



## MS4 Pollution Reduction Plan (PRP)

Perkiomen Township

August 2, 2017

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Prepared for:           Perkiomen Township  
                                  1 Trappe Road  
                                  Collegeville PA 19426

August 2, 2017

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## GENERAL DESCRIPTION

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Perkiomen Township (the MS4) is located in Montgomery County, Pennsylvania immediately north of Trappe Borough and primarily along the west side of Perkiomen Creek. The Township is primarily residential with a mix of commercial, manufacturing and institutional (school) land uses. The Urbanized Area (UA) from the 2010 census covers the entire Township. The extents of the UA are shown on Map #1. All maps associated with this document may be found in Appendix B.

Geographically, the Township is split by the Perkiomen Creek and East Branch of the Perkiomen Creek.

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## WATERSHEDS AND IMPAIRMENTS

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There are three primary watersheds within the Township and a fourth secondary watershed identified by the Pennsylvania Department of Environmental Resources (PaDEP) in the requirements table (Appendix A of this document) or have sub watersheds that are impaired. The overall watersheds are shown on Maps #2 - #5. Their names and impairments are:

<b>Impaired Downstream Waters Name</b>	<b>Impairment</b>	<b>Appendix</b>
Unnamed Tributaries to Perkiomen Creek <sup>1</sup>	Siltation	E
Schoolhouse Run	Siltation	E
Perkiomen Creek	Pathogens	B

<sup>1</sup>The tributaries listed are (north to south) Trib 01167 (Mine Run), Trib 01165 and Trib 01163 (Landis Creek).

PaDEP requires that the MS4 address each impairment in accordance with the appendix noted. Appendix B requires that the MS4 “Map and Inventory” all suspected and known sources of the impairment within the drainage area of outfalls and identify if they are suspected or known, the basis for this determination, the responsible party (if known), and any corrective action the permittee has taken or plans to take for any of these sources. The inventory shall be submitted to PaDEP with an annual MS4 Status Report due no later than September 30, 2020.

For those impairments that require the Township to address impairments of Sediment (Siltation), the MS4 is required to prepare a Pollution Reduction Plan (PRP) that demonstrates that the pollutant reduction(s) (lbs/year) proposed in the PRP have been achieved within 5 years following the PaDEP’s approval of coverage under the General Permit. Sediments shall be reduced by 10%. The following pollution reduction plan demonstrates that Perkiomen Township will reduce sediments by 10% in accordance with the General Permit requirements.

Since the Unnamed Tributaries to Perkiomen Creek and Schoolhouse Run are within the same USGS HUC-12 watershed boundary, Perkiomen Township has chosen to aggregate the loading reduction requirements and treat the entire loading within the Perkiomen Greene subdivision which is solely located within the Schoolhouse Run watershed.

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## **POLLUTION REDUCTION PLAN (PRP)**

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### **Mapping Sewersheds**

As required by the original permit, Perkiomen Township had mapped their entire storm sewer system prior to the current permit renewal. In order to meet the requirements of the permit renewal for load reductions, efficiently map sewersheds, and provide a PRP that identifies Best Management Practices (BMPs) that can meet the required 10% sediment reductions, the Township has taken a very systematic approach to delineating storm sewersheds.

The overall storm sewersheds were delineated first, parsing out areas not within the UA as well as areas not within the impaired watershed and only upstream of the lowest outfall said area. These maps were not finalized nor were existing loading calculations finalized until the Township, along with its engineer, identified potential areas for BMPs. One of the most efficient and cost effective means to address sediment reduction is through the conversion of conventional detention basins to extended detention wet basins or naturalized basins that more efficiently remove pollutants. Cost efficiency can be greater if the Township already owns the basins. Fortunately, Perkiomen Township owns the 6 conventional detention basins located within the subdivision known as Perkiomen Greene. All basins were designed as conventional basins solely for rate control with grass bottom interiors. Knowing that these basins would be the prime source of sediment reduction, the Township Engineer focused on utilizing these basins as the sole means of meeting the reduction requirements.

### **Existing Loading and Reduction Calculations**

The Township Engineer chose to use the simplified method (excel spreadsheet) for the calculations. The data source for the impervious and pervious areas were developed from the 2011 National Land Cover Database (NLCD 2011). The BMP effectiveness utilized in this analyses are taken from the PaDEP BMP Effectiveness Values Table document 3800-PM-BCW0100m.

**Whole Township Storm Sewersheds**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Required Sediment Reduction (lbs/yr) (10%)
Impervious	156.49	1839.00	287776.41	
Pervious	325.65	264.96	86284.02	
	<b>482.13</b>		<b>374060</b>	<b>37406</b>

Perkiomen Township Existing Sediment Loading and Required Sediment Reduction

The following outfalls have conventional detention basins that have agreements for maintenance and are properly maintained. Therefore, this PRP is taking the standard 10% credit to reduce the overall existing loading.

**Basin at Outfall 135 (Fox Heath)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	6.40	1839.00	11777.82	
Pervious	13.12	264.96	3474.97	
	<b>19.52</b>		<b>15253</b>	<b>1525</b>

Sediment Reduction From Basin 135 (40.236054, -75.473885)

**Basin at Outfall 136 (Fox Heath)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	6.92	1839.00	12732.05	
Pervious	10.92	264.96	2894.59	
	<b>17.85</b>		<b>15627</b>	<b>1563</b>

Sediment Reduction From Basin 136 (40.237248, -75.472010)

**Basin at Outfall 334 (Mayfield Estates)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	1.47	1839.00	2703.91	
Pervious	2.14	264.96	567.61	
	<b>3.61</b>		<b>3272</b>	<b>327</b>

Sediment Reduction From Basin 334 (40.241202, -75.467488)

**Basin at Outfall 335 (Mayfield Estates)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	0.97	1839.00	1788.66	
Pervious	2.56	264.96	679.41	
	<b>3.54</b>		<b>2468</b>	<b>247</b>

Sediment Reduction From Basin 335 (40.240298, -75.465484)

**Basin at Outfall 336 (Mayfield Estates)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	1.52	1839.00	2787.02	
Pervious	2.31	264.96	612.46	
	<b>3.83</b>		<b>3399</b>	<b>340</b>

Sediment Reduction From Basin 336 (40.239969, -75.463380)

**Basin at Outfall 706/707 (Mayfield Estates)**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (10%)
Impervious	5.77	1839.00	10604.38	
Pervious	10.34	264.96	2739.61	
	<b>16.11</b>		<b>13344</b>	<b>1334</b>

Sediment Reduction From Basin 706/707 (40.242309, -75.462103)

**Total Sediment Reduction (lbs/yr): 5336**

**Total Existing Sediment Loading (lbs/yr): 368724**  
**Total Required Sediment Reduction (lbs/yr) (10%): 36872**

**Basin at Outfall 406**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (60%)
Impervious	5.72	1839.00	10520.57	
Pervious	3.91	264.96	1035.69	
	<b>9.63</b>		<b>11556</b>	<b>6934</b>

Outfall 406 (40.213639, -75.466154) Generated Sediment and Provided Reduction

**Basin at Outfall 003**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (60%)
Impervious	7.19	1839.00	13218.37	
Pervious	7.96	264.96	2108.20	
	<b>15.14</b>		<b>15327</b>	<b>9196</b>

Outfall 003 (40.212990, -75.455902) Generated Sediment and Provided Reduction

**Basin at Outfall 002**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (60%)
Impervious	5.21	1839.00	9573.04	
Pervious	6.80	264.96	1800.90	
	<b>12.00</b>		<b>11374</b>	<b>6824</b>

Outfall 002 (40.211226, -75.460117) Generated Sediment and Provided Reduction

**Basin at Outfall 103**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (60%)
Impervious	1.78	1839.00	3280.00	
Pervious	2.69	264.96	712.73	
	<b>4.47</b>		<b>3993</b>	<b>2396</b>

Outfall 103 (40.212671, -75.463585) Generated Sediment and Provided Reduction



**Basin at Outfall 416**

Land Cover	Area (Ac)	Loading Rate (lbs/ac/yr)	Sediment Loading (lbs/yr)	Sediment Reduction (lbs/yr) (60%)
Impervious	5.08	1839.00	9345.66	
Pervious	9.25	264.96	2451.74	
	<b>14.34</b>		<b>11797</b>	<b>7078</b>

Outfall 416 (40.211343, -75.461484) Generated Sediment and Provided Reduction

**Required Sediment Reduction (lbs/yr):            36,872**

**Total Sediment Reduction (lbs/yr):            43,238**

Conclusion: The removal of 43,238 lbs/yr by the BMP is greater than the 10% reduction requirement (36,872 lbs/year) and therefore the design meets the permit requirements for this watershed.

It should be noted that during the first year of the permit term, the Township will pursue means to help reduce the total number of basins required to be modified. Infiltration testing will be completed and if positive results are found, the efficiencies would rise and thus the total basin conversions may decrease. In addition, more existing detention basins may be analyzed to help reduce existing loading which in turn may also decrease the number of basin conversions required.

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**BMP INSTALLATION AND FINANCING PLAN**

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**Background**

Perkiomen Township realizes the importance to establish a designed infrastructure to reduce pollution being transmitted to our waterways and, even more importantly, properly plan for the installation of such facilities, including how to finance the costs of these installations. A proper sequencing plan of installations and a pro-active financing plan increase the potential for success to accomplish our goals of reducing our waterway pollution.

As noted by the above calculations, Perkiomen Township has identified that by converting 5 basins within the Perkiomen Greene subdivision, the required load reductions may be met. This analysis does not include utilizing infiltration as part of the basin conversions as a credit for pollution reduction. During the beginning

of the permit 5 year term, the Township will conduct infiltration testing within the basins and if feasible reduce the amount of work (# of basin conversions) required to meet the pollution reduction plan requirements. At that time, more detailed designs of the facilities will be completed.

Perkiomen Township is located in the Perkiomen Valley of Montgomery County. The Township is bordered by the Perkiomen Creek to the north, Collegeville Borough/Trappe Borough to the east, Limerick Township to the west, and Upper Providence Township to the south. The Township is roughly 4.9 square miles. As of 2010, the population is 9,139 people. The Township is a Second-Class Township governed by a five-member Board of Supervisors. There is currently 27.15 miles of roadway maintained by the Township. The Township's revenues are principally the Earned Income Tax and the mileage rate. Presently, the Township has not created a storm sewer user fee to pay for the implementation and maintenance of the BMPs to be installed as part of the Pollution Reduction Plan. The present plan is to cover these costs through the Capital Reserve Funds of the Township. However, the Township will consider other options should they become available (e.g. grants, volunteers, etc.) or if they deem other methods (e.g. storm sewer user fee, etc.) to be a better means to finance these projects.

Without grants or other financial assistance, the Township's anticipated cost to convert the existing 5 basins is \$400,000. The Township will own and maintain the BMP in accordance with proper BMP maintenance protocols. The estimated annual maintenance cost for all 5 facilities would be approximately \$1,500.

## **Goal**

The goal of the Perkiomen Township BMP Installation and Financing Plan is to lay out a specific set of criteria to install and finance our Best Management Practice sites to achieve measurable milestones and goals. This set of specific criteria shall be kept simple for continuity purposes with any staff changes yet detailed enough to provide accountability by the township. The program shall be arranged to allow some flexibility in the event of extenuating circumstances taking place outside of the Perkiomen Township Pollution Reduction Plan that may conflict with or impact the ability to implement this plan. Once the BMPs are completed, routine maintenance will likely be completed by Township staff. However, should any maintenance or repairs extend beyond their capabilities, the Township will hire a contractor that is capable of providing the appropriate services.

## **Strategies to Achieve Measurable Goals**

The next MS4 Permit period will contain five years from March 16, 2018 through March 15, 2023. This allows time for the township to plan, prepare, and arrange financing to complete the required BMP facilities within the five year period. Obviously, due to the nature of the work, these BMP facilities will need to be constructed during suitable weather conditions free from freezing temperatures.

## **Timing of Projects**

Each of the BMP facility projects will likely be installed in separate years to minimize the overall financial impact to the Township in any given year. However, all BMPs will be installed and functioning by the end of the permit period.

No BMP facilities will be installed in the first year of the permit cycle. This will allow the township to properly prepare for the projects, complete topographical surveys, infiltration testing secure and adjust for any design modifications. This one year period will also allow the township to reinforce the financial planning of these projects.

Although it is likely that 2, 3 or more facilities in any given year from 2019 to 2022 will be constructed, Perkiomen Township is only committing to have the facilities required to meet the load reduction requirements constructed and functioning by the end of the permit period.

## **Method of Installation**

Perkiomen Township will publicly bid the projects and their engineer will oversee the construction.

## **Financing**

All material, labor and equipment costs associated with the installation of these facilities will be paid for through the Perkiomen Township's Capital Reserve Fund or Storm Sewer User Fund. Presently, Perkiomen Township has not created a Storm Sewer User Fee. The initial course of action will be to fund these improvements through the Township's Capital Reserve Fund. If it is determination that the funding source must be altered, that determination will be made depending upon the most prudent course of action in implementing the PRP.

## Appendix A

Pennsylvania Department of Environmental Protection (PaDEP) Requirements Table

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
<b>Montgomery County</b>						
NARBERTH BORO	PAG130080	No		East Branch Indian Creek	Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Gulley Run		Water/Flow Variability (4c)
				Indian Creek	Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	
				Cobbs Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
NEW HANOVER TWP	PAG130020	No		Swamp Creek	Appendix E-Siltation (5)	Cause Unknown (5)
				Schuylkill River	Appendix C-PCB (4a)	
NORRISTOWN BORO	PAG130159	No		Schuylkill River	Appendix C-PCB (4a)	
				Stony Creek	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
				Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Sawmill Run	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
				Unnamed Tributaries to Stony Creek		Cause Unknown (5)
NORTH WALES BORO	PAG130005	Yes	TMDL Plan	Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Other Habitat Alterations, Water/Flow Variability (4c)
PENNSBURG BORO	PAG130063	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	
PERKIOMEN TWP	PAG130069	No		Unnamed Tributaries to Perkiomen Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Schoolhouse Run	Appendix E-Siltation (5)	
				Perkiomen Creek	Appendix B-Pathogens (5)	
PLYMOUTH TWP	PAG130008	No		Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Sawmill Run	Appendix E-Siltation (5)	Turbidity (5), Water/Flow Variability (4c)
				Diamond Run	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Plymouth Creek	Appendix E-Siltation (5)	Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	
POTTSTOWN BORO	PAG130033	No		Schuylkill River	Appendix C-PCB (4a)	
				Schuylkill River PCB TMDL	Appendix C-PCB (4a)	
				Unnamed Tributaries to Manatawny Creek	Appendix E-Siltation (5)	Flow Alterations, Other Habitat Alterations (4c)
RED HILL BORO	PAG130164	No		Green Lane Reservoir	Appendix E-Organic Enrichment/Low D.O. (4a)	

## Appendix B

Maps #1 through #5



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