

Pollutant Reduction Plan

September 18

2017

This Pollutant Reduction Plan for stormwater discharges of nutrients and sediment to surface waters in the Chesapeake Bay watershed and for stormwater discharges to local surface waters impaired for sediment was developed to comply with the requirements of the Pennsylvania Department of Environmental Protection. The Plan accompanies the Notice of Intent to comply with the National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems. The planning period is five years beginning March 16, 2018.

East
Pennsboro
Township,
Cumberland
County, PA

Revised May 2018

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Narrative

East Pennsboro Township is a Township of the First Class located at the northeast corner of Cumberland County, PA that consists of a 10.7 square mile area. The population of the Township was 20,228 at the 2010 census. All stormwater runoff from the Township eventually reaches the Susquehanna River, via direct tributaries or from the Conodoguinet Creek, and ultimately the Chesapeake Bay.

To meet Municipal Separate Storm Sewer Systems (MS4) Permit Requirements, the Township has elected to submit a Combined Pollutant Reduction Plan (PRP) to address local impaired waters (Permit Appendix E) and the Chesapeake Bay Watershed impairments (Permit Appendix D). The pollutant aggregation process has permitted us to combine all local watersheds into two large watersheds encompassing the entire Township. Through this process, the Planning Areas for the Appendix D and E pollution reduction plans are exactly the same.

This plan was prepared utilizing the guidelines outlined in the following Pennsylvania Department of Environmental Protection documents:

- 3800-PM-BCW0100k - National Pollutant Discharge Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions, last revised March 2017.
- 3800-PM-BCW0100m - National Pollutant Discharge Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values, last revised May 2016.
- Pollutant Aggregation Suggestions for MS4 Municipal Requirements Table, last revised May 9, 2017
- Pollution Reduction Plan: A Methodology

The PRP consists of the following sections:

- Section A. Public Participation
- Section B. Map
- Section C. Pollutants of Concern
- Section D. Existing Loading for Pollutants of Concern
- Section E. BMPs to Achieve the Minimum Required Reductions
- Section F. Funding Mechanism(s)
- Section G. Operation and Maintenance (O&M) of BMPs
- Appendices

Section A. Public Participation

The applicant made a complete copy of the PRP available for public review at the Township office as of August 3, 2017. An electronic version was also made available for review via the Township website (<http://eastpennsboro.net/stormwater>). The applicant published a public notice in the Patriot News, a newspaper of general circulation in the area, 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 was published on July 18, 2017, which is at least 45 days prior to the deadline for submission of the PRP to DEP, September 16, 2017. A copy of the public notice to the PRP is in Appendix I.

The applicant accepted written comments for a minimum of 30 days from the date of public notice. A copy of all written comments received from the public to the PRP is in Appendix II. The applicant accepted comments from interested members of the public at a regularly scheduled meeting of the Board of Commissioners, held on September 6, 2017. The applicant considered and made 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 permittee's record of consideration of all timely comments received in the public comment period to the PRP is in Appendix II.

Section B. Maps

Appendix III contains maps that identify land uses and impervious/pervious surfaces and the storm sewershed boundary associated with each MS4 outfall that discharges to impaired surface waters and surface waters draining to the Chesapeake Bay and calculates the storm sewershed area that is subject to Appendix D and Appendix E. In addition, the map identifies the proposed location of structural Best Management Practices (BMPs) that will be implemented to achieve the required pollutant load reductions. The map is sufficiently detailed to identify the PRP Planning Area relevant to satisfying the requirements of Appendix D and Appendix E and to demonstrate that BMPs will be located in appropriate storm sewersheds to meet the requirements.

Section C. Pollutants of Concern

According to DEP Publication “MS4 Requirements Table (Municipal),” revised May 9, 2017, the obligations for the NPDES permit term are as follows:

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Cumberland County						
EAST PENNSBORO TWP	PAG133680	No		Holtz Run	Appendix B-Pathogens (5)	
				Unnamed Tributaries to Susquehanna River	Appendix E-Siltation (5)	Other Habitat Alterations (4c)
				Unnamed Tributaries to Conodoguinet Creek		Cause Unknown (5)
				Susquehanna River	Appendix C-PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	

According to DEP Publication “Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal),” revised June 26, 2017, the obligations for the NPDES permit term are as follows:

MS4 Name	Permit Number	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Cumberland County				
EAST PENNSBORO TWP	PAG133680	Conodoguinet Creek-Susquehanna River	Chesapeake Bay Nutrients/Sediment, Holtz Run	Appendix B-Pathogens, Appendix D-Siltation/Nutrients
		Cove Creek-Susquehanna River, Laurel Run-Susquehanna River	Chesapeake Bay Nutrients/Sediment, Susquehanna River, Unnamed Tributaries to Susquehanna River	Appendix C-PCB, Appendix D-Siltation/Nutrients, Appendix E-Siltation

As shown above, the Urbanized Area within East Pennsboro Township drains to three 12-digit Hydrologic Unit Code (HUC-12) watersheds: Cove Creek, Laurel Run and Conodoguinet Creek. Because Cove Creek and Laurel Run watersheds share common pollutants with the downstream 10-digit Hydrologic Unit Code (HUC-10) watershed, the Planning Areas for these HUC-12 watersheds are combined in this PRP. The impaired waterways within this combined Planning Area, which is labeled as the “Susquehanna River Planning Area,” include the Chesapeake Bay, Susquehanna River and Unnamed Tributaries to the Susquehanna River. A separate Planning Area for the Conodoguinet Creek HUC-12 watershed is included in this PRP. The impaired waterways within this separate Planning Area, which is labeled as the “Conodoguinet Creek Planning Area,” include the Chesapeake Bay and Holtz Run.

According to DEP Publication 3800-PM-BCW0100k “PRP Instructions”:

For Chesapeake Bay PRPs (Appendix D), the pollutants of concern are sediment, TP and TN and the minimum reductions in loading are 10%, 5% and 3%, respectively. Permittees are encouraged to select appropriate BMPs to achieve the 10% sediment loading reduction objective, as it expected that, overall within the Bay watershed, the TP (5%) and TN (3%) goals will be achieved when a 10% reduction in sediment is achieved.

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. If the impairment is based on nutrients only or other surrogates for nutrients (e.g., “Excessive Algal Growth” and “Organic Enrichment/Low D.O.”), a minimum 5% TP reduction is required. If the impairment is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed. PRPs may use a presumptive approach in which it is assumed that a 10% sediment

reduction will also accomplish a 5% TP reduction. However, MS4s may not presume that a reduction in nutrients will accomplish a commensurate reduction in sediment

Both the Susquehanna River Planning Area and the Conodoguinet Creek Planning Area include the Chesapeake Bay pollutants of concern. The Susquehanna River Planning Area also includes pollutants based on local impairments of Unnamed Tributaries to the Susquehanna River due to siltation.

Section D. Existing Loading for Pollutants of Concern

East Pennsboro Township in Cumberland County has a total of 3,241 acres within storm sewersheds draining to the Chesapeake Bay, and portion of this area which drains to the locally impaired waters. A total of 2,065 acres is within the Conodoguinet Creek Planning Area and 1,176 acres is within the Susquehanna River Planning Area.

The “simplified method” was utilized to determine the existing loading. This method is described in the PRP Instructions as “determine the percent impervious and pervious surface within the urbanized area of the storm sewershed and calculate existing loading by multiplying the developed impervious and developed pervious land areas (acres) by pollutant loading rates (lbs/acre/year).” Storm sewersheds for each outfall within each HUC-12, as well as land areas within each storm sewershed, were determined using computer mapping techniques. Parsing was utilized to refine the land cover areas and calculations. The following areas were parsed out according to Attachment A of the PRP Instructions:

- Land areas associated with PennDOT roadways (roads and right-of-ways)
- Land areas located within the Township that are located outside of the Urbanized Area 2010
- Land areas that have a separate regulated discharge permit
- Land areas in which stormwater runoff does not enter the MS4

The Norfolk Southern Railyards (Major Industrial NPDES Permit No. PA0009229) and the East Pennsboro Township Sewer Treatment Plant (NPDES Permit No. PA0038415 for Publicly Owned Treatment Works) have separate regulated discharge permits.

According to Attachment B of the PRP Instructions, Cumberland County’s developed and undeveloped land loading rates for sediment are as follows:

Category	Sediment Loading Rate (lbs/ac/yr)
Impervious Developed	2,065.10
Pervious Developed	306.95
Undeveloped	234.60

Preliminary Existing Loading

The existing loading was estimated as of September 16, 2017 (date of NOI submission). A preliminary sediment loading, in pounds per year, for each Planning Area, without consideration of any previously installed structural BMPs, is summarized below. Additional breakdown of the calculations are included in Appendix IV.

Planning Area	Preliminary Sediment Load (lbs/yr)
Susquehanna River Planning Area	
Cove Creek watershed	959,404.69
Laurel Run watershed	178,955.45
Subtotal	1,138,360.13

Planning Area	Preliminary Sediment Load (lbs/yr)
Conodoguinet Creek Planning Area	
Conodoguinet Creek watershed	2,048,410.74
Total of all Planning Areas	3,186,770.88

Existing Basin Reductions

There are multiple structural BMPs currently in place and functioning, which minimally reduce the existing loading estimates. According to the PRP Instructions, the following information for each existing structural BMP is required to take credit for the pollutant reductions:

- A detailed description of the BMP;
- Latitude and longitude coordinates for the BMP;
- Location of the BMP on the storm sewershed map;
- The permit number, if any, that authorized installation of the BMP;
- Calculations demonstrating the pollutant reductions achieved by the BMP;
- The date the BMP was installed and a statement that the BMP continues to serve the function(s) it was designed for; and
- The operation and maintenance (O&M) activities and O&M frequencies associated with the BMP.

A summary of the existing BMPs is below. Additional information is included in Appendix V. All facilities listed are privately maintained per recorded O&M agreements. These BMPs are functionally adequate for the reductions calculated.

Description	Coordinates	Permit No.	Installed
1250 Camp Hill Bypass Infiltration Bed	40.25122, -76.91721	PAG-02-0021-13-035	4/6/2016
The Overlook Bioretention Basin 1	40.26378, -76.92043	PAG-02-0021-10-027	9/26/2014
Deer Trace Infiltration Basin	40.29416, -76.96121	PAG-02-0021-10-007	9/2/2014
Park Ave. Townhouses Infiltration Trenches	40.30638, -76.92733	PAG-02-0021-09-021	11/11/2009
Floribunda Phase 1, Section 10B Drainage Area 3	40.26750, -76.94722	PAG2-0021-07-038	4/12/2011
Floribunda Phase 1, Section 10B Drainage Area 5	40.26750, -76.94722	PAR-10-H037-R-1	4/12/2011
Grandview Avenue Pervious Pavement	40.26113, -76.92088	PAG2-0021-07-045	8/24/2007
Holy Spirit Mediplex Bioretention Basin and Infiltration Beds	40.256423, -76.923797	PAG2-0021-07-004	7/2/2007
308 Park Avenue Rain Garden	40.30618, -76.928158	Not applicable	12/15/2015
310 Park Avenue Rain Garden	40.306036, -76.928344	Not applicable	6/28/2016
312 Park Avenue Rain Garden	40.305936, -76.92851	Not applicable	11/29/2016
306 Valley Road Pervious Pavement and Infiltration Bed	40.307288, -76.929129	Not applicable	4/15/2015
Aqua Duck Car Wash Infiltration Basin	40.29139, -76.94722	Not applicable	7/15/2015

Description	Coordinates	Permit No.	Installed
Holy Spirit Hospital Data Center Pervious Pavement	40.25167, -76.92111	Not applicable	7/1/2015
Holy Spirit Hospital Boiler House Rain Garden	40.254745, -76.922161	Not applicable	12/10/2015
401 Center Street Infiltration Berms	40.28111, -76.94000	Not applicable	6/10/2014
East Penn Center Dry Detention Basin	40.28750, -76.94778	Not applicable	4/18/2000
East Penn Drive Dry Detention Basin	40.29056, -76.94861	Not applicable	10/3/2001
Pennsboro Commons East Dry Detention Basin	40.29111, -76.94611	Not applicable	9/19/2001

Final Existing Loading

The final existing sediment loading, in pounds per year, for each Planning Area, with consideration of existing BMPs, is summarized below.

Planning Area	Final Sediment Load (lbs/yr)
Susquehanna River Planning Area	
Cove Creek watershed	956,814.80
Laurel Run watershed	168,668.94
Subtotal	1,125,483.74
Conodoguinet Creek Planning Area	
Conodoguinet Creek watershed	2,009,289.26
Total of all Planning Areas	3,134,773.00

Minimum Required Reductions

The Township has determined the minimum sediment loading (lbs/yr) that must be reduced within 5 years following DEP's approval of coverage. The minimum percent reduction for sediment according to Appendix D and Appendix E is 10%. As stated above, the Cove Creek and Laurel Run watersheds are combined and labeled as the Susquehanna River Planning Area.

Planning Area	Required Sediment Reduction (lbs/yr)
Susquehanna River Planning Area	112,548.37
Conodoguinet Creek Planning Area	200,928.93
Total	313,477.30

Section E. BMPs to Achieve the Minimum Required Reductions

The Township has to plan for multiple BMPs to achieve the minimum required reductions in pollutant loading for each Planning Area. The BMPs for each Planning Area will be similar, but will be accounted for separately to ensure that the reductions are appropriately allocated. Furthermore, the locally impaired Unnamed Tributaries to the Susquehanna River, as mapped, are the focus of efforts in the Susquehanna River Planning Area. To calculate pollutant reductions from the selected BMPs, the Chesapeake Bay Program expert panel reports and DEP Publication 3800-PM-BCW0100m “BMP Effectiveness Values” were utilized.

BMP #1 – Street Sweeping

For pollutant reduction calculations, the DEP’s BMP Effectiveness Values document was utilized:

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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To determine the credit, the following assumptions and calculations were made:

- Daily effort of 12 lanes miles per day for 180 days per year (equates to 2,160 lane miles)
- Streets are swept 25 times per year, which equates to 86.4 lane miles
- Assuming 1 impervious acre per lane mile, for a total of 86.4 impervious acres
- Using a sediment loading rate of 2,065.10 lbs/ac/yr results in a loading of 178,425 lbs/yr
- Using a 9% reduction rate yields 16,058 lbs/yr of sediment reduction
- Based on the mapping, the Conodoguinet Creek Planning Area contains approximately 64% of the overall planning area. The Susquehanna River Planning Area contains approximately 36% of the overall planning area. These percentages are used to appropriately proportion the sediment reduction of street sweeping to each planning area.

To accomplish the level of street sweeping as planned, a new street sweeper with vacuum attachment will have to be purchased by the Township. This sweeper will also be used to clean out the storm system as detailed below. The capital cost of this piece of equipment is approximately \$250,000 to \$300,000. Annualized over 20 years, this yields \$15,000 per year. Township labor to operate the sweeper, including benefits, is estimated at \$40 per hour. Operating the sweeper for 8 hours per day for 180 days is estimated at \$57,600 per year. Disposal costs are estimated based on bids received during the Capital Region Council of Governments (CapCOG) Joint Bid process, which include a hauling fee of \$250 per load and disposal fee of \$35 per ton. The accumulated sediment is projected to cost approximately \$660 per year for disposal. Only streets swept within the Planning Area will be used for crediting.

BMP #2 – Storm Sewer Cleaning

It has been determined that the Township’s existing storm sewer system contains sediment buildup and can be cleaned out to reduce our sediment load. For pollutant reduction calculations, the DEP’s BMP

Effectiveness Values document for Storm Sewer Systems Solids Removal was utilized. For the current planning period, no filter bags or end of pipe solids removal systems are proposed; only removing sediment that is currently within the collection system.

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	<p>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.</p> <p>To determine pollutant reductions for this BMP, these steps must be taken:</p> <ol style="list-style-type: none"> 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. <p>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%.</p>

To determine the credit, the following assumptions and calculations were made:

- Yearly removal of 20 wet tons per year for 5 years, which equates to 200,000 lbs wet weight
- A 10% reduction is included to account for debris and refuse
- Of the remaining 180,000 lbs wet weight, 55% considered inorganic, 45% considered organic
- Annual wet weight converted to dry weight using factors of 0.7 for inorganic and 0.2 for organic, which results in 85,500 lbs dry weight
- Reductions for nitrogen and phosphorus based on the tabular values reduce the total dry weight to 85,072 lbs, or 17,014 lbs/yr of sediment, which is 5% of the minimum reduction
- Based on the mapping, the Conodoguinet Creek Planning Area contains approximately 64% of the overall planning area. The Susquehanna River Planning Area contains approximately 36% of the overall planning area. These percentages are used to appropriately proportion the sediment reduction of street sweeping to each planning area.

As stated above, the annualized cost of the sweeper is \$15,000 per year. Township labor to operate the sweeper, including benefits, is estimated at \$40 per hour. It doesn't appear feasible to clean out inlets and pipes while street sweeping, so for planning purposes, the labor to operate the equipment will be

estimated separately. Operating the equipment for 8 hours per day for 30 days is estimated at \$9,600 per year. Using CapCOG costs, the accumulated sediment is projected to cost approximately \$550 per year for disposal.

Combining the annualized capital cost for the sweeper with the labor and disposal costs for both street sweeping and storm sewer cleaning, the projected cost of sediment removal is \$2.07/lb for these BMPs. Street sweeping and storm system cleaning have to be performed each year to continue to receive the sediment reduction credit.

BMP #3 – Urban Stream Restoration

Since the majority of first through third order streams are on private property, the proposed restoration will require coordination between the Township and the owners of the property where the stream exists. For pollutant reduction calculations, the DEP’s BMP Effectiveness Values document was utilized:

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.
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To determine the credit, the following assumptions and calculations were made:

- Approximately 2,100 linear feet of stream bank within the Conodoguinet Creek Planning Area times 44.88 lbs/ft/yr yields 94,248 lbs/yr of sediment reduction
- Approximately 1,800 linear feet of stream bank within the Susquehanna River Planning Area times 44.88 lbs/ft/yr yields 80,784 lbs/yr of sediment reduction

The estimated cost of urban stream restoration is \$250 per linear foot. Using a total of 3,900 linear feet yields a total of \$975,000 over 5 years, or \$195,000 per year. The projected cost of sediment removal is \$5.57/lb for this BMP. Since stream restoration is a structural BMP, the installation cost occurs one time, but the sediment reduction credit remains each year during the life of the BMP.

BMP #4 – Impervious Area Reduction

It has been determined that portions of old Center Street, which are paved, can be removed to reduce the sediment load of the Township. This area is located within the Conodoguinet Creek Planning Area.

To determine the credit, the following assumptions and calculations were made:

- Approximately 1.127 acres of existing impervious area to be converted to pervious
- Using a sediment loading rate of 2,065.10 lbs/ac/yr for impervious and 306.95 lbs/ac/yr for pervious yields a net reduction of 1,758.15 lbs/ac/yr
- The net reduction rates yields 1,981.75 lbs/yr of sediment reduction

It is estimated that there is approximately 4 inches of existing asphalt to be removed, which equates to approximately 1,200 tons per acre. Using CapCOG costs, the asphalt planned for removal is projected to cost \$64,300, or \$12,900 per year. The projected cost of sediment removal is \$27.64/lb for this BMP.

Since impervious area reduction is a structural BMP, the demolition cost occurs one time, but the sediment reduction credit remains each year during the life of the BMP.

BMP #5 – Basin Retrofits

A combination of both new retrofits and existing BMP retrofits are proposed. New retrofit facilities include new retrofit projects that create storage to reduce nutrients from existing developed land that is not currently receiving any stormwater treatment. The existing BMP retrofits are conversions of older dry detention basins into bioretention facilities. As required, the Chesapeake Bay Program expert panel reports were utilized to determine the sediment load reductions for each retrofit. A summary of the proposed facilities is below:

Name of Facility	Type of Retrofit	Planning Area
Gannett Fleming complex	New retrofit	Susquehanna River
East Shady Lane basin	Dry detention to bioretention	Susquehanna River
South Westwood basin	Dry detention to bioretention	Susquehanna River
East Treemont basin	Dry detention to bioretention	Conodoguinet Creek
West Treemont basin	Dry detention to bioretention	Conodoguinet Creek
Mountain View basin	Dry detention to bioretention	Conodoguinet Creek
Penn Valley basin	Dry detention to bioretention	Conodoguinet Creek
Magnolia Drive basin	Dry detention to bioretention	Conodoguinet Creek

Of the eight retrofits, only three are on Township-owned property – East Treemont, West Treemont and Mountain View basins. The new retrofit at the Gannett Fleming complex is proposed by the property owner. The remaining conversion retrofits will require coordination between the Township and the owners of the property where the basin exists. Sediment reduction calculations are included in Appendix VI.

The estimated cost of basin retrofits is \$1,000 to \$3,000 per acre, according to the Water Environment Federation Manual of Practice No. 23 “Design of Urban Stormwater Controls”. For this plan, \$2,000 per acre is assumed. The summarized costs for the conversion retrofits are below:

Name of Facility	Estimated Cost	Cost per pound of removal
East Treemont basin retrofit	\$77,014.88	\$1.94
West Treemont basin retrofit	\$29,528.19	\$1.93
Mountain View basin retrofit	\$120,523.09	\$3.21
Penn Valley basin retrofit	\$45,266.21	\$1.98
Magnolia Drive basin retrofit	\$14,029.38	\$1.51
East Shady Lane basin retrofit	\$13,971.95	\$1.03
South Westwood basin retrofit	\$23,043.71	\$1.24
Total	\$323,377.41	

The new retrofit at the Gannett Fleming complex is estimated to cost approximately \$210,500, which will be funded privately.

Summary of Selected BMPs

The required reduction from the Conodoguinet Creek Planning Area will be achieved by the selected BMPs as detailed below:

Selected BMP	Sediment Load Reduction (lbs/yr)
Street sweeping	10,233.09
Storm sewer cleaning	10,842.42
Urban stream restoration	94,248.00
Impervious area reduction	1,981.75
East Treemont basin retrofit	30,663.52
West Treemont basin retrofit	9,465.92
Mountain View basin retrofit	26,343.58
Penn Valley basin retrofit	13,509.35
Magnolia Drive basin retrofit	6,294.30
Total	203,581.95

The required reduction from the Susquehanna River Planning Area will be achieved by the selected BMPs as detailed below:

Selected BMP	Sediment Load Reduction (lbs/yr)
Street sweeping	8,472.91
Storm sewer cleaning	6,171.99
Urban stream restoration	80,784.00
Gannett Fleming complex retrofit	2,402.40
East Shady Lane basin retrofit	8,281.89
South Westwood basin retrofit	7,615.63
Total	111,081.04

The overall required reduction of 313,477.30 lbs/yr of sediment will be achieved with the combination of reductions from each of the planning areas, which totals 314,662.99 lbs/yr.

Section F. Funding Mechanism(s)

The selected BMPs will mainly be funded by the taxpayers of East Pennsboro Township. The Township is considering the implementation of a stormwater fee, but is waiting on revisions to the First Class Township Code to decide whether to proceed. Other funding sources have been secured or have been applied for to help with the costs as listed below:

- Award of the 2015 Local Stormwater BMP Implementation Grant from DEP for the East Treemont existing dry detention BMP conversion project in the amount of \$79,200
- Application to DEP for the 2017 Local Stormwater BMP Implementation Grant for the Gannett Fleming complex retrofit project in the amount of \$200,000

Other funding sources to be considered include:

- Federal Emergency Management Agency Flood Mitigation Assistance (FMA) Grant Program
- Commonwealth Financing Authority Watershed Restoration and Protection Program (WRPP)
- Department of Conservation and Natural Resources Community Conservation Partnership Program
- Department of Environmental Protection Growing Greener Grant Program

For budgetary purposes, an estimated yearly cost is included below:

Selected BMP	Year 1	Year 2	Year 3	Year 4	Year 5
Street sweeping	\$73,258.75	\$73,258.75	\$73,258.75	\$73,258.75	\$73,258.75
Storm sewer cleaning	\$10,147.75	\$10,147.75	\$10,147.75	\$10,147.75	\$10,147.75
Urban stream restoration	\$195,000.00	\$195,000.00	\$195,000.00	\$195,000.00	\$195,000.00
Impervious area reduction					\$64,341.60
East Treemont basin retrofit	\$77,014.88				
West Treemont basin retrofit		\$29,528.19			
Mountain View basin retrofit			\$120,523.09		
Penn Valley basin retrofit				\$45,266.21	
Magnolia Drive basin retrofit				\$14,029.38	
East Shady Lane basin retrofit					\$13,971.95
South Westwood basin retrofit					\$23,043.71
Total	\$355,421.38	\$307,934.69	\$398,929.59	\$337,702.09	\$379,763.76

Section G. Operation and Maintenance (O&M) of BMPs

The Township or the private property owners will be responsible for the O&M of the various BMPs listed in this plan, depending on which BMP and which location.

Street Sweeping and Storm System Cleaning

Street sweeping and storm system cleaning are ongoing BMPs that will be performed by Township staff. The preventative maintenance for the street sweeper will be done by Township mechanics. Stockpiling and disposal of the sweepings will be handled according to DEP protocol by Township staff. Standard Operating Procedures (SOPs) will be created and followed to ensure consistency and accuracy in reporting.

Urban Stream Restoration

The long-term operation and maintenance of the urban stream restorations will be the responsibility of the property owners. The plan would be to have Township staff perform semiannual inspections for the first three years, then turn over to annual inspections done by the property owners for subsequent years. Additional inspections by either Township staff or the property owner, depending on timeframe above, should occur following large storm events.

There will be a five-year initial monitoring period to ensure proper vegetation and stability in addition to ensuring that invasive species are not established. Following the initial five-year monitoring period, a regular maintenance plan will be followed.

The following normal O&M of the BMP will be required to allow the restoration to develop into and maintain its full ecological potential:

- Avoid encroachment into the proposed floodplain area. Encroachments will detract from the functions and services of the wetlands and stream system.
- Manage any invasive species that may try to out-compete the proposed native riparian planting community until viable successional processes can naturally be sustained. Invasive species control should be implemented at a minimum one time per year using the appropriate methods described below based on site conditions.
- Visually inspect the floodplain and channel. Appropriate corrective measures shall be identified by a qualified professional to address any noted instabilities. The property owner shall be responsible for any necessary corrective measures.

Impervious Area Reduction

Removal of impervious surfaces will be performed by Township staff. The preventative maintenance for the heavy equipment will be done by Township mechanics. Stockpiling and disposal of the debris will be handled according to DEP protocol by Township staff.

Basin Retrofits

The long-term operation and maintenance of the retrofitted basins will be the responsibility of the property owners, which is the Township for three locations. For the locations not owned by the Township, an O&M Agreement detailing the requirements will be signed and recorded prior to the work beginning. The O&M activities for the basins will follow guidance from the PA BMP manual, the Chesapeake Bay Foundation and Water Environment Federation Manual of Practice No. 23 “Design of Urban Stormwater Controls”. Below is a list and frequency of maintenance activities to occur to assure continued pollutant reductions throughout the life of the bioretention basin.

- Prune and weed while vegetation is being established. Continue to prune per schedule (February, September, October and November). Continue to weed from April through November.
- Inspect bioretention basin monthly and remove any accumulated trash.
- Remove silt/sediment when sediment accumulates a depth that exceeds one inch or when ponding is evident on the surface of the filter bed for more than 72 hours.
- Remove leaves and debris quarterly. Cut down perennial plantings at the end of each growing season.
- Replace dead or diseased plant material. Re-mulch areas devoid of mulch on an annual basis (April).
- Maintain direct access to the filter bed.
- Maintain vigorous and dense growth. Re-seed or re-plant any bare spots, burned out areas, or eroded areas immediately.
- During periods of extended drought, watering may be required.

Appendix I
Proof of Publication

Appendix II
Public Comments and Responses

Appendix III
Maps

Appendix IV
Pollutant Loading Calculations

Appendix V
Existing Basin Calculations and Information

Appendix VI
Basin Retrofit Calculations