

# STORMWATER BEST MANAGEMENT PRACTICES (BMPs)

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NJDEP Division of Water Enforcement  
October 13, 2016

**BMP MANUAL**  
General Overview

## **TYPES OF BMPs**

Vegetative  
Infiltration  
Uncategorized

# BMP MANUAL: General Overview

- Guidance to help meet the requirements in the Stormwater Management rules
- Stormwater management planning
- Stormwater runoff calculations
- Structural BMP design
- Maintenance & landscaping
- [njstormwater.org/bmp\\_manual2.htm](http://njstormwater.org/bmp_manual2.htm)

**STATE OF NEW JERSEY**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**  
**Nj STORMWATER.ORG**  
*Stormwater in New Jersey*

**NJ Stormwater Best Management Practices Manual**

The Stormwater Management rules, N.J.A.C. 7:8 specify stormwater management standards that are mandatory for new major development. The New Jersey Stormwater Best Management Practices Manual (BMP manual) is developed to provide guidance to address the standards in the proposed Stormwater Management Rules, N.J.A.C. 7:8. The BMP manual provides examples of ways to meet the standards contained in the rule. The methods referenced in the BMP manual are one way of achieving the standards. An applicant is welcome to demonstrate that other proposed management practices will also achieve the standards established in the rules. The BMP Manual is developed by the New Jersey Department of Environmental Protection, in coordination with the New Jersey Department of Agriculture, the New Jersey Department of Community Affairs, the New Jersey Department of Transportation, municipal engineers, county engineers, consulting firms, contractors, and environmental organizations.

The BMP manual has been drafted to assist review agencies and the regulated community. The methods in the BMP manual can be utilized without need for additional documentation to address the performance standards in the rule. The Department anticipates providing guidance on additional best management practices and new information on already included practices as research and development occurs in this field.

Future updates of the BMP Manual will be available through [www.njstormwater.org](http://www.njstormwater.org).

NJ Stormwater Best Management Practices Technical Manual Technical Committee Meetings  
NJ Stormwater Best Management Practices Technical Manual Technical Committee Members

**BMP MANUAL - April 2004, Revised September 2014 & February 2016**

Cover and Contents: Includes the cover pages, Notes on Technical Updates, Acknowledgements, and Table of Contents.

Chapter One: Impacts of Development on Runoff discusses the impact of development on the quality and quantity of stormwater runoff.

Chapter Two: Low Impact Development Techniques provides information how to use structural and nonstructural to provide lower impact development

Chapter Three: Regional and Municipal Stormwater Management Plans presents guidance on the development of regional and municipal stormwater management plans.

## Chapter Nine: provides general information on Structural Stormwater Management Measures

- Chapter 9.1 Bioretention Systems **\*\*\*UPDATED\*\*\***
- Chapter 9.2 Standard Constructed Wetlands
- Chapter 9.3 Dry Wells **\*\*\*UPDATED\*\*\***
- Chapter 9.4 Extended Detention Basins
- Chapter 9.5 Infiltration Basins **\*\*\*UPDATED\*\*\***
- Chapter 9.6 Manufactured Treatment Devices **\*\*\*UPDATED\*\*\***
- Chapter 9.7 Pervious Paving Systems
- Chapter 9.8 Blue Roofs (reserved)
- Chapter 9.9 Sand Filters
- Chapter 9.10 Vegetative Filter Strips
- Chapter 9.11 Wet Ponds
- Chapter 9.12 Grass Swales
- Chapter 9.13 Subsurface Gravel Wetlands



# TYPES OF BMPS: Vegetative

Bioretention Systems\*



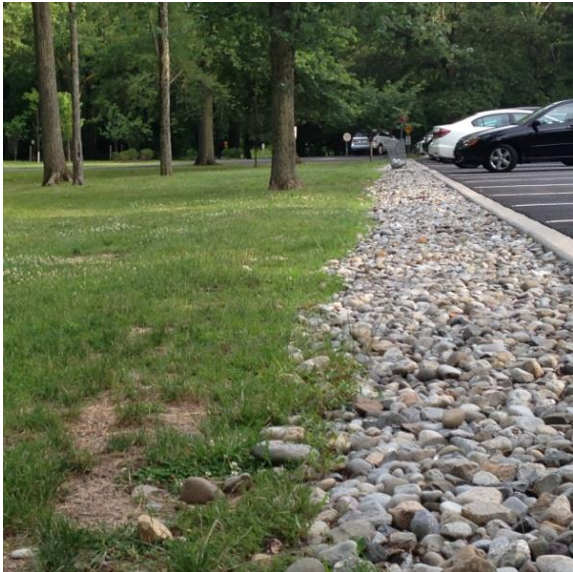
Constructed Wetlands



Subsurface Gravel Wetlands



Vegetative Filter Strips

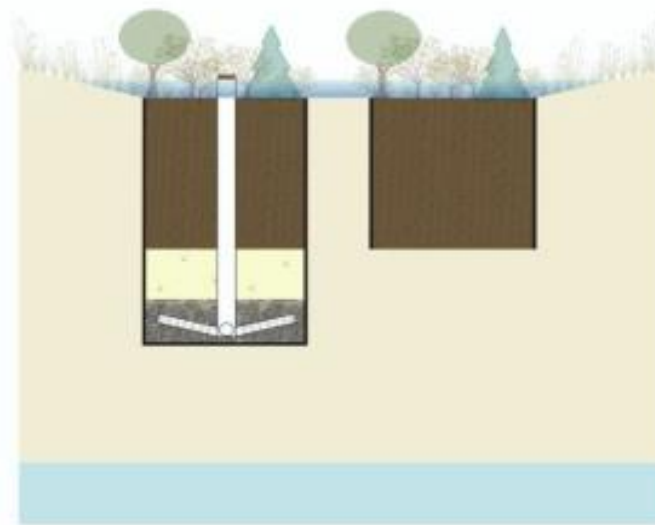


Grass Swales









## 9.1 BIORETENTION SYSTEMS



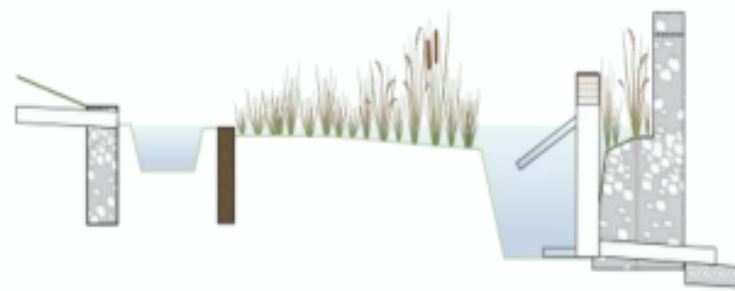
Bioretention systems are stormwater management facilities used to address the stormwater quality and quantity impacts of land development. The system consists of a soil bed planted with vegetation; it can be underdrained, or runoff can discharge from the system into the underlying soil layers. Pollutants are treated through the processes of settling and uptake and filtration by the vegetation. Pollutants are also treated in the soil bed through infiltration. The total suspended solids (TSS) removal rate is 80 - 90%; this rate will depend on the depth of the soil bed and the type of vegetation selected.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategies	Assist with Strategies #2, 4, 7, and 8; See Page 3
	Water Quantity	Yes, when designed as an on-line system
	Groundwater Recharge	Yes, for systems designed to infiltrate into the subsoil
	Water Quality	80 - 90% TSS Removal, depending on vegetation selection and depth of soil bed







## 9.2 STANDARD CONSTRUCTED WETLANDS



Standard constructed wetlands are stormwater management systems designed to maximize the removal of pollutants from stormwater runoff. Flow is directed through an engineered, open marsh system where pollutants are removed through settling and vegetative uptake/filtration. The total suspended solids (TSS) removal rate is 90%.

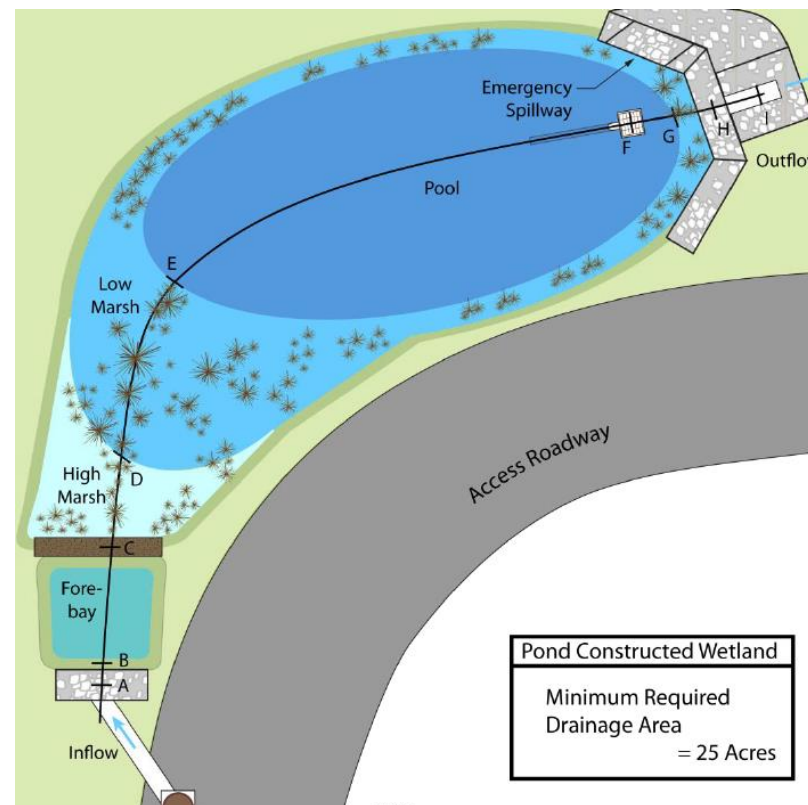
### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategy	Assist with Strategy #7; See Page 2
	Water Quantity	When designed to receive runoff from all storm events (on-line)
	Groundwater Recharge	Not Allowed
	Water Quality	90% TSS



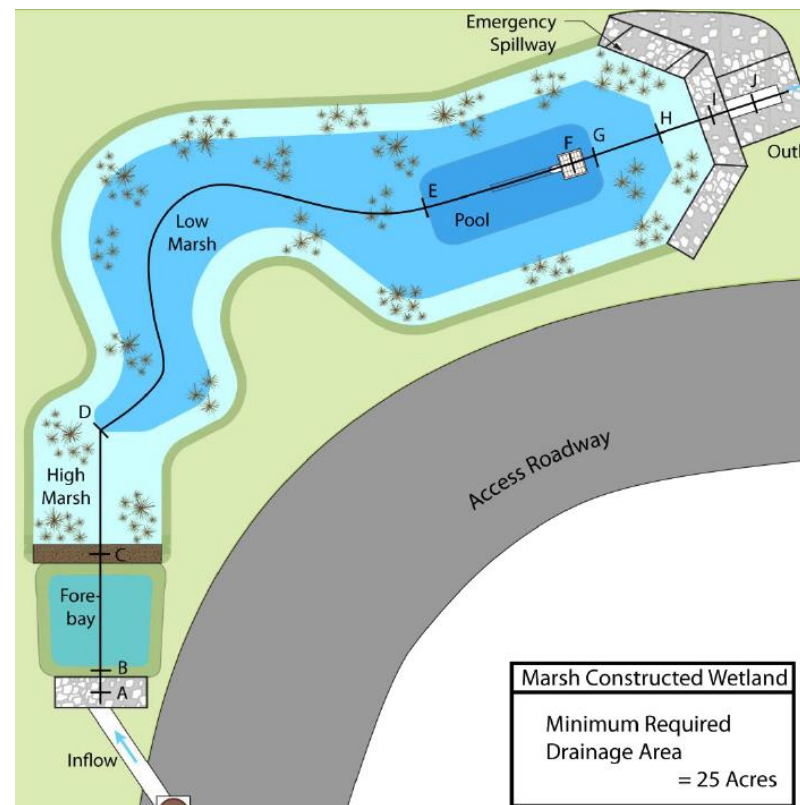
# BMP DESIGN: Constructed Wetlands: *Types*

## Pond Wetlands



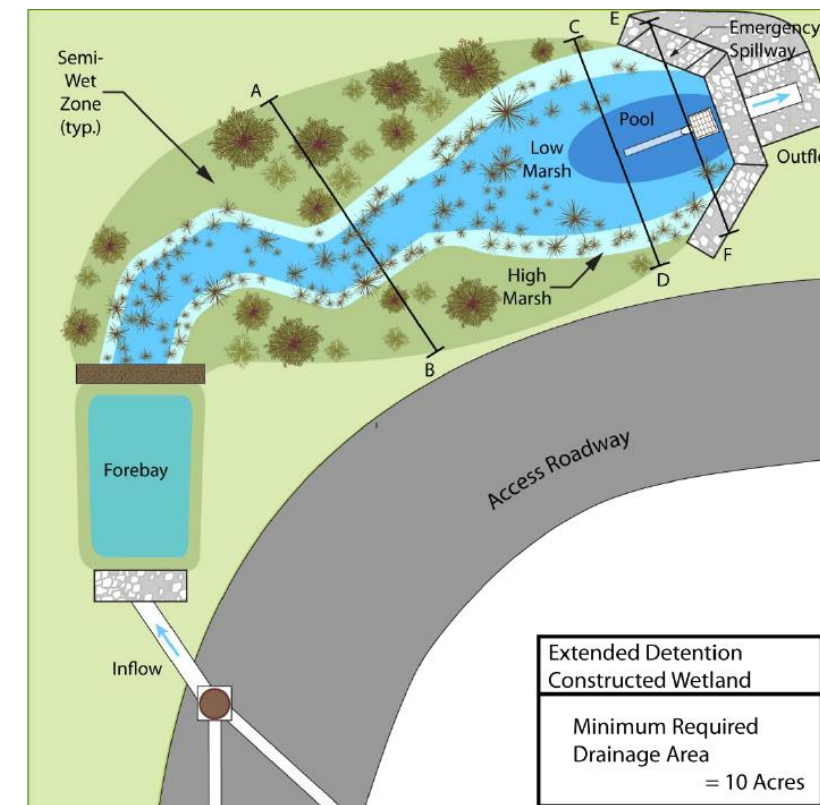
- Majority of water in pool zone
- Minimum drainage area: 25 acres

## Marsh Wetlands



- Majority of water in marsh zones
- Minimum drainage area: 25 acres

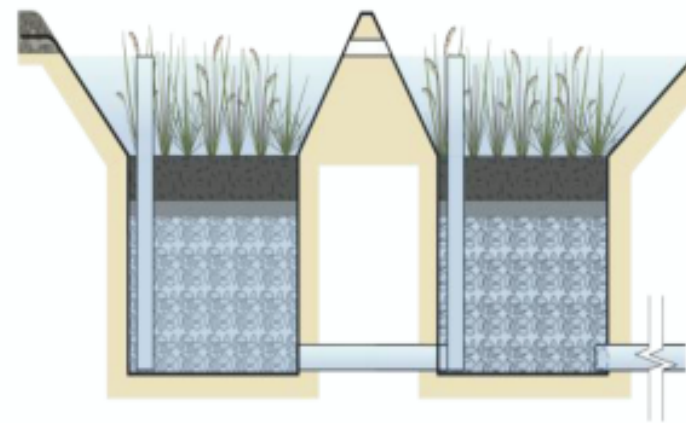
## Extended Detention Wetlands



- Include a semi-wet zone
- Minimum drainage area: 10 acres







## 9.13 SUBSURFACE GRAVEL WETLANDS



A subsurface gravel wetland is a stormwater management system designed to maximize the removal of pollutants from stormwater; the system is a combination of a surface marsh and a subsurface gravel bed. Pollutants are treated through settling, both uptake and filtration by vegetation, and chemical transformation in the subsurface bed, specifically denitrification. Both the total suspended solids (TSS) removal rate and the nitrogen removal rate are 90%.

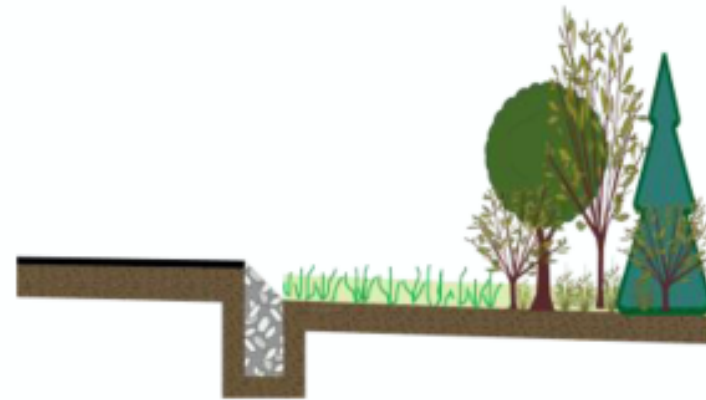
### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategy	Assist with Strategy #7; See Page 2
	Water Quantity	Not Allowed
	Groundwater Recharge	Not Allowed
	Water Quality	90% TSS; 90% Nitrogen







# BMP DESIGN: Vegetative Filter Strips

## 9.10 VEGETATIVE FILTER STRIPS



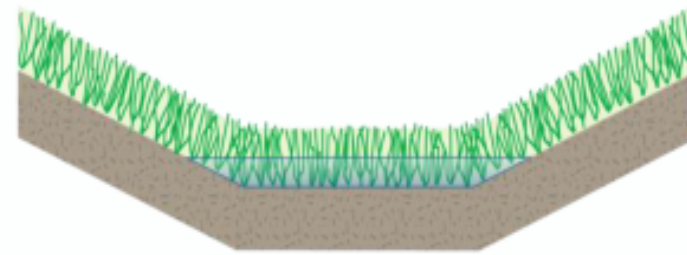
A vegetative filter strip is a stable, evenly graded area that removes pollutants from stormwater runoff through filtration and biological uptake. In order to provide pollutant treatment, runoff must enter and move through the filter strip as sheet flow; therefore, vegetative filter strips must have shallow enough slopes to maintain sheet flow. When designed in accordance with this chapter, the total suspended solid (TSS) removal rate is 60 - 80%, depending on the type of vegetation.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategies	Assist with Strategies #1, 3, 4, 5, and 7; See Page 2
	Water Quantity	Not Allowed
	Groundwater Recharge	Not Allowed
	Water Quality	60 - 80% TSS, depending on type of vegetation







## 9.12 GRASS SWALES



A grass swale is a stable, parabolic or trapezoidal channel that is lined with turf; it is used to improve water quality and convey stormwater runoff. Grass swales do not rely on the permeability of the underlying soil for pollutant removal; instead, pollutants are removed by settling and filtration through the grass. The maximum total suspended solids (TSS) removal rate is 50%.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategies	Assist with Strategies #4 and 8; See Page 2
	Water Quantity	Not Allowed
	Groundwater Recharge	Not Allowed
	Water Quality	≤ 50% TSS

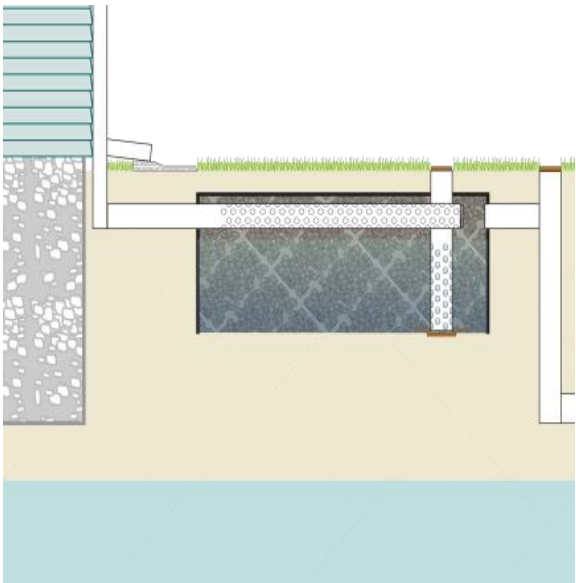


# TYPES OF BMPS: Infiltration

Infiltration Basins



Dry Wells



Bioretention Systems\*



Pervious Paving Systems

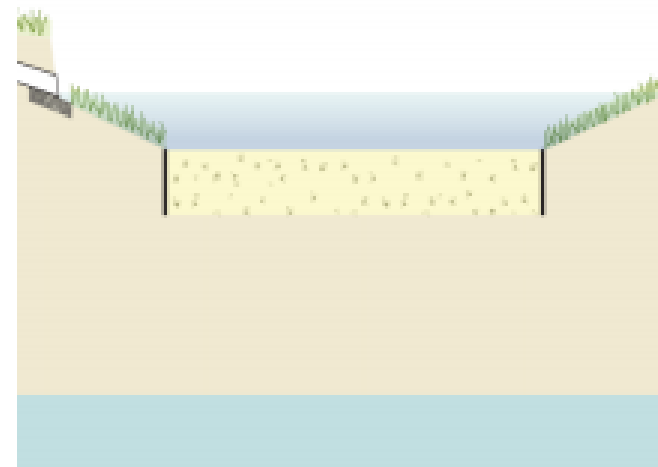


Sand Filters









## 9.5 INFILTRATION BASINS



Infiltration basins are stormwater management systems constructed with highly permeable components designed to both maximize the removal of pollutants from stormwater and to promote groundwater recharge. Pollutants are treated through settling, filtration of the runoff through, and biological and chemical activity within, the components. The total suspended solids (TSS) removal rate is 80%.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategy	Assist with Strategy #2; See Page 3
	Water Quantity	Yes, when designed as an on-line system
	Groundwater Recharge	Yes
	Water Quality	80% TSS Removal







## 9.3 DRY WELLS



Dry wells are subsurface stormwater facilities that are used to collect and temporarily store runoff from clean rooftops; runoff is discharged through infiltration into the subsoil. Dry wells may be used to comply with the groundwater recharge design and performance standard of the Stormwater Management rules. Additionally, they may also be used to reduce the volume of clean, roof runoff.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategies	Assist with Strategy #2; See Page 3
	Water Quantity	Not Allowed
	Groundwater Recharge	Yes
	Water Quality	Not Allowed

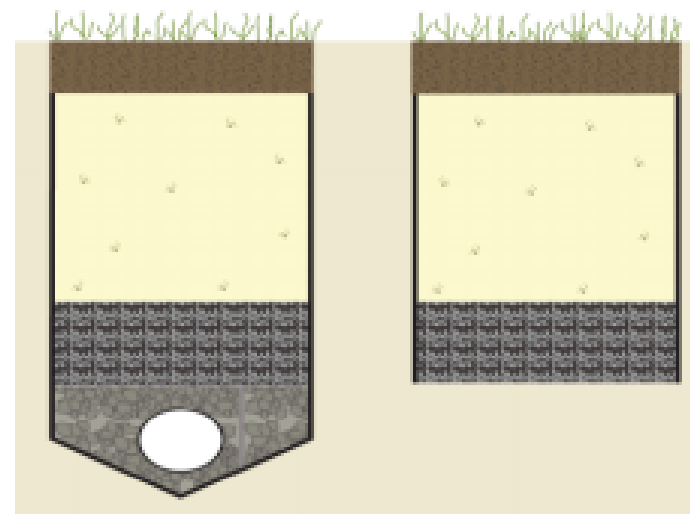


# BMP DESIGN: Pervious Paving Systems









## 9.9 SAND FILTERS



A sand filter is a stormwater management system designed to maximize the removal of pollutants from stormwater. It consists of a pre-treatment zone and a treatment zone, which includes the sand bed, and in underdrained systems, and the underlying components. Pollutants are treated through settling, filtration, and adsorption by the sand bed. The total suspended solids (TSS) removal rate is 80%.

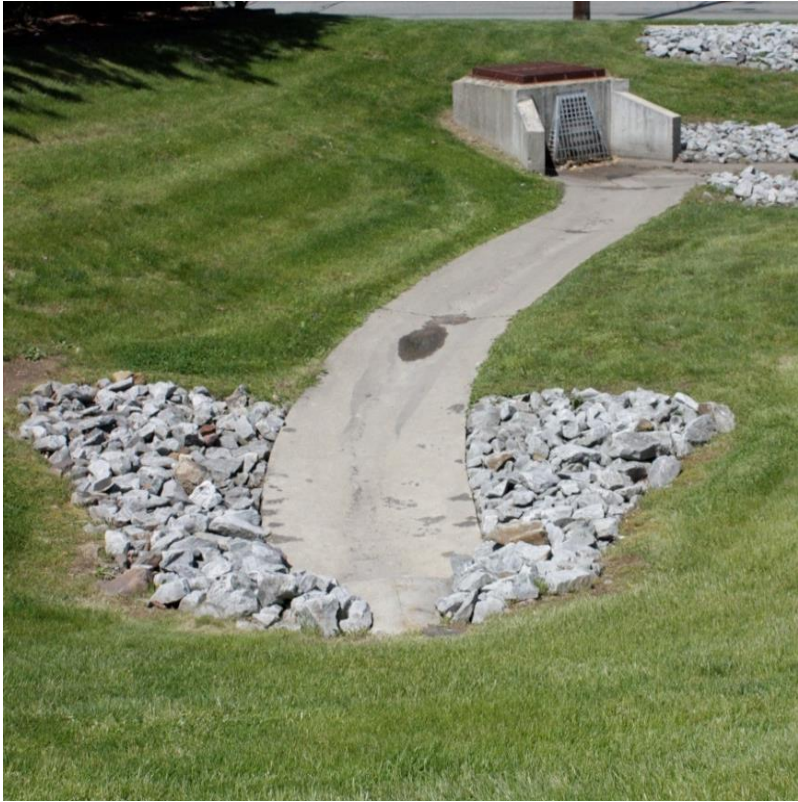
### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategy	Not Allowed
	Water Quantity	Yes, when designed as an on-line system
	Groundwater Recharge	Yes, for systems designed to infiltrate into the subsoil
	Water Quality	80% TSS



# TYPES OF BMPs: Uncategorized BMPs

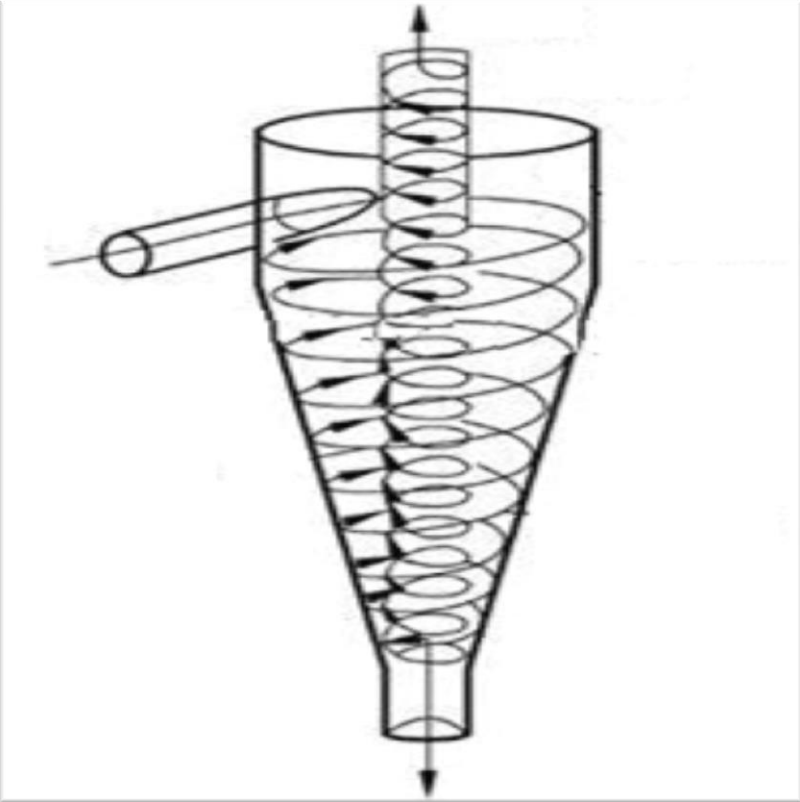
Extended Detention Basins



Wet Ponds

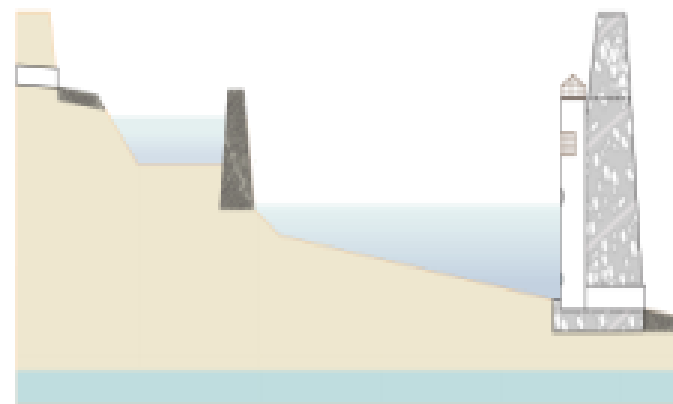


Manufactured Treatment Devices









## 9.4 EXTENDED DETENTION BASINS



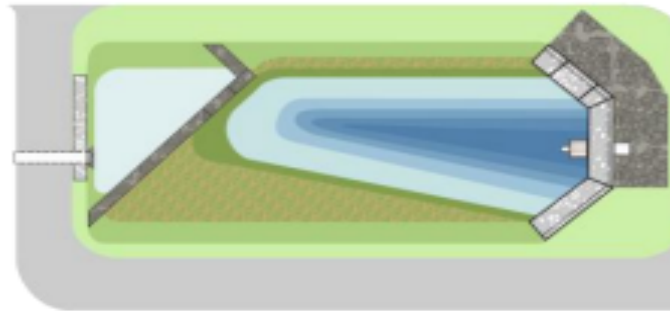
An extended detention basin is a stormwater management facility that temporarily stores and attenuates stormwater runoff. In addition, extended detention basins provide pollutant treatment for runoff from the Water Quality Design Storm through settling. When designed in accordance with this chapter, the total suspended solids (TSS) removal rate is 40 - 60%, depending on the duration of runoff detention.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural Strategies	Not Allowed
	Water Quantity	Yes, when designed for the 2-, 10- and 100-year design storms
	Groundwater Recharge	Not Allowed
	Water Quality	40 - 60% TSS Removal, depending on duration of detention







## 9.11 WET PONDS



Wet ponds, also known as retention basins, are used to address the stormwater quantity and quality impacts of land development. This type of stormwater facility has an elevated outlet structure that creates a permanent pool where stormwater runoff is detained and attenuated. Wet ponds can be designed as multi-stage, multi-function systems; extended detention in the permanent pool provides pollutant treatment for runoff from the Water Quality Design Storm through

sedimentation and biological processing; detention and attenuation are also provided for larger storm event through the higher elevation outlets. When designed in accordance with this chapter, the total suspended solids (TSS) removal rate is 50 - 90%, depending upon the storage volume in the permanent pool and the duration of detention time, if extended detention is provided.

### N.J.A.C. 7:8 Stormwater Management Rules - Design and Performance Standards

	Nonstructural	Not Allowed
	Water Quantity	Yes, when designed as an on-line system
	Groundwater Recharge	Not Allowed
	Water Quality	50% TSS removal with 1:1 pool volume ratio; up to 90% TSS removal if extended detention is also provided



# BMP DESIGN: Manufactured Treatment Devices

- Proprietary devices supplied by a manufacturer
- Best for use in small, highly-impervious drainage areas
- Often used as pretreatment for another stormwater management facility
- TSS removal rate varies based on device
- All devices must be verified by NJCAT and certified by NJDEP

Stormwater Management Manufactured Treatment Devices Certified by NJDEP	MTD Laboratory Test Certifications	Field Test Certifications	Superseded Certifications	Certified TSS Removal Rate	Maintenance Plan
AquaFilter Filtration Chamber by AquaShield, Inc.		Certification	Superseded	80%	Plan
Aqua-Swirl Concentrator By Aqua-Shield. Inc.		Certification	Superseded	50%	Plan
Continuous Deflective Separator (CDS) Unit by CONTECH Stormwater Solutions, Inc.	Certification	Certification	Superseded	50%	Plan
Downstream Defender by Hydro International, Inc.	Certification		Superseded	50%	Plan
Filterra Bioretention System by Contech Engineered Solutions	Certification		Superseded	80%	Plan
Jellyfish Filter by Imbrium Systems Corporation		Certification	Superseded	80%	Plan
Media Filtration Systems by CONTECH Stormwater Solutions, Inc.		Certification	Superseded	80%	Appendix A
StormPro Stormwater Treatment Device by Environment 21, LLC	Certification			50%	
StormVault by Jensen Precast, Inc.		Certification	Superseded	80%	Appendix A
Stormwater Management StormFilter by CONTECH Stormwater Solutions, Inc.		Certification	Superseded	80%	Plan
Up-Flo Filter by Hydro International		Certification	Superseded	80%	Plan
Vortechs Stormwater Treatment System by CONTECH Stormwater Solutions, Inc		Certification	Superseded	50%	Plan

<http://www.njstormwater.org/treatment.html>  
<http://www.njcat.org/verification/Verifications.cfm>



# More Information

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