

**MS4 Pollutant Reduction Plan
For the
Plymouth Creek
In
Conshohocken Borough
Montgomery County, Pennsylvania**

June 2018

Prepared For:

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Table of Contents

A.	Public Participation	2
B.	Map	3
C.	Pollutants of Concern	4
D.	Determine Existing Loads for Pollutants of Concern	5
E.	Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading	7
F.	Identify Funding Mechanisms	9
G.	Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs	10
H.	General Information	11

List of Tables

Table D- 1:	Summary of Planning Area	5
Table D- 2:	Summary of Planning Area Existing Loads	6
Table E- 1:	Summary of Load Reduction.....	8
Table E- 2:	BMP to Achieve Required Loading Reduction	8
Table G- 1:	BMP Operation & Maintenance	10

Appendices

Appendix A Public Participation

- Appendix A-1: Public Notice & Proof of Advertisement
- Appendix A-2: Public Meeting Agenda & Meeting Minutes
- Appendix A-3: Record of Consideration

Appendix B Maps

- Appendix B-1: Planning Area Map
- Appendix B-2: Land Use Map

Appendix C MS4 Requirements Table

- Appendix C-1: Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 3/5/2018)

Appendix D Determine Existing Loads for Pollutants of Concern

- Appendix D-1: Plymouth Creek Watershed within Conshohocken Borough
- Appendix D-2: Total Loading for Plymouth Creek in Conshohocken Borough
- Appendix D-3: Conshohocken Borough Planning Area
- Appendix D-4: Conshohocken Borough Planning Area Loading

Appendix E Proposed BMP Inputs/Outputs

- Appendix E-1: BMP 1 – Underground Dry Extended Detention Basin (Sutcliffe Park)
- Appendix E-2: Applicable portion of the NPDES MS4 BMP Effectiveness Values table

Conshohocken Borough, Montgomery County is submitting this Municipal Separate Storm Sewer System (MS4) Pollutant Reduction Plan in accordance with the requirements of the *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)*; specifically, in accordance with the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Revised 3/5/2018)*. Conshohocken Borough must create a Pollution Reduction Plan (PRP) due to stormwater discharges from their MS4 to the Plymouth Creek, which has been listed as impaired for Siltation, as shown in the Municipal Requirements Table in Appendix A.

The intent of this MS4 Pollutant Reduction Plan is to establish the Planning Areas within in the Plymouth Creek Watershed that drain to the MS4 from within the jurisdiction of Conshohocken Borough, determine existing pollutant loads discharged from the MS4 to each of these Planning Areas, and to present a plan to reduce the pollutant loads. This MS4 Pollutant Reduction Plan is organized to address the PRP requirements established in the *NPDES Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions*. This MS4 Pollutant Reduction Plan will be evaluated and updated by Conshohocken Borough on an as-needed basis, based on its effectiveness in reducing pollutant loads in discharges from the MS4. If Conshohocken Borough determines that updates are needed, the Borough will work with the Pennsylvania Department of Environmental Protection (DEP) for review and approval of any revisions or updates.

Per the *PRP Instructions*, this Plan includes the following elements:

Section A: Public Participation

Section B: Map

Section C: Pollutants of Concern

Section D: Determine Existing Loads for Pollutants of Concern

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

Section F: Identify Funding Mechanisms

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

Section H: General Information

A. Public Participation

As part of this MS4 Pollutant Reduction Plan, Conshohocken Borough was required to address the following components related to public participation:

- Make a complete copy of the MS4 Pollutant Reduction Plan available for public review.
- 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 Borough 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 MS4 Pollutant Reduction Plan to DEP. **A copy of the Public Notice and Proof of Advertisement is included as Appendix A-1.**
- Accept written comments for a minimum of 30 days from the date of public notice.
- 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 that is the permittee. **A copy of Council's public meeting agenda and meeting minutes from when the MS4 Pollutant Reduction Plan was discussed is included as Appendix A-2.**
- 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. **A copy of the Borough's record of consideration of all timely comments received in the public comment period is included as Appendix A-3.**

The following dates are important to understanding how Conshohocken Borough met the public participation requirements:

- Date the MS4 Pollutant Reduction Plan was made available for public review/comment: June 13, 2018
- Date the MS4 Pollutant Reduction Plan public notice was published in newspaper: June 13, 2018
- End date for the receipt of written comments (30 days from the date of public notice): July 16, 2018
- Date the MS4 Pollutant Reduction Plan listed on the public meeting agenda: June 20, 2018
- Date the MS4 Pollutant Reduction Plan comments were accepted at a public meeting: June 20, 2018

B. Map

Mapping was an integral part of the MS4 Pollutant Reduction Plan (PRP) and required a level of detail suitable to determine the existing land uses, impervious/pervious surface coverages, topography, and loads for sediment.

The Planning Area Map was developed to identify the Planning Area, including the storm sewershed boundaries, and the proposed location of the structural Best Management Practice (BMP) to achieve the required pollutant load reduction. Parsed areas, which are the areas within the storm sewershed excluded from the Planning Area, and related calculations for land area and existing pollutant loads were also identified. Examples of land areas that were parsed include:

- Land area associated with PennDOT roadways (roads and rights-of-way)
- Land area in which stormwater runoff does not enter the MS4. Examples include homeowner's associations which do not contain municipal roads or other municipal infrastructure and areas which drain directly into the stream without entering the MS4.

All BMPs located within these parsed areas have been excluded from calculations for achieving pollutant load reduction objectives.

The Planning Area Map is included as Appendix B-1. The Map shows the impervious/pervious surfaces through the use of the aerial map background layer and identifies the drainage area boundary associated with each MS4 outfall that discharges to the Plymouth Creek, the overall Planning Area within the MS4's jurisdiction, and the location and drainage area associated with the proposed structural BMP. A Land Use Map is included as Appendix B-2, which shows the land uses based on GIS data made available to Conshohocken Borough from Montgomery County, Pennsylvania.

C. Pollutants of Concern

The pollutant addressed by this MS4 Pollutant Reduction Plan is based on the Requirement(s) column of the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*, included as Appendix C-1. The impaired downstream water and pollutant in Conshohocken Borough is the Plymouth Creek, impaired for Siltation (hereinafter referred to as “sediment”). This MS4 Pollutant Reduction Plan demonstrates how the Borough will achieve the required 10 percent sediment load reduction.

D. Determine Existing Loads for Pollutants of Concern

The existing loading condition was calculated for Conshohocken Borough in May 2018 as follows:

As the first step in determining the existing sediment load, Conshohocken Borough determined its Planning Area within the Plymouth Creek. The Planning Area is the land that drains to the municipal separate storm sewer system from within the jurisdiction of the MS4 permittee, also known as the “storm sewershed.” Land owned by the Commonwealth or County, as well as land that drains directly to streams or non-Borough roads, were parsed since they are outside the Borough’s jurisdiction. The sewersheds within the Planning Area were delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours and were then modified as necessary based on field conditions, such as curbing and localized high points. Conshohocken Borough did not claim “credit” for any existing BMPs.

The Table below summarizes all areas of Conshohocken Borough within the Plymouth Creek Watershed:

TABLE D- 1: SUMMARY OF PLANNING AREA

Land Area Location	Area
Borough Area within Plymouth Creek Watershed (acres)	294
Area Parsed (acres)	36
Borough Planning Area within Plymouth Creek Watershed (acres)	258
Area Parsed (%)	12.2%

Next, Conshohocken Borough utilized the MapShed software program to model the total sediment load from the existing land uses. MapShed is a customized GIS interface used to create input data for an enhanced version of the Generalized Watershed Loading Functions – Enhanced (GWLFE) watershed model originally developed at Cornell University. MapShed was improved by Dr. Barry Evans and his group at the Penn State Institute of Energy and the Environment using AVGWLF, which is a GIS-based watershed modeling tool that uses hydrology, land cover, soils, topography, weather, pollutant discharges, and other critical environmental data to model sediment and nutrient transport within a watershed. MapShed was run for the entire Plymouth Creek watershed to properly account for downstream channel impacts and included impaired waters identified in the MS4 Requirements Table. The MapShed outputs for the Planning Area, including the existing Plymouth Creek watershed loading,

sewershed identification map, and existing sewershed loading, are available in Appendix D. Conshohocken Borough has a total existing loading of 129,029 lbs/year in its Plymouth Creek Planning Area (see Appendices D-3 and D-4).

The existing sediment Planning Area load was multiplied by 10 percent to determine the required sediment load reduction. Table D-2 shows a summary of the Plymouth Creek watershed loading, Planning Area loading, and the required reduction.

TABLE D- 2: SUMMARY OF PLANNING AREA EXISTING LOADS

Land Area Location	Sediment Load (lbs/year)	Area (acres)
Plymouth Creek	1,933,379	4,505
Conshohocken Borough		
Sewershed 0	2,694	5
Sewershed 1	125,129	251
Sewershed 2	1,206	2
Borough Planning Area Loading	129,029	258
Required Borough Sediment Reduction (10%)	12,903	

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

As part of this MS4 Pollutant Reduction Plan, Conshohocken Borough is required to implement Best Management Practices (BMPs) within the five-year term of the general NPDES MS4 permit coverage that will reduce sediment loads by 10 percent within the Planning Area.

Conshohocken Borough plans to achieve the required sediment reduction by designing, constructing, operating, and maintaining a structural BMP. The first step in selecting a BMP to achieve the minimum required sediment load reduction was to review the sewersheds for drainage areas and available land which could support the construction a structural BMP. The drainage areas were delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours and were then modified as necessary based on field conditions, such as curbing and localized high points. The selected BMP drainage area was then analyzed further.

The geographical data of the BMP drainage area was input into MapShed and the MapShed program exported the related land use data. The program calculated an equivalent of approximately 2.3 percent of the 161 hectares of hay/pasture land in the Plymouth Creek Watershed as being located within the drainage area of the selected BMP. This data were input into the BMP5 category in the Rural Land BMP Scenario. The program also calculated the hectares of each category of impervious coverage (Area Treated) within the BMP drainage area, which equated to 11 hectares of high density residential and 1 hectare of high density mixed use. This data were then input into the Retrofit section of the Urban Scenario BMP Editor.

Please note that although this is a newly proposed BMP, MapShed considers the BMP to be a Retrofit since the existing and proposed impervious surface categories will not change as a result of the BMP. In the event pervious area was being replaced with impervious area, then the New Development section of the Urban Scenario BMP Editor would have been utilized; however, the existing and proposed land types are to remain pervious.

The selected BMP is an underground Dry Extended Detention Basin and is referenced as BMP Type "Infiltration Basin" in MapShed. The Calculated Reduction Efficiency for TSS (total suspended solids, which is sediment) for the Infiltration Basin was input to match the 60 percent sediment effectiveness value listed in the *BMP Effectiveness Value* table for a Dry Extended Detention Basin. The sediment load reduction was determined by running MapShed for the entire Plymouth Creek watershed again but with the BMP included. The difference between the existing sediment load and the sediment load with the BMP included is the sediment load reduction resulting from the construction of the BMP, which is

summarized in Table E-1. Please refer to the tables included in Appendix E-1 for these referenced MapShed input parameters and associated outputs with respect to the proposed BMP. A copy of the related information from the *BMP Effectiveness Value* table can be found in Appendix E-2.

TABLE E- 1: SUMMARY OF LOAD REDUCTION

Land Area Location	Sediment Load (lbs/year)	Area (acres)
Plymouth Creek – existing	1,933,379	4,505
Plymouth Creek – with BMP	1,919,340	4,505
Proposed Borough Sediment Reduction (10%)	14,039	
Required Borough Sediment Reduction (10%)	12,903	

Since the reduction provided by this BMP is greater than the required sediment reduction, no additional BMPs are proposed to achieve the minimum reduction in sediment loading required during this permit term.

Table E-2 is a summary of the proposed BMP, including type, location, drainage area treated, and sediment load removed. Table E-1 notes the sediment removal value as “potential” since the actual load reduction cannot be verified until the time of BMP design. For example, infiltration testing has not been completed and therefore it is unknown at this time whether the basin will function in dry extended detention or infiltration conditions.

TABLE E- 2: BMP TO ACHIEVE REQUIRED LOADING REDUCTION

BMP #	Type	Location	Drainage Area Treated (ac.)	Potential Sediment Reduction (lbs/yr)
1	underground Dry Extended Detention Basin	Sutcliffe Park	38	14,039
Required Borough Sediment Reduction				12,903
Proposed Borough Sediment Reduction				14,039

F. Identify Funding Mechanisms

Conshohocken Borough will be working during the five-year term of the general permit coverage to determine the best funding source for the proposed BMP. Funding sources for the proposed structural BMP outlined in this MS4 Pollutant Reduction Plan could include the following:

- General Fund
- MS4 Dedicated Fund
- MS4 Stormwater Fee
- Developer Cooperation
- Grant Funding
- PennVest Low-Interest Loan
- Bond

For example, Conshohocken Borough intends to apply for related grants, such as Growing Greener, to implement this BMP but will utilize general fund monies to cover the design and construction costs for the proposed BMP should grant money not be awarded.

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

Once implemented, the BMP must be maintained in order to continue producing the expected sediment load reduction. Actual Operations and Maintenance (O&M) activities will be identified by Conshohocken Borough in their Annual MS4 Status Reports, submitted under the general permit. At this time it is anticipated that all BMPs will be owned by the Borough and maintained by the Borough Public Services department. O&M activities and frequency are anticipated to be completed in accordance with the latest version of the *Pennsylvania Stormwater Best Management Practices Manual* (PA BMP Manual).

TABLE G- 1: BMP OPERATION & MAINTENANCE

Type	Location	Responsible Party	O & M Activity & Frequency
underground Dry Extended Detention Basin	Sutcliffe Park	Conshohocken Borough Public Services	Annually and after significant rain events, per the PA BMP Manual (latest revision)

H. General Information

Terms: The terms “sediment,” “siltation,” and “suspended solids” all refer to inorganic solids and are hereinafter referred to as “sediment.” The term, “storm sewershed” is defined in the PAG-13 General Permit as the land area that drains to the municipal separate storm sewer from within the jurisdiction of the MS4 permittee. This term is used as well as the term, “PRP Planning Area” (or “Planning Area”), which refers to all of the storm sewersheds that an MS4 must calculate existing loads and plan load reductions for.

Pollutants of Concern and Required Reductions: For all PRPs, MS4s shall calculate existing loading of the pollutant(s) of concern, in lbs/year; calculate the minimum reduction in loading, in lbs/year; select BMP(s) to reduce loading; and demonstrate that the selected BMP(s) will achieve the minimum reductions.

For PRPs developed for impaired waters (Appendix E), the pollutant(s) are based on the impairment listing, as provided in the MS4 Requirements Table. If the impairment is based on siltation only, a minimum 10% sediment reduction is required.

Existing Pollutant Loading: Existing loading must be calculated and reported for the portion of the Planning Area which drains to impaired waters as of the date of the development of the PRP. MS4s may not claim credit for street sweeping and other non-structural BMPs implemented in the past. If structural BMPs were implemented prior to development of the PRP and continue to be operated and maintained, the MS4 may claim pollutant reduction credit in the form of reduced existing loading.

Each impairment identified on the MS4 Requirements Table (“Table”) must be addressed in a PRP document. The Table listings for each MS4 are different because they reflect local conditions, which is why an MS4 must carefully interpret the information on the Table.

NOTE - MapShed, or any other watershed model where channel erosion is explicitly modeled, should be run on a minimum of ~10 mi² area to properly account for downstream channel impacts and include impaired waters identified in the MS4 Requirements Table. Aggregation of these waters up to approximately the 12-digit HUC scale for modeling purposes is acceptable. Modeling may not be done at the individual storm sewershed or municipal scale where the extent of downstream impact is not included in load calculation.

BMP Effectiveness: All MS4s must use the BMP effectiveness values contained within DEP’s BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in PRPs, except as otherwise approved by DEP. An example of other approaches that may be approved by DEP include the use of thoroughly vetted mechanistic models with self-contained BMP modules (e.g., Storm Water Management Model (SWMM), WinSLAMM) to demonstrate achievement of reduction targets. Application of these data intensive models could allow for a streamlining of the planning and design phases of BMPs that may provide future cost savings as municipalities move toward implementation of the plan. Such resources must be documented in the PRP, and must reflect both overland flow and in-stream erosion components.

BMP Selection: MS4s may propose and take credit for only those BMPs that are not required to meet regulatory requirements or otherwise go above and beyond regulatory requirements. For example, a BMP that was installed to meet Chapter 102 NPDES permit requirements for stormwater associated with construction activities may not be used to meet permit term minimum pollutant reductions unless the MS4 can demonstrate that the BMP exceeded regulatory requirements; if this is done, the MS4 may take credit for only those reductions that will occur as a result of exceeding regulatory requirements.

NOTE – Street sweeping may be proposed as a BMP for pollutant loading reductions if 1) street sweeping is not the only method identified for reducing pollutant loading, and 2) the BMP effectiveness values contained in 3800-PM-BCW0100m or Chesapeake Bay Program expert panel reports are utilized.

Submission of PRP: Attach one copy of the PRP with the NOI or individual permit application that is submitted to the regional office of DEP responsible for reviewing the NOI or application. In addition, one copy of the PRP (not the NOI or application) must be submitted to DEP's Bureau of Clean Water (BCW). BCW prefers electronic copies of PRPs, if possible. Email the electronic version of the PRP, including map(s) (if feasible), to RA-EPPAMS4@pa.gov. If the MS4 determines that submission of an electronic copy is not possible, submit a hard copy to: PA Department of Environmental Protection, Bureau of Clean Water, 400 Market Street, PO Box 8774, Harrisburg, PA 17105-8774.

PRP Implementation and Final Report: Under the PAG-13 General Permit, the permittee must achieve the required pollutant load reductions within 5 years following DEP's approval of coverage under the General Permit, and must submit a report demonstrating compliance with the minimum pollutant load reductions as an attachment to the first Annual MS4 Status Report that is due following completion of the 5th year of General Permit coverage.

For example, if DEP issues written approval of coverage to a permittee on June 1, 2018, the required pollutant load reductions must be implemented by June 1, 2023 and the final report documenting the BMPs that were implemented (with appropriate calculations) must be attached to the annual report that is due September 30, 2023.

Appendix A

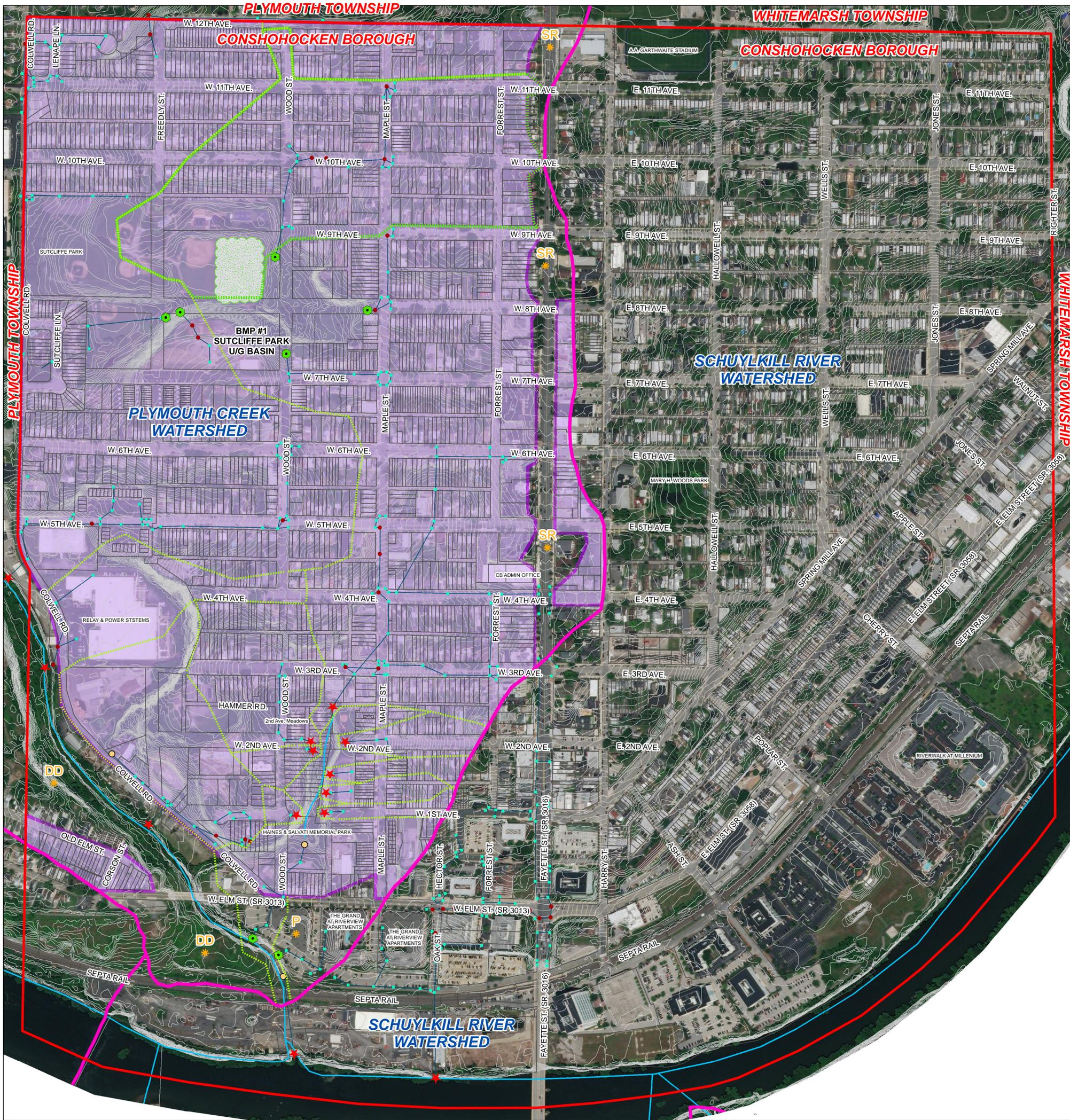
Public Participation

Appendix A-1:	Public Notice & Proof of Advertisement
Appendix A-2:	Public Meeting Agenda & Meeting Minutes
Appendix A-3:	Record of Consideration

Appendix B

Maps

Appendix B-1: Planning Area Map
Appendix B-2: Land Use Map



Legend	
	Municipal Boundary
	Watershed Boundary
	Parsing
	Outfall DA
	BMP Drainage Area
	BMP
	Outfall
	Manhole
	Headwall
	Endwall
	Storm Inlet
	Streams
	Storm Pipe
	Parcels
	Contours
	Planning Area

PARSING CLASSIFICATION LEGEND	
DD	= DIRECT DISCHARGE; AREA FLOWS DIRECTLY TO STREAM AND DOES NOT ENTER OR MIX WITH THE MUNICIPALITY'S MS4
P	= PRIVATELY OWNED/MAINTAINED; AREA IS NOT MAINTAINED BY MUNICIPALITY AND IS A SEPARATE PRIVATE ENTITY. NO DRAINAGE ENTERS OR MIXES WITH THE MUNICIPALITY'S MS4
SR	= STATE ROAD; AREA IS MAINTAINED BY PENNDOT & ALL DRAINAGE TO ROAD IS MAINTAINED BY PENNDOT

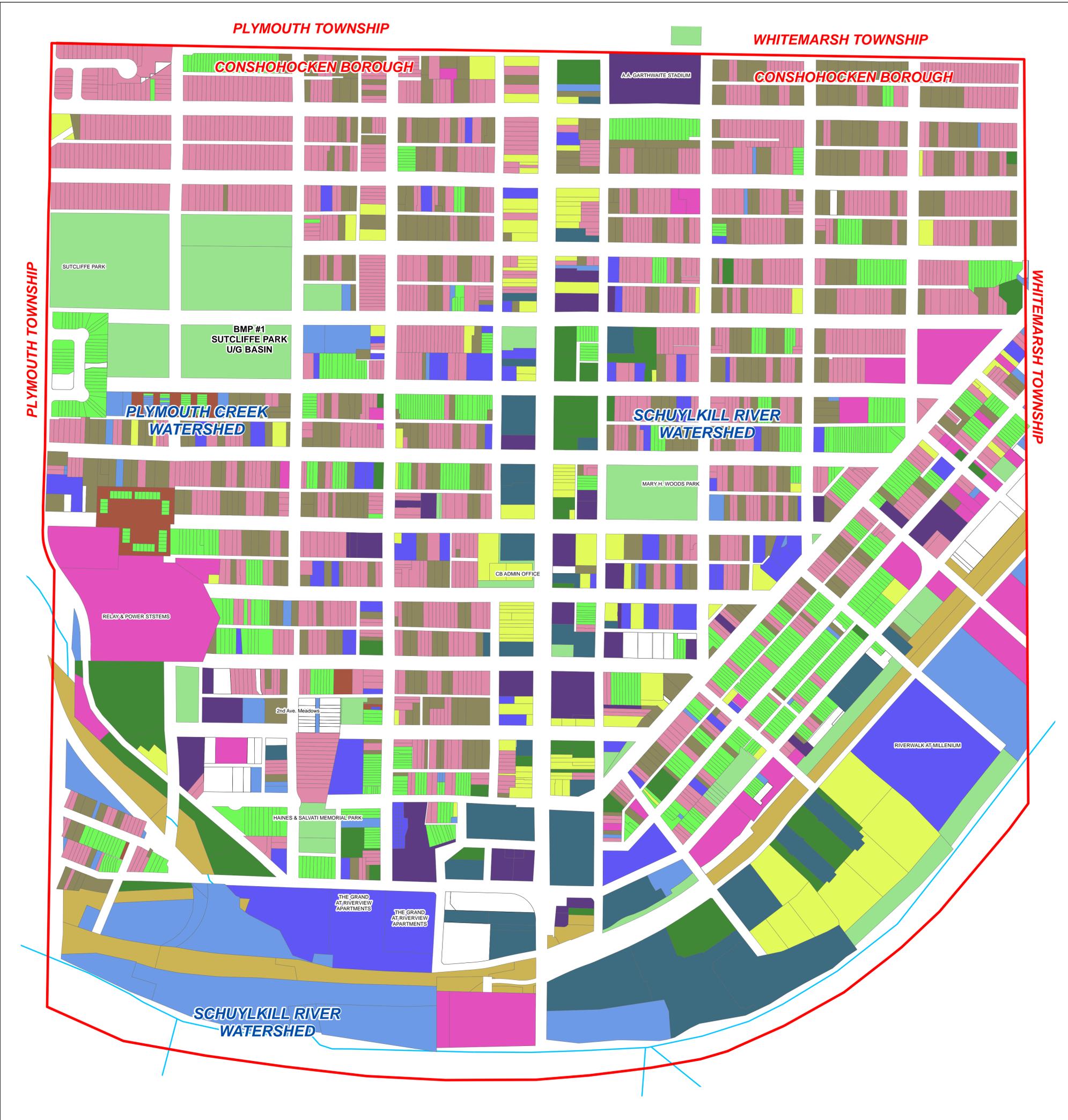
**MS4 POLLUTION REDUCTION PLAN
PLANNING AREA MAP**

CONSHOHOCKEN BOROUGH, MONTGOMERY COUNTY

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 E. BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901
(215) 345-4330 www.gilmore-assoc.com

JOB NO: 18-03042 DATE: JUNE 2018

0 250 500
Feet



Legend

Municipal Boundary	Retail
Land Use	Office
Vacant	Industrial
Multifamily	Institutional
Single Family Attached	Utilities
Twin / Duplex	Undeveloped
Single Family Detached	Public Open Space
Mixed Use	Private Open Space
	Streams

**MS4 POLLUTION REDUCTION PLAN
LAND USE MAP
CONSHOHOCKEN BOROUGH, MONTGOMERY COUNTY**

	GILMORE & ASSOCIATES, INC. ENGINEERING & CONSULTING SERVICES 65 E. BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 (215) 345-4330 www.gilmore-assoc.com	0 250 500 Feet
	JOB NO: 18-03042 DATE: JUNE 2018	

Appendix C

MS4 Requirements Table

Appendix C-1: Applicable portion of the MS4 Requirements Table (Municipal Anticipated Obligations for Subsequent NPDES Permit Term (Revised 6/26/2017))

Appendix C-1: Required portion of the MS4 Requirements Table Anticipated Obligations for Subsequent NPDES Permit Term (Revised 3/5/2018)

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Montgomery County						
CHELTENHAM TWP	PAG130054	Yes	TMDL Plan	Schuylkill River	Appendix C-PCB (4a)	
				Jenkintown Creek		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Unnamed Tributaries to Wissahickon Creek		Other Habitat Alterations (4c)
				Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Frankford Creek	Appendix C-PCB (4a), Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Tacony Creek	Appendix E-Organic Enrichment/Low D.O. (5)	Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)
				Delaware River	Appendix C-PCB (4a)	
	Mill Run		Flow Alterations, Other Habitat Alterations, Water/Flow Variability (4c)			
COLLEGEVILLE BORO	PAG130138	No		Donny Brook	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Perkiomen Creek	Appendix B-Pathogens (5)	
				Schuylkill River	Appendix C-PCB (4a)	
CONSHOHOCKEN BORO	PAG130013	No		Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Schuylkill River	Appendix C-PCB (4a)	
				Plymouth Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
DOUGLASS TWP	PAG130095	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	
				Swamp Creek	Appendix E-Siltation (5)	Cause Unknown (5)
EAST GREENVILLE BORO	PAG130156	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	
EAST NORRITON TWP	PAG130032	No		Stony Creek	Appendix E-Siltation (5)	Cause Unknown, Turbidity (5), Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	
				Sawmill Run	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
FRANCONIA TWP	PAI130005	Yes	TMDL Plan, IP	West Branch Neshaminy Creek	Appendix E-Siltation (4a), Appendix E-Excessive Algal Growth, Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Indian Creek	Appendix E-Siltation (4a)	Cause Unknown, TDS (4a)
				Indian Creek TMDL	TMDL Plan-Nutrients (4a)	
				Skippack Creek	Appendix E-Excessive Algal Growth, Nutrients (5)	
				Unnamed Tributaries to Skippack Creek		Water/Flow Variability (4c)
				West Branch Skippack Creek		Water/Flow Variability (4c)
	Skippack Creek Watershed TMDL	TMDL Plan-Siltation (4a)				

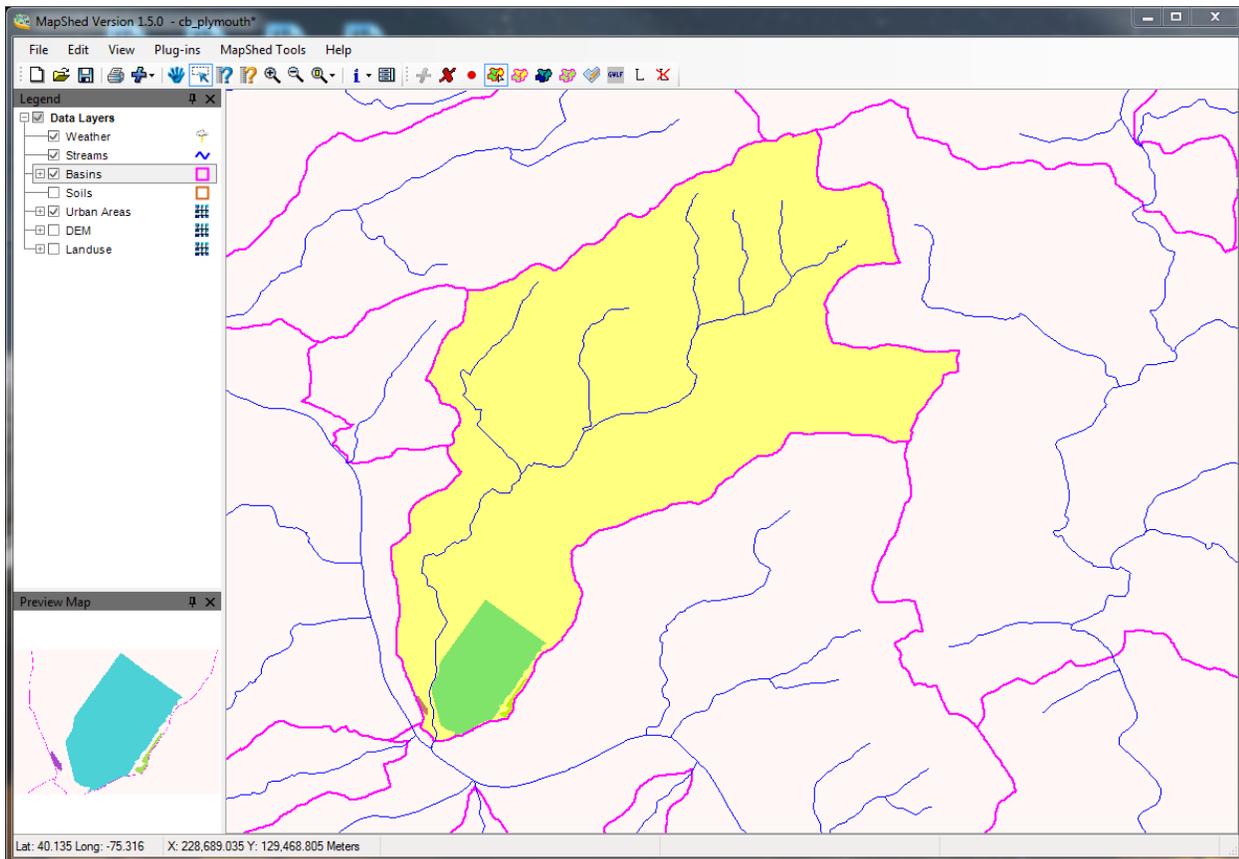
Appendix D

Determine Existing Loads for Pollutants of Concern

Appendix D-1:	Plymouth Creek within Conshohocken Borough
Appendix D-2:	Total Loading for Planning Areas in Conshohocken Borough
Appendix D-3:	Conshohocken Borough Planning Area
Appendix D-4:	Conshohocken Borough Planning Area Loading

Appendix D – Determine Existing Loads for Pollutants of Concern

Appendix D- 1: Plymouth Creek Watershed within Conshohocken Borough



Appendix D- 2: Total Loading for Plymouth Creek in Conshohocken Borough

GWLF-E Urban Area Viewer - Version 1.1.3

Select input data file: C:\MapShed\Runfiles\Conshohocken\pa\Output\pa-9534_ua.csv

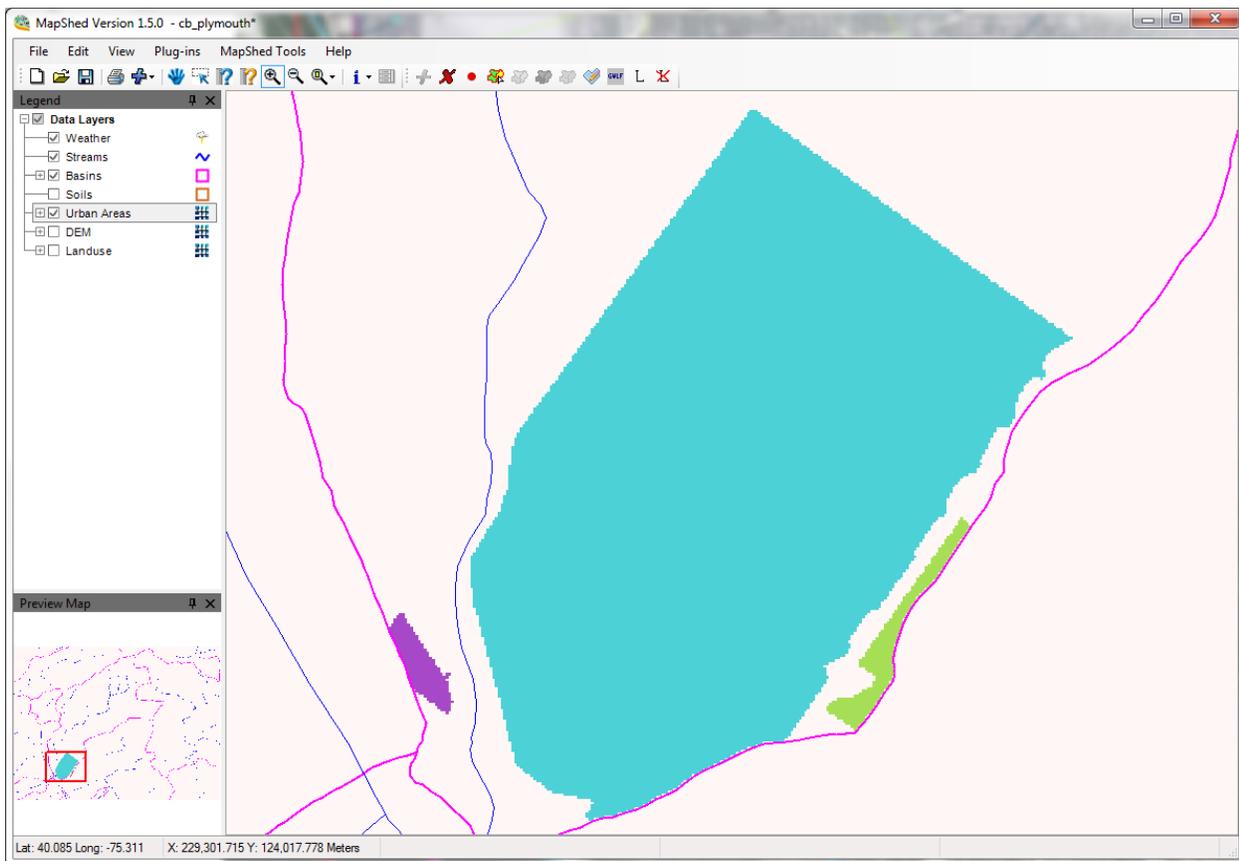
Watershed Totals Municipality Loads Regulated Loads Unregulated Loads

GWLF-E Average Loads by Source for Watershed 9534

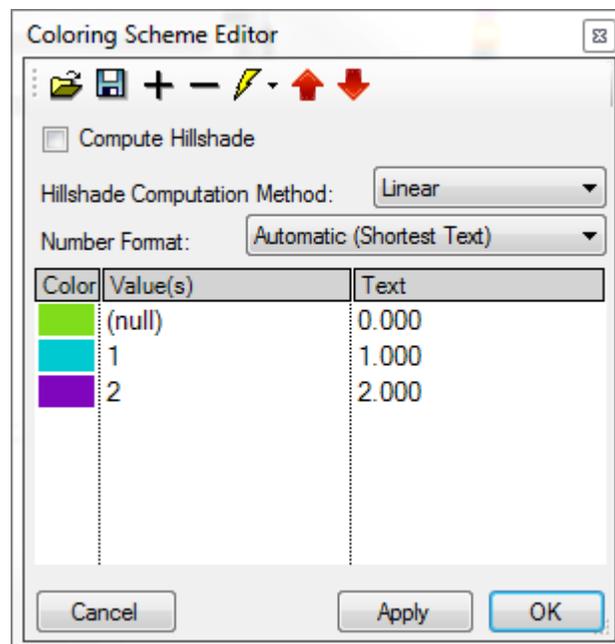
Source	Area (ac)	Sediment		Nitrogen		Phosphorus	
		Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)
Hay/Pasture	398	30688.35	77.10	134.94	0.34	34.17	0.09
Cropland	59	66491.42	1127.00	243.72	4.13	42.59	0.72
Forest	388	2380.99	6.10	18.70	0.05	2.01	0.01
Wetland	12	66.14	5.50	2.34	0.19	0.15	0.01
Disturbed	618	29541.94	47.80	76.39	0.12	24.52	0.04
Turfgrass	7	154.32	20.80	3.22	0.43	0.29	0.04
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Mixed	205	13756.85	67.10	369.76	1.80	40.57	0.20
HD Mixed	1391	93255.54	67.00	2508.09	1.80	275.11	0.20
LD Residential	151	2491.22	16.50	57.28	0.38	6.17	0.04
MD Residential	1030	69070.83	67.10	1857.68	1.80	203.77	0.20
HD Residential	245	16402.39	66.90	441.03	1.80	48.37	0.20
Water	0.5868385						
Farm Animals				0.0		0.0	
Tile Drainage		0.0		0.0		0.0	
Stream Bank		1609079.1		804.7		216.1	
Groundwater				7899.5		150.0	
Point Sources				0.0		0.0	
Septic Systems				952.1		0.0	
Totals	4505	1933379		15369		1044	

Print Export to JPEG Exit

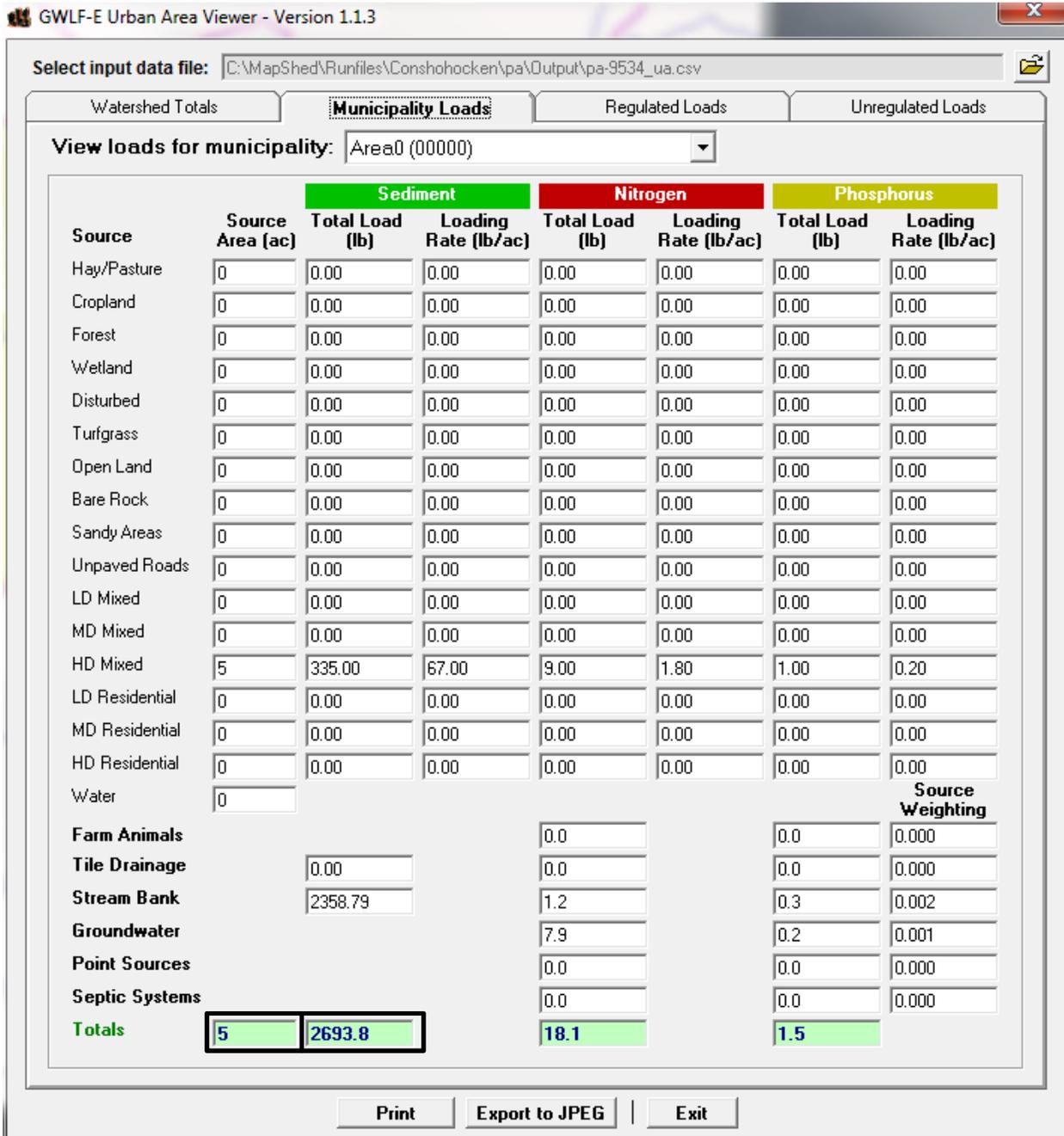
Appendix D- 3: Conshohocken Borough Planning Area



Sewershed Numbering (0-2)



Appendix D-4: Conshohocken Borough Planning Area Loading



GWLF-E Urban Area Viewer - Version 1.1.3

Select input data file: C:\MapShed\Runfiles\Conshohocken\pa\Output\pa-9534_ua.csv

Watershed Totals **Municipality Loads** Regulated Loads Unregulated Loads

View loads for municipality: Area1 (00001)

Source	Source Area (ac)	Sediment		Nitrogen		Phosphorus	
		Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)
Hay/Pasture	17	1310.70	77.10	5.80	0.34	1.50	0.09
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	7	42.70	6.10	0.40	0.05	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	7	334.60	47.80	0.80	0.12	0.30	0.04
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Mixed	40	2684.00	67.10	72.00	1.80	8.00	0.20
HD Mixed	17	1139.00	67.00	30.60	1.80	3.40	0.20
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	163	10904.70	66.90	293.40	1.80	32.60	0.20
Water	0						
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		108713.74		54.4		14.6	0.085
Groundwater				537.2		10.2	0.068
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	251	125129.4		994.6		70.7	

Source Weighting

Print Export to JPEG Exit

GWLF-E Urban Area Viewer - Version 1.1.3

Select input data file: C:\MapShed\Runfiles\Conshohocken\pa\Output\pa-9534_ua.csv

Watershed Totals **Municipality Loads** Regulated Loads Unregulated Loads

View loads for municipality: Area2 (00002)

Source	Source Area (ac)	Sediment		Nitrogen		Phosphorus	
		Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	2	133.80	66.90	3.60	1.80	0.40	0.20
Water	0						
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		1072.24		0.5		0.1	0.001
Groundwater				7.9		0.2	0.001
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	2	1206.0		12.0		0.7	

Source Weighting

Print Export to JPEG Exit

Appendix E

Proposed BMP Inputs/Outputs

- Appendix E-1: BMP 1 – U/G Basin (Sutcliffe Park)
Appendix E-2: Applicable portion of the NPDES MS4 BMP Effectiveness Values table

Appendix E – Proposed BMP Inputs/Outputs

Appendix E- 1: BMP 1 – Underground Dry Extended Detention Basin (Sutcliffe Park)

Editing Data File: BMP1 - Sutcliffe

Rural Land BMP Scenario Editor

	Hectares	% Existing	BMP1	BMP2	BMP3	BMP4	BMP5	BMP6	BMP7	BMP8
Row Crops	24	% Existing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hay/Pasture	161	% Existing				0.0	2.3	0.0	0.0	0.0

Streams in Agricultural Areas	1.8	Km	AWMS (Livestock)	0	% Existing
Total Stream Length	17.3	Km	AWMS (Poultry)	0	% Existing
Unpaved Road Length	0.0	Km	Runoff Control	0	% Existing
			Phytase in Feed	0	% Existing
			Stream Km with Vegetated Buffer Strips	0.0	Existing Km
			Stream Km with Fencing	0.0	Existing Km
			Stream Km with Bank Stabilization	0.0	Existing Km
			Unpaved Road Km with E and S Controls	0.0	Existing Km

Urban BMP Data Editor (BMP1 - Sutcliffe)

Urban Scenario BMP Editor

Performance Standard Calculations

Retrofits

BMP Type: Infiltration Basin

Area Treated (ha)		Existing Area (ha)	
LD Residential	0	LD Residential	61
MD Residential	0	MD Residential	417
HD Residential	11	HD Residential	99
LD Mixed	0	LD Mixed	0
MD Mixed	0	MD Mixed	83
HD Mixed	1	HD Mixed	563
Total	12	Total	1223

Rainfall Captured (2.54 cm = 1 in)
 Depth (cm): 1.45
 Volume (m3): 1513
 Run

Calculated Reduction Efficiency
 TN: 0.48 TP: 0.56 **TSS: 0.60**

New Development

BMP Type: Select BMP Type

Area Developed (ha)	Area Replaced (ha)	Existing Area (ha)
LD Residential	Hay/Pasture	Hay/Pasture
MD Residential	Cropland	Cropland
HD Residential	Forest	Forest
LD Mixed	Disturbed	Disturbed
MD Mixed	Turfgrass	Turfgrass
HD Mixed	Open Land	Open Land
Total	Total	Total

Rainfall Captured (2.54 cm = 1 in)
 Depth (cm): 7.10
 Volume (m3): 0
 Run

Calculated Reduction Efficiency
 TN: 0.00 TP: 0.00 TSS: 0.00

Stream Protection

Vegetative buffer strip width (m): 0

Fraction of streams treated (0-1): 0.000

Total streams in non-ag areas (km): 15.5

Streams w/bank stabilization (km): 0.0

Street Sweeping

Fraction of area treated (0-1): 1.000

Sweep Type: Mechanical Vacuum

Times/month

Jan	0	Apr	0	Jul	0	Oct	0
Feb	0	May	0	Aug	0	Nov	0
Mar	0	Jun	0	Sep	0	Dec	0

[Rural BMP Editor](#)

[BMP Efficiency Editor](#)

[Export to JPEG](#)

[Save File](#)

[Close](#)

GWLF-E Urban Area Viewer - Version 1.1.3

Select input data file: C:\MapShed\Runfiles\Conshohocken\pa\Output\Sutcliffe-9534_ua.csv

Watershed Totals
 Municipality Loads
 Regulated Loads
 Unregulated Loads

GWLF-E Average Loads by Source for Watershed 9534

Source	Area (ac)	Sediment		Nitrogen		Phosphorus	
		Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)	Total Load (lb)	Loading Rate (lb/ac)
Hay/Pasture	398	30269.47	76.10	133.45	0.34	33.73	0.08
Cropland	59	66491.42	1127.00	243.72	4.13	42.59	0.72
Forest	388	2380.99	6.10	18.70	0.05	2.01	0.01
Wetland	12	66.14	5.50	2.34	0.19	0.15	0.01
Disturbed	618	29541.94	47.80	76.39	0.12	24.52	0.04
Turfgrass	7	154.32	20.80	3.22	0.43	0.29	0.04
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Mixed	205	13646.61	66.60	367.55	1.79	40.28	0.20
HD Mixed	1391	92572.10	66.60	2493.21	1.79	273.22	0.20
LD Residential	151	2469.18	16.40	56.92	0.38	6.13	0.04
MD Residential	1030	68563.76	66.60	1846.66	1.79	202.36	0.20
HD Residential	245	16270.11	66.40	438.41	1.79	48.04	0.20
Water	0.5868385						
Farm Animals				0.0		0.0	
Tile Drainage		0.0		0.0		0.0	
Stream Bank		1596914.0		798.1		213.8	
Groundwater				7899.5		150.0	
Point Sources				0.0		0.0	
Septic Systems				952.1		0.0	
Totals	4505	1919340		15330		1037	



**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.