

# Municipal Separate Storm Sewer System (MS4) Pollution Reduction Plan

**Prepared for**  
Hatfield Borough  
401 S. Main St.  
P.O. Box 190  
Hatfield, PA 19440



**Prepared by**  
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Bursich Project Number: HAT-01/065080

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## **Introduction – Purpose, Scope and Public Participation**

Hatfield Borough is required to develop and implement a Pollutant Reduction Plan (PRP) for sediment nutrient and pathogen impairments to the West Branch of the Neshaminy Creek and Neshaminy Creek. These plans are required as part of the 2018 National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4) General Permit (PAG-13) application to the Pennsylvania Department of Environmental Protection (DEP). These permits are re-issued every five years to municipalities that lie within urbanized areas, as Hatfield Borough lies completely within an urbanized area. This area is defined by the U.S. Census Bureau as an area within census blocks and/or tracts that has a population of 50,000 people or greater within the defined territory. Ultimately, this plan provides a 5-year framework on how Hatfield Borough will meet its permit requirements.

The PRP must contain certain elements to satisfy the requirements of the evolving MS4 permit program. These elements are:

- Public Participation – 30-day public comment period with public notice
- Mapping – identifying land uses, the stormwater conveyances, and existing and proposed BMP's
- Pollutants of Concern
- Determining existing loads for Pollutants of Concern
- Selection of Best Management Practices (BMPs) to achieve minimum required reduction of the pollutants of concern
- Identification of funding sources for pollution reduction BMPs
- Identification of responsibility for operation and maintenance of BMPs

Several base factors must be known to prepare the PRP. These factors will be explained and detailed in the information provided in this PRP narrative. The base factors include the following:

- Pollutant type/category (a pre-existing condition of the stream assessed by DEP)
- Existing pollutant load to the impaired stream from the urbanized area (i.e., the calculated pollutant amounts contributed from the MS4 planning area)
- The pollution load reduction required
- The PRP planning area of the Borough (the urbanized area within the Borough draining to the MS4, excluding parsed areas)
- The means of achieving and maintaining the required pollutant reduction

This PRP must be made available to the public for a comment period of 30 days to satisfy the requirement of public involvement. Any comments received within the time frame will be addressed in Appendix A of this PRP. As well, proof of public notification will be provided in Appendix A.

## Permit Requirements and Pollutant Impairment(s) of the West Branch Neshaminy Creek.

The included excerpt from the MS4 Requirements Table provides the impaired downstream waters name and the impairment required to be addressed. The Neshaminy Creek, while not in the Borough limits, is listed in this table because it is the receiving water course for the West Branch Neshaminy Creek. The Neshaminy Creek impairments will be addressed, in part, by the implementation of the Hatfield Borough PRP.

<b>INDIVIDUAL PERMIT REQUIRED:</b> No	<b>REASON:</b> n/a	<b>NPDES ID:</b> PAG130052
<b>IMPAIRED DOWNSTREAM WATERS</b>	<b>REQUIREMENTS</b>	<b>OTHER CAUSES OF IMPAIRMENT</b>
West Branch Neshaminy Creek	Appendix E-Siltation (4a) Appendix E-Excessive Algal Growth Nutrients Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
Neshaminy Creek	Appendix E-Siltation (4a) Appendix B-Pathogens (5) Appendix E-Nutrients Organic Enrichment/Low D.O. (5)	

*Source - DEP Document- Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*

Appendix E of the MS4 Permit Application provides direction to the Permittee/Municipality that the minimum reduction for sediment (Total Suspended Solids - TSS) loading over the 5-year life of the MS4 permit be 10% and for nutrients (Total Phosphorous – TP) a 5% reduction. DEP allows PRPs to use a presumptive approach that assumes a 10% reduction in TSS loading from the PRP planning area will correlate to a 5% reduction in TP loading. Sediment is the primary surrogate for phosphorous, as phosphorous is typically bound to the sediment particle and transported through natural and accelerated erosion processes. Furthermore, phosphorous is the primary nutrient for aquatic vegetation (i.e., algae growth).

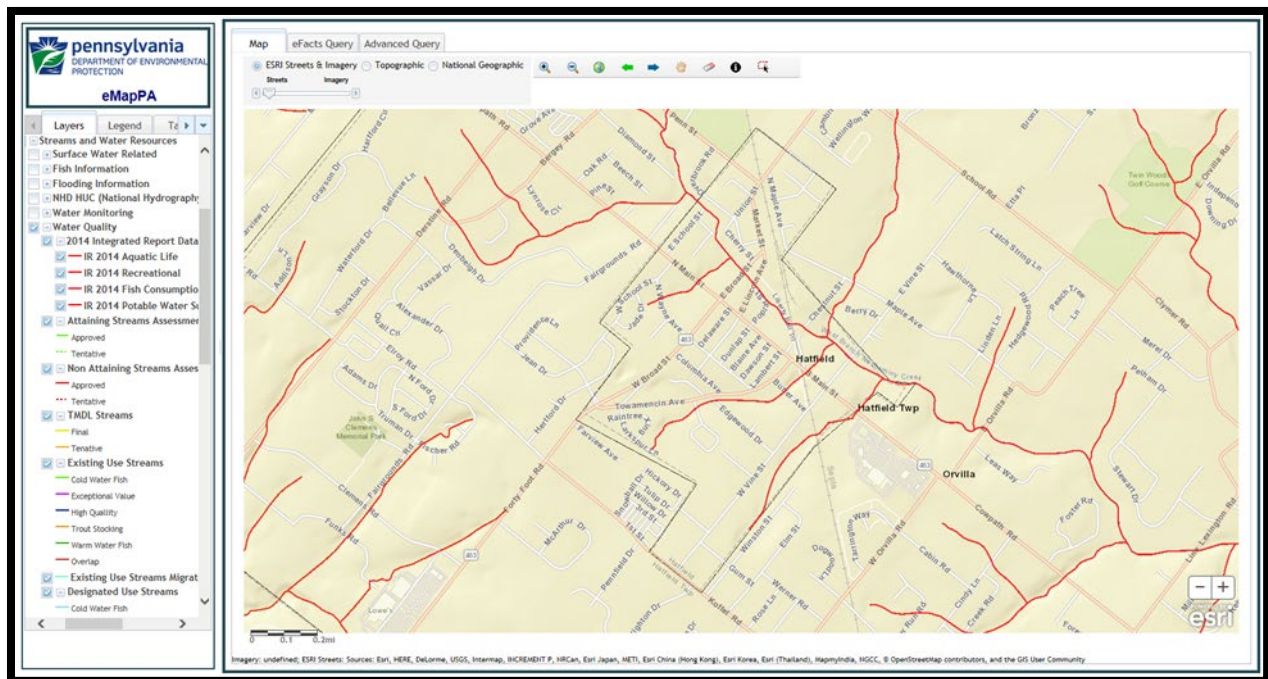
Appendix B of the MS4 Permit Application provides direction to the Permittee/Municipality that it identifies suspected and known sources of bacteria, and document their investigation and sampling, as required under the Illicit Discharge Detection & Elimination Program under MCM#3 of the MS4 General Permit.

The 2018 MS4 Permit lifespan is March 16, 2018, to March 15, 2023. An annual report on the implementation of the PRP is due on September 30<sup>th</sup> of each year for the 5-year life of the permit. This report will include efforts towards the permit requirements and pollutant reductions occurring from July 1 – June 30 of the respective years.

The MS4 program permit requirements are to be accomplished within the 5-year permit term. Subsequent permit term requirements can be expected to be the same or more stringent.

## Hatfield Borough Watershed Information

Hatfield Borough lies entirely within the watershed of the West Branch of the Neshaminy Creek. The following map was generated utilizing the DEP eMapPA system.



## Pollutant Load Analysis – Methods, Calculations & Considerations

An analysis of existing land cover within each watershed was required to estimate impervious and pervious area. This information is key to calculating the baseline sediment loading to the portion of stream that lies within the Borough limits. Land cover information was obtained from the Stroud Water Research Center's Wiki Watershed online modeling application. The web-based, geo-referenced modeling tool extrapolates land use over a specified area (Hatfield Borough) using data provided by the 2011 National Land Cover Database (NLCD 2011) land use information.

Parsing provides for the MS4 permittee to eliminate areas within the storm sewer shed that do not drain to the MS4, and for areas already covered by an NPDES permit for stormwater discharges. Railroad and private property not contributing to the MS4 have been parsed. This area provides for a 126.5-acre reduction in the overall planning area for the PRP, bringing the net total area within the PRP to 284.06 acres. No other existing permitted areas were found or known to be worthy of parsing, based on current information related to railroad storm systems.

The baseline sediment loading rate was calculated using the above referenced Wiki Watershed modeling tool output of NLCD 2011 combined with DEP provided loading rates based on extensive modeling from across the Chesapeake Bay Watershed (Hatfield Borough lies outside of this watershed). This information is presented in the following table and maps.

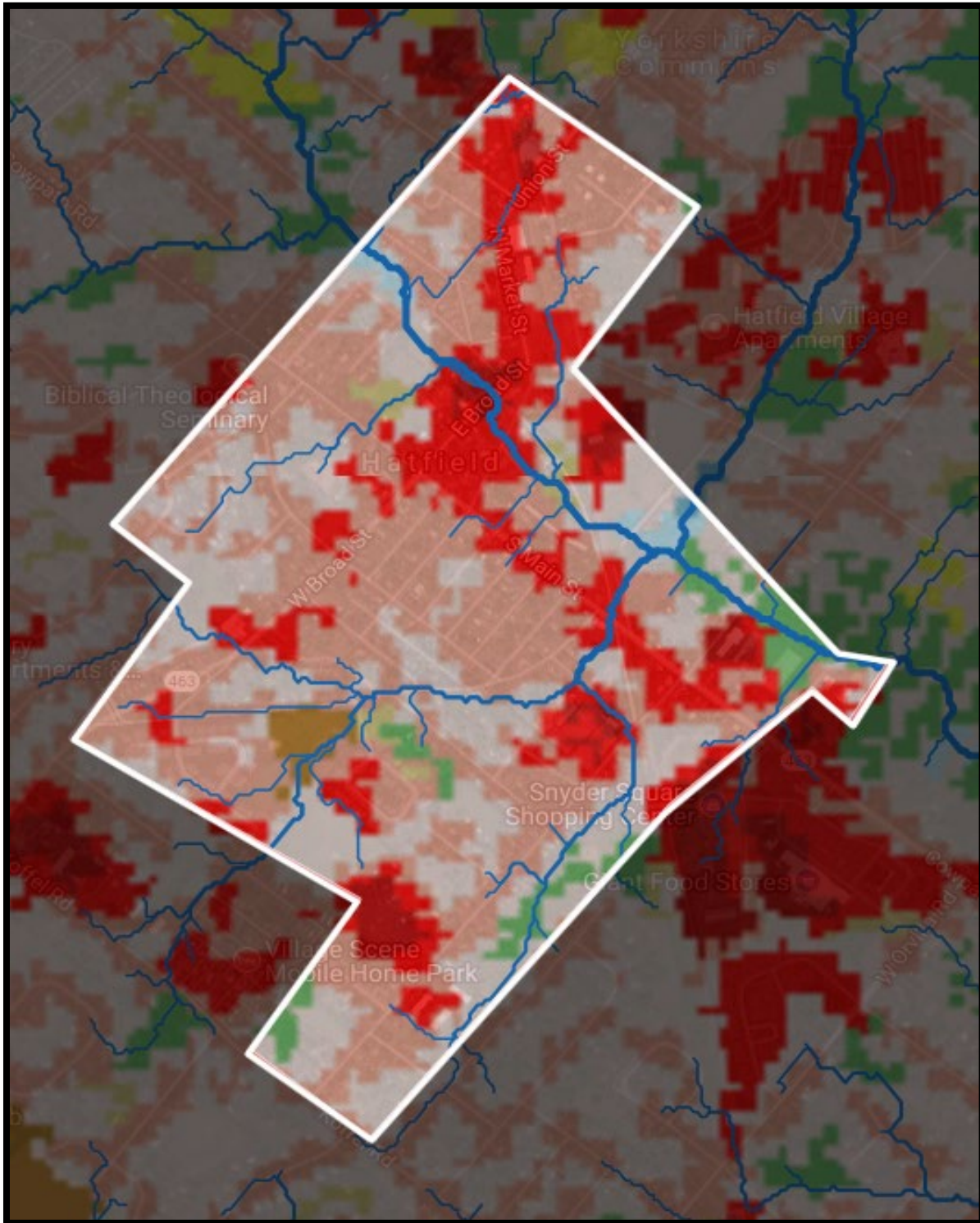
## Hatfield Borough Land Use Data Table, NLCD-2011

Type of Land Cover	Area (m <sup>2</sup> )	Coverage (%)	Area (Acres)	% Impervious	Total Impervious Acreage
Open Water	0.00	0.0	0.0	0.0	0.0
Perennial Ice/Snow	0.00	0.0	0.0	0.0	0.0
Developed, Open Space	519,484.58	31.3	128.37	20	25.67
Developed, Low Intensity	644,196.77	38.8	159.18	35	55.71
Developed, Medium Intensity	295,182.09	17.8	72.94	65	47.41
Developed, High Intensity	78,057.27	4.7	19.28	100	19.28
Barren Land (Rock/Sand/Clay)	0.00	0.0	0.0	0.0	0.0
Deciduous Forest	66,393.54	4.0	16.40	0.0	0.0
Evergreen Forest	0.00	0.0	0.0	0.0	0.0
Mixed Forest	0.00	0.0	0.0	0.0	0.0
Shrub/Scrub	19,738.62	1.2	4.87	0.0	0.0
Grassland/Herbaceous	0.00	0.0	0.0	0.0	0.0
Pasture/Hay	0.00	0.0	0.0	0.0	0.0
Cultivated Crops	19,738.62	1.2	4.87	0.0	0.0
Woody Wetlands	17,046.99	1.0	4.21	0.0	0.0
Emergent Herbaceous Wetlands	1,794.42	0.1	0.44	0.0	0.0
<b>TOTALS</b>	<b>1,661,632.90</b>	<b>100.1</b>	<b>410.56</b>	<b>36.07</b>	<b>148.07</b>
<i>Parsed areas</i>	<i>511,927.00</i>	<i>31</i>	<i>126.5</i>	<i>33</i>	<i>10</i>
<b>NET TOTALS</b>	<b>1,149,705.9</b>	<b>69</b>	<b>284.06</b>	<b>48</b>	<b>126.05</b>

Data for this table derived from NLCD-2011: <http://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description>

See Appendix F for detailed legend

## Hatfield Borough Land Use Data Map, NLCD-2011



See Appendix F for detailed legend

## Pollutant Reduction Analysis - Methods, Calculations & Considerations

Consideration of current pollution prevention practices the Borough conducts and/or are existing have been evaluated for their viability to be included in the reduction of the existing pollutant load. Being of relatively small size with most of the land in an urbanized use, the Borough does not have many existing BMPs that give substantial credits towards reducing the existing pollutant load with the exception of the Heather Meadows Stormwater Basin.

#### Heather Meadows Wetland Basin

The naturalized wetland basin in the Heather Meadows Development was preliminarily evaluated for its potential reduction in the existing pollutant load calculation. Due to its relative drainage area (appx. 32.5 acres) within the PRP planning area (appx. 410 acres) its net reduction is significant, covering appx. 8% of the PRP planning area. The credited reduction of the existing pollutant load is calculated at 16,754.80 lbs./yr. This information is provided below in table and map (Appendix C) form.

### **Heather Meadows Wetland Basin Drainage Calculation Table**

Data for this table derived from NLCD-2011: <http://www.mrlc.gov/data/legends/national-land-cover->

Type of Land Cover	Area (m <sup>2</sup> )	Coverage (%)	Area (Acres)	% Impervious	Total Impervious Acreage
Developed, Open Space	26,019.12	19.73	6.43	20	1.29
Developed, Low Intensity	38,580.08	29.25	9.53	35	3.34
Developed, Medium Intensity	47,552.19	36.05	11.75	65	7.64
Cultivated Crops	0	0	0	0	0
Developed, High Intensity	4,486.06	3.4	1.1	100	1.1
Open Water	0.00	0.0	0	0	0
Deciduous Forest	897.21	0.68	.22	0	0
Shrub/Scrub	0.00	0.0	0	0	0
Grassland/Herbaceous	0.00	0.0	0	0	0
Pasture/Hay	14,355.38	10.88	3.55	0	0
Woody Wetlands	0.00	0.0	0	0	0
Emergent Herbaceous Wetlands	0.00	0.0	0	0	0
<b>TOTALS</b>	<b>131,890.00</b>	<b>100</b>	<b>32.5</b>	<b>38</b>	<b>12.27</b>

[database-class-legend-and-description](#)

See Appendix F for detailed legend



## Heather Meadows Wetland Basin Sediment Removal Table

\*Based on DEP Developed Land Loading Rates for PA Counties – Appendix D

Drainage Area Acres	Impervious Acres	Pervious Acres	Impervious Acres Loading Rate – TSS * lbs./acre/yr.	Pervious Acres Loading Rate – TSS * lbs./acre/yr.	Total Loading Rate -TSS lbs./yr.	TSS Removed at 60% efficiency ** lbs. /yr.
32.5	12.27	20.23	1839	264.96	27,924.67	<b>16,754.80</b>

\*\*Based on DEP approved BMP effectiveness values – Appendix E

**12.27 Impervious acres x 1839 lb./acre/yr. = 22,564.53 lb./acre/yr. x .60 (60% efficiency) = 13,538.72 lb./acre/yr.**  
**20.23 pervious acres x 264.96 lb./acre/yr. = 5,360.14 lb./acre/yr. x .60 (60% efficiency) = 3,216.08 lb./acre/yr.**

Heather Meadows Wetland Basin is an existing water impoundment structure that was expanded in 2001 with the development of the Heather Meadows Development. The structure retains several shallow pools, allowing the settlement of some of the received sediment. The impoundment was planted with cattails, as many basins were in the early days of stormwater management. Today the basin continues to be maintained for its designed function as a well-established naturalized, wetland basin with emergent plants, shrubs, and trees. A supporting photo can be found in Appendix C. The above land cover data table indicates the basin as pasture/hay land based on remote sensing features. Essentially, the equipment used to determine these land types likely identified this area to be a crop field. The coordinates for the location of this BMP are: Latitude – 40 degrees 16' 28.76" N  
 Longitude – 75 degrees 18' 6.95" W

The naturalized wetland basin is the backdrop for a community park and is well maintained. Operation and Maintenance duties are as follows in the below table.

## Heather Meadows Wetland Basin O&M Duties Table

Operation and Maintenance	Activity	Frequency	Responsible Party
Visual Inspection of the BMP structure	Visual inspection to ensure outfalls and outlet have not been blocked by debris and erosion is not occurring.	After each storm event or on a weekly basis	Hatfield Borough
Vegetation Management	Mowing and trimming of basin berms.	Weekly/bi-weekly during the growing season	Hatfield Borough
Invasive removal	Hand removal of invasive vegetation.	Annually	Hatfield Borough
Sediment Removal	Mechanical removal of accumulated sediment based on a designed plan	Evaluate every 5 years	Hatfield Borough

## Hatfield Borough Land Cover Table (inclusive of parsed area)

Type of Land Cover	Area (m <sup>2</sup> )	Area (Acres)
TOTALS	1,661,632.90	410.56
<i>Parsed areas</i>	<i>511,927.00</i>	<i>126.5</i>
<b>NET TOTALS</b>	<b>1,149,705.90</b>	<b>284.06</b>

## Hatfield Borough Existing Pollutant Load Calculation Table Existing Structural BMPs & Parsed Areas

Type of Land Cover	Coverage (%)	Total Acreage	TSS Loading Rate lbs./acre/yr. *	TSS Loading Rate lbs./yr.	Heather Meadows Basin Reduction lbs./yr. **	Net Total TSS Loading Rate lbs./yr.	10% Required Reduction lbs./5yr.	Annual Required Reduction lbs./yr.
Impervious Area (Acres)	48	138.07	1,839	253,910.73	See below	253,910.73	24,037.20	4,807.45
Pervious Area (Acres)	52	145.99	264.96	38,681.51	See below	38,681.51	3,546.54	709.30
Heather Meadows Basin Drainage (Acres)	11	32.5	n/a	27,924.67	16,754.80	11,169.87	n/a	n/a
Impervious Area (Acres)	38	12.27	1,839	22,564.53	@ 60% = 13,538.72	9,025.81	n/a	n/a
Pervious Area (Acres)	62	20.23	264.96	5,360.14	@60% = 3,216.08	2144.06	n/a	n/a
<b>NET TOTALS</b>	<b>100</b>	<b>284.06</b>	n/a	292,592.24	16,754.80	275,837.44	27,583.74	<u>5,516.75</u>

\*Based on DEP Developed Land Loading Rates for PA Counties – Appendix D

\*\* Based on DEP approved BMP effectiveness values – Appendix E

**Impervious area calculation: 138.07-acre x 1,839 = 253,910.73 – 13,538.72 = 240,372.01 x .10 = 24,037.20**

**Pervious area calculation: 145.99-acre x 264.96 = 38,681.51 – 3,216.08 = 35,465.43 x .10 = 3,546.54**

## Structural and Non-Structural Best Management Practices (BMPs)

### Street Sweeping and Inlet Cleaning

Street sweeping was evaluated for its potential use in reducing the existing pollutant load calculation. The DEP previously provided credits for this BMP with a 9% efficiency factor in its ability to reduce TSS from the existing pollutant load, as provided in Appendix E. A 10% reduction is the minimum required. As a result, sweeping may not stand alone as a pollution reduction method. This is considered a non-structural practice related to a human action. This method was recommended to be disallowed by the Chesapeake Bay Program - Expert Panel Report on Street and Storm Drain Cleaning, after 2017 due to generalization and assumptions made on the practice. The new calculation method is much more specific to the machinery and methods of the sweeping practice and is utilized in the table below.

### Basin Retrofit

A basin retrofit is an opportunity to increase the effectiveness of a stormwater management facility. These retrofits may be conversions, enhancements, or restorations. Heather Meadows Wetland Basin can be enhanced by utilizing the original design of the basin and increasing the volume and hydraulic residence time of the stormwater runoff in the basin. This activity will achieve the sediment load reduction needed to meet the MS4 program requirement of a 10% reduction in the total pollutant load for the MS4.

## Hatfield Borough Pollution Reduction Plan – Proposed, Non-Structural BMPs

BMP	Total Area Applied (All Borough and State Roads)	Total TSS Loading Rate	Pollution Reduction Effectiveness Value *	Implement by Date	Funding Source	Cost Estimate	Pollution Reduction Value Lbs./yr.
Street Sweeping 25/Year (existing)	8.8 miles w/ avg. width of 35' <b>37.33 acres</b> <i>*(1 mile = 1 acre)</i>	<b>68,649.87</b> Impervious loading rate of 1839lb/acre	TSS = .5% P = 0% N = 0%	Ongoing	Hatfield Borough	Budgeted Annually	TSS = <b>343.25</b> P = 0 N = 0 <i>(Due to use of mechanical broom without vacuum)</i>
Inlet Cleaning (existing)	All inlets within Borough Limits	n/a	TSS = 0% P=0.12% N=1.11%	Ongoing	Hatfield Borough	Budgeted Annually	P = <b>17.86</b> N = <b>165.17</b>
<b>TOTAL</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>	TSS = <b>343.25</b> P = <b>17.86</b> N = <b>165.17</b>

\*Based On Chesapeake Bay Program - Expert Panel Report on Street and Storm Drain Cleaning – Table 17

## Hatfield Borough PRP – Proposed, Structural BMP Enhancement

BMP	Total Area Drainage Area Applied	Net Total TSS Loading Rate	Pollution Reduction Effectiveness Value *	Implement by Date	Funding Source	Cost Estimate	Pollution Reduction Value TSS Lbs./yr.
Heather Meadow Basin Retrofit – Impoundment of additional .51-acre feet of volume through weir structure	32.5 acres <b>12.27 Impervious</b>	<b>11,169.87</b>	50%  <u>(.51) (12)</u> 12.27 = .5 inches/impervious acre	August 2022	Borough Public Works Budget	\$7,500	<b>5,584.94</b>

\* CBP – Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects  
See Appendix C (Figure 5. Retrofit Removal Adjustor Curve for Sediment)

### Conclusion

The information provided in this PRP is based on the best information available at the time of development. This information is provided and derived from multiple sources, including regulatory agencies, non-governmental partners, and higher education institutions. Several methods were considered and evaluated for their effectiveness and accuracy in addressing the MS4 permit requirements.

It is the conclusion of this PRP, through the investigations, discussions and considerations involved, that Hatfield Borough has conducted its MS4 program with the intent of meeting the desired outcomes of the permit requirements, historically. As programmatic permit requirements evolve, other methods of evaluation and implementation may become more viable or necessary. Additional and supporting information regarding the MS4 program can be found at the following web address:

<http://www.dep.pa.gov/Business/Water/CleanWater/StormwaterMgmt/Stormwater/Pages/default.aspx>

# **Appendix A**

## **Public Comment**

*Proof of public comment period publication on following page*

PHILADELPHIA GROUP

**AFFIDAVIT OF PUBLICATION**  
390 Eaglevew Boulevard • Exton, PA 19341

**Hatfield Borough - Legal Notices**  
401 S MAIN STREET  
PO BOX 190  
HATFIELD, PA 19440  
Attention:

**STATE OF PENNSYLVANIA,**

The undersigned Shelley G. Meehan, being duly sworn the he/she is the principal clerk of The Reporter, The Reporter Digital, published in Montgomery County for the dissemination of local or transmitted news and intelligence of a general character, which are duly qualified newspapers, and the annexed hereto is a copy of certain order, notice, publication or advertisement of:

**HATFIELD BOROUGH  
PUBLIC NOTICE OF DRAFT  
POLLUTION REDUCTION PLAN**

Public Notice is being provided for the purpose of a public meeting including a public comment period for the Draft Pollution Reduction Plan (PRP) required of Hatfield Borough under the 2018 MS4 permit application process. The plans detail the methods, calculations, and considerations utilized in reducing the related pollution of the impaired West Branch Neshaminy Creek. Interested persons may submit comments during the 30-day period of April 13 - May 13, 2022. Comments must be submitted in writing to the Borough Office (address listed below) or by e-mail [admin@hatfieldborough.com](mailto:admin@hatfieldborough.com) (Attn: MS4 Coordinator), name and address must be included in the submission. Written and verbal comments will also be accepted during a public Town Hall Meeting held on May 11th at 7:00pm at the Borough Office located at 401 S. Main Street Hatfield, PA 19440. The plans may be reviewed during the comment period at the Borough Administration Office located at 401 S. Main Street Hatfield, PA 19440 weekdays from 8:30am - 4:00pm. The plan may also be viewed at the following web address [www.hatfield-borough.com/information/stormwater-management](http://www.hatfield-borough.com/information/stormwater-management).

Jaime E. Snyder  
Borough Manager  
LAN: Apr. 11. a-1

**Hatfield Borough - Legal Notices**

**Published in the following edition(s):**

The Reporter, The Reporter Digital  
04/11/22

Sworn to the subscribed before me this 4/11/22.

Maureen Schmid

**Notary Public, State of Pennsylvania  
Acting in County of Montgomery**

Commonwealth of Pennsylvania - Notary Seal  
MAUREEN SCHMID, Notary Public  
Montgomery County  
My Commission Expires March 31, 2025  
Commission Number 1248132

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# BOROUGH OF HATFIELD

County of Montgomery, Commonwealth of Pennsylvania

## RESOLUTION NO. 2022-17

### A RESOLUTION OF THE BOROUGH OF HATFIELD in the COUNTY of MONTGOMERY, COMMONWEALTH of PENNSYLVANIA

**WHEREAS**, Hatfield Borough is required to submit a Pollution Reduction Plan under the MS4 Program for the impaired waters of the W. Branch Neshaminy Creek; and provide public notice of a 30-day comment period for the Pollution Reduction Plan; and

**WHEREAS**, Hatfield Borough is required to provide a statement in the Pollution Reduction Plan that the Borough will fund the implementation and maintenance of the Pollution Reduction Plan, and verification that the public participation process was completed.

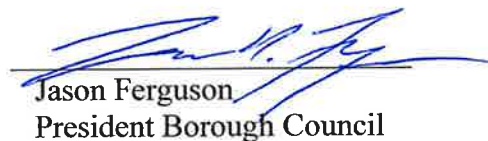
**NOW, THEREFORE BE IT RESOLVED**, that Hatfield Borough has completed the 30-day public comment period, receiving no comments, and held a Townhall meeting where the Pollution Reduction Plan was discussed. The Hatfield Borough will fund the implementation and maintenance of the Pollution Reduction Plan through the annual budgeting of funds for the MS4 program, allocated through the general fund.

**NOW APPROVED** and adopted by Hatfield Borough Council at a duly advertised public meeting held this 15<sup>th</sup> day of June 2022 with 5 Council Members Voting "Aye" and 0 Council Members voting "Nay".

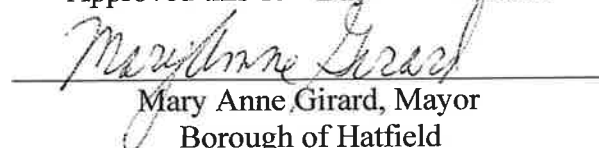
**ATTEST**

**BOROUGH OF HATFIELD**

  
Jaime E. Snyder  
Borough Manager

  
Jason Ferguson  
President Borough Council

Approved this 15<sup>th</sup> Day of June 2022.

  
Mary Anne Girard, Mayor  
Borough of Hatfield

## CERTIFICATION

I, Kathryn H. Vlahos, Assistant to the Manager for the Borough of Hatfield, do hereby certify that the foregoing Resolution 2022-17 was adopted by majority vote of Hatfield Borough Council at a Workshop / Regular session of Council held on June 15, 2022 said session being duly advertised at which a quorum was present. Further, the said Resolution was approved by the Mayor and recorded in the Resolution Book on the same date.

Dated: June 21, 2022



Kathryn H. Vlahos, Assistant to the Manager  
Borough of Hatfield

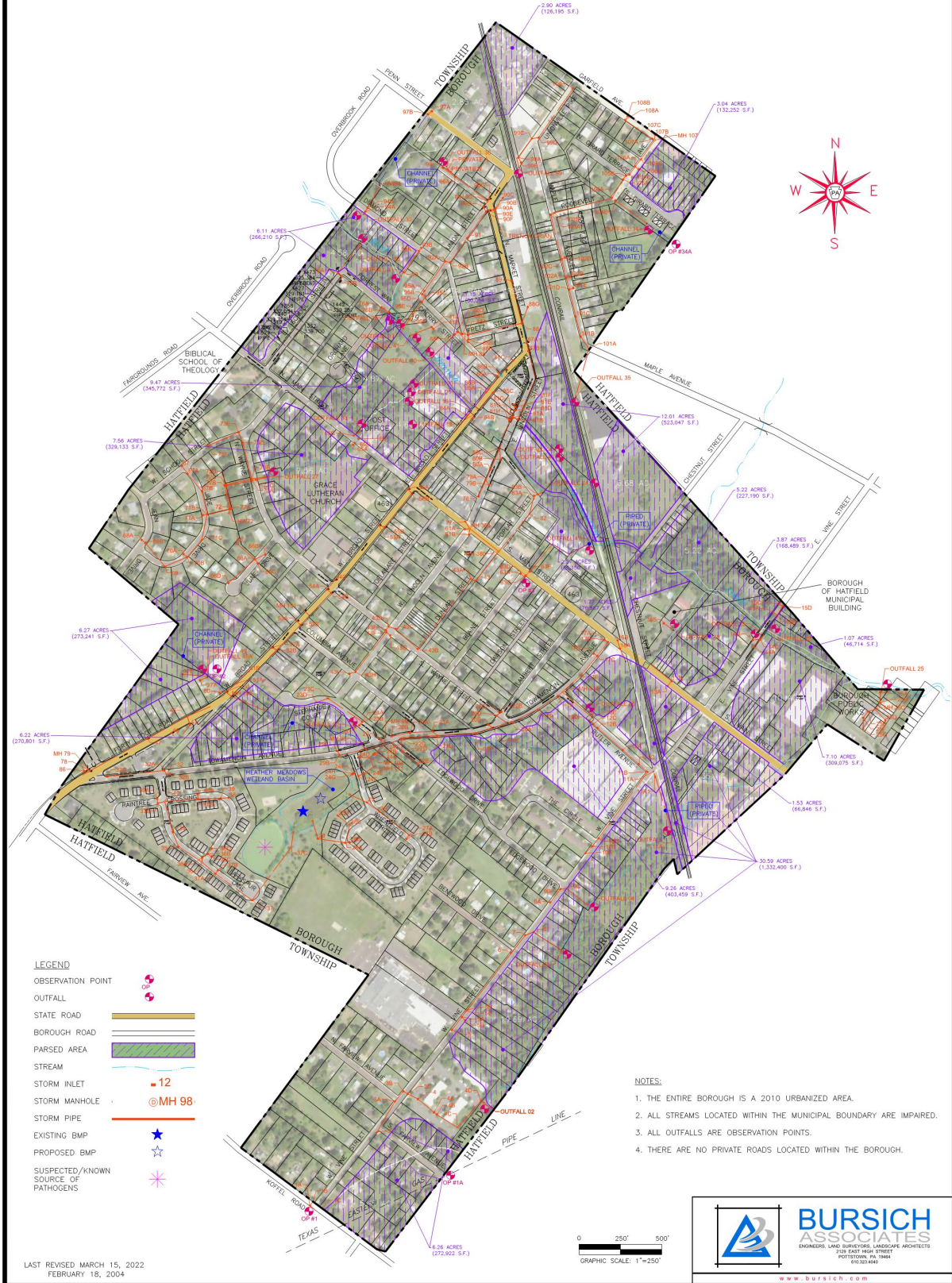


# **Appendix B**

## **Storm Sewershed Map and BMP Location Map**

# MS-4 OUTFALLS, STORM SEWERSHEDS & BMP AREAS

HATFIELD BOROUGH  
MONTGOMERY COUNTY - PENNSYLVANIA



**LEGEND**

OBSERVATION POINT	OP
OUTFALL	OF
STATE ROAD	100' - 150'
BOROUGH ROAD	75' - 100'
PARSED AREA	150' - 200'
STREAM	150' - 200'
STORM INLET	12"
STORM MANHOLE	MH 98"
STORM PIPE	12"
EXISTING BMP	★
PROPOSED BMP	☆
SUSPECTED/KNOWN SOURCE OF PATHOGENS	✳

- NOTES:**
1. THE ENTIRE BOROUGH IS A 2010 URBANIZED AREA.
  2. ALL STREAMS LOCATED WITHIN THE MUNICIPAL BOUNDARY ARE IMPAIRED.
  3. ALL OUTFALLS ARE OBSERVATION POINTS.
  4. THERE ARE NO PRIVATE ROADS LOCATED WITHIN THE BOROUGH.

LAST REVISED MARCH 15, 2022  
FEBRUARY 18, 2004



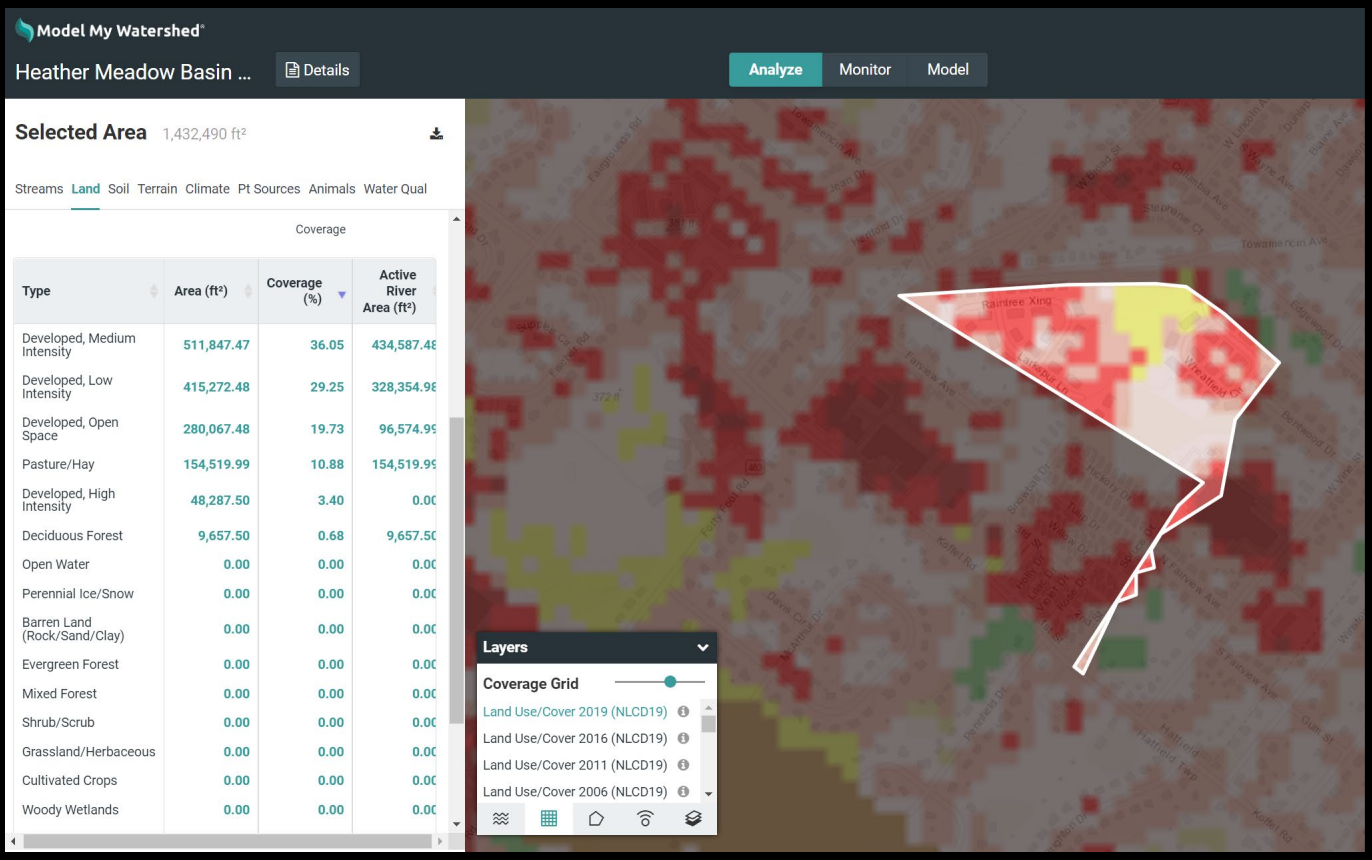
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F:\2017-01\060006\_M04\_Working\2018\_M04\_P00-13\_Review\2017\01\060006\02018.dwg, 3/15/2022 4:22:26 PM

# **Appendix C**

## **Heather Meadows Naturalized Wetland Basin** **Drainage Area Determination**

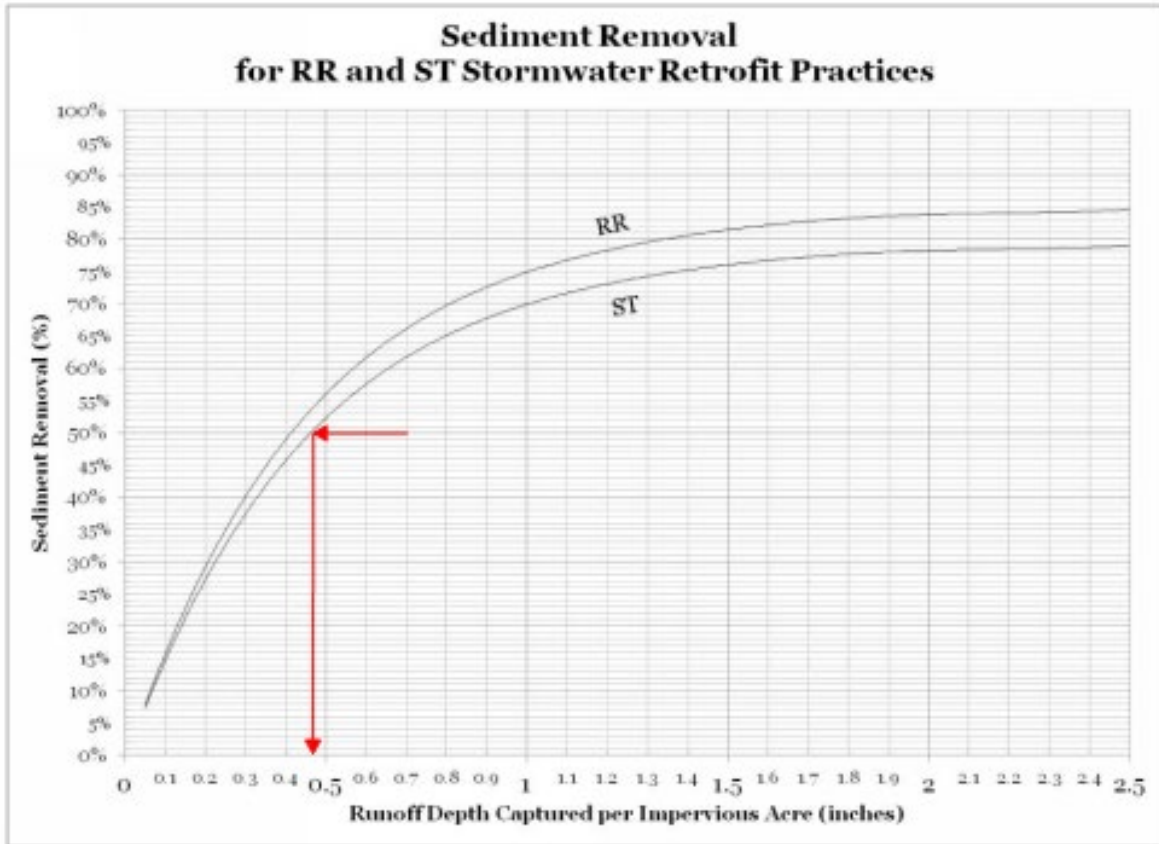
# Land Cover Determination Table and Map



# Heather Meadows Naturalized Wetland Basin Photo



## Sediment Removal Table



**Figure 5. Retrofit Removal Adjustor Curve for Sediment**

# Appendix D

## DEP Developed Land Loading Ratios

3800-PM-BCW0100k 3/2017  
PRP Instructions

### ATTACHMENT B

#### DEVELOPED LAND LOADING RATES FOR PA COUNTIES<sup>1,2,3</sup>

County	Category	Acres	TN lbs/acre/yr	TP lbs/acre/yr	TSS (Sediment) lbs/acre/yr
All Other Counties	impervious developed	-	23.06	2.28	1,839
	pervious developed	-	20.72	0.84	264.96

# **Appendix E**

## DEP BMP Effectiveness Values

**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](http://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](mailto: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.
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.

## Expert Panel Report on Street and Storm Drain Cleaning

### Section 6: Recommended Credits for Street and Storm Drain Cleaning

#### Section 6.1 Derivation of the Street Cleaning Credit

Practice #	Description <sup>1</sup>	Approx Passes/Yr <sup>2</sup>	TSS Removal (%)	TN Removal (%)	TP Removal (%)
SCP-1	AST- 2 PW	~100	21	4	10
SCP-2	AST- 1 PW	~50	16	3	8
SCP-3	AST- 1 P2W	~25	11	2	5
SCP-4	AST- 1 P4W	~10	6	1	3
SCP-5	AST- 1 P8W	~6	4	0.7	2
SCP-6	AST- 1 P12W	~4	2	0	1
SCP-7	AST- S1 or S2	~15	7	1	4
SCP-8	AST- S3 or S4	~20	10	2	5
SCP-9	MBT- 2PW	~100	1.0	0	0
<b>SCP-10</b>	<b>MBT- 1 PW</b>	<b>~50</b>	<b>0.5</b>	<b>0</b>	<b>0</b>
SCP-11	MBT- 1 P4W	~10	0.1	0	0

AST: Advanced Sweeping Technology MBT: Mechanical Broom Technology  
<sup>1</sup> See Table 15 for the codes used to define street cleaning frequency  
<sup>2</sup> Depending on the length of the winter shutdown, the number of passes/yr may be lower than shown



## Expert Panel Report on Street and Storm Drain Cleaning

### 6.4 Storm Drain Cleaning Credit

**Table 19.** Mean Nutrient Enrichment Factor to Apply to Dry Weight Mass of Solids Physically Removed From Storm Drains

Nutrient Enrichment Factor *	% P	% N	Notes
BMP and Catch Basin Sediments	<b>0.06</b>	<b>0.27</b>	See Table B-4
<b>Organic Matter/Leaf Litter</b>	<b>0.12</b>	<b>1.11</b>	<b>See Table 11</b>

\* Multiply the mass (dry weight) of sediment removed from the storm drain (in pounds) by a factor of 0.0006 and 0.0027, for TP and TN, respectively. The result is the lbs/year of TP and TN credited.

# Appendix F

## Hatfield Borough Land Use Data Key, NLCD-2011

### NLCD Land Cover Classification Legend

	11 Open Water
	12 Perennial Ice/ Snow
	21 Developed, Open Space
	22 Developed, Low Intensity
	23 Developed, Medium Intensity
	24 Developed, High Intensity
	31 Barren Land (Rock/Sand/Clay)
	41 Deciduous Forest
	42 Evergreen Forest
	43 Mixed Forest
	51 Dwarf Scrub*
	52 Shrub/Scrub
	71 Grassland/Herbaceous
	72 Sedge/Herbaceous*
	73 Lichens*
	74 Moss*
	81 Pasture/Hay
	82 Cultivated Crops
	90 Woody Wetlands
	95 Emergent Herbaceous Wetlands

\* Alaska only

Class\ Value	Classification Description
<b>Water</b>	
11	<b>Open Water</b> - areas of open water, generally with less than 25% cover of vegetation or soil.
12	<b>Perennial Ice/Snow</b> - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.
<b>Developed</b>	
21	<b>Developed, Open Space</b> - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	<b>Developed, Low Intensity</b> - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	<b>Developed, Medium Intensity</b> - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units,
24	<b>Developed High Intensity</b> -Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
<b>Barren</b>	
31	<b>Barren Land (Rock/Sand/Clay)</b> - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

A more detailed legend with land use definitions can be found at:

[https://www.mrlc.gov/nlcd11\\_leg.php](https://www.mrlc.gov/nlcd11_leg.php)

# Appendix G

## DEFINITIONS

The following definitions are sourced directly from DEP document 3800-PM-BCW0100d 5/2016

*Best Management Practices (BMPs)* means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce pollutant loading to surface waters of this Commonwealth. The term includes treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. The term includes activities, facilities, measures, planning or procedures used to minimize accelerated erosion and sedimentation and manage stormwater to protect, maintain, reclaim and restore the quality of waters and the existing and designated uses of waters within this Commonwealth before, during and after earth disturbance activities. (25 Pa. Code § 92a.2)

*Clean Water Act (CWA)* means the Federal Water Pollution Control Act, as amended, 33 U.S.C.A. §§ 1251 - 1387.

*Cleaning Agent* means any product, substance or chemical other than water that is used to clean the exterior surface of vehicles.

*Designated Uses* are those uses specified in 25 Pa. Code §§ 93.4(a) and 93.9a – 93.9z for each water body or segment whether or not they are being attained. (25 Pa. Code § 93.1)

*Dry Weather* means a condition in which there are no precipitation, snowmelt, drainage or other events producing a stormwater discharge for more than 48 consecutive hours.

*Existing Permittee* means any entity that has been designated as a regulated small MS4 and has previously obtained permit coverage under the PAG-13 General Permit or obtained an Individual NPDES MS4 Permit.

*Existing Uses* are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards. (25 Pa. Code § 93.1)

*Illicit Connection* means any physical connection to a municipal separate storm sewer system that can convey illicit discharges into the system and/or is not authorized or permitted by the permittee.

*Illicit Discharge* means any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except non-stormwater discharges as described in the “Discharges Authorized by this General Permit” section of this General Permit. Examples of illicit discharges include dumping of motor vehicle fluids, household hazardous wastes, grass clippings, leaf litter, animal wastes, or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-stormwater waste into a municipal separate storm sewer system. Illicit discharges can be accidental or intentional. **3800-PM-BCW0100d 5/2016 Permit**

*Impaired Waters* means surface waters that fail to attain one or more of its designated uses under 25 Pa. Code Chapter 93 and as listed in Categories 4 and 5 of Pennsylvania's Integrated Water Quality Monitoring and Assessment Report.

*Integrated Water Quality Monitoring and Assessment Report* means the report published every other year by DEP to report on the conditions of Pennsylvania's surface waters to satisfy sections 305(b) and 303(d) of the CWA.

*Intermittent Stream* means a body of water flowing in a channel or bed composed primarily of substrates associated with flowing water, which, during periods of the year, is below the local water table and obtains its flow from both surface runoff and groundwater discharges. (25 Pa. Code § 92a.2)

*Load Allocation* means the portion of a surface water's loading capacity that is assigned or allocated to existing and future nonpoint sources and natural quality. (25 Pa. Code § 96.1)

*Low Impact Development (LID)* means site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater. LID can be applied to new development, urban retrofits, and revitalization projects. LID utilizes design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large-scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost-effective landscape features located on-site.

*MS4 Requirements Table* is a compilation of information regarding Pennsylvania MS4s, surface waters that receive stormwater discharges from MS4s, surface water impairments and TMDLs that is posted to DEP's website, [www.dep.pa.gov/MS4](http://www.dep.pa.gov/MS4). The MS4 Requirements Table has been assembled by DEP to assist MS4 permittees in determining applicable requirements for the development of plans and implementation of BMPs, as well as eligibility for the PAG-13 General Permit. In general, the MS4 Requirements Table will be updated prior to each renewal of this General Permit based on DEP's latest published Integrated Water Quality Monitoring and Assessment Report.

*Municipal separate storm sewer* means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters; (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2. (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(8))

*Municipal Separate Storm Sewer System (MS4)* means all separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems pursuant to 40 CFR §§ 122.26(b)(4), (b)(7), and (b)(16), respectively, or designated under 40 CFR § 122.26(a)(1)(v). (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(18))

*Municipality* means a city, town, borough, county, township, school district, institution, authority or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes or other wastes. (25 Pa. Code § 92a.2)

*New Permittee* means any entity that has been designated as a regulated small MS4 and has not previously obtained permit coverage under the PAG-13 General Permit or obtained an Individual NPDES MS4 Permit.

*NOI* means the Notice of Intent for coverage under the NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems.

*Non-Municipal Permittee* means a regulated small MS4 that is not a municipality, e.g., military bases, large hospital or prison complexes, and highways and other thoroughfares. **3800-PM-BCW0100d 5/2016 Permit**

*Non-Structural BMPs* means actions that involve management and source controls such as: (1) policies and ordinances that provide requirements and standards to direct growth to identified areas, promote redevelopment, protect areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation; (2) education programs for developers and the public about minimizing water quality impacts; (3) measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, street sweeping, and source control measures such as good housekeeping, maintenance, and spill prevention; and other BMPs as referenced in Chapter 5 of the Pennsylvania Stormwater BMP Manual (363-0300-002).

*Ordinance* means a law enacted by the government of a municipality.

*Outfall* means a point source as defined by 40 CFR § 122.2 at the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters. (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(9))

*Owner or Operator* means the owner or operator of any “facility” or “activity” subject to regulation under the NPDES program. (25 Pa. Code § 92a.3(b)(1) and 40 CFR § 122.2)

*Permittee* means the owner or operator of a regulated small MS4 authorized to discharge under the terms of this General Permit.

*Point Source* means a discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, Concentrated Aquatic Animal Production Facility (CAAP), Concentrated Animal Feeding Operation (CAFO), landfill leachate collection system, or vessel or other floating craft from which pollutants are or may be discharged. (25 Pa. Code § 92a.2)

*Pollutant* means any contaminant or other alteration of the physical, chemical, biological, or radiological integrity of surface water which causes or has the potential to cause pollution as defined in section 1 of the Pennsylvania Clean Streams Law, 35 P.S. § 691.1. (25 Pa. Code § 92a.2)

*Qualifying Development or Redevelopment Project* means an earth disturbance activity that requires an NPDES permit for stormwater discharges associated with construction activity per 25 Pa. Code Chapter 102.

*Regulated Small MS4* means any small MS4 that is covered by the federal Phase II stormwater program, either through automatic nationwide designation under 40 CFR § 122.32(a)(1) (via the Urbanized Area criteria) or by designation on a case-by-case basis by DEP pursuant to 40 CFR § 122.32(a)(2). “Regulated small MS4s” are a subset of “small MS4s” as defined in this section.

*Riparian Forest Buffer* means an area of permanent vegetation consisting of native trees, shrubs, forbs and grasses along surface water that is maintained in a natural state or sustainably managed to protect and enhance water quality, stabilize stream channels and banks, and buffer land use activities from surface waters.

*Small Municipal Separate Storm Sewer System (Small MS4)* means an MS4, as defined in this section, that is not a large or medium MS4 pursuant to 40 CFR §§ 122.26(b)(4) and 122.26(b)(7). The term small MS4 includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings. (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(16))

*Standard Operating Procedure (SOP)* means a policy or set of procedures that are enacted by a non-municipal permittee to implement a stormwater management program.

*Storm Sewershed* means the land area that drains to an individual MS4 outfall from within the jurisdiction of the MS4 permittee. The term “combined storm sewershed” means the drainage areas of all MS4 outfalls that discharge to a specific surface water or to waters within the Chesapeake Bay watershed. **3800-PM-BCW0100d 5/2016 Permit**

*Stormwater* means runoff from precipitation, snow melt runoff and surface runoff and drainage. “Stormwater” has the same meaning as “storm water.” (25 Pa. Code § 92a.2)

*Structural BMPs* means stormwater storage and management practices including, but not limited to, wet ponds and extended detention outlet structures; filtration practices such as grassed swales, sand filters and filter strips; infiltration practices such as infiltration basins and infiltration trenches; and other BMPs as referenced in Chapter 6 of the Pennsylvania Stormwater BMP Manual (363-0300-002).

*Surface Waters* means perennial and intermittent streams, rivers, lakes, reservoirs, ponds, wetlands, springs, natural seeps and estuaries, excluding water at facilities approved for wastewater treatment such as wastewater treatment impoundments, cooling water ponds and constructed wetlands used as part of a wastewater treatment process. (25 Pa. Code § 92a.2)

*Total Maximum Daily Load (TMDL)* means the sum of individual waste load allocations for point sources, load allocations for nonpoint sources and natural quality and a margin of safety expressed in terms of mass per time, toxicity or other appropriate measures. (25 Pa. Code § 96.1)

*Urbanized Area (UA)* means land area comprising one or more places (central place(s)) and the adjacent densely settled surrounding area (urban fringe) that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile, as defined by the United States Bureau of the Census and as determined by the latest available decennial census. The UA outlines the extent of automatically regulated areas.

*Wasteload Allocation (WLA)* means the portion of a surface water’s loading capacity that is allocated to existing and future point source discharges. (25 Pa. Code § 96.1)

*Water Quality Criteria* means numeric concentrations, levels or surface water conditions that need to be maintained or attained to protect existing and designated uses. (25 Pa. Code § 93.1)

*Water Quality Standards* means the combination of water uses to be protected and the water quality criteria necessary to protect those uses. (25 Pa. Code § 92a.2)