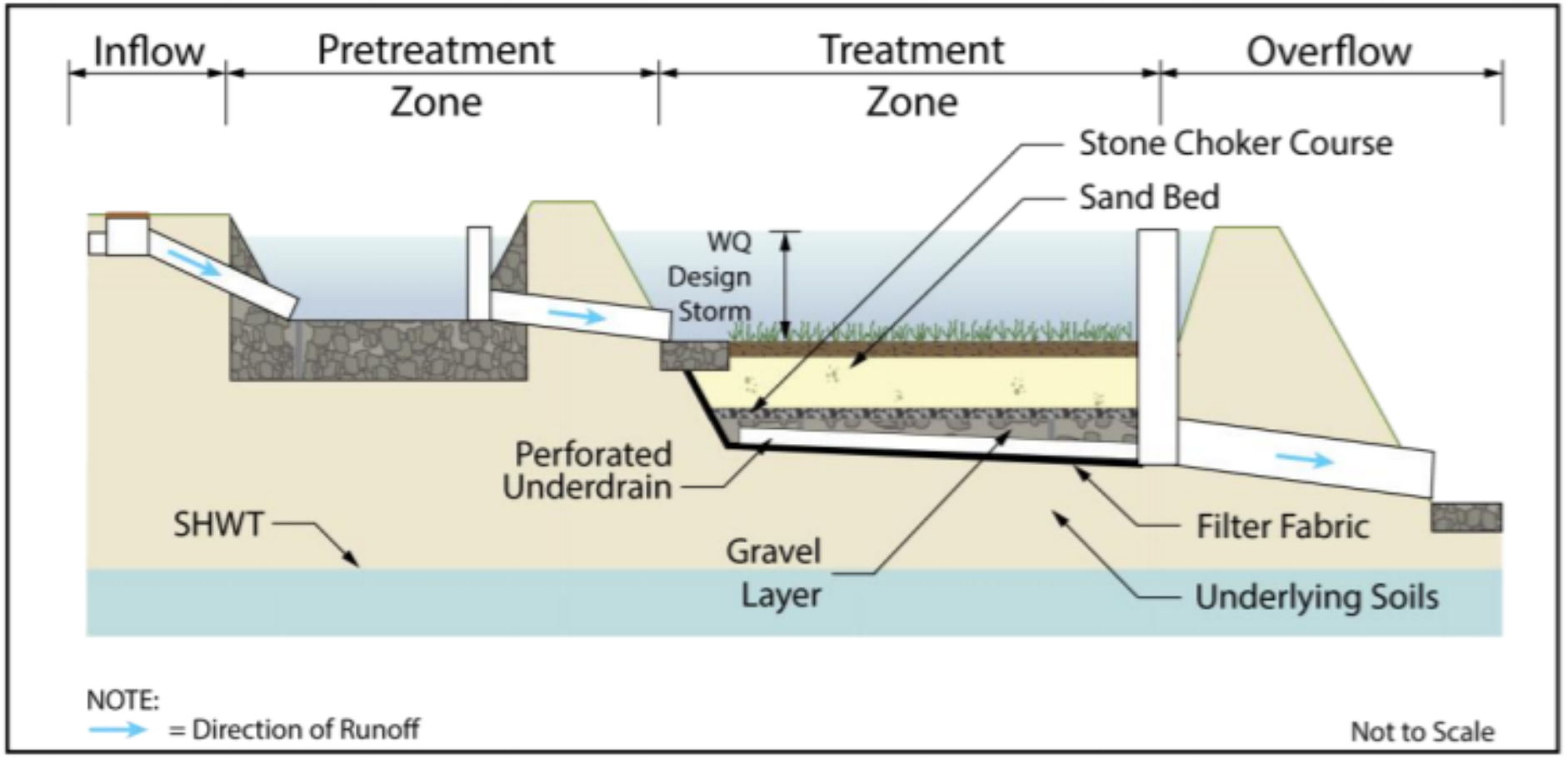
Profile View – Sand Filter Basics



Plan View – Sand Filter Basics



Profile View – Sand Filter with Underdrain



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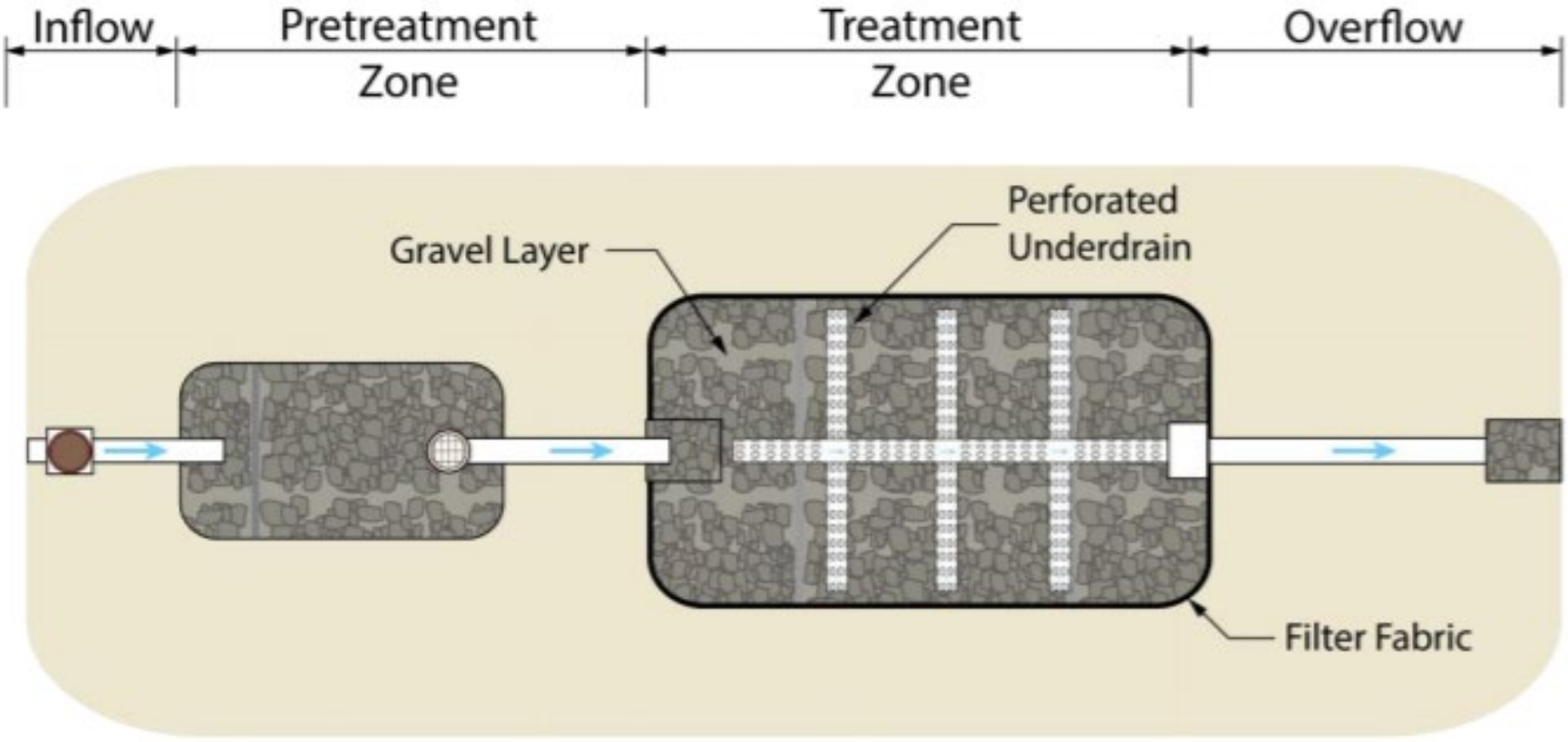


NOTE:
→ = Direction of Runoff
Surface Vegetation, Topsoil, Sand Layer & Stone Choker Course Not Shown

Not to Scale

N.J.A.C. 7:8 - Stormwater Management Regulations

Goal is to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies.

New Jersey Stormwater Management Rules

- Rules apply to any "Major Development" defined as a project disturbing more than 1 acre or increasing impervious surfaces by ¼ acre or more
- Design and Performance Standards established in NJAC 7:8-5, for:
  - Stormwater Quantity
  - Groundwater Recharge
  - Stormwater Quality
  - Stormwater Maintenance Plan

Water Quantity Performance Standards

– Demonstrate that post-development 2, 10, and 100-year storm event hydrographs do not exceed pre-development hydrographs

or

– Demonstrate that hydrograph peaks will not increase and that increase in volume or change in timing won't increase flood damage downstream

or

– Design BMPs so that 2, 10, and 100-year pre-development hydrographs are reduced to 50%, 75%, and 80%, respectively

- 2-year rainfall
- 10-year rainfall
- 100-year rainfall

Groundwater Recharge Performance Standards

– Maintain 100% of average annual groundwater recharge volume

or

– Infiltrate increase in the post development runoff volume for the 2-year storm

Water Quality Performance Standards

- Install BMPs to reduce at least 80% of total suspended solids (TSS) loads
- Install BMPs to provide nutrient removal to maximum extent feasible

BMP	TSS Removal Rate
Bioretention	90%
Constructed Wetlands	90%
Forested Buffers	70%
Extended Detention Basin	40-60%
Infiltration Structure	80%
Sand Filter	80%
Vegetative Filter Strip	50%
Wet Pond	60-90%

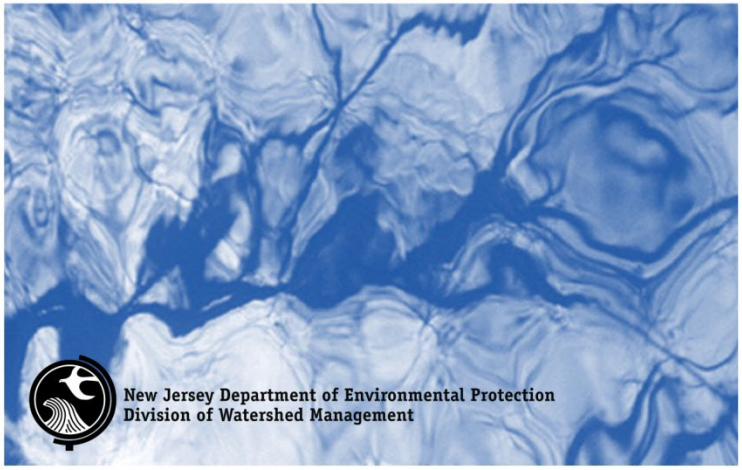
SOURCE: NJ Stormwater Management Rules and BMP Manual

NJ Stormwater Guidance

New Jersey

Stormwater

Best Management Practices Manual



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2019 Revisions

1. The current requirement that major developments incorporate nonstructural stormwater management strategies to the “maximum extent practical” to meet groundwater recharge standards, stormwater runoff quantity standards, and stormwater runoff quality standards, with a requirement that green infrastructure be utilized to meet these same standards.
2. Total suspended solids (TSS) removal only applies to runoff from motor vehicle surfaces

NJDEP Green Infrastructure Definition

A stormwater management measure that manages stormwater close to its source by:

1. Treating stormwater runoff through infiltration into subsoil
2. Treating stormwater runoff through filtration by vegetation or soil
3. Storing stormwater runoff for reuse

Green Infrastructure Standard

- Green infrastructure best management practices (BMP) must be used to satisfy recharge, quantity, and quality
- Three tables identifying the performance of each BMP in meeting the three standards
  - Water Quality & Recharge – BMPs in Table 1
  - Quantity – BMPs in Table 1 or Table 2
  - If received a variance – BMPs in Table 1, Table 2, or Table 3
- Maintain existing ability to propose an alternative stormwater design
  - Alternative design must meet green infrastructure definition and must meet drainage area limitation if similar to BMP with limit

Table 1

Best Management Practice	Quality TSS removal rate (%)	Quantity	Recharge	Minimum separation from seasonal high-water table (ft)
Bioretention Systems	80 or 90	Yes	Yes No	2 1
Cisterns	0	Yes	No	-
Dry Wells	0	No	Yes	2
Grass Swales	50 or less	No	No	2
Green Roofs	0	Yes	No	-
Infiltration Basins	80	Yes	Yes	2
Manufactured Treatment Device	50 or 80	No	No	Dependent upon the device
Pervious Paving Systems	80	Yes	Yes No	2 1
Sand Filters	80	Yes	Yes	2
Vegetative Filter Strips	60-80	No	No	-

- Table 1 BMPs shall be used for recharge, quantity, and quality

- Drainage area limitation applies to bioretention basins, dry wells, infiltration basins, manufactured treatment devices, and sand filters

Table 2

Best Management Practice	Quality TSS removal rate (%)	Quantity	Recharge	Minimum separation from seasonal high water table (ft)
Bioretention Systems	80 or 90	Yes	Yes No	2 1
Infiltration Basins	80	Yes	Yes	2
Standard Constructed Wetlands	90	Yes	No	N/A
Wet Ponds	50-90	Yes	No	N/A

Table 2 BMPs may only be used for quantity

Table 3

Best Management Practice	Quality TSS removal rate (%)	Quantity	Recharge	Minimum separation from seasonal high water table (ft)
Blue Roofs	0	Yes	No	N/A
Extended Detention Basins	40-60	Yes	No	1
Manufactured Treatment Device	50 or 80	No	No	Dependent upon the device
Sand Filters	80	Yes	No	1
Subsurface Gravel Wetlands	90	No	No	1
Wet ponds	50-90	Yes	No	N/A

Table 3 BMPs may only be used if a variance is granted

Let’s talk about the practicality of these new regulations

Table 1

Best Management Practice	Quality TSS removal rate (%)	Quantity	Recharge	Minimum separation from seasonal high-water table (ft)
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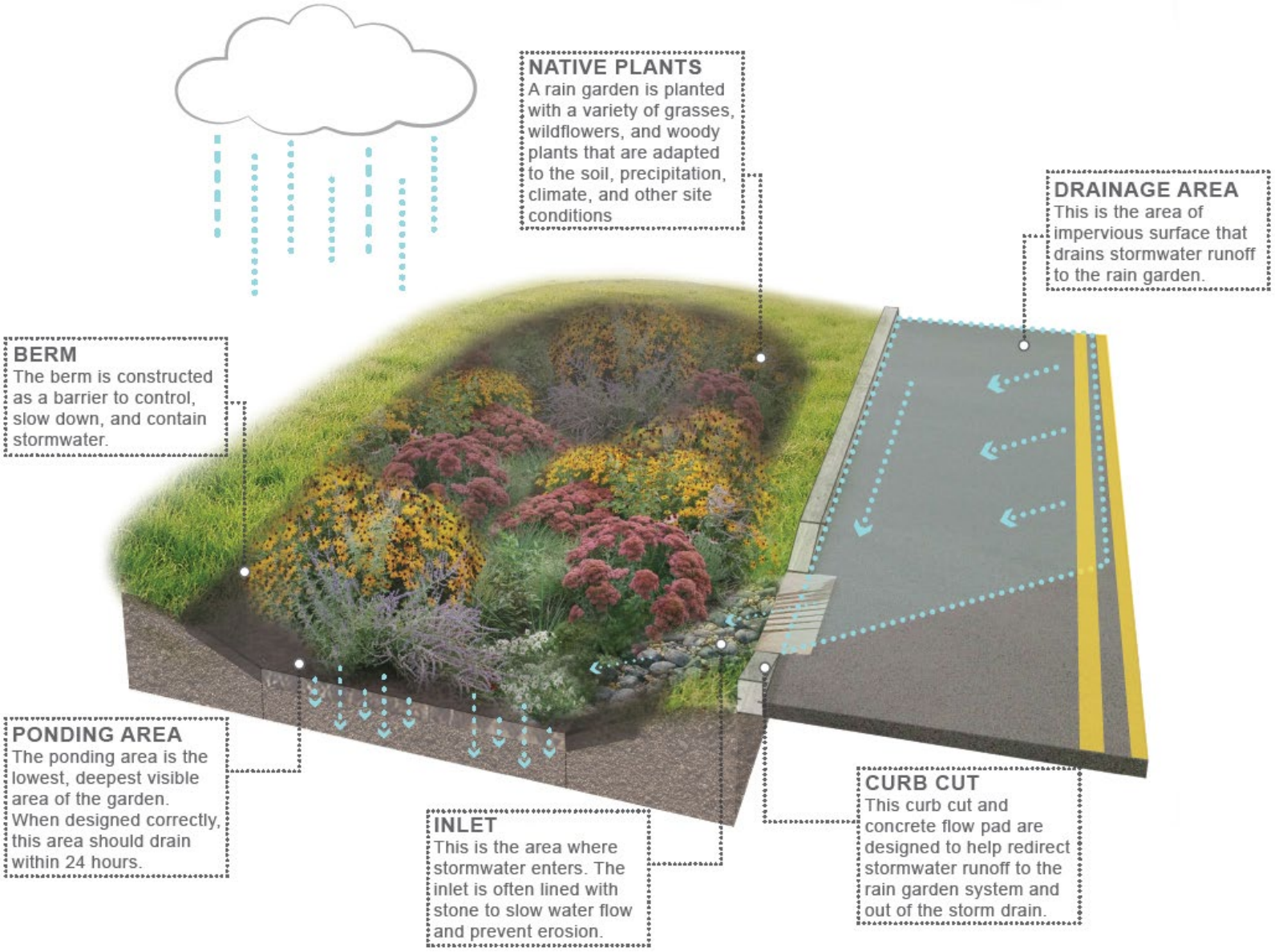
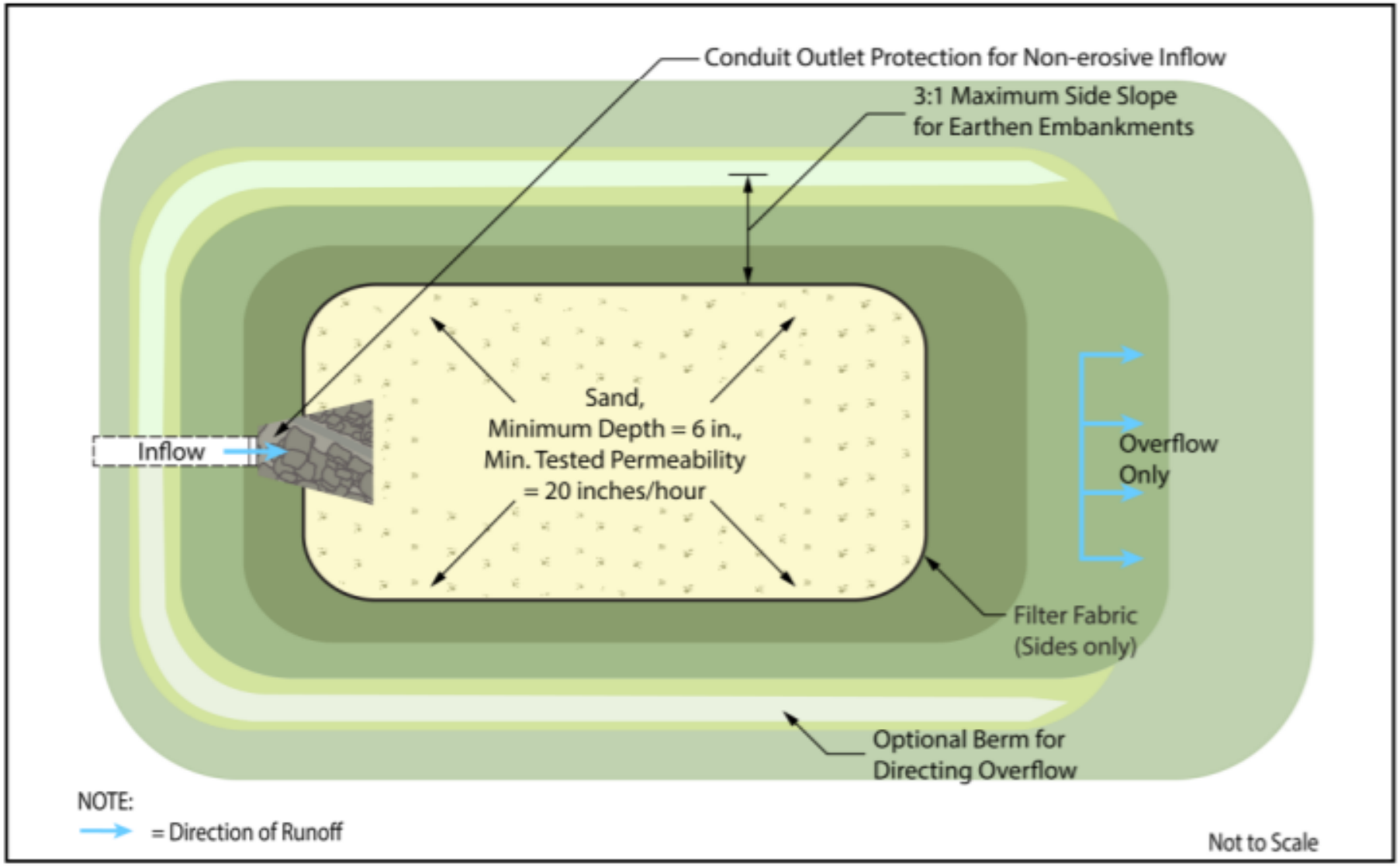
Manufactured Treatment Device	50 or 80	No	No	Dependent upon the device
Pervious Paving Systems	80	Yes	Yes No	2 1
Sand Filters	80	Yes	Yes	2
Vegetative Filter Strips	60-80	No	No	-

Bioretention Systems

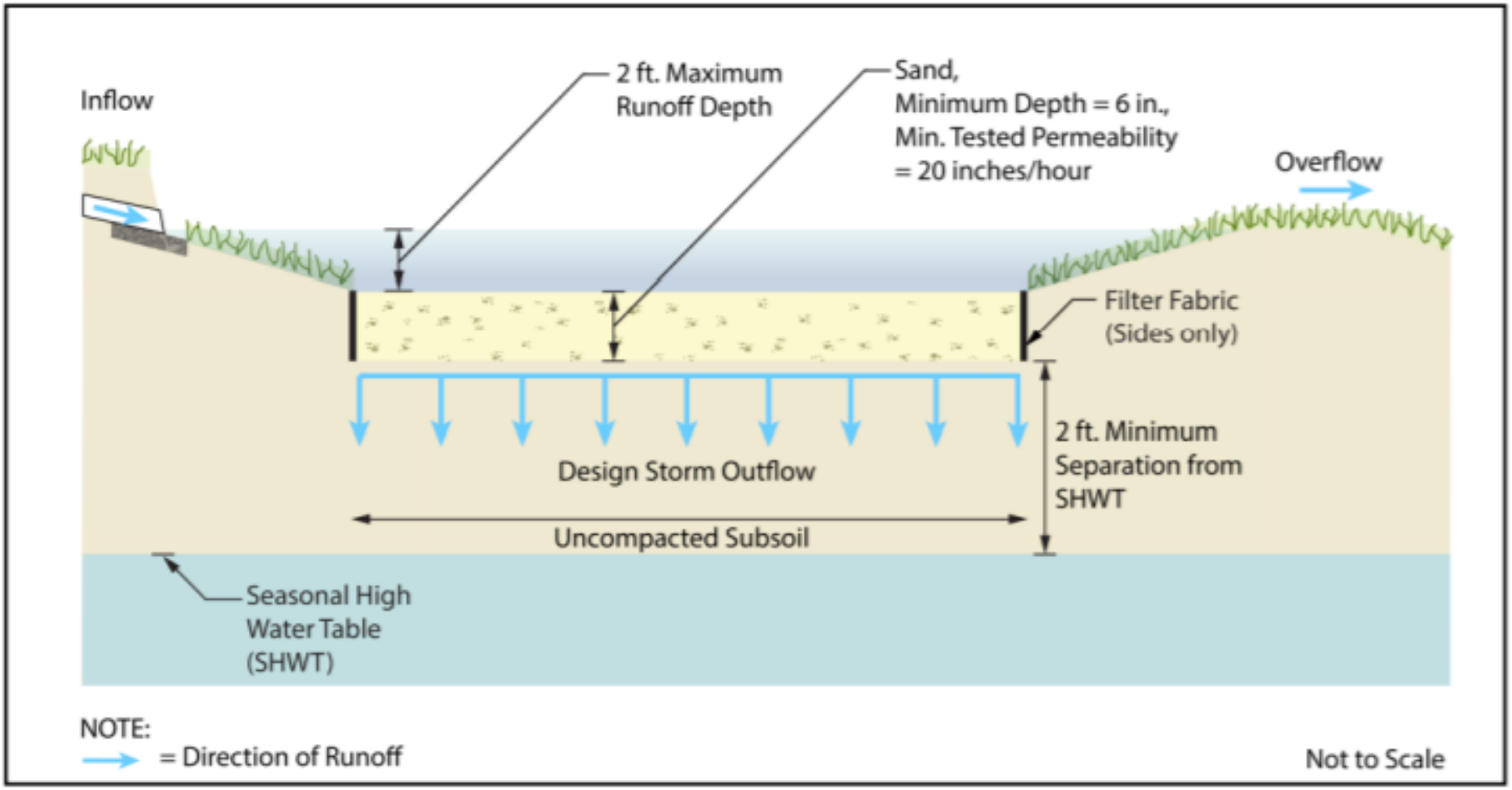


Infiltration Systems

Surface Infiltration Basin – Plan View



Surface Infiltration Basin – Profile View



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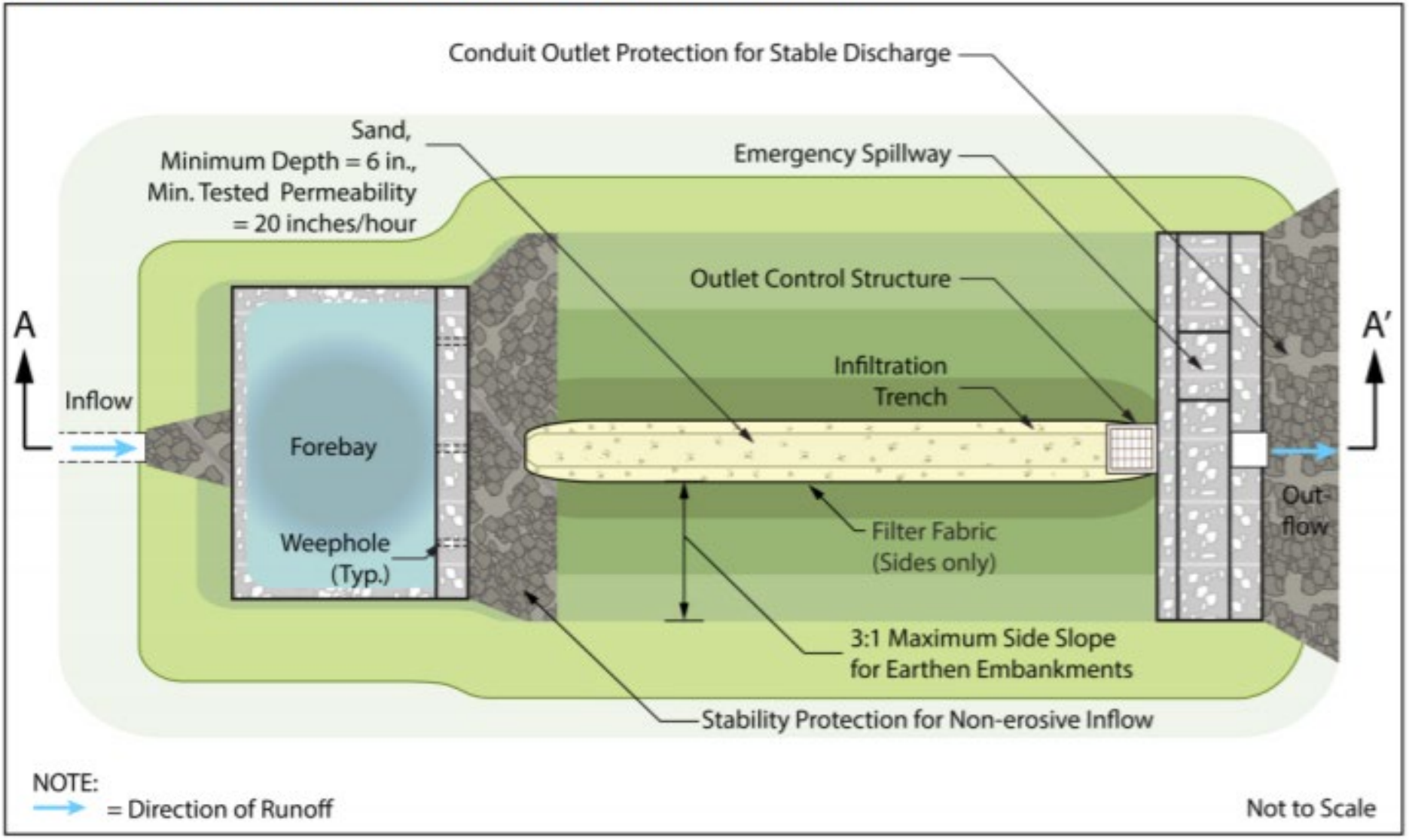
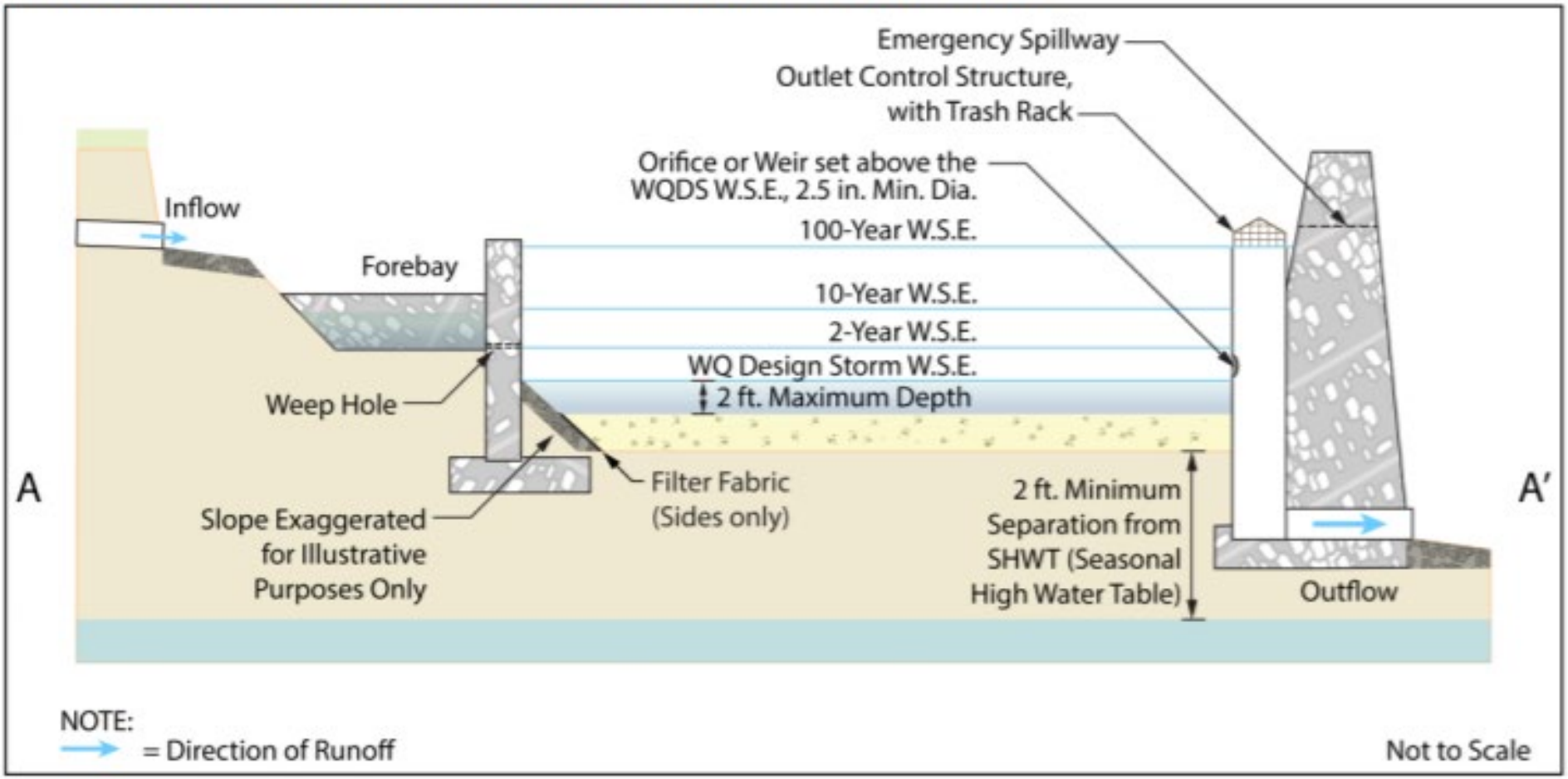
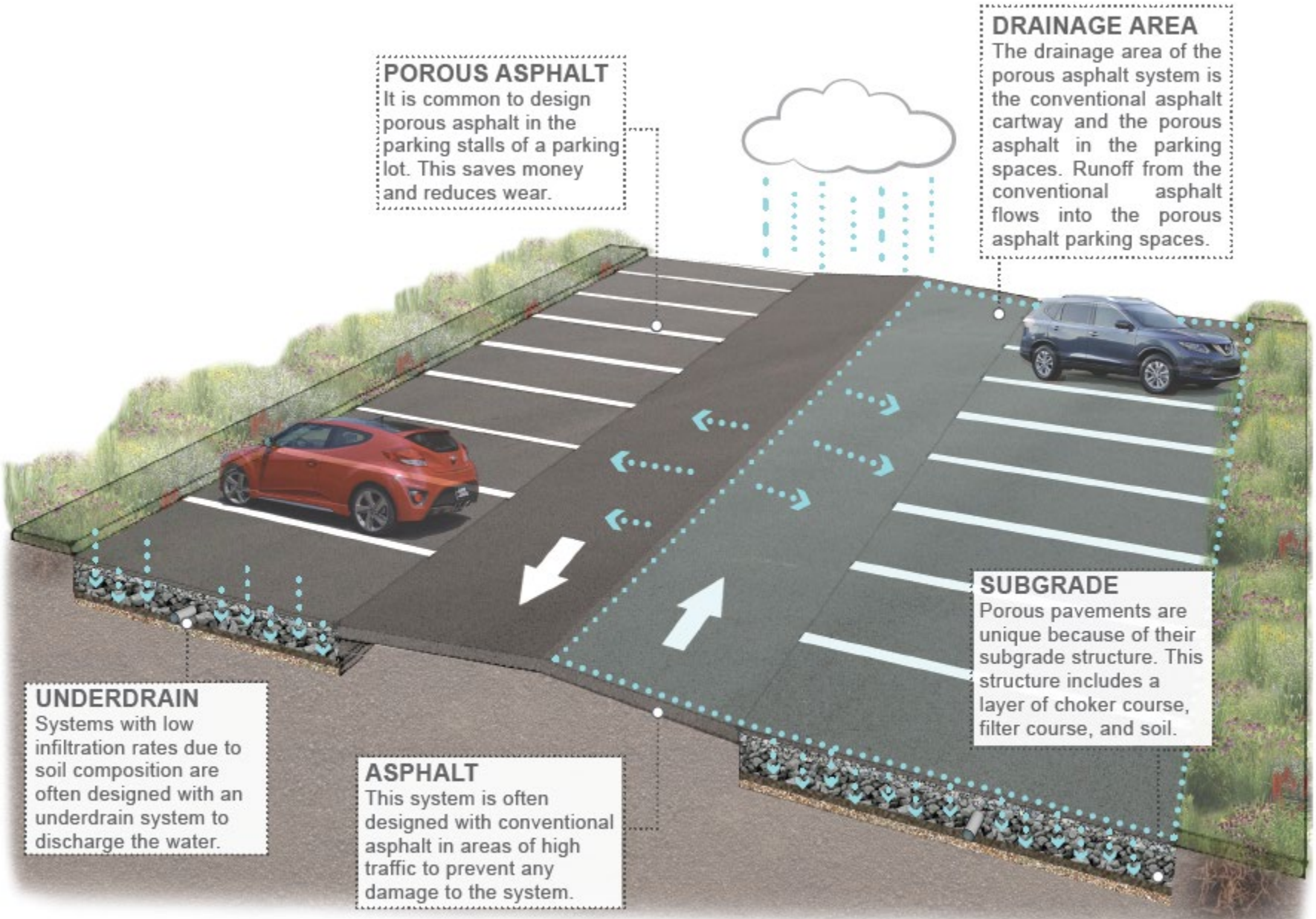
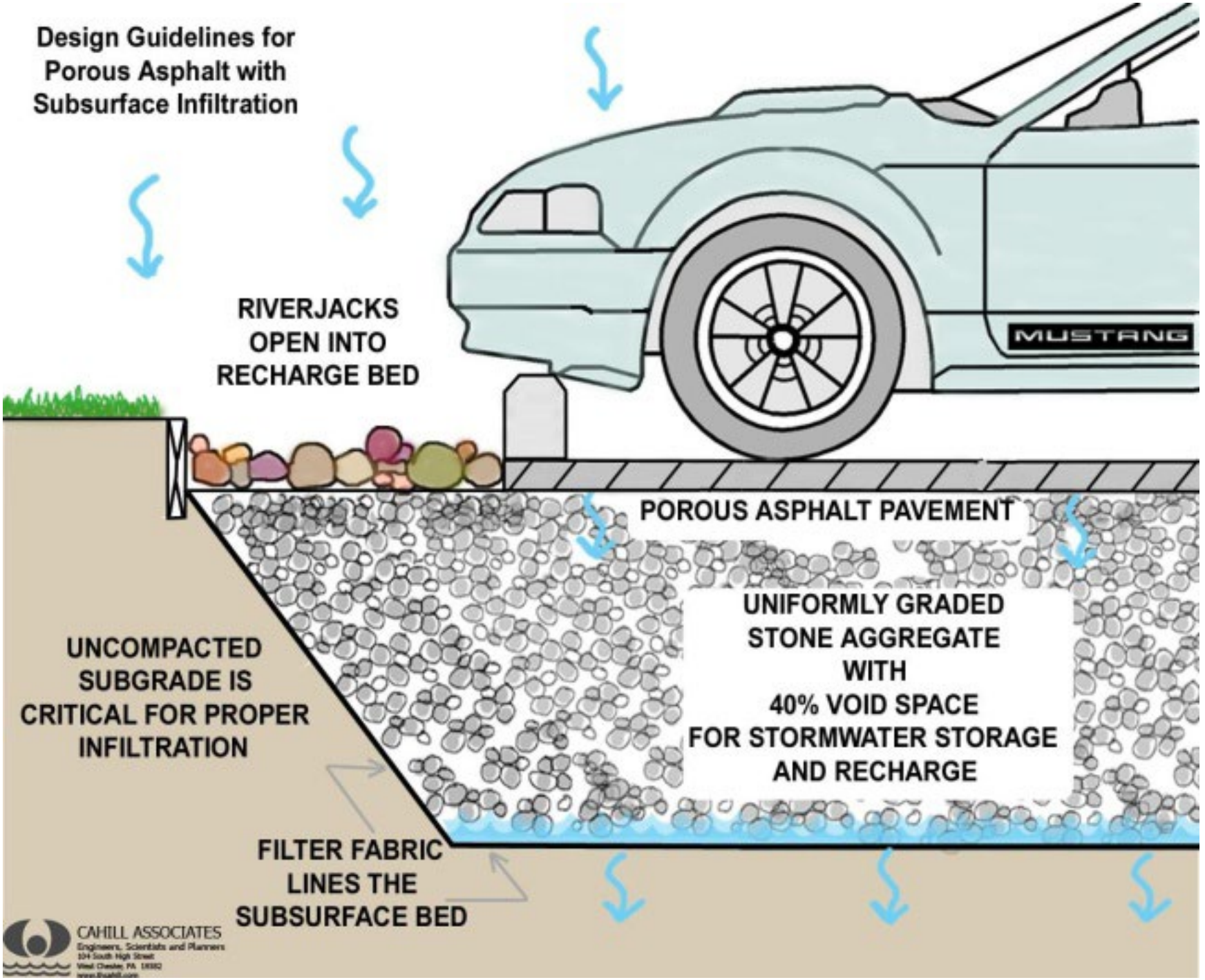


Infiltration – Extended Detention Basin: Profile View



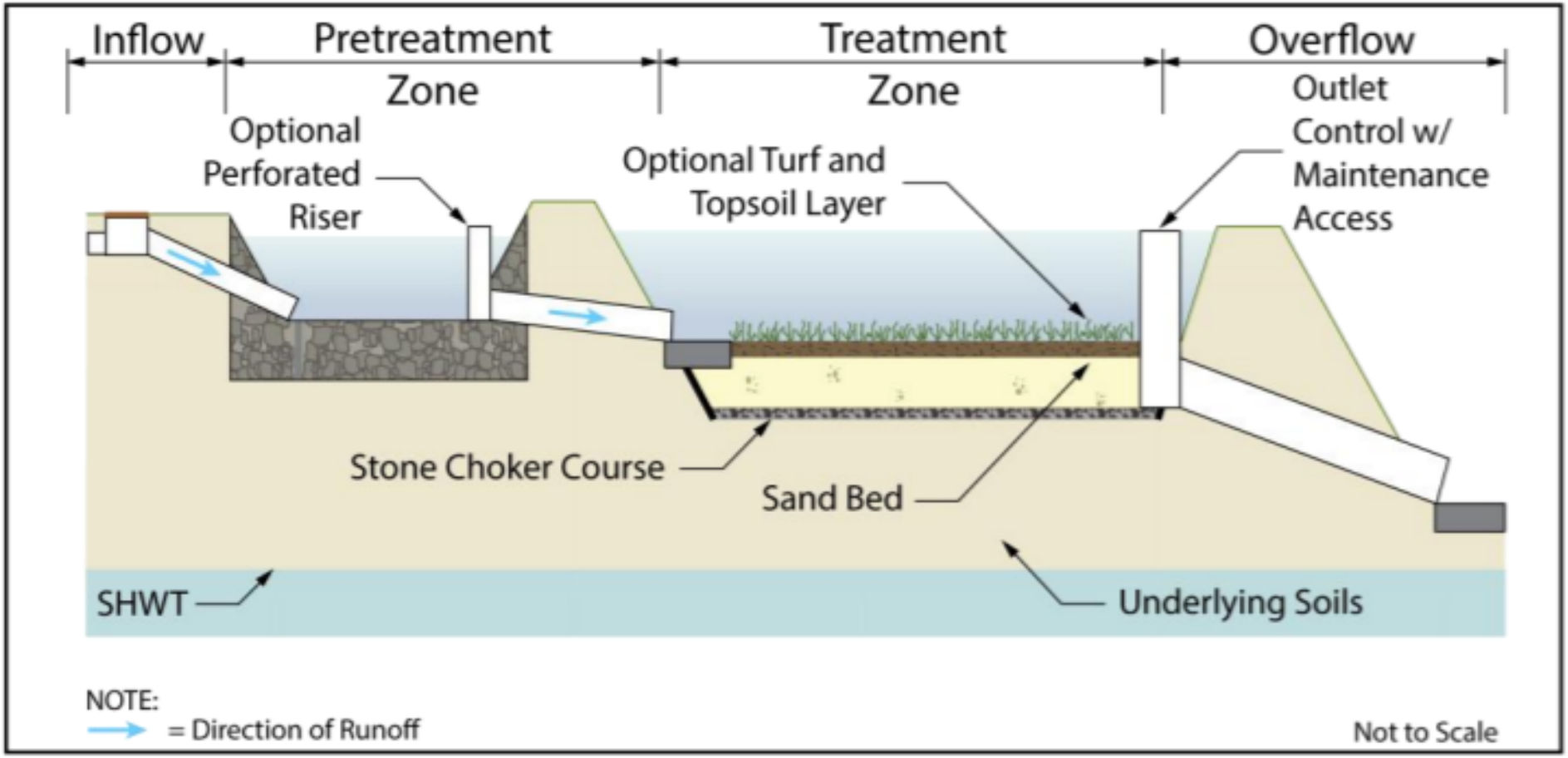
Pervious Paving Systems



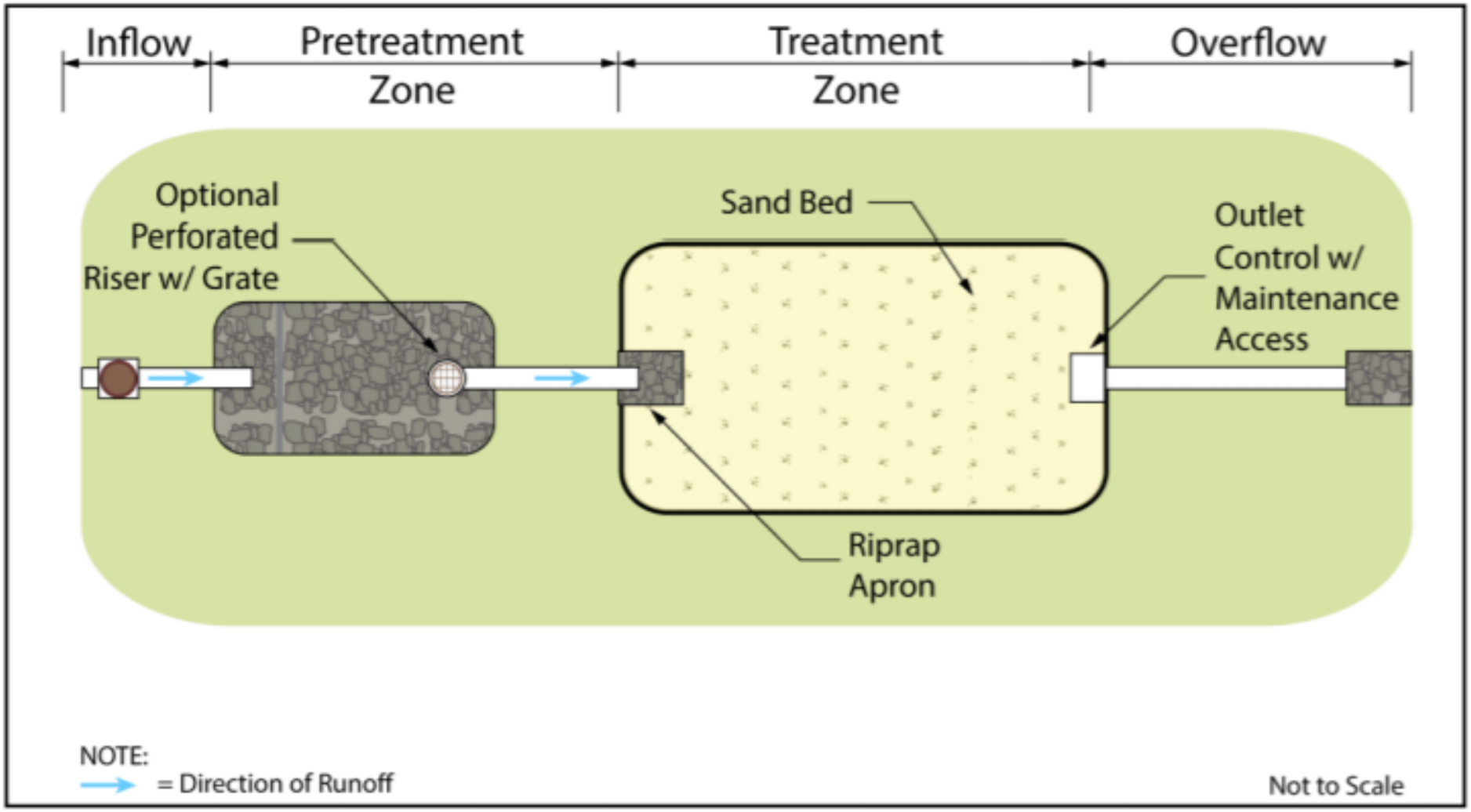

Design Guidelines for
Porous Asphalt with
Subsurface Infiltration
RIVERJACKS
OPEN INTO
RECHARGE BED
MUSTANG
POROUS ASPHALT PAVEMENT
UNIFORMLY GRADED
STONE AGGREGATE
WITH
40% VOID SPACE
FOR STORMWATER STORAGE
AND RECHARGE
UNCOMPACTED
SUBGRADE IS
CRITICAL FOR PROPER
INFILTRATION
FILTER FABRIC
LINES THE
SUBSURFACE BED
CAHILL ASSOCIATES
Engineers, Scientists and Planners
104 South High Street
West Chester, PA 19382

Sand Filter

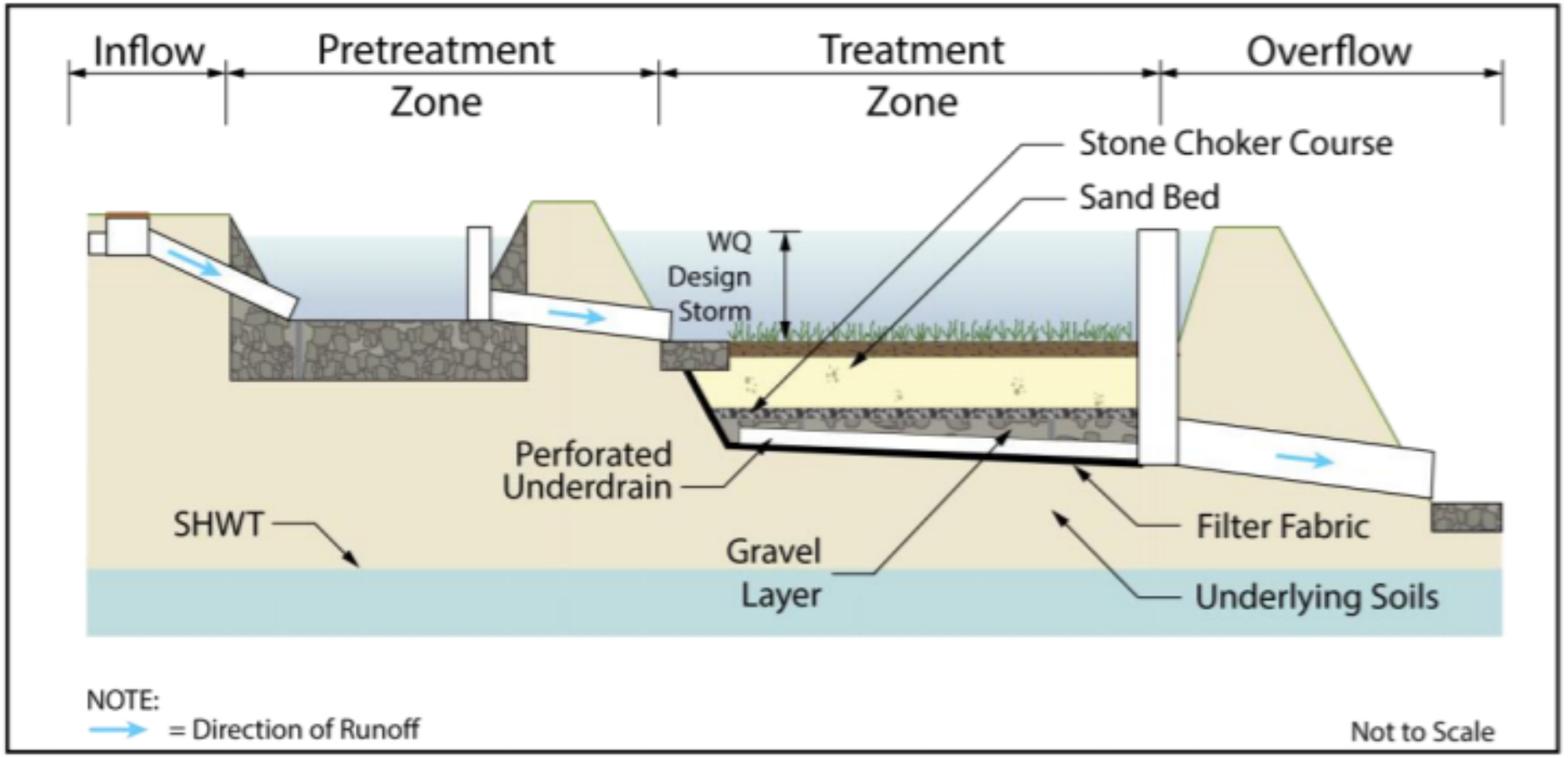
Profile View – Sand Filter Basics



Plan View – Sand Filter Basics



Profile View – Sand Filter with Underdrain



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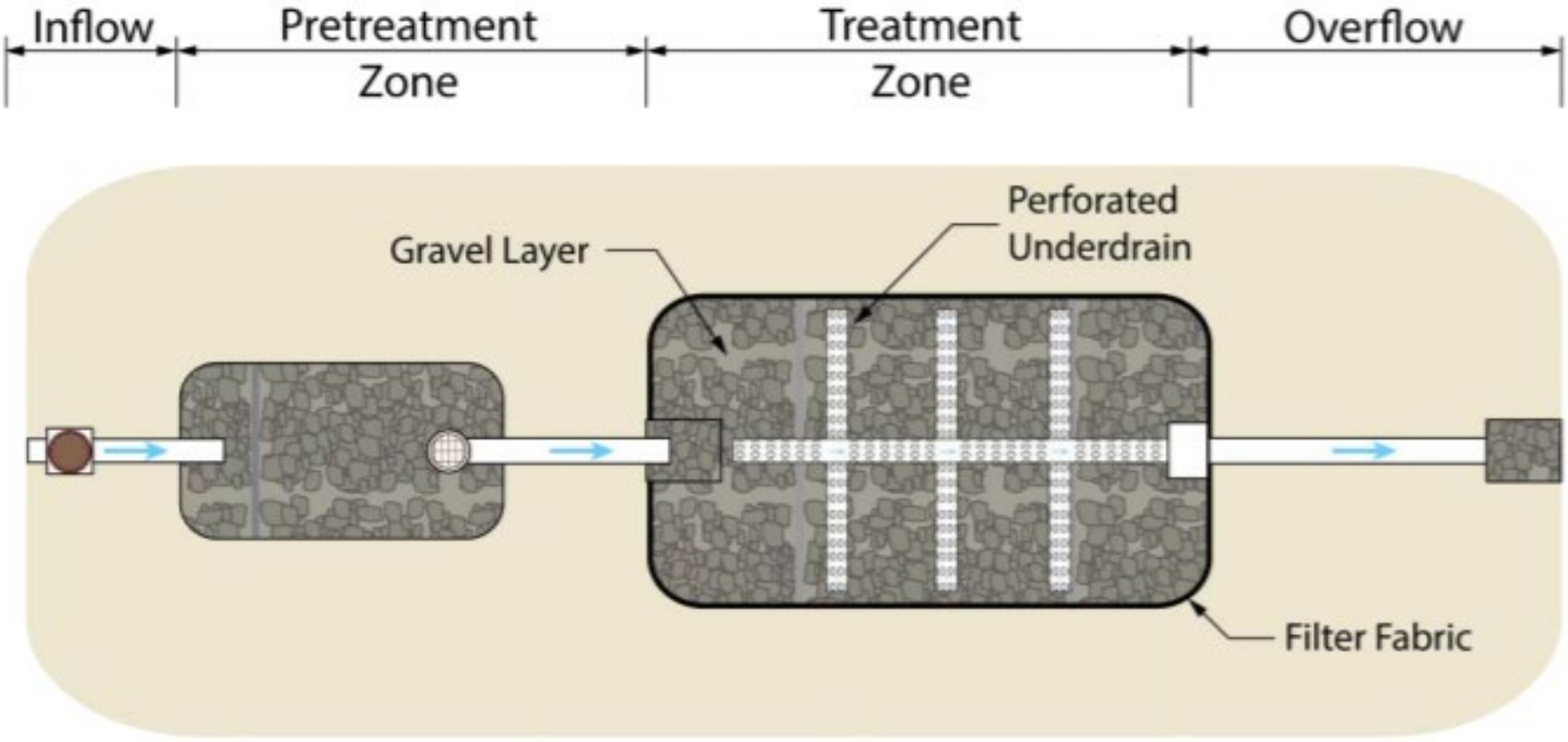


NOTE:
→ = Direction of Runoff
Surface Vegetation, Topsoil, Sand Layer & Stone Choker Course Not Shown

Not to Scale

On July 17, 2023, NJDEP revised Stormwater Management Rules Flood Hazard Area Control Act Rules

2100 Projection

Future Precipitation Change Factors			
County	2-year Design Storm	10-year Design Storm	100-year Design Storm
Atlantic	1.22	1.24	1.39
Bergen	1.20	1.23	1.37
Burlington	1.17	1.18	1.32
Camden	1.18	1.22	1.39
Cape May	1.21	1.24	1.32
Cumberland	1.20	1.21	1.39
Essex	1.19	1.22	1.33
Gloucester	1.19	1.23	1.41
Hudson	1.19	1.19	1.23
Hunterdon	1.19	1.23	1.42
Mercer	1.16	1.17	1.36

Future Precipitation Change Factors			
County	2-year Design Storm	10-year Design Storm	100-year Design Storm
Middlesex	1.19	1.21	1.33
Monmouth	1.19	1.19	1.26
Morris	1.23	1.28	1.46
Ocean	1.18	1.19	1.24
Passaic	1.21	1.27	1.50
Salem	1.20	1.23	1.32
Somerset	1.19	1.24	1.48
Sussex	1.24	1.29	1.50
Union	1.20	1.23	1.35
Warren	1.20	1.25	1.37

2020 Projection

Current Precipitation Adjustment Factors			
County	2-year	10-year	100-year
Atlantic	1.01	1.02	1.03
Bergen	1.01	1.03	1.06
Burlington	0.99	1.01	1.04
Camden	1.03	1.04	1.05
Cape May	1.03	1.03	1.04
Cumberland	1.03	1.03	1.01
Essex	1.01	1.03	1.06
Gloucester	1.05	1.06	1.06
Hudson	1.03	1.05	1.09
Hunterdon	1.02	1.05	1.13
Mercer	1.01	1.02	1.04

Current Precipitation Adjustment Factors			
County	2-year	10-year	100-year
Middlesex	1.00	1.01	1.03
Monmouth	1.00	1.01	1.02
Morris	1.01	1.03	1.06
Ocean	1.00	1.01	1.03
Passaic	1.00	1.02	1.05
Salem	1.02	1.03	1.03
Somerset	1.00	1.03	1.09
Sussex	1.03	1.04	1.07
Union	1.01	1.03	1.06
Warren	1.02	1.07	1.15

100-Year Storm for Somerset County

Condition (100-yr Design Storm)	24-hour rainfall total (in)
2000 Rainfall Total	8.21
2020 Rainfall Total	8.95
2100 Rainfall Total	12.15

From NJDEP:
APPENDIX D: MODEL STORMWATER CONTROL ORDINANCE FOR MUNICIPALITIES

Enhanced Model Stormwater Ordinance for Municipalities

https://thewatershed.org/the-watershed-institute-releases-enhanced-stormwater-management-model-ordinance/

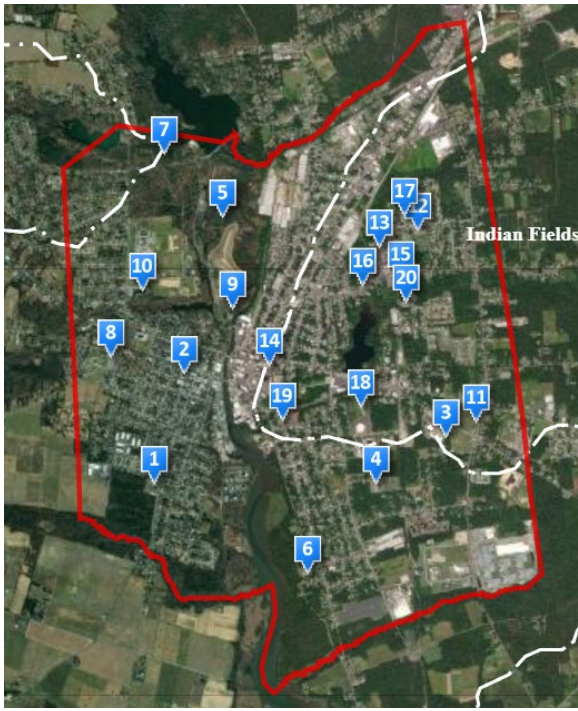
The Watershed Institute Enhanced Stormwater Management Ordinance includes the following provisions:

- Reduced threshold definition for major development
- Requires major developments to treat runoff from all impervious surfaces for water quality.
- Requires stormwater management for minor development over 250 square feet
- Addresses redevelopment
- Requires the use of Low Impact Development techniques
- Includes maintenance and inspection reporting requirements

Components of NJ MS4 Permit

Watershed Improvement Plan

- Designed to improve water quality problems
- Focused on reducing the MS4 contribution of pollutants to waterbodies with listed impairments and TMDLs
- Reducing or eliminating flooding with priority given based on human health and safety, environmental impacts, and frequency of occurrence
- Plan shall be developed with input from residents, businesses, neighboring towns, other dischargers



Three phases of watershed improvement plans

Phase 1 – Prepare and submit the Watershed Inventory Report; conduct outreach *(December 31, 2025)*

- Summarize/map required information, some is available from the Department's GIS database

Phase 2 – Prepare and submit the Watershed Assessment Report; conduct outreach *(December 31, 2026)*

- Assess potential projects with estimates of the reduction in pollutant loading and funding need

Phase 3 – Prepare and submit the Watershed Improvement Plan Report; conduct outreach *(December 31, 2027)*

- Summarize proposed projects with improvement expected, comments received, costs, coordination with other regulatory programs, and implementation schedule