

**Willistown Township MS4
Issued for Public Comment
April 16, 2018
Amended May 30, 2018
Amended December 13, 2021**

**Pollution Reduction Plan (PRP)
Report and Strategy Plan**

For

**Willistown Township, Chester County,
Pennsylvania**

**MS4 Individual Permit Application
2018**

Prepared For:
Willistown Township
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Malvern, PA 19319

**Application Due Date Required: June 3, 2018
MS4 Permit Expiration Date: November 30, 2018
Amended per PADEP Reviews
Issued: December 13, 2021**

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**Replaces Wikiwatershed Analysis Average Passes; ** New*

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Preamble

1. Background

This report and plan address the National Pollutant Discharge Elimination System (NPDES) Individual Permit requirement to discharge stormwater from a Small Municipal Separate Storm Sewer System (MS4) for Willistown Township, Chester County as established by the Pennsylvania Department of Environmental Protection (PADEP). The report, plan, and application content are based on attendance at multiple MS4 seminars, the periodic disbursement of amended and updated program requirements by PADEP, and meetings with the Township representatives. **The MS4 Report / Application review process was granted extensions due to COVID-19. This report has been updated per PADEP review letter dated February 25, 2020 conversations, and emails. The mapping and parsing have been approved via email on May 28, 2021. Due to the timing of the resubmission versus the public review period, this report will be further amended. A complete summary of revisions since the first submission to this resubmission are noted in a spreadsheet in Appendix L.**

2. Introduction

2.1. General Information

The Township's current MS4 Permit is under Individual Permit No. PAI130521 for reporting period December 1, 2013 to November 30, 2018. (See **Appendix A**) The MS4 Requirements Table (Revised 08-10-2017) (See also **Appendix D**) for the 2018 permit renewal identifies a Pollutant Reduction Plan (PRP) requirement per **Appendix E** and no Total Maximum Daily Load (TMDL) requirement as follows:

Willistown Township MS4 Requirements Table (Municipal)

MS4 Name	NPDES ID	Individual Permit?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Chester County						
WILLISTOWN TWP	PAI130521	Yes	SP, IP	Ridley Creek	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Crum Creek	Appendix E-Excessive Algal Growth, Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Little Valley Creek	Appendix C-PCB (4a), Appendix B-Pathogens (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	(No cause listed.)
				Valley Creek	Appendix C-PCB (4a), Appendix B-Pathogens (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Hunters Run	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)

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The 2018 permit renewal requires coverage by an Individual Permit for MS4s with a TMDL requirement and / or PRP requirement. Accordingly, an Individual Permit renewal application with a PRP is to be prepared and submitted for Willistown Township (See also 2018 MS4 Permit NOI/Application Due Date Report **Appendix A**).

2.2. MS4 Client/Operator/Applicant Information

The stand-alone application provided by PADEP has been completed with the requested information. Below is an excerpt of some of the general information, see the application form for more details:

Organization: Willistown Township, Chester County

Mailing Address: 688 Sugartown Road, Malvern PA 19355

Client Contact: Ms. Sally Slook, Township Manager

Client ID # / Code: 86424 / MUNI

Current Application Required: PADEP 3800-PM-BCW0200b 1/2017: National Pollutant Discharge Elimination System (NPDES) Individual Permit To Discharge Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) Application

Application Due Date: June 3, 2018

Update Due Date: December 31, 2021, to be amended and completed once public review period has elapsed.

3. Annual Reporting Status

3.1. Last Annual Reporting Period: December 1, 2013 to November 30, 2018

The last NPDES Individual permitting period was approved by PADEP in their letter dated November 27, 2013. (See attached PADEP letter **Appendix A**.)

4. 2018 Total Maximum Daily Load (TMDL)

4.1. Total Maximum Daily Load (TMDL) Review History: No reduction in TMDL pollutant loads have been or are currently required.

5. 2018 Pollutant Reduction Plan (PRP)

5.1. MS4 Mapping – Outfall & Urbanized Area and Aerial Maps of 2018, revised December 13, 2021, and Supplemental Map to Outfall & Urbanized Area Map – Sewersheds & Parsed Out Areas Mapping, dated March 11, 2021, last revised December 13, 2021. All mapping has been approved by PADEP on May 21, 2021. (See **Appendix C, and Section 10.8 of this report**)

5.2. Urbanized Area: The Urbanized Area of Willistown Township has been updated is based on the 2010 U.S. Census. The 2010 U.S. Census based Urbanized Area encompasses a greater portion of Willistown Township than the 2000 U.S. Census based Urbanized Area. (See **Appendices B & C**)

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5.3. Outfalls & Storm Sewer Lines: All Township owned and maintained MS4 outfall locations and storm sewer line locations have been identified or updated in accordance with the Willistown Township's Geographical Information System (GIS) database and/or by field observation. All outfalls have also been renumbered or re-labeled based on updated mapping. No field survey work has been performed by Yerkes Associates, Inc. - a *cirilli company* to verify or confirm outfall and storm sewer line locations. Note: in some cases, an outfall location is an unknown at this time, but has been assumed to discharge to the nearest water source and has been included in the sewershed calculations. Designation CCMRP (Crum Creek Mill Road Park) is the discharge from the Mill Road Park basin.

5.3.1. Watersheds: Watersheds have been refined and updated from the original GIS as necessary to follow the topography more accurately.

5.3.2. Sewersheds: (Designated with SS on mapping) Only sewersheds to all outfall locations within the Urbanized Area have been shown and labeled to reduce map clutter. Sewershed identification has been coordinated to coincide with the final outfall location label. **PADEP review ,additional sewersheds have been added to account for all currently owned Willistown Township roadways, regardless if there is a physical storm sewer system in the Township's roadway. A summary table has been provided that outlines the final updated changes to the sewersheds versus the initial 2018 submission.**

5.3.3. Outfalls: (Designated with RC [Ridley Creek], CC [Crum Creek] or RC [Ridley Creek] & Outfall No. or label on mapping) In order to further reduce map clutter, only the most downstream outfalls within any sewershed and within the Urbanized Area have been labeled. Note: Structures are either designated as EW (Endwall), HW (Headwall), UNK (Unknown) or as labeled specifically. **Per PADEP review, outfalls have been updated to identify MS4 outfalls, Municipal Outfalls, Virtual Outfalls (no actual existing outfall – see 5.3.2), and Observation Points (see 5.3.2)**

5.3.4. General: In addition to the above, the map has been updated to note the locations of impairments as per the MS4 Requirement Table (See **Appendix D**); additional notes have been added and other GIS data and other information updated as needed. A second outfalls and aerial map has also been provided. (See **Appendix C**)

5.4. PRP Area

5.4.1. Affective Area: The area of the PRP is within the Willistown Township Urbanized Area portions of the Ridley Creek, Crum Creek and Little Valley Creek Watersheds.

5.4.2. Streams vs. MS4 Requirements Table: The following streams are affected in the PRP designated area: Ridley Creek, Crum Creek, Little Valley Creek, Valley Creek, and Hunters Run. The sewershed areas for

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each watershed leading to their respective streams are listed in the tabulation of Existing Loading Without Accounting for Any BMP's table (See **Appendix H**), which has been updated to show the summary overall BMP sediment removals for each watershed. Little Valley Creek leads to Valley Creek and no portion of Valley Creek is within Willistown Township. Therefore, Willistown Township has no direct discharges into Valley Creek. Any pollutant reductions in Little Valley Creek Watershed will contribute to Valley Creek's pollutant reduction. Hunters Run is within the Ridley Creek watershed and leads to Ridley Creek and is considered as part of the overall pollutant load to Ridley Creek and the Ridley Creek Watershed.

5.4.3. PRP Calculations Methodology to Determine Minimum Load Reduction Required

5.4.3.1. Source: The PRP plan was prepared using WikiWatershed Analysis and the Simplified Method as outlined in the Pollution Reduction Plan: A Methodology (PRP:AM) (See **Appendix E**), as endorsed as a valid methodology by the Pennsylvania Department of Protection of Pennsylvania (PADEP). Spreadsheets by this office have been generated and used are based on the PRP:AM and are utilized in the analysis.

5.4.3.2. Mapping: This section refers to the Outfall & Urbanized Area Map, MS4 Program – 2018 and/or the Outfall & Aerial Map, MS4 Program - 2018 for locations of the outfall sewershed areas. (See **Appendix C**) Maps contain all notes regarding source data material. Additionally, refer to Supplemental Map to Outfall & Urbanized Area Map – Sewersheds & Parsed Out Areas Map.

5.4.3.3. WikiWatershed: WikiWatershed was used in each case to analyze the sewershed areas for each outfall location shown in Table 1a. Importing the sewershed areas to WikiWatershed was determined to be not compatible. It was ascertained that by manually recreating the outline of sewershed that there may be variations in the results. In order to minimize the error in manually retracing the sewershed areas, three passes were taken to get an average result for each land use. It has been indicated on the mapping but not included in the total sediment loading for the Crum Creek Watershed. The average values were generated in a spreadsheet (See **Appendix G**) and linked to the Load Rate Calculations Spreadsheet for each watershed.

5.4.3.4. Sewersheds Update: Per PADEP review some sewershed areas were deemed partially outside and in the urbanized area which have been deducted, and any de minimis areas have been removed. However, additional sewersheds had to be added and calculated, since PADEP has determined that the

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Municipal Separate Storm Sewer Systems also include Township roadways with or without storm sewers. Overall there was a net increase overall sewershed areas, which necessitated additional BMP's having to be provided, and recalculating of loading rates via WikiWatershed as noted next.

5.4.3.5. Loading Rate Calculations Spreadsheet: The Loading Rate Calculations Spreadsheet (LRCS) (See **Appendix G**) was developed as outlined in the PRP:AM for each sewershed designation used. The actual value of each sewershed is listed on the table and final area acreages rounded to match the actual areas measured.

5.4.3.5.1. Table 1b: Final Averages from WikiWatersheds, as described above, are entered here. (% impervious values per PRP:AM, page 3.) Final impervious and pervious values are calculated and then tabulated.

5.4.3.5.2. Table 2: Developed Land Loading Rate: The Developed Land Loading Rate for Chester County values were from PADEP, Attachment B, PRP Instructions, 03/2017. (See **Appendix E**)

5.4.3.5.3. Table 3a: Total Suspended Solids (TSS): This table calculates the tabulated values from Tables 1 & 2 to tabulate the Sediment loading Rate for each sewershed area.

5.4.3.5.4. Tables for Total Phosphorus (TP) and Total Nitrogen (TN): It was expressed in the seminars and as noted in the PRP Instructions (03/2017) that if 10% sediment loading reduction is achieved the TP of 5%, and TN of 3% will also be achieved. Therefore, these further calculations were not required.

5.4.3.6. Existing Loading Without Accounting for BMP's: The Existing Loading Without Accounting for BMP's (ELWAB) spreadsheet (See **Appendix H**) is tabulated from the values generated in the LRCS. Additionally, provided is the minimum 10% reduction to be achieved, amount reduction provided, and final provided percentage. **This has been updated to show the summary overall BMP sediment removals for each watershed.**

5.4.4. PRP Calculations Methodology to Determine Minimum Load Reduction Required

5.4.4.1. Simplified Method: The Simplified Method has been used as outlined in the PRP:AM and in accordance with the PADEP MS4 BMP (Best Management Practice) Effectiveness Values.

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5.4.4.2. Parsing vs. Without Parsing Results: All PennDOT roadways have been parsed out. **Per PADEP review PennDOT parse out calculations have been updated and shown also on both the Outfall & Urbanized Area Mapping, and Supplemental Map to Outfall & Urbanized Area Map – Sewersheds & Parsed Out Areas Map.** In a few cases this divides some sewersheds into two sewersheds that discharge to a single outfall location. One sewershed is Little Valley Creek Watershed SSLVC1a (Sewershed Little Valley Creek Outfall No. 1a) and SSLVC1b (Sewershed Little Valley Creek Outfall No. 1b) to Outfall LVC1 (Little Valley Creek Outfall No. 1). The other two sewersheds are in the Ridley Creek Watershed and are SSRC24a (Sewershed Ridley Creek Outfall 24a) & SSRC24b (Sewershed Ridley Creek Outfall 24b) to Outfall RC25 (Ridley Creek Outfall 25), and SSRC25a (Sewershed Ridley Creek Outfall 25a) & SSRC25b (Sewershed Ridley Creek Outfall 25b) to Outfall RC25 (Ridley Creek Outfall 25).

6. Proposed Load Reductions with BMP's Per Watershed

6.1. BMP's Proposed for Each Watershed (See [Appendix J](#))

6.1.1. Ridley Creek:

- 6.1.1.1. Rita Reves Park:** A Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that discharges to Garrett Mill Road culvert to Ridley Creek. **Per PADEP, calculations have been updated.**
- 6.1.1.2. Inlet Sediment Filter Bags:** To be installed at 9 locations along Cratin Lane, Smedley Drive, Dutton Mill Road, and Fox Run Lane that lead to outfalls discharging via tributaries to Ridley Creek. **Per PADEP, calculations have been updated.**
- 6.1.1.3. Troutbeck Farm Subdivision:** This is an approved subdivision plan that is currently under construction at this time, and anticipated to be completed within the next five years. Troutbeck Farm Subdivision proposes a Riparian Forest Buffer along the unnamed tributary leading to the Northeast Branch of Ridley Creek. The drainage area to the Riparian Forest Buffer area is in a parsed out area, with roadways that have not been dedicated to Willistown Township at this time. Calculations for sediment reduction are based on the drainage area to the riparian forest buffer. The Riparian Forest Buffer is indicated as 100 feet wide on each side of the stream. Troutbeck Farm Subdivision Riparian Forest Buffer will contribute to the overall sediment reduction entering the Ridley Creek. It will be owned, operated, and maintained by the Home Owners Association and monitored by Willistown Township. Riparian Buffer Plans, notes, Post-Development Drainage Area map, and Drainage Area Summary pg. A-1 of the Post Construction Storm Water Management Report dated April 15, 2020, revised March 22,

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2021, have been provided in **Appendix F. Note:** Troutbeck Farm Subdivision as an approved PADEP NPDES Permit as noted in the updated application, which included the Riparian Forest Buffer as a BMP.

- 6.1.1.4.** Willistown Point Subdivision (Previously known as Preserve at Willistown): This is an approved subdivision plan that is currently under construction at this time, which proposes Tree Plantings within the subdivision. Runoff leads to tributary 00672 leading to the Ridley Creek. It is anticipated to be completed within the next five years. The drainage area to the Tree Plantings area is in a parsed out area, with private roadways. Calculations for sediment reduction are based on the criteria of the 3-steps outlined in the BMP Effectiveness Table. In Step 1, is as prescribed using 0.01 times 10% of the trees to be provided. In Step 2, only the pervious loading rate is used to determine prior loading amount since all tree treated area is pervious. Also, the pervious (and impervious) is based on the drainage areas from the stormwater report to the tree plantings area are used to calculate the site loading. Step 3 is then calculated as prescribed based on the BMP effectiveness value of 20%. Willistown Point_Subdivision Tree Plantings will contribute to the overall sediment reduction entering the Crum Creek. It will be owned, operated, and maintained by the Home Owners Association, and monitored by Willistown Township. Tree planting plans with notes, Post-Development Drainage Area map, and Stormwater Calculations of the Stormwater Management Report, dated August 2018, revised January 2020 have been provided in **Appendix F. Note:** Willistown Point_Subdivision as an approved PADEP NPDES Permit as noted in the updated application, which included the Tree Plantings as a BMP.

Reduction Required: 19,857 lb/yr,* (updated per PADEP review)

Reduction Met: 24,489 lb/yr,* (updated per PADEP review)

6.1.2. Crum Creek:

- 6.1.2.1.** Greentree Park: Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via overland drainage to tributary to Crum Creek. **Per PADEP, calculations have been updated.**
- 6.1.2.2.** Mill Road Park: Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via tributary to Crum Creek. **Per PADEP, calculations have been updated.**
- 6.1.2.3.** Eisenhower Road: Stream Bank Restoration along Crum Creek.
- 6.1.2.4.** Inlet Sediment Filter Bags: Installed at 3 locations along Callery Way that lead to outfalls discharging to stream along Eisenhower Road.

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6.1.2.5. Stonehenge Subdivision: Stonehenge is an existing development. Stream restoration is proposed along Tributary 00728 (a.k.a. W. Tributary) that leads to Crum Creek.

Reduction Required: 45,973 lb/yr* (updated per PADEP review)
Reduction Met: 46,636 lb/yr* (updated per PADEP review)

6.1.3. Little Valley Creek:

6.1.3.1. Inlet Sediment Filter Bags: Installed at 4 locations along Industrial Boulevard and 4 locations along Jaqueline Drive that lead to outfalls discharging to Tributary 01002 to Little Valley Creek. Per PADEP, calculations have been updated.

6.1.3.2. Industrial Boulevard: Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via Tributary 01002 to Little Valley Creek

Reduction Required: 13,971 lb/yr* (updated per PADEP review)
Reduction Met: 27,521 lb/yr* (updated per PADEP review)

Overall Reduction Required: 79,801 lb/yr*
Overall Reduction Met: 97,983 lb/yr*

* See **Appendices H & I**

7. BMP Design Parameters with Operation & Maintenance Requirements

(Sample design / installation, and is subject to final design.)

7.1. Existing Basin Retrofit to a Bioretention / Raingarden with Under Drain Construction

- 7.1.1. Percolation test basin for suitable infiltration.
- 7.1.2. Excavate bottom of Existing basin to within 1 foot above of the final proposed infiltration bottom.
- 7.1.3. Install temporary sediment control BMP's.
- 7.1.4. Enlarge or regrade Basin to if necessary to capture larger drainage area.
- 7.1.5. Complete site grading and immediately stabilize.
- 7.1.6. Once all upstream areas from basin are permanently stabilized, construct complete basin outlet structure and underdrain. Provide E&S protection so that drainage is prohibited from entering construction area.
- 7.1.7. Stabilize grading within the limit of disturbance except within the Retrofit Bioretention / Raingarden Basin area.
- 7.1.8. Excavate bioretention area to proposed invert depth and scarify the soil surface.
- 7.1.9. Backfill Bioretention Basin with amended soils. Overfilling is recommended to account for settlement. Light hand tamping is acceptable if necessary.
- 7.1.10. Plant vegetation according to planting plan.
- 7.1.11. Mulch and install erosion protection at surface flow entrances where necessary.

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7.1.12. Provide Operation, Maintenance and Inspections on at least an annual basis.

7.1.13. See Sample Details **Appendix J**

7.1.14. In the following O&M procedures BMP's refers to the Bioretention Basins / Raingardens at Rita Reves Park, Greentree Park, Mill Road Park, Industrial Boulevard

7.1.14.1. Inspections are to be performed a minimum of twice a year, or and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

7.1.14.2. It will be the responsibility of the owner to maintain the stormwater management BMPs / facilities and related appurtenances. The property owner shall not alter the stormwater facilities. The owner shall not alter the BMP facilities on the site.

7.1.14.3. General objectives of maintenance are to prevent clogging of the outlets, and prevent the growth of weeds, standing water around inlets and noxious plants.

7.1.14.4. Vegetation shall be mowed whenever necessary to maintain a pleasing appearance and discourage weed growth. All local regulations will be complied with.

7.1.14.5. Detailed inspections by a qualified inspector should occur annually to ensure that all facilities are operating as designed and to schedule maintenance that the facility may require. If possible, inspections should be made during wet weather to ensure that the facility is maintaining desirable retention times. In addition to regularly scheduled inspections, deficiencies should be noted during any visit by maintenance personnel. An important purpose of inspections is to ascertain the operational condition and safety of the facility, particularly the condition of mulch, standing water around inlets and other safety-related aspects. Annual inspection reports are to be forwarded to the Township.

7.1.14.6. Inflow and outflow points into Basin should be kept clear of leaves and other debris. Any leaves or debris will negatively impact the performance of these systems.

7.1.14.7. Assess and document the various species of the plant cover. It may be necessary to supplement and/or remove various species due to their growing patterns.

7.1.14.8. After any storm rainfall event of a 2-yr or greater magnitude, the Basin and associated outlets should be inspected. Any damage or blockage to inlet or outlet structures should be repaired or removed immediately. Any eroded areas should be top soiled and permanently seeded and mulched.

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7.1.14.9. All sediment is to be disposed of on-site as long as sediment does not contain hazardous toxins. Sediments should be tested for toxins in compliance with current disposal requirements if land uses in the basin include commercial or industrial zones, or if visual or olfactory indications of pollution are noticed. Sediments containing high levels of pollutants should be disposed of properly in accordance with Federal, State and Local Regulations. Non-toxic sediment is to be clean of all trash and debris. Sediment should be placed in areas away from direct runoff to the basin. Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible. Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor to prevent smearing of the basin floor.

7.1.14.10. Additional BMP Inspection and Maintenance Criteria

- 7.1.14.10.1.** Catch Basins and Inlets (upgradient of basin) should be inspected and cleaned at least two times per year and after runoff events.
- 7.1.14.10.2.** The vegetation along the surface of the permanent vegetated swale should be maintained in good condition, and any bare spots revegetated as soon as possible.
- 7.1.14.10.3.** Vehicles should not be parked or driven on the basin or permanent vegetated swale area after construction.
- 7.1.14.10.4.** Inspect the basin after runoff events and make sure that runoff drains down within 72 hours.
- 7.1.14.10.5.** Mosquito's should not be a problem if the water drains in 72 hours. Mosquitoes require a considerably long breeding period with relatively static water levels.
- 7.1.14.10.6.** Also inspect for accumulation of sediment, damage to outlet control structures, erosion control measures, signs of water contamination/spills, and slope stability in the berms.
- 7.1.14.10.7.** Mow only as appropriate for vegetative cover species.
- 7.1.14.10.8.** Remove accumulated sediment from basin and filter strip as required. Restore to original condition.
- 7.1.14.10.9.** Properly dispose of sediment.

7.2. Inlet Sediment Filter Bags

(Based on ADA FlexStorm Inlet Filter or approved equal.)

- 7.2.1.** Remove the grate from the casting or concrete drainage structure.
- 7.2.2.** Clean the ledge (lip) of the casting frame or drainage structure to ensure it is free of stone and dirt. Drop in the Inlet Filter through the clear opening and be sure the suspension hangers rest firmly on the inside ledge (lip) of the casting.
- 7.2.3.** Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers.
- 7.2.4.** For Curb Box Inlet Filters: Insert Inlet Filter as described above, pull the rear curb guard flap up and over the open curb box until tight, align magnets to ensure firm attachment to the top portion of the curb box

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casting. If the curb back opening is not magnetic, slide a typical rock sack or 2 x 4 through the 2-ply rear curb box flap to create a dam which will direct runoff into the sediment bag.

See Sample Details **Appendices F & J**

7.2.5. In the following O&M procedures BMP's refers to the inlet filter bags at Smedley Lane, Dutton Mill Road, Fox Run Lane, Cratin Lane, Callery Way, Industrial Boulevard, and Jaqueline Drive

7.2.5.1. Inlet filter bags shall be at a minimum cleaned 4 times a year, or within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

7.2.5.2. General O&M Procedures:

7.2.5.2.1. Remove sediment deposits when sediment has accumulated between 1/3 to 1/2 of the design depth or the device is no longer functioning as designed.

7.2.5.2.2. Inspect the device routinely, and repair fabric (if necessary) and restore to original dimension.

7.2.5.2.3. Sediment removed from the device shall filter or be deposited in a suitable area and stabilized in accordance with PADEP regulations.

7.2.5.3. Additional O&M Procedures as may be required:

7.2.5.3.1. Remove sediment when it accumulates to within 6 inches of the bottom of the overflow holes.

7.2.5.3.2. If standing water remains within 6 inches of the bottom of the overflow holes 24 hours after a runoff event, accumulated sediment shall be removed and the filtering capacity of the fabric shall be restored.

7.2.5.3.3. Holes in the filter fabric less than 2 inches in length may be repaired by stitching. The bag must be replaced if holes greater than 2 inches are observed in the filter fabric.

7.2.5.3.4. The insert filter fabric shall be replaced if any holes are observed in the fabric.

7.2.5.3.5. The filter must be replaced if the flap pockets sustain damage that compromises the integrity of the filter or the ability to perform maintenance.

7.3. Stream Bank Stabilization

(Based on PADEP GP-3 Bank Rehabilitation and Projection Vegetative Stabilization Details and other sources.)

7.3.1. Must be mostly vegetative. Rip-rap or gabions maybe used where necessary to stabilize, but sections cannot count towards load reduction.

7.3.2. Engineering analysis and design of stream required.

7.3.3. Clean steam of any debris.

7.3.4. Stream may require bypass pumping and temporary coffer dam.

7.3.5. Begin at the base of the embankment or below the low water line.

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- 7.3.6. Excavate stream and stream bank where necessary. Realign stream if required.
- 7.3.7. Install any check dams associated with stream bank armoring. Armoring may be completely underneath embankment to get additional credit. (Discuss with PADEP)
- 7.3.8. Tamp stakes in a row across embankment if necessary.
- 7.3.9. Back fill embankment install vegetative features and/or seeding and apply erosion control matting.
- 7.3.10. Install landscape plantings along a permeant buffer area outside the embankment. Typically, buffer area should be 35 ft. each side of stream. Lesser buffer zone should be discussed with PADEP. See Sample Details and Photos **Appendix J**.
- 7.3.11. See “Considerations of Stream Restoration Projects in Pennsylvania for eligibility as an MS4 Best Management Practice, June 22, 2017”, **Appendix K**.
- 7.3.12. In the following O&M procedures BMP's refers to the stream restoration along Eisenhower Road and at Stonehenge ad Salisbury Lanes
 - 7.3.12.1. Stream restorations shall be minimally inspected 2 times a year, or within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.
 - 7.3.12.2. Upon Each Inspection Perform any or more of the following as it relates to the BMP:
 - 7.3.12.2.1. The weeding of invasive plants, and irrigation of planted materials.
 - 7.3.12.2.2. The management of flows from impoundments, and correct any deviations.
 - 7.3.12.2.3. Repair any damages to the stream channel and embankments or other features within the stream in accordance with the design plans.
 - 7.3.12.2.4. Any managed grazing of riparian corridors
 - 7.3.12.2.5. The inputs of gravels, wood, or nutrients in systems where the natural input of such material has been disrupted.
 - 7.3.12.2.6. If the stream provides fish passage, make any necessary repairs by clearing the passage.
 - 7.3.12.2.7. In general, remove accumulated debris, install additional drop structures, or replacement of geotextile fabric, logs, boulders, riprap, ballast, or other structural elements.
 - 7.3.12.2.8. The removal of any temporary project construction components such as erosion control measures.

7.4. Forest Riparian Buffer at Troutbeck Farm Subdivision

(Extracted from the approved plan, for more detail see also plan in **Appendix F**)

- 7.4.1. Field delineate the limit of disturbance riparian buffer reforestation area prior to disturbance activities with survey stakes or posts & rope.
- 7.4.2. Begin removal of all invasive species:
 - 7.4.2.1. The large stands of phragmites are to be controlled through mowing.

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

- 7.4.2.2.** Existing invasive species (other than phragmites) shall be removed from the reforestation areas. A qualified professional shall be contracted to perform the invasive species removal.
- 7.4.2.3.** Existing healthy trees shall remain and be de-vined. All vines shall be cut at ground level and at least 10 feet above ground; the stump should be then treated with rodeo, or an approved herbicide.
- 7.4.3.** Following removal of all invasive species, begin installation of proposed plants:
 - 7.4.3.1.** Tree plantings:
 - 7.4.3.1.1.** Spray a 3' foot diameter circle around the planting locations. The proposed planting area is to be sprayed with rodeo by a "qualified professional" according to manufacturer's directions two weeks prior to installation and twice a year for 5 years to continually maintain bare earth around the tree to protect against voles.
 - 7.4.3.1.2.** Plantings are to be planted at approximately 12 feet on center to facilitate mowing or other maintenance activities.
 - 7.4.3.1.3.** All new plantings are to be watered every week during the first few summer months.
 - 7.4.3.1.4.** All new plantings are to be provided with a Tubex® standard tree-shelter attached to an oak stake (see detail on landscape plan). The tree shelters shall be removed after the trees reach 2-2.5" caliper. After the tree shelter is removed a 'black leonard plastic mesh tree guard', or approved substitute, should be used until the tree reaches 5" caliper. Zip ties are not to be used to connect mesh.
 - 7.4.3.1.5.** Native whip plantings - the native whip plantings can be installed at the spacing depicted on the landscape plan. The proposed species shall be evenly distributed throughout the reforestation areas.
 - 7.4.3.2.** Within the delineated riparian buffer zone(s), all areas not occupied by phragmites, or are delineated as wetland(s), are to be planted with the Ernst riparian buffer seed mix, ernmx-178. See seeding specifications.
- 7.4.4.** The vegetation shall be controlled around the base of the tree shelter for three (3) years. Tree shelters shall be inspected annually for the first three (3) years to ensure they are upright and attached to oak stakes.
- 7.4.5.** The reforestation areas shall be mowed twice a year for the first five (5) years; once in early spring (between February 15 and march 15), with a second mid-summer mowing (between July 15 and august 1) only as necessary for control of invasive plants.
- 7.4.6.** The reforestation area shall be inspected annually by a "qualified professional" to ensure invasive species due not overtake the native plantings.
- 7.4.7.** The maintenance schedule is shown in the plan for five (5) years upon completion. Willistown Township will monitor the site on at least an annual basis.

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7.5. Tree Plantings at Willistown Point

(Extracted from the approved plan, for more detail see also plan in **Appendix F.**)

- 7.5.1.** The location, dimensions and spacing of required plantings should be adequate for their proper growth and maintenance, taking into account the sizes of such plantings at maturity and their present and future environmental requirements, such as wind, soil, moisture and sunlight.
- 7.5.2.** Plant material shall be true to species and variety. All plants shall conform to the minimum standards for health, form and root condition as outlined in the publications of the American Standard for Nursery Stock, ANSI or U.S.A.S Section 60.1 of the American Association of Nurserymen (AAN) Standards, latest edition.
- 7.5.3.** All plant material shall be hardy within the United States Department of Agriculture (USDA) hardiness zone 6, applicable to Willistown Township and shall be nursery grown.
- 7.5.4.** All plant material shall be guaranteed by the developer for 12 months from the date of final approval of the landscape installation by township engineer. Any plant material that is 25% or greater dead shall be considered dead.
- 7.5.5.** Soil conditions shall be tested prior to planting and treated with appropriate ingredients to balance the ph.
- 7.5.6.** The contractor shall verify all quantities and dimensions, and shall report any discrepancies to the landscape architect.
- 7.5.7.** The contractor shall ascertain the location of all utilities and shall assume responsibility for damages to utilities and property as a result of his work.
- 7.5.8.** Plant material shall be of nursery stock, balled and burlapped or container grown. It shall be of symmetrical growth, free of insects, pests and disease, have a normal growth habit, vigorous root system and durable under the maintenance contemplated.
- 7.5.9.** All planting materials shall be installed per the a.a.n. standards with regard to planting, pit size, backfill mixture, stacking and guying, or as may be indicated on the drawings.
 - 7.5.9.1.** Additionally:
 - 7.5.9.1.1.** Trees with poor quality root balls or root balls that have been cracked or damaged shall be rejected.
 - 7.5.9.1.2.** Trees that have grown too close together in the nursery, resulting in weak trunks shall be rejected.
 - 7.5.9.1.3.** Trees with central leader broken shall be rejected.
 - 7.5.9.1.4.** Trees that do not display the normal characteristics shall be rejected. -trees that have grown together in nursery, resulting in weak trunks shall be rejected.
 - 7.5.9.1.5.** Trees and shrubs shall be free from defects and injuries and be certified by the appropriate federal and state authorities to be free from diseases and insect infestations.
 - 7.5.9.1.6.** Trees and shrubs shall be freshly dug and nursery grown. They shall have been grown under climatic conditions similar to those in the township or properly acclimated to conditions of the township.

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- 7.5.10.** All street trees shall be planted a minimum distance of five (5) feet from the ultimate right-of-way line of West Chester Pike.
 - 7.5.11.** Trees shall be planted a minimum distance of three (3) feet from curbs and sidewalks, fifteen (15) feet from overhead utilities and six (6) feet from underground utilities.
 - 7.5.12.** Trees and other required plant material shall not be planted until the finished grading of the land development has been completed.
 - 7.5.13.** Additional foundation or site landscaping may be added at the owner's expense
 - 7.5.14.** After installation prune branches and foliage (not all evergreens or deciduous end tips) by 1/3, retaining natural plant shape. Do not cut leader on any evergreen shrub or any evergreen or deciduous tree. Spray trunk stem and branches with anti-desiccant wax.
 - 7.5.15.** Trees and shrubs shall bear same relation to finish grade as previous finish grade in nursery.
 - 7.5.16.** Scarify compacted subsoils at bottom and sides of planting pit before installation.
 - 7.5.17.** These landscape plans shall be regarded as schematic in nature. All plant locations shall be subject to field adjustment by the owner's representative.
 - 7.5.18.** All areas underlain by rock are to be measured to determine if minimum depth necessary to permit placement of backfill required to ensure proper drainage is feasible or alternately, if additional fill material is feasible to achieve proper planting. Contractor shall report this condition to the landscape architect and receive approval on method of planting.
 - 7.5.19.** Filling of soils over the roots of trees to be preserved is strictly prohibited.
 - 7.5.20.** Cleanly prune all damaged root ends immediately prior to backfilling planting pit.
 - 7.5.21.** All sight triangles shall remain clear of obstructions and any plant material which could endanger safety shall be removed. It shall be the responsibility of the homeowner's association to ensure all plantings and architectural elements are maintained to provide a safe environment.
 - 7.5.22.** Root barriers shall be placed along sidewalks and walkways where trees are to be placed within 10' of the walk.
 - 7.5.23.** Foundation plantings may be substituted with alternate landscaping with the approval of the township landscape architect. Additional landscaping can be provided at the discretion of the developer.
- 7.6. In the following O&M procedures BMP's refers to the Land Developments at Troutbeck Farm, and Willistown Point**
- 7.6.1.** In accordance with the approved plans the respective Home Owners Associations for each development will follow the following recorded plan O&M procedures as follows:
 - 7.6.2. Troutbeck Farm – Riparian Management**

**PRP Report and Strategy Plan for Willistown Township
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7.6.2.1. The land development / subdivision plan will be providing a forested area within the riparian buffer areas of the land development plan. See attached approved plan sheet 31 of 33, "Troutbeck Farm", Riparian Buffer Management Plan, dated November 5, 2020, last revised May 21, 2021 in Appendix F. The schedule for Operation and Maintenance schedule are indicated on the plan.

7.6.3. Willistown Point – Tree Replacements and Establishment

7.6.3.1. The land development / subdivision plan will be removing invasive non-indigenous plantings and installing indigenous trees within the existing tree areas and around the land development area and open space of the plan. See attached approved plan sheets 17 and 18 of 26, "Willistown Point", PCSWM Landscaping Plan, sheet 31 of 33, dated August 9, 2018, last revised March 6, 2020, in Appendix F. The schedule for Operation and Maintenance schedule are indicated on the plans.

**PRP Report and Strategy Plan for Willistown Township
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8. Order of Magnitude Cost Estimate for Proposed BMP's

Table: Order of Magnitude Cost Estimate for Proposed BMP's

WATERSHED	PROPOSED BMP	Quantity	Original Unit Cost ⁽¹⁾	Inflation Since 2018	Sub Unit Total Costs	
Ridley Creek	Rita Reves Park Retrofit to a Bioretention / Raingarden w/UD ⁽¹⁾	1	\$ 20,000	\$ 22,134	\$ 22,134	
	Basin Operation, Inspection and Maintenance Annually 10%	1	\$ 2,213	\$ 2,213	\$ 2,213	
	Inlet Sediment Filter Bags (ISFB) per Inlet ⁽¹⁾	9	\$ 100	\$ 111	\$ 999	
	Labor cost per Inlet	9	\$ 200	\$ 221	\$ 1,989	
	ISFB Operation, Inspection and Maintenance Quarterly/Inlet	36	\$ 100	\$ 111	\$ 3,996	
New Proposed BMP			Unit Cost	Note		
	Troutbeck Farm Riparian Forest Buffer (Complete)	1	\$ 154,000	See Note 6	\$ 154,000	
	Tree Operation, Inspection and Maintenance Annually 10%	1	\$ 15,400	See Note 6	\$ 15,400	
	Willistown HOA Monitoring 10% per year	1	\$ 1,540	See Note 6	\$ 1,540	
	Willistown Point Tree Plantings (Complete)	1	\$ 200,000	See Note 6	\$ 200,000	
	Tree Operation, Inspection and Maintenance Annually 10%	1	\$ 35,400	See Note 6	\$ 35,400	
	Willistown HOA Monitoring 10% per year	1	\$ 3,540	See Note 6	\$ 3,540	
	Ridley Creek Watershed Construction OM Cost Estimate Total				\$ 437,671	
	Engineering Cost 15% Construction ⁽⁵⁾	1	\$ 65,651		\$ 65,651	
	Ridley Creek Watershed Sub Cost Estimate Total				\$ 503,322	
Crum Creek	Greentree Park Retrofit to a Bioretention / Raingarden w/UD ^{(1), (4)}	1	\$ 20,000	\$ 22,134	\$ 22,134	
	Mill Road Park Retrofit to a Bioretention / Raingarden w/UD ⁽¹⁾	1	\$ 20,000	\$ 22,134	\$ 22,134	
	Basins Operation, Inspection and Maintenance Annually 10%	2	\$ 2,213	\$ 2,500	\$ 5,000	
	Stream Restoration per Linear Foot ⁽¹⁾ at Eisenhower Road	250	\$ 250	\$ 277	\$ 69,250	
	Stream Res. Operation, Inspection and Maintenance Annually 10%	1	\$ 6,925	\$ 12,262	\$ 12,262	
	Inlet Sediment Filter Bags (ISFB) per Inlet ⁽¹⁾	3	\$ 100	\$ 111	\$ 333	
	Labor cost per Inlet	3	\$ 200	\$ 221	\$ 663	
	ISFB Operation, Inspection and Maintenance Quarterly/Inlet	12	\$ 100	\$ 111	\$ 1,332	
	New Proposed BMP			Unit Cost	Note	
		Stream Restoration per Linear Foot ⁽¹⁾ at Stonehenge & Salisbury Lanes	250	\$ 277		\$ 69,250
	Stream Res. Operation, Inspection and Maintenance Annually 10%	1	\$ 12,262		\$ 12,262	
	Crum Creek Watershed Construction Cost Estimate Total				\$ 214,620	
	Engineering Cost 15% Construction ⁽⁵⁾	1	\$ 32,193		\$ 32,193	
	Crum Creek Watershed Sub Cost Estimate Total				\$ 246,813	
Little Valley Creek	Inlet Sediment Filter Bags (ISFB) per Inlet ⁽¹⁾	4	\$ 100	\$ 111	\$ 400	
	Labor cost per Inlet	4	\$ 200	\$ 221	\$ 800	
	ISFB Operation, Inspection and Maintenance Quarterly/Inlet	16	\$ 100	\$ 111	\$ 1,600	
	New Proposed BMP			Unit Cost	Note	
	Industrial Boulevard Bioretention / Raingarden w/UD ⁽¹⁾	1	\$ 22,134		\$ 22,134	
	Basin Operation, Inspection and Maintenance Annually 10%	1	\$ 5,000		\$ 5,000	
	Little Valley Creek Construction Cost Estimate Total				\$ 29,934	
	Engineering Cost 15% Construction ⁽⁵⁾	1	\$ 4,490		\$ 4,490	
	Little Valley Creek Sub Cost Estimate Total				\$ 34,424	
Total All Watersheds MS4 BMP's Cost Estimated⁽²⁾					\$ 784,559.21	
Willistown Total Annual O&M MS4 BMP's Cost Estimated^(2&3)					\$ 48,745	
By HOA Total Annual O&M MS4 BMP's Cost Estimated⁽³⁾					\$ 50,800	
Total Annual O&M MS4 BMP's Cost Estimated^(2&3)					\$ 99,545	

Notes:

- BMP Cost Estimates includes installation (labor, equipment, etc.) except Inlet Sediment Filter Bags labor costs are separated out.
- This Cost Estimate is based on conceptual information and subject to change based on completed engineering and final bidding.
- Replacement costs not included.
- The current Greentree Park project final costs may affect Total Cost Estimate.
- Engineering Sediment Removal Analysis Post-Construction may be required by PADEP and is not included.
- Installation by developer, O&M will be by the HOA, and monitored by the Willistown Township.

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Willistown Township MS4 Pollution Reduction Plan

Order of Magnitude Cost Estimates

2019 - 2023 (Original Time Line, Time starts when Permit is issued, which may begin in 2022.)

<u>Year</u>	<u>Operating Cost Estimate</u>	<u>Capital Cost Estimate</u>
2019	\$48,745	in total
2020	\$48,745	in total
2021	\$48,745	in total
2022	\$48,745	in total
2023	\$48,745	in total
Total	\$243,727	+ \$784,559.21 = \$1,028,286.21

9. Descriptions of Proposed MS4 BMPS per PaDEP BMP Effectiveness Values Table

9.1.1.1. Bioretention – Raingarden (C/D soils w/ underdrain)*

Sediment Removal Effective Value 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.

9.1.1.2. Stream Restoration*

Sediment 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.

9.1.1.3. Storm Sewer System Solids Removal (Inlet Sediment Filter Bag)*

Total Nitrogen (TN) = 0.0027 for sediment, 0.0111 for organic matter

Total Phosphorus (TP) = 0.0006 for sediment, 0.0012 for organic matter

Sediment = 1 – TN and TP concentrations

This BMP (also referred to as “Storm Drain Cleaning”) involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the

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potential for backups onto roadways or other areas that can produce safety hazards.

Storm Sewer System Solids Removal Determination Criteria

To determine pollutant reductions for this BMP, these steps must be taken:

1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected.

2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter).

3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations.

DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.

9.1.1.4. Forest Buffers

Sediment Removal Effective Value 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. Effectiveness credit for TN is for 4 upslope acres for each acre of buffer (4:1), and 2 upslope acres for TP and sediment (2:1). Additional credit is gained by converting land use from current use to forest. (Note – the values represent pollutant load reductions from stormwater draining through buffers).

9.1.1.5. Tree Planting

Sediment Removal Effective Value 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

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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.

*See PRP Simplified Method BMP Analysis **Appendix E**

10. Conclusion

- 10.1.** This report was prepared as required by PADEP via the MS4 application process.
- 10.2.** This application, due to changes in the MS4 regulations is now being submitted under an Individual Permit.
- 10.3.** This MS4 PRP report has been submitted on June 6, 2018 for the November 30, 2018 deadline, unless otherwise notified by PADEP. This plan had been extended PADEP due to Covid-19, and revised per PADEP comments. Mapping has been approved on May 28, 2021. The updated MS4 PRP Report and Application is to be resubmitted no later than December 31, 2021.
- 10.4.** 2018 MS4 TMDL reductions are not required for this application.
- 10.5.** The **updated** 2018 PRP Individual Permit Application has been submitted and meets the reduction criteria.
- 10.6.** BMP's may be located on either public or private property. This proposal is to be done within municipal owned or **HOA** operated locations.
- 10.7.** During the review process we will endeavor to work with PADEP to finalize the MS4 application after **any additional** review comments have been received.
- 10.8. Additional updated MS4 mapping per 10.3 has been provided as requested per the following summary:**
 - 10.8.1.** A new set of 11 maps to clarify the parsed out areas has been produced.
 - 10.8.2.** All previous sewersheds have been revised from showing discharge from their outfall structure, and extended to their respective water surface to which they discharge into.
 - 10.8.3.** Areas previously parsed-out between the "outfall", and water surface have been included.
 - 10.8.4.** Outfalls have been further categorized as MS4, Non-Municipal MS4, Virtual (no-actual physical outfall), and observation points
 - 10.8.5.** 40 additional sewer sheds overall have been provided to cover all Township Roads, regardless as to whether an actual physical MS4 Sewer and outfall exist. Virtual (non-existent) MS4 Outfalls have been

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indicated, and also two observation points. The 40 ne sewersheds have a letter designation in their identification suffix (i.e. -A, -B, -C, etc.)

10.8.6. Parsed out roadways from PennDOT have been updated.

10.8.7. Some minor updates have been made during the sewershed analysis, correcting some sewershed overlap, typos, and graphical changes.

10.8.8. Locations of all proposed BMP's have been now indicated also on the parsed out mapping.

- 11. Implementation:** Upon completion of review comments and then from the date of written approval by PADEP of this report, implementation of the proposed BMP's must begin to take place over the following 5-year period.

**Required Pollution Reduction Plan (PRP) Elements Instructions Outline
Sections II A to G**

A. PUBLIC COMMENTs (1st & 2nd)

First Public Meeting and Comments from May 7, 2018

A special public meeting was advertised on May 7, 2018 at 7:00pm as follows:

The Willistown Township Board of Supervisors will hold a special meeting on Monday, May 7, 2018 at 7:00 PM in the Municipal Meeting Room at 688 Sugartown Road, Malvern, PA. The purpose of the special meeting will be to receive verbal comments from the public concerning the draft Pollutant Reduction Plan (PRP). The PRP is required by the National Pollutant Discharge Elimination System (NPDES) Individual Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). The PRP estimates the pollutant loads generated by existing land cover within the Township and provides a 5-year plan to reduce these loads as the permit requires. The PRP includes detailed maps of the planning area, existing pollutant load calculations, proposed Best Management Practices (BMP) to achieve the required load reductions, cost estimates and long-term operation and maintenance procedures. The Township will accept public comment on the draft PRP prior to submittal to the Department of Environmental Protection (DEP) by the June 3, 2018 deadline. The draft PRP will be available for review as of April 14, 2018 at the Township Administration Building, 688 Sugartown Road, Malvern, PA and at www.willistown.pa.us. The written comment period will remain open for 30 days, until May 14, 2018. All timely comments received during the public comment period will be considered by the Township. A copy of all comments received and a record of consideration will be included with the final PRP submitted to DEP. David R. Burman, Township Manager.

PRP Report and Strategy Plan for Willistown Township
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WILLISTOWN TOWNSHIP
688 Sugartown Road
MALVERN, PA 19355
Attention:

STATE OF PENNSYLVANIA,
COUNTY OF MONTGOMERY

The undersigned *Margaret DeWine*, being duly sworn the he/she is the principal clerk of Daily Local News, Daily Local News Digital, published in the English language for the dissemination of local or transmitted news and intelligence of a general character, which are duly qualified newspapers, and the annexed hereto is a copy of certain order, notice, publication or advertisement of:

WILLISTOWN TOWNSHIP

Published in the following edition(s):

Daily Local News 04/13/18
Daily Local News Digital 04/13/18

The Willistown Township Board of Supervisors will hold a special meeting on Monday, May 7, 2018 at 7:00 PM in the Municipal Meeting Room at 688 Sugartown Road, Malvern, PA. The purpose of the special meeting will be to receive verbal comments from the public concerning the draft Pollutant Reduction Plan (PRP). The PRP is required by the National Pollutant Discharge Elimination System (NPDES) Individual Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). The PRP estimates the pollutant loads generated by existing land cover within the Township and provides a 5-year plan to reduce these loads as the permit requires. The PRP includes detailed maps of the planning area, existing pollutant load calculations, proposed Best Management Practices (BMP) to achieve the required load reductions, cost estimates and long-term operation and maintenance procedures. The Township will accept public comment on the draft PRP prior to submittal to the Department of Environmental Protection (DEP) by the June 3, 2018 deadline. The draft PRP will be available for review as of April 14, 2018 at the Township Administration Building, 688 Sugartown Road, Malvern, PA and at www.willistown.pa.us. The written comment period will remain open for 30 days, until May 14, 2018. All timely comments received during the public comment period will be considered by the Township. A copy of all comments received and a record of consideration will be included with the final PRP submitted to DEP. David R. Burman, Township Manager
dln 4/13 - 1a

Sworn to the subscribed before me this 4/16/18.

Jacqueline A. Kelly
Notary Public, State of Pennsylvania
Acting in County of Montgomery

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Jacqueline A. Kelly, Notary Public
Hatfield Twp., Montgomery County
My Commission Expires July 27, 2020
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

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PRP Report and Strategy Plan for Willistown Township MS4 Individual Permit Application 2018

Minutes from the 1st Public Meeting May 7, 2018

WILLISTOWN TOWNSHIP BOARD OF SUPERVISORS MEETING MINUTES 688 SUGARTOWN ROAD, MALVERN, PA MAY 7, 2018 AT 7:00 PM

The Special Meeting of the Willistown Township Board of Supervisors came to order at 7:00 PM. Supervisors Robert T. Lange, William R. Shoemaker, and Barbara L. Handelin were present. Also present were Township Manager David R. Burman and Township Engineer Michael Conrad.

Mr. Lange led the Pledge of Allegiance to the Flag, followed by a moment of silence for our troops.

The purpose of the special meeting will be to receive verbal comments from the public concerning the draft Pollutant Reduction Plan (PRP). The PRP is required by the National Pollutant Discharge Elimination System (NPDES) Individual Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4). The PRP estimates the pollutant loads generated by existing land cover within the Township and provides a 5-year plan to reduce these loads as the permit requires. The PRP includes detailed maps of the planning area, existing pollutant load calculations, proposed Best Management Practices (BMP) to achieve the required load reductions, cost estimates and long-term operation and maintenance procedures. The Township will accept public comment on the draft PRP prior to submittal to the Department of Environmental Protection (DEP) by the June 3, 2018 deadline. The draft PRP will be available for review as of April 14, 2018 at the Township Administration Building, 688 Sugartown Road, Malvern, PA and at www.willistown.pa.us. The written comment period will remain open for 30 days, until May 14, 2018. All timely comments received during the public comment period will be considered by the Township. A copy of all comments received and a record of consideration will be included with the final PRP submitted to DEP.

Mr. Conrad led the presentation and, with input from the Board of Supervisors and Mr. Burman, provided an overview of the MS4 Program and a summary of the proposed Pollutant Reduction Plan. The visual displays utilized by Mr. Conrad are attached to these meeting minutes.

Mahala Renkey of Tulip Drive expressed concerns with the drainage and accumulation of debris and pollutants along Paoli Pike in the vicinity of Bryn Mawr Rehab Hospital. Mr. Conrad clarified that stormwater management along the State Road would be PennDOT's responsibility. Mr. Conrad also noted that the area in question is outside of the urbanized area.

John Jameison of Applebrook Meadows inquired with regard to the calculation of the sediment load. Mr. Conrad reported that the existing pollutant load is measured via a model provided by DEP. The Township is required to reduce that pollutant load by 10% over the next five years. At the conclusion of the five-year period, the Township will be required to demonstrate compliance with that requirement in terms of both the activities and or projects included in the PRP and in terms of the model.

Victor Gulielmi of Wildwood Drive inquired about private basins, such as those owned by a Homeowners' Association. Mr. Shoemaker clarified that the Township has jurisdiction, from an MS4 perspective, over such facilities only to the extent that they would flow into a Township-owned facility.

Mike Kerr of Stonehenge Lane inquired with regard to the pollutants such as phosphorous and nitrogen. Mr. Conrad reported that the pollutants are coming from many different sources that come from private properties, such as pet excrement, lawn fertilizers, road salt, etc. Mr. Kerr expressed his opposition to this mandate.

PRP Report and Strategy Plan for Willistown Township MS4 Individual Permit Application 2018

David Clohecy of Willistown Township expressed his feeling that we should use actual measurements to determine existing pollutant load, rather than the model that has been used. Mr. Clohecy also expressed concern that utilizing filter bags in stormwater inlets that may restrict capacity and result in ponding. Mr. Clohecy feels that educational outreach may be a better solution, to avoid unintended consequences. He recommends something less complicated and less costly for the first submission, with different measures and less operational and capital outlay. He expressed a desire to test some of the filter bags and other solutions to see how they work, rather than making the commitment to spending a lot of money and potentially raising taxes, on solutions that may result in ponding and other problems. He feels that keeping vehicles on roads rather than speeding and stirring up the side of the road, it would reduce the sediment load.

Mr. Shoemaker summarized the Township Environmental Protection Ordinance and, in particular, the regulations pertaining to the Riparian Buffer Area and, to the extent that we can comply with the MS4 requirements without spending excess sums and raising taxes, we will do so.

Dan Higgins of East Boot Road suggested it may be productive to install filters in basins to capture sediment rather than in individual inlets. Mr. Conrad agreed and explained that is the idea behind basin retrofit project.

Allie Barchi of Laurel Circle asked whether the Township can address a well-groomed stream bank with those landowners who may not be aware of the Riparian Buffer Area and proper treatment thereof. Mr. Shoemaker noted that the Township prefers to do so via education and outreach. Ms. Barchi noted that the Township did a phenomenal job repairing the stream bank along Spring Road after the most recent severe rain event.

Mr. Burman and Mr. Conrad discussed the history of the MS4 program and the value of education and outreach over the years. Mr. Conrad also discussed the value of street sweeping versus the value of other BMP's identified in the MS4 program.

Mr. Burman then summarized the anticipated conceptual / order of magnitude costs for the proposed BMP's, as presented by Mr. Conrad.

Conceptual capital costs would be \$32,545, \$179,515, and \$3,220 for the Ridley, Crum, and Little Valley Creek Watersheds, respectively. Conceptual annual operating costs would be approximately \$22,400 for all three watersheds combined. Total order of magnitude costs for the five-year MS4 program would be \$327,280.

Next Meeting

The next Regular Meeting of the Board of Supervisors will take place on Monday, May 14, 2018 at 7:00 PM at 688 Sugartown Road.

Adjournment

There being no further business, the meeting adjourned.

Respectfully submitted,

David R. Burman
Secretary

**PRP Report and Strategy Plan for Willistown Township
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One written comment was sent on May 8, 2018 via email, to the Willistown Township Manager by a resident as follows:

Thank you for your explanations and the insights you provided at last evening's Township meeting.

My comment is that I believe it is in error or otherwise incorrect to include Laurel Circle in the Urbanized Area on the map provided in the Draft Plan.

The Willistown Twp. zoning map show the properties and area around Laurel Circle are designated RA Zoning, which according to the TWP code means among other things that each property have a lot size not less than 2 acres, with not more than 12% of the lot area occupied by buildings and not more than 15% of the lot area covered by impervious surfaces. I can tell you that the actual impervious surfaces on these lots are generally much less than 15%. In addition, Laurel Circle is well outside of and south of the Malvern Borough, and it is not served by typical urbanized underground infrastructure services such as Storm Sewers. There is no contiguous municipal collection and conveyance system for storm water such as inlets and pipelines directing storm water to waterways. There are no Storm Sewer Inlets on Laurel Circle, as are commonly found in urban and urbanized areas. There are no contiguous Storm sewer pipes (other than two road crossing culverts) buried under Laurel Circle roadways or road sides. There are two short culverts perpendicular to and under the Laurel Circle roadway at two points which allow a tributary branch of Crum Creek to pass under the roadway and one or two lots have a short culvert under their driveways to allow surface water to flow more easily from one side of the driveway to the other. These culverts are not a storm water conveyance, but rather a means to allow the road to pass over the stream, which could also be replaced by a very short bridge (a culvert is obviously a more cost effective option). So, I believe it is an inappropriate stretch not only to classify Laurel Circle as an Urbanized Area for this or any other purpose, but it is also inappropriate to classify a few short culverts under roadways or driveways as Small Municipal Separate Storm Water Systems.

Also the Map provided in the Draft Plan posted on the Willistown Twp. website under the Draft PRD which shows urbanized areas misspells Census, in the legend it is spelled Census.

I request that you correct the misspelling in the draft application and at the same time recommend that you arrange to have the Urbanized Area color designation southern limit moved to north of Laurel Circle.

Thank you for your consideration and thank you for your help with this matter.

Response was as follows:

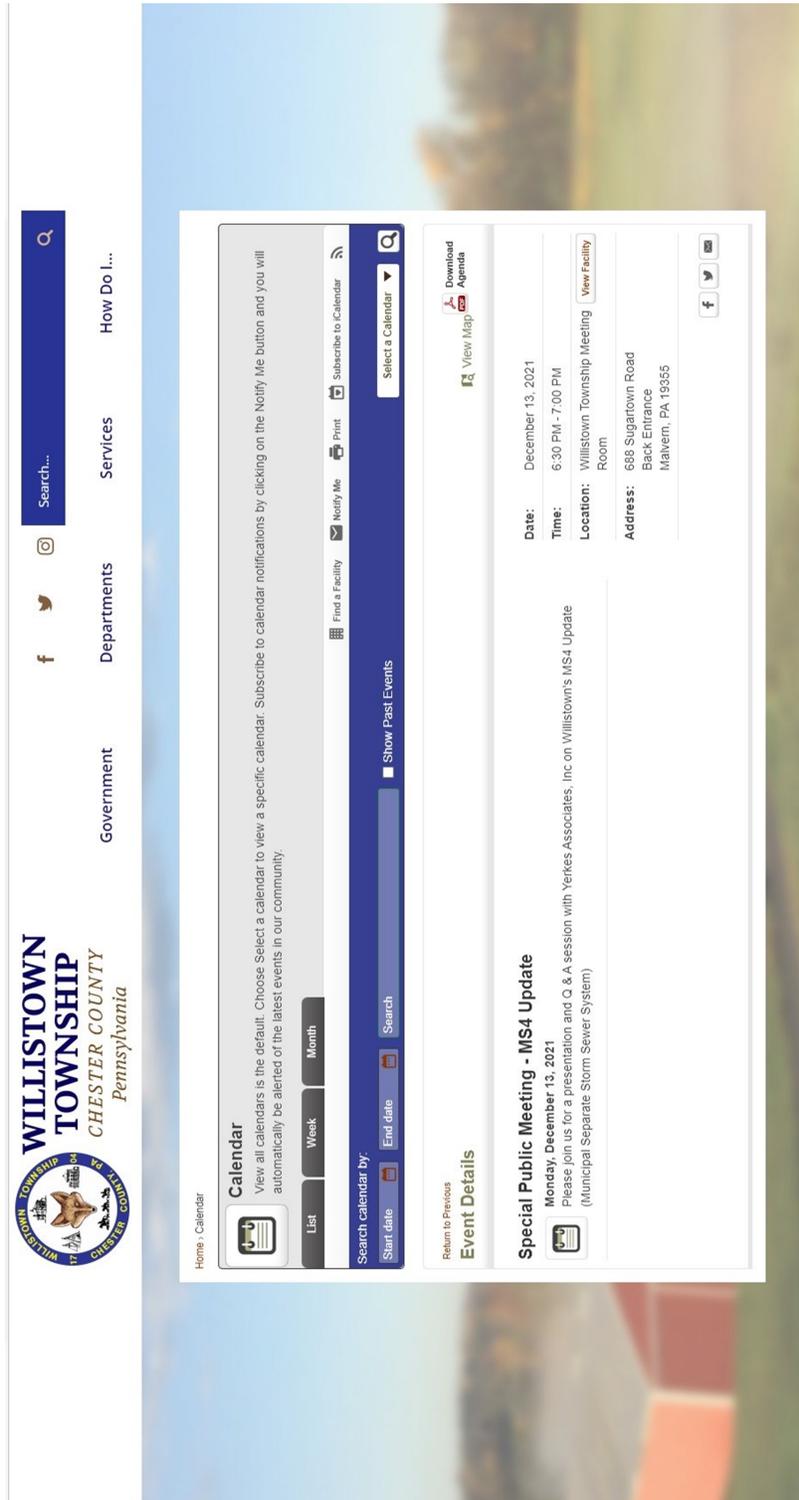
1. The Urbanized Area shown on the MS4 Map is based on the U.S. Census GIS data provided by them, the MS4 map actually matches the reference map that was provided. When reading the reference map the clear unshaded area is the urbanized area, not the shaded area. The shaded area, as noted on the reference maps legend, are areas "Outside the Subject Area" or outside the Urbanized Area. Otherwise, we have no jurisdiction to analyze and/or revise the Urbanized Area data as provided by the U.S Census.
2. The mapping posted previously on the Township web page was an older earlier mapping draft, this spelling error has already been corrected in subsequent mapping revisions and current report, which has also been updated the web page.

PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018

Second Public Meeting and Comments from Willistown Board of Supervisors
Meeting on December 13, 2021

A Willistown Board of Supervisors meeting was advertised, and notified on their web page and on Facebook for the meeting that included the MS4 PRP Plan as follows:

Willistown Web Page



PRP Report and Strategy Plan for Willistown Township MS4 Individual Permit Application 2018

Facebook Page

The screenshot shows the Facebook page for Willistown Township. The page header includes the township's profile picture, name, and navigation buttons for Sign Up, Like, Message, and Search. Below the header is a grid of six images: a red heart, a Thanksgiving-themed image, a cartoon character, a woman at a recycling station, a Veterans Day graphic, and a hurricane warning. The main content area features a video thumbnail titled "Score One for the Good Guys During the..." with 2.7K likes and a "Page transparency" section. The central focus is a post from Willistown Township dated December 9 at 9:09 AM. The post text reads: "Please join us for a presentation and Q & A session with Yerkes Associates, Inc on Willistown's MS4 Update (Municipal Separate Storm Sewer System) on Monday, December 13 from 6:30 - 7:00 PM in the meeting room at the rear of the Administration Building at 688 Sugartown Road." The post has 1 share and 1 like. Below the post is a comment box and another post from Willistown Township dated December 8 at 1:07 PM, which mentions a new location for the next OSRB meeting.

Willistown Township
December 9 at 9:09 AM · 🌐

Please join us for a presentation and Q & A session with Yerkes Associates, Inc on Willistown's MS4 Update (Municipal Separate Storm Sewer System) on Monday, December 13 from 6:30 - 7:00 PM in the meeting room at the rear of the Administration Building at 688 Sugartown Road.

👍 1 1 Share

👍 Like 💬 Comment ➦ Share

Write a comment...
Press Enter to post.

Willistown Township
December 8 at 1:07 PM · 🌐

📌 Please note the new location for the next OSRB meeting. 📌

The Willistown Township Open Space Review Board will meet on Monday, December 13th, 2021 at 5:30 PM. The meeting will be held in the auditorium of the General Wayne Elementary School located at 20 Devon Road, Malvern. Both the front entrance and bus entrance off Grubb will be open. Masks are required regardless of vaccination status.

**PRP Report and Strategy Plan for Willistown Township
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Daily Local Advertisement

RECEIPT 11/30/21



PENNSYLVANIA GROUP

Account: **884427**
 Name: **SALLY SLOOK**
 Company: **WILLISTOWN TOWNSHIP**

 Address: **688 Sugartown Road**
MALVERN, PA 19355

 Telephone: **(610) 647-5300**
 Fax:
 Description: **The Willistown Township Board of Sup**

Date: **11/30/21**
 Start Date: **12/01/21** Stop Date: **12/01/21**
 Class: **1201 - Legal Notices**
 Ad ID: **2258176**
 Ad Taker: **CRRDEAN**
 Sales Person: **Ryan Dean (018303)**
 Words: **48**
 Lines: **12**
 Agate Lines: **12**
 Depth: **1.333**
 Inserts: **2**
 Blind Box:
 PO Number:

Ad sample

Total: **\$65.90**
 Paid Amount: **\$0.00**
 Amount Due: **\$65.90**

The Willistown Township Board of Supervisors will hold a regularly scheduled meeting Monday, December 13, 2021 at 6:30 PM. The meeting will be held in the board room at rear of the Township administration building located at 688 Sugartown Road, Malvern. Sally Slook, Township Manager
 DLN 12/1; 1a

Publication
Daily Local News, Daily Local News Digital

*We Appreciate Your Business!
Thank You SALLY SLOOK!*

PRP Report and Strategy Plan for Willistown Township MS4 Individual Permit Application 2018

WILLISTOWN TOWNSHIP
SPECIAL MEETING MINUTES
688 SUGARTOWN ROAD, MALVERN, PA
DECEMBER 13, 2021 AT 6:30 PM

The special public meeting of Willistown Township came to order at 6:30 pm. In attendance were Township Manager Sally Slook, Assistant to the Township Manager Jennifer Jacobs and Nick Cirilli, PE, PLS of Yerkes Associates, Inc. The purpose of the special meeting was to receive verbal comments from the public per a formal presentation of the Draft Pollutant Reduction Plan (PRP).

Announcements - A Draft Copy of the MS4 Report is available for review at the Township Administration Building, 688 Sugartown Road, Malvern, PA. A copy of all comments received, and a record of consideration will be included with the PRP submitted to DEP. Ms. Slook introduced Mr. Nick Cirilli, PE, PLS of Yerkes Associates, Inc.

Presentation by Yerkes Associates, Inc - Attached to these minutes.

Mr. Nick Cirilli, PE, PLS led a Power Point Presentation explaining the goal of the MS4 Program and the measures the Township is proposing to reduce the pollutant loads in the township. A summary of the proposed measures by Watershed were presented as follows:

Ridley Creek Pollution Reduction Plan

- 1 Rita Reves Park: Basin Retrofit to a Bioretention / Raingarden
- 2 Inlet Sediment Filter Bags: at 9 locations
- 3 Troutbeck Farm Subdivision: Riparian Forest Buffer along the unnamed tributary
- 4 Willistown Point Subdivision Tree Plantings within the subdivision.

Crum Creek Pollution Reduction Plan

- 1 Greentree Park: Basin Retrofit to a Bioretention / Raingarden
- 2 Mill Road Park: Basin Retrofit to a Bioretention / Raingarden
- 3 Eisenhower Road: Stream Bank Restoration along Crum Creek
- 4 Inlet Sediment Filter Bags: at 3 locations
- 5 Stonehenge Subdivision: Stream restoration along Tributary leading to Crum Creek

Little Valley Creek Pollution Reduction Plan

- 1 Inlet Sediment Filter Bags: at 8 locations
- 2 Industrial Boulevard: Bioretention / Raingarden

Citizen's Comments

None

Adjournment

Seeing no further business, the meeting adjourned

Sincerely,



Sally Slook, Township Manager

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

A written comment period will remain open for 30 days, until January 13, 2021. Once all comments are received, with responses made, an amendment will be sent to PADEP, and made part of this report.

RESERVED FOR ANY ADDITIONAL PUBLIC COMMENTS AND RESPONSES

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

B. MAP

Outfall and Aerial Mapping (Prior 2017) and updated 2018 revised December 13, 2021, and Supplemental Map to Outfall & Urbanized Area Map – Sewersheds & Parsed Out Areas Map, dated March 11, 2021, last revised December 13, 2021 has been provided in Appendices B, and C. All storm sewersheds have been labeled and identified on the mapping. All stormsewer shed areas, land uses and pervious / impervious surfaces are calculated per Wikiwatersheds in **Appendix G** for Ridley Creek, Crum Creek and Little Valley Creek watersheds. All associated stormsewer shed calculations, per the Simplified Method, have been provided in **Appendices E, G, H and I**. See Also Section 5 of this report.

C. POLLUTANTS OF CONCERN

The pollutants of concern for Willistown Township are as provided by the PADEP Requirements Table of 08-10-17 have been included in **Appendix D**. See also Section 2.1 of this report.

The MS4 Requirements Table (Revised 08-10-2017) (See also **Appendix D**) for the 2018 permit renewal identifies only a Pollutant Reduction Plan (PRP) requirement per **Appendix E** and no Total Maximum Daily Load (TMDL) requirement as follows:

Willistown Township MS4 Requirements Table (Municipal)

MS4 Name	NPDES ID	Individual Permit?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Chester County						
WILLISTOWN TWP	PAI130521	Yes	SP, IP	Ridley Creek	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Crum Creek	Appendix E-Excessive Algal Growth, Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)
				Little Valley Creek	Appendix C-PCB (4a), Appendix B-Pathogens (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Schuylkill River	Appendix C-PCB (4a)	(No cause listed.)
				Valley Creek	Appendix C-PCB (4a), Appendix B-Pathogens (5), Appendix E-Siltation (5)	Cause Unknown (5), Other Habitat Alterations, Water/Flow Variability (4c)
				Hunters Run	Appendix E-Siltation (5)	Cause Unknown (5), Water/Flow Variability (4c)

The 2018 permit renewal requires coverage by an Individual Permit for MS4s with a TMDL requirement and / or PRP requirement. Accordingly, an Individual Permit renewal application with a PRP is to be prepared and submitted for Willistown Township (See also 2018 MS4 Permit NOI/Application Due Date Report **Appendix A**).

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

D. DETERMINE EXISTING LOADING FOR POLLUTANTS OF CONCERN.

There is no specific outfall testing that was performed for this report, therefore there are no testing dates. It was understood in lieu of outfall testing and via PADEP seminars and discussions that using the Simplified Method and WikiWatersheds that the pollutant load for each sewershed may be calculated to each MS4 outfall. The pollutant load was performed by calculating each sewershed within each watershed area for at each MS4 outfall location. The loading to be applied for the entire watershed was totaled and then BMP's were applied to reduce the pollutant load by 10% for the specific drainage watershed. Following the Simplified Method, all calculations for the pollutant load for each sewershed and total for each watershed area are provided in **Appendices E, F G, and H**. See also section 5 of this report.

NOTE: Delineation of the Storm Sewershed Drainage areas versus MS4 outfall location to nearest Water Surface.

By the PADEP PRP instructions definition the Storm Sewershed is, "...the land area that drains to the municipal separate storm sewer [system] (or MS4) from within the jurisdiction of the MS4 permittee." The sewershed drainage areas that are shown on the mapping indicate the actual drainage area received by the MS4 via the existing collecting structures (inlets, headwalls, etc...) that receive runoff / pollutant load and discharged to the MS4 outfall. **This has been further expanded per PADEP review to include sewershed drainage areas that do not necessarily have a physical municipal storm sewer within them, but is expanded to the roadways that are part of the municipal storm sewer system.** Per PADEP review, the **sewershed** drainage area is taken to the last possible inlet structure prior to discharge through to the lowest MS4 Outlet **to the nearest water surface** discharge point within each sewershed. The MS4 Outlet **to the water surface** is only a discharge point, not a collector of runoff / pollutant load. Therefore, sewershed drainage area pollutant loads are actually calculated as discharged through the MS4 to the MS4 Outlet **to the water surface**.

E. SELECT BMPS TO ACHIEVE THE MINIMUM REQUIRED REDUCTIONS IN POLLUTANT LOADING.

The following BMP's have been provided to reduce the pollutant load for each watershed area (**See Section 6 for Additional Details**):

Ridley Creek:

Rita Reves Park: A Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that discharges to Garrett Mill Road culvert to Ridley Creek.

Inlet Sediment Filter Bags: To be installed at 9 locations along Cratin Lane, Smedley Drive, Dutton Mill Road, and Fox Run Lane that lead to outfalls discharging via tributaries to Ridley Creek.

Troutbeck Farm Subdivision: This is an approved subdivision plan that is currently under construction at this time, which proposes a Riparian Forest Buffer along the unnamed tributary leading to the Northeast Branch of Ridley Creek. It is anticipated to be completed within the next five years. It will be owned, operated, and maintained by

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

the Home Owners Association and monitored by Willistown Township. Riparian Buffer Plans and notes have been provided in **Appendix F**.

Willistown Point Subdivision: This is an approved subdivision plan that is currently under construction at this time, which proposes a Tree Plantings within the subdivision. Runoff leads to tributary 00672 leading to the Ridley Creek. It is anticipated to be completed within the next five years. It will be owned, operated, and maintained by the Home Owners Association and monitored by Willistown Township. Tree planting plans and notes have been provided in **Appendix F**

Reduction Required: 19,857 lb/yr, (updated per PADEP review)

Reduction Met: 24,489 lb/yr, (updated per PADEP review)

Crum Creek:

Greentree Park: Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via overland drainage to tributary to Crum Creek.

Mill Road Park: Basin Retrofit to a Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via tributary to Crum Creek.

Eisenhower Road: Stream Bank Restoration along Crum Creek.

Inlet Sediment Filter Bags: Installed at 3 locations along Callery Way that lead to outfalls discharging to stream along Eisenhower Road.

Stonehenge Subdivision: Stonehenge is an existing development. Stream restoration is proposed along Tributary 00728 (a.k.a. W. Tributary) that leads to Crum Creek.

Reduction Required: 45,973 lb/yr (updated per PADEP review)

Reduction Met: 46,636 lb/yr (updated per PADEP review)

Little Valley Creek:

Inlet Sediment Filter Bags: Installed at 4 locations along Industrial Boulevard and 4 locations along Jacqueline Drive that lead to outfalls discharging to tributary to Little Valley Creek.

Industrial Boulevard: Bioretention / Raingarden w/underdrain C/D Soils that lead to outfall discharge via Tributary 01002 to Little Valley Creek

Reduction Required: 5,812 lb/yr (updated per PADEP review)

Reduction Met: 27,521 lb/yr (updated per PADEP review)

Overall Reduction Required: 71,643 lb/yr

Overall Reduction Met: 98,646 lb/yr

The locations of all proposed BMP's have been indicated on the mapping in **Appendix C**. See also Sections 6, 7, & 9 of this report and **Appendices I, J & K**

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

F. IDENTIFY FUNDING MECHANISM(S).

Willistown Township will be the responsible party for funding the implementation of all proposed BMP's, **except HOA owned and operated BMP's. The Township will provide funding to monitor HOA BMP's.** The Township will also seek funding through State or private grant opportunity sources. See also Section 8 of this report.

G. IDENTIFY RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPS.

Willistown Township will be the sole responsible party for operation and maintenance of BMP's. See also Sections 8 & 11 and **Appendices J & K** for proposed BMP's.

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix A

PADEP 2018 MS4 Permit NOI/Application Due Date Report & PADEP Permit Letter

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

PADEP 2018 MS4 Permit NOI/Application Due Date Report

**PRP Report and Strategy Plan for Willistown Township
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PADEP Permit Letter

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix B

Outfall & Urbanized Area, MS4 Program - 2017

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix C

**Outfall & Urbanized Area & Aerial Maps, and Supplemental Map to Outfall &
Urbanized Area Map – Sewersheds & Parsed Out Areas Mapping
MS4 Program - 2018**

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Outfall & Urbanized Area Map

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Outfall Aerial Map

**PRP Report and Strategy Plan for Willistown Township
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Supplemental Map to Outfall & Urbanized Area Map – Sewersheds & Parsed Out Areas
Mapping

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix D

MS4 Requirements Table

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix E

**Pollution Reduction Plan: A Methodology
&
PRP Instructions**

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Pollution Reduction Plan: A Methodology

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

PRP Instructions

**PRP Report and Strategy Plan for Willistown Township
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Appendix F

Land Development Plans

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Troutbeck Farms Subdivision
Riparian Forest Buffer Plans
w/ Stormwater Report Data

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Willistown Point Subdivision
Tree Planting Plans
w/ Stormwater Report Data

**PRP Report and Strategy Plan for Willistown Township
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Appendix G

Loading Rate Calculations For Each Sewershed to Final Outfall

**PRP Report and Strategy Plan for Willistown Township
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Ridley Creek Loading Rates

**PRP Report and Strategy Plan for Willistown Township
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Crum Creek Loading Rates

**PRP Report and Strategy Plan for Willistown Township
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Little Valley Creek Loading Rates

**PRP Report and Strategy Plan for Willistown Township
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Appendix H

**Existing Loading Without Accounting for BMP's
& Summary Totals of All Watersheds with Proposed BMP's Sediment Removal**

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix I

Proposed BMP's Load Reduction Analysis

**PRP Report and Strategy Plan for Willistown Township
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Appendix J

**Example BMP Details
(See Appendix F for Subdivision Details)**

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Existing Basin Retrofit to a Bioretention / Raingarden with Under Drain Construction
Detail

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Stream Restoration Details & Photos

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Inlet Sediment Filter Bags Detail

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix K

**Considerations of Stream Restoration Projects in Pennsylvania for eligibility as
an MS4 Best Management Practice**

**PRP Report and Strategy Plan for Willistown Township
MS4 Individual Permit Application 2018**

Appendix L

Overall Summary of Updates to Sewersheds and PennDOT Parsed Out Roadways