LEGAL NOTICE

NOTICE IS HEREBY GIVEN that Lower Gwynedd Township Board of Supervisors will hold a public meeting on Tuesday, August 22, 2017 at 7:30 p.m. in the public meeting room of Gwynedd Estates, 301 Norristown Road, Ambler, PA 19002 for purpose of reviewing and receiving public comment on the Lower Gwynedd Township MS4 Pollution Reduction Plan. The Pollution Reduction Plan outlines the plan the Township will use to reduce pollutants discharged from the Township storm sewer system (MS4) consistent with the requirements of the PAG-13 MS4 Individual Permit. The Township is soliciting written comments on the Pollution Reduction Plan until September 5, 2017. Comments must be submitted in writing to the attention of the Township Manager at 1130 N. Bethlehem Pike, Spring Houses, PA or by email at (cmcanally@lowergwynedd.org.) Comments submitted via facsimile will not be accepted. Comments, including comments submitted by email, must include the originator's name and address. The document will be available for review at the Township office at 1130 N. Bethlehem Pike, Spring House, PA during regular office hours Monday – Friday 8:30 a.m. to 4:30 p.m. The document is also available for review on the Township website at www.lowergwynedd.org.

Craig McAnally
Township Manager

Publish: August 3, 2017
Proof of Publication Required.

NPDES Stormwater Discharges from MS4

Total Maximum Daily Load (TMDL) & Pollutant Reduction Plan for Lower Gwynedd Township

Lower Gwynedd Township

Montgomery County, Pennsylvania

August 1, 2017

Prepared For:

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MS4 Pollutant Reduction Plan
for
Lower Gwynedd Township
Montgomery County, Pennsylvania

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Lower Gwynedd Township, Montgomery County, is submitting this supplemental TMDL and Pollution Reduction Plan (PRP) in accordance with the requirements of *Individual Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems* (MS4); specifically, in accordance with the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*. Lower Gwynedd Township must create a TMDL and PRP due to discharges from their MS4 to Impaired Downstream Waters, which are listed as impaired within the below table:

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Montgomery County						
LOWER GWYNEDD TWP	PAG130072	Yes	TMDL Plan	Unnamed Tributaries to Wissahickon Creek		Other Habitat Alterations (4c)
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
				Trewellyn Creek	Appendix E-Nutrients (4a)	Water/Flow Variability (4c)
				Willow Run		Water/Flow Variability (4c)
				Wissahickon Creek	Appendix E-Nutrients (4a), Appendix B-Pathogens (5)	Water/Flow Variability (4c)
				Wissahickon TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	Cause Unknown (4a)
				Little Neshaminy Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	Water/Flow Variability (4c)
				Park Creek	Appendix B-Pathogens (5), Appendix C-PCB (5), Appendix E-Nutrients (5)	Water/Flow Variability (4c)

Last Revised 2017-06-26

Lower Gywnedd Township is required to develop a PRP for the Wissahickon Creek & Little Neshaminy Creek to demonstrate a nutrient reduction of 5%, along with establishing compliance with the Neshaminy Creek TMDL for Sediment as well as the Wissahickon TMDL for Sediment. A “Revised TMDL Strategy Plan” outlining the Township’s plan to achieve compliance with the Waste Load Allocations (WLAs) for sediment loading within the Wissahickon & Little Neshaminy Creeks was prepared by CKS Engineer’s, Inc. and submitted to DEP for review/approval on December 8, 2015. To date, no review comments and/or approval letter has been issued by DEP. As such, this PRP document is intended to be a supplement to the previously submitted TMDL Strategy. The baseline sediment calculations from the 2015 TMDL Strategy will be adjusted to reflect current conditions and then utilized as a starting point for the reduction analysis performed within this PRP. The “Revised TMDL Strategy Plan” prepared by CKS Engineer’s, Inc. is included with the NOI submission for reference.

The purpose of this PRP is to outline how Lower Gwynedd Township will comply with the Individual Permit requirement to reduce 5% of the nutrient load from the MS4 to waters impaired by such pollutants (Designated in the Requirement Table as "Appendix-E Nutrients"). This plan proposes to achieve the 5% reduction within the upcoming permit term March 2018 – March 2023. The plan will also demonstrate that the Township is on track to achieve the Neshaminy Creek TMDL & Wissahickon Creek TMDL WLAs for sediment within the next 5 permit terms (25 years) that were contemplated in the previously submitted strategy plan.

In accordance with guidance provided by DEP, achieving a 10% reduction in sediment will also cause nutrients to be reduced by 5%. As such, only sediment loading was considered in the pre and post improvement analysis for this report. The intent of this MS4 TMDL/PRP is to utilize the existing loading of sediment and pollutants discharged from the MS4 to Impaired Downstream Waters, and to present a plan to reduce these loadings. Since all tributaries within the Urbanized Area of the Township ultimately drain to the Wissahickon Creek or Neshaminy Creek, a watershed-wide approach was taken to provide the required reductions in both the Wissahickon & Neshaminy watersheds rather than analyzing each individual tributary separately. This approach was suggested by PA DEP.

This Plan is organized to follow the "Required PRP Elements" presented in the PRP Instructions included as part of the *PAG-13 MS4 Individual Permit* instruction packages. This Plan will be evaluated and updated by Lower Gwynedd Township on an as-needed basis, based on 1) its effectiveness in reducing pollutant loads in discharges from the regulated small MS4, 2) the reasonableness of achieving the reductions, and 3) the cost/benefit of the BMP"(s) under consideration. If revision is necessary, Lower Gwynedd Township will work with the Department of Environmental Protection (DEP) for review and approval of the update(s). The "potential BMPs" listed in this document are intended to show that compliance with the required reductions can be achieved within the coming permit term March 2018 to March 2023. The Township reserves the right to implement a combination of the listed BMPs, remove BMPs, and/or add additional BMPs should the opportunity to implement them present itself within the permit term.

Each MS4 PRP must include the following Required PRP Elements:

Section A: Public Participation
Section B: Map
Section C: Pollutants of Concern
Section D: Determine Existing Loading for Pollutants of Concern
Section E: Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading
Section F: Identify Funding Mechanisms
Section G: Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

A. Public Participation

As part of the preparation of this MS4 TMDL/PRP, public participation is required. The public participation measures that are required are:

- A complete copy of the TMDL/PRP shall be available for public review.
- A public notice containing a statement describing the plan, where it may be reviewed by the public and the length of time provided for the receipt of comments shall be published by the MS4 in a newspaper of general circulation in the area.
- Written comments shall be accepted by the MS4 for a minimum of 30 days from the date of public notice.
- The MS4 shall accept comments from any interested member of the public at a public meeting, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee.
- Consider, and make a record of the consideration of, each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment.

A copy of the newspaper public notice, copies of all written comments received from the public, and a copy of the MS4's record of consideration of all timely comments received in the public comment period are included with this TMDL/PRP. Note that all comments received during the public comment period were considered. Revisions to the TMDL/PRP in response to those comments were made as applicable. All required documentation of public participation, as outlined above, is included as Appendix A.

- Date TMDL/PRP public notice was published in newspaper: August 3, 2017
- Date TMDL/PRP was made available for public review/comment: August 3, 2017
- End date for receipt of written comments (30 days from the date of public notice): September 7, 2017
- Date TMDL/PRP listed on the public meeting agenda: August 22, 2017
- Date TMDL/PRP comments were accepted at a public meeting: August 22, 2017

B. Map

Mapping is an integral part of developing the TMDL/PRP and requires a level of detail suitable to determine the topography, MS4 drainage areas and loading for the listed impairments. The MS4 TMDL/PRP map shows the storm sewershed boundaries. The MS4 TMDL/PRP map also shows the proposed locations of BMPs that will be implemented in efforts to achieve the required pollutant load reductions. The storm sewershed boundaries shown on the Lower Gwynedd Township MS4 TMDL/PRP Map constitute the combined storm sewershed of all MS4 outfalls within the MS4's jurisdiction that discharge to the Wissahickon & Neshaminy Creeks.

Lower Gwynedd Township MS4 TMDL/PRP Map identifies the storm sewershed boundaries, as well as, the proposed locations of structural BMPs to be implemented to achieve required pollutant load reductions. The Township's MS4 TMDL/PRP Map is included in Appendix B.

The Township's MS4 TMDL/PRP Map shows parsed areas, which are areas within the Township that are excluded in the calculation of existing pollutant loading due to the area not contributing flow to the Township's MS4. Examples of parsed areas include; drainage to PennDOT, Turnpike and/or Railroad Rights-of-ways, drainage to private roads (which do not connect to the Township's MS4), and direct drainage to the creek.

C. Pollutants of Concern

For all TMDL/PRPs, Lower Gwynedd Township shall calculate existing loading of the pollutant(s) of concern in lbs/year; calculate the minimum reduction in loading in lbs/year; select BMP(s) to reduce loading; and demonstrate that the selected BMPs will achieve the minimum reductions.

For TMDL/PRPs developed for impaired water, the pollutants are based on the impairment listing as provided in the reference TMDL Plan and Appendix A of this document: the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term (Appendix E)*. If the impairment is based on siltation only, a minimum of 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.

Within Lower Gwynedd Township, the minimum reductions for sediment within the Wissahickon Creek & Neshaminy Creek are determined by the WLAs outlined in those specific EPA approved TMDL plans. Please refer to the "Revised TMDL Strategy" prepared by CKS Engineer's, Inc. for the sediment WLA in each watershed. As discussed previously, PA DEP has determined that providing a 10% sediment reduction to be the limiting factor and thus causing a 5% reduction in nutrients. As such, the plan will identify BMPs that can be implemented to achieve the required reduction in siltation and it will be assumed that a 5% reduction in nutrients will be achieved across the Township's MS4 planning area. The MS4 TMDL/PRP presents the minimum reduction in loading for each impairment as pounds per year (lbs/yr). The Neshaminy Creek TMDL (Little Neshaminy Sub-basin) identifies the required reduction of 17.1% of sediment within Lower Gwynedd's MS4 that is tributary to the creek. This plan shows that after parsing, the required 17% reduction can be achieved in the next 5 years.

The Wissahickon Creek Sediment TMDL establishes a required reduction for sediment within the entire Township of 306,396 lbs/year. As outlined in the "Revised TMDL Strategy", only 80% of the land within the watershed is tributary to the Township's MS4. As such, the WLA applied to the MS4 is 245,117 lbs/year. Since the "Revised TMDL Strategy" contemplated a 25 year

compliance strategy, the goal of this PRP is to demonstrate that 20% of the overall required reduction can be achieved in the next 5 years, thus keeping the Township on track for full compliance by the end of year 25.

D. Determine Existing Loading for Pollutants of Concern

In accordance with DEP requirements, existing loading must be calculated and reported as of the date of the development of this TMDL/PRP. Any methodology that calculates existing pollutant loading in terms of pounds per year, evaluates BNP-based pollutant reductions utilizing BMP effectiveness values contained in Document 3800-PM-BCW0100m (see Appendix D-1) or Chesapeake Bay Program expert panel reports, uses average annual precipitation conditions and is based on sound science may be considered acceptable.

The date the existing loading was calculated is July 31, 2017. Lower Gwynedd Township's permit obligation applies only to runoff collected by and discharged from the MS4. The storm sewershed land area that is collected by and discharges from the MS4 to various tributaries of the Neshaminy & Wissahickon Creeks were delineated in the previously submitted "Revised TMDL Strategy Plan". The below tables reflect a summary of the required TMDL sediment load reductions for the Wissahickon & Neshaminy Creeks. (Both tables are taken directly from the previously submitted "Revised TMDL Strategy Plan".

Wissahickon Creek Required Reduction

Existing Load from Streambank Erosion (lbs/yr)	Streambank Erosion WLA (lbs/yr)	Existing Overland Load (lbs/yr)	Total Existing Load (lbs/yr)	Total WLA (lbs/yr)	Reduction (lbs/yr)
168245.82	87487.83	575,510.64	743,756.46	437,360.33	306,396

From Table 4-12, page 4-24 of the Wissahickon Creek TMDL Assessment

Area of Wissahickon Creek Watershed in Lower Gwynedd Twp.	8.27	sq. mi.
Land Area within watershed that is "parsed"	1.65	sq. mi.
% of non-parsed area to overall land area within watershed	80%	
% of MS4 area applied to reduction:	245,117	lb/yr

Within the Wissahickon watershed several projects which were contemplated within the "Revised TMDL Strategy Plan" have already been implemented. Please note, the proposed

load reduction calculations utilized in the previously submitted strategy are not in line with the most recent guidance from DEP, contained in the BMP Effectiveness Table located in Appendix C of this report. As such, the effectiveness of BMPs installed since 2012 have been revised based on the DEP approved effectiveness table. The below table establishes a new required reduction for the Wissahickon Creek planning area:

Wissahickon Creek Required Sediment Reduction	
2015 Calculated Reduction	245,117 lbs/yr
Penllyn Pike - Georgetown - (103 LF Streambank Stabilization)	- 4,622 lbs/yr
Penllyn Pike (7 LF Streambank Restoration)	- 315 lbs/yr
Ingersoll Property (50 LF Streambank Stabilzation)	-2,244 lbs/yr
Infiltration Trench (Penllyn Pike)	-137 lbs/yr
Required Sediment Reduction (PRP Calculation Date)	**237,779 lbs/yr**

Effectiveness of streambank stabilization projects assumed to be 44.88 lbs/year in accordance with DEP guidelines. The goal of this PRP is to show that proposed BMPs are capable of reducing sediment to keep the Township on track to achieve the full reduction required by the TMDL WLA by the end of the 25th year. As such, 20% of the required reduction must be achieved with the upcoming 5 year permit term (March 2018 – March 2023). The Township acknowledges that additional BMPs will need to be evaluated and installed within the 2nd through 5th permit term (Years 6 through 25). The BMPs installed within the Wissahickon Creek MS4 planning area will be designed to reduce at least 47,556 lbs/year over the upcoming permit term.

Neshaminy Creek Required Reduction

Land Use Category	Acres	1992 Load (#/yr)	2000 Load (#/year)	WLA (#/year)	Reduction (#/year)	Reduction
Hay/Pasture	2,726	47,108	43,465	36,032	7,433	17%
Cropland	7,989	1,286,115	1,053,201	873,004	180,197	17%
Coniferous Forest	296	240	243	201	42	17%
Mixed Forest	1,911	2,250	2,252	1,867	385	17%
Deciduous Forest	6,918	10,504	10,110	8,381	1,729	17%
Unpaved Road	7	3,285	3,289	2,727	562	17%
Transitional Land	17	3,991	826,324	685,023	141,301	17%
Low Intensity Development	5,640	127,814	136,071	112,603	23,468	17%
High Intensity Development	1,758	29,731	30,949	25,657	5,292	17%
Stream Bank Erosion		6,197,130	6,263,576	5,192,105	1,071,471	17%
Groundwater						
Point Source						
Septic Systems						
Total	27,262	7,708,168	8,369,480	6,937,600	1,431,880	

From Table C2.5, page 30 of the Neshaminy Creek TMDL Assessment

Area of Little Neshaminy Creek sub-watershed in Lower Gwynedd Twp.	1.13	sq. mi.
% of Lower Gwynedd Twp. in Little Neshaminy Creek sub-watershed	2.6%	
% applied to reduction	37,412	lb/yr
Land Area within watershed that is "parsed"	0.382	sq. mil
% of non-parsed area to overall land area within watershed	34%	
% of MS4 area applied to reduction:	12,740	lb/yr

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

Lower Gwynedd Township has a requirement to reduce siltation and nutrients. Implementation of BMPs or land use changes must be proposed that will result in meeting the minimum required reduction in pollutant loading with the storm sewershed(s) identified by the MS4. These BMP(s) must be implemented within five (5) years of DEP's approval of coverage under the PAG-13 Individual Permit, and must be located within the watershed of the applicable impaired waters, on either public or private property. BMPs that will be implemented by others (either in cooperation with the Township or otherwise) within the storm sewershed that will result in net pollution loading reductions (not E&S BMPs to satisfy Chapter 102 requirements) may be included within the TMDL/PRP.

The names and descriptions of BMPs and land uses reported in the TMDL/PRP are in accordance with the Chesapeake Bay Program Model; names and descriptions are available through "CAST" (www.casttool.org, see "Documentation", "Source Data" and worksheets "Land Use Definitions" and "BMP Definitions").

Lower Gwynedd Township plans to achieve the sediment reduction by designing, constructing, operating and maintaining Best Management Practices (BMPs).

Table E-1 & E-2 are a summary of the proposed BMPs under consideration, including location, type, and list impairment removed. Specific locations and drainage areas are depicted on the map found in Appendix B:

TABLE E-1: SUMMARY OF BMPS (NESHAMINY CREEK)

Sediment Load Reductions	
Area/BMP	**Load (lbs)**
Streambank Stabilization (285 LF)	12,790

After parsing, the area within the Neshaminy Creek Watershed that is within the Township's MS4 planning area is relatively small. The opportunity to implement BMPs is limited and as such streambank stablization has been determined as the most viable BMP option. Portions of Park Creek will be evaluated based on DEP guideance for streambank restoration and 285 LF of restoration/enhancement will be implemented to achieve compliance with the Neshaminy Creek TMDL sediment reduction of 17.1% as well as the PRP required nutrient reduction of 5%.

TABLE E-2: SUMMARY OF BMPS (WISSAHICKON CREEK WATERSHED)

Sediment Load Reductions	
Area/BMP	**Load (lbs)**
BMP 1 - Basin Retrofit (Township Building)	1,689
BMP 2 - Basin Retrofit (Spring House Farms)	9,024
BMP 3 - Basin Retrofit (Spring House Farms)	32,031
BMP 4 - Streambank Restoration (110 LF)	4,936

As illustrated in Table E-2, the load after proposed BMPs are implemented for the Wissahickon Creek MS4 Planning area will be reduced by 47,680 lbs/year meeting the 47,556 lbs/year

requirement established in Section D of this report. Proposed load reductions were calculated using the BMP Effectiveness Table in conjunction with the MapShed program. MapShed is a customized GIS interface that is used to create input data for an enhanced version of the GWLF watershed model originally developed at Cornell University. MapShed was improved by Dr. Barry Evans and his group at PSIEE using AVGWLF, a GIS-based watershed modeling tool that uses hydrology, land cover, soils, topography, weather, pollutant discharges, and other critical environmental data to model sediment and nutrient transport within a watershed. Located in Appendix D of this report is information from MapShed displaying the source area and information related to the proposed BMPs. Assumed drainage areas for the basin retrofit projects are depicted on the map within Appendix B.

This PRP is a working document and in the event that any of the above-listed BMPs cannot be implemented, the Township understands that this plan will need to be revised in order to achieve compliance within the current 5 year permit term. The Township remains fully committed to meeting applicable water standards and has the ability to revise the plan and include detailed BMP design and additional BMPs for consideration if additional controls are required in the long-term.

F. Identify Funding Mechanism(s)

The Municipality intends to apply for related grants, such as Growing Greener, Watershed Restoration Protection, DCNR, ect. The Municipality intends to utilize general funds to cover the design and construction costs for the proposed BMPs should grant money not be awarded. Once the PRP has been approved by PADEP, the Municipality intends to authorize design of the BMPs, upon which time a feasibility and cost analysis will be prepared to determine the order for which the potential BMPs will be implemented.

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

Once implemented, the BMPs must be maintained in order to continue producing the expected pollutant reductions. Actual O&M activities will be identified by the MS4 in their Annual MS4 Status Reports, submitted under the Permit.

Applicants must identify the following for each selected BMP:

- The parties responsible for ongoing O&M;
- The activities involved with O&M for each BMP; and
- The frequency at which O&M activities will occur

Table G-1 (Proposed BMPs)

BMP O&M TABLE			
Type	**Location**	**Responsible Party**	**Activity & Frequency**
Streambank Stabilization	Park Creek (Neshaminy)	Lower Gwynedd Township	Per PA BMP Manual
BMP 1 - Basin Retrofit	Township Building	Lower Gwynedd Township	Per PA BMP Manual
BMP 2 - Basin Retrofit	Spring House Farms	Lower Gwynedd Township	Per PA BMP Manual
BMP 3 Basin Retrofit	Spring House Farms	Lower Gwynedd Township	Per PA BMP Manual
Streambank Stabilization	Wissahickon Creek	Lower Gwynedd Township	Per PA BMP Manual

As shown in the above tables, Lower Gwynedd Township will be responsible for ownership and maintenance of all constructed BMPs. In the event that another entity is willing to assume ownership responsibilities of a constructed BMP, the Township will ensure the BMP is maintained in perpetuity through the implementation of a Stormwater Ownership & Maintenance Covenant that would be drafted by the Township Solicitor.

H. GENERAL INFORMATION

Terms: The term "nutrients" refers to "Total Nitrogen" (TN) and "Total Phosphorus" (TP) unless specifically stated otherwise in DEP's latest Integrated Report. The terms "sediment," "siltation," and "suspended solids" all refer to inorganic solids and are hereinafter referred to as "sediment."

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

For PRPs developed for impaired waters (Appendix E), the pollutant(s) are based on the impairment listing, as provided in the MS4 Requirements Table. If the impairment is based on siltation only, a minimum 10% sediment reduction is required. 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 impaired is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed.

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

> **NOTE** – An MS4 may not reduce its obligations for achieving pollutant load reductions through previously installed BMPs. An MS4 may only use such BMPs to reduce its estimate of existing pollutant loading. For example, if a rain garden was installed ten years ago and is expected to remove 100 lbs of sediment annually, and the overall annual loading of sediment in the storm sewershed is estimated to be 1,000 lbs without specifically addressing the rain garden, an MS4 may not claim that the rain garden satisfies its obligations to reduce sediment loading by 10%. The MS4 may, however, use the rain garden to demonstrate that existing loading is 900 lbs instead of 1,000 lbs, and 90 lbs rather than 100 lbs needs to be reduced during the term of permit coverage.

BMP Effectiveness: All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in TMDL/PRPs. For BMPs not listed in 3800-PM-BCW0100m or expert panel reports, MS4s may use effectiveness values from other technical resources; such resources must be documented in the TMDL/PRP.

Combining PRPs: If the MS4 discharges into multiple local surface waters impaired for nutrients and/or sediment, one PRP may be submitted to satisfy Appendix E but calculations and BMP selections must be completed independently for the storm sewershed of each impaired water. If, for example, an MS4 permittee must complete three PRPs according to the MS4 Requirements Table for three separate surface waters, storm sewershed maps must be

developed, existing loads must be calculated, and BMPs must be implemented for pollutant reductions independently within those storm sewersheds. In other words, BMPs cannot be implemented in one storm sewershed to count toward pollutant reductions in an entirely separate storm sewershed for a different impaired water.

Where local surface waters are impaired for nutrients and/or sediment, and those waters are tributary to a larger body of water that is also impaired, MS4s can propose BMPs within the upstream impaired waters to meet the pollutant reduction requirements of both the upstream and downstream waters. For example, if Stream A flows through a municipality that is tributary to Stream B, both are impaired and the MS4 has discharges to both streams, the MS4 can implement BMPs in the storm sewershed of Stream A to satisfy pollutant reduction requirements for both Streams A and B. In general, the MS4 permittee would not be able to satisfy pollutant reduction requirements for both streams if BMPs were only implemented in the storm sewershed of Stream B; however, on a case by case basis DEP will consider such proposals where it can be demonstrated that implementing BMPs in the upstream storm sewershed is infeasible.

If, however, Stream A does not flow into Stream B, both are impaired and the MS4 has discharges to both streams, in general DEP would expect that BMPs be implemented in the storm sewershed of both streams to meet pollutant reduction requirements.

MS4s participating in collaborative efforts are encouraged to contact DEP's Bureau of Clean Water during the PRP development phase for feedback on proposed approaches.

Joint PRPs: MS4s may develop and submit a joint PRP, regardless of whether the MS4s will be submitting a "joint NOI" or are already co-permittees. In general, the MS4s participating in a joint PRP should have contiguous land areas. The "study area" to be mapped is the combined storm sewershed for all MS4 jurisdictions.

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

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

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

PA Department of Environmental Protection, Bureau of Clean Water, 400 Market Street, PO Box 8774, Harrisburg, PA 17105-8774.

PRP Implementation and Final Report: Under the PAG-13 General Permit, the permittee must achieve the required pollutant load reductions within 5 years following DEP's approval of coverage under the General Permit, and must submit a report demonstrating compliance with the minimum pollutant load reductions as an attachment to the first Annual MS4 Status Report that is due following completion of the 5th year of General Permit coverage. For example, if DEP issues written approval of coverage to a permittee on June 1, 2018, the required pollutant load reductions must be implemented by June 1, 2023 and the final report documenting the BMPs that were implemented (with appropriate calculations) must be attached to the annual report that is due September 30, 2023. In general, the same methodology used to calculate the existing pollutant loads should be used in the final report to demonstrate the reductions. If BMP effectiveness values are updated in DEP's BMP Effectiveness Values document or Chesapeake Bay Program expert panel reports between the time the PRP is approved and the time the final report is developed, those updated effectiveness values may be used.

APPENDIX A

APPENDIX B

LOWER GWYNEDD TOWNSHIP
POLLUTANT REDUCTION PLAN (PRP)
WISSAHICKON CREEK & NESHAMINY CREEK WATERSHEDS

DATE: AUGUST 3, 2017

LEGEND

- PARSED AREA
- FLOODPLAIN ZONE
- BMP DRAINAGE AREA
- WATERSHED BOUNDARY LINE

NESHAMINY CREEK WATERSHED

WISSAHICKON CREEK WATERSHED

BMP 1

BMP 2

BMP 3

WELSH ROAD (SR 63)

DEKALB PK (SR 202)

EVANS RD (SR 2016)

BETHLEHEM PK (SR 309)

MCKEAN RD

TENNIS AVE (SR 2020)

FT WASHINGTON EX (SR 309)

NORRISTOWN RD (SR 2052)

J&J PHARMACEUTICALS

OLD YORK ROAD COUNTRY CLUB

GWYNEDD MERCY UNIVERSITY

SIEMENS INDUSTRY AUTOMATION

FOULKEWAYS AT GWYNEDD

MEETINGHOUSE RD

PANGLEWOOD DR

SUMNEYTOWN PK.

SWEDESFORD RD.

PLYMOUTH RD

BRUSHTOWN RD

PENLLYN PK

SCHOOL HOUSE LN

SEPTA RAILROAD

GYPSY HILL RD (SR 2005)

HUNT SEAT DR

PLYMOUTH RD (SR 2016)

GRASSHOPPER LN

PENLLYN WOODS

LG PARK

PEN-AMBLER RD (SR 2020)

PEN-AMBLER PARK

TOWNSHIP LINE RD

DAGER RD

WISSAHICKON HIGH SCHOOL

WISSAHICKON MIDDLE SCHOOL

BRIGHTS LN

LOWER GWYNEDD ELEMENTARY SCHOOL

HOUSTON RD

KNIGHT RD

MT. PLEASANT AVE.

HATBORO

GILMORE & ASSOCIATES, INC.
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APPENDIX C

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORMWATER DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS
BMP EFFECTIVENESS VALUES

This table of BMP effectiveness values (i.e., pollutant removal efficiencies) is intended for use by MS4s that are developing and implementing Pollutant Reduction Plans and TMDL Plans to comply with NPDES permit requirements. The values used in this table generally consider pollutant reductions from both overland flow and reduced downstream erosion, and are based primarily on average values within the Chesapeake Assessment Scenario Tool (CAST) (www.casttool.org). Design considerations, operation and maintenance, and construction sequences should be as outlined in the Pennsylvania Stormwater BMP Manual, Chesapeake Bay Program guidance, or other technical sources. The Department of Environmental Protection (DEP) will update the information contained in this table as new information becomes available. Interested parties may submit information to DEP for consideration in updating this table to DEP's MS4 resource account, RA-EPPAMS4@pa.gov. Where an MS4 proposes a BMP not identified in this document or in Chesapeake Bay Program expert panel reports, other technical resources may be consulted for BMP effectiveness values. Note – TN = Total Nitrogen and TP = Total Phosphorus.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Wet Ponds and Wetlands	20%	45%	60%	A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. Until recently, these practices were designed specifically to meet water quantity, not water quality objectives. There is little or no vegetation living within the pooled area nor are outfalls directed through vegetated areas prior to open water release. Nitrogen reduction is minimal.
Dry Detention Basins and Hydrodynamic Structures	5%	10%	10%	Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.
Dry Extended Detention Basins	20%	20%	60%	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Infiltration Practices w/ Sand, Veg.	85%	85%	95%	A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff.
Filtering Practices	40%	60%	80%	Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.
Filter Strip Runoff Reduction	20%	54%	56%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.4 design ratio of filter strip length to impervious flow length is recommended for runoff reduction urban filter strips.
Filter Strip Stormwater Treatment	0%	0%	22%	Urban filter strips are stable areas with vegetated cover on flat or gently sloping land. Runoff entering the filter strip must be in the form of sheet-flow and must enter at a non-erosive rate for the site-specific soil conditions. A 0.2 design ratio of filter strip length to impervious flow length is recommended for stormwater treatment urban filter strips.
Bioretention – Raingarden (C/D soils w/ underdrain)	25%	45%	55%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in C or D soil.
Bioretention / Raingarden (A/B soils w/ underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

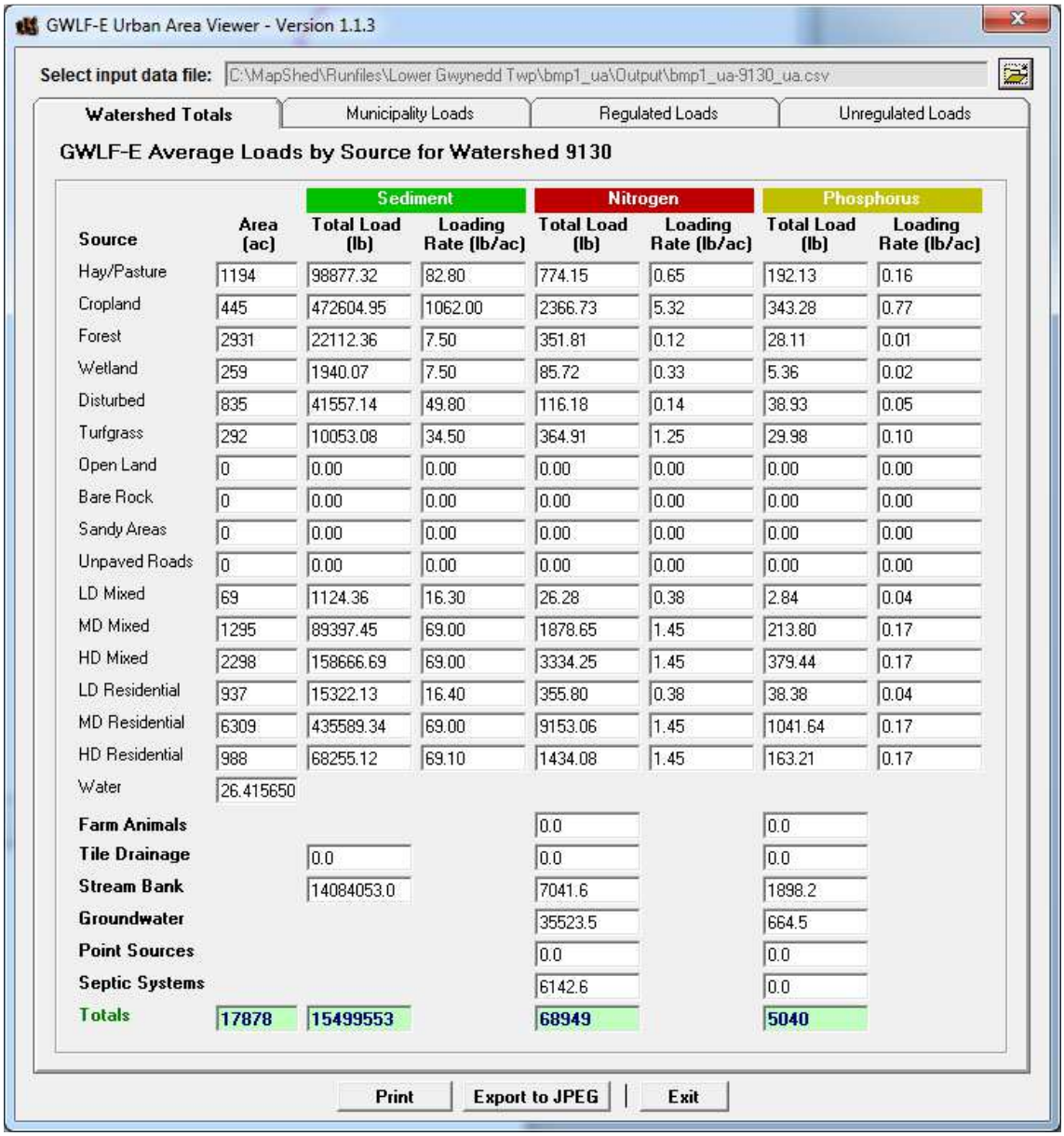
BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Bioretention / Raingarden (A/B soils w/o underdrain)	80%	85%	90%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has no underdrain and is in A or B soil.
Vegetated Open Channels (C/D Soils)	10%	10%	50%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in C or D soil.
Vegetated Open Channels (A/B Soils)	45%	45%	70%	Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils. This BMP has no underdrain and is in A or B soil.
Bioswale	70%	75%	80%	With a bioswale, the load is reduced because, unlike other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area.
Permeable Pavement w/o Sand or Veg. (C/D Soils w/ underdrain)	10%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in C or D soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/ underdrain)	45%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/o Sand or Veg. (A/B Soils w/o underdrain)	75%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, no sand or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (A/B Soils w/ underdrain)	50%	50%	70%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in A or B soil.

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Permeable Pavement w/ Sand or Veg. (A/B Soils w/o underdrain)	80%	80%	85%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has no underdrain, has sand and/or vegetation and is in A or B soil.
Permeable Pavement w/ Sand or Veg. (C/D Soils w/ underdrain)	20%	20%	55%	Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, has sand and/or vegetation and is in C or D soil.
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.
Forest Buffers	25%	50%	50%	An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. The riparian area is managed to maintain the integrity of stream channels and shorelines, to reduce the impacts of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals. (Note – the values represent pollutant load reductions from stormwater draining through buffers).
Tree Planting	10%	15%	20%	The BMP effectiveness values for tree planting are estimated by DEP. DEP estimates that 100 fully mature trees of mixed species (both deciduous and non-deciduous) provide pollutant load reductions for the equivalent of one acre (i.e., one mature tree = 0.01 acre). The BMP effectiveness values given are based on immature trees (seedlings or saplings); the effectiveness values are expected to increase as the trees mature. To determine the amount of pollutant load reduction that can credited for tree planting efforts: 1) multiply the number of trees planted by 0.01; 2) multiply the acreage determined in step 1 by the pollutant loading rate for the land prior to planting the trees (in lbs/acre/year); and 3) multiply the result of step 2 by the BMP effectiveness values given.
Street Sweeping	3%	3%	9%	Street sweeping must be conducted 25 times annually. Only count those streets that have been swept at least 25 times in a year. The acres associated with all streets that have been swept at least 25 times in a year would be eligible for pollutant reductions consistent with the given BMP effectiveness values.

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	This BMP (also referred to as "Storm Drain Cleaning") involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards. To determine pollutant reductions for this BMP, these steps must be taken: 1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected. 2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter). 3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations. DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.

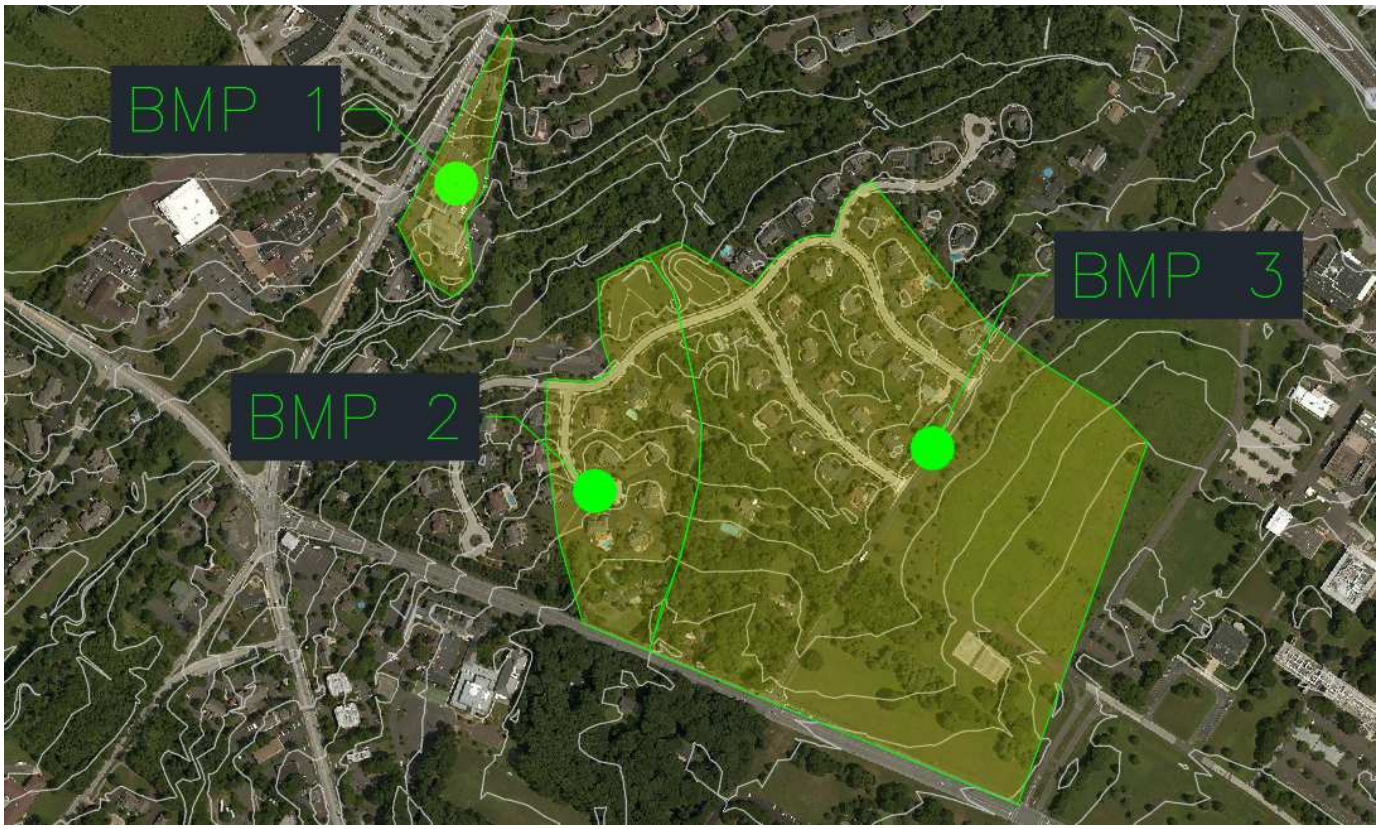
APPENDIX D

Wissahickon Baseline



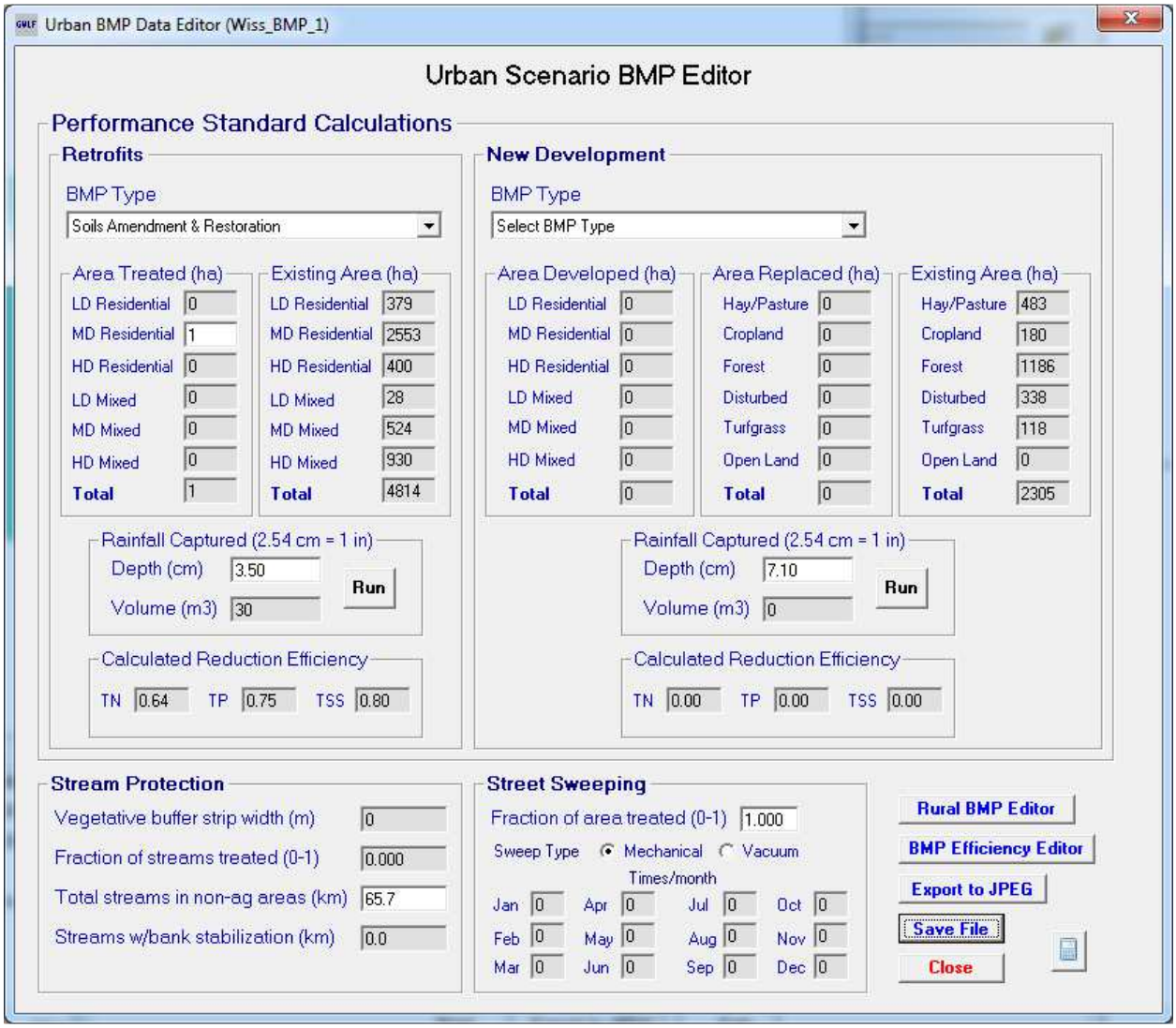
Source	Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	1194	98877.32	82.80	774.15	0.65	192.13	0.16
Cropland	445	472604.95	1062.00	2366.73	5.32	343.28	0.77
Forest	2931	22112.36	7.50	351.81	0.12	28.11	0.01
Wetland	259	1940.07	7.50	85.72	0.33	5.36	0.02
Disturbed	835	41557.14	49.80	116.18	0.14	38.93	0.05
Turfgrass	292	10053.08	34.50	364.91	1.25	29.98	0.10
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	69	1124.36	16.30	26.28	0.38	2.84	0.04
MD Mixed	1295	89397.45	69.00	1878.65	1.45	213.80	0.17
HD Mixed	2298	158666.69	69.00	3334.25	1.45	379.44	0.17
LD Residential	937	15322.13	16.40	355.80	0.38	38.38	0.04
MD Residential	6309	435589.34	69.00	9153.06	1.45	1041.64	0.17
HD Residential	988	68255.12	69.10	1434.08	1.45	163.21	0.17
Water	26.415650						
Farm Animals				0.0		0.0	
Tile Drainage		0.0		0.0		0.0	
Stream Bank		14084053.0		7041.6		1898.2	
Groundwater				35523.5		664.5	
Point Sources				0.0		0.0	
Septic Systems				6142.6		0.0	
Totals	**17878**	**15499553**		**68949**		**5040**	

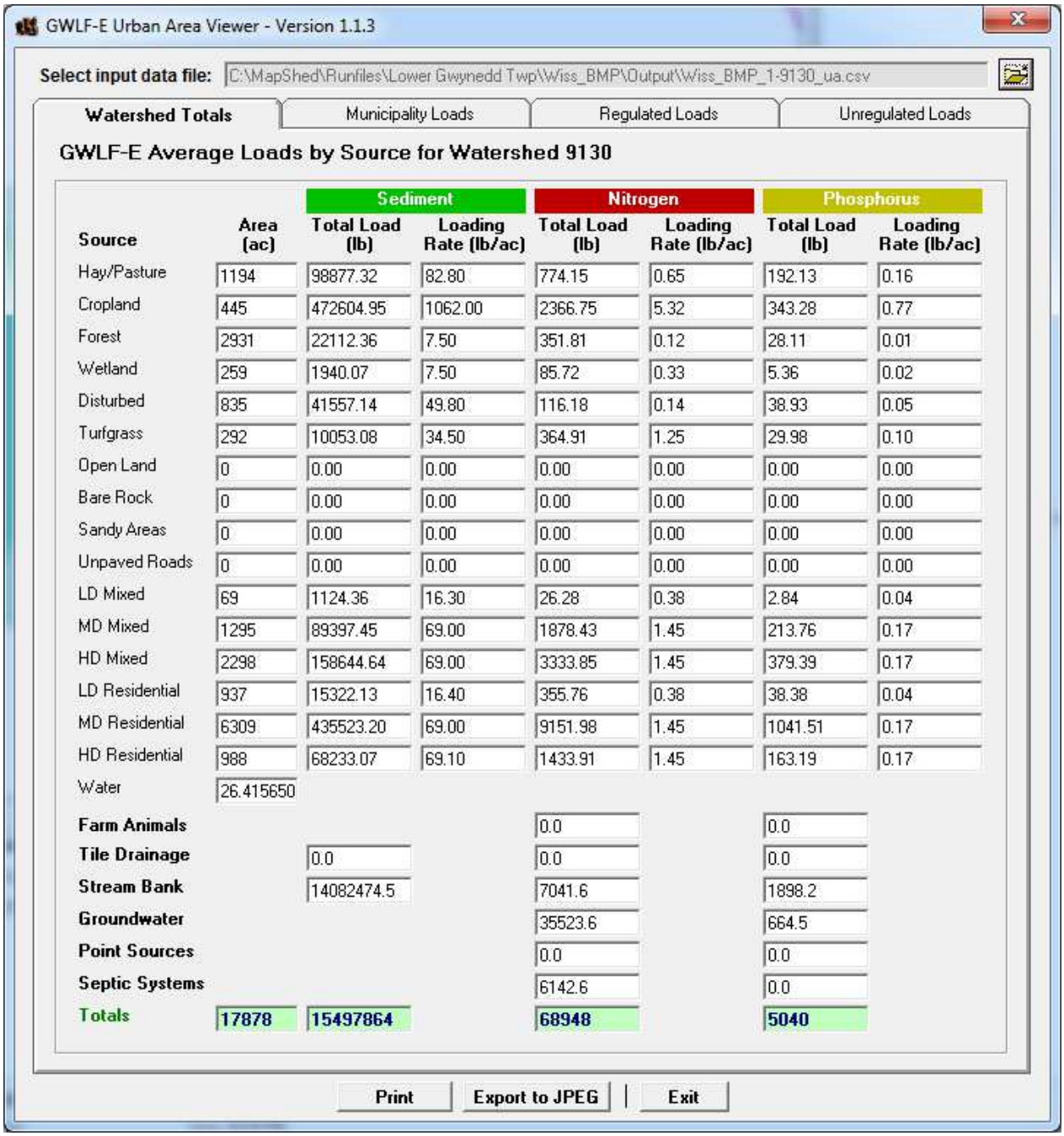
Sediment Load Reductions	
Area/BMP	**Load (lbs)**
Total Wissahickon Watershed	15,499,553
BMP 1 - Basin Retrofit	1,689
BMP 2 - Basin Retrofit	9,024
BMP 3 - Basin Retrofit	32,031


BMP 1
BMP 2
BMP 3

BMP 1 – Township Building Basin Retrofit

Proposed Reduction = 15,499,553 – 15,497,864
1,689 lbs =

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Watershed Totals
Municipality Loads
Regulated Loads
Unregulated Loads
GWLF-E Average Loads by Source for Watershed 9130
Sediment
Nitrogen
Phosphorus
Source
Area (ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Hay/Pasture 1194 98877.32 82.80 774.15 0.65 192.13 0.16
Cropland 445 472604.95 1062.00 2366.75 5.32 343.28 0.77
Forest 2931 22112.36 7.50 351.81 0.12 28.11 0.01
Wetland 259 1940.07 7.50 85.72 0.33 5.36 0.02
Disturbed 835 41557.14 49.80 116.18 0.14 38.93 0.05
Turfgrass 292 10053.08 34.50 364.91 1.25 29.98 0.10
Open Land 0 0.00 0.00 0.00 0.00 0.00 0.00
Bare Rock 0 0.00 0.00 0.00 0.00 0.00 0.00
Sandy Areas 0 0.00 0.00 0.00 0.00 0.00 0.00
Unpaved Roads 0 0.00 0.00 0.00 0.00 0.00 0.00
LD Mixed 69 1124.36 16.30 26.28 0.38 2.84 0.04
MD Mixed 1295 89397.45 69.00 1878.43 1.45 213.76 0.17
HD Mixed 2298 158644.64 69.00 3333.85 1.45 379.39 0.17
LD Residential 937 15322.13 16.40 355.76 0.38 38.38 0.04
MD Residential 6309 435523.20 69.00 9151.98 1.45 1041.51 0.17
HD Residential 988 68233.07 69.10 1433.91 1.45 163.19 0.17
Water 26.415650
Farm Animals 0.0 0.0
Tile Drainage 0.0 0.0 0.0
Stream Bank 14082474.5 7041.6 1898.2
Groundwater 35523.6 664.5
Point Sources 0.0 0.0
Septic Systems 6142.6 0.0
Totals 17878 15497864 68948 5040
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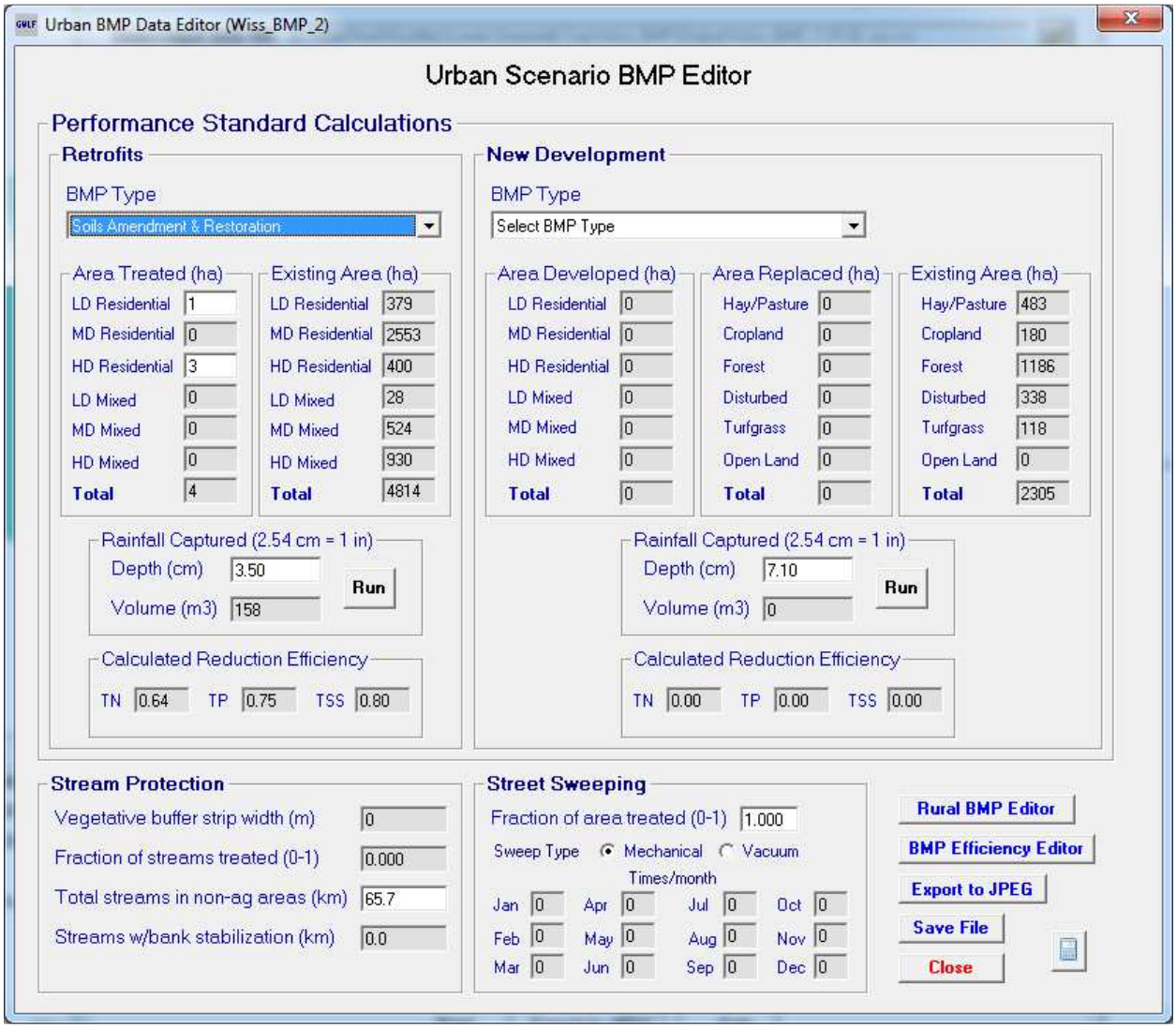
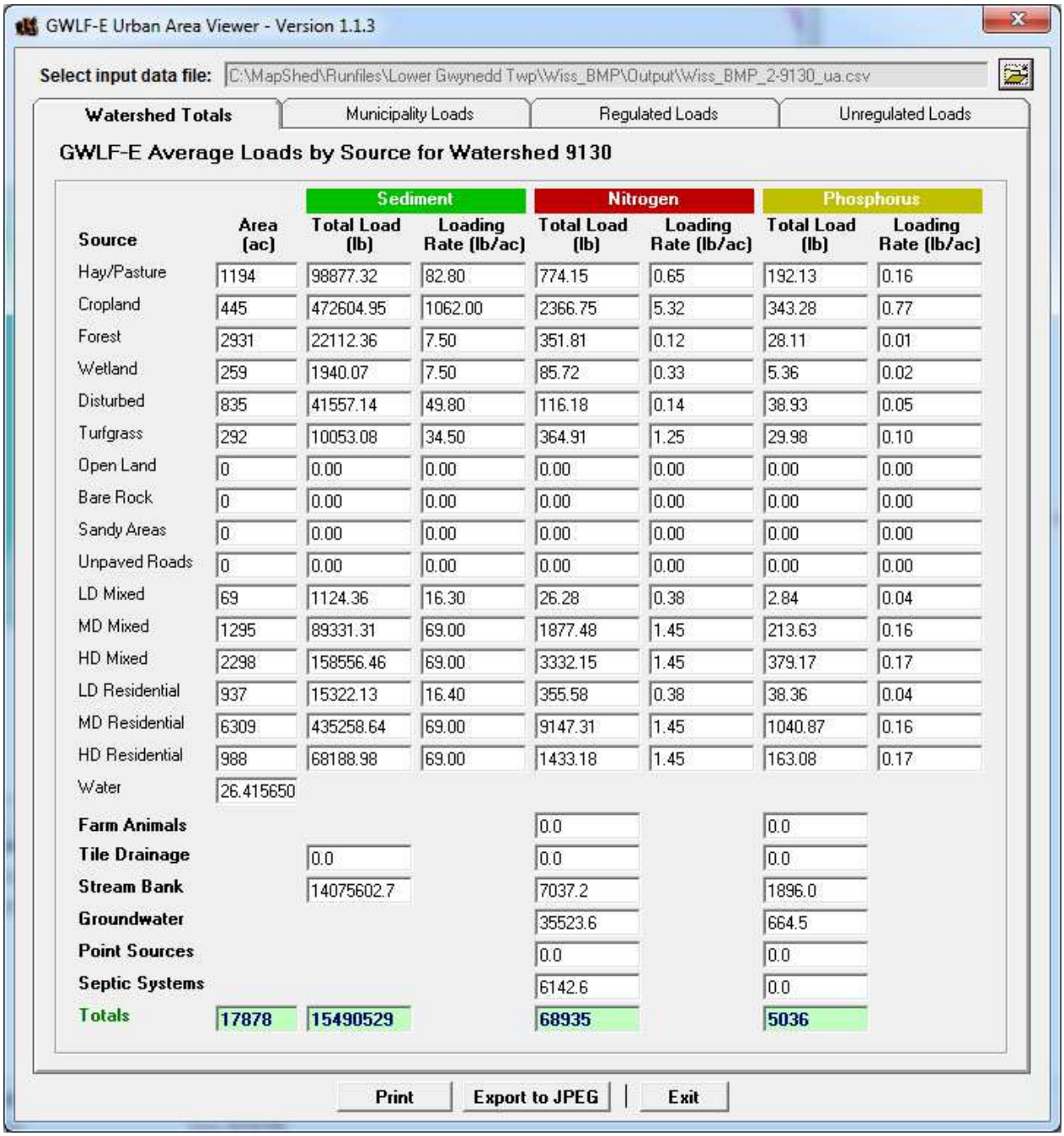
Export to JPEG
Exit

BMP 2 – Stone House Road (West)




GWLF-E Urban Area Viewer - Version 1.1.3
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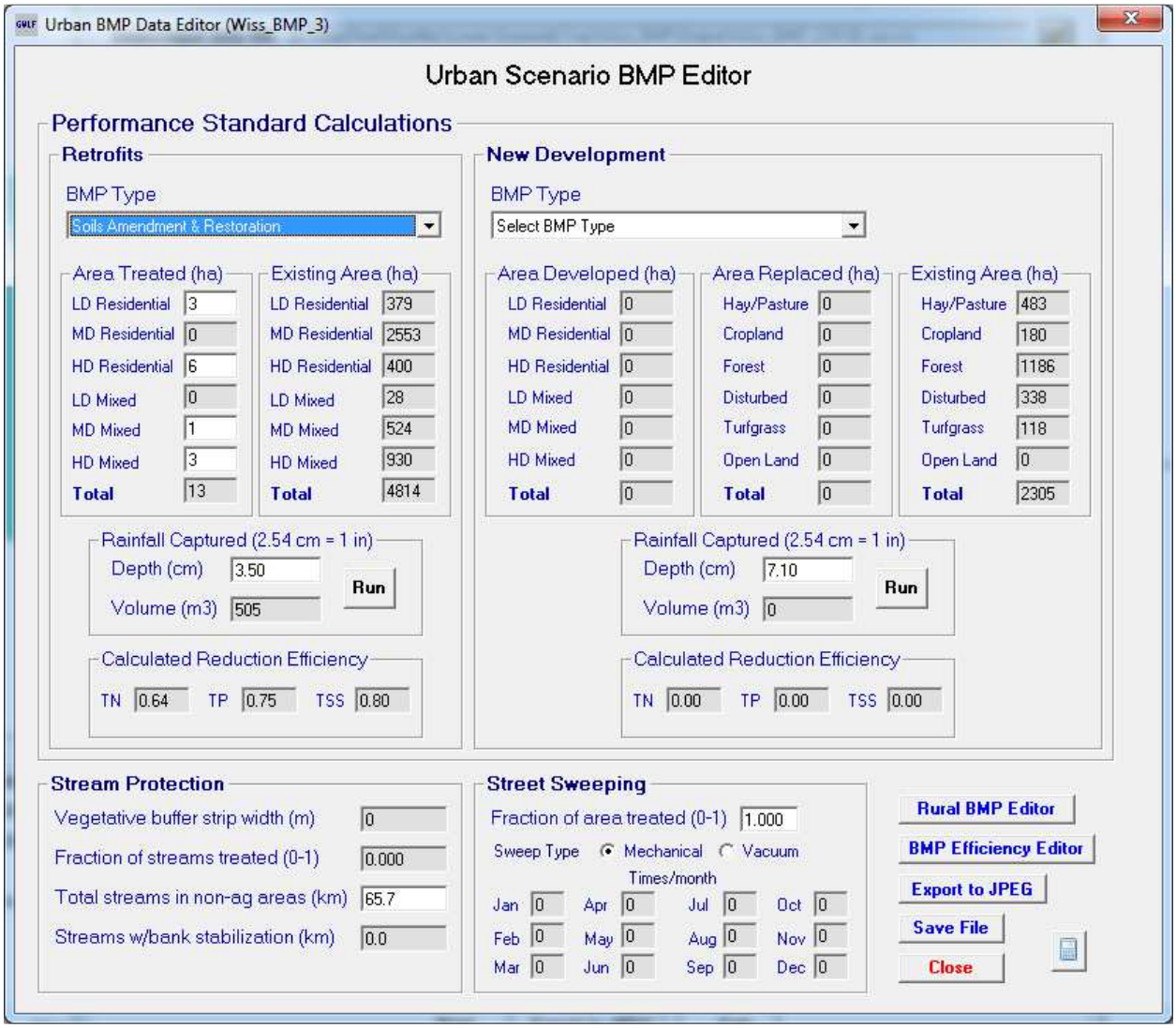
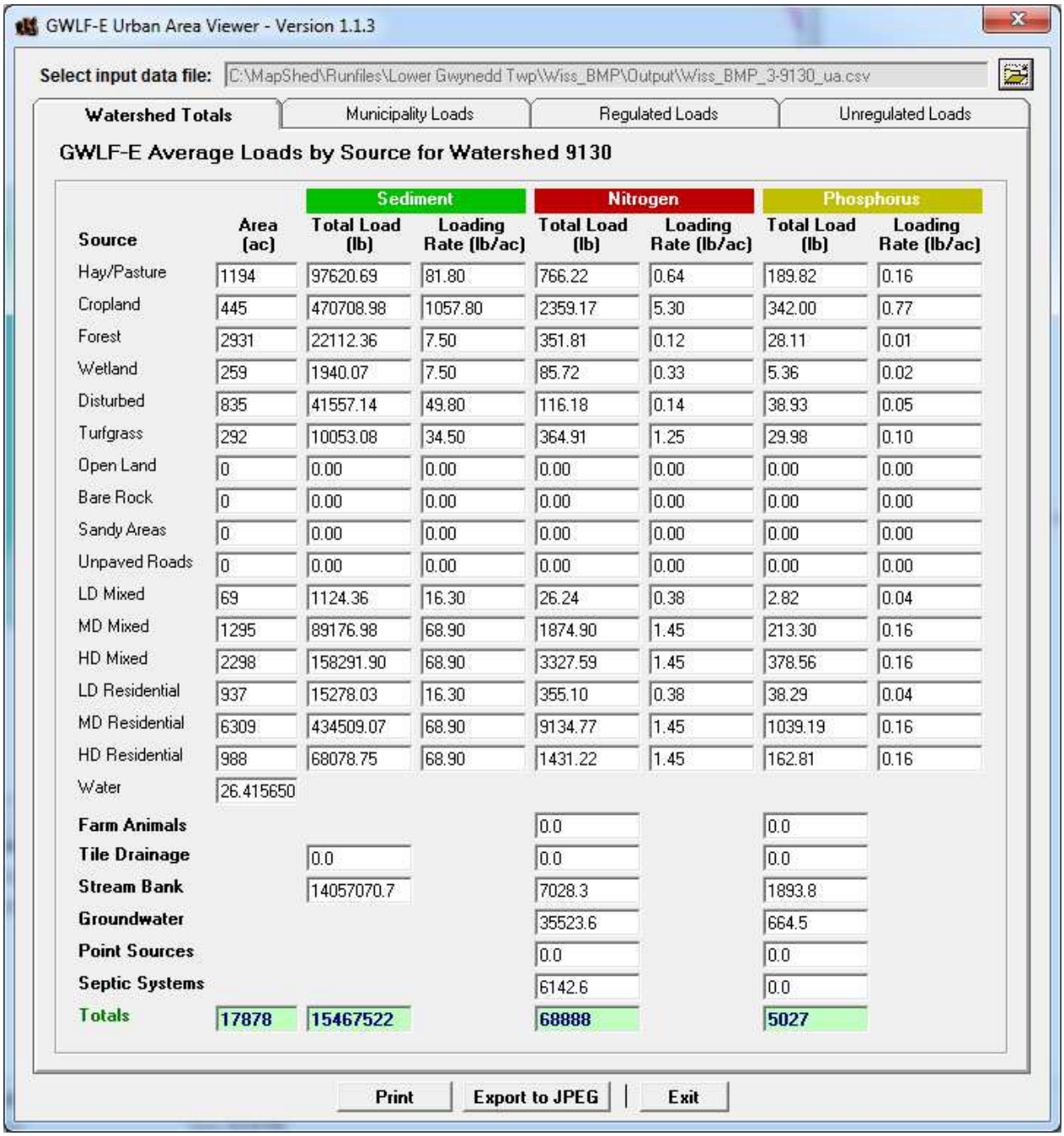
Watershed Totals
Municipality Loads
Regulated Loads
Unregulated Loads
GWLF-E Average Loads by Source for Watershed 9130
Sediment
Nitrogen
Phosphorus
Source
Area (ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Hay/Pasture 1194 98877.32 82.80 774.15 0.65 192.13 0.16
Cropland 445 472604.95 1062.00 2366.75 5.32 343.28 0.77
Forest 2931 22112.36 7.50 351.81 0.12 28.11 0.01
Wetland 259 1940.07 7.50 85.72 0.33 5.36 0.02
Disturbed 835 41557.14 49.80 116.18 0.14 38.93 0.05
Turfgrass 292 10053.08 34.50 364.91 1.25 29.98 0.10
Open Land 0 0.00 0.00 0.00 0.00 0.00 0.00
Bare Rock 0 0.00 0.00 0.00 0.00 0.00 0.00
Sandy Areas 0 0.00 0.00 0.00 0.00 0.00 0.00
Unpaved Roads 0 0.00 0.00 0.00 0.00 0.00 0.00
LD Mixed 69 1124.36 16.30 26.28 0.38 2.84 0.04
MD Mixed 1295 89331.31 69.00 1877.48 1.45 213.63 0.16
HD Mixed 2298 158556.46 69.00 3332.15 1.45 379.17 0.17
LD Residential 937 15322.13 16.40 355.58 0.38 38.36 0.04
MD Residential 6309 435258.64 69.00 9147.31 1.45 1040.87 0.16
HD Residential 988 68188.98 69.00 1433.18 1.45 163.08 0.17
Water 26.415650
Farm Animals 0.0 0.0
Tile Drainage 0.0 0.0 0.0
Stream Bank 14075602.7 7037.2 1896.0
Groundwater 35523.6 664.5
Point Sources 0.0 0.0
Septic Systems 6142.6 0.0
Totals 17878 15490529 68935 5036
Print
Export to JPEG
Exit

BMP 3 – Stone House Road (East)




GWLF-E Urban Area Viewer - Version 1.1.3
Select input data file:
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Watershed Totals
Municipality Loads
Regulated Loads
Unregulated Loads
GWLF-E Average Loads by Source for Watershed 9130
Sediment
Nitrogen
Phosphorus
Source
Area (ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Total Load (lb)
Loading Rate (lb/ac)
Hay/Pasture 1194 97620.69 81.80 766.22 0.64 189.82 0.16
Cropland 445 470708.98 1057.80 2359.17 5.30 342.00 0.77
Forest 2931 22112.36 7.50 351.81 0.12 28.11 0.01
Wetland 259 1940.07 7.50 85.72 0.33 5.36 0.02
Disturbed 835 41557.14 49.80 116.18 0.14 38.93 0.05
Turfgrass 292 10053.08 34.50 364.91 1.25 29.98 0.10
Open Land 0 0.00 0.00 0.00 0.00 0.00 0.00
Bare Rock 0 0.00 0.00 0.00 0.00 0.00 0.00
Sandy Areas 0 0.00 0.00 0.00 0.00 0.00 0.00
Unpaved Roads 0 0.00 0.00 0.00 0.00 0.00 0.00
LD Mixed 69 1124.36 16.30 26.24 0.38 2.82 0.04
MD Mixed 1295 89176.98 68.90 1874.90 1.45 213.30 0.16
HD Mixed 2298 158291.90 68.90 3327.59 1.45 378.56 0.16
LD Residential 937 15278.03 16.30 355.10 0.38 38.29 0.04
MD Residential 6309 434509.07 68.90 9134.77 1.45 1039.19 0.16
HD Residential 988 68078.75 68.90 1431.22 1.45 162.81 0.16
Water 26.415650
Farm Animals 0.0 0.0
Tile Drainage 0.0 0.0 0.0
Stream Bank 14057070.7 7028.3 1893.8
Groundwater 35523.6 664.5
Point Sources 0.0 0.0
Septic Systems 6142.6 0.0
Totals 17878 15467522 68888 5027
Print
Export to JPEG
Exit