Wrightstown Township
PRP for Jericho Creek – Siltation

July 24, 2017
Revised August 31, 2017
Revised January 14, 2019

Prepared for:

Wrightstown Township
2203 Second Street Pike
Wrightstown, PA 18940

Boucher & James, Inc.
CONSULTING ENGINEERS

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INTRODUCTION

Permittees with coverage under a Municipal Separate Storm Sewer System (MS4) that discharge to certain impaired waters are required to implement Pollutant Reduction Plans (PRP) as specified in the Pennsylvania Department of Environmental Protection's (PA DEP) MS4 Requirements Table. The applicable section of the Requirements Table is included in Appendix I.

The table requires Wrightstown Township to develop a PRP for the Jericho Creek watershed for siltation. Overall, a ten percent reduction in the current sediment load is required.

A PRP is a planning document prepared by the permittee which guides the selection and implementation of specific BMPs to reduce pollutant loading to surface waters. The objective of a PRP is to improve the condition of surface waters such that the waters eventually attain water quality standards and its designated and existing uses in accordance with 25 Pa. Code Chapter 93. The pollutant reducing BMPs are to be completed within 5 years of DEP's permit approval.

PUBLIC PARTICIPATION

The PA DEP requires public participation as part of the development of a PRP. The requirements for the public participation are:

> "The permittee shall make a complete copy of the PRP available for public review. The permittee shall publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments. The permittee must accept written comments for a minimum of 30 days from the date of public notice. The permittee must accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee. The permittee shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. Modified PRPs submitted to DEP must include a copy of the newspaper notice, a copy of all written comments received from the public and a copy of the permittee's record of consideration of all timely comments received in the public comment period."

A complete copy of the PRP was available for public review at the municipal offices. A public notice was published in a local newspaper which included a description of the plan, where it could be reviewed, the 30-day comment period and the municipal meeting at which public comments would be received.

Appendix II contains the public notification, public comments and consideration of the comments. A public notification was completed during the initial preparation of this plan. Due to changes to the plan a public notification was also completed for this plan update.

MAPPING

Appendix III contains a plan developed under the MS4 program. The plan provides details concerning stormwater outfalls and watersheds. The watershed boundaries were determined based on topographic mapping, land development plans and field verifications. The plan also shows the proposed location of the BMP proposed to reduce the pollutant load. A separate plan is included which shows the areas which were parsed and not included in the pollutant load calculations.

POLLUTANT OF CONCERN

The PA DEP MS4 Requirements Table specifies the pollutant of concern as siltation. A ten percent reduction for siltation is required.

DETERMINE EXISTING LOAD

The Stroud Water Research Center – Model My Watershed program was utilized to determine the watershed's land uses and loading rates. This information is compiled in Appendix IV on the Land Use Information and Pollutant Load Calculation table. The land use information is based on the current conditions in the watershed. Where recent land development has changed the land use, as indicated in the Stroud program, differences are noted on the table.

Pollutant load calculations for parsed areas, if present in the watershed, is also included in Appendix IV. Appendix IV also includes, if applicable, pollutant reduction calculations for existing BMP's which reduce the watershed's existing pollutant load.

The overall calculated pollutant load for the Jericho Creek is 50,033.57 lbs/year for sediment. The PRP requires a ten percent reduction in sediment. Therefore, the required sediment reduction is 5,003.36 lbs/year.

REQUIRED REDUCTION IN POLLUTANT LOADING / BMP SELECTION

The PRP watershed was evaluated for the potential for sediment removal BMPs. This included retrofits of existing BMPs, such as older basin modifications, and new projects such as stream restorations.

When evaluating the potential BMPs the 'National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values' and the 'Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects' were used to determine the effectiveness of the proposed BMP.

No municipally owned basins or other existing BMP's were identified in the watershed which would be suitable for retrofits. To address the required pollutant load reductions the Township is proposing stream restoration on Warner Meadows Open Space parcels as shown on the map in Appendix III. These properties are owned by the Township and have over one thousand feet of stream channel for possible restoration.

Based on the National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values (3800-PM-BCW0100m) approximately 112 feet of stream restoration, at an effectiveness value of 44.88 lbs./ft./yr., will be necessary to address the required sediment reduction.

Although additional areas, as shown on the mapping in Appendix III, are available for stream bank restoration, the municipality will be implementing the minimum amount to meet the pollutant reduction requirements for the PRP.

FUNDING MECHANISMS

The municipal's general fund will be used to complete the proposed project. The municipality will be researching other funding mechanisms, such as grants, to help offset the cost of the projects.

OPERATIONS AND MAINTENANCE

It is anticipated the municipality will be responsible for operation and maintenance of the BMPs. If specific BMPs were identified in this report, the operation and maintenance requirements are provided below. Operation and maintenance details for any additional BMPs will be incorporated into an update to this report.

Stream Restoration – Restoration areas shall be inspected a minimum of once a year, as well as after major storm events. The actual schedule will depend on the type of restoration. When live plantings are involved, inspection will be emphasized during plant establishment.

Inspections will document, depending on the type of restoration, the physical stability of the areas and the success of the vegetative establishment. Collection and documentation of physical data, vegetative cover, etc. may utilize stream assessment techniques, photographic stations or other suitable methods. Repairs or modification to the restoration areas will be completed as necessary.

APPENDIX I

MS4 REQUIREMENTS TABLE

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Bucks County						
WARMINSTER TWP	PAG130049	Yes	TMDL Plan	Southampton Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Mill Creek		Other Habitat Alterations, Water/Flow Variability (4c)
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Pennypack Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Southampton Creek TMDL	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation (4a)	
				Unnamed Tributaries to Pennypack Creek	Appendix C-Priority Organics (5)	
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
WARRINGTON TWP	PAG130055	Yes	TMDL Plan	Mill Creek	Appendix E-Nutrients (5)	
				Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Unnamed Tributaries to Neshaminy Creek		Water/Flow Variability (4c)
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Unnamed Tributaries to Mill Creek		Flow Alterations (4c)
				Warrington Lake	Appendix E-Nutrients (5)	Exotic Species (5)
WARWICK TWP	PAG130074	Yes	TMDL Plan	Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Unnamed Tributaries to Neshaminy Creek		Water/Flow Variability (4c)
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
WEST ROCKHILL TWP	PAG130046	Yes	SP	Unnamed Tributaries to East Branch Perkiomen Creek	Appendix E-Siltation (5)	Flow Alterations, Water/Flow Variability (4c)
				Tohickon Creek	Appendix E-Nutrients, Siltation (5)	
				Threemile Run	Appendix E-Nutrients (5)	Flow Alterations (4c)
				Lake Nockamixon	Appendix E-Nutrients, Suspended Solids (4a)	
				Delmont Lake		Exotic Species (5)
				Mill Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
WRIGHTSTOWN TWP	PAG130043	No		Neshaminy Creek	Appendix E-Siltation (4a), Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Jericho Creek	Appendix E-Siltation (5)	
				Delaware River		Mercury (5)

APPENDIX II

PUBLIC NOTIFICATION / PUBLIC COMMENTS

NOTICE

NOTICE IS HEREBY GIVEN by the Supervisors of Wrightstown Township, Bucks County, Pennsylvania of its intent to receive written public comments, for a period of 30 days from the date of publication of this Notice, on the following:

Wrightstown Township PRP for Jericho Creek – Siltation
and
Wrightstown Township PRP for Neshaminy Creek – Siltation, Nutrients, Organic Enrichment/Low D.O.

The Plans describes proposed measures to be taken to address impaired surface waters within the Township.

Written comments will be received at Wrightstown Township, 2203 Second Street Pike, Wrightstown, PA 18940.

NOTICE IS HEREBY ALSO GIVEN by the Township Supervisors that the PRPs will be presented at a public meeting on August 21, 2017 at 7:30 pm at Wrightstown Township, 2203 Second Street Pike, Wrightstown, PA 18940. The Supervisors will receive public verbal or written comments on the proposed Plans at this meeting. The public is invited to attend and comment on the Plans.

The full text of the proposed PRPs may be examined or copies obtained at cost, at Wrightstown Township, 2203 Second Street Pike, Wrightstown, PA 18940, by appointment with the Township Manager, Joseph Pantano, (215) 598-3313. In addition, a copy of the PRPs is posted on the Township website, http://www.wrightstownpa.org/.

Joseph Pantano
Township Manager

Bucks County, SS.

WRIGHTSTOWN TWP
2203 SECOND ST PIKE
WRIGHTSTOWN, PA 18940

1-2155983313
0007144448-01

Ad Content Proof

Pat Vigneau being duly affirmed according to law, deposes and says that he/she is the Legal Billing Co-ordinator of the COURIER TIMES INCORPORATED, Publisher of The Bucks County Courier Times, a newspaper of general circulation, published and having its place of business at Levittown, Bucks County, Pa; that said newspaper was established in 1910; that securely attached hereto is a facsimile of the printed notice which is exactly as printed and published in said newspaper on

July 24, 2017

and is a true copy thereof; and that this affiant is not interested in said subject matter of advertising; and all of the allegations in this statement as to the time, place and character of publication are true.

LEGAL BILLING CO-ORDINATOR

Affirmed and subscribed to me before me this 24th day of July 2017 A.D.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Ann Clark, Notary Public
Tullytown Boro, Bucks County
My Commission Expires April 30, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

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Joseph Pantano
Township Manager

1t Jy 24 7144448

Public Comment Note

No public comments were received by the Municipality concerning the July 24, 2017 Pollution Reduction Plan (PRP).

WRIGHTSTOWN TOWNSHIP BOARD OF SUPERVISORS
REGULAR MEETING AUGUST 21, 2017

The Wrightstown Township Board of Supervisors met on Monday, August 21, 2017 in the Meeting Room of the Wrightstown Township Municipal Building, 2203 Second Street Pike, Wrightstown, PA. Chair Chester S. Pogonowski called the meeting to order at 7:35 P.M. Present were Vice Chair Jane B. Magne, Treasurer Robert S. Lloyd, Solicitor Scott MacNair, Engineer Mario Canales and Township Manager Joe Pantano.

APPROVAL OF MINUTES:
On a motion by Vice Chair Magne, seconded by Chair Pogonowski, Board of Supervisors meeting minutes of August 7, 2017 were approved unanimously. Treasurer Lloyd abstained.

APPROVAL OF BILLS:
On a motion by Vice Chair Magne, seconded by Treasurer Lloyd, the following August 21, 2017 payments were approved unanimously:

General Fund bills	$89,684.06
Cable Access Fund bill	56.81
JCE Sewer Fund bill	6,444.73
Open Space Bond Fund bill	222.31
Total	$96,407.91

On a motion by Vice Chair Magne, seconded by Treasurer Lloyd, the following transfers were approved unanimously.

General Fund to Payroll Fund	$15,000.00
General Fund to Flexible Spending Account	$443.08

ANNOUNCEMENTS:
- **A.** There were no announcements.
- **B.** There were no changes to the agenda.

PUBLIC COMMENT:
There was none.

POLICE REPORT:
Chief Pasqualini gave the July police report. There were 200 calls for service and 15 traffic citations. Chief Pasqualini introduced Kaitlyn Falcon, recently sworn in as a Newtown Township Police Department officer.

SOLICITOR'S REPORT:
Plan Approval Resolution, The Gatherings. Some changes still need to be made to the pending resolution and then reviewed by all parties involved. The final resolution will be presented for approval at the August 28 Board of Supervisors work session.

ENGINEER'S REPORT:
- **A.** The Board accepted the Engineer's report for July.
- **B.** Engineer Canales reviewed the proposed MS4 Pollution Reduction Plan Application for Jericho Creek and Neshaminy Creek. On a motion by Treasurer Lloyd, seconded by Vice Chair Magne, the Board voted unanimously to have Chair Pogonowski sign the application.

SUPERVISORS' COMMENTS:
There were none.

DEPARTMENT REPORTS:

A. **Code/Zoning Department.** The Board received the July report. There were 28 permits issued, 26 permit inspections (8 failed inspections) and a total of $5,295.00 in fees collected.
B. **Public Works Department.** The July report was received by the Board.
C. **Lingohocken Fire Company Report.** Chair Pogonowski reviewed the July activity report. There were 22 calls for service, 70 man-hours for responses, 77 man-hours for training and 6 man-hours for work details, for a total of 152 man-hours of service to the community.
D. **Central Bucks Rescue Squad.** The Board accepted the June reports.
E. **Historical Commission.** The Board accepted the meeting minutes of July 6.

MANAGER'S REPORT:

A. **PennDOT Winter Services Agreement 2017 – 2018.** The Township received the Winter Services Agreement from PennDOT for the 2017-18 winter season. The Agreement would reimburse the Township for some of the costs associated with plowing and salting various PennDOT roads. The total reimbursement for the year would be $9,452.98. On a motion by Treasurer Lloyd, seconded by Vice Chair Magne, the Board voted unanimously to have Manager Pantano sign the agreement.
B. **Salt Shed Update.** The wood has been delivered for the salt shed. Manager Pantano and Public Works Foreman Steve Kraiss have been working with the Bucks County Department of Health to get the storage tank moved. Manager Pantano and Building Code Officer Ted Middleman have reviewed the draft structural drawings. Manager Pantano submitted a work change order for a quote for fencing the Public Works area and is waiting for that.
C. **Granicus.** Manager Pantano reviewed the quotes received for new equipment for webcasting. He asked the Board to approve the purchase of the equipment from Advanced AV in the amount of $7,190.48. On a motion by Treasurer Lloyd, seconded by Vice Chair Magne, the Board voted unanimously to approve the purchase.

UNFINISHED BUSINESS:
There was none.

NEW BUSINESS:
There was none.

PUBLIC COMMENT:
There was none.

EXECUTIVE SESSION:
There was an executive session to discuss personnel issues.

ADJOURNMENT:
There being no further business to go before the Board, on a motion by Treasurer Lloyd, seconded by Vice Chair Magne, the meeting was adjourned at 8:12 P.M.

Respectfully submitted,

Joseph F. Pantano
Manager

APPENDIX III

MAPPING

APPENDIX IV

EXISTING LOAD CALCULATIONS / PARSED LOAD CALCULATIONS / EXISTING BMP LOAD REDUCTIONS

Wrightstown Township Jericho Creek Watershed Land Use from 2011 National Land Cover Database (NLCD 2011)
Revised Parsed Jericho Creek Watershed as per DEP Meeting on November 7, 2018

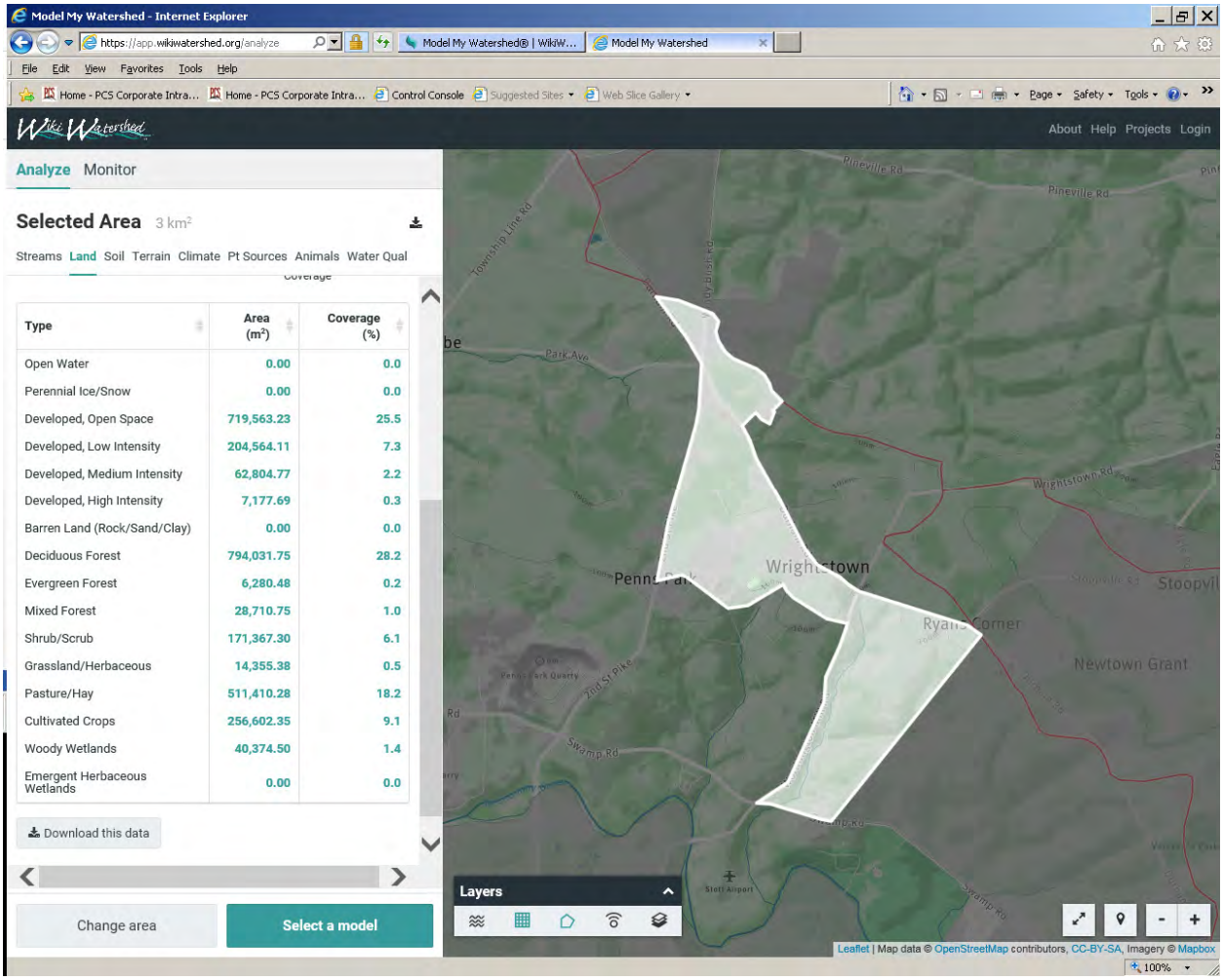
Land Use	Area (m^2)	Coverage (%)	Area (acres)	% Impervious	Impervious Area (acres)	Pervious Area (acres)
Developed, Open Space	558,960.92	38.94	44.16	19	8.39	35.77
Developed, Low Intensity	104,076.19	7.25	8.22	49	4.03	4.19
Developed, Medium Intensity	4,486.04	0.31	0.35	79	0.28	0.07
Developed, High Intensity	0	0.00	0.00	100	0.00	0.00
Barren Land (Rock/Sand/Clay)	66,393.43	4.62	5.24	0	0.00	5.24
Deciduous Forest	311,331.36	21.69	24.59	0	0.00	24.59
Evergreen Forest	0	0.00	0.00	0	0.00	0.00
Mixed Forest	0	0.00	0.00	0	0.00	0.00
Shrub/Scrub	109,459.44	7.62	8.65	0	0.00	8.65
Grassland/Herbaceous	0	0.00	0.00	0	0.00	0.00
Pasture/Hay	157,011.49	10.94	12.40	0	0.00	12.40
Cultivated Crops	113,945.48	7.94	9.00	0	0.00	9.00
Woody Wetlands	9,869.29	0.69	0.78	0	0.00	0.78
Total	1,435,533.64	100.00	113.40		12.70	100.70
					11%	89%

Loading Rates	TP (lbs/acre/yr)	TSS (lbs/acre/yr)
Impervious Development	2.28	1839
Pervious Development	0.84	264.96

Wrightstown Township - Jericho Creek Watershed Parsed Loading

	Nutrients (TP) (lbs/yr)	Sediment (TSS) (lbs/yr)
Impervious Development	28.95	23,351.56
Pervious Development	84.59	26,682.01
Total	**113.54**	**50,033.57**

Pollution Reduction Plan (PRP) required with 10% reduction in sediment loads **5,003.36 lbs/yr**



Jericho Creek Watershed

APPENDIX V

POLLUTANT LOAD REDUCTION CALCULATIONS / POLLUTANT LOAD REDUCTION REFERENCE

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORMWATER DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS
BMP EFFECTIVENESS VALUES

This table of BMP effectiveness values (i.e., pollutant removal efficiencies) is intended for use by MS4s that are developing and implementing Pollutant Reduction Plans and TMDL Plans to comply with NPDES permit requirements. The values used in this table generally consider pollutant reductions from both overland flow and reduced downstream erosion, and are based primarily on average values within the Chesapeake Assessment Scenario Tool (CAST) (www.casttool.org). Design considerations, operation and maintenance, and construction sequences should be as outlined in the Pennsylvania Stormwater BMP Manual, Chesapeake Bay Program guidance, or other technical sources. The Department of Environmental Protection (DEP) will update the information contained in this table as new information becomes available. Interested parties may submit information to DEP for consideration in updating this table to DEP's MS4 resource account, RA-EPPAMS4@pa.gov. Where an MS4 proposes a BMP not identified in this document or in Chesapeake Bay Program expert panel reports, other technical resources may be consulted for BMP effectiveness values. Note – TN = Total Nitrogen and TP = Total Phosphorus.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Wet Ponds and Wetlands	20%	45%	60%	A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. Until recently, these practices were designed specifically to meet water quantity, not water quality objectives. There is little or no vegetation living within the pooled area nor are outfalls directed through vegetated areas prior to open water release. Nitrogen reduction is minimal.
Dry Detention Basins and Hydrodynamic Structures	5%	10%	10%	Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.
Dry Extended Detention Basins	20%	20%	60%	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Infiltration Practices w/ Sand, Veg.	85%	85%	95%	A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff.
Filtering Practices	40%	60%	80%	Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.
Filter Strip Runoff Reduction	20%	54%	56%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.4 design ratio of filter strip length to impervious flow length is recommended for runoff reduction urban filter strips.
Filter Strip Stormwater Treatment	0%	0%	22%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.2 design ratio of filter strip length to impervious flow length is recommended for stormwater treatment urban filter strips.
Bioretention – Raingarden (C/D soils w/ underdrain)	25%	45%	55%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in C or D soil.
Bioretention / Raingarden (A/B soils w/ underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Bioretention / Raingarden (A/B soils w/o underdrain)	80%	85%	90%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has no underdrain and is in A or B soil.
Vegetated Open Channels (C/D Soils)	10%	10%	50%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in C or D soil.
Vegetated Open Channels (A/B Soils)	45%	45%	70%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in A or B soil.
Bioswale	70%	75%	80%	With a bioswale, the load is reduced because, unlike other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area.
Permeable Pavement w/o Sand or Veg. (C/D Soils w/ underdrain)	10%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in C or D soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/ underdrain)	45%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/o underdrain)	75%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (A/B Soils w/ underdrain)	50%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in A or B soil.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Permeable Pavement w/ Sand or Veg. (A/B Soils w/o underdrain)	80%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, has sand and/or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (C/D Soils w/ underdrain)	20%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in C or D soil.
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.
Forest Buffers	25%	50%	50%	An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. The riparian area is managed to maintain the integrity of stream channels and shorelines, to reduce the impacts of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals. (Note – the values represent pollutant load reductions from stormwater draining through buffers).
Tree Planting	10%	15%	20%	The BMP effectiveness values for tree planting are estimated by DEP. DEP estimates that 100 fully mature trees of mixed species (both deciduous and non-deciduous) provide pollutant load reductions for the equivalent of one acre (i.e., one mature tree = 0.01 acre). The BMP effectiveness values given are based on immature trees (seedlings or saplings); the effectiveness values are expected to increase as the trees mature. To determine the amount of pollutant load reduction that can credited for tree planting efforts: 1) multiply the number of trees planted by 0.01; 2) multiply the acreage determined in step 1 by the pollutant loading rate for the land prior to planting the trees (in lbs/acre/year); and 3) multiply the result of step 2 by the BMP effectiveness values given.
Street Sweeping	3%	3%	9%	Street sweeping must be conducted 25 times annually. Only count those streets that have been swept at least 25 times in a year. The acres associated with all streets that have been swept at least 25 times in a year would be eligible for pollutant reductions consistent with the given BMP effectiveness values.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Storm Sewer System Solids Removal	0.0027 for sediment, 0.0111 for organic matter	0.0006 for sediment, 0.0012 for organic matter	1 – TN and TP concentrations	This BMP (also referred to as "Storm Drain Cleaning") involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards. To determine pollutant reductions for this BMP, these steps must be taken: 1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected. 2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter). 3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations. DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.