

MS4 Pollutant Reduction Plan
for
Lower Makefield Township
Bucks County, Pennsylvania

Prepared For:



Lower Makefield Township
1100 Edgewood Road
Yardley, PA 19067
(267) 274-1100

Prepared By:



Remington & Vernick Engineers
Lower Makefield Corporate Center, North Campus
1010 Stony Hill Road, Suite 175
Yardley, PA 19067
(267) 394-4500

**MS4 Pollutant Reduction Plan
for
Lower Makefield Township
Bucks County, Pennsylvania**

Table of Contents

A. Public Participation.....	1
B. Map.....	2
C. Pollutants of Concern.....	3
D. Determine Existing Loading for Pollutants of Concern.....	4
E. Select BMPs to Achieve the Minimum Required Reductions in Pollutant Loading.....	5
F. Pollutant Control Measures For Waters Impaired By Priority Organic Compounds.....	10
G. Identify Funding Mechanism(s).....	11
H. Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs.....	11
I. General Information.....	15

List of Tables

Table C-1: Summary of Impaired Waters.....	3
Table D-1: Summary of Areas.....	4
Table E-1: Summary of Proposed BMPs.....	5
Table E-2: MS4 PRP Strategy Summary.....	8
Table G-1: Operation and Maintenance of BMPs.....	12

Appendices

Appendix A: MS4 Requirements Table

Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term

Appendix B: Public Participation

Appendix B-1 Public Notice & Proof of Advertisement

Appendix B-2 Public Comments Received

Appendix B-3 Public Meeting Agenda and Meeting Minutes

Appendix C: Maps

Appendix C-1 Lower Makefield MS4 PRP Map

Appendix D: Existing Loading for Pollutants of Concern

Appendix D-1: Existing Sediment Loading

Appendix D-2: Existing Priority Organics Loading

Appendix D-3: Existing Sediment Loading in Each Impaired Watershed

Appendix E: Loading Reduction Calculations

Appendix E-1: Charles Boehm Middle School Streambank Restoration

Appendix E-2: Basin CC-DB-004 Detention Basin to Retention Basin Retrofit

Appendix E-3: Basin CC-DB-008A Detention Basin to Retention Basin Retrofit

Appendix E-4: Basin CC-DB-010 Detention Basin to Retention Basin Retrofit

Appendix E-5: Basin CC-DB-011 Detention Basin to Retention Basin Retrofit

Appendix E-6: Basin CC-DB-012 Detention Basin to Retention Basin Retrofit

Appendix E-7: Basin CC-DB-026 Detention Basin to Retention Basin Retrofit

Appendix E-8: Basin CC-DB-030 Detention Basin to Retention Basin Retrofit

Appendix E-9: Basin CC-DB- 014A Detention Basin to Retention Basin Retrofit

Appendix E-10: Basin RR-DB-OB2 Detention Basin to Retention Basin Retrofit

Appendix E-11: Basin RR-DB-035 Detention Basin to Retention Basin Retrofit

Appendix E-12: Basin RR-DB-038 Detention Basin to Retention Basin Retrofit

Appendix E-13: Basin MC-DB-OP1B Detention Basin to Retention Basin Retrofit

Appendix E-14: Proposed Pervious Pavement QA-PEP-01

Appendix E-15: DEP BMP Load reduction Percentages Used for Calculations

Appendix E-16: Proposed BMP Costs, Credits, and Locations

Appendix E-17: Credit and Reduction Breakdown per Watershed

Appendix E-18: Lower Makefield BMP Inventory

The Township of Lower Makefield (Municipality), Bucks County is submitting this Pollution Reduction Plan (PRP) in accordance with the requirements of *General Permit PAG-13 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*. The Municipality must create a PRP due to discharges from their MS4 to the following watersheds: Core Creek, Queen Anne Creek, Martins Creek, and Rock Run Creek, which all have been listed as impaired for sediment (Appendix A).

The intent of this MS4 PRP is to establish the existing loading of pollutants discharged from the MS4 to the following watersheds: Core Creek, Queen Anne Creek, Martins Creek, Rock Run Creek, Mill Creek, Neshaminy Creek, and its unnamed tributaries, and to present a plan to reduce these pollutants. This MS4 PRP is organized to follow the "Required PRP Elements" presented in the PRP Instructions included as part of the *PAG-13 MS4 General Permit* instruction packages. This PRP will be evaluated and updated by the Municipality on an as-needed basis, based on its effectiveness in reducing pollutant loads in discharges from the regulated small MS4. If this occurs, the Municipality will work with the Pennsylvania Department of Environmental Protection (DEP) for review and approval of any revisions or updates.

Each MS4 PRP must include the following Required PRP Elements:

- Section A: Public Participation;
- Section B: Maps;
- 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: Pollutant Control Measures For Waters Impaired By Pathogens
- Section G: Pollutant Control Measures For Waters Impaired By Priority Organic Compounds
- Section H: Identify Funding Mechanisms;
- Section I: Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

A. Public Participation.

As part of the preparation of this MS4 PRP, public participation is required. The MS4 shall complete the public participation measures listed below, and report in the PRP that each was completed:

- A complete copy of the PRP shall be available for public review.
- The applicant shall publish, in a newspaper of general circulation in the area, a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the permittee will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP.
- The applicant shall accept written comments for a minimum of 30 days from the date of public notice.
- The applicant shall accept comments from any interested member of the public at a public meeting or hearing, which may include a regularly scheduled meeting of the governing body of the municipality or municipal authority that is the permittee.
- The applicant shall 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.

The PRP was made available at the beginning of September 2021. The 30-day public review period will therefore end by the end of September 2021, and comments will be accepted at a public meeting to be held after this time. The Township has every intention to hear all public comments as required and consider making any changes to the plan in response to these comments. Any comments received and changes made to the plan will be forwarded to DEP to be included in their review of the PRP.

B. Map.

Mapping is an integral part of developing the PRP and requires a level of detail suitable to determine the existing land uses, impervious/pervious surface coverages, topography and loading for the sediment. The MS4 PRP map shall show land uses and/ or impervious/pervious surfaces and the storm sewershed boundary. The MS4 PRP map(s) shall also show the proposed locations of structural BMPs that will be implemented to achieve the required pollutant load reductions. The storm sewershed boundary shown on the Municipality MS4 PRP Maps constitutes the storm sewershed to each of the MS4 outfalls within the MS4's jurisdiction that discharge to the Core Creek, Queen Anne Creek, Martins Creek, and Rock Run Creek watersheds.

The Municipality MS4 PRP Maps identify the storm sewershed boundary, the existing land uses and impervious/pervious surface coverages, as well as the proposed locations of structural BMPs to be implemented to achieve required pollutant load reductions. The Municipality MS4 PRP Maps are included in Appendix C.

C. Pollutants of Concern

The Municipality shall calculate the existing loading of sediment 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 PRPs developed for impaired water ["Appendix E" noted in the Requirements Table column in the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*], the pollutants are based on the impairment listing as provided in the *MS4 Requirements Table (Municipal) Anticipated Obligations for Subsequent NPDES Permit Term*. If the impairment is based on siltation only, a minimum of 10% sediment reduction is required.

The impaired downstream waters and causes of impairment that require a PRP are summarized in TABLE C-1. A minimum 10% reduction is required for sediment. The MS4 PRP presents the minimum reduction in loading for sediment as pounds per year (lbs/yr).

TABLE C-1: SUMMARY OF IMPAIRED WATERS

Impaired Downstream Waters Name	Requirements
Core Creek	Appendix E - Siltation
Queen Anne Creek	Appendix E - Siltation
Lake Luxembourg	Appendix E – Nutrients, Suspended Solids
Martins Creek	Appendix C – PCB & Appendix E - Siltation
Neshaminy Creek	Appendix B – Pathogens, Appendix E – Siltation, Nutrients, Organic Enrichment/Low D.O.
Rock Run	Appendix E - Siltation
Mill Creek	Appendix E - Siltation

D. Determine Existing Loading for Pollutants of Concern

TABLE D-1 below summarizes the division of the total area of the Municipality.

TABLE D-1: SUMMARY OF AREAS

Area Description	Area (acres)
Parsed Areas	942.00
MS4 Areas	3,155.41
Non-Impaired Areas	7,337.59
Total Area	11,435

The loading and reduction for sediment was calculated as follows:

The Municipality's permit obligation applies to the land area that drains to the municipal separate storm sewer (See TABLE D-1) from within the jurisdiction of the MS4 permittee (the "storm sewershed") less that of the pre-developed condition (as if the whole Municipality were wooded). The storm sewershed land area that drains to the municipal separate storm sewer from within the jurisdiction of the MS4 to impaired water ways was delineated using PAMAP data known as Light Detection and Ranging (LiDAR) contours. Lands owned by the State or County, streams, or permitted BMPs were parsed. GIS software was then used to define impervious and pervious area in the Municipality and the total area of each was used to calculate the total sediment loading to the impaired water ways created by the Municipality for the non-parsed areas. The existing sediment loading was calculated utilizing the Bucks County loading rates provided by DEP for pervious and impervious areas. The loading rates used for the calculations are 264.96 lbs/acre for pervious areas, and 1,839 lbs/acre for impervious areas (See Appendix D).

The existing loading condition was calculated for the Municipality on May 19th, 2021. The Municipality has a total non-parsed sediment loading of 1,541,083.59 lbs/year in its Core Creek, Martin's Creek, Queen Anne Creek, and Rock Run storm sewersheds. In order to address the impairment, a minimum 10% sediment reduction (154,108.36 lbs/year) is required. Achieving this minimum sediment reduction will result in the Municipality's MS4 having a new sediment load of 1,386,975.23 lbs/year.

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

Drainage areas to proposed BMP locations (BMP DA) were delineated in GIS utilizing LiDAR contours to calculate the existing pollutant loads and the anticipated reductions due to the implementation of the proposed BMPs.

The Municipality has a requirement to reduce sediment by 10% in the Core Creek, Martin's Creek, Queen Anne Creek, and Rock Run storm sewersheds. Implementation of BMPs or land use changes must be proposed that will result in meeting the minimum required reduction in pollutant loading within 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 General Permit, and must be located within the storm sewersheds of the applicable impaired waters, on either public or private property.

The Municipality plans to achieve the sediment reduction by designing, constructing, operating and maintaining Best Management Practices (BMPs). The Municipality is also considering pairing with neighboring municipalities for joint reduction projects to meet requirements. The Municipality is required to implement this plan over the next five (5) years.

Table E-1 is a summary of the proposed BMPs under consideration, including location, type, area treated, and sediment removed. Not all of the BMPs seen in this summary will be implemented, for this is an extensive list of BMP options to meet the sediment reduction requirement:

TABLE E-1: SUMMARY OF PROPOSED BMPs

BMP #	BMP LOCATION	BMP TYPE	AREA TREATED BY BMP (acres)	SEDIMENT REMOVED BY BMP (lbs/year)
1	Charles Boehm Middle School	Streambank/Floodplain Restoration (1,400 feet)	1.12	47,124.00
2	Basin CC-DB-004	Basin Retrofit (Detention Basin to Retention Basin)	58.63	20,067.82

3	Basin CC-DB-008A	Basin Retrofit (Detention Basin to Retention Basin)	89.06	18,107.58
4	Basin CC-DB-010	Basin Retrofit (Detention Basin to Retention Basin)	43.76	6,105.49
5	Basin CC-DB-011	Basin Retrofit (Detention Basin to Retention Basin)	37.01	10,212.74
6	Basin CC-DB-012	Basin Retrofit (Detention Basin to Retention Basin)	100.73	9,197.52
7	Basin CC-DB-026	Basin Retrofit (Detention Basin to Retention Basin)	75.54	4,538.19
8	Basin CC-DB-030	Basin Retrofit (Detention Basin to Retention Basin)	59.44	6,929.12
9	Basin CC-DB-014A	Basin Retrofit (Detention Basin to Retention Basin)	24.81	10,419.96
10	Basin RR-DB-OP2	Basin Retrofit (Detention Basin to Retention Basin)	45.05	13,303.25
11	Basin RR-DB-035	Basin Retrofit (Detention Basin to Retention Basin)	57.43	11,601.58
12	Basin RR-DB-038	Basin Retrofit (Detention Basin to Retention Basin)	60.00	8,577.04
13	Basin MC-DB-OP1B	Basin Retrofit (Detention Basin to Retention Basin)	31.32	9,432.31
14	QA-PEP-01	Proposed Pervious Pavement	3.00	1,210.82
			TOTAL WITH ALL BMPS	176,827.40

As outlined in Section D, the load after proposed BMPs are implemented for the Core Creek, Martin's Creek, Queen Anne Creek, and Rock Run Storm Sewersheds should be at most 1,386,975.23 lbs/year. As demonstrated above in Table E-1, upon implementation of all BMPs the proposed total load reduction will be at least *176,827.40 lbs/year*, which exceeds the minimum required reduction in pollutant loading.

Refer to Appendix E-15 to the DEP BMP effectiveness values that were used for calculations of load reductions.

The following table summarizes the sediment load and required sediment reduction for Core Creek, Martin's Creek, Queen Anne Creek, and Rock Run Storm Sewersheds. Also included is a summary of the proposed BMPs contemplated to achieve the required sediment load reduction.

TABLE E-3: MS4 PRP STRATEGY SUMMARY

Description	Value	Unit
Core Creek, Martin's Creek, Queen Anne Creek, and Rock Run Creek Watershed	4,103.41	acres
Parsed Area - Total	942	acres
Existing Sediment Load	1,541,083.59	lbs/year
Required Sediment Pollutant Load Reduction Percentage	10	%
Minimum Required Pollutant Load Reduction	154,108.36	lbs/year
Proposed Sediment Load Reduction from BMPs	176,827.40	lbs/year
Proposed Sediment Total Load with Proposed BMPs Installed	1,364,256.19	lbs/year

F. Pollutant Control Measures for Waters Impaired By Pathogens

In addition to sediment impairment, the Neshaminy Creek has also been identified as being impaired by Pathogens. The instructions require that by September 30, 2019 the permittee must submit a map of the storm sewersheds associated with all outfalls that discharge to Neshaminy Creek. An inventory of all suspected and known sources of bacteria in stormwater within the identified storm sewershed. This inventory must identify if the source is suspected or known, basis for this determination, the responsible party and any corrective action the permittee plans or has taken for any of these sources, by September 30, 2020. All suspected sources must be investigated including stormwater sampling if required under MCM #3, otherwise it is voluntary. Any investigations performed must be reported and submitted with Annual MS4 Status Reports, and all sources must be investigated by 2022. If not already established in the Stormwater Management Ordinance, the permittees must enact an ordinance that requires proper management of animal wastes on property owned by the permittee, by 2022.

The township enacted the proper management of animal waste ordinance in 2020 and has published and implemented it throughout the township. Neshaminy creek sewersheds are continuing to be mapped to meet the 2022 requirements of source investigation and inventory.

G. Pollutant Control Measures For Waters Impaired By Priority Organic Compounds

Lower Makefield is also responsible for addressing the impairment of the Delaware River and Martin's Creek which has been identified as being impaired by Priority Organics Compounds. The instructions require that by September 30, 2019 the permittee must submit a map of the storm sewersheds associated with all outfalls that discharge to the Delaware River. An inventory of all suspected and known anthropogenic sources of Priority Organic Compounds in stormwater within the identified storm sewershed. This inventory must identify if the source is suspected or known, basis for this determination, the responsible party and any corrective action the permittee plans or has taken for any of these sources, by September 30, 2020. All suspected sources must be investigated including stormwater sampling if required under MCM #3, otherwise it is voluntary. Any investigations performed must be reported and submitted with Annual MS4 Status Reports, and all sources must be investigated by 2022. Where it is determined that sources of Priority Organic Compounds are being discharged in stormwater from industrial sites into the permittee's MS4, the permittee shall notify DEP in writing within 90 days of the permittee's findings.

Delaware River and Martin's Creek sewersheds are continuing to be mapped to meet the 2022 requirements of source investigation and inventory.

H. Identify Funding Mechanism(s)

The Municipality intends to apply for related grants, such as Growing Greener, to implement these BMPs. The Municipality intends to utilize general fund money to cover the construction costs for the proposed BMPs should grant money not be awarded. The BMPs are expected to be constructed in the last three years of the new permit cycle. Once the PRP has been approved by DEP, the Municipality intends to approve design of the BMPs, upon which time a feasibility and cost analysis will be prepared and shared with DEP.

*See Appendix E-16 for BMP Cost Estimates and associated Credits.

I. 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. 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 OPERATION AND MAINTENANCE OF BMPs

BMP #	BMP LOCATION	BMP TYPE	OWNER/ RESPONSIBLE PARTY	O&M ACTIVITY & FREQUENCY
1	Charles Boehm Middle School	Streambank/Floodplain Restoration (1,400 feet)	Pennsbury School District	Bi-Annual Inspection, Replace Dead Trees, Remove Invasive Plants*
2	Basin CC-DB-004	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
3	Basin CC-DB-008A	Basin Retrofit (Detention Basins to Retention Basins)	Lower Makefield Township	Bi-Annual Inspection *
4	Basin CC-DB-010	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
5	Basin CC-DB-011	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
6	Basin CC-DB-012	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *

		Retention Basin)		
7	Basin CC-DB-026	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
8	Basin CC-DB-030	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
9	Basin CC-DB-014A	Credited Basin (Dry Extended Basin built after 2017)	Lower Makefield Township	Bi-Annual Inspection *
13	Basin RR-DB-OP2	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
14	Basin RR-DB-035	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
15	Basin RR-DB-038	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
17	Basin MC-DB-OP1B	Basin Retrofit (Detention Basin to Retention Basin)	Lower Makefield Township	Bi-Annual Inspection *
18	QA-PEP-01	Proposed Pervious Pavement	Lower Makefield Township	Bi-Annual Inspection *

*Note: Actual O&M activities will be identified by the Municipality in their Annual MS4 Status Reports, submitted under the General Permit. Once the PRP has been approved by DEP and the Municipality begins design of the BMPs, an O&M manual will be created and submitted to DEP for review and comment.

J. 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 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 PRP. MS4s may not claim credit for street sweeping and other non-structural BMPs implemented in the past. If structural BMPs were implemented prior to development of the PRP and continue to be operated and maintained, the MS4 may claim pollutant reduction credit in the form of reduced existing loading.

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 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 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

MS4 Requirements Table

Appendix A-1: Applicable portion of the MS4 Requirements Table (Municipal) Anticipated Obligations
for Subsequent NPDES Permit Term

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Bucks County						
LANGHORNE BORO	PAG130038	No		Neshaminy Creek	Appendix E-Siltation (4a), Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Magnolia Lake	Appendix E-Excessive Algal Growth, Nutrients, Organic Enrichment/Low D.O., Suspended Solids (5)	Other Habitat Alterations, WaterFlow Variability (4c)
				Mill Creek	Appendix E-Siltation (5)	Other Habitat Alterations (5)
				Silver Lake	Appendix E-Excessive Algal Growth, Nutrients, Suspended Solids (5)	Other Habitat Alterations (5)
LANGHORNE MANOR BORO	PAG130044	Yes	TMDL Plan	Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Silver Lake	Appendix E-Excessive Algal Growth, Nutrients, Suspended Solids (5)	Other Habitat Alterations (5)
				Magnolia Lake	Appendix E-Excessive Algal Growth, Nutrients, Organic Enrichment/Low D.O., Suspended Solids (5)	
				Mill Creek	Appendix E-Siltation (5)	Other Habitat Alterations, WaterFlow Variability (4c)
				Neshaminy Creek TMDL	TMDL Plan-Siltation, Suspended Solids (4a)	
LOWER MAKEFIELD TWP	PAG130011	No		Core Creek	Appendix E-Siltation (4a)	
				Queen Anne Creek	Appendix E-Siltation (5)	Other Habitat Alterations, WaterFlow Variability (4c)
				Delaware River	Appendix C-PCB (4a)	Mercury (5)
				Lake Luxembourg	Appendix E-Nutrients, Suspended Solids (4a)	
				Martins Creek	Appendix C-PCB (4a), Appendix E-Siltation (5)	Flow Alterations (4c)
				Neshaminy Creek	Appendix E-Siltation (4a), Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
				Brock Creek		Cause Unknown (5), Other Habitat Alterations, WaterFlow Variability (4c)
				Rock Run	Appendix E-Siltation (5)	Flow Alterations (4c)
				Unnamed Tributaries to Delaware River		Cause Unknown (5), Other Habitat Alterations, WaterFlow Variability (4c)
				Unnamed Tributaries to Mill Creek		Flow Alterations (4c)
				Mill Creek	Appendix E-Siltation (5)	Other Habitat Alterations, WaterFlow Variability (4c)
				Buck Creek		Cause Unknown (5), Other Habitat Alterations, WaterFlow Variability (4c)
				LOWER SOUTHAMPTON TWP	PAG130030	Yes
Mill Creek		Other Habitat Alterations, WaterFlow Variability (4c)				
Poquessing Creek	Appendix C-PCB (5), Appendix E-Excessive Algal Growth (5)	Flow Alterations, Other Habitat Alterations, WaterFlow Variability (4c)				
Neshaminy Creek	Appendix B-Pathogens (5), Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)					

Appendix B

Public Participation

Appendix B-1: Public Notice & Proof of Advertisement

Appendix B-2: Public Comments Received

Appendix B-3: Public Meeting Agenda and Meeting Minutes

Notice of Public Comment Period and Public Meeting

The Township of Lower Makefield will hold a 30-day public comment period between August 1 and August 30, 2021 for the Township's Pollution Reduction Plan (PRP). The intent of the PRP is to establish the existing loading of pollutants discharged from the Municipal Separate Storm Sewer System (MS4) to Core Creek, Queen Anne Creek, Martin's Creek, and Rock Run and to present a plan to reduce these pollutants. The PRP public comment period is required under the terms of the Township's MS4 Permit. The draft PRP will be available for public inspection at the Lower Makefield Township Hall building between the hours of 8:00 AM and 4:30 PM Monday through Friday. The report will also be available online at www.lmt.org. Comments regarding the draft PRP should be sent to 1100 Edgewood Rd, Yardley, PA 19067, Attn: Kurt Ferguson, Township Manager or to admin@lmt.org. All comments made shall include the originator's name and address. Written and public comments will also be accepted at a public meeting on August 18, 2021 at 7:00 PM.



LMT Draft MS4 Pollution Reduction Plan – for Public Review & Comment

By Admin | News | Comments are Closed | 30 July, 2021 | ❤️ 20

The Township of Lower Makefield will hold a 30-day public comment period until September 1, 2021 for the Township's Pollution Reduction Plan (PRP). The intent of the PRP is to establish the existing loading of pollutants discharged from the Municipal Separate Storm Sewer System (MS4) to Core Creek, Queen Anne Creek, Martin's Creek, and Rock Run and to present a plan to reduce these pollutants. The PRP public comment period is required under the terms of the Township's MS4 Permit.

The draft PRP will be available for public inspection at the Township Offices located at 1100 Edgewood Road, Yardley, PA 19067, from 8:00 a.m. to 4:00 p.m., Monday through Friday, and will also be available online at www.lmt.org. Comments regarding the draft PRP should be sent to 1100 Edgewood Rd, Yardley, PA 19067, Attn: Kurt Ferguson, or to admin@lmt.org. All comments made shall include the originator's name and address. Written and public comments will also be accepted at a public meeting on August 18, 2021 at 7:30 PM.

Draft copy of the MS4 Pollution Reduction Plan

Exhibit Plan for BMPs already completed and credited

Exhibit Plan for proposed BMPs for the Pollution Reduction Plan

**NOTICE OF PUBLIC COMMENT
PERIOD AND PUBLIC MEETING**

The **Township of Lower Makefield** will hold a 30-day public comment period until September 1, 2021 for the Township's Pollution Reduction Plan (PRP). The intent of the PRP is to establish the existing loading of pollutants discharged from the Municipal Separate Storm Sewer System (MS4) to Core Creek, Queen Anne Creek, Martin's Creek, and Rock Run and to present a plan to reduce these pollutants. The PRP public comment period is required under the terms of the Township's MS4 Permit. The draft PRP will be available for public inspection at the Township Offices located at 1100 Edgewood Road, Yardley, PA 19067, from 8:00 a.m. to 4:00 p.m., Monday through Friday, and will also be available online at www.lmt.org. Comments regarding the draft PRP should be sent to 1100 Edgewood Rd, Yardley, PA 19067, Attn: Kurt Ferguson, or to admin@lmt.org. All comments made shall include the originator's name and address. Written and public comments will also be accepted at a public meeting on August 18, 2021 at 7:30 PM.

1t Aug 2

7401164

re: **EAC Comments on the MS4 Pollutant Reduction Plan for Lower Makefield Township, Bucks County PA (DRAFT)**

Representatives from Remington and Vernick Engineering attended the Environmental Advisory Council's (EAC) August 11 meeting and discussed the draft MS4 Pollutant Reduction Plan with our members.

As a follow-up to the meeting, the comments below are being submitted by the EAC. The version of the document reviewed was downloaded from the Township's website on July 31, 2021.

Section E – Selected BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

1. **Add a Watershed Specific Sediment Reduction Table** - Each of the four impaired watersheds/sewersheds in the Township (Core Creek, Rock Run, Martin's Creek, and Queen Anne Creek) are required to reduce their sediment loads by 10 percent. Section E contains a table demonstrating that in total, all four will meet this requirement. An additional table should be added showing that on an individual basis each of the four watersheds/sewersheds meet the 10 percent sediment reduction requirement.
2. **Table E-2 - Proposed BMP#1 (Rock Run watershed)** – We strongly support the restoration of the Rock Run streambanks near the Charles Boehm Middle School. The streambank at this location is extremely degraded and is no doubt a major source of sediment.
3. **Table E-2 - Proposed BMP#9 (Basin RR-DB-005 at Trent Dr./Friar Dr., Rock Run watershed)** – It is not clear what modifications to this large 3.7 acre basin could be done to reduce sediment load into Rock Run. The Township's BMP Inspection Report done in April 2021 states that the basin is a wetlands and that there are no maintenance issues. In addition, Map 3 (Hydrological Resources) of the Township's 2019 Master Plan Update shows the area is a wetlands, a designation based on data from the National Wetlands Inventory (NWI).

Wetlands are highly effective in removing sediment. How is the basin going to be altered to further reduce sediment? Will the 3.7 acres of existing wetlands be affected? Estimated cost between \$451,000 to \$650,000, is this retrofit the best use of the Township's money?

4. **Table E-2 - Additional BMP for the Rock Run Watershed/Sewershed** – Instead of implementing the proposed BMP#9 discussed in the previous comment, the EAC

suggests retrofitting the Township owned basin near the intersection of West Ferry Road/Big Oak Road. This basin is part of the larger 6 acre Ragan Open Space purchased by the Township in 2012.

This basin is an ideal candidate for retrofitting. There are a number of concrete low flow channels in the basin and has significant sediment outflow during rain storms. Attached to the transmittal email is a portion of a video taken at the basin after a rainstorm. As can be seen, there is a significant amount sediment in the outflow from the basin. Most comes from the concrete channel to the right.

Section G – Pollutant Control Measures for Waters Impaired by Priority Organic Compounds

5. **Delaware River is Identified as Impaired by Priority Organics Compounds** - The tributary of Buck Creek that transverses the center of Patterson Farm flows downstream to the Delaware River. Large scale agriculture operations such as Patterson Farm normally involve the extensive use of fertilizers and herbicides. The recent plantings of trees and shrubs and the creation of a vegetative buffer along the tributary will reduce the inflow of fertilizer and herbicides contaminates into the creek. The Township may be able to get credit for reducing organic compounds inflow into Delaware River for this new buffer.

Appendices

6. Appendices D and E – To evaluate the report, it would help to have all existing sediment load and reductions in sediment load calculations included in Appendices D and E of the draft.

On behalf of the EAC, we would like to thank Remington and Vernick Engineering for attending our meeting and the opportunity to comment on the draft document.

Alan Dresser
1907 Lynbrooke Drive
Yardley, PA

TOWNSHIP OF LOWER MAKEFIELD
BOARD OF SUPERVISORS
MINUTES – AUGUST 18, 2021

The regular meeting of the Board of Supervisors of the Township of Lower Makefield was held in the Municipal Building on August 18, 2021. Ms. Blundi called the meeting to order at 7:30 p.m. and called the Roll.

Those present:

Board of Supervisors: Suzanne Blundi, Chair
 James McCartney, Vice Chair
 John B. Lewis, Secretary
 Frederic K. Weiss, Treasurer
 Daniel Grenier, Supervisor

Others: Kurt Ferguson, Township Manager
 David Truelove, Township Solicitor
 Andrew Pockl, Township Engineer

COVID 19 UPDATE

Mr. Grenier commended the Bucks County Commissioners for promoting following CDC and APA guidelines in our Bucks County Schools. He also commended them for instituting a strict mask policy at the County Government level.

COMMUNITY ANNOUNCEMENTS

Mr. Ferguson stated during this portion of the Agenda residents and Youth Organizations may call in to make a special announcement or contact the Township to request a special announcement to be added to a future Agenda.

Mr. Ferguson stated information about Park & Recreation in-person recreation opportunities can be found on the Township Website.

Mr. Ferguson stated Community Day is August 28, 2021, and there will be 3v3 basketball, vendors, rides, a concert, activities, and fireworks. More information can be obtained by contacting the Township Park & Recreation Department.

Mr. Ferguson stated the 20th Commemoration of the 9/11 attacks will be at the Garden of Reflection located at 1950 Woodside Road throughout the day on 9/11. At 8:30 a.m. there will be a ceremony to honor the victims of the attacks and mark significant times of the day. From Mid-Day until 3 p.m. there will be quiet time to reflect on your own at the Memorial, and there will be ambassadors who will be able to provide information about the Garden and 9/11. The evening Ceremony will be held at 7:00 p.m.

Mr. Ferguson stated September 12 is the 9/11 Memorial 5K located at the Garden of Reflection. To register visit GOR5K.com.

Mr. Ferguson stated there will be a Styrofoam Recycling Event that will also include wine corks and amber/white prescription pill containers with lids on Saturday, September 18 from 10 a.m. to Noon at the Township Building, 1100 Edgewood Road. Ms. Blundi asked that those bringing prescription pill containers remove the labels.

Mr. Ferguson stated November 6 is the Veterans Day Parade on Edgewood Road, and interested sponsors and participants should contact the Park & Recreation Department.

Mr. Grenier stated a lot of large Township gatherings will be coming up, and the COVID numbers are spiking. He stated the State is not able to provide as much guidance as they could previously. He asked Mr. Ferguson if we have metrics in place that will determine whether or not certain events will have to be modified or scaled back so that we can be as safe as possible. Mr. Ferguson stated he could not say that there are specific metrics in terms of cases per day, etc. He stated the events are outside, and specifically for Community Day, the booths will be spread out. Mr. Grenier stated COVID numbers are spiking, and this is the last Board meeting before Community Day so he feels we should “keep in touch” to see if anything needs to be changed based on certain metrics that are forcing changes in how things are done at the local and County level and the private sector as well.

APPROVAL OF MINUTES

Mr. McCartney moved, Dr. Weiss seconded and it was unanimously carried to approve the Minutes of July 21, 2021 as written.

Mr. McCartney moved, Dr. Weiss seconded and it was unanimously carried to approve the Minutes of August 4, 2021 as written.

TREASURER'S REPORT

Dr. Weiss moved, Mr. Grenier seconded and it was unanimously carried to approve the July Interfund Transfers in the amount of \$741,997.79 as attached to the Minutes.

Dr. Weiss moved, Mr. Grenier seconded and it was unanimously carried to approve the Warrant Lists from August 2, 2021 and August 16, 2021 in the amount of \$1,481,124.94 as attached to the Minutes.

2020 ANNUAL FINANCIAL REPORT – MAILLIE, LLC. TOWNSHIP AUDITOR

Mr. Greg Shank, Partner at Maillie LLC. in charge of overseeing the Audit was present with Mr. Mike Gentile, the Manager overseeing the Audit. Mr. Shank stated everyone has been issued the Audit Report which is a comprehensive report in excess of eighty-five pages. In order to present tonight he has an Audit Executive Summary which was shown.

Mr. Shank stated the primary purpose of the Audit is to issue an opinion on the Township's Financial Statements. He stated they reviewed those statements and audited them, and they have issued a clean, unqualified opinion which means that the Township has followed the financial standards of U. S. generally-accepted accounting principles. He stated the Township has also followed the standards and presented the financials in accordance with Government accounting standards.

Mr. Shank stated the other report issued is a 114, and there is nothing in that outside of the norm. He stated there were no disagreements with management, and management was very cooperative throughout the Audit giving them all of the information they required to do a thorough and efficient audit. He stated the information was issued timely based on their requests.

Mr. Shank stated they did not issue a 115. He stated a 115 letter would be issued if they noted any significant deficiencies or material weaknesses during the Audit, and they did not. He stated they found the books and records to be very well adjusted, and there were no significant adjustments that had to be made. He stated that is very important since it means that management and the Supervisors are able to look at financial information throughout the year, and there are no major adjustments.

Mr. Shank stated in any Financial Statement there are estimates that have to be made, and they have to review those estimates to make sure that they are reasonable. He showed on the screen the major estimates that are throughout the Report. He noted Capital Assets which on a Government-wide statement you have Capital Assets that are added, and then you depreciate those Assets over the useful life. He stated it is shown that that there is \$109 million of Capitalized Assets, and the current year depreciation was \$1 million. He stated the same can be seen for the Business activities. He stated they evaluated those key estimates and found them to be reasonable.

Mr. Shank stated you can also see the Net Pension Liability and it went down about 5.9 to 4.4. He stated Business-type activities went from 353 to 228. He stated this is a net number meaning that is the Liability less the Assets that the Township has put aside for those Liabilities. Mr. Shank stated the OPEB Liabilities are much like the Pension where the Liability is determined by the actuary. He stated this is a net number, but there are no Assets that are earmarked which is fairly typical with the OPEB Liability, but they are still presented in the Financials as a Liability. He stated Compensated Absences is another common estimate that is done as well as the Fair Market Value of Investment.

Mr. Shank stated a lot of these estimates would look very similar to any other Township, from the type of estimate, not necessarily their numbers which he will discuss further.

Mr. Shank noted the page showing Operating Grants and Contributions. He stated 2019 is shown in orange, and 2020 is in blue. He stated they are down which is expected since in 2019 there was a RACP of about \$900,000. He stated this is a normal trend line that they would expect and would happen from year to year as you have particular anomalies with a Grant hitting in one year and not the other.

Mr. Shank stated Charges for Services were down slightly, and this was a result of the Pandemic. He stated Transfer Taxes were very similar and static, and Property Taxes went up as a result of the millage increase.

Mr. Shank noted the next page with the same analysis for Expenditures. He stated that blue is 2020 and orange is 2019. He stated Park & Rec Expenditures were down; and in Public Works, the Expenditures were also slightly down. He stated Public Safety was relatively static which is an expected trend. He stated General Government was up slightly.

Mr. Shank stated they did not see any large variances between year to year when they look at the Expenditures.

Mr. Shank noted the next page which focuses on the Notes and Bonds of the Township, but it does not consider the Pension Debt or the OPEB. He stated in December, 2018 the Township was at about \$41.7 mill, and the Township has been on a continual trend to reduce the Debt of the Township. He stated it was \$38 in 2019, down to \$35.8 in December, 2020. He stated the Township is on a steady trend of paying down the Debt.

Mr. Shank noted the page showing Net Pension Obligations. He stated the actuary would determine the Liability based on a number of factors including life expectancy. He stated you then subtract the Asset that has been set aside for the Pension, and the \$8. million is the Net Liability. He stated a significant downward trend can be seen of that Liability, and that is primarily on the investment/Asset side. He stated there are very detailed Footnotes on the Statement on this. He stated the Liability on an actuarial basis is actually going up which is normal; but the reason there is a decrease in the Net is on the Asset side because of the contributions made by the Township and especially the good investment returns. He stated 2019 and 2020 were very good investment years. He stated the annual money-weighted rate of return for 2019, which the actuary discloses, was about 19% between the Uniform and non-Uniform; and in 2020 the returns ranged from 13.94% in the Police and 14% in the non-Uniform. He stated what they are seeing is that very good investment returns in those two years helped to bridge the gap with the Asset and Liability. Mr. Shank stated this Liability that the Township has is by no means unusual. He stated many Townships and Cities across the State and across the County have significant Pension Liabilities; and the Township is “pretty good.” He stated the Township has a positive Government-wide Net Asset. He stated there are many Municipalities and Cities that are negative because they have such significant Pension Liabilities.

Mr. Shank showed a chart on the Total OPEB (Other Post Employment Benefit) Liability. He stated there is not a corresponding Asset set aside for this which is not unusual, so they would expect to see this trending higher as costs grow. He stated the actuary determines this based on life expectancy and the benefits derived, and the increase of those benefits. He stated this is also reported in the Government-wide Financial Statement as a Liability.

Mr. Shank stated there are two types of statements – the Government Fund Financial Statement and the Government-wide. He stated the Government Fund Financial Statement presents on the modified accrual and more closely depicts the way Governments budget. He stated the Government-wide Statement is put on a full accrual so you are capitalizing costs, etc. He stated sometimes the Fund Statements are more meaningful. He showed the Fund Balance/Net Position, and this is the Assets minus the Liabilities at a point in time. He stated this is the most important when the Township gets looked at by the rating agencies, and they have a tendency to focus significantly on General Funds and Fund Balance. He stated the General Fund Balance is shown in dark blue, and it went up and down slightly, but is still a healthy Fund Balance at \$1.5 million; and that means the Township has that reserve going into the next year.

Mr. Shank stated looking at the one that went up for the Sewer, there was a significant increase during the year which was primarily a result of the rates going up, and they ended up with about \$8.3 million in Net Assets.

Mr. Shank noted the change in Golf where there was improvement which was primarily because of the popularity of golf and outdoor sports as a result of the Pandemic.

Mr. Shank noted the next page which is the Net Position on the Government-wide basis. He stated all the Assets and Liabilities are on an accrual basis. He stated as he noted earlier it is not unusual to see a City or larger Municipality have a negative Net position. He stated the reason for this is because their Assets are exceeded by significant Pension Liabilities and OPEB. He stated that is not the case in Lower Makefield as the Township has a significant Net position at the end of the year.

Mr. Shank stated overall the Township financials are in good shape. He stated during the course of their Audit, they use very powerful software which is a data-extraction software. He stated the software enables the auditors to extract the information and look at the data efficiently and quickly. He stated the Township data and probability is exactly along what they would expect in a trend line.

Mr. Shank stated the Audit went very well, and minimal adjustments were required, and management was helpful which enabled them to do an efficient Audit.

Mr. Lewis asked if they sampled Interfund Transfers in the Audit, and Mr. Shank stated they do look at Interfund Transfers and “pretty much everything” during the Audit. He stated they look for anomalies in Transfers that would not appear right, and they also look at Board Minutes for approvals.

Mr. Lewis asked if they noticed any Contingent Liabilities that the Board has not previously discussed or disclosed. Mr. Shank stated they did not that they are aware of.

Mr. Lewis stated it was indicated last year that Lower Makefield has a favorable Debt to Equity Ratio, and he asked if that is still the case; and Mr. Shank agreed. Mr. Shank added that they see that on the Government-wide Statement when they talk about all of the Liabilities and the Assets. He stated they do not just consider Debt, and they consider the other Liabilities such as OPEB and the Pension. He stated they are considerable Liabilities, and before the GASB standards within the last ten years, they were not even presented on the Government-wide Statement. He stated they are now presented, and as he noted previously he is seeing many Cities and Townships that have a negative overall Net Assets in the Township; and Lower Makefield does not have that.

Mr. Lewis stated Mr. Shank has indicated that he is comfortable with the Balance Sheet, and there is no immediate risk to the long-term safety of the residents of Lower Makefield. Mr. Shank stated an Auditor cannot speculate into the future as they are not allowed to do that. He added that they are not seeing any warning signals.

Mr. Lewis asked Mr. Shank if the proposed sale of the Sewer system to Aqua were not to go through on time or at all, would that cause him any issues or concerns about the financial safety of the Township. Mr. Shank stated as he noted Auditors have to be careful what they can talk about in the future and projections as they are not allowed to do that. Mr. Shank stated a financial analysis would be needed to make that assessment.

Mr. Lewis stated Mr. Shank’s firm did their first Audit for the Township in 2018, and also reviewed the 2017 Audit. Mr. Lewis stated in September, 2019, he asked Mr. Furman if he was comfortable with the prior Auditor’s work, and if he felt that there were any inconsistencies or failures in terms of internal controls or improper misappropriation or “anything bordering on something that was a mistake or worse than a mistake;” and Mr. Furman had stated that he did not adding that he had reviewed the work papers. Mr. Lewis asked Mr. Shank if that is still his official answer. Mr. Shank

stated a typical procedure in any Audit is to go in and look at the work of the Auditor, the statements, etc.; and there are procedures that they would do that are normal in any transitional Audit period.

Mr. Lewis noted the Unfunded Pension Liability where there was an improvement this year largely market based, but we are still below 100%. He stated last year and previously it had been expressed that there was no significant concern with our level of funding. Mr. Lewis asked Mr. Shank if he is still okay with that and that we are not “woefully underfunding our Pension.” Mr. Shank stated any time there is a deficit it is something that should be considered, but what they are seeing in the Township is not an extraordinary Liability. He stated he does like that the gap is closing. He stated just as important as funding, the investment return is helping to close that gap; and the end goal is to close the gap. Mr. Shank stated he sees significant progress being made, but they do need to plan for the future and consider that when looking at the Budget and long-term planning just as you would the Capital.

Mr. Lewis stated if the Township were to complete its transaction with Aqua and receive a large sum of money as a result of that, one of the areas that the funds that could be used for would be resolving the unfunded Pension Liability and potentially increasing the investment in the Pension Fund. Mr. Shank stated that is a possibility that should be looked at with the Township’s Administrators who handle that as well as the actuary.

Mr. Lewis asked if the Township were to significantly increase its Pension Funding such that it reduces the unfunded Pension Liability, is there a significant downside risk to over-funding the Pension if it can be invested in marketable securities. Mr. Shank asked what Mr. Lewis meant by “downside.” Mr. Lewis asked Mr. Shank if he would have any concerns with that since in “theory Mr. Shank would be happy because it reduces the potential Liability of the Township.” Mr. Shank stated the Township would have to evaluate that, and the Auditors would not be prepared to make a statement as to how these funds should be invested. He stated they have not done an analysis on that. He stated when Mr. Lewis made the statement about “downside,” he could be talking about market risk which is really an investment item that the Auditor could not comment on. He stated the role of the Auditor is that they are “fact people,” and they present historical facts, and they are not able to speculate what the Township should do.

Mr. Lewis noted the OPEB Liability adding there is not a Fund to offset that in any way. He added that he knows that this is a relatively-new accounting principle. Mr. Lewis asked if it is worth considering in the future if it is a Contingent Liability to have an off-setting fund. Mr. Shank stated these Liabilities always existed, but GASB changed the rules to have them quantified and put on the Financial Statement of the Township. He stated it is not unusual now that OPEB Liabilities are not funded, but that does not mean that it is not a good idea to fund them; and there are Municipalities that have stated to set aside funds for this. Mr. Lewis asked if the Township were to consider that, would it have the same limitations as other Funds in terms of what it could be invested in or would it have the same flexibility as the Pension Fund. Mr. Shank stated the Township's advisor would have to look into this, but he feels there would be certain restrictions as to the investments. Mr. Lewis stated Pension investments are more flexible in Second Class Townships. Mr. Shank stated that would have to be looked into by someone from the investment side.

Ms. Blundi stated she understands that Mr. Shank cannot predict the future or provide advice in certain areas as that is outside the scope of what Mr. Shank is here to do.

Mr. Ferguson stated a Health Trust could be set up with similar options as a Pension Fund. He stated our actuaries are currently creating an OPEB summary much like they do every year for the Pension summary; and they would come up with the unfunded number that would start and an annual amount target to invest. He stated the difference with that versus a Pension would be when you do a Pension Fund and you have an MMO, you need to put in that MMO or threaten your funding from the State. He stated because there is no funding from the State for an OPEB, you can use the numbers as guidance; and there could be funds put in which would be an irrevocable health trust, and all that you could draw the money for would be for retirement health care specifically. Mr. Ferguson stated it gives the same basic parameters of a Pension Fund to do that.

Mr. Lewis asked Mr. Shank the total number of Municipalities that they are auditing, and Mr. Shank stated it is over one hundred Governments and Municipalities. Mr. Lewis asked Mr. Shank how he views our general level of financial health compared to other Municipalities that they are auditing. Mr. Shank stated as he indicated they are seeing a lot of larger Cities and Municipalities with negative Net Assets because of the Pension Liability, and they are not seeing that in Lower Makefield. Mr. Lewis stated previously they were given guidance as to where Lower Makefield was versus other

Municipalities; and at that time it was indicated that Lower Makefield had a strong financial position, and he is looking for that “general benchmarking” between what Lower Makefield looks like financially versus some others. He stated in Bucks County there are some Municipalities with zero debt and strong financial footing, and “others not so much.” He stated since they see approximately 100 Municipalities, giving a range as to where Lower Makefield fits is helpful in the process. Mr. Shank stated as he indicated it is a strong Municipality with positive Net Assets which is better than other areas where there may be deficits. Mr. Lewis stated he understands that has been Mr. Shank’s experience throughout auditing Lower Makefield, and Mr. Shank agreed.

Dr. Weiss thanked Mr. Shank for conducting another unqualified Audit. He also thanked Mr. Ferguson “for getting us there.” Dr. Weiss stated Mr. Shank’s firm has now seen Lower Makefield in 2017, 2018, 2019, and 2020 and re-stated the 2017 Audit. He asked about the trend since 2017. Mr. Shank stated they like that the Government-wide Net Assets continue to go up, and they like the trend where the Net Pension obligation for the last three years has gone in a positive direction. He stated there will be some funds that go up and down due to timing, and that is normal; but they look at the overall big picture, and he feels overall they have seen some positive trends with the Township. Dr. Weiss stated the Township is getting healthier as time goes on, and Mr. Shank agreed.

Ms. Blundi asked Mr. Ferguson to speak about the Pension funding. Mr. Ferguson stated every two years the actuaries do an evaluation, and the last one that was officially listed would show where things stood on 12/31/18. He stated they are working on the 1/21 report which would be up to and including December 31 of last year. He stated he has seen the preliminary report. He stated for non-Police employees all new hires having started in 2012 are in a Defined-Contribution Plan and not in the Defined-Benefit Plan which would fall outside of the scope of this evaluation. He stated in time it will be seen that the Township will be essentially split. He stated the Police have to stay in the Defined-Benefit Plan under Act 600. He stated other than the Police, the rest would be in the Contribution Plan which would be the equivalent of a 401K. He stated with regard to the Defined-Benefit Plan, he feels that we will see the non-Uniform, which is those who are not the Police, those being Public Works, the Office staff, and the Finance Department, that that Pension Fund will be coming in at about 88% in the report, which will probably come out in October. He stated with regard to the Police Fund, which has the larger amount of money, it will be

around 77% to 78%. Mr. Ferguson stated he has spoken to the actuaries, and they have indicated that if you are close to 80%, they view that “you are okay.” He stated in 1/1/19, the Police were at 75.5%, and this time he feels it will be about 77.8% or 77.9% so they like the trend that they are seeing since it is close to 80%. He stated the non-Uniform number is 88% which they are very pleased with.

Mr. Lewis stated those are definitely improving and are good numbers. He stated one of the strategies they did was to get rid of high-load investments for the vast majority of the portfolio saving investment costs. Mr. Ferguson stated there was an instruction to put more toward index funds lowering our costs which saved approximately \$60,000 to \$70,000.

Mr. Grenier thanked Mr. Shank for the very thorough report. He stated he did not see in the Board’s packet the Summary Report which was presented this evening, and he asked if they could be provided a copy of that. Mr. Shank agreed and added that Mr. Ferguson has that. Mr. Ferguson agreed to forward it to the Board tomorrow.

Mr. Grenier noted Page 8 of the Executive Summary which showed the various trend lines over the last three years for the various Funds. He noted the General Fund which was relatively flat and the Sewer Fund which went up substantially in 2019, which was primarily due to the rate increase. Mr. Grenier asked if the \$3 million down payment which was received for the Sewer sale is represented in the General Fund. Mr. Shank stated while it is, it is not represented in the change because what they are looking at on the graphic Mr. Grenier has referred to is Net Position, which is the Assets minus the Liabilities. He stated while it is in the General Fund, it is not represented on any line because it is booked as an Advance Liability. He stated they do not recognize that Liability as a deposit until everything is signed, and it will then roll into the Revenue. Mr. Shank stated all of the lines are moving, but that movement did not affect the lines. Mr. Gentile stated it is in General Fund Cash and General Fund Liability so they offset each other. Mr. Grenier stated what is being shown on this graph is the Net, and Mr. Shank agreed.

Mr. Grenier stated he feels that there is some level of risk if the sale does not go through or goes through later in time. He asked if the Audit considered in any way the potential risk that the sale does not go through, and the Township has to give back the \$3 million; and he asked what that would do to the General Fund. Mr. Shank stated that is exactly why it was

presented as a Liability. He stated Mr. Grenier's concern would be met if the Township had recognized it as Revenue before all of the Conditions are met; and if they had and the sale did not go through, the Township would have a "big hit." He stated because the Township recognized it as a Liability, it would be a reversal of the Liability; and that was the right way. He added it is also conservative in the respect that while the Township has the deposit, they are not recognizing it as Township money because all of the Conditions of the Agreement have not yet been met.

Mr. Grenier stated there is a statement that they are selling the Sewer system for \$53 million recognizing that there is some level, probably low, of that not happening. He asked if that sale does not occur, and the Township does not get the \$53 million, does the Audit consider what the Township's financial position is. Mr. Shank stated the Township has done what they are supposed to in an Audit, and it discloses the potential subsequent event. He stated it is in the Opinion to bring this to the reader's attention. He stated there is also the deposit which has been shown as a Liability. He stated aside from the deposit and the cash, when you look at the numbers in the Audit, it has not been reflected because it is an event in the future. Mr. Shank stated Audits are done on historical Financial Statements, and there is no indication of how that will affect the Township in those historical figures; and in fact it is not really allowed. Mr. Grenier stated since they did not consider that, and the Township is still in generally good financial health, the Township is in really good shape. Mr. Shank stated the Township is in good shape.

Mr. McCartney thanked Mr. Shank and Mr. Gentile for putting together an easy-to-follow presentation tonight. He also thanked Mr. Lewis for asking the important questions.

ENGINEER'S REPORT

Mr. Pockl stated the Board received his Report in their packet.

Approve to Participate with Falls Township in the Paving of Walnut Lane to be Paid in 2022 at an Amount not to Exceed \$18,000

Mr. Pockl stated a few months ago as part of Falls Township's Road Program, Falls requested Lower Makefield participating in paving Elbow Lane which is half located in Lower Makefield and half located in Falls Township. He stated

as they have been going through their Road Program, Falls has been seeing some savings on the quantities that they initially bid out; and they have considered Alternatives for expanding the scope of their Road Program to include Walnut Lane, which is also half in Falls Township and half in Lower Makefield Township. Mr. Pockl stated based on the quantities that the Falls Township engineer has measured out in the field and using the unit prices in the Bid for Elbow Lane, they believe that the amount would not exceed \$18,000.

Mr. Pockl stated Walnut Lane was last paved in 1988, and it is not in good condition, although it is not in the worst condition of all of the Township roads. He stated it is a dead-end road so it does not get a lot of volume of traffic.

Mr. McCartney moved to participate with Falls Township in the paving of Walnut Lane to be paid in 2022 at an amount not to exceed \$18,000.

Ms. Blundi stated there was another road in that Township, so she feels that this would piggy-back into what is already pending, and she feels the Motion would be to include an Amendment to the previous Agreement for Elbow Lane, and Mr. McCartney agreed.

Dr. Weiss seconded.

Mr. Grenier stated while he is in favor of doing this, he would like to know if there is some form of communication that could be set up with Falls and any other Township that we share a border with to allow the Board to plan ahead more in the future rather than getting this in the middle of the year. Ms. Blundi stated that was discussed previously. Mr. Grenier stated while it was discussed it is not happening yet so we need to emphasize that with our neighbors so that the Board can prepare for it. Ms. Blundi stated she knows that Mr. Ferguson has been working on that, although this one was part of a Bid Alternate.

Mr. Ferguson stated he is in communication with the Manager of Middletown and the Manager of Upper Makefield. He stated Falls Township has a new Manager, and they have discussed that during Budget time, they will discuss any shared roads; and we have that same understanding with Middletown that those would be communicated back and forth to avoid this happening in the future. Mr. Ferguson stated the new Falls Township Manager came in at the end of last year, and they have since started talking so that this

should be avoided in the future. Mr. Grenier stated while he appreciates that, this year he is inclined to vote in favor of it given the circumstances and the relatively low dollar amount; but next year if it comes up the same way, he probably would not vote in favor of it.

Ms. Blundi stated while Mr. Grenier has a valid point, in both of these situations, if the Township did not agree to this, there would be a road where one side would be paved, and the Lower Makefield side would not be paved. She stated she appreciates all that Mr. Ferguson is doing to have better communication with the other Townships.

Motion carried unanimously.

Opportunity for Public Comment for the Township NDES MS4 Pollution Reduction Plan

Mr. Pockl stated at a previous Board meeting, he presented the status of the Township's MS4 Permit which is the Stormwater Permit that we have with DEP for our stormwater system. He stated the status report included an overview of the Township's Pollution Reduction Plan, which is required by DEP. One of the requirements of the Pollution Reduction Plan is that a Public Comment period is provided, and the draft copy of the Pollution Reduction Plan was put on the Township Website and a hard copy is in the Township Building for those wishing to come in to review it. He stated the Public Comment period began on August 1. Mr. Pockl stated they did receive valid comments from the EAC, and he is in process of incorporating them into the Pollution Reduction Plan.

There was no one wishing to make Public Comment at this time.

Mr. Pockl asked that those wishing to make comments reach out to him before the Public Comment period ends on August 30, 2021.

PROJECT UPDATES

Memorial Park Project

Mr. Pockl stated the contractor has put the stone sub base down within the trail and the tennis court area, and they intend to put the stone sub base down

in the parking lot area early next week after they verify the condition of the soil underneath where the stone will be placed. He stated hopefully by next week they will have the stone sub base and the asphalt paving in the tennis court/ pickleball court area, the walking trail, and the additional parking lot on the west side.

Mr. Grenier asked Mr. Pockl when he feels the Memorial Park project will be complete and ready for use. Mr. Pockl stated it is weather-dependent, and there is also the two-week break in and around the events of 9/11. He stated the project will be shut down the week before and the week after 9/11. He stated he feels they are on schedule to complete the project by early October. Mr. Grenier asked what should people anticipate the area will look like during the two-week period around 9/11. Mr. Pockl stated there is the existing parking lot on the western edge; and as part of this project, we are expanding that parking lot to include two additional rows of parking. He stated he feels that should be fully stoned and paved, weather-permitting, so that area should be able to be used for parking during the event. He stated all of the contractor's equipment that they have on site will be parked on the the eastern side and from the main entrance, the circle driveway, and further west, there should not be any equipment in that area.

Sandy Run Road Project

Mr. Ferguson stated the project is on schedule. The targeted completion date was when School started. He stated much of the work is done. He stated while he does not anticipate that there will be a delay, in the event that they get to the time when School is opening, they could take measures to let School buses through the same way they would let emergency vehicles through now. He stated if that happens, they will coordinate with the School District to make sure that there is no impact on School bus traffic, although they anticipate at this point the work will be completed before School starts. Mr. Ferguson stated photos of the project have been shared on social media. He stated they will also put on-line and on the TV Channel some information on the use of roundabouts including videos which will show round-about etiquette.

Taylorsville/Woodside/Maplevale Re-Paving

Mr. Grenier asked for an update on where the re-paving of this area stands. Mr. Ferguson stated Mr. Hucklebridge is in contact weekly about this, and it is anticipated that the paving will take place in September. Mr. Ferguson stated once he gets a timeline, it will be posted on-line. Mr. Grenier asked about the scope of what is being re-paved, adding he had talked about the 300 feet of Maplevale, a section of Taylorsville, and part of Woodside. Mr. Ferguson stated they will put up the scope of work as well. He added that if there is something beyond this that has been impacted, the Township will reach out to them before they start the project to make the case if it is beyond what they originally planned.

Sandy Run Road Public Comment

Mr. Dan Matlis, 585 Hearthstone Drive asked about the Edgewood round-about. He asked if anyone had taken into consideration the width of the roundabouts to accommodate some of the heavy equipment such as fire trucks, plows, and trailers. He stated he feels the roundabouts are about 15', and a heavy plow is about 12' and with a truck and/or trailer, it is not going to fit through the round-about without damage. Mr. Ferguson stated that has been considered. He stated the literal width of the round-about may not accommodate those larger pieces of equipment, and the traffic engineer had made some presentations about that. He stated some of those presentations may still be on-line. He stated he had indicated that there may be certain size vehicle that would go over the center circle of the round-about and get through without causing damage. He stated part of the design of the round-about was to make the center areas stronger than the asphalt to withstand the trucks going over them in those instances. Mr. Ferguson stated in time, they may have to do some repairs to those center areas. He stated they actually took out Township vehicles including fire trucks and garbage trucks to reinforce the idea that they could fit under the parameters that he just outlined.

Mr. Matlis asked how this will be plowed since if you go through with a plow given the way that the concrete has been put in sections, the plow will lift the concrete "in no time." Mr. Ferguson stated he would defer to the Public Works Director for that, but he feels that they would run that with a smaller truck; and that has been discussed in depth with the plowing crews, the Public Works

Director, and the Township engineer. He agrees that eventually it could get chipped or damaged, but this should not be any more so than a normal road, sidewalk, or curb area.

Mr. Pockl stated the curb within the central island of the round-about is specifically designed to be mountable and to be at such an angle that the plows should not damage the curb.

Mr. Matlis stated he is an engineer as well, and he feels that will happen when there is no settling, but as soon as there is settling, there will be unevenness in the settling; and the edge of a 12' plow will pick it up. He stated he does not understand why that was not made wider since there is plenty of room in the circle; and they could have made the round-about 2' shorter in radius and still achieved the same results and not have to come back in two years to repair something that is brand new.

Mr. Ferguson stated they had three separate engineering firms that were part of the design, the quality review, and a final say as to how that was completed. Mr. Matlis stated while he understands that, his concern is that he is sure that there were three separate engineering firms that looked at the Sandy Run project originally and everyone said that it would be okay, and now they are spending a lot of money fixing something that should have been done right the first time.

Mr. Lewis stated they considered over twenty-five different design permutations and "reviewed multiple engineers and made an engineering change." He stated the traffic engineer developed the least expensive option of the ones that were considered and developed a compelling simulation model of how cars and trucks would flow through. He stated the Board spent a significant amount time on this, and he is optimistic that we will be able to open Sandy Run Road in a safe manner.

MANAGER'S REPORT

Approve Tree Planting from the Tree Bank Fund as Recommended by the EAC at the Revere Road Tennis Courts and Twig Lane Tot Lot

Ms. Linda Salvati was present. Mr. Ferguson stated the EAC recently had a discussion about tree plantings at the Revere Road tennis courts and the Twig Lane tot lot. He stated a concept was reviewed by the EAC. If approved

we would get multiple quotes on, but the collective amount between both of these is about \$8,000 so there can be an Administrative approval. He stated this could come out of the Tree Bank Fund which has about \$100,000 in it, and is specifically for these types of purposes. Mr. Ferguson stated the Concept Plan had been provided in the Board's packet.

Ms. Blundi stated the EAC provides the Township with invaluable comments and input on different projects. She stated over the last two years, they have been doing a lot of work in planting and using Tree Bank money to plant around the Township. She stated Ms. Salvati has identified these projects and used her professional expertise to scope out the plantings so that we can get the most we can for the money.

Ms. Salvati stated the numbers that she provided were estimates, and they were just for the trees alone, and not for installation. She stated she took the original design that was done by Boucher & James and made some minor changes based on what is existing at the sites, what needs to be added, and where it needs to be added. She stated what is proposed is a combination of trees 6' to 7' and some larger trees. She stated she tried to keep the numbers as consistent to the original design as possible. She stated at Revere Road there is a total of thirty-one trees, and at the Tot Lot there is a total of twenty-two trees.

Ms. Blundi stated they hope that there will be a more ambitious presentation later this year to scope out additional plantings with this funding for 2022.

Mr. Grenier stated Ms. Salvati has been doing a great job leading the tree-planting efforts. Mr. Grenier stated he understands that the estimate that has been provided was for material and not labor, and Ms. Salvati agreed. Mr. Grenier asked if adding the labor costs will put us near the threshold for this having to be Bid out or will we be using volunteer labor. Mr. Ferguson stated if it involves labor, and they start seeing quotes that fall outside of the parameters of an Administrative approval, then it would need to come back to the Board to take appropriate action. He stated under \$10,000 we do not even need to get three written quotes; however, he has it as a matter of policy that we do so regardless of that. He stated they will see the quotes, and if they have to do something differently, they will come back to the Board.

Ms. Blundi stated this is not intended to be a volunteer project, but there will be an opportunity for volunteers to help with planting at Patterson Farm this year which the EAC is also organizing.

Mr. Grenier moved and Mr. Lewis seconded to authorize the Township Manager to Bid out the planting plans for the Revere Road tennis courts and the Twig Lane tot lot.

Mr. Lewis asked if these will all be native trees, and Ms. Salvati stated she did confirm with the nursery where she got the quotes from that these are natives.

Mr. Grenier noted the drawings from Boucher & James from 2016 which just reference shade trees, understory trees, evergreen trees, and proposed lawn; and there is no mention of size of material, species, or planting details with tree protection in place, etc. Ms. Salvati stated she provided more in-depth information with photographs of the existing conditions and spread sheets with the tree names, size, and the cost. Ms. Blundi stated Mr. Bray was in favor of the selection that Ms. Salvati provided.

Mr. Grenier asked Ms. Salvati to discuss what trees she is looking at. Ms. Salvati reviewed what trees would be at the tennis courts and the tot lot which includes some aesthetically-pleasing ornamentals and other trees. Mr. Grenier asked about the size, and Ms. Salvati stated the shade trees would be 2" to 2 ½" caliper, and they would be ball and burlap which are larger trees that would need to be brought in and installed professionally. She stated everything else would be between 5' to 6' which are still decent-sized trees. Mr. Grenier asked if they speced out any deer protection. Ms. Salvati stated while she did not, she could. She stated she does not feel that would be needed for the 2" to 2 ½" caliper trees, but some of the 5' to 6' trees could benefit from a plastic cage. Ms. Salvati stated if we go with the nursery that she speced this with, the trees would have a one-year warranty; and most nurseries will guarantee for a year. Mr. Grenier stated it may be good to get a price for tree protection on the smaller trees to protect from deer browsing.

Motion carried unanimously.

Approve to Authorize Advertisement for Snow Plow Contractors

Mr. Lewis moved, Dr. Weiss seconded and it was unanimously carried to authorize advertisement for snow plow contractors for the upcoming winter season.

Approve to Authorize Advertisement to Bid Leaf Contractors

Mr. Lewis moved, Dr. Weiss seconded and it was unanimously carried to authorize advertisement to Bid leaf contractors for the upcoming leaf collection season.

Approve Payment Request #2 for the Manhole Rehabilitation Project to Advanced Rehabilitation Technology, LLC. in the Amount of \$3,220.00

Mr. Ferguson stated this is relative to closing out the 2020 Sewer lining project with the final payment.

Dr. Weiss moved and Mr. Lewis seconded to approve Payment Request #2 for the Manhole Rehabilitation Project to Advanced Rehabilitation Technology, LLC. in the amount of \$3,220.00.

Mr. Grenier asked how this came in compared to Budget, and Mr. Ferguson stated there were no Bid Alternates or anything that pushed this beyond the originally-budgeted amount in 2020. Mr. Grenier asked if they are satisfied with what was done, and Mr. Ferguson agreed.

Motion carried unanimously.

Police Activity

Mr. Ferguson stated we were on scene today for an event that happened in Yardley Borough where Chief Kelly was wounded. He stated this resulted in a great deal of strain on all of the Officers. He thanked the entire Police Department particularly the command staff that were on site the whole time. He added that Chief Kelly is doing well. Ms. Blundi thanked all of the Township and Borough Officers who responded.

SOLICITOR'S REPORT

Mr. Truelove stated the Executive Session commenced at 6:45 p.m. and informational items were discussed as well as litigation and Contract items.

Mr. Truelove stated with the help of a lot of the Supervisors, Mr. Pockl, and others he and Mr. Ferguson were able to conclude a Lease Termination Agreement with BrightFarms. He stated the BrightFarms structure will be coming down sometime in September, the utility lines will be returned to their pre-structure condition, and the ground will be returned to its pre-structure condition and quality as well. The Agreement outlines all of those terms and conditions as well as a security arrangement that will insure that the land is tillable again by March of next year. He stated there will be oversight as this work continues.

Approve Stipulations to Settle Tax Assessment Appeals for Lower Bucks Corporate Center Properties as Requested by Primary Taxing Authority, Pennsbury School District

Mr. Truelove stated Pennsbury School District filed Reverse Appeals for Tax Assessments in the last year or two for eight properties, five of which are located at Lower Makefield Corporate Center North and three of which are located at Lower Makefield Corporate Center South. He stated as the primary taxing authority, they have come to a positive settlement for tax years 2020 and 2021. He stated the anticipated Tax Revenue for some of these places is still uncertain due to COVID, but this is still a positive result with the aggregate amount of Tax Revenue increase to the Township being around \$20,000 for those two years.

Mr. Lewis moved, Mr. Grenier seconded and it was unanimously carried to approve the Stipulations to Settle Tax Assessment Appeals for Lower Bucks Corporate Center Properties as requested by the primary taxing authority, Pennsbury School District.

ZONING HEARING BOARD MATTERS

With regard to Appeal #21-1928 Warren Parry for the property located at 500 American Drive, Yardley, PA 19067, Tax Parcel #20-057-076 Variance request from the Township Zoning Ordinance #200-23B in order to install a patio and concrete pad for a hot tub which would increase the impervious surface from the existing 20.28% to 22.2% where 18% is the allowable amount, it was agreed to leave the matter to the Zoning Hearing Board.

Mr. Grenier stated he has been getting questions about a number of Zoning Hearing Board Appeals that have been Continued. Mr. Truelove stated the Jennings matter was Continued to September 21. Mr. Jennings has retained Counsel, and they may be submitting Revised Plans. Mr. Majewski stated they will be submitting Revised Plans, and their attorney will be at the next meeting. Mr. Majewski stated the Moock matter was also Continued, and the Applicant will be looking into their Application further as the Zoning Hearing Board had indicated that they might be able to redesign the Plan so that it would not require any Variances. Mr. Majewski stated another Appeal was Continued as the Applicants had technical difficulties and called into the meeting late after the Board had already voted to Continue the matter. Mr. Majewski stated the Deck Application will have a Special Meeting held just for that Appeal on August 31.

ZONING, INSPECTIONS, AND PLANNING

Approve Contract for Professional Services for Kaplan Subdivision (Plan #642)

Mr. Majewski stated the request is for the Board to approve a Contract for professional services for the Kaplan Subdivision, which is a two-lot Minor Subdivision to create one new house located on Dolington Road just north of Woodside Road. He stated this is to secure the public improvements as part of the Plan which includes stormwater management, landscaping, and erosion and sediment control.

Dr. Weiss moved, Mr. Grenier seconded and it was unanimously carried to approve Contract for professional services for Kaplan Subdivision (Plan #642).

Approve Release of Letter of Credit for McGinn/Minehart Subdivision

Mr. Majewski stated this is the Subdivision which adjoins Memorial Park at the intersection of Woodside Road and Lindenhurst Road. He stated this was a seven-lot Subdivision, and all work was completed in 2016. The developer is now requesting release of their Letter of Credit in the amount of \$32,595.20.

Dr. Weiss moved, Mr. McCartney seconded and it was unanimously carried to approve the release of the Letter of Credit for the McGinn/Minehart Subdivision.

PUBLIC COMMENT

Mr. Timothy Daly, 1554 Clark Drive, stated he is a fourteen-year resident and an avid user of the Township parks. He stated his children were members of YMS and his wife is a leader of the Girl Scout Troop for Sandy Run which utilized a Township park for their summer camp. He provided some information to Mr. Ferguson.

Mr. Daly stated on May 2 and May 15 there were some inappropriate uses of our parks that he uncovered through the review of Ordinances that are publicly available on the Website; and he found that those uses were in violation of multiple Ordinances. He stated Mr. Robert Abrams, who is also present this evening, helped him out with some “RTKs” to obtain the Permits. Mr. Daly stated the Permits were requested by an individual named Ann Warner-Ault with a purpose of use of “get together for friends.” Mr. Daly stated on-line he found a flyer from Lois Lambing and Josh Waldorf for a campaign event that was at the same exact location at the exact same time. He stated on May 15, an event was held at the pavilion, and he found a flyer talking about an event at the same exact location at the same exact time. He stated on-line there were also comments from an individual listed as “Ann WA,” which he construed and has confirmed, is Ann Warner-Ault. He stated her comment was: “Great event – thanks for the donuts.”

Mr. Daly stated his concern is that this was used for a campaign event, and there are requirements based on the Ordinance that someone would have to go to in order to do some of the things that can be seen in the photographs that he has just provided. He stated it was disturbing to see that Josh Waldorf, who is a public official who the Supervisors all know and “are personally friendly with,” would by-pass the Ordinances and by-pass the Board of Supervisors who had to approve him using the Parks in the manner that he did.

Mr. Daly noted that in Section 141-19 there are very specific rules on “peddling and soliciting;” adding that he feels they can all agree that a “campaign event is peddling and soliciting.” Mr. Daly stated within that Section it states that they cannot collect any funds, cannot distribute any hand bills, cannot put out any advertising material; and as can be seen in the picture provided, advertising material was presented. Mr. Daly stated it also states that you cannot post unauthorized signs, and it can be seen in the pictures that there are campaign signs on Lower Makefield Township grounds. Mr. Daly stated in order for them to do this, it states that it cannot be done without first obtaining written

permission from the Board and a Permit to be issued by the Township. Mr. Daly stated he did the “RTK,” and could not find any permission from the Board so it is clear “that he did not come and ask for it.”

Mr. Daly stated the second thing that he feels which was done which was a violation of the Ordinances by Ms. Lambing and Mr. Waldorf was under Section 141-20, which is Unlawful Obstruction. Mr. Daly stated their set-up had donuts at the Township pavilion; and when they were at the Garden of Reflection, they were at the kids playground handing out candy. He stated at the pavilion they used donuts to entice little kids over from the YMS soccer field. Mr. Daly stated he knows of one person in particular who was interfered with as she tried to take her child to the restroom, and that individual is Ms. Blundi’s next-door neighbor. Mr. Daly stated that individual was very offended and upset over the fact that Mr. Waldorf interfered with her and her child in their path to go to the bathroom. Mr. Daly stated it is very clear to anyone who is utilizing the Park, that they should not interfere with other people.

Mr. Daly also noted Section 141-32. He stated that given that Mr. Waldorf and Ms. Lambing did not get the Permits, there is a question as to whether they violated that Section.

Mr. Daly noted Section 141-35 with regard to violations and penalties; and for people who do violate the Ordinance, it states that there is a \$600 fine for each and every incident.

Mr. Daly stated he will leave the evidence adding that he felt it was necessary to do this publicly given that it was a public official; otherwise he would have gone to the Lower Makefield Township Police and filed a complaint there. He stated he wanted to make sure that he made this aware in a public setting, especially since Mr. Waldorf “is good friends with all of you.” He stated he understands that this is probably hard to listen to given that they all “have personal respect for him; but given what he has uncovered, he hopes they will do their duties as people within this community.” Mr. Daly stated he takes violations in our parks seriously as one of the biggest values for house values in this community is our parks. He stated the worst thing you can do is allow campaign events to happen “on hallowed ground like the Garden of Reflection, and that is so inappropriate, and very unfortunate that it happened.” He stated he hopes the Board will take action and do the “right thing.”

Mr. Daly stated while he is not a lawyer, he questions whether or not there is a criminal act here as well because there “is clearly coordination, and there was an attempt to falsify a governmental document.” He stated if there is a criminal act that falls underneath falsifying a government document, he hopes that the Board will go forward on it to the full extent of the law.

Mr. Ferguson stated he is familiar with the Permit, and both Parties have done this over the years. He stated the Application itself came in from the Campaign Manager, and that it not unlike Republican events by Republican Supervisors, Congress people, and State reps who did the same thing. He stated the Permit itself was authorized through the Park & Recreation Department; and staff, administering the Code do not view these events, which have been held by both Parties, as falling under Peddling. Mr. Ferguson stated with regard to the requirement of the Permit, they make the Application to Park & Rec, and have to post a check with a security deposit; and if there is not a need for clean-up, etc. the deposit is returned. Mr. Ferguson stated he feels they administered this, through their interpretation of the Code, consistent with what has been done in the past, and it was done properly.

Mr. Grenier stated Section 141 was referenced. Mr. Grenier stated the terms “soliciting and peddling” were noted by Mr. Daly, and those terms are under Section 147. Mr. Grenier read as follows: “Soliciting and peddling shall not apply to persons seeking local County, State, or Federal elective office or persons engaged on behalf of a candidate for local County, State, or Federal elective office.” Mr. Grenier asked Mr. Truelove if that applies in this case. Mr. Truelove agreed. He stated in this case Section 147 addresses situations where people are going door-to-door, and that is why there is a separate category spelled out for candidates.

Mr. Truelove stated the threshold issue is whether the claim even meets that standards because events occur at different Township facilities involving political parties and political groups all the time. He stated both political parties have met in the Township meeting room for years. He stated sometimes they may have signs and food, and that is not considered soliciting or peddling.

Mr. Truelove stated we have had people going door-to-door selling windows, etc., and the Police have been involved, and they need a License to do that; however, the exemption is when someone is a political candidate.

Mr. Truelove stated he does not feel the situation that has been brought up this evening does not apply to events that occur on Township property in the manner that has been described. He stated Mr. Ferguson also discussed other circumstances which were very similar to this as well.

Mr. Daly stated his concern is with the behavior that was exhibited that he feels “crosses bounds; and to hand out candy to little kids who did not come to the event and to hand out donuts to kids that did not come to the event violates the Ordinance.” Mr. Daly stated the pavilion and the spot at the Garden of Reflection were for people who were coming to the event and were invited by those people who rented it. He stated the individuals from YMS who went to the bathroom did not ask to be “intruded upon by having a donut handed to their kid so they could get a conversation with the parent.” He stated that is the problem he has. He stated he has no problem with them renting a room like the Township meeting room and having a party amongst themselves with invited guests. He stated the issue is when you are “dealing with little kids, going onto the kids playgrounds, interfering with YMS Soccer events with five-year-olds and six-year-olds is really a low bar.” He stated he feels everyone can agree with this, and he does not feel any of the Board members would have done something like that. He stated that is where his issue is. He stated he hopes that the Board will look into this and take action.

DISCUSSION ITEMS

Guidance on Property Inclusion to Ad Hoc Property Committee

Ms. Blundi stated the Ad Hoc Property Committee has been meeting. She stated we are still looking for volunteers; and those interested in participating should submit their resume. She stated there was a very aggressive timetable which had been delayed by the formation of the Committee as well as what could be construed as a large Agenda. She stated tonight they are looking to give the Committee direction that they should focus on the properties contained within the three reports. Ms. Blundi asked that Mr. Ferguson prepare a summary of those three reports so that everyone understands what the focus is, which she feels are those properties that are not currently being used for governmental functions that are in some level of disrepair and/or neglect, and in need of immediate attention to prevent any further deterioration.

Mr. Ferguson stated per the Ad Hoc Property Committee Chair's request and Ms. Blundi's as well, he will create that Summary and the punch list of the properties so that they are easily referenced and understood moving forward.

SUPERVISORS REPORTS

Mr. Lewis stated the Citizens Traffic Committee met, and they want to follow up on "revised painting of lines" on Oxford Valley Road, and that should be scheduled in the next few weeks.

Mr. Grenier stated the Planning Commission reviewed a Sketch Plan of another option for the Quill house area which was presented by Mr. Troilo. He stated they are asking for use of a Township parking lot for their own use, and he feels it is still quite a dense development.

Mr. Grenier wished Chief Kelly a quick recovery and thanked the local Police Departments and first responders who were able to get Chief Kelly to safety quickly. He added that same group had to address another dangerous matter in Middletown Township.

Mr. Grenier stated he is getting a lot of requests to post the Board of Supervisors Agenda on the LMT Facebook page; and Mr. Ferguson stated they did miss a deadline, and they will make sure that is done in the future.

There being no further business, the meeting was adjourned at 9:35 p.m.

Respectfully Submitted,

John B. Lewis, Secretary

**LOWER MAKEFIELD TOWNSHIP
BOS MEETING - 08/18/2021**

A/P WARRANT LISTS	8/2/2021		8/16/2021		TOTAL
	PRINTED CHECKS	MANUAL CKS/WIRES	PRINTED CHECKS	MANUAL CKS/WIRES	
Fund					
01- GENERAL FUND	230,956.69	3,861.76	102,308.79	3,706.39	340,833.63
02- STREET LIGHTS	487.35		2,657.29		3,144.64
03- FIRE SAFETY					-
04- HYDRANTS			212.84		212.84
05- PARK AND RECREATION	32,264.57	772.64	34,956.90	(28.71)	67,965.40
06- P & R FEE IN LIEU					-
08- SEWER	120,446.21	365.46	51,769.98		172,581.65
09- POOL	16,576.37	1,180.52	11,033.91		28,790.80
11- TRAFFIC IMPACT					-
15- GOLF COURSE			246,115.00		246,115.00
18- SEWER CAPITAL PROJECTS			6,379.47		6,379.47
19- SPECIAL PROJECTS	5,631.85		455.50		6,087.35
20- DEBT SERVICE					-
21- REGENCY BRIDGE	6,174.75		3,713.18		
30- CAPITAL RESERVE	178.50				178.50
31- POOL CAPITAL RESERVE FUND					-
32- TREE FUND					-
35- LIQUID FUELS	9,560.96			537,444.78	547,005.74
36- ROAD MACHINERY FUND					-
40- 9/11 MEMORIAL	6,742.19		2,740.83		9,483.02
45- PATTERSON FARM	1,537.05		21,767.61		23,304.66
50- AMBULANCE/RESCUE SQUAD					-
84- DEVELOPER ESCROW	21,286.65		7,755.59		29,042.24
91- UNEMPLOYMENT					
	451,843.14	6,180.38	491,866.89	541,122.46	1,481,124.94

JULY 2021 PAYROLL AND INTERFUND TRANSFERS	
Fund	
01- GENERAL FUND OPERATING TO PAYROLL ACCOUNT	729,490.39
GENERAL FUND OPERATING TO 401A DEFINED CONTRIBUTION PENSION PLAN ACCOUNT	7,624.66
60- POLICE PENSION FUND TO D.R.O.P. ACCOUNT	4,882.74
	741,997.79

John B. Lewis

James McCartney

Fredric K. Weiss

Suzanne S. Blundi

Daniel R. Grenier

Appendix C

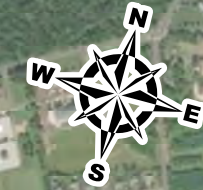
Maps

Appendix C-1: Lower Makefield Township MS4 PRP Maps (See attached)



Lower Makefield Township
Bucks County, PA

MS4 PRP Overview Map



Sheet 1

Sheet 2

Sheet 3

Sheet 4

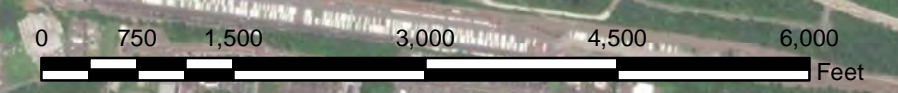
Sheet 5

Sheet 6

Sewersheds					
Unimpaired	CC-016	CC-033	RR-007	RR-023-1	RR-039
CC-001	CC-017	CC-034	RR-008	RR-024	RR-OP-01
CC-001-1	CC-018	CC-035	RR-009	RR-024-1	RR-OP-02
CC-002	CC-019	CC-OP-01	RR-010	RR-025	RR-OP-03
CC-004	CC-021	CC-OP-02	RR-011	RR-026	RR-OP-04
CC-006	CC-021	CC-OP-03	RR-012	RR-027	RR-OP-05
CC-006A	CC-021-1	CC-OP-04	RR-013	RR-027A	
CC-007	CC-023	CC-OP-05	RR-014	RR-028	
CC-008	CC-024	CC-OP-06	RR-015	RR-029	
CC-009	CC-025	MC-OP-01	RR-016	RR-029-1	
CC-009-1	CC-025-1	QA-01	RR-017	RR-030	
CC-010	CC-026	QA-02	RR-018	RR-031	
CC-011	CC-027	QA-03	RR-019	RR-032	
CC-012	CC-028	QA-OP-04	RR-020	RR-033	
CC-012-1	CC-029	QA-OP-05	RR-020-1	RR-036	
CC-013	CC-030	RR-004	RR-021	RR-037	
CC-014	CC-031	RR-005	RR-022	RR-037-1	
CC-015	CC-032	RR-006	RR-023	RR-038	

Legend

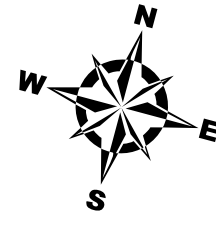
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Streambank Restoration
- Basin Installation/Retrofit
- Proposed Pervious Pavement
- Basins, Wetponds, & Lakes
- Culvert
- Total Parsed Area
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- National Wetland Inventory**
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Parcels
- Municipal Boundary
- Sheet Index



Last Revised: 01/20/2022



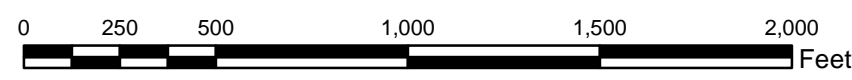
Source: Esri, DeLorme, GeoEye, Earthstar/GeoInt, Inc., CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



MS4 PRP Map: Sheet 1

Legend

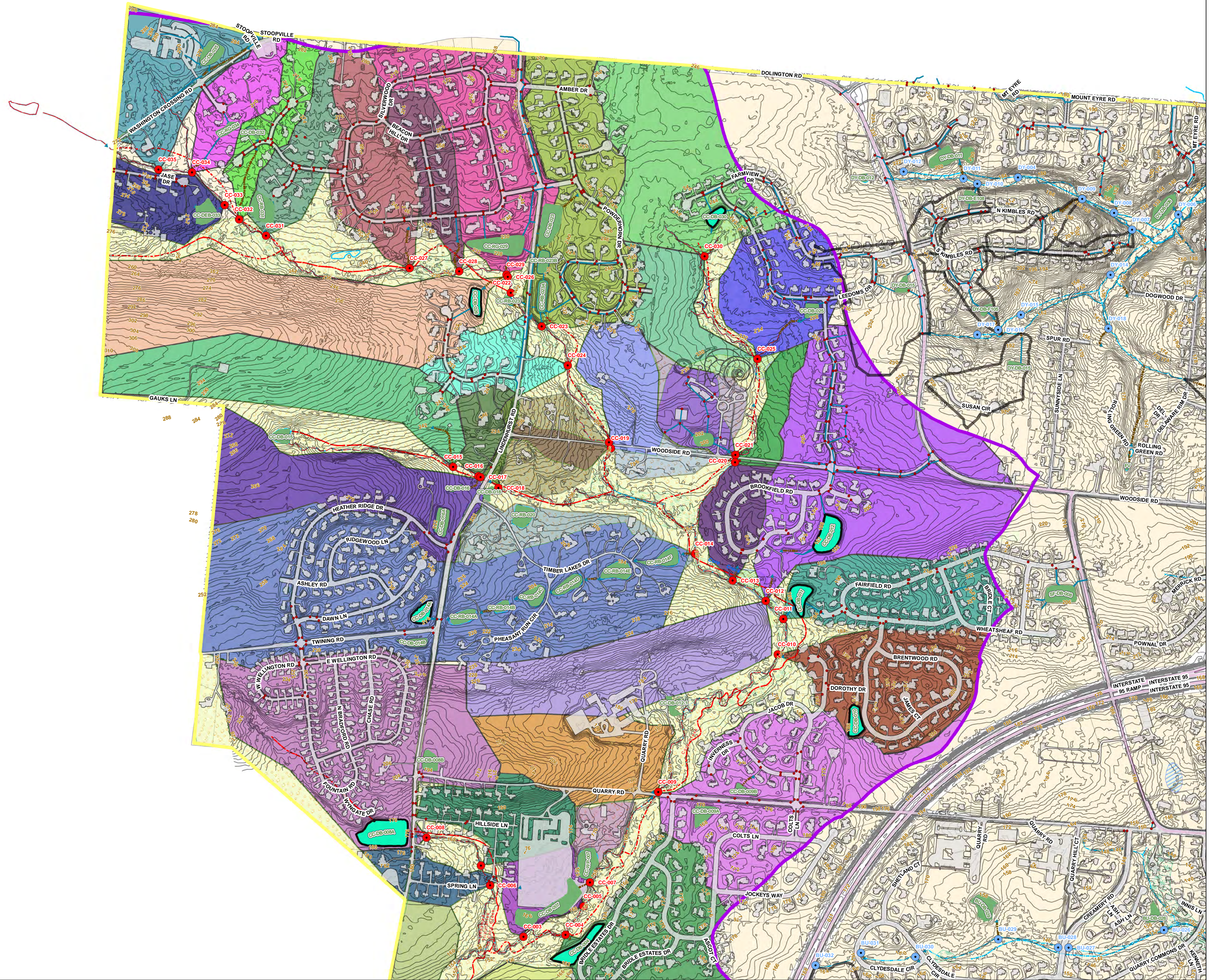
- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Total Parsed Area
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- National Wetland Inventory**
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Parcels
- Municipal Boundary

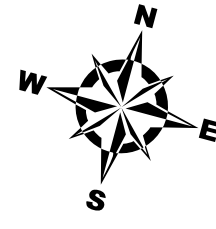


1 inch = 500 feet



Last Revised: 01/13/2022

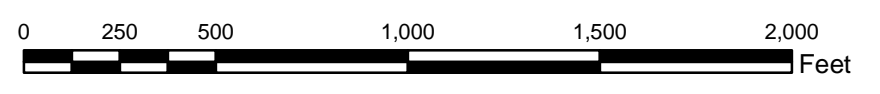
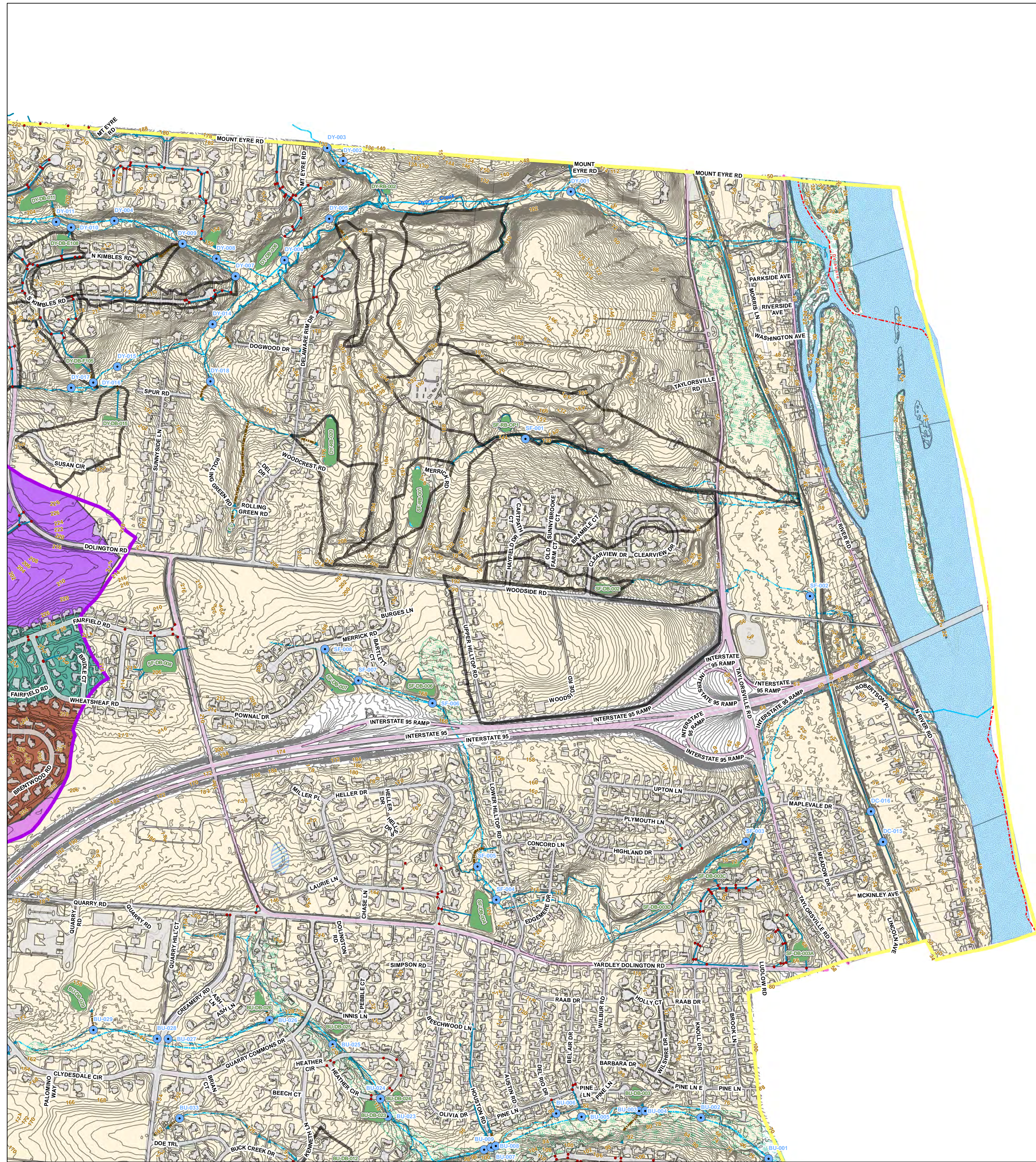




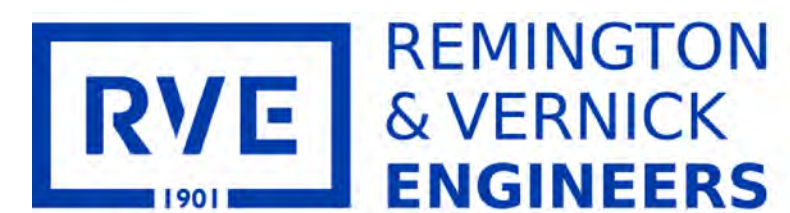
MS4 PRP Map: Sheet 2

Legend

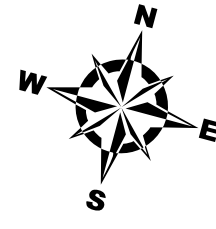
- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Total Parsed Area
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- National Wetland Inventory**
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Parcels
- Municipal Boundary



1 inch = 500 feet



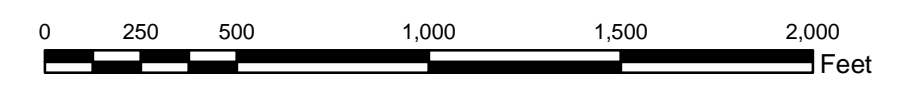
Last Revised: 01/13/2022



MS4 PRP Map: Sheet 3

Legend

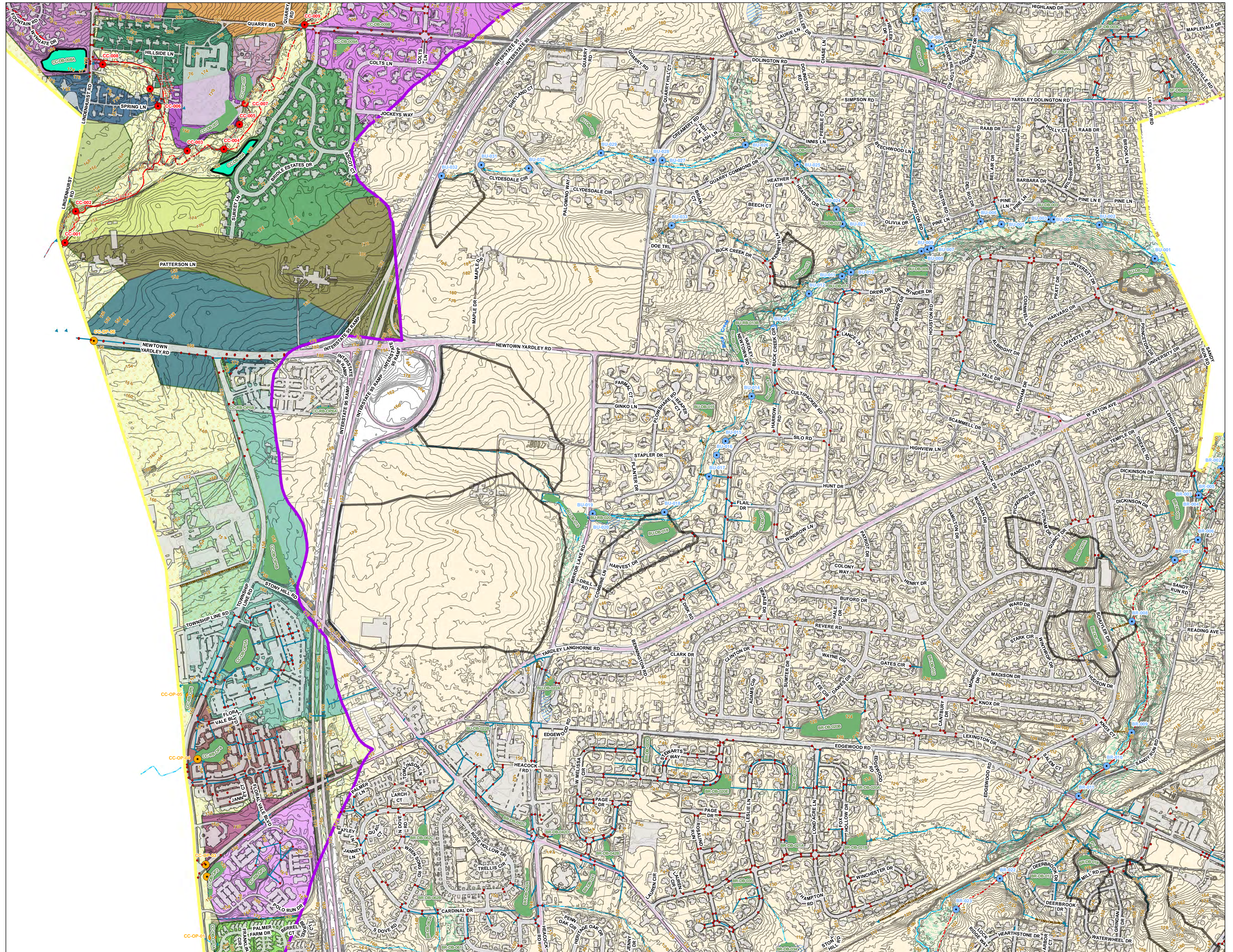
- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Total Parsed Area
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- National Wetland Inventory**
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Parcels
- Municipal Boundary

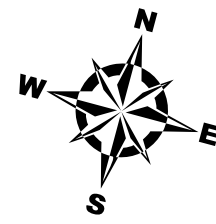


1 inch = 500 feet



Last Revised: 01/13/2022

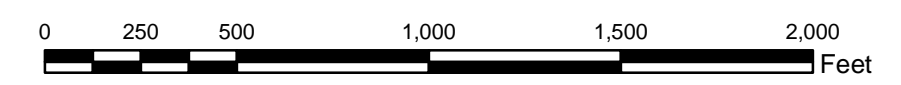




MS4 PRP Map: Sheet 4

Legend

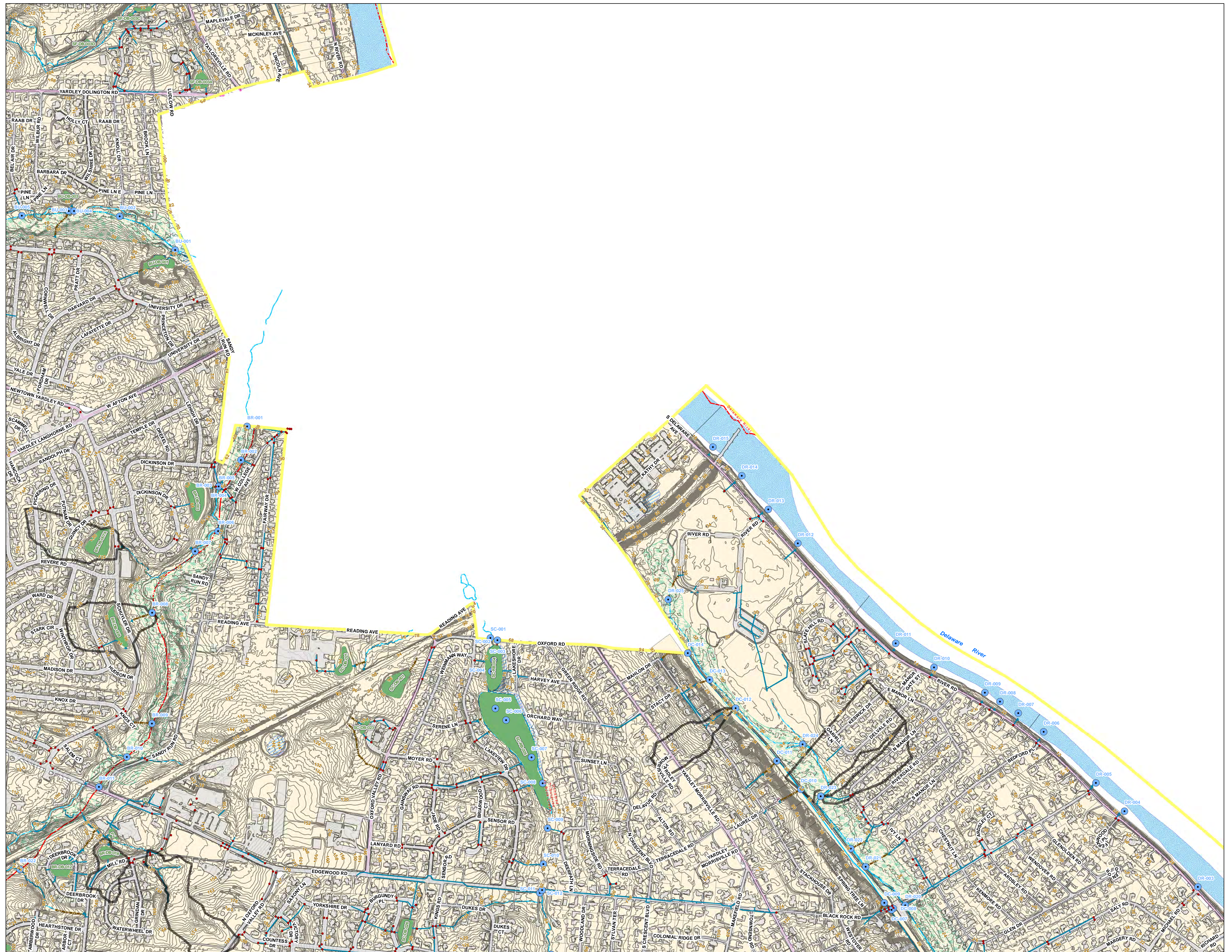
- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- Impaired Stream
- Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- National Wetland Inventory**
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Parcels
- Municipal Boundary

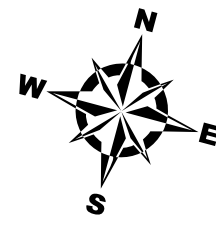


1 inch = 500 feet



Last Revised: 01/13/2022

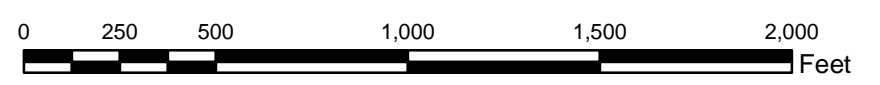
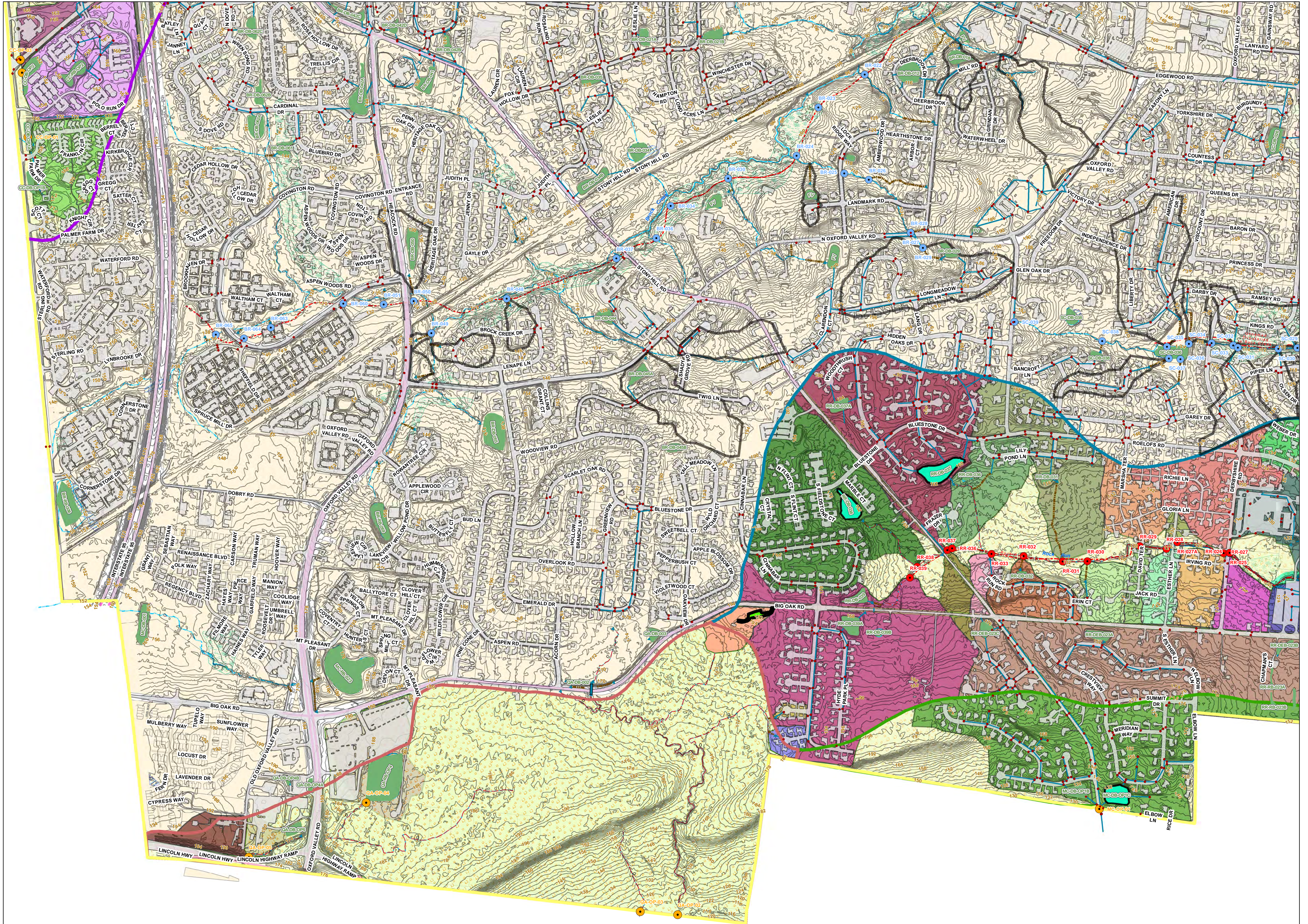




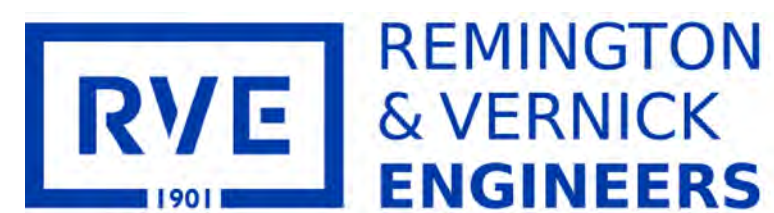
MS4 PRP Map: Sheet 5

Legend

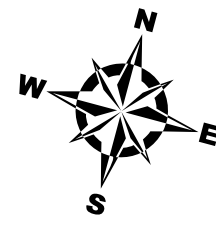
- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Culvert
- Total Parsed Area
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- Proposed Pervious Pavement
- Streambank Restoration
- National Wetland Inventory**
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Parcels
- Municipal Boundary



1 inch = 500 feet



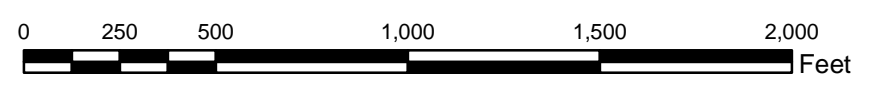
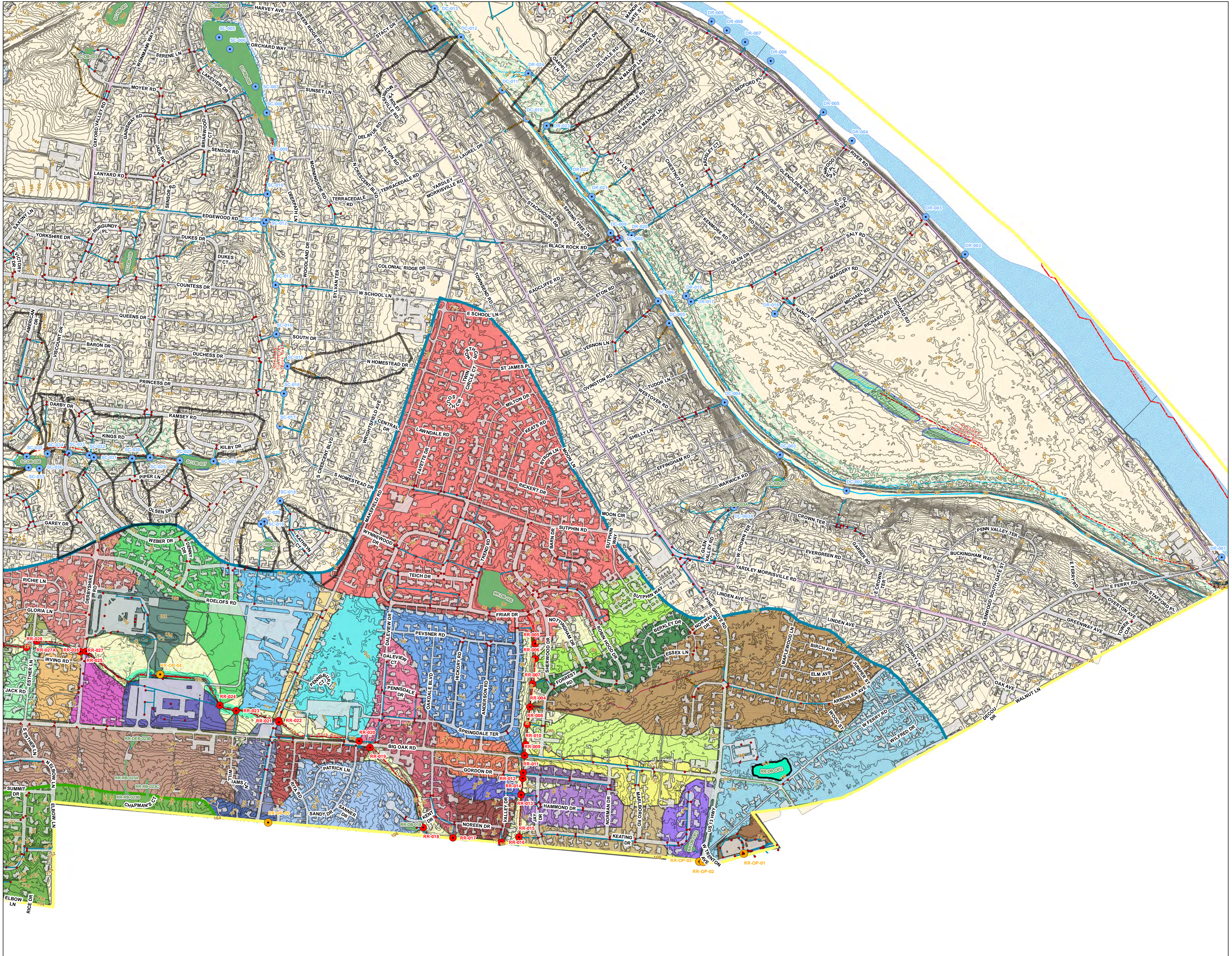
Last Revised: 01/13/2022



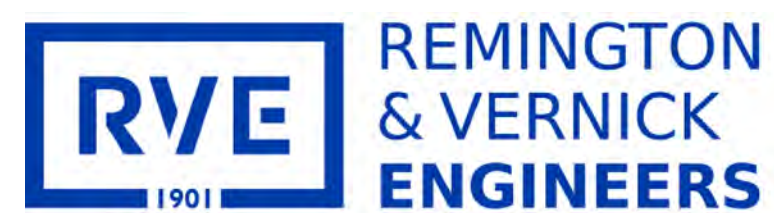
MS4 PRP Map: Sheet 6

Legend

- To be Field Verified
- Manhole
- Inlet
- ▲ Headwalls
- ▲ Endwalls
- Impaired Outfall
- Unimpaired Outfall
- Observation Points
- Open Channel
- Stormpipe
- - - Impaired Stream
- - - Unimpaired Stream
- PennDOT
- Contours
- Basins, Wetponds, & Lakes
- Total Parsed Area
- Total Impervious
- PRP Impaired Watersheds**
- Core Creek
- Martins Creek
- Queen Anne Creek
- Rock Run
- Basin Installation/Retrofit
- Streambank Restoration
- National Wetland Inventory**
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- Parcels
- Municipal Boundary



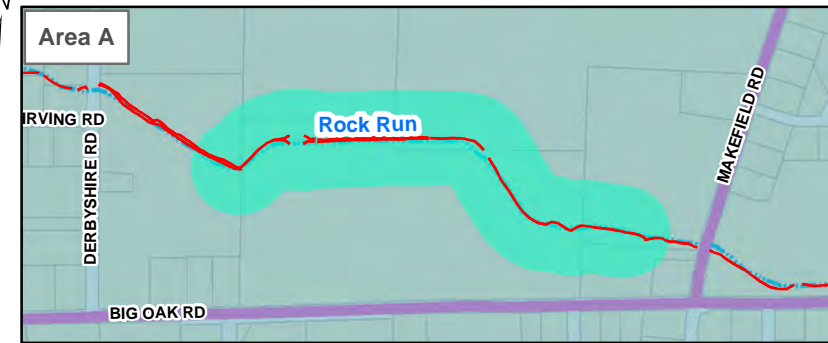
1 inch = 500 feet



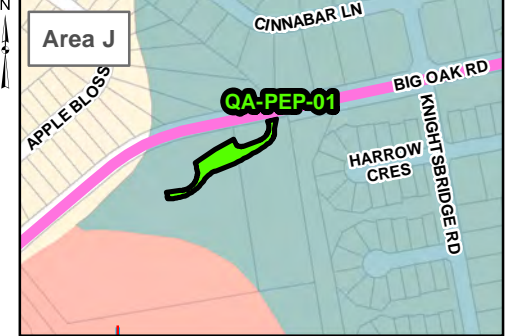
Last Revised: 01/13/2022

MS4 PRP PROPOSED BMP OPTIONS

Charles Boehm Middle School Streambank Restoration

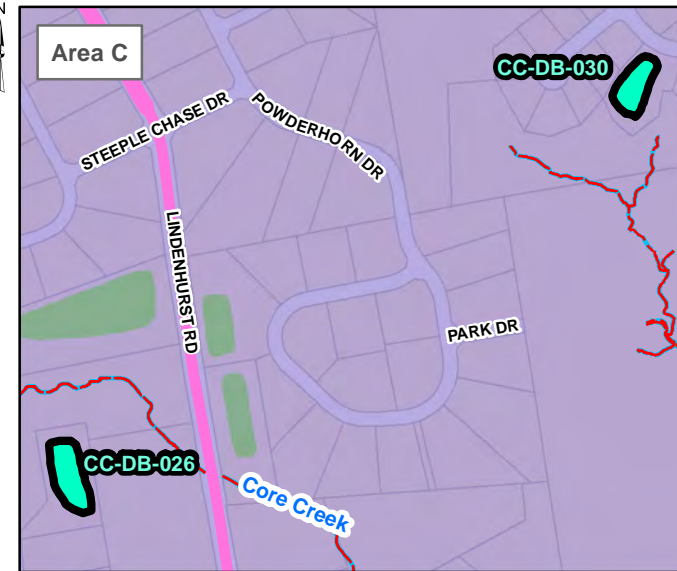


Pervious Pavement



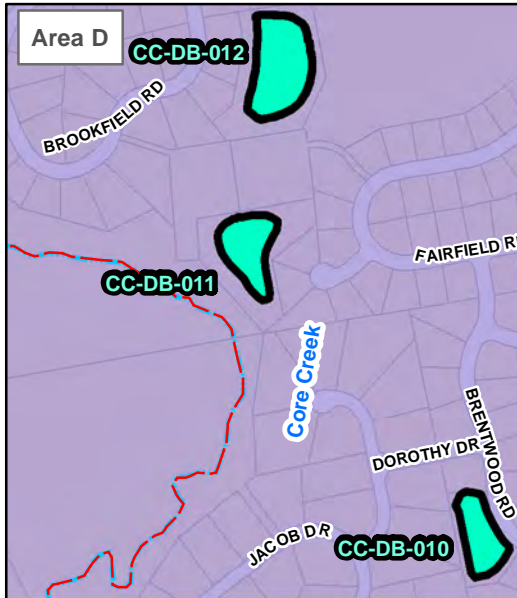
Five Mile Woods Parking Lot

Basin Retrofit



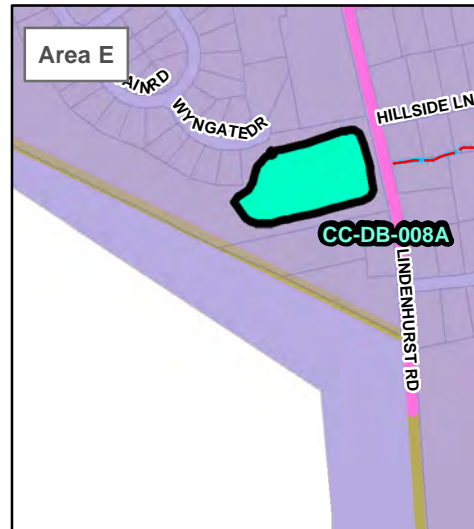
Dolington Estates and Penn's Fields at Farmview

Basin Retrofit



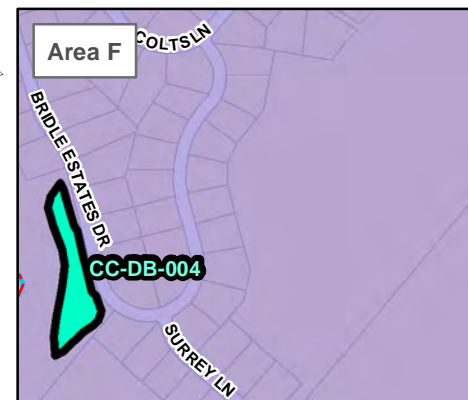
Makefield Brook

Basin Retrofit



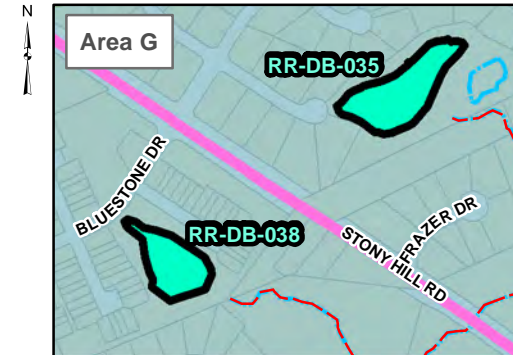
Back of Yardley Run

Basin Retrofit



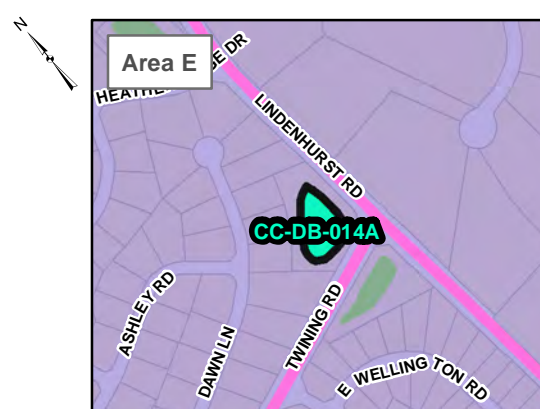
Bridle Estates

Basin Retrofit



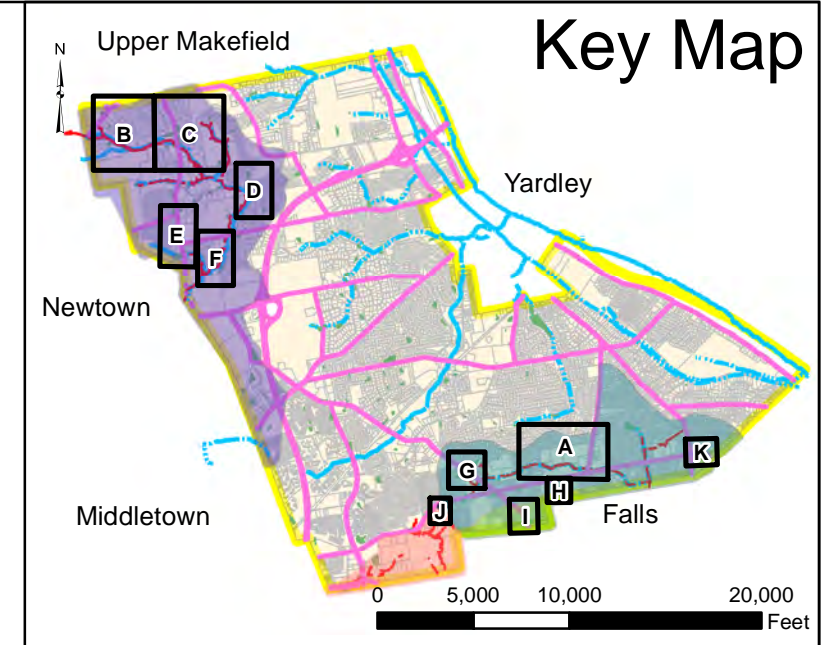
Hidden Oaks

Basin Retrofit



Data Sources:

1. Parcel Data provided by Bucks County Planning Commission.
2. Stream data provided by Pennsylvania Spatial Data Access (PASDA).



Lower Makefield Township Bucks County, PA

Legend

- Rock Run Streams-Siltation Impaired
- Queen Anne Streams-Siltation Impaired
- Core Creek Streams-Siltation Impaired

- StreamBank Restore
- Proposed PRP Basins
- Proposed PRP Pervious Pavement
- Basins, Wetponds & Lakes

Impaired Watersheds

- CORE CREEK
- MARTINS CREEK
- QUEEN ANNE CREEK
- ROCK RUN
- PennDOT
- Streams
- Parcels
- Municipal Boundary

Last Revised: 1/14/2022



L:\GIS Data\Pennsylvania\Bucks County\Lower Makefield\MS4\PRP

Appendix D

Existing Loading for Pollutants of Concern Calculations

Appendix D-1: Existing Sediment Loading

Appendix D-2: Existing Priority Organics Loading

Appendix D-3: Existing Sediment Loading per Watershed

APPENDIX D-1: EXISTING SEDIMENT LOADING

Drainage Area Outfall	Total Area (Ac.)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)	BMP Load Reduction (TSS) (lbs/year)	Type of BMP	Adjusted Pollutant Load (TSS) (lbs/year)
CC-001	22.26	0.81	21.45	1,839	264.96	7,165.61	0.00	None	7,165.61
CC-001-1	63.83	5.05	58.78	1,839	264.96	24,858.93	0.00	None	24,858.93
CC-002	14.33	0.30	14.02	1,839	264.96	4,274.18	0.00	None	4,274.18
CC-004	58.63	16.56	42.07	1,839	264.96	41,606.74	4,013.56	Dry Basin	37,593.17
CC-006	10.19	1.60	8.59	1,839	264.96	5,214.66	0.00	None	5,214.66
CC-006A	23.12	6.44	16.67	1,839	264.96	16,268.05	0.00	None	16,268.05
CC-007	13.47	4.86	8.61	1,839	264.96	11,215.90	8,051.56	Dry Extended Basin	3,164.33
CC-008	89.06	20.26	68.80	1,839	264.96	55,492.08	7,164.59	1-Dry Basin, 1-Retention Basin	48,327.49
CC-009	67.99	16.41	51.58	1,839	264.96	43,846.51	1,739.48	2-Dry Basins	42,107.03
CC-009-1	34.06	3.88	30.17	1,839	264.96	15,136.09	0.00	None	15,136.09
CC-010	43.76	13.28	30.48	1,839	264.96	32,499.46	1,221.10	Dry Basin	31,278.37
CC-011	37.01	11.40	25.61	1,839	264.96	27,758.02	2,042.55	Dry Basin	25,715.47
CC-012	100.73	12.36	88.38	1,839	264.96	46,141.09	1,839.50	Dry Basin	44,301.59
CC-012-1	50.29	3.18	47.11	1,839	264.96	18,328.51	0.00	None	18,328.51
CC-013	14.44	3.08	11.36	1,839	264.96	8,681.77	0.00	None	8,681.77
CC-014	145.68	24.20	121.48	1,839	264.96	76,683.81	9,343.82	2-Dry Basins, 6-Retention Basins	67,339.98
CC-015	54.41	1.88	52.53	1,839	264.96	17,378.12	0.00	None	17,378.12
CC-016	46.67	3.16	43.51	1,839	264.96	17,335.48	611.44	2-Dry Basins	16,724.03
CC-017	8.25	0.95	7.30	1,839	264.96	3,684.33	0.00	None	3,684.33
CC-018	1.69	0.08	1.61	1,839	264.96	569.32	0.00	None	569.32
CC-019	6.08	0.51	5.57	1,839	264.96	2,421.27	0.00	None	2,421.27
CC-019A	19.97	0.93	19.04	1,839	264.96	6,753.18	0.00	None	6,753.18
CC-021	8.94	0.29	8.66	1,839	264.96	2,819.49	0.00	None	2,819.49
CC-021-1	12.46	1.91	10.55	1,839	264.96	6,307.23	344.65	Dry Basin	5,962.58
CC-023	56.55	14.61	41.94	1,839	264.96	37,982.19	8,006.45	1-Dry Basin, 2-Retention Basins	29,975.74
CC-024	14.87	3.51	11.36	1,839	264.96	9,469.29	0.00	None	9,469.29
CC-025	31.37	5.17	26.21	1,839	264.96	16,445.82	831.24	Dry Basin	15,614.59
CC-025-1	19.39	0.83	18.57	1,839	264.96	6,437.91	0.00	None	6,437.91
CC-026	75.54	2.60	72.94	1,839	264.96	24,108.12	907.64	Dry Basin	23,200.48
CC-027	33.04	8.15	24.89	1,839	264.96	21,575.32	0.00	None	21,575.32
CC-028	17.37	5.07	12.30	1,839	264.96	12,576.61	0.00	None	12,576.61
CC-029	51.68	12.13	39.55	1,839	264.96	32,788.53	14,499.31	Rain Garden	18,289.22
CC-030	59.44	5.40	54.03	1,839	264.96	24,255.34	1,385.82	Dry Basin	22,869.51
CC-031	19.47	1.09	18.38	1,839	264.96	6,874.63	3,128.39	Retention Basin	3,746.24
CC-032	15.24	0.25	14.98	1,839	264.96	4,432.54	382.13	Dry Basin	4,050.40
CC-033	16.33	0.46	15.86	1,839	264.96	5,053.46	3,105.16	Dry Extended Basin	1,948.30
CC-034	17.12	1.89	15.23	1,839	264.96	7,509.32	2,113.74	Rain Garden	5,395.58
CC-035	29.63	5.39	24.24	1,839	264.96	16,342.88	850.85	Dry Basin	15,492.04
CC-OP-01	20.28	8.33	11.95	1,839	264.96	18,486.02	1,777.59	2-Dry Basins	16,708.42
CC-OP-02	31.69	11.35	20.34	1,839	264.96	26,254.73	7,259.96	1-Dry Basin, 1-Retention Basin	18,994.77
CC-OP-03	8.23	2.33	5.90	1,839	264.96	5,840.79	0.00	None	5,840.79
CC-OP-04	29.31	16.85	12.46	1,839	264.96	34,284.40	20,570.64	Retention Basin	13,713.76
CC-OP-05	77.84	36.07	41.77	1,839	264.96	77,398.49	12,836.77	2-Dry Basins, 3-Retention Basins	64,561.72
CC-OP-06	57.57	1.93	55.64	1,839	264.96	18,292.38	1,219.05	Retention Basin	17,073.33

APPENDIX D-1: EXISTING SEDIMENT LOADING

Drainage Area Outfall	Total Area (Ac.)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)	BMP Load Reduction (TSS) (lbs/year)	Type of BMP	Adjusted Pollutant Load (TSS) (lbs/year)
MC-OP-01	76.78	18.42	58.36	1,839	264.96	49,338.05	2,386.97	2-Dry Basins	46,951.07
QA-01	6.30	0.39	5.90	1,839	264.96	2,287.56	0.00	None	2,287.56
QA-02	1.24	0.72	0.52	1,839	264.96	1,468.16	0.00	None	1,468.16
QA-03	3.00	0.79	2.20	1,839	264.96	2,041.91	0.00	None	2,041.91
QA-OP-05	4.89	0.88	4.01	1,839	264.96	2,674.83	0.00	Dry Basin	2,674.83
RR-004	81.79	10.57	71.22	1,839	264.96	38,310.19	0.00	None	38,310.19
RR-005	192.88	51.73	141.15	1,839	264.96	132,526.19	11,300.64	Dry Basin	121,225.55
RR-006	17.31	6.02	11.29	1,839	264.96	14,061.00	0.00	None	14,061.00
RR-007	16.22	4.50	11.72	1,839	264.96	11,379.64	0.00	None	11,379.64
RR-008	20.44	2.01	18.43	1,839	264.96	8,579.65	0.00	None	8,579.65
RR-009	44.19	12.36	31.83	1,839	264.96	31,169.06	0.00	None	31,169.06
RR-010	13.59	3.04	10.55	1,839	264.96	8,380.69	0.00	None	8,380.69
RR-011	4.75	1.69	3.06	1,839	264.96	3,927.06	0.00	None	3,927.06
RR-012	8.76	1.84	6.92	1,839	264.96	5,214.49	0.00	None	5,214.49
RR-013	12.51	3.32	9.19	1,839	264.96	8,547.16	0.00	None	8,547.16
RR-014	4.54	0.78	3.76	1,839	264.96	2,429.85	0.00	None	2,429.85
RR-015	14.67	4.07	10.59	1,839	264.96	10,298.40	0.00	None	10,298.40
RR-016	7.43	1.77	5.66	1,839	264.96	4,748.91	0.00	None	4,748.91
RR-017	14.39	4.08	10.31	1,839	264.96	10,228.54	0.00	None	10,228.54
RR-018	26.86	5.82	21.04	1,839	264.96	16,271.99	1,531.79	Dry Basin	14,740.21
RR-019	8.95	2.03	6.92	1,839	264.96	5,569.44	0.00	None	5,569.44
RR-020	12.36	3.85	8.51	1,839	264.96	9,340.07	0.00	None	9,340.07
RR-020-1	29.02	5.70	23.32	1,839	264.96	16,654.31	0.00	None	16,654.31
RR-021	9.91	2.94	6.96	1,839	264.96	7,259.96	0.00	None	7,259.96
RR-022	7.77	2.59	5.18	1,839	264.96	6,137.19	0.00	None	6,137.19
RR-023	86.91	16.56	70.35	1,839	264.96	49,086.63	12,938.25	3-Dry Extended Basins, 3- Retention Basins	36,148.37
RR-023-1	27.33	10.52	16.81	1,839	264.96	23,793.13	0.00	None	23,793.13
RR-024	15.08	8.48	6.61	1,839	264.96	17,337.68	0.00	None	17,337.68

APPENDIX D-1: EXISTING SEDIMENT LOADING

Drainage Area Outfall	Total Area (Ac.)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)	BMP Load Reduction (TSS) (lbs/year)	Type of BMP	Adjusted Pollutant Load (TSS) (lbs/year)
RR-024-1	34.90	9.49	25.40	1,839	264.96	24,188.93	0.00	None	24,188.93
RR-025	8.90	0.80	8.10	1,839	264.96	3,617.74	0.00	None	3,617.74
RR-026	24.55	7.10	17.45	1,839	264.96	17,682.92	0.00	None	17,682.92
RR-027	9.65	1.64	8.00	1,839	264.96	5,140.49	0.00	None	5,140.49
RR-027A	1.55	0.37	1.17	1,839	264.96	998.53	0.00	None	998.53
RR-028	6.90	1.54	5.35	1,839	264.96	4,257.56	0.00	None	4,257.56
RR-029	3.67	0.92	2.76	1,839	264.96	2,413.52	0.00	None	2,413.52
RR-029-1	11.80	2.90	8.90	1,839	264.96	7,687.98	0.00	None	7,687.98
RR-030	8.24	1.16	7.08	1,839	264.96	4,014.06	0.00	None	4,014.06
RR-031	34.55	6.78	27.77	1,839	264.96	19,826.24	1,393.84	Dry Basin	18,432.41
RR-032	10.58	3.20	7.39	1,839	264.96	7,835.20	600.67	Dry Basin	7,234.53
RR-033	3.79	0.93	2.87	1,839	264.96	2,465.40	0.00	None	2,465.40
RR-036	18.11	2.82	15.29	1,839	264.96	9,243.01	158.76	Dry Basin	9,084.25
RR-037	57.43	15.81	41.62	1,839	264.96	40,105.27	2,969.87	2-Dry Basins	37,135.40
RR-037-1	4.97	0.07	4.90	1,839	264.96	1,435.10	0.00	None	1,435.10
RR-038	60.00	19.04	40.96	1,839	264.96	45,863.54	1,715.41	Dry Basin	44,148.13
RR-039	80.76	12.57	68.19	1,839	264.96	41,186.00	3,348.60	3-Dry Basins	37,837.40
RR-OP-01	4.67	2.09	2.58	1,839	264.96	4,524.20	0.00	None	4,524.20
RR-OP-02	61.12	8.81	52.31	1,839	264.96	30,062.31	2,660.65	Dry Basin	27,401.66
RR-OP-03	9.48	2.75	6.73	1,839	264.96	6,841.53	477.34	Dry Basin	6,364.19
RR-OP-04	18.26	8.59	9.66	1,839	264.96	18,362.43	0.00	None	18,362.43
RR-OP-05	3.18	0.83	2.35	1,839	264.96	2,151.14	0.00	None	2,151.14

Totals (ac.)	2876.19	594.48	2281.70
Percents of Impervious and Pervious		21%	79%
1,541,083.59 lbs/year	< Total Existing Sediment Load at Township Outfalls		
154,108.36 lbs/year	< Required Sediment Reduction (10%)		

APPENDIX D-2: EXISTING PRIORITY ORGANICS LOADING

Drainage Area Outfall	Total Area (Ac.)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious TP Loading (lbs/acre)	Pervious TP Loading (lbs/acre)	TP (lbs/year)	BMP Load Reduction (TP) (lbs/year)	Type of BMP	Adjusted TP (lbs/year)	Impervious TN Loading (lbs/acre)	Pervious TN Loading (lbs/acre)	TN (lbs/year)	BMP Load Reduction (TN) (lbs/year)	Adjusted TN (lbs/year)
CC-001	22.26	0.81	21.45	2.28	0.84	19.86	-	None	19.86	23.06	20.72	463.12	-	463.12
CC-001-1	63.83	5.05	58.78	2.28	0.84	60.89	-	None	60.89	23.06	20.72	1,334.35	-	1,334.35
CC-002	14.33	0.30	14.02	2.28	0.84	12.47	-	None	12.47	23.06	20.72	297.55	-	297.55
CC-004	58.63	16.56	42.07	2.28	0.84	73.10	7.04	Dry Basin	66.07	23.06	20.72	1,253.65	60.20	1,193.45
CC-006	10.19	1.60	8.59	2.28	0.84	10.86	-	None	10.86	23.06	20.72	214.83	-	214.83
CC-006A	23.12	6.44	16.67	2.28	0.84	28.70	-	None	28.70	23.06	20.72	494.05	-	494.05
CC-007	13.47	4.86	8.61	2.28	0.84	18.31	5.95	Dry Extended Basin	12.36	23.06	20.72	290.42	122.94	167.48
CC-008	89.06	20.26	68.80	2.28	0.84	103.99	7.82	1-Dry Basin, 1-Retention Basin	96.17	23.06	20.72	1,892.76	70.55	1,822.21
CC-009	67.99	16.41	51.58	2.28	0.84	80.74	2.99	2-Dry Basins	77.75	23.06	20.72	1,447.10	25.07	1,422.02
CC-009-1	34.06	3.88	30.17	2.28	0.84	34.20	-	None	34.20	23.06	20.72	714.73	-	714.73
CC-010	43.76	13.28	30.48	2.28	0.84	55.88	1.63	Dry Basin	54.25	23.06	20.72	937.83	12.43	925.40
CC-011	37.01	11.40	25.61	2.28	0.84	47.51	3.29	Dry Basin	44.22	23.06	20.72	793.54	236.17	557.37
CC-012	100.73	12.36	88.38	2.28	0.84	102.41	3.23	Dry Basin	99.18	23.06	20.72	2,116.14	27.69	2,088.45
CC-012-1	50.29	3.18	47.11	2.28	0.84	46.82	-	None	46.82	23.06	20.72	1,049.50	-	1,049.50
CC-013	14.44	3.08	11.36	2.28	0.84	16.57	-	None	16.57	23.06	20.72	306.48	-	306.48
CC-014	145.68	24.20	121.48	2.28	0.84	157.21	15.61	2-Dry Basins, 6-Retention Basins	141.60	23.06	20.72	3,075.10	138.73	2,936.37
CC-015	54.41	1.88	52.53	2.28	0.84	48.41	-	None	48.41	23.06	20.72	1,131.75	-	1,131.75
CC-016	46.67	3.16	43.51	2.28	0.84	43.75	1.09	2-Dry Basins	42.66	23.06	20.72	974.37	9.41	964.95
CC-017	8.25	0.95	7.30	2.28	0.84	8.30	-	None	8.30	23.06	20.72	173.26	-	173.26
CC-018	1.69	0.08	1.61	2.28	0.84	1.53	-	None	1.53	23.06	20.72	35.12	-	35.12
CC-019	6.08	0.51	5.57	2.28	0.84	5.85	-	None	5.85	23.06	20.72	127.28	-	127.28
CC-019A	19.97	0.93	19.04	2.28	0.84	18.11	-	None	18.11	23.06	20.72	415.97	-	415.97
CC-021	8.94	0.29	8.66	2.28	0.84	7.92	-	None	7.92	23.06	20.72	185.99	-	185.99
CC-021-1	12.46	1.91	10.55	2.28	0.84	13.22	0.71	Dry Basin	12.51	23.06	20.72	262.69	6.99	255.69
CC-023	56.55	14.61	41.94	2.28	0.84	68.54	10.80	1-Dry Basin, 2-Retention Basins	57.75	23.06	20.72	1,205.99	83.30	1,122.68
CC-024	14.87	3.51	11.36	2.28	0.84	17.55	-	None	17.55	23.06	20.72	316.42	-	316.42
CC-025	31.37	5.17	26.21	2.28	0.84	33.79	1.44	Dry Basin	32.35	23.06	20.72	662.13	12.18	649.95
CC-025-1	19.39	0.83	18.57	2.28	0.84	17.48	-	None	17.48	23.06	20.72	403.72	-	403.72
CC-026	75.54	2.60	72.94	2.28	0.84	67.20	2.22	Dry Basin	64.99	23.06	20.72	1,571.34	24.23	1,547.12
CC-027	33.04	8.15	24.89	2.28	0.84	39.48	-	None	39.48	23.06	20.72	703.58	-	703.58
CC-028	17.37	5.07	12.30	2.28	0.84	21.88	-	None	21.88	23.06	20.72	371.71	-	371.71
CC-029	51.68	12.13	39.55	2.28	0.84	60.88	24.11	Rain Garden	36.77	23.06	20.72	1,099.28	389.57	709.71
CC-030	59.44	5.40	54.03	2.28	0.84	57.71	2.23	Dry Basin	55.48	23.06	20.72	1,244.21	23.59	1,220.62
CC-031	19.47	1.09	18.38	2.28	0.84	17.92	4.27	Retention Basin	13.65	23.06	20.72	405.91	33.65	372.26
CC-032	15.24	0.25	14.98	2.28	0.84	13.16	0.73	Dry Basin	12.43	23.06	20.72	316.26	6.72	309.54
CC-033	16.33	0.46	15.86	2.28	0.84	14.38	2.11	Dry Extended Basin	12.27	23.06	20.72	339.38	41.12	298.26
CC-034	17.12	1.89	15.23	2.28	0.84	17.10	4.17	Rain Garden	12.93	23.06	20.72	359.06	77.45	281.61
CC-035	29.63	5.39	24.24	2.28	0.84	32.66	1.29	Dry Basin	31.37	23.06	20.72	626.63	9.34	617.29
CC-OP-01	20.28	8.33	11.95	2.28	0.84	29.03	2.72	2-Dry Basins	26.30	23.06	20.72	439.63	20.00	419.63
CC-OP-02	31.69	11.35	20.34	2.28	0.84	42.96	9.51	1-Dry Basin, 1-Retention Basin	33.45	23.06	20.72	683.15	69.12	614.03
CC-OP-03	8.23	2.33	5.90	2.28	0.84	10.26	-	None	10.26	23.06	20.72	175.89	-	175.89
CC-OP-04	29.31	16.85	12.46	2.28	0.84	48.88	22.00	Retention Basin	26.88	23.06	20.72	646.70	129.34	517.36
CC-OP-05	77.84	36.07	41.77	2.28	0.84	117.33	15.20	2-Dry Basins, 3-Retention Basins	102.13	23.06	20.72	1,697.29	91.41	1,605.88
CC-OP-06	57.57	1.93	55.64	2.28	0.84	51.14	1.38	Retention Basin	49.76	23.06	20.72	1,197.43	8.81	1,188.61

APPENDIX D-2: EXISTING PRIORITY ORGANICS LOADING

Drainage Area Outfall	Total Area (Ac.)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious TP Loading (lbs/acre)	Pervious TP Loading (lbs/acre)	TP (lbs/year)	BMP Load Reduction (TP) (lbs/year)	Type of BMP	Adjusted TP (lbs/year)	Impervious TN Loading (lbs/acre)	Pervious TN Loading (lbs/acre)	TN (lbs/year)	BMP Load Reduction (TN) (lbs/year)	Adjusted TN (lbs/year)
MC-OP-01	76.78	18.42	58.36	2.28	0.84	91.02	7.07	2-Dry Basins	83.95	23.06	20.72	1,633.94	58.27	1,575.67
QA-01	6.30	0.39	5.90	2.28	0.84	5.86	-	None	5.86	23.06	20.72	131.41	-	131.41
QA-02	1.24	0.72	0.52	2.28	0.84	2.08	-	None	2.08	23.06	20.72	27.40	-	27.40
QA-03	3.00	0.79	2.20	2.28	0.84	3.66	-	None	3.66	23.06	20.72	63.96	-	63.96
QA-OP-05	4.89	0.88	4.01	2.28	0.84	5.37	8.01	Dry Basin	-2.64	23.06	20.72	103.37	72.24	31.12
RR-004	81.79	10.57	71.22	2.28	0.84	83.92	-	None	83.92	23.06	20.72	1,719.37	-	1,719.37
RR-005	192.88	51.73	141.15	2.28	0.84	236.50	19.06	Dry Basin	217.44	23.06	20.72	4,117.41	156.81	3,960.61
RR-006	17.31	6.02	11.29	2.28	0.84	23.21	-	None	23.21	23.06	20.72	372.70	-	372.70
RR-007	16.22	4.50	11.72	2.28	0.84	20.11	-	None	20.11	23.06	20.72	346.67	-	346.67
RR-008	20.44	2.01	18.43	2.28	0.84	20.06	-	None	20.06	23.06	20.72	428.16	-	428.16
RR-009	44.19	12.36	31.83	2.28	0.84	54.92	-	None	54.92	23.06	20.72	944.59	-	944.59
RR-010	13.59	3.04	10.55	2.28	0.84	15.79	-	None	15.79	23.06	20.72	288.61	-	288.61
RR-011	4.75	1.69	3.06	2.28	0.84	6.43	-	None	6.43	23.06	20.72	102.46	-	102.46
RR-012	8.76	1.84	6.92	2.28	0.84	10.01	-	None	10.01	23.06	20.72	185.84	-	185.84
RR-013	12.51	3.32	9.19	2.28	0.84	15.30	-	None	15.30	23.06	20.72	266.98	-	266.98
RR-014	4.54	0.78	3.76	2.28	0.84	4.94	-	None	4.94	23.06	20.72	95.89	-	95.89
RR-015	14.67	4.07	10.59	2.28	0.84	18.19	-	None	18.19	23.06	20.72	313.40	-	313.40
RR-016	7.43	1.77	5.66	2.28	0.84	8.78	-	None	8.78	23.06	20.72	158.01	-	158.01
RR-017	14.39	4.08	10.31	2.28	0.84	17.96	-	None	17.96	23.06	20.72	307.68	-	307.68
RR-018	26.86	5.82	21.04	2.28	0.84	30.94	2.86	Dry Basin	28.08	23.06	20.72	570.10	25.93	544.17
RR-019	8.95	2.03	6.92	2.28	0.84	10.45	-	None	10.45	23.06	20.72	190.26	-	190.26
RR-020	12.36	3.85	8.51	2.28	0.84	15.93	-	None	15.93	23.06	20.72	265.09	-	265.09
RR-020-1	29.02	5.70	23.32	2.28	0.84	32.58	-	None	32.58	23.06	20.72	614.57	-	614.57
RR-021	9.91	2.94	6.96	2.28	0.84	12.56	-	None	12.56	23.06	20.72	212.14	-	212.14
RR-022	7.77	2.59	5.18	2.28	0.84	10.26	-	None	10.26	23.06	20.72	167.15	-	167.15
RR-023	86.91	16.56	70.35	2.28	0.84	96.84	8.62	3-Dry Extended Basins, 3- Retention Basins	88.22	23.06	20.72	1,839.44	133.15	1,706.30
RR-023-1	27.33	10.52	16.81	2.28	0.84	38.10	-	None	38.10	23.06	20.72	590.85	-	590.85
RR-024	15.08	8.48	6.61	2.28	0.84	24.87	-	None	24.87	23.06	20.72	332.35	-	332.35
RR-024-1	34.90	9.49	25.40	2.28	0.84	42.98	-	None	42.98	23.06	20.72	745.27	-	745.27
RR-025	8.90	0.80	8.10	2.28	0.84	8.63	-	None	8.63	23.06	20.72	186.35	-	186.35
RR-026	24.55	7.10	17.45	2.28	0.84	30.85	-	None	30.85	23.06	20.72	525.32	-	525.32
RR-027	9.65	1.64	8.00	2.28	0.84	10.47	-	None	10.47	23.06	20.72	203.70	-	203.70
RR-027A	1.55	0.37	1.17	2.28	0.84	1.84	-	None	1.84	23.06	20.72	32.89	-	32.89
RR-028	6.90	1.54	5.35	2.28	0.84	8.02	-	None	8.02	23.06	20.72	146.53	-	146.53
RR-029	3.67	0.92	2.76	2.28	0.84	4.40	-	None	4.40	23.06	20.72	78.20	-	78.20
RR-029-1	11.80	2.90	8.90	2.28	0.84	14.08	-	None	14.08	23.06	20.72	251.23	-	251.23
RR-030	8.24	1.16	7.08	2.28	0.84	8.60	-	None	8.60	23.06	20.72	173.50	-	173.50
RR-031	34.55	6.78	27.77	2.28	0.84	38.79	2.26	Dry Basin	36.53	23.06	20.72	731.78	17.79	713.98
RR-032	10.58	3.20	7.39	2.28	0.84	13.49	0.99	Dry Basin	12.51	23.06	20.72	226.73	7.87	218.87
RR-033	3.79	0.93	2.87	2.28	0.84	4.52	-	None	4.52	23.06	20.72	80.76	-	80.76
RR-036	18.11	2.82	15.29	2.28	0.84	19.28	0.30	Dry Basin	18.98	23.06	20.72	381.90	2.79	379.11
RR-037	57.43	15.81	41.62	2.28	0.84	71.01	4.81	2-Dry Basins	66.20	23.06	20.72	1,226.99	37.83	1,207.12
RR-037-1	4.97	0.07	4.90	2.28	0.84	4.28	-	None	4.28	23.06	20.72	103.17	-	103.17
RR-038	60.00	19.04	40.96	2.28	0.84	77.81	2.66	Dry Basin	75.15	23.06	20.72	1,287.74	19.87	1,287.74
RR-039	80.76	12.57	68.19	2.28	0.84	85.94	6.21	3-Dry Basins	79.73	23.06	20.72	1,702.81	55.98	1,691.38
RR-OP-01	4.67	2.09	2.58	2.28	0.84	6.93	-	None	6.93	23.06	20.72	101.56	-	101.56
RR-OP-02	61.12	8.81	52.31	2.28	0.84	64.03	1.16	Dry Basin	62.87	23.06	20.72	1,287.11	11.43	1,275.68
RR-OP-03	9.48	2.75	6.73	2.28	0.84	11.92	0.76	Dry Basin	11.16	23.06	20.72	202.84	5.83	197.01
RR-OP-04	18.26	8.59	9.66	2.28	0.84	27.71	-	None	27.71	23.06	20.72	398.39	-	398.39
RR-OP-05	3.18	0.83	2.35	2.28	0.84	3.87	-	None	3.87	23.06	20.72	67.79	-	67.79

Totals **2876.19** **594.48** **2281.70**

3,053.74 lbs/year < Total Existing Priority Organics to Unnamed Tributaries
 152.69 lbs/year < Required Priority Organics Reduction (5%)
 58676.27 lbs/year < Total Existing Nitrogen to Unamed Tributaries
 2933.81 lbs/year < Required Nitrogen Reduction (5%)

APPENDIX D-3: EXISTING SEDIMENT LOADING IN EACH IMPAIRED WATERSHED

Impaired Watershed	Total Sediment (lbs/year)	Reduction	Sediment Reduction Goal (lbs/year)
Core Creek	783,601.57	10%	78,360.16
Martin's Creek	46,951.07	10%	4,695.11
Queen Anne	8,472.45	10%	847.25
Rock Run	702,058.49	10%	70,205.85
Total	1,541,083.59	10%	154,108.36

Appendix E

Loading Reduction Calculations

Appendix E-1: Charles Boehm Middle School Streambank Restoration

Appendix E-2: Basin CC-DB-004 Detention Basin to Retention Basin Retrofit

Appendix E-3: Basin CC-DB-008A Detention Basin to Retention Basin Retrofit

Appendix E-4: Basin CC-DB-010 Detention Basin to Retention Basin Retrofit

Appendix E-5: Basin CC-DB-011 Detention Basin to Retention Basin Retrofit

Appendix E-6: Basin CC-DB-012 Detention Basin to Retention Basin Retrofit

Appendix E-7: Basin CC-DB-026 Detention Basin to Retention Basin Retrofit

Appendix E-8: Basin CC-DB-030 Detention Basin to Retention Basin Retrofit

Appendix E-9: Basin CC-DB- 014A Detention Basin to Retention Basin Retrofit

Appendix E-10: Basin RR-DB-OB2 Detention Basin to Retention Basin Retrofit

Appendix E-11: Basin RR-DB-035 Detention Basin to Retention Basin Retrofit

Appendix E-12: Basin RR-DB-038 Detention Basin to Retention Basin Retrofit

Appendix E-13: Basin MC-DB-OP1B Detention Basin to Retention Basin Retrofit

Appendix E-14: Proposed Pervious Pavement QA-PEP-01

Appendix E-15: DEP BMP Load reduction Percentages Used for Calculations

Appendix E-16: Proposed BMP Costs, Credits, and Locations

Appendix E-17: Credit and Reduction Breakdown per Watershed

Appendix E-18: Lower Makefield BMP Inventory

Appendix E-1: Charles Boehm Middle School Streambank/Floodplain Restoration		
BMP Type:	Stream Restoration	
Project Length:	1400	LF stream
BMP Effectiveness Value:	44.88	lbs/year/LF
BMP Load Reduction	62,832	lbs/year
Adjusted BMP Load Reduction (Credit)	47,124	lbs/year*
* Adjusted amount assuming 75% credit		

Appendix E-2: Basin CC-DB-004 Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **F**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-004	56.30	16.02	40.27	1,839.00	264.96	40,135.64

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 20,067.82 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-3: Basin CC-DB-008A

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **E**

BMP Drainage Area & Pollutant Loading						
Basin Name	Total BMP Drainage Areas (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-008A	49.89	14.61	35.28	1,839.00	264.96	36,215.17

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 18,107.58 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-4: Basin CC-DB-010 Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **D**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-010	12.47	5.66	6.81	1,839.00	264.96	12,210.97

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 6,105.49 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-5: Basin CC-DB-011

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **D**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-011	23.86	8.96	14.90	1,839.00	264.96	20,425.48

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 10,212.74 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-6: Basin CC-DB-012

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **D**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-012	25.90	7.33	18.57	1,839.00	264.96	18,395.03

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 9,197.52 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-7: Basin CC-DB-026

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **C**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-026	23.17	1.87	21.31	1,839.00	264.96	9,076.37

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 4,538.19 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-8: Basin CC-DB-030

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **C**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-030	32.51	3.33	29.17	1,839.00	264.96	13,858.24

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 6,929.12 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-10: Basin RR-DB-OB2 Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **K**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
RR-DB-OP2	45.05	9.32	35.73	1,839.00	264.96	26,606.50

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 13,303.25 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-11: Basin RR-DB-035 Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **G**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
RR-DB-035	27.27	10.15	17.11	1,839.00	264.96	23,203.16

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 11,601.58 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-12: Basin RR-DB-038 Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **G**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
RR-DB-038	18.30	7.82	10.48	1,839.00	264.96	17,154.07

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 8,577.04 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-9: Basin CC-DB-014A

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **E**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
CC-DB-014A	24.81	9.06	15.75	1,839.00	264.96	20,839.92

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 10,419.96 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-13: Basin MC-DB-OP1C Retrofit

BMP Type: **Detention Basin to Retention Basin**

BMP Location Map Area: **I**

BMP Drainage Area & Pollutant Loading						
Basin Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
MC-DB-OP1C	22.95	8.12	14.82	1,839.00	264.96	18,864.61

BMP Effectiveness Value

Sediment: 50%

Credited Reduction

Sediment: 9,432.31 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

Appendix E-14: Pervious Pavement QA-PEP-01 Retrofit

BMP Type: **Pervious Pavement**

BMP Location Map Area: **J**

BMP Drainage Area & Pollutant Loading						
Pervious Pavement Name	BMP Drainage Area (acres)	Total Impervious (Ac.)	Total Pervious (Ac.)	Impervious Sediment Loading (lbs/acre)	Pervious Sediment Loading (lbs/acre)	Pollutants Load (TSS) (lbs/year)
QA-PEP-01	3.00	0.40	2.60	1,839.00	264.96	1,424.50

BMP Effectiveness Value

Sediment: 85%

Credited Reduction

Sediment: 1,210.82 lbs/yr

KEY

BMP Drainage Area	The area in acres in which stormwater runoff flows to this Basin.
Total Impervious	The area in acres of impervious surfaces that are within the drainage area (Examples: roads, homes, driveways, etc.).
Total Pervious	The area in acres of pervious surfaces that are within the drainage area (Examples: grass, lawns, woods, etc.).
Impervious Sediment Loading	The Bucks County loading rate for Impervious surfaces (1,839.00 lbs/acre).
Pervious Sediment Loading	The Bucks County loading rate for Pervious surfaces (264.96 lbs/acre).
Pollutant Load (TSS)	The total Pollution Load based off pervious and impervious surfaces and loading rates.
BMP Effectiveness Values	The reduction percentage of the BMP to obtain the credited reduction. These values were obtained from Appendix E-19. All retrofit percentages were obtained by subtracting the proposed basin percentage from the existing basin percentage.
Credited Reduction	The Pollutant Load multiplied by the BMP effectiveness value. The amount of pollutant reduced from the Township for this proposed BMP.

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 be 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	<p>This BMP (also referred to as “Storm Drain Cleaning”) involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards.</p> <p>To determine pollutant reductions for this BMP, these steps must be taken:</p> <ol style="list-style-type: none"> 1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected. 2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter). 3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations. <p>DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.</p>

Appendix E-16: Proposed BMP Costs, Credits, and Locations

Proposed BMP Name	BMP Location	BMP Type	Estimated Size	Units	Cost Estimate*	BMP Sediment Load Reduction (lbs/year)
Basin CC-DB-004 Retrofit	West of Intersection of Surrey Ln and Bridle Estates Dr	Detention Basin to Retention Basin	63,000	SF	\$214,800.00 to \$257,760.00	20,067.82
Basin CC-DB-008A Retrofit	South of Wyngate Dr	Detention Basin to Retention Basin	129,500	SF	\$427,950.00 to \$513,540.00	18,107.58
Basin CC-DB-010 Retrofit	Southwest of the Intersection of Brentwood Rd and Dorothy Rd	Detention Basin to Retention Basin	40,200	SF	\$148,120.00 to \$177,744.00	6,105.49
Basin CC-DB-011 Retrofit	West of Horseshoe Bend	Detention Basin to Retention Basin	47,300	SF	\$190,630 to \$228,756.00	10,212.74
Basin CC-DB-012 Retrofit	South of Greenbriar Ct	Detention Basin to Retention Basin	79,000	SF	\$300,900.00 to \$361,080.00	9,197.52
Basin CC-DB-026 Retrofit	Northeast of Trowdrige Dr	Detention Basin to Retention Basin	30,800	SF	\$141,480.00 to \$169,776.00	4,538.19
Basin CC-DB-030 Retrofit	Southeast of Farmview Dr	Detention Basin to Retention Basin	23,400	SF	\$110,540 to \$132,648.00	6,929.12
Basin CC-DB-014A Retrofit	North of Twining Road	Detention Basin to Retention Basin	35,000	SF	\$105,000 to \$140,000	10,419.96
Charles Boehm Middle School Streambank/Floodplain Restoration	South of Charles Boehm Middle School	Streambank Restoration	1,400	LF	\$483,338.00 to \$580,006.00	47,124.00
Basin RR-DB-OP2 Retrofit	Northwest of the intersection of Big Oak Road and West Ferry Road	Detention Basin to Retention Basin	82,000	SF	\$291,200.00 to \$349,440.00	13,303.25
Basin RR-DB-035 Retrofit	East of Pondview Ct	Detention Basin to Retention Basin	79,400	SF	\$286,140.00 to \$343,368.00	11,601.58
Basin RR-DB-038 Retrofit	East of S Fieldstone Ct	Detention Basin to Retention Basin	52,700	SF	\$189,870.00 to \$227,844.00	8,577.04
Basin MC-DB-OP1C Retrofit**	Northeast of the Intersection of Stony Hill Rd and Elbow Ln	Detention Basin to Retention Basin	53,900	SF	\$200,090.00 to \$240,2018.00	9,432.31
Pervious Pavement (QA-PEP-01)**	Five Mile Park Parking Lot	Pervious Pavement Installation	130,680	SF	\$247,760.00 to \$297,312.00	1,210.82
				Total	\$3,345,818.00 to \$4,018,582.00	176,827.40

*All costs and ranges for BMP Implementation Projects were developed from direct contractor bids for previous BMP Projects. They were scaled specifically to the current size of each project.

**These projects are required to meet the reduction requirements per that specific watershed.

Appendix E-17: Credit and Reduction Breakdown per Watershed

Impaired Watershed	Total Sediment (lbs/year)	Reduction	Sediment Reduction Goal (lbs/year)	Proposed BMPs*	Total Reduction Proposed**
Core Creek	783,601.57	10%	78,360.16	Basin Retrofits, Credited basins	85,578.41
Martin's Creek	46,951.07	10%	4,695.11	One Basin Retrofit	9,432.31
Queen Anne	8,472.45	10%	847.25	Pervious Pavement	1,210.82
Rock Run	702,058.49	10%	70,205.85	Streambank Restoration, Basins Retrofits, Credited Basins	80,605.87
Total	1,541,083.59	10%	154,108.36		176,827.40

*For specific credit values refer to Appendices E-1 to E-14

** All Watersheds met their 10% Reduction with all of the Proposed BMPs

