POLLUTION REDUCTION PLAN

Schuylkill Township
Chester County, Pennsylvania

In Compliance with the Pennsylvania Department of Environmental Protection's National Pollutant Discharge Elimination System Phase II MS4 Program
Permit No. PAI 130533

Prepared For:
Schuylkill Township
111 Valley Park Road
Phoenixville, PA 19460

Prepared By:
T&M Associates

YOUR GOALS. OUR MISSION.

October 2023

Project No. SCHU 00005

Contents

List of Figures

List of Tables

Foreword

This Pollutant Reduction Plan (PRP) is an update of the PRP prepared by Gilmore & Associates, Inc. for Schuylkill Township dated November 2018 and approved by DEP on December 6, 2019. Once this updated PRP is approved by PA DEP, it shall supersede the PRP plan prepared by Gilmore & Associates. This plan update is necessary due to land ownership issues that exist for the BMPs proposed in the approved PRP prepared by Gilmore & Associates. Since realization of these issues, T&M Associates and Schuylkill Township have been in communication with DEP and have received guidance from DEP in regards to submitting an updated plan.

This Pollution Reduction Plan serves to fulfill the requirements of Appendix E of NPDES Individual Permit PAI-130533 for Schuylkill Township. In accordance with the "*MS4 Requirements Table (Municipal) - Anticipated Obligations for Subsequent NPDES Permit Term*" (revised 11/18/2019), Schuylkill Township must create a PRP due to discharges from their MS4 to Valley Creek, which has been listed as impaired for Siltation (see appendix).

This plan has been completed using Schuylkill's previously approved Pollution Reduction Plan prepared by Gilmore & Associates, along with publicly available data and data supplied by Schuylkill Township. The intent of this plan is to provide guidance for the construction and implementation of stormwater quality Best Management Practices (BMPs) to provide pollutant loading reductions. It should be noted that this document may be evaluated and updated as needed as the proposed BMP's are analyzed and designs, as new opportunities for partnerships are realized, and as revised regulations and BMPs are developed and implemented.

Based on the PA DEP "Pollutant Reduction Plan (PRP) Instructions" (revised 03-2017), the PRP shall include the following elements:

A. Public Participation
B. Land Use and Storm Sewershed Boundary Map
C. Identification of Pollutants of Concern
D. Determination of Existing Loading for Pollutants of Concern
E. Selection of BMPs Proposed to Achieve the Minimum Required Reduction In Pollutant Loading
F. Identification of Funding Mechanisms
G. Identification of Responsible Parties for Operation and Maintenance (O&M) of BMPs

Section A – Public Participation

PA DEP Requirement: *"The applicant shall make a complete copy of the PRP available for public review*"

A complete copy of the PRP is available for review by the public at the following locations:

- On the Schuylkill Township website at https://schuylkilltwp.org/210/Stormwater-Management
- At the Schuylkill Township office: 111 Valley Park Road, Phoenixville, PA 19460

PA DEP Requirement: "*The applicant 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 public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP.* ***Attach a copy of the public notice to the PRP"****.*

The required public notice will be printed in the Mercury (paper and digital) on October 16, 2023. A copy of the public notice and proof of publishing will be attached in the Appendix.

PA DEP Requirement: *"The applicant shall accept written comments for a minimum of 30 days from the date of public notice.* ***Attach a copy of all written comments received from the public to the PRP****."*

Written comments will be received from October 16 to November 15, 2023. A copy of the written comments received from the public will be attached in the Appendix.

PA DEP Requirement: *"The applicant shall 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."*

Verbal comments will be accepted from the public at the regularly scheduled Board of Supervisors meeting on November 8, 2023. A copy of the verbal comments and the public meeting minutes will be attached in the Appendix.

PA DEP Requirement: "*The applicant 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.* ***Attach a copy of the permittee's record of consideration of all timely comment received in the public comment period to the PRP****."*

All written or verbal public comments will be considered and a written response to each comment will be provided in the Appendix.

Section B – Map

PA DEP Requirement: "*Attach a map that identifies **land uses and/or impervious/pervious surfaces** and the **storm sewershed boundary** associated with each MS4 outfall that discharges to impaired surface waters, or surface waters draining to the Chesapeake Bay (see note below), and calculate the storm sewershed area that is subject to Appendix D and/or Appendix E. In addition, the map must identify the proposed location(s) of structural BMP(s) that will be implemented to achieve the required pollutant load reductions." "The MS4 may display the storm sewershed for each MS4 outfall or just the PRP Planning Area, at its discretion."*

A map showing the PRP planning area, current land cover and the locations of proposed structural BMPs is included in the Appendix as Figure 1.

Section C – Pollutants of Concern

PA DEP Requirement: "*Identify the pollutants of concern for each storm sewershed or the overall PRP Planning Area (see Section I.B of these instructions)."*

Since this PRP is being developed for impaired waters, the pollutants are based on the impairment listing provide in PA DEPs MS4 Requirements Table (included in the Appendix) which references "siltation" for Valley Creek. The pollutant of concern for siltation is Total Suspended Solids (TSS).

Section D – Determine Existing Loading for Pollutants of Concern

PA DEP Requirement: *"Identify the date associated with the existing loading estimate (see Section I.C of these instructions)"*

The date of development of this PRP and the existing loading estimate is October 2023. As referenced below, the impervious and pervious land cover areas used to calculate the existing loading estimate were derived using publicly available data DVRPC Chester County 2015 (which is updated as needed).

PA DEP Requirement: "*Calculate the existing loading, in lbs. per year, for the pollutant(s) of concern in the PRP Planning Area."*

The planning area assessed in this PRP consists of the urbanized area in Schuylkill Township which drains to the impaired watercourse (the Valley Creek) excluding PennDOT right-of-way's. The loading rates for pervious and impervious cover for Schuylkill Township are provided in the PADEPs "PRP Instructions" in Attachment B, "Developed Land Loading Rates for PA Counties" under the "Chester County" Section (included in Appendix).

Table 1. "Chester County" Pollutant Loading Rates

Pollutant and Source	Loading Rate (lb/ac/yr)
TSS Impervious developed	1,504.78
TSS Pervious Developed	185.12

The impervious and pervious areas within the planning area were derived using publicly available data from DVRPC Chester County 2015 (the website indicates it is updated as needed).

The land covers within the planning area were compiled into impervious and pervious surfaces as shown in Table 2.

Table 2. Land Cover within the Planning Area

Land Cover	Area (ft^2)	Area (Ac)
Impervious	683,450	15.69
Pervious	3,413,349	78.36

The existing loading of TSS for the planning area was calculated using the simplified method in Table 3.

Table 3. Existing Pollutant Loading of TSS

Pollutant and Source	Loading Rate (lb/ac/yr)	Area (Ac)	Annual Load (lbs/yr)	Annual Load (Ton/yr)
TSS Impervious developed	1,504.78	15.69	23,611.50	11.81
TSS Pervious Developed	185.12	78.36	14,505.95	7.25
		Total TSS Load	**38,117.45**	**19.06**

In accordance with PADEP's "PRP Instructions", the Township may claim 'credit' for existing structural BMPs to reduce the existing sediment load estimate. It is noted that there no existing structural BMPs located within the Township's PRP Planning area, therefore the total annual credits generated by existing BMPs is 0 lbs/year.

Section E – Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

PA DEP Requirement: *"Identify the minimum required reductions in pollutant loading" "If the impairment is based on siltation only, a minimum 10% sediment reduction is required."*

As stated above, PA DEPs MS4 Requirements Table references "siltation" for the Township's impaired watercourse. Therefore, the Township's minimum required sediment reduction is 10%. Therefore, the Township's minimum required reduction is:

38,117.45 lbs/yr x 0.10 = **3,811.75 lbs/yr (1.91 tons/yr)**

Table 4 (in Appendix) lists the BMPs proposed to meet the required reduction. Their locations are shown on Figure 1 attached in the Appendix. The proposed BMPs are as follows:

1. Infiltration Trench
   a. An infiltration trench will be installed along the north (downstream) side of Oakwood Lane, west of Davis Road. Prior to installation of the trench, infiltration testing will be performed in the field to confirm adequate infiltration rates. If testing reveals that infiltration rates are inadequate, the PRP will be updated accordingly.
2. Vegetated Open Channel
   a. 200 LF of vegetated open channel is proposed along the west side of Davis Road. The channel will include check damns and will be stabilized with a native meadow seed mix to help facilitate sediment removal. If it is determined during the design process that the vegetated open channel is not feasible, the PRP will be updated accordingly to achieve the minimum required TSS reduction.
3. Storm Sewer System Solids Removal
   a. This will consist of cleaning and/or providing inlet filter bags in the 12 existing inlets along Colonial Springs Road and Oakwood Lane within the PRP Planning Area. The Township will document the actual weight of sediment collected during the first year inlet cleaning and the PRP plan will then be updated accordingly.

Section F – Identify Funding Mechanisms

PA DEP Requirement: "*Applicants must identify all project sponsors and partners and probable funding sources for each BMP."*

The proposed BMPs will be completed using Township funds and Township workforce.

Section G – Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

PA DEP Requirement: "*Applicants must identify the following for each selected BMP:*

- *The party(ies) responsible for ongoing O&M;*
- *The activities involved with O&M for each BMP; and*
- *The frequency at which O&M activities will occur."*

The Township will be responsible for O & M of all the new BMP's once they are implemented.

O&M activities for the proposed/new BMPs are as follows:

Infiltration Trench

Maintenance is necessary to ensure proper functionality of the infiltration trench and should take place on a regular basis. A maintenance plan should be developed which includes the following measures to be completed annually and within 48 hours after every major storm event (>1 inch rainfall depth):

- Catch basins and inlets should be inspected and cleaned at least twice per year.
- The vegetation along the surface of the infiltration trench should be maintained in good condition, and any bare spots revegetated as soon as possible.
- Vehicles should not be parked or driven on a vegetated infiltration trench, and care should be taken to avoid excessive compaction by mowers.

Vegetated Open Channel

Maintenance is necessary to ensure proper functionality of the vegetated open channel and should take place on a regular basis. A maintenance plan should be developed which includes the following measures:

- Inspect and correct erosion problems, damage to vegetation, and sediment and debris accumulation (address when > 3 inches at any spot or covering vegetation).
- Inspect vegetation on side slopes for erosion and formation of rills or gullies, correct as needed.
- Inspect for pools of standing water. Dewater and discharge to an approved location and restore to design grade.
- Mow and trim vegetation to ensure safety, aesthetics, proper open channel operation, or to suppress weeds and invasive vegetation; dispose of cuttings in a local composting facility; mow only when channel is dry to avoid rutting.

- Inspect for litter and remove prior to mowing.
- Inspect for uniformity in cross-section and longitudinal slope. Correct as needed.
- Inspect channel inlet (curbs cuts, pipes, etc.) and outlet for signs of erosion or blockage. Correct as needed.

Storm Sewer System Solids Removal (SSSSR)

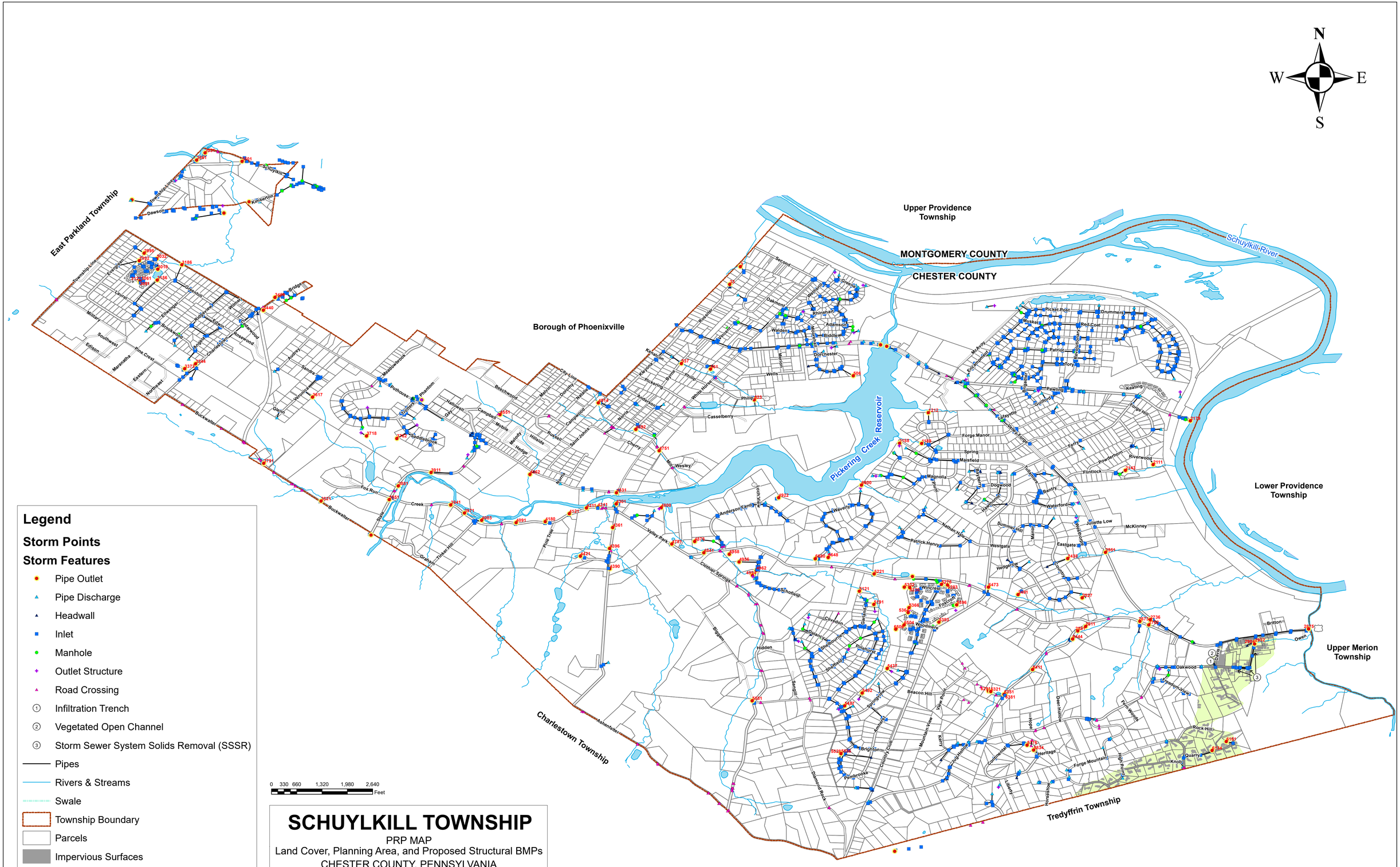
Maintenance is necessary to ensure proper functionality of the inlet filter bags and should take place on a regular basis. A maintenance plan should be developed which includes the following measures:

- Inspect three times per year and after major runoff events for sediment and debris accumulation
- Empty filter bag when more than half filled and clean twice a year. Dispose of sediment/debris as directed to an approved location.
- Alternatively, an industrial vacuum may be used to collect accumulated sediment.
- Replace the filter bag if torn or punctured to ½" diameter or larger on the lower half of the bag.

APPENDIX

INSERT PROOF OF PUBLISHING OF THE PUBLIC COMMENT PERIOD PRIOR TO SUBMISSION TO PA DEP

INSERT PUBLIC COMMENT PRIOR TO SUBMISSION TO PA DEP



SCHUYLKILL TOWNSHIP

PRP MAP
Land Cover, Planning Area, and Proposed Structural BMPs
CHESTER COUNTY, PENNSYLVANIA
September 22, 2023

TABLE 4 - SCHUYLKILL TOWNSHIP - PROPOSED STORMWATER MANAGEMENT BMPs

September 2023

BMP ID	Name	Address	BMP description	Proposed Intallation Date	Lattitude	Longitude	Impervious Area (acres)	Pervious Area (acres)	TSS Impervious Loading rate (lbs/ac/yr)	TSS Pervious Loading rate (lbs/ac/yr)	Existing BMP Effectiveness	Proposed BMP Effectiveness*	TSS lbs/year	Proposed Annual Reduction (lbs/yr)	Proposed Annual Reduction (ton/yr)
1	Infiltration Trench	Oakwood Lane	Infiltration Practices w/ Sand, Veg.	2024	40.097425	-75.469913	1.02	5.07	1,504.78	185.12	N/A	0.95	2,473.43	2,349.76	1.17
2	Vegetated Open Channel	Davis Road	Vegetated Open Channel (A/B Soils)	2024	40.098214	-75.469305	0.70	1.89	1,504.78	185.12	N/A	0.70	1,403.22	982.26	0.49
3	Storm Sewer System Solids Removal (SSSSR)	Colonial Springs Road and Oakwood Lane	Storm Sewer System Solids Removal	annually	N/A	N/A	2.43	0.00	1,504.78	185.12	N/A	N/A	3,656.62	1905.88**	0.95
											Subtotal Proposed Annual Reduction			**5,237.90**	**2.62**
*BMP effectiveness is taken from PA DEP's BMP Effectiveness Values table (in Appendix)															
												Required Annual Reduction		3,811.75	1.91
**Maximum permitted SSSSR is 50% of the required reduction (3,811.75 lbs/year x 50% = 1,905.88 lb/yr = 0.95 tons/yr))															

Table 5 - PA DEP MS4 Requirements Table

MS4 Name	Permit Number	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Chester County				
NEW LONDON TWP	PAI130526	Big Elk Creek, East Branch Big Elk Creek	Chesapeake Bay Nutrients\Sediment, East Branch Big Elk Creek	Appendix D-Siltation/Nutrients, Appendix E-Organic Enrichment/Low D.O.
		Middle Branch White Clay Creek, Upper White Clay Creek, West Branch White Clay Creek	Christina River Basin Nutrients, Christina River Basin Sediment, Middle Branch White Clay Creek, West Branch White Clay Creek, White Clay Creek	Appendix B-Pathogens, TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
NEWLIN TWP	PAG130175	Upper Brandywine Creek	Christina River Basin Sediment	TMDL Plan-Siltation, Suspended Solids
NORTH COVENTRY TWP	PAI130537	Pigeon Creek, Sprogles Run-Schuylkill River	Pigeon Creek, Unnamed Tributaries to Schuylkill River	Appendix E-Siltation
		Sprogles Run-Schuylkill River	Schuylkill River PCB TMDL	Appendix C-PCB
		Sixpenny Creek-Schuylkill River	Schuylkill River PCB TMDL, Unnamed Tributaries to Schuylkill River	Appendix C-PCB, Appendix E-Siltation
OXFORD BORO		Big Elk Creek, Little Elk Creek	Chesapeake Bay Nutrients\Sediment, Little Elk Creek	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Siltation
		Tweed Creek-Octoraro Creek	Chesapeake Bay Nutrients\Sediment, Octoraro Lake	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Siltation
		Little Elk Creek	Little Elk Creek	Appendix E-Nutrients, Siltation
		Muddy Run-East Branch Octoraro Creek	Chesapeake Bay Nutrients\Sediment, Octoraro Lake	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Siltation
PARKESBURG BORO	PAG130081	Buck Run	Christina River Basin Sediment	TMDL Plan-Siltation, Suspended Solids
		Valley Creek-East Branch Octoraro Creek	Chesapeake Bay Nutrients\Sediment, East Branch Octoraro Creek, Unnamed Tributaries to East Branch Octoraro Creek, Valley Creek	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Siltation
PENN TWP	PAI130539	Middle Branch White Clay Creek, Upper White Clay Creek, West Branch White Clay Creek	Christina River Basin Nutrients, Christina River Basin Sediment, Middle Branch White Clay Creek, West Branch White Clay Creek	Appendix B-Pathogens, TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
		Big Elk Creek, East Branch Big Elk Creek	Chesapeake Bay Nutrients\Sediment, East Branch Big Elk Creek	Appendix D-Siltation/Nutrients, Appendix E-Organic Enrichment/Low D.O.
PENNSBURY TWP	PAG130134	Middle Brandywine Creek, Upper Brandywine Creek	Christina River Basin Nutrients, Christina River Basin Sediment	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
PHOENIXVILLE BORO	PAI130003	Lower French Creek	French Creek	Appendix B-Pathogens
		Mingo Creek-Schuylkill River	Schuylkill River PCB TMDL	Appendix C-PCB
POCOPSON TWP	PAG130113	Middle Brandywine Creek, Upper Brandywine Creek	Christina River Basin Sediment	TMDL Plan-Siltation, Suspended Solids
SADSBURY TWP	PAG130101	Buck Run, Sucker Run, Upper West Branch Brandywine Creek	Christina River Basin Nutrients, Christina River Basin Sediment	TMDL Plan-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
		Upper West Branch Brandywine Creek	West Branch Brandywine Creek	Appendix C-PCB
SCHUYLKILL TWP	PAI130533	Lower French Creek	French Creek	Appendix B-Pathogens
		Mingo Creek-Schuylkill River	Valley Creek	Appendix B-Pathogens, Appendix E-Siltation
		Little Valley Creek-Valley Creek, Mingo Creek-Schuylkill River	Schuylkill River PCB TMDL, Unnamed Tributaries to Valley Creek, Valley Creek	Appendix C-PCB

ATTACHMENT B

DEVELOPED LAND LOADING RATES FOR PA COUNTIES[1,2,3]

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
Adams	impervious developed	10,373.2	33.43	2.1	1,398.77
	pervious developed	44,028.6	22.99	0.8	207.67
Bedford	impervious developed	9,815.2	19.42	1.9	2,034.34
	pervious developed	19,425	17.97	0.68	301.22
Berks	impervious developed	1,292.4	36.81	2.26	1,925.79
	pervious developed	5,178.8	34.02	0.98	264.29
Blair	impervious developed	3,587.9	20.88	1.73	1,813.55
	pervious developed	9,177.5	18.9	0.62	267.34
Bradford	impervious developed	10,423	14.82	2.37	1,880.87
	pervious developed	23,709.7	13.05	0.85	272.25
Cambria	impervious developed	3,237.9	20.91	2.9	2,155.29
	pervious developed	8,455.4	19.86	1.12	325.3
Cameron	impervious developed	1,743.2	18.46	2.98	2,574.49
	pervious developed	1,334.5	19.41	1.21	379.36
Carbon	impervious developed	25.1	28.61	3.97	2,177.04
	pervious developed	54.2	30.37	2.04	323.36
Centre	impervious developed	7,828.2	19.21	2.32	1,771.63
	pervious developed	15,037.1	18.52	0.61	215.84
Chester	impervious developed	1,838.4	21.15	1.46	1,504.78
	pervious developed	10,439.8	14.09	0.36	185.12
Clearfield	impervious developed	9,638.5	17.34	2.78	1,902.9
	pervious developed	17,444.3	18.89	1.05	266.62
Clinton	impervious developed	7,238.5	18.02	2.80	1,856.91
	pervious developed	11,153.8	16.88	0.92	275.81
Columbia	impervious developed	7,343.1	21.21	3.08	1,929.18
	pervious developed	21,848.2	22.15	1.22	280.39
Cumberland	impervious developed	8,774.8	28.93	1.11	2,065.1
	pervious developed	26,908.6	23.29	0.34	306.95
Dauphin	impervious developed	3,482.4	28.59	1.07	1,999.14
	pervious developed	9,405.8	21.24	0.34	299.62
Elks	impervious developed	1,317.7	18.91	2.91	1,556.93
	pervious developed	1,250.1	19.32	1.19	239.85
Franklin	impervious developed	13,832.3	31.6	2.72	1,944.85
	pervious developed	49,908.6	24.37	0.76	308.31
Fulton	impervious developed	3,712.9	22.28	2.41	1,586.75
	pervious developed	4,462.3	18.75	0.91	236.54
Huntington	impervious developed	7,321.9	18.58	1.63	1,647.53
	pervious developed	11,375.4	17.8	0.61	260.15
Indiana	impervious developed	589	19.29	2.79	1,621.25
	pervious developed	972	20.1	1.16	220.68
Jefferson	impervious developed	21.4	18.07	2.76	1,369.63
	pervious developed	20.4	19.96	1.24	198.60
Juniata	impervious developed	3,770.2	22.58	1.69	1,903.96
	pervious developed	8,928.3	17.84	0.55	260.68
Lackawana	impervious developed	2,969.7	19.89	2.84	1,305.05
	pervious developed	7,783.9	17.51	0.76	132.98
Lancaster	impervious developed	4,918.7	38.53	1.55	1,480.43
	pervious developed	21,649.7	22.24	0.36	190.93
Lebanon	impervious developed	1,192.1	40.58	1.85	1,948.53
	pervious developed	5,150	27.11	0.4	269.81
Luzerne	impervious developed	5,857	20.43	3	1,648.22
	pervious developed	13,482.9	19.46	0.98	221.19
Lycoming	impervious developed	10,031.7	16.48	2.57	1,989.64
	pervious developed	19,995.5	16	0.84	277.38

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
McKean	impervious developed	38.7	20.93	3.21	1,843.27
	pervious developed	5.3	22.58	1.45	249.26
Mifflin	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Montour	impervious developed	5,560.2	21.83	1.79	1,979.13
	pervious developed	16,405.5	21.13	0.71	296.07
Northumberland	impervious developed	8,687.3	25.73	1.54	2,197.08
	pervious developed	25,168.3	24.63	0.54	367.84
Perry	impervious developed	5,041.1	26.77	1.32	2,314.7
	pervious developed	9,977	23.94	0.51	343.16
Potter	impervious developed	2,936.3	16.95	2.75	1,728.34
	pervious developed	2,699.3	17.11	1.09	265.2
Schuylkill	impervious developed	5,638.7	30.49	1.56	1,921.08
	pervious developed	14,797.2	29.41	0.57	264.04
Snyder	impervious developed	4,934.2	28.6	1.11	2,068.16
	pervious developed	14,718.1	24.35	0.4	301.5
Somerset	impervious developed	1,013.6	25.13	2.79	1,845.7
	pervious developed	851.2	25.71	1.14	293.42
Sullivan	impervious developed	3,031.7	19.08	2.85	2,013.9
	pervious developed	3,943.4	21.55	1.31	301.58
Susquehanna	impervious developed	7,042.1	19.29	2.86	1,405.73
	pervious developed	14,749.7	20.77	1.21	203.85
Tioga	impervious developed	7,966.9	12.37	2.09	1,767.75
	pervious developed	18,090.3	12.22	0.76	261.94
Union	impervious developed	4,382.6	22.98	2.04	2,393.55
	pervious developed	14,065.3	20.88	0.69	343.81
Wayne	impervious developed	320.5	18.69	2.89	1,002.58
	pervious developed	509	21.14	1.31	158.48
Wyoming	impervious developed	3,634.4	16.03	2.53	2,022.32
	pervious developed	10,792.9	13.75	0.7	238.26
York	impervious developed	10,330.7	29.69	1.18	1,614.15
	pervious developed	40,374.8	18.73	0.29	220.4
All Other Counties	impervious developed	-	23.06	2.28	1,839
	pervious developed	-	20.72	0.84	264.96

Notes:

1 These land loading rate values may be used to derive existing pollutant loading estimates under DEP's simplified method for PRP development. MS4s may choose to develop estimates using other scientifically sound methods.

2 Acres and land loading rate values for named counties in the Chesapeake Bay watershed are derived from CAST. (The column for Acres represents acres within the Chesapeake Bay watershed). For MS4s located outside of the Chesapeake Bay watershed, the land loading rates for "All Other Counties" may be used to develop PRPs under Appendix E; these values are average values across the Chesapeake Bay watershed.

3 For land area outside of the urbanized area, undeveloped land loading rates may be used where appropriate. When using the simplified method, DEP recommends the following loading rates (for any county) for undeveloped land:

- TN – 10 lbs/acre/yr
- TP – 0.33 lbs/acre/yr
- TSS (Sediment) – 234.6 lbs/acre/yr

These values were derived by using the existing loads for each pollutant, according to the 2014 Chesapeake Bay Progress Run, and dividing by the number of acres for the unregulated stormwater subsector.

3800-PM-BCW0100m Rev. 6/2018
BMP Effectiveness Values

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.

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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
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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
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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. Effectiveness credit for TN is for 4 upslope acres for each acre of buffer (4:1), and 2 upslope acres for TP and sediment (2:1). Additional credit is gained by converting land use from current use to forest. (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.

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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%.