Combined Total Maximum Daily Load and Pollutant Reduction Plan for Indian Creek and Skippack Creek Watershed

For

Souderton Borough MS4 Permit Program

Souderton Borough, Montgomery County, PA

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EXECUTIVE SUMMARY

This report presents the combined Pollutant Reduction Plan (PRP) and Total Maximum Daily Load (TMDL) implementation strategy for Souderton Borough, prepared in accordance with the Pennsylvania Municipal Separate Storm Sewer System (MS4) Permit requirements. Souderton Borough is a regulated small MS4 whose stormwater discharges drain to impaired segments of Skippack Creek and Indian Creek, both of which are subject to approved TMDLs for sediment and nutrients, respectively. As required under the MS4 permit, the Borough has evaluated its contribution to these impairments and developed a plan to achieve measurable progress toward pollutant load reductions necessary to support attainment of water quality standards.

The Skippack Creek watershed is impaired by excessive sediment loading, with impacts to aquatic life attributed largely to stormwater runoff and streambank erosion. Under the approved 2005 Skippack Creek TMDL, Souderton Borough is assigned an 18 percent sediment reduction target relative to its wasteload allocation. Indian Creek is impaired by nutrient over-enrichment, primarily phosphorus, and is regulated under a 2008 nutrient TMDL that assigns Souderton Borough a 13 percent phosphorus reduction requirement. In addition to TMDL obligations, the Borough is subject to PRP requirements under Appendix E of the MS4 permit for sediment reductions.

To support a combined PRP/TMDL approach, Souderton Borough recalculated its existing pollutant loading using the WikiWatershed Model My Watershed tool. This modeling effort delineated MS4 planned and parsed areas, applied land use–based loading rates, and accounted for existing best management practices (BMPs) to reduce pollutant loading. The resulting adjusted existing sediment load for the Borough totals approximately 852,305 pounds per year across both watersheds. Consistent with MS4 permit provisions, both short-term and long-term reduction goals were established. Short-term goals require a minimum 10 percent reduction in adjusted sediment loading within the current permit term, while long-term goals align with the applicable TMDL wasteload allocations for sediment and nutrients.

To meet these requirements, Souderton Borough has identified a suite of 18 proposed BMP projects consisting of both structural and non-structural measures. These projects include one stream restoration project, ten rain gardens, three tree planting initiatives totaling more than 478 trees, one advanced hydrodynamic separator, one stormwater basin retrofit, one vegetated swale, and one pervious pavement installation. Collectively, the proposed BMPs are estimated to achieve approximately 123,000 pounds per year of sediment reduction, exceeding the Borough's minimum short-term reduction requirement and providing progress toward long-term TMDL compliance. Notably, the proposed stream restoration project alone has the capacity to satisfy the Borough's total required sediment reduction, providing flexibility and redundancy in implementation.

PERMIT DEFINITIONS

Attaining Use: Achieving and maintaining water bodies that meet specific, pre-defined standards for their intended use, such as supporting aquatic life, recreational activities, or public water supply.

Baseline Load: Pollutant load discharged by an MS4 as reported in the TMDL.

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

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

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

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

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

Existing Load: The pollutant load that the MS4 estimates is draining to impaired waters from the Planning Area at the time of TMDL Plan submission. The existing load will be the same as the baseline load (regardless of whether or not the baseline load is revised) unless the MS4 accounts for reduction from structural BMPs installed between the date of TMDL approval and TMDL plan submission.

Existing permittee: Any entity that has been designated as a regulated small MS4 and has previously obtained permit coverage under the PAG-13 permit or obtained an Individual NPDES MS4 Permit.

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

Hydrologic Unit Code: Watersheds delineated by United States Geologic Survey (USGS) using a nationwide system based on surface hydrologic features. This system divides the county into 22 regions (2-digit), subregions -digit), 405 basins (6-digit), 2400 subbasins (8-digits), 19,000 watersheds (10-digit), and 105,000 subwatersheds (12-digit)

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

Illicit Discharge: Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater, except non-stormwater discharges as described in the "Discharges Authorized by this Permit"

section of this Permit. Examples of illicit discharges including dumping of motor vehicle fluids, household hazardous wastes, grass clippings, leaf litter, animal wastes, or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-stormwater waste into a municipal separate storm sewer system. Illicit discharges can be accidental or intentional.

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

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

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

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

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

MS4 Requirements Table: A compilation of information regarding Pennsylvania's MS4s, surface waters that receive stormwater discharges from MS4s, surface water impairments and TMDLs that is posted to DEP's website, www.dep.pa.gov/MS4. The MS4 Requirements Table has been assembled by DEP to assist MS4 permittees in determining applicable requirements for the development of plans and implementation of BMPs.

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

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

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

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

Non-Municipal Permittee: A regulated small MS4 that is not a municipality, e.g., military bases, large hospital or prison complexes, and highways and other thoroughfares.

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

Nutrients: Elements essential for plant growth. Nitrogen (TN) and Phosphorus (TP) are the limiting nutrients in most aquatic environments.

Observation Point: A location upstream of an outfall where a permittee must conduct dry weather screening if the permittee determines that screening at an outfall is infeasible, and the point at which stormwater discharges to storm sewers owned or operated by an adjoining municipality where dry weather screening must be conducted.

Ordinance: A law enacted by the government of a municipality.

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

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

Permittee: Owner or operator of a regulated small MS4 authorized to discharge under the terms of this permit.

Parsed Area: Land area removed from the Planned Area in order to calculate the actual or target pollutant loads applicable to an MS4 (i.e land associated with non-municipal stormwater NPDES permit coverage that exist within the urbanized area of a municipality, land area associated with PennDOT roadways, lands associated with production area of a concentrated animal feeding operation covered by NPDES permit, land areas in which stormwater runoff does not enter the MS4.

Planned Area: All of the storm sewersheds that an MS4 must calculate existing loads and plan reductions for.

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

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

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

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

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

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

Storm Sewershed: Land area that drains to an individual MS4 Outfall from within the jurisdiction of the MS4 permittee. The term "combined storm sewershed" means the drainage area of all MS4 outfalls that discharge to a specific surface water or to waters within the Chesapeake Bay watershed.

Stormwater: Runoff from precipitation, snow melt runoff and surface runoff and drainage. "Stormwater" has the same meaning as "storm water". (25 Pa. Code §92a.2)

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

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

Total Maximum Daily Load (TMDL): Sum of individual waste load allocations (WLA) for point sources, load allocations (LA) for nonpoint sources and natural quality and a margin of safety (MOS) expressed in terms of mass per time, toxicity, or other appropriate measures. (25 Pa. Code §96.1). *A TMDL identifies the maximum amount of a pollutant that a water body can receive while still meeting water quality standards*.

$$TMDL = \Sigma WLA + \Sigma LA + \Sigma MOS$$

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

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

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

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

INTRODUCTION

As a regulated MS4 permittee located within TMDL watersheds, Souderton Borough is required to evaluate its contribution to the identified impairments and implement measures that achieve reasonable progress toward the pollutant load reductions necessary to support attainment of water quality standards.

This combined PRP/TMDL report documents the regulatory applicability, pollutants of concern, and methodologies used to characterize existing pollutant loading conditions within the Borough's MS4 planned area. The report further identifies the required pollutant load reductions assigned to the Borough based on approved TMDL allocations and describes the process used to evaluate, select, and prioritize structural and non-structural best management practices (BMPs) capable of addressing those pollutants. BMP selection considers site feasibility, pollutant removal effectiveness, and opportunities to integrate stormwater improvements with existing municipal infrastructure and programs.

Consistent with MS4 permit requirements, this report is intended to serve as a planning and implementation tool, rather than a demonstration of immediate TMDL attainment. Pollutant reduction targets represent short-term and long-term goals to be achieved over multiple permit terms, and progress will be documented through phased BMP implementation and annual reporting. The PRP/TMDL may be updated over time to reflect new data, completed projects, or refinements to pollutant loading estimates, ensuring continued alignment with watershed conditions and regulatory expectations.

SKIPPACK CREEK WATERSHED

Skippack Creek is a 15.2 mile stream located in Montgomery County, Pa. that begins in Souderton Borough and flows generally southwest where it meets the Perkiomen Creek within the Perkiomen Creek Watershed. Major tributaries in the stream's 56-square mile basin include the West Branch of Skippack Creek, Towamencin Creek and Zacharias Creek and includes urbanized areas from 12 municipalities. The entire Skippack Creek watershed is classified as trout stocked fishery (TSF) according to the Pennsylvania Chapter 93 water quality standards. Approximately 84% of Souderton's land area or 597.9 acres drains towards the Skippack Creek Watershed with the majority of land uses within the low to high intensity development.

INDIAN CREEK WATERSHED

The Indian Creek watershed is part of the overall HUC-12 East Branch Perkiomen Creek Watershed and drains approximately seven square miles in Montgomery County, Pa and includes urbanized area from 8 municipalities. The designated use for Indian Creek is TSF. The main stem of Indian Creek flows southwesterly prior to its' confluence with East Branch

Perkiomen Creek. Approximately 16% of Souderton Borough's land area or 115.54 acres drains towards the Indian Creek watershed with the major land uses comprising 45% as low intensity development, 26% as open space, 19.2% as medium intensity development, 6.7% as high intensity development.

A. Public Participation

Public participation is a key component of the PRP/TMDL development process and ensures that community stakeholders are informed and engaged in the Borough's stormwater management efforts. Souderton Borough will provide opportunities for public review and comment on the proposed TMDL/PRP, consistent with the MS4 permit and TMDL guidance. This includes posting the draft PRP on the Borough website and holding a public meeting/workshops to discuss proposed BMP projects, pollutant reduction goals, and implementation timelines. Input received from the public will be considered in finalizing the PRP to promote transparency, foster community support, and enhance the effectiveness of BMP implementation. Documentation of public participation activities and responses to comments are included in Appendix A of this report and will be maintained as part of the Borough's compliance record.

B. Mapping

Accurate and detailed mapping is an essential component of the TMDL/PRP plan and supports effective planning, implementation, and tracking of BMPs within Souderton Borough. The TMDL/PRP includes mapping of the municipal storm sewer system, subwatershed and individual sewershed boundaries, outfalls, existing and proposed BMP locations, planned areas contributing to pollutant loading within the Skippack Creek and Indian Creek watersheds and parsed areas which the MS4 is not responsible to manage.

Geographic information system (GIS) mapping enables identification of priority areas for BMP implementation, facilitates calculation of existing and projected pollutant loads, and supports monitoring of progress toward TMDL/PRP reduction targets. All maps are prepared at a scale and resolution sufficient to allow clear identification of drainage areas, structural and non-structural BMPs, and connectivity to receiving waters. Outfall Maps can be found in Appendix B of this report.

Mapping data will be maintained and updated over time to reflect completed BMP projects, changes in land use, and any refinements to drainage delineations, consistent with Appendix E and Appendix F requirements of the MS4 permit. Figure 1 and 2 demonstrate an overview of Souderton Borough's geographic setting within the larger watershed boundaries context.

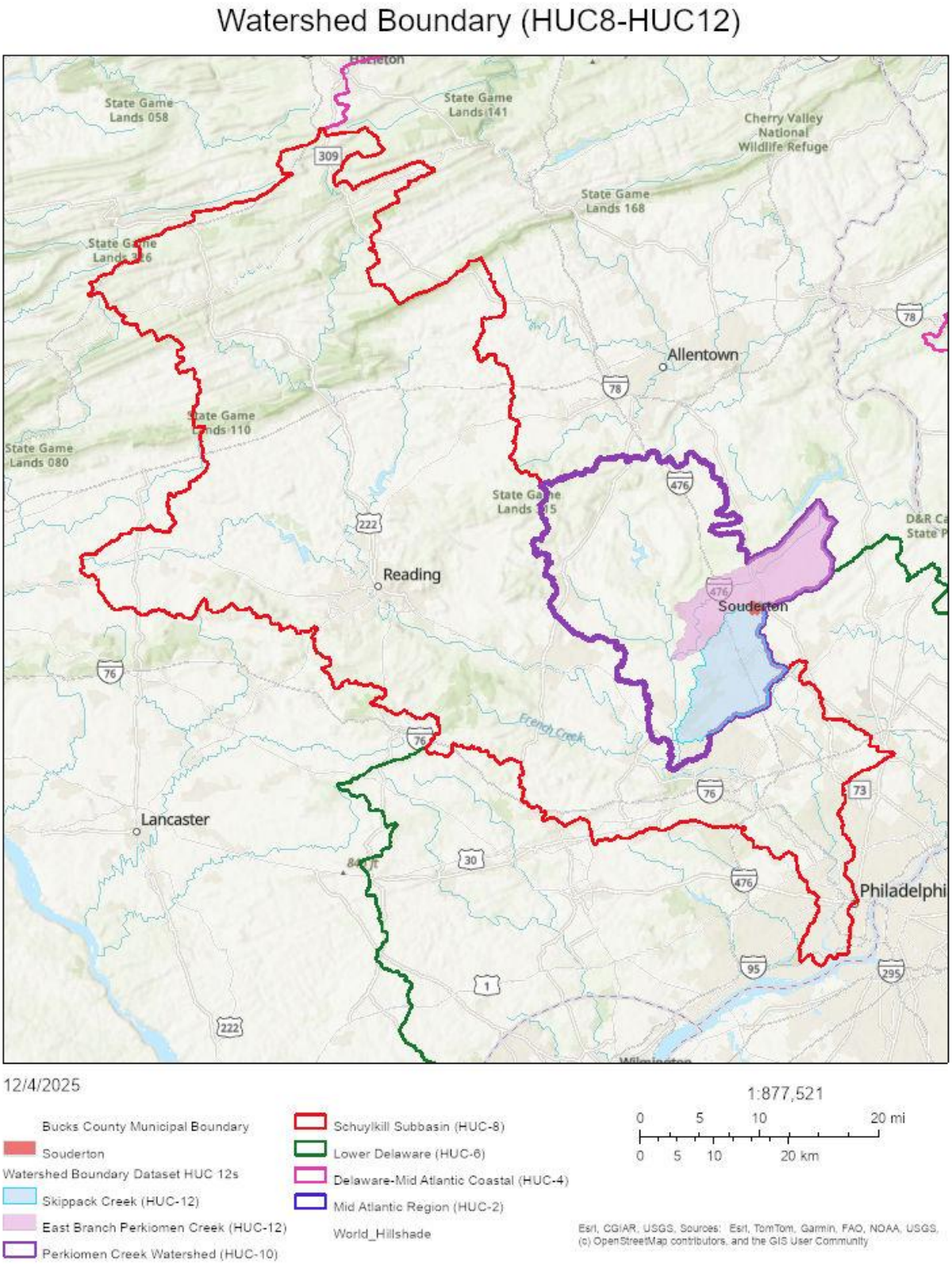

Figure 1: Hydrologic Unit Code Watershed Boundary Map (HUC-8-HUC-12)

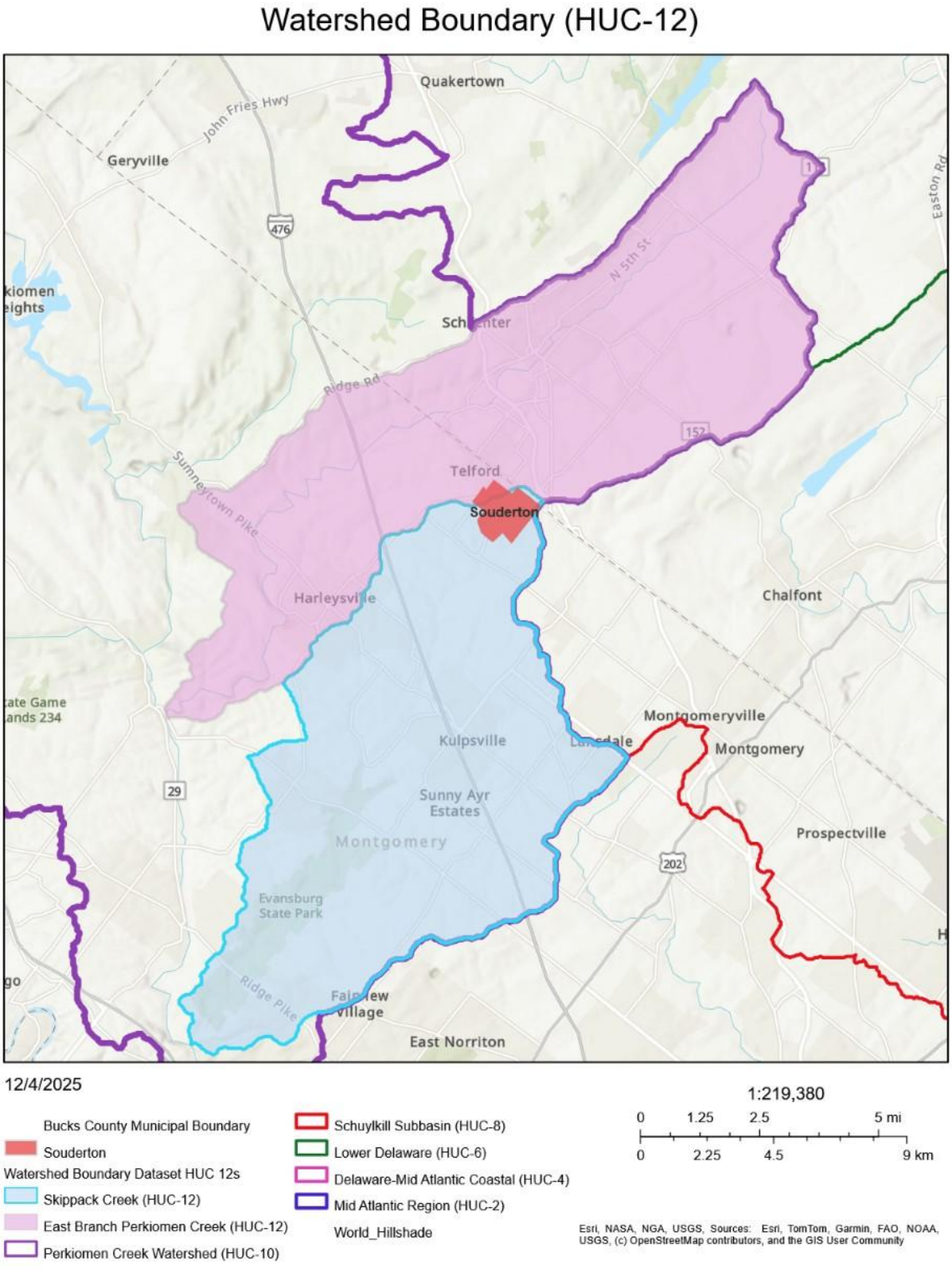

Figure 2: Hydrologic Unit Code Watershed Boundary Map (HUC-12)

C. POLLUTANTS OF CONCERNS

C.1 MUNICIPAL MS4 REQUIREMENTS

The DEP municipal requirements table demonstrated below in Table 4 identifies the pollutants of concern applicable to Souderton Borough and specifies the corresponding permit appendices that establish required control measures. The table functions as a regulatory cross-reference, clarifying which MS4 permit requirements apply based on the presence of regulated pollutants and approved TMDLs within the watershed.

MS4 Name	***NPDES ID***	***Individual Permit Required***	***Reason***	***Impaired Downstream Water of TMDL Name***	***Requirement(s)***
Souderton Borough	PAG130132	Yes	TMDL Plan	Skippack Creek Watershed TMDL	TMDL Plan – Siltation (4a)
				Indian Creek	Appendix E – Siltation (4a)
				West Branch Neshaminy Creek	Appendix E – Siltation (4a), Excessive Algal Growth, Organic Enrichment/Low DO
				Skippack Creek	Appendix E- Excessive Algal Growth, Nutrients
				Indian Creek TMDL	TMDL Plan- Nutrients

Table 1: Souderton Borough MS4 Requirements Table

Souderton Borough's planned area drains towards Skippack Creek and Indian Creek. Upon topographic investigation it was established no planned area within the Borough drains towards West Branch Neshaminy Creek, therefore no requirements are necessary for this watershed.

Table 1 identifies TMDL and Appendix E requirements for the Indian Creek and Skippack Creek. The approved TMDLs are discussed further in Sections C and D of this report. The Borough intends to combine these two requirements to satisfy their pollutant reduction goals in order for these watersheds to attain their designated use of Trout Stocked Fishery (TSF).

C.2 Reference TMDL Assessments – Skippack Creek Watershed

The Skippack Creek TMDL entitled "*U.S. Environmental Protection Agency, Region 3, Total Maximum Daily Load for Skippack Creek, Montgomery County, Pennsylvania*" was established April 8, 2005. On October 1, 2007 EPA withdrew the nutrient TMDL since the published nutrient target endpoints were not sufficient to attain and maintain the existing water quality standards and uses for the watershed. It was determined that nitrogen controls as well as phosphorus controls may be needed to reduce excessive algal growth.

Skippack Creek is listed as impaired according to Pennsylvania's Integrated Water Quality Monitoring and Assessment Report. The Pennsylvania Department of Environmental Protection (PaDEP) and EPA attribute the impairment primarily due to *excessive sediment loading*, especially streambank erosion caused by small residential stormwater runoff and *nutrient over-enrichment*, which causes low dissolved oxygen and excess periphyton/algal growth. EPA, therefore, established this TMDL to reduce loads consistent with an unimpaired watershed.

C.2.A Sediment Impairment

Pennsylvania does not have a numeric sediment water-quality criterion, so the TMDL relies on biological indicators to determine impairment. The state uses Pennsylvania's Aquatic Life Use Biological Assessment Protocols which measures benthic macroinvertebrate community structure, diversity, pollution tolerance, and habitat quality. Streams with biological scores below threshold values when compared to attaining reference streams are considered impaired.

C.2.A.1 TMDL Calculation Methodology

A "Reference watershed approach" was utilized to develop the sediment TMDL which compares two watersheds, one attaining its uses and one that is impaired based upon biological assessments. The objective is to reduce the loading rate of pollutants in the impaired stream segment to a level equivalent to the loading rate in the non-impaired, reference segment.

The reference watershed chosen was East Branch Perkiomen Creek which had similar size, geology, and land use and was attaining its use at the time of TMDL development. Land use is based on 1998 data provided by PADEP and Penn State University. Table 2 below highlights the existing average unit loading rate (lb/ac/yr) of Skippack Creek Watershed versus the allowable/attaining average unit loading rate (lb/ac/yr) of the East Branch Perkiomen Creek Watershed. The allowable sediment loading of **39,320,019 lbs/yr** is the TMDL that must be achieved for the **entire watershed** to attain its designated use.

Skippack Creek Watershed	Area (ac)	Average Unit Loading Rate (lb/ac/yr)	Sediment Loading (lb/yr)
Existing	35,368.2	1220.98	43,183,799
Allowable	35,368.2	1111.73	**39,320,019**

Table 2: Existing and Allowable Sediment Loading for Skippack Creek Watershed based upon Table 18 within the original 2005 TMDL Report

C.2.A.2 Skippack Creek Wasteload Allocation

The **allowable** sediment loading (TMDL) was then separated into three required components and is the sum of: Wasteload Allocations (WLA), Load Allocation (LA), and a Margin of Safety (MOS). For the purposes of the approved TMDL, all MS4s were considered point sources and placed under the WLA.

$$TMDL = \Sigma WLA + \Sigma LA + \Sigma MOS$$

TMDL	ΣWLA	ΣLA	ΣMOS
39,320,019	**35,388,017**	0	3,932,002

Table 3: Allowable Sediment Loading (TMDL) with Wasteload Allocation (WLA) based upon Table 18 within the original 2005 TMDL Report

C.2.A.3 Souderton Borough Wasteload Allocation

There are 12 municipalities within the Skippack Creek watershed and each have a portion of the WLA or allocated sediment load mentioned above that must be met in order for the watershed to attain its designated use. Table 4 below identifies each municipality with their corresponding existing sediment loading, allocated sediment load (WLA), and the required sediment reduction.

Component Source	Existing Sediment Load (lbs/yr)	Allocated Sediment Load (lbs/yr)	Required Reduction (%)	Required Sediment Reduction (lbs/yr)
WLAs	43,183,799	35,388,017	18%	7,795,782
Franconia	3,329,329	2,728,310	18%	601,019
Hatfield	2,126,160	1,742,235	18%	383,925
Hilltown	161,247	132,123	18%	29,124
Lansdale	2,299,779	1,884,401	18%	415,378
Lower Salford	4,467,807	3,661,337	18%	806,470
Providence	2,067,511	1,694,657	18%	372,854
Skippack	2,735,864	2,242,531	18%	493,333
Souderton	2,551,834	2,090,933	18%	460,901
Telford	9,632	7,892	18%	1,740
Towamencin	13,545,558	11,099,513	18%	2,446,045
Upper Gwynedd	5,325,888	4,364,075	18%	961,813
Worcester	4,563,192	3,740,010	18%	823,182

Table 4: Wasteload Allocation for all MS4 municipalities in Skippack Watershed based upon Table 21 in original TMDL

According to the TMDL, Souderton Borough must reduce its' existing load by 18%, i.e. 460,901 lbs/yr to meet water quality standards. Souderton Borough intends to recalculate the existing sediment load through a new modeling effort and is discussed in Section D of this report.

C.3 Reference TMDL Assessments – Indian Creek Watershed

The Indian Creek TMDL entitled "*Nutrient and Sediment TMDLs for the Indian Creek Watershed, Pennsylvania: Established by the U.S. Environmental Protection Agency*" was established on June 30, 2008. On March 21, 2014 EPA withdrew the sediment TMDL since a *hybrid* reference watershed approach was used to derive the loading rates which deviated from the commonly accepted "Reference Watershed" approach as mentioned in Section C.2.A.1. Additionally, an errata was published on May 19, 2015 for the *Nutrient* Total Maximum Daily Load (TMDL) for the Indian Creek Watershed, Pennsylvania to make clarifications to the listed tables found in the original TMDL.

Several segments within the watershed have been listed on Pennsylvania's 303(d) list of impaired waters for not meeting aquatic life uses and for impairments due to siltation and nutrients. EPA and PaDEP attribute these causes to municipal point sources, agriculture, and urban and residential stormwater runoff. Data collected at the time of TMDL

development show severe swings in dissolved oxygen (DO), oxygen saturation levels, and pH levels. The elevated phosphorus and nitrogen levels are likely contributing to the thick algal mats which blanket the stream bed at various locations.

C.3.A Nutrient Impairment

Indian Creek is impaired due to excess nutrient loading, primarily phosphorus, which has led to eutrophication-related impacts on aquatic life. The impairment is most critical during the April through October growing season, when higher temperatures and increased sunlight amplify biological productivity and oxygen demand. To address these conditions, the nutrient TMDL establishes a seasonal total phosphorus target designed to reduce algal growth, improve dissolved oxygen levels, and restore aquatic life uses.

C.3.A.1 TMDL Calculation methodology

Because Pennsylvania's water quality standards for nutrients are narrative (i.e., they describe conditions that should be "free from" excessive nutrients rather than numeric criteria), the TMDL process first required development of a numeric nutrient endpoint that could be used as a basis for calculating reductions.

For Indian Creek, the EPA adopted a total phosphorus endpoint of **40 µg/L** based on a regional nutrient endpoint analysis conducted for the Northern Piedmont Ecoregion of Pennsylvania. This analysis incorporated multiple lines of evidence — including reference watershed conditions, biological response relationships, and stressor-response approaches — to derive an environmentally meaningful target concentration that corresponded with attainment of water quality goals.

Once the nutrient endpoint was established, the TMDL calculation followed the standard mass-balance framework used in TMDLs: Existing annual loads of total phosphorus were estimated using available monitoring data and watershed modeling. An allowable load consistent with the 40 µg/L phosphorus endpoint was defined as the target condition that, when multiplied by representative stream flow, would support attainment of water quality standards. The required load reduction was determined by comparing existing loads to the allowable load and expressing the difference as a reduction target.

These elements were then allocated among point sources (wasteload allocations) and nonpoint sources/load allocations, with an implicit margin of safety included to account for uncertainty. This methodology ensured the nutrient TMDL was grounded in both biological relevance (via the endpoint) and mass balance principles, allowing the TMDL

to function as a pollutant budget that sets the total allowable phosphorus load and required reductions within Indian Creek.

Table 5 below represents the existing phosphorus load and WLA for Souderton based upon Tables 5-7 and ES-5 of the approved TMDL. According to the TMDL, Souderton Borough must reduce its existing load by 13%.

Facility	***Existing Load (lb/yr))***	***TMDL WLA (lb/yr)***	***Maximum Daily Load (lb/day)***	***% Reduction***
Souderton	49.40	42.83	0.263	13%

Table 5: Existing, TMDL, and Maximum Daily Total Phosphorus WLAs for Souderton Borough based upon approved TMDL

D. Existing Pollutant Loading

Since Souderton Borough intends to combine their TMDL/PRP requirements, a new modelling effort must be utilized to recalculate the existing pollutant loading. Wikiwatershed's Model My Watershed was implemented to estimate Souderton's existing pollutant loading for Indian Creek and Skippack Creek.

D.1 Wikiwatershed Model My Watershed

WikiWatershed's Model My Watershed is an online watershed planning tool developed by the Stroud Water Research Center and is widely used to support MS4 planning and Pollutant Reduction Plan development. The model estimates average annual pollutant loading, including sediment, by applying land use–based loading rates derived from peer-reviewed literature and national datasets to spatially defined drainage areas. Model My Watershed allows users to delineate MS4-regulated areas and evaluate planned-area land uses, making it well suited for estimating existing sediment loading from developed land uses subject to municipal stormwater control.

D.2 Calculation Methodology

The following steps were undertaken to recalculate the existing loading:

1. *Storm Sewershed Delineation*

Planned and Parsed areas to Indian Creek and Skippack Creek were delineated into sewersheds within Souderton Borough utilizing Civil 3D software. These drainage areas were then exported to Wikiwatershed for analysis.

2. Land Use Identification

Land Uses within each delineated sewershed were identified through the model (e.g. Open Space, Low-intensity developed, Medium-intensity developed, etc.). Model-specific

sediment loading rates were assigned to each land use category. These loading rates represent average annual sediment yields under conditions existing at the time of the original TMDL approval.

3. Baseline Sediment Loading Calculation and Summation

A presumptive approach was utilized when calculating the existing loading which states "a load reduction of 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients". Therefore, the area of each land use category was then multiplied by its applicable *sediment* loading rate. The resulting sediment loads were summed across all land uses to generate a total baseline sediment loading for each sewershed and for the Borough overall. Detailed baseline loading calculations for Indian Creek and Skippack Creek can be found in Appendix C1 and C2, respectively. Table 6 below is a summary of the total baseline sediment loading for Indian Creek and Skippack Creek. It is noted that the sediment loading attributed from parsed areas was not included in the baseline loading.

Subwatershed	***Drainage Area (ac)***	***Planned Area (ac)***	***Parsed Area (ac)***	***Baseline Sediment Loading (lb/yr)***	***Coverage***
Indian Creek	115.54	96.41	19.13	131,755.26	16%
Skippack Creek	597.9	520.27	77.64	736,678.97	84%
Total	713.44	616.68	96.77	868,434.23	100%

Table 6: Indian Creek and Skippack Creek Baseline Sediment Loading Summary for Souderton Borough

4. Adjust Baseline Loading for Existing BMPs

The baseline sediment loading was then reduced to account for BMPs installed prior to the approved TMDL (2005) for Skippack Creek and BMPs installed after the approved TMDL (2008) for Indian Creek and prior to PRP development. Since the Indian Creek TMDL removed the sediment component, only the PRP requirement remains for sediment, therefore Souderton may use all BMPS prior to the date of load calculation (i.e. this PRP/TMDL) to reduce its existing pollutant loading. Detailed loading calculations of these existing BMPs are located in Appendix C-3 of this report. Table 7 below demonstrates the reduced loading from existing BMPs and the Adjusted (i.e Existing) Sediment Loading.

Subwatershed	***Planned Area (ac)***	***Baseline Sediment Loading (lbs/yr)***	***Existing BMPs to Reduce Loading (lbs/yr)***	***Adjusted Sediment Loading (lbs/yr)***
Indian Creek	96.41	131,755	13,370	118,385
Skippack Creek	520.27	736,678.97	2,758	733,920
Total	616.68	**868,434.23**	16,128	852,305

Table 7: Indian Creek and Skippack Creek Adjusted Sediment Loading for Souderton Borough

5. Calculate Short-Term and Long-Term Pollutant Reduction Goals

There are two objectives for a combined PRP/TMDL plan and Souderton Borough must achieve at least one of these goals within the five year permit term (2024-2029).

- Long Term Pollutant Reduction Goals: Plan for the reduction of pollutant loads to achieve the WLA(s) in the TMDL.
    - Skippack Creek: 18% WLA of Sediment
    - Indian Creek: 13% WLA of Nutrients
- Short Term Reduction Goals: 10% Reduction of the Adjusted Sediment Loading.

Below are summary tables 8 and 9 for Indian Creek and Skippack Creek which highlights the TMDL requirements (Appendix F) and PRP requirements (Appendix E) with the recalculated pollutant loadings and reduction goals. Souderton Borough must effectively reduce **11,838 lbs/yr and 73,392 lbs/yr** of sediment within the Indian Creek and Skippack Creek, respectively, to achieve their short term reduction goals. Additionally, a reduction of **132,106 lbs/yr** of sediment is required to achieve their long-term reduction goals.

	Indian Creek				
	Appendix F: TMDL Requirements (2008)			*Appendix E: PRP Requirements*	
	WLA	*Nutrients*[1]	*Sediment*	*Nutrients*[1]	*Sediment*
Baseline Loading (lbs/yr)	---	52.2	N/A	N/A	131,755
BMPs to Reduce Loading (lbs/yr)	---	---	N/A	N/A	13,370
Adjusted Loading (lbs/yr)	---	52.2	N/A	N/A	118,385
Short Term Reduction Goals (lbs/yr)	---	5.22	N/A	N/A	**11,838**
Long Term Reduction Goals (lbs/yr)(TMDL only)	13%	6.786	N/A	N/A	N/A

1: A presumptive approach was utilized which states a load reduction of at least 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients.

Table 8: Indian Creek Numeric Pollutant Loading and Required Reduction Goals

	Skippack Creek				
	Appendix F: TMDL Requirements (2005)			*Appendix E: PRP Requirements*	
	WLA	*Nutrients*[1]	*Sediment*	*Nutrients*[1]	*Sediment*
Baseline Loading (lbs/yr)	---	N/A	736,678	N/A	736,678
BMPs to Reduce Loading (lbs/yr)	---	N/A	2,758	N/A	2,758
Adjusted Loading (lbs/yr)	---	N/A	733,920	N/A	733,920
Short Term Reduction Goals (lbs/yr)	---	N/A	73,392	N/A	**73,392**
Long Term Reduction Goals (lbs/yr)(TMDL only)	18%	N/A	**132,106**	N/A	N/A

1: A presumptive approach was utilized which states a load reduction of at least 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients.

Table 9: Skippack Creek Numeric Pollutant Loading and Required Reduction Goals

Because both the Skippack Creek and Indian Creek watersheds ultimately drain to the Perkiomen Creek, *DEP agreed that pollutant loads generated within Souderton Borough were evaluated on a cumulative basis for planning and implementation purposes*. Loads associated with each watershed were calculated independently to maintain alignment with the applicable TMDLs as shown in Table 8 and Table 9 above, then summed to represent the Borough's total MS4 pollutant contribution to downstream receiving waters. This aggregated load provides a comprehensive accounting of Souderton Borough's stormwater-related pollutant contributions and supports prioritization of BMP implementation across municipal drainage areas while maintaining consistency with individual watershed TMDL requirements. Table 10 demonstrates the cumulative existing pollutant loadings and required reductions.

Subwatershed	***Planned Area (ac)***	***Adjusted/Existing Sediment Loading (lb/yr)***	***Short-Term Reduction Goals (10% Reduction)***	***Long-Term Reduction Goals***
Indian Creek	96.41	118,385	11,838	N/A
Skippack Creek	520.27	733,920	73,392	132,106
Total	616.68	**852,305**	**85,230**	**132,106**

Table 10: Summation of Existing Sediment Loading and Required Reduction Goals

D.3 TMDL vs. WikiWatershed Results

It is noted that Souderton Borough's existing sediment pollutant loading of 2,551,834 lbs/yr identified in the approved TMDL and referenced in Table 4 in Section C.2.A.3 does not numerically correspond to the baseline sediment loading of 736,678 lbs/yr calculated for Skippack Creek utilizing Model My Watershed.

Model My Watershed applies generalized land use–based sediment loading rates that implicitly incorporate average contributions from upland erosion and streambank processes, whereas the approved TMDL explicitly models streambank erosion as a distinct source through watershed-scale routing. A cross-reference of land use categories and associated loading rates between the TMDL and Model My Watershed (See Appendix C-4) indicates that when identical land cover distributions are applied consistently across the Skippack Creek watershed, the resulting sediment load differential is approximately seven percent as demonstrated in Table 11 below.

	Existing Sediment Loading (lbs/yr)		
Watershed Scale	***TMDL***	***Wikiwatershed***	**Δ Differential**
Indian Creek	N/A*	39,542,082.76	N/A
Skippack Creek	43,183,799	40,267,416.34	7%

*Sediment TMDL was withdrawn in 2014

Table 11: Differences between TMDL and Wikiwatershed Sediment Loading for Indian Creek and Skippack Creek.

This comparison confirms that Model My Watershed reproduces the TMDL's land-based sediment loading methodology at the watershed scale, and that remaining differences are attributable to differences in spatial aggregation and explicit versus implicit treatment of streambank erosion.

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

To achieve the minimum required reductions in pollutant loading established in Section D of this report, Souderton Borough has identified a suite of **18 proposed best management practice (BMP) projects** that collectively address the pollutants of concern within the Skippack Creek and Indian Creek watersheds. The proposed BMPs include a balanced combination of structural and non-structural measures, selected based on pollutant reduction effectiveness, feasibility within a developed municipal setting, and consistency with MS4 permit requirements.

The proposed projects consist of one stream restoration project, ten rain gardens, three tree planting initiatives totaling more than 478 trees throughout the Borough, one advanced hydrodynamic separator, one stormwater basin retrofit, one vegetated swale, and one pervious pavement installation. These BMPs are designed to reduce sediment loading through a combination of runoff volume reduction, pollutant capture, and stabilization of erosive conditions within the drainage network.

Among the proposed projects, *the stream restoration project represents a significant pollutant reduction opportunity. Based on established pollutant reduction methodologies, this project alone has the capacity to satisfy the Borough's total required reduction of* ***85,230 pounds****,* providing a substantial margin of compliance with the minimum TMDL reduction target. The remaining BMPs provide additional reductions, redundancy, and flexibility, and support long-term reduction goals.

Collectively, the proposed BMPs provide a robust and implementable strategy for achieving required pollutant load reductions while allowing for phased implementation over multiple permit terms. Pollutant reductions will be documented as projects are implemented, and the TMDL/PRP may be updated as necessary to reflect completed BMPs, refined load estimates, or additional implementation opportunities, consistent with Appendix E and F MS4 permit requirements. Table 12 demonstrates the proposed BMPs Souderton has planned to implement to achieve load reductions. Detailed BMP calculations and exhibits are located in Appendix D and shown on the MS4 Outfall Map located in Appendix B.

Proposed BMP Summary Table					
Proposed BMP	**BMP Type**	**TSS Removal Efficiency (%)[1]**	**Treated Drainage Area (ac)**	**Load Reduction (lbs/yr)[2]**	**Funding**
A	BMP 6.4.5 Rain Garden / Bioretention	55	1.06	586.66	General Funds/Grants
B	BMP 6.4.5 Rain Garden / Bioretention	55	2.52	3256.89	General Funds/Grants
C	BMP 6.7.2 Landscape Restoration	20	3.02	265.25	General Funds/Grants
D	BMP 6.4.5 Rain Garden / Bioretention	55	0.49	438.20	General Funds/Grants
E	BMP 6.4.5 Rain Garden / Bioretention	55	0.53	318.84	General Funds/Grants
F1 and F2	BMP 6.4.5 Rain Garden / Bioretention	55	0.46	546.02	General Funds/Grants
G	BMP 6.7.2 Landscape Restoration	20	7.52	718.61	General Funds/Grants
H	BMP 6.6.4 Water Quality Inserts	10	7.65	881.98	General Funds/Grants
I	BMP 6.4.5 Rain Garden / Bioretention	55	0.92	1092	General Funds/Grants
J	BMP 6.6.3 Dry Extended Detention Basin	60	8.7	8,914	General Funds/Grants
K	BMP 6.4.8 Vegetated Swale	50	5.06	3244.64	General Funds/Grants
L	BMP 6.7.2 Landscape Restoration	20	See BMP Calculation	105.37	General Funds/Grants
M	BMP 6.4.5 Rain Garden / Bioretention	55	1.73	1319.63	General Funds/Grants
N	BMP 6.4.1 Perious Pavement with Infiltration Bed	55	0.81	584.13	General Funds/Grants
O	BMP 6.4.5 Rain Garden / Bioretention	55	16.24	12467.60	General Funds/Grants
P	BMP 6.4.5 Rain Garden / Bioretention	55	0.38	403.62	General Funds/Grants
Q	BMP 6.4.5 Rain Garden / Bioretention	55	1.77	1551.34	General Funds/Grants
R	Stream Restoration	N/A	N/A	**86,250.00**	General Funds/Grants
Total Sediment Reduction (lbs/yr)				**122,945**	

Table 12: Proposed BMP Summary Table to Achieve Pollutant Reduction Requirements

F. Identify Funding Mechanisms

Implementation and long-term operation of the proposed BMP projects will be supported through a combination of municipal funding, grant opportunities, and potential partner contributions. Souderton Borough will allocate capital and operational funds from its stormwater management program budget, and will pursue available state and federal grant programs where feasible to supplement local resources. Additional partnerships with community groups, local businesses, or watershed organizations may be leveraged to support planting initiatives, maintenance, and public education efforts.

G. Identify Responsible Parties for Operation and Maintenance of BMPs

Responsibility for operations and maintenance (O&M) of the BMPs will be clearly assigned to the Borough or designated partners to ensure continued functionality and pollutant reduction performance. Structural BMPs, including the stream restoration project, stormwater basin retrofit, vegetated swales, pervious pavement, and advanced hydrodynamic separator, will be maintained according to manufacturer recommendations, design specifications, and permit requirements, with regular inspections and corrective maintenance as needed. Non-structural BMPs, such as rain gardens and tree planting initiatives, will be incorporated into the Borough's landscape and grounds maintenance programs, with monitoring and upkeep scheduled to sustain plant health and infiltration capacity. Documentation of O&M activities will be maintained to demonstrate long-term compliance with TMDL/PRP pollutant reduction goals and to support annual MS4 reporting requirements.

APPENDIX A: PUBLIC AD

APPENDIX B: MS4 MAPS

APPENDIX C1: BASELINE POLLUTANT LOADING CALCULATIONS (INDIAN CREEK)

APPENDIX C2: BASELINE POLLUTANT LOADING CALCULATIONS (SKIPPACK CREEK)

APPENDIX C3: EXISTING BMPS TO REDUCE POLLUTANT LOADING

APPENDIX C4: LAND USE LOADING RATES CROSS-REFERENCE WIKIWATERSHED VS. APPROVED TMDL)

APPENDIX D: PROPOSED BMPS TO REDUCE POLLUTANT LOADING

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APPENDIX D: PROPOSED BMPS TO REDUCE POLLUTANT LOADING

EXECUTIVE SUMMARY

This report presents the combined Pollutant Reduction Plan (PRP) and Total Maximum Daily Load (TMDL) implementation strategy for Souderton Borough, prepared in accordance with the Pennsylvania Municipal Separate Storm Sewer System (MS4) Permit requirements. Souderton Borough is a regulated small MS4 whose stormwater discharges drain to impaired segments of Skippack Creek and Indian Creek, both of which are subject to approved TMDLs for sediment and nutrients, respectively. As required under the MS4 permit, the Borough has evaluated its contribution to these impairments and developed a plan to achieve measurable progress toward pollutant load reductions necessary to support attainment of water quality standards.

The Skippack Creek watershed is impaired by excessive sediment loading, with impacts to aquatic life attributed largely to stormwater runoff and streambank erosion. Under the approved 2005 Skippack Creek TMDL, Souderton Borough is assigned an 18 percent sediment reduction target relative to its wasteload allocation. Indian Creek is impaired by nutrient over-enrichment, primarily phosphorus, and is regulated under a 2008 nutrient TMDL that assigns Souderton Borough a 13 percent phosphorus reduction requirement. In addition to TMDL obligations, the Borough is subject to PRP requirements under Appendix E of the MS4 permit for sediment reductions.

To support a combined PRP/TMDL approach, Souderton Borough recalculated its existing pollutant loading using the WikiWatershed Model My Watershed tool. This modeling effort delineated MS4 planned and parsed areas, applied land use–based loading rates, and accounted for existing best management practices (BMPs) to reduce pollutant loading. The resulting adjusted existing sediment load for the Borough totals approximately 852,305 pounds per year across both watersheds. Consistent with MS4 permit provisions, both short-term and long-term reduction goals were established. Short-term goals require a minimum 10 percent reduction in adjusted sediment loading within the current permit term, while long-term goals align with the applicable TMDL wasteload allocations for sediment and nutrients.

To meet these requirements, Souderton Borough has identified a suite of 18 proposed BMP projects consisting of both structural and non-structural measures. These projects include one stream restoration project, ten rain gardens, three tree planting initiatives totaling more than 478 trees, one advanced hydrodynamic separator, one stormwater basin retrofit, one vegetated swale, and one pervious pavement installation. Collectively, the proposed BMPs are estimated to achieve approximately 123,000 pounds per year of sediment reduction, exceeding the Borough's minimum short-term reduction requirement and providing progress toward long-term TMDL compliance. Notably, the proposed stream restoration project alone has the capacity to satisfy the Borough's total required sediment reduction, providing flexibility and redundancy in implementation.

PERMIT DEFINITIONS

Attaining Use: Achieving and maintaining water bodies that meet specific, pre-defined standards for their intended use, such as supporting aquatic life, recreational activities, or public water supply.

Baseline Load: Pollutant load discharged by an MS4 as reported in the TMDL.

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

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

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

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

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

Existing Load: The pollutant load that the MS4 estimates is draining to impaired waters from the Planning Area at the time of TMDL Plan submission. The existing load will be the same as the baseline load (regardless of whether or not the baseline load is revised) unless the MS4 accounts for reduction from structural BMPs installed between the date of TMDL approval and TMDL plan submission.

Existing permittee: Any entity that has been designated as a regulated small MS4 and has previously obtained permit coverage under the PAG-13 permit or obtained an Individual NPDES MS4 Permit.

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

Hydrologic Unit Code: Watersheds delineated by United States Geologic Survey (USGS) using a nationwide system based on surface hydrologic features. This system divides the county into 22 regions (2-digit), subregions -digit), 405 basins (6-digit), 2400 subbasins (8-digits), 19,000 watersheds (10-digit), and 105,000 subwatersheds (12-digit)

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

Illicit Discharge: Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater, except non-stormwater discharges as described in the "Discharges Authorized by this Permit"

section of this Permit. Examples of illicit discharges including dumping of motor vehicle fluids, household hazardous wastes, grass clippings, leaf litter, animal wastes, or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-stormwater waste into a municipal separate storm sewer system. Illicit discharges can be accidental or intentional.

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

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

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

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

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

MS4 Requirements Table: A compilation of information regarding Pennsylvania's MS4s, surface waters that receive stormwater discharges from MS4s, surface water impairments and TMDLs that is posted to DEP's website, www.dep.pa.gov/MS4. The MS4 Requirements Table has been assembled by DEP to assist MS4 permittees in determining applicable requirements for the development of plans and implementation of BMPs.

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

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

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

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

Non-Municipal Permittee: A regulated small MS4 that is not a municipality, e.g., military bases, large hospital or prison complexes, and highways and other thoroughfares.

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

Nutrients: Elements essential for plant growth. Nitrogen (TN) and Phosphorus (TP) are the limiting nutrients in most aquatic environments.

Observation Point: A location upstream of an outfall where a permittee must conduct dry weather screening if the permittee determines that screening at an outfall is infeasible, and the point at which stormwater discharges to storm sewers owned or operated by an adjoining municipality where dry weather screening must be conducted.

Ordinance: A law enacted by the government of a municipality.

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

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

Permittee: Owner or operator of a regulated small MS4 authorized to discharge under the terms of this permit.

Parsed Area: Land area removed from the Planned Area in order to calculate the actual or target pollutant loads applicable to an MS4 (i.e land associated with non-municipal stormwater NPDES permit coverage that exist within the urbanized area of a municipality, land area associated with PennDOT roadways, lands associated with production area of a concentrated animal feeding operation covered by NPDES permit, land areas in which stormwater runoff does not enter the MS4.

Planned Area: All of the storm sewersheds that an MS4 must calculate existing loads and plan reductions for.

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

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

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

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

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

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

Storm Sewershed: Land area that drains to an individual MS4 Outfall from within the jurisdiction of the MS4 permittee. The term "combined storm sewershed" means the drainage area of all MS4 outfalls that discharge to a specific surface water or to waters within the Chesapeake Bay watershed.

Stormwater: Runoff from precipitation, snow melt runoff and surface runoff and drainage. "Stormwater" has the same meaning as "storm water". (25 Pa. Code §92a.2)

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

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

Total Maximum Daily Load (TMDL): Sum of individual waste load allocations (WLA) for point sources, load allocations (LA) for nonpoint sources and natural quality and a margin of safety (MOS) expressed in terms of mass per time, toxicity, or other appropriate measures. (25 Pa. Code §96.1). *A TMDL identifies the maximum amount of a pollutant that a water body can receive while still meeting water quality standards*.

$$TMDL = \Sigma WLA + \Sigma LA + \Sigma MOS$$

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

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

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

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

INTRODUCTION

As a regulated MS4 permittee located within TMDL watersheds, Souderton Borough is required to evaluate its contribution to the identified impairments and implement measures that achieve reasonable progress toward the pollutant load reductions necessary to support attainment of water quality standards.

This combined PRP/TMDL report documents the regulatory applicability, pollutants of concern, and methodologies used to characterize existing pollutant loading conditions within the Borough's MS4 planned area. The report further identifies the required pollutant load reductions assigned to the Borough based on approved TMDL allocations and describes the process used to evaluate, select, and prioritize structural and non-structural best management practices (BMPs) capable of addressing those pollutants. BMP selection considers site feasibility, pollutant removal effectiveness, and opportunities to integrate stormwater improvements with existing municipal infrastructure and programs.

Consistent with MS4 permit requirements, this report is intended to serve as a planning and implementation tool, rather than a demonstration of immediate TMDL attainment. Pollutant reduction targets represent short-term and long-term goals to be achieved over multiple permit terms, and progress will be documented through phased BMP implementation and annual reporting. The PRP/TMDL may be updated over time to reflect new data, completed projects, or refinements to pollutant loading estimates, ensuring continued alignment with watershed conditions and regulatory expectations.

SKIPPACK CREEK WATERSHED

Skippack Creek is a 15.2 mile stream located in Montgomery County, Pa. that begins in Souderton Borough and flows generally southwest where it meets the Perkiomen Creek within the Perkiomen Creek Watershed. Major tributaries in the stream's 56-square mile basin include the West Branch of Skippack Creek, Towamencin Creek and Zacharias Creek and includes urbanized areas from 12 municipalities. The entire Skippack Creek watershed is classified as trout stocked fishery (TSF) according to the Pennsylvania Chapter 93 water quality standards. Approximately 84% of Souderton's land area or 597.9 acres drains towards the Skippack Creek Watershed with the majority of land uses within the low to high intensity development.

INDIAN CREEK WATERSHED

The Indian Creek watershed is part of the overall HUC-12 East Branch Perkiomen Creek Watershed and drains approximately seven square miles in Montgomery County, Pa and includes urbanized area from 8 municipalities. The designated use for Indian Creek is TSF. The main stem of Indian Creek flows southwesterly prior to its' confluence with East Branch

Perkiomen Creek. Approximately 16% of Souderton Borough's land area or 115.54 acres drains towards the Indian Creek watershed with the major land uses comprising 45% as low intensity development, 26% as open space, 19.2% as medium intensity development, 6.7% as high intensity development.

A. Public Participation

Public participation is a key component of the PRP/TMDL development process and ensures that community stakeholders are informed and engaged in the Borough's stormwater management efforts. Souderton Borough will provide opportunities for public review and comment on the proposed TMDL/PRP, consistent with the MS4 permit and TMDL guidance. This includes posting the draft PRP on the Borough website and holding a public meeting/workshops to discuss proposed BMP projects, pollutant reduction goals, and implementation timelines. Input received from the public will be considered in finalizing the PRP to promote transparency, foster community support, and enhance the effectiveness of BMP implementation. Documentation of public participation activities and responses to comments are included in Appendix A of this report and will be maintained as part of the Borough's compliance record.

B. Mapping

Accurate and detailed mapping is an essential component of the TMDL/PRP plan and supports effective planning, implementation, and tracking of BMPs within Souderton Borough. The TMDL/PRP includes mapping of the municipal storm sewer system, subwatershed and individual sewershed boundaries, outfalls, existing and proposed BMP locations, planned areas contributing to pollutant loading within the Skippack Creek and Indian Creek watersheds and parsed areas which the MS4 is not responsible to manage.

Geographic information system (GIS) mapping enables identification of priority areas for BMP implementation, facilitates calculation of existing and projected pollutant loads, and supports monitoring of progress toward TMDL/PRP reduction targets. All maps are prepared at a scale and resolution sufficient to allow clear identification of drainage areas, structural and non-structural BMPs, and connectivity to receiving waters. Outfall Maps can be found in Appendix B of this report.

Mapping data will be maintained and updated over time to reflect completed BMP projects, changes in land use, and any refinements to drainage delineations, consistent with Appendix E and Appendix F requirements of the MS4 permit. Figure 1 and 2 demonstrate an overview of Souderton Borough's geographic setting within the larger watershed boundaries context.

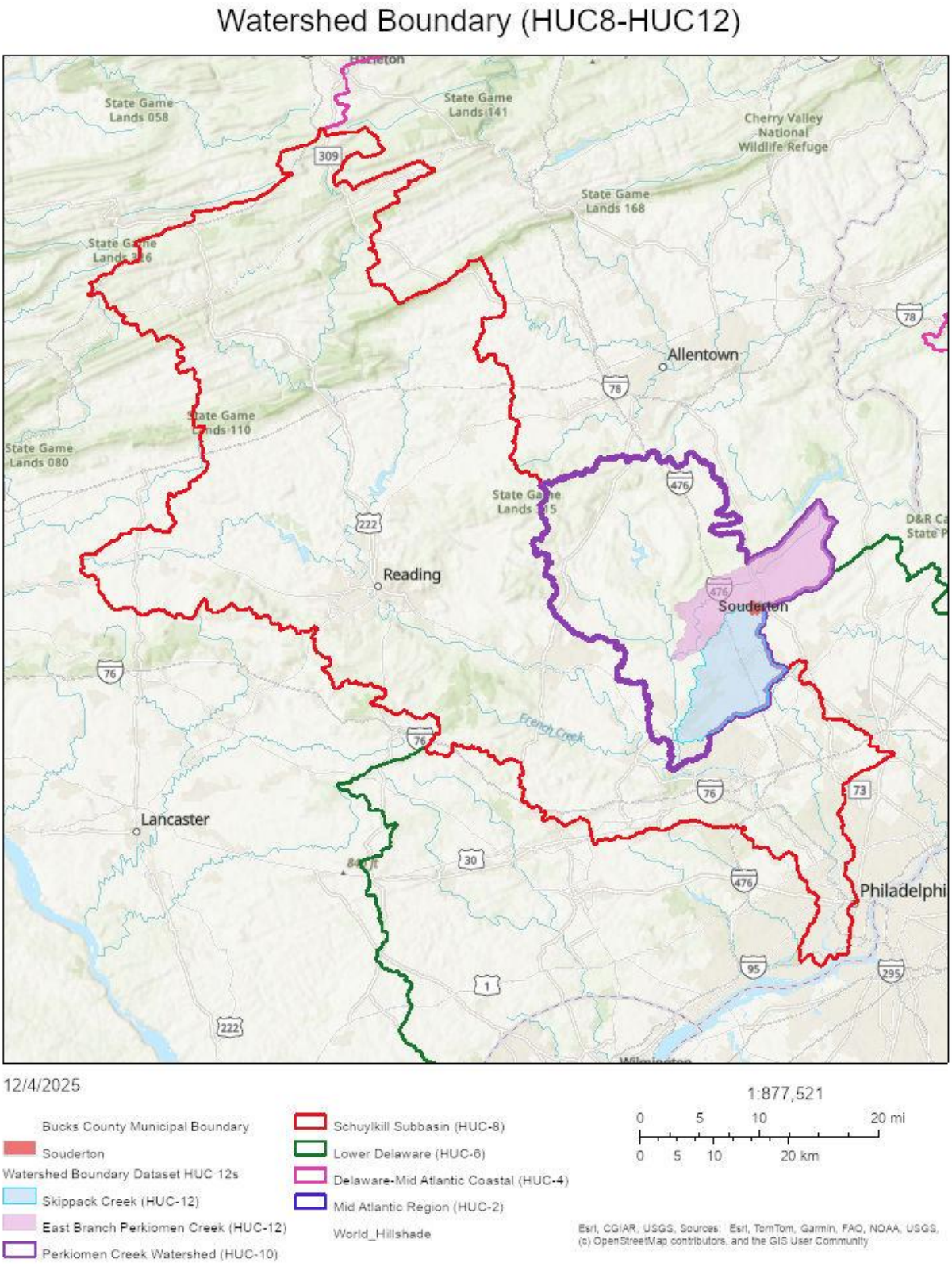

Figure 1: Hydrologic Unit Code Watershed Boundary Map (HUC-8-HUC-12)

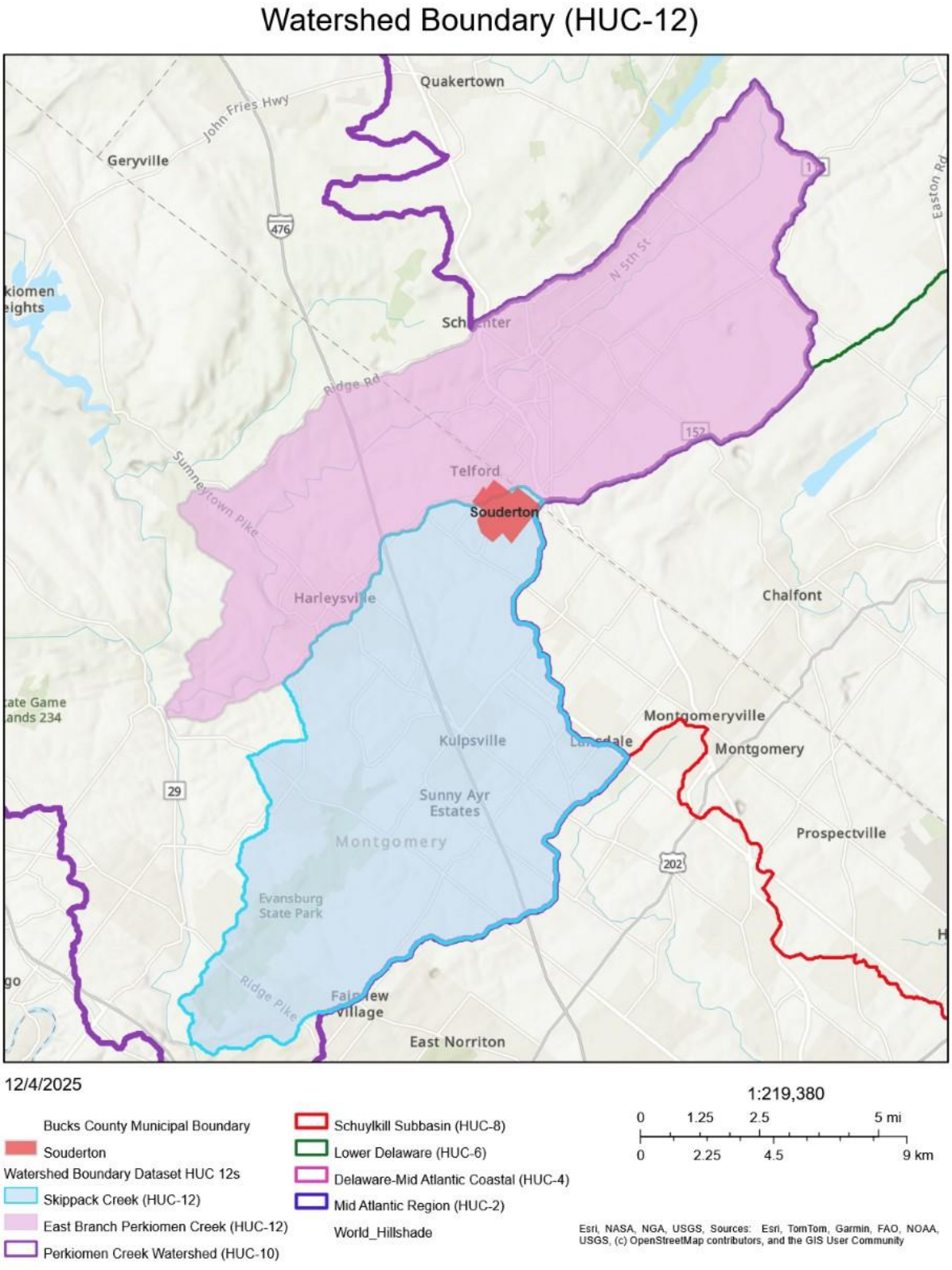

Figure 2: Hydrologic Unit Code Watershed Boundary Map (HUC-12)

C. POLLUTANTS OF CONCERNS

C.1 MUNICIPAL MS4 REQUIREMENTS

The DEP municipal requirements table demonstrated below in Table 4 identifies the pollutants of concern applicable to Souderton Borough and specifies the corresponding permit appendices that establish required control measures. The table functions as a regulatory cross-reference, clarifying which MS4 permit requirements apply based on the presence of regulated pollutants and approved TMDLs within the watershed.

MS4 Name	***NPDES ID***	***Individual Permit Required***	***Reason***	***Impaired Downstream Water of TMDL Name***	***Requirement(s)***
Souderton Borough	PAG130132	Yes	TMDL Plan	Skippack Creek Watershed TMDL	TMDL Plan – Siltation (4a)
				Indian Creek	Appendix E – Siltation (4a)
				West Branch Neshaminy Creek	Appendix E – Siltation (4a), Excessive Algal Growth, Organic Enrichment/Low DO
				Skippack Creek	Appendix E- Excessive Algal Growth, Nutrients
				Indian Creek TMDL	TMDL Plan- Nutrients

Table 1: Souderton Borough MS4 Requirements Table

Souderton Borough's planned area drains towards Skippack Creek and Indian Creek. Upon topographic investigation it was established no planned area within the Borough drains towards West Branch Neshaminy Creek, therefore no requirements are necessary for this watershed.

Table 1 identifies TMDL and Appendix E requirements for the Indian Creek and Skippack Creek. The approved TMDLs are discussed further in Sections C and D of this report. The Borough intends to combine these two requirements to satisfy their pollutant reduction goals in order for these watersheds to attain their designated use of Trout Stocked Fishery (TSF).

C.2 Reference TMDL Assessments – Skippack Creek Watershed

The Skippack Creek TMDL entitled "*U.S. Environmental Protection Agency, Region 3, Total Maximum Daily Load for Skippack Creek, Montgomery County, Pennsylvania*" was established April 8, 2005. On October 1, 2007 EPA withdrew the nutrient TMDL since the published nutrient target endpoints were not sufficient to attain and maintain the existing water quality standards and uses for the watershed. It was determined that nitrogen controls as well as phosphorus controls may be needed to reduce excessive algal growth.

Skippack Creek is listed as impaired according to Pennsylvania's Integrated Water Quality Monitoring and Assessment Report. The Pennsylvania Department of Environmental Protection (PaDEP) and EPA attribute the impairment primarily due to *excessive sediment loading*, especially streambank erosion caused by small residential stormwater runoff and *nutrient over-enrichment*, which causes low dissolved oxygen and excess periphyton/algal growth. EPA, therefore, established this TMDL to reduce loads consistent with an unimpaired watershed.

C.2.A Sediment Impairment

Pennsylvania does not have a numeric sediment water-quality criterion, so the TMDL relies on biological indicators to determine impairment. The state uses Pennsylvania's Aquatic Life Use Biological Assessment Protocols which measures benthic macroinvertebrate community structure, diversity, pollution tolerance, and habitat quality. Streams with biological scores below threshold values when compared to attaining reference streams are considered impaired.

C.2.A.1 TMDL Calculation Methodology

A "Reference watershed approach" was utilized to develop the sediment TMDL which compares two watersheds, one attaining its uses and one that is impaired based upon biological assessments. The objective is to reduce the loading rate of pollutants in the impaired stream segment to a level equivalent to the loading rate in the non-impaired, reference segment.

The reference watershed chosen was East Branch Perkiomen Creek which had similar size, geology, and land use and was attaining its use at the time of TMDL development. Land use is based on 1998 data provided by PADEP and Penn State University. Table 2 below highlights the existing average unit loading rate (lb/ac/yr) of Skippack Creek Watershed versus the allowable/attaining average unit loading rate (lb/ac/yr) of the East Branch Perkiomen Creek Watershed. The allowable sediment loading of **39,320,019 lbs/yr** is the TMDL that must be achieved for the **entire watershed** to attain its designated use.

Skippack Creek Watershed	Area (ac)	Average Unit Loading Rate (lb/ac/yr)	Sediment Loading (lb/yr)
Existing	35,368.2	1220.98	43,183,799
Allowable	35,368.2	1111.73	**39,320,019**

Table 2: Existing and Allowable Sediment Loading for Skippack Creek Watershed based upon Table 18 within the original 2005 TMDL Report

C.2.A.2 Skippack Creek Wasteload Allocation

The **allowable** sediment loading (TMDL) was then separated into three required components and is the sum of: Wasteload Allocations (WLA), Load Allocation (LA), and a Margin of Safety (MOS). For the purposes of the approved TMDL, all MS4s were considered point sources and placed under the WLA.

$$TMDL = \Sigma WLA + \Sigma LA + \Sigma MOS$$

TMDL	ΣWLA	ΣLA	ΣMOS
39,320,019	**35,388,017**	0	3,932,002

Table 3: Allowable Sediment Loading (TMDL) with Wasteload Allocation (WLA) based upon Table 18 within the original 2005 TMDL Report

C.2.A.3 Souderton Borough Wasteload Allocation

There are 12 municipalities within the Skippack Creek watershed and each have a portion of the WLA or allocated sediment load mentioned above that must be met in order for the watershed to attain its designated use. Table 4 below identifies each municipality with their corresponding existing sediment loading, allocated sediment load (WLA), and the required sediment reduction.

Component Source	Existing Sediment Load (lbs/yr)	Allocated Sediment Load (lbs/yr)	Required Reduction (%)	Required Sediment Reduction (lbs/yr)
WLAs	43,183,799	35,388,017	18%	7,795,782
Franconia	3,329,329	2,728,310	18%	601,019
Hatfield	2,126,160	1,742,235	18%	383,925
Hilltown	161,247	132,123	18%	29,124
Lansdale	2,299,779	1,884,401	18%	415,378
Lower Salford	4,467,807	3,661,337	18%	806,470
Providence	2,067,511	1,694,657	18%	372,854
Skippack	2,735,864	2,242,531	18%	493,333
Souderton	2,551,834	2,090,933	18%	460,901
Telford	9,632	7,892	18%	1,740
Towamencin	13,545,558	11,099,513	18%	2,446,045
Upper Gwynedd	5,325,888	4,364,075	18%	961,813
Worcester	4,563,192	3,740,010	18%	823,182

Table 4: Wasteload Allocation for all MS4 municipalities in Skippack Watershed based upon Table 21 in original TMDL

According to the TMDL, Souderton Borough must reduce its' existing load by 18%, i.e. 460,901 lbs/yr to meet water quality standards. Souderton Borough intends to recalculate the existing sediment load through a new modeling effort and is discussed in Section D of this report.

C.3 Reference TMDL Assessments – Indian Creek Watershed

The Indian Creek TMDL entitled "*Nutrient and Sediment TMDLs for the Indian Creek Watershed, Pennsylvania: Established by the U.S. Environmental Protection Agency*" was established on June 30, 2008. On March 21, 2014 EPA withdrew the sediment TMDL since a *hybrid* reference watershed approach was used to derive the loading rates which deviated from the commonly accepted "Reference Watershed" approach as mentioned in Section C.2.A.1. Additionally, an errata was published on May 19, 2015 for the *Nutrient* Total Maximum Daily Load (TMDL) for the Indian Creek Watershed, Pennsylvania to make clarifications to the listed tables found in the original TMDL.

Several segments within the watershed have been listed on Pennsylvania's 303(d) list of impaired waters for not meeting aquatic life uses and for impairments due to siltation and nutrients. EPA and PaDEP attribute these causes to municipal point sources, agriculture, and urban and residential stormwater runoff. Data collected at the time of TMDL

development show severe swings in dissolved oxygen (DO), oxygen saturation levels, and pH levels. The elevated phosphorus and nitrogen levels are likely contributing to the thick algal mats which blanket the stream bed at various locations.

C.3.A Nutrient Impairment

Indian Creek is impaired due to excess nutrient loading, primarily phosphorus, which has led to eutrophication-related impacts on aquatic life. The impairment is most critical during the April through October growing season, when higher temperatures and increased sunlight amplify biological productivity and oxygen demand. To address these conditions, the nutrient TMDL establishes a seasonal total phosphorus target designed to reduce algal growth, improve dissolved oxygen levels, and restore aquatic life uses.

C.3.A.1 TMDL Calculation methodology

Because Pennsylvania's water quality standards for nutrients are narrative (i.e., they describe conditions that should be "free from" excessive nutrients rather than numeric criteria), the TMDL process first required development of a numeric nutrient endpoint that could be used as a basis for calculating reductions.

For Indian Creek, the EPA adopted a total phosphorus endpoint of **40 µg/L** based on a regional nutrient endpoint analysis conducted for the Northern Piedmont Ecoregion of Pennsylvania. This analysis incorporated multiple lines of evidence — including reference watershed conditions, biological response relationships, and stressor-response approaches — to derive an environmentally meaningful target concentration that corresponded with attainment of water quality goals.

Once the nutrient endpoint was established, the TMDL calculation followed the standard mass-balance framework used in TMDLs: Existing annual loads of total phosphorus were estimated using available monitoring data and watershed modeling. An allowable load consistent with the 40 µg/L phosphorus endpoint was defined as the target condition that, when multiplied by representative stream flow, would support attainment of water quality standards. The required load reduction was determined by comparing existing loads to the allowable load and expressing the difference as a reduction target.

These elements were then allocated among point sources (wasteload allocations) and nonpoint sources/load allocations, with an implicit margin of safety included to account for uncertainty. This methodology ensured the nutrient TMDL was grounded in both biological relevance (via the endpoint) and mass balance principles, allowing the TMDL

to function as a pollutant budget that sets the total allowable phosphorus load and required reductions within Indian Creek.

Table 5 below represents the existing phosphorus load and WLA for Souderton based upon Tables 5-7 and ES-5 of the approved TMDL. According to the TMDL, Souderton Borough must reduce its existing load by 13%.

Facility	***Existing Load (lb/yr))***	***TMDL WLA (lb/yr)***	***Maximum Daily Load (lb/day)***	***% Reduction***
Souderton	49.40	42.83	0.263	13%

Table 5: Existing, TMDL, and Maximum Daily Total Phosphorus WLAs for Souderton Borough based upon approved TMDL

D. Existing Pollutant Loading

Since Souderton Borough intends to combine their TMDL/PRP requirements, a new modelling effort must be utilized to recalculate the existing pollutant loading. Wikiwatershed's Model My Watershed was implemented to estimate Souderton's existing pollutant loading for Indian Creek and Skippack Creek.

D.1 Wikiwatershed Model My Watershed

WikiWatershed's Model My Watershed is an online watershed planning tool developed by the Stroud Water Research Center and is widely used to support MS4 planning and Pollutant Reduction Plan development. The model estimates average annual pollutant loading, including sediment, by applying land use–based loading rates derived from peer-reviewed literature and national datasets to spatially defined drainage areas. Model My Watershed allows users to delineate MS4-regulated areas and evaluate planned-area land uses, making it well suited for estimating existing sediment loading from developed land uses subject to municipal stormwater control.

D.2 Calculation Methodology

The following steps were undertaken to recalculate the existing loading:

1. *Storm Sewershed Delineation*

Planned and Parsed areas to Indian Creek and Skippack Creek were delineated into sewersheds within Souderton Borough utilizing Civil 3D software. These drainage areas were then exported to Wikiwatershed for analysis.

2. Land Use Identification

Land Uses within each delineated sewershed were identified through the model (e.g. Open Space, Low-intensity developed, Medium-intensity developed, etc.). Model-specific

sediment loading rates were assigned to each land use category. These loading rates represent average annual sediment yields under conditions existing at the time of the original TMDL approval.

3. Baseline Sediment Loading Calculation and Summation

A presumptive approach was utilized when calculating the existing loading which states "a load reduction of 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients". Therefore, the area of each land use category was then multiplied by its applicable *sediment* loading rate. The resulting sediment loads were summed across all land uses to generate a total baseline sediment loading for each sewershed and for the Borough overall. Detailed baseline loading calculations for Indian Creek and Skippack Creek can be found in Appendix C1 and C2, respectively. Table 6 below is a summary of the total baseline sediment loading for Indian Creek and Skippack Creek. It is noted that the sediment loading attributed from parsed areas was not included in the baseline loading.

Subwatershed	***Drainage Area (ac)***	***Planned Area (ac)***	***Parsed Area (ac)***	***Baseline Sediment Loading (lb/yr)***	***Coverage***
Indian Creek	115.54	96.41	19.13	131,755.26	16%
Skippack Creek	597.9	520.27	77.64	736,678.97	84%
Total	713.44	616.68	96.77	868,434.23	100%

Table 6: Indian Creek and Skippack Creek Baseline Sediment Loading Summary for Souderton Borough

4. Adjust Baseline Loading for Existing BMPs

The baseline sediment loading was then reduced to account for BMPs installed prior to the approved TMDL (2005) for Skippack Creek and BMPs installed after the approved TMDL (2008) for Indian Creek and prior to PRP development. Since the Indian Creek TMDL removed the sediment component, only the PRP requirement remains for sediment, therefore Souderton may use all BMPS prior to the date of load calculation (i.e. this PRP/TMDL) to reduce its existing pollutant loading. Detailed loading calculations of these existing BMPs are located in Appendix C-3 of this report. Table 7 below demonstrates the reduced loading from existing BMPs and the Adjusted (i.e Existing) Sediment Loading.

Subwatershed	***Planned Area (ac)***	***Baseline Sediment Loading (lbs/yr)***	***Existing BMPs to Reduce Loading (lbs/yr)***	***Adjusted Sediment Loading (lbs/yr)***
Indian Creek	96.41	131,755	13,370	118,385
Skippack Creek	520.27	736,678.97	2,758	733,920
Total	616.68	**868,434.23**	16,128	852,305

Table 7: Indian Creek and Skippack Creek Adjusted Sediment Loading for Souderton Borough

5. Calculate Short-Term and Long-Term Pollutant Reduction Goals

There are two objectives for a combined PRP/TMDL plan and Souderton Borough must achieve at least one of these goals within the five year permit term (2024-2029).

- Long Term Pollutant Reduction Goals: Plan for the reduction of pollutant loads to achieve the WLA(s) in the TMDL.
    - Skippack Creek: 18% WLA of Sediment
    - Indian Creek: 13% WLA of Nutrients
- Short Term Reduction Goals: 10% Reduction of the Adjusted Sediment Loading.

Below are summary tables 8 and 9 for Indian Creek and Skippack Creek which highlights the TMDL requirements (Appendix F) and PRP requirements (Appendix E) with the recalculated pollutant loadings and reduction goals. Souderton Borough must effectively reduce **11,838 lbs/yr and 73,392 lbs/yr** of sediment within the Indian Creek and Skippack Creek, respectively, to achieve their short term reduction goals. Additionally, a reduction of **132,106 lbs/yr** of sediment is required to achieve their long-term reduction goals.

	Indian Creek				
	Appendix F: TMDL Requirements (2008)			*Appendix E: PRP Requirements*	
	WLA	*Nutrients*[1]	*Sediment*	*Nutrients*[1]	*Sediment*
Baseline Loading (lbs/yr)	---	52.2	N/A	N/A	131,755
BMPs to Reduce Loading (lbs/yr)	---	---	N/A	N/A	13,370
Adjusted Loading (lbs/yr)	---	52.2	N/A	N/A	118,385
Short Term Reduction Goals (lbs/yr)	---	5.22	N/A	N/A	**11,838**
Long Term Reduction Goals (lbs/yr)(TMDL only)	13%	6.786	N/A	N/A	N/A

1: A presumptive approach was utilized which states a load reduction of at least 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients.

Table 8: Indian Creek Numeric Pollutant Loading and Required Reduction Goals

	Skippack Creek				
	Appendix F: TMDL Requirements (2005)			*Appendix E: PRP Requirements*	
	WLA	*Nutrients*[1]	*Sediment*	*Nutrients*[1]	*Sediment*
Baseline Loading (lbs/yr)	---	N/A	736,678	N/A	736,678
BMPs to Reduce Loading (lbs/yr)	---	N/A	2,758	N/A	2,758
Adjusted Loading (lbs/yr)	---	N/A	733,920	N/A	733,920
Short Term Reduction Goals (lbs/yr)	---	N/A	73,392	N/A	**73,392**
Long Term Reduction Goals (lbs/yr)(TMDL only)	18%	N/A	**132,106**	N/A	N/A

1: A presumptive approach was utilized which states a load reduction of at least 10% for sediment may be used as the objective in lieu of a 5% reduction in nutrients.

Table 9: Skippack Creek Numeric Pollutant Loading and Required Reduction Goals

Because both the Skippack Creek and Indian Creek watersheds ultimately drain to the Perkiomen Creek, *DEP agreed that pollutant loads generated within Souderton Borough were evaluated on a cumulative basis for planning and implementation purposes*. Loads associated with each watershed were calculated independently to maintain alignment with the applicable TMDLs as shown in Table 8 and Table 9 above, then summed to represent the Borough's total MS4 pollutant contribution to downstream receiving waters. This aggregated load provides a comprehensive accounting of Souderton Borough's stormwater-related pollutant contributions and supports prioritization of BMP implementation across municipal drainage areas while maintaining consistency with individual watershed TMDL requirements. Table 10 demonstrates the cumulative existing pollutant loadings and required reductions.

Subwatershed	***Planned Area (ac)***	***Adjusted/Existing Sediment Loading (lb/yr)***	***Short-Term Reduction Goals (10% Reduction)***	***Long-Term Reduction Goals***
Indian Creek	96.41	118,385	11,838	N/A
Skippack Creek	520.27	733,920	73,392	132,106
Total	616.68	**852,305**	**85,230**	**132,106**

Table 10: Summation of Existing Sediment Loading and Required Reduction Goals

D.3 TMDL vs. WikiWatershed Results

It is noted that Souderton Borough's existing sediment pollutant loading of 2,551,834 lbs/yr identified in the approved TMDL and referenced in Table 4 in Section C.2.A.3 does not numerically correspond to the baseline sediment loading of 736,678 lbs/yr calculated for Skippack Creek utilizing Model My Watershed.

Model My Watershed applies generalized land use–based sediment loading rates that implicitly incorporate average contributions from upland erosion and streambank processes, whereas the approved TMDL explicitly models streambank erosion as a distinct source through watershed-scale routing. A cross-reference of land use categories and associated loading rates between the TMDL and Model My Watershed (See Appendix C-4) indicates that when identical land cover distributions are applied consistently across the Skippack Creek watershed, the resulting sediment load differential is approximately seven percent as demonstrated in Table 11 below.

	Existing Sediment Loading (lbs/yr)		
Watershed Scale	***TMDL***	***Wikiwatershed***	**Δ Differential**
Indian Creek	N/A*	39,542,082.76	N/A
Skippack Creek	43,183,799	40,267,416.34	7%

*Sediment TMDL was withdrawn in 2014

Table 11: Differences between TMDL and Wikiwatershed Sediment Loading for Indian Creek and Skippack Creek.

This comparison confirms that Model My Watershed reproduces the TMDL's land-based sediment loading methodology at the watershed scale, and that remaining differences are attributable to differences in spatial aggregation and explicit versus implicit treatment of streambank erosion.

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

To achieve the minimum required reductions in pollutant loading established in Section D of this report, Souderton Borough has identified a suite of **18 proposed best management practice (BMP) projects** that collectively address the pollutants of concern within the Skippack Creek and Indian Creek watersheds. The proposed BMPs include a balanced combination of structural and non-structural measures, selected based on pollutant reduction effectiveness, feasibility within a developed municipal setting, and consistency with MS4 permit requirements.

The proposed projects consist of one stream restoration project, ten rain gardens, three tree planting initiatives totaling more than 478 trees throughout the Borough, one advanced hydrodynamic separator, one stormwater basin retrofit, one vegetated swale, and one pervious pavement installation. These BMPs are designed to reduce sediment loading through a combination of runoff volume reduction, pollutant capture, and stabilization of erosive conditions within the drainage network.

Among the proposed projects, *the stream restoration project represents a significant pollutant reduction opportunity. Based on established pollutant reduction methodologies, this project alone has the capacity to satisfy the Borough's total required reduction of* ***85,230 pounds****,* providing a substantial margin of compliance with the minimum TMDL reduction target. The remaining BMPs provide additional reductions, redundancy, and flexibility, and support long-term reduction goals.

Collectively, the proposed BMPs provide a robust and implementable strategy for achieving required pollutant load reductions while allowing for phased implementation over multiple permit terms. Pollutant reductions will be documented as projects are implemented, and the TMDL/PRP may be updated as necessary to reflect completed BMPs, refined load estimates, or additional implementation opportunities, consistent with Appendix E and F MS4 permit requirements. Table 12 demonstrates the proposed BMPs Souderton has planned to implement to achieve load reductions. Detailed BMP calculations and exhibits are located in Appendix D and shown on the MS4 Outfall Map located in Appendix B.

Proposed BMP Summary Table					
Proposed BMP	**BMP Type**	**TSS Removal Efficiency (%)[1]**	**Treated Drainage Area (ac)**	**Load Reduction (lbs/yr)[2]**	**Funding**
A	BMP 6.4.5 Rain Garden / Bioretention	55	1.06	586.66	General Funds/Grants
B	BMP 6.4.5 Rain Garden / Bioretention	55	2.52	3256.89	General Funds/Grants
C	BMP 6.7.2 Landscape Restoration	20	3.02	265.25	General Funds/Grants
D	BMP 6.4.5 Rain Garden / Bioretention	55	0.49	438.20	General Funds/Grants
E	BMP 6.4.5 Rain Garden / Bioretention	55	0.53	318.84	General Funds/Grants
F1 and F2	BMP 6.4.5 Rain Garden / Bioretention	55	0.46	546.02	General Funds/Grants
G	BMP 6.7.2 Landscape Restoration	20	7.52	718.61	General Funds/Grants
H	BMP 6.6.4 Water Quality Inserts	10	7.65	881.98	General Funds/Grants
I	BMP 6.4.5 Rain Garden / Bioretention	55	0.92	1092	General Funds/Grants
J	BMP 6.6.3 Dry Extended Detention Basin	60	8.7	8,914	General Funds/Grants
K	BMP 6.4.8 Vegetated Swale	50	5.06	3244.64	General Funds/Grants
L	BMP 6.7.2 Landscape Restoration	20	See BMP Calculation	105.37	General Funds/Grants
M	BMP 6.4.5 Rain Garden / Bioretention	55	1.73	1319.63	General Funds/Grants
N	BMP 6.4.1 Perious Pavement with Infiltration Bed	55	0.81	584.13	General Funds/Grants
O	BMP 6.4.5 Rain Garden / Bioretention	55	16.24	12467.60	General Funds/Grants
P	BMP 6.4.5 Rain Garden / Bioretention	55	0.38	403.62	General Funds/Grants
Q	BMP 6.4.5 Rain Garden / Bioretention	55	1.77	1551.34	General Funds/Grants
R	Stream Restoration	N/A	N/A	**86,250.00**	General Funds/Grants
Total Sediment Reduction (lbs/yr)				**122,945**	

Table 12: Proposed BMP Summary Table to Achieve Pollutant Reduction Requirements

F. Identify Funding Mechanisms

Implementation and long-term operation of the proposed BMP projects will be supported through a combination of municipal funding, grant opportunities, and potential partner contributions. Souderton Borough will allocate capital and operational funds from its stormwater management program budget, and will pursue available state and federal grant programs where feasible to supplement local resources. Additional partnerships with community groups, local businesses, or watershed organizations may be leveraged to support planting initiatives, maintenance, and public education efforts.

G. Identify Responsible Parties for Operation and Maintenance of BMPs

Responsibility for operations and maintenance (O&M) of the BMPs will be clearly assigned to the Borough or designated partners to ensure continued functionality and pollutant reduction performance. Structural BMPs, including the stream restoration project, stormwater basin retrofit, vegetated swales, pervious pavement, and advanced hydrodynamic separator, will be maintained according to manufacturer recommendations, design specifications, and permit requirements, with regular inspections and corrective maintenance as needed. Non-structural BMPs, such as rain gardens and tree planting initiatives, will be incorporated into the Borough's landscape and grounds maintenance programs, with monitoring and upkeep scheduled to sustain plant health and infiltration capacity. Documentation of O&M activities will be maintained to demonstrate long-term compliance with TMDL/PRP pollutant reduction goals and to support annual MS4 reporting requirements.

APPENDIX A: PUBLIC AD

APPENDIX B: MS4 MAPS

APPENDIX C1: BASELINE POLLUTANT LOADING CALCULATIONS (INDIAN CREEK)

APPENDIX C2: BASELINE POLLUTANT LOADING CALCULATIONS (SKIPPACK CREEK)

APPENDIX C3: EXISTING BMPS TO REDUCE POLLUTANT LOADING

APPENDIX C4: LAND USE LOADING RATES CROSS-REFERENCE WIKIWATERSHED VS. APPROVED TMDL)

APPENDIX D: PROPOSED BMPS TO REDUCE POLLUTANT LOADING

APPENDIX A: PUBLIC AD

APPENDIX B: MS4 MAPS

MS4 PERMIT PROGRAM

FOR

SOUDERTON BOROUGH

OUTFALL AND LAND USE MAPS

SOUDERTON BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

GENERAL NOTES

1. THIS PLAN IS FOR PLANNING PURPOSES ONLY.
2. THE MS4 PERMITTEE, SOUDERTON BOROUGH, DRAINS TO DOWNSTREAM WATERS WHICH HAVE BEEN IDENTIFIED ON THE MS4 REQUIREMENTS TABLE WITH APPENDIX E AND TMDL REQUIREMENTS. THEREFORE, THE BOROUGH MUST DEVELOP A POLLUTANT REDUCTION PLAN AND A TMDL PLAN TO SATISFY THESE REQUIREMENTS.
3. SOUDERTON BOROUGH INTENDS TO TAKE A PRESUMPTIVE APPROACH UNDER THE COMBINED TMDL/PRP PLAN TO REDUCE 10% SEDIMENT TO REACH THE SHORT TERM REDUCTION OF THIS PERMIT CYCLE.
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5. SOUDERTON BOROUGH IS APPROXIMATELY 720 ACRES AND DRAINS TOWARDS THE INDIAN CREEK WATERSHED AND SKIPPACK CREEK WATERSHED.
6. THE WEST BRANCH NESHAMINY CREEK HUC-12 REQUIREMENT AS NOTED IN "PA DEP'S POLLUTANT AGGREATION SUGGESTIONS FOR MS4 REQUIREMENTS TABLE" IS NO LONGER APPLICABLE FOR SOUDERTON BOROUGH SINCE NO PLANNED AREA DRAINS TO THIS BASIN.
7. THIS PLAN TO BE USED IN CONJUNCTION WITH THE COMBINED PRP/TMDL REPORT PREPARED BY GILMORE AND ASSOCIATES DATED JANUARY 202.
8. LAND USE SHOWN ON MAPS ARE FOR GRAPHICAL PURPOSES ONLY BASED UPON NATIONAL LAND USE COVER DATEBASE DATED 2011 (NLCD 2011).

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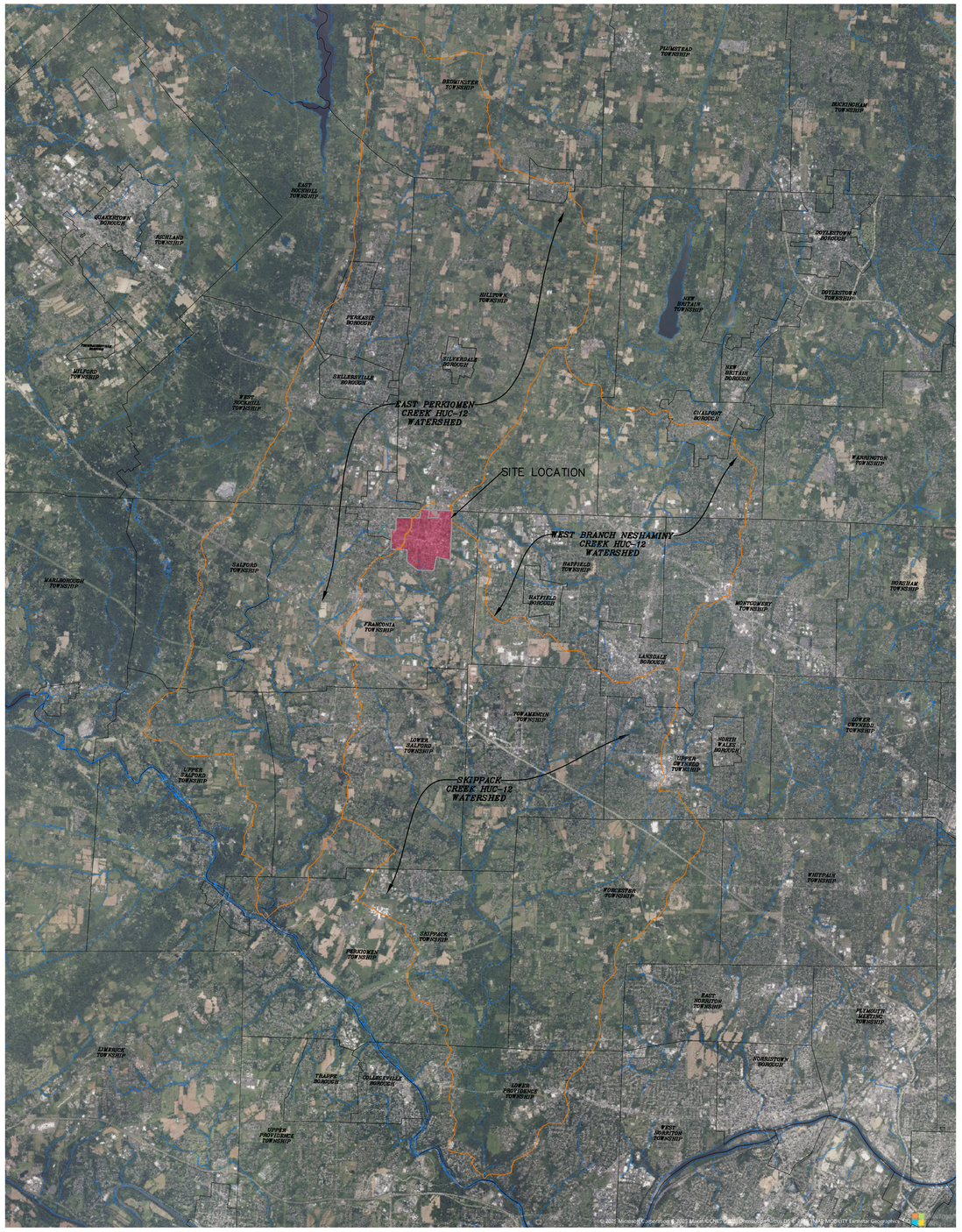
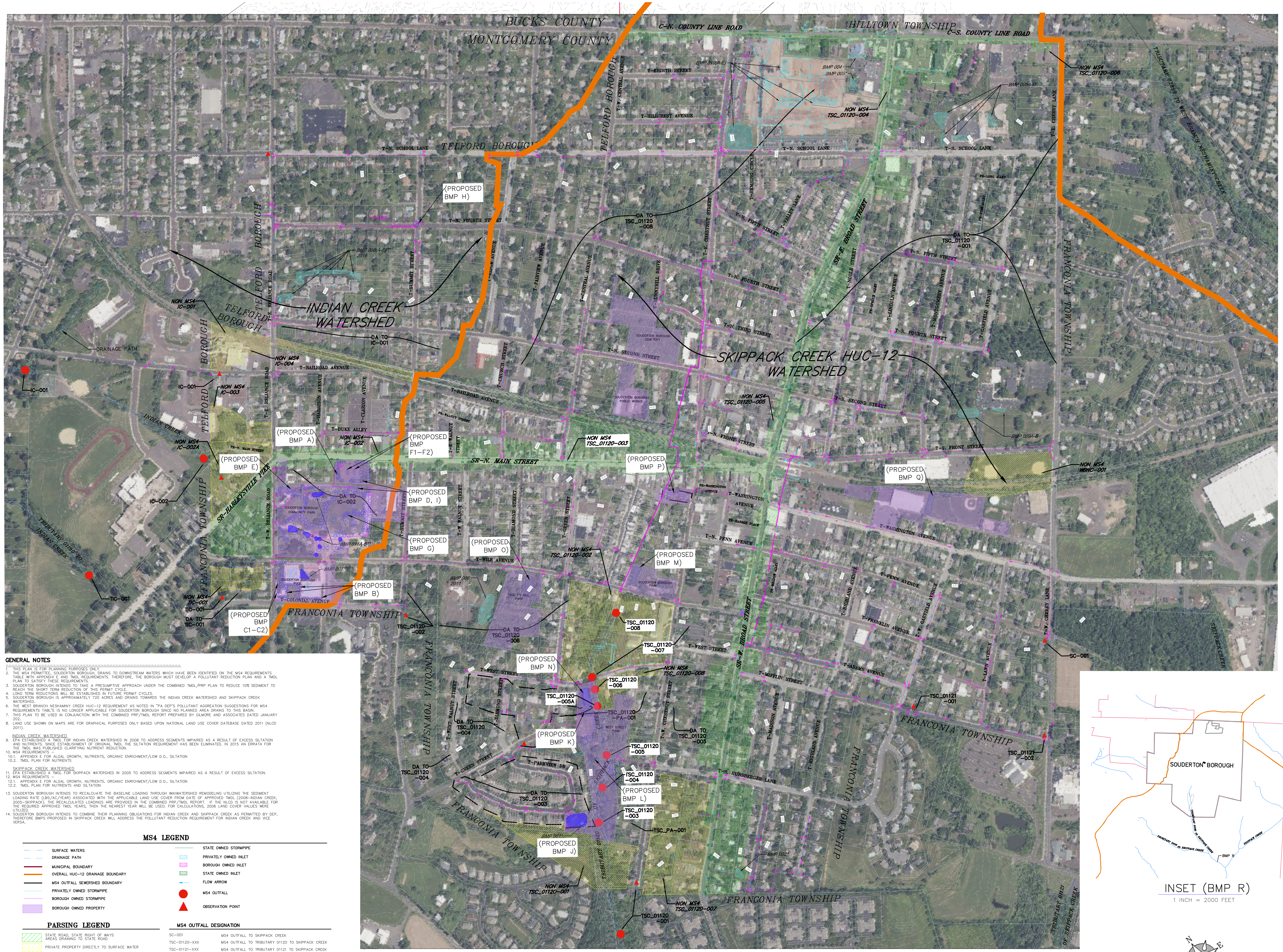


GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
CORPORATE HEADQUARTERS
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330 • www.gilmore-assoc.com

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
2309027 SOUDERTON BOROUGH PRP/TMDL

PLAN DATE: July 9, 2024

NOT APPROVED FOR CONSTRUCTION



INSET (BMP R)

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SKIPPACK CREEK WATERSHED

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MS4 LEGEND

- SURFACE WATERS
- DRAINAGE PATH
- MUNICIPAL BOUNDARY
- OVERALL HUC-12 DRAINAGE BOUNDARY
- MS4 OUTFALL SEWERSHED BOUNDARY
- PRIVATELY OWNED STORMPIPE
- BOROUGH OWNED STORMPIPE
- BOROUGH OWNED PROPERTY
- STATE OWNED STORMPIPE
- PRIVATELY OWNED INLET
- BOROUGH OWNED INLET
- STATE OWNED INLET
- FLOW ARROW
- MS4 OUTFALL
- OBSERVATION POINT

PARSING LEGEND

- STATE ROAD, STATE RIGHT OF WAYS AREAS DRAINING TO STATE ROAD
- PRIVATE PROPERTY DIRECTLY TO SURFACE WATER

BMP LEGEND

	BOROUGH OWNED BMP
	PRIVATELY OWNED BMP
*BMP-XX**	BMP INSTALLED PRIOR TO TMDL APPROVAL USED TO REDUCE EXISTING LOADING
*BMP-XX***	BMP INSTALLED PRIOR TO PRP IMPLEMENTATION USED TO REDUCE EXISTING LOADING
BMP-XX	POST CONSTRUCTION CH. 102 BMPS INSTALLED AFTER 2003

MS4 OUTFALL DESIGNATION

SC-001	MS4 OUTFALL TO SKIPPACK CREEK
TSC-01120-XXX	MS4 OUTFALL TO TRIBUTARY 01120 TO SKIPPACK CREEK
TSC-01121-XXX	MS4 OUTFALL TO TRIBUTARY 01121 TO SKIPPACK CREEK
TSC-PA-XXX	PLANNED AREA TO TRIBUTARY TO SKIPPACK CREEK
IC-XXX	MS4 OUTFALL TO INDIAN CREEK
TIC-XXX	MS4 OUTFALL TO TRIBUTARY 01199 TO INDIAN CREEK

NON- MS4 DESIGNATION

NON MS4 IC-XXX	PARSED DRAINAGE AREA TO INDIAN CREEK
NON MS4 TIC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO INDIAN CREEK
NON MS4 WBNC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO WEST BRANCH TO NESHAMINY CREEK
NON MS4 TSC-01120-XXX	PARSED DRAINAGE AREA TO TRIBUTARY 01120 TO SKIPPACK CREEK

SOUDERTON BOROUGH MS4 OUTFALL MAP

1 INCH = 225 FEET

225 112.5 0 225 675 1125 FEET

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NOT APPROVED FOR CONSTRUCTION

REV.	DESCRIPTION	DATE	BY

MS4 MAP

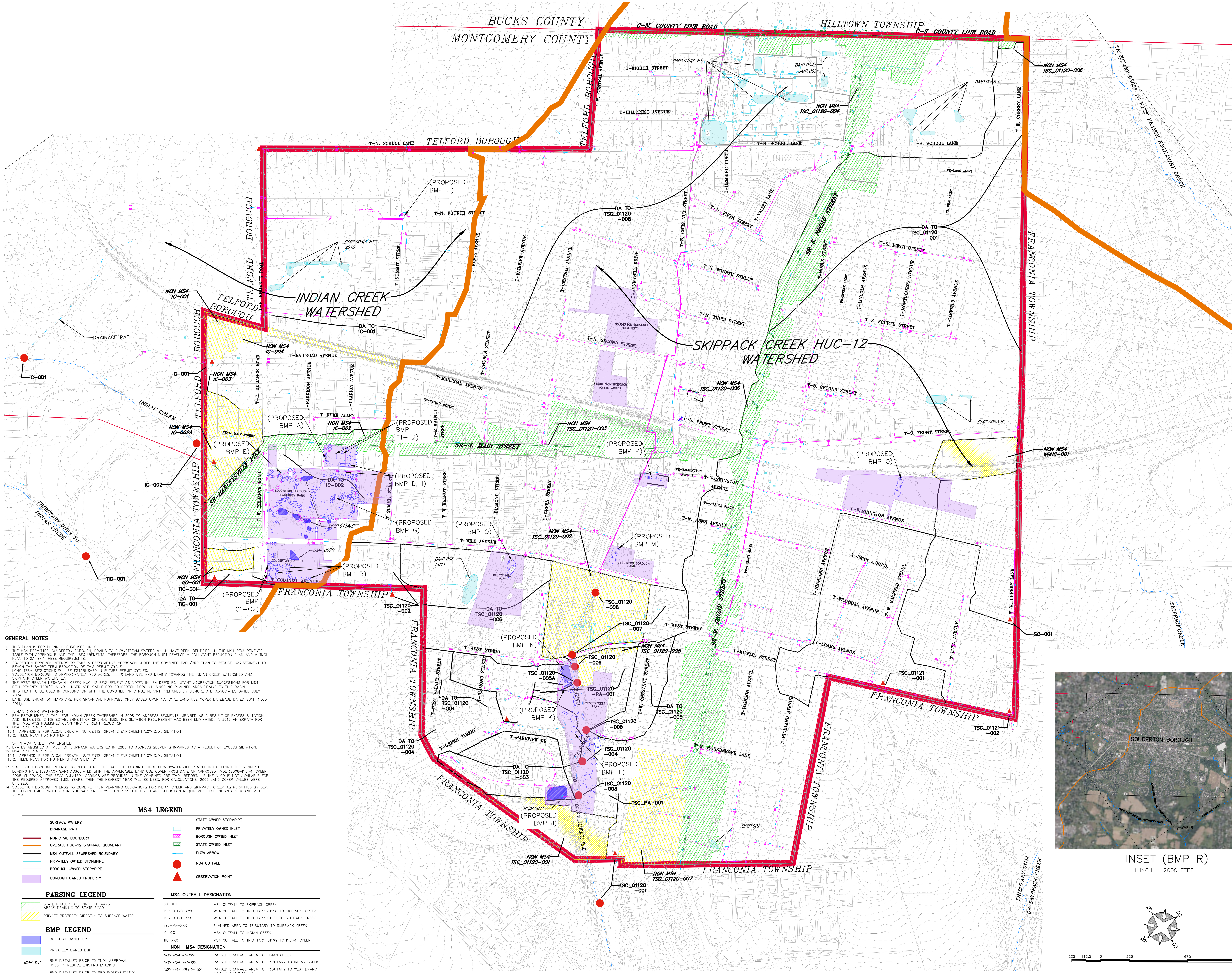
SOUDERTON BOROUGH MS4 PERMIT PROGRAM

SOUDERTON BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

OUTFALL MAP

GILMORE & ASSOCIATES, INC
ENGINEERING & CONSULTING SERVICES

PROJECT No.: 2309027	
OWNERS INFO: SOUDERTON BOROUGH, 31 WEST SUMMIT STREET, SOUDERTON, PA 18964, 215-723-4371	
MUNICIPAL FILE No.: ----	
TAX MAP PARCEL No.: N/A	
TOTAL AREA: N/A	TOTAL LOTS: N/A
DATE: JANUARY 30, 2026	SCALE: AS NOTED
DRAWN BY: CMK	CHECKED BY: GA
SHEET NO.: 2 OF4	



SOUDERTON BOROUGH MS4 OUTFALL MAP

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MS4 LEGEND

- SURFACE WATERS
- DRAINAGE PATH
- MUNICIPAL BOUNDARY
- OVERALL HUC-12 DRAINAGE BOUNDARY
- MS4 OUTFALL SEWERSHED BOUNDARY
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- STATE OWNED INLET
- FLOW ARROW
- MS4 OUTFALL
- OBSERVATION POINT

PARSING LEGEND

- STATE ROAD, STATE RIGHT OF WAYS AREAS DRAINING TO STATE ROAD
- PRIVATE PROPERTY DIRECTLY TO SURFACE WATER

BMP LEGEND

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- PRIVATELY OWNED BMP
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SC-001	MS4 OUTFALL TO SKIPPACK CREEK
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TSC-01121-XXX	MS4 OUTFALL TO TRIBUTARY 01121 TO SKIPPACK CREEK
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IC-XXX	MS4 OUTFALL TO INDIAN CREEK
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NON- MS4 DESIGNATION

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NON MS4 TIC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO INDIAN CREEK
NON MS4 WBNC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO WEST BRANCH TO NESHAMINY CREEK
NON MS4 TSC-01120-XXX	PARSED DRAINAGE AREA TO TRIBUTARY 01120 TO SKIPPACK CREEK

NOT APPROVED FOR CONSTRUCTION

MS4 MAP

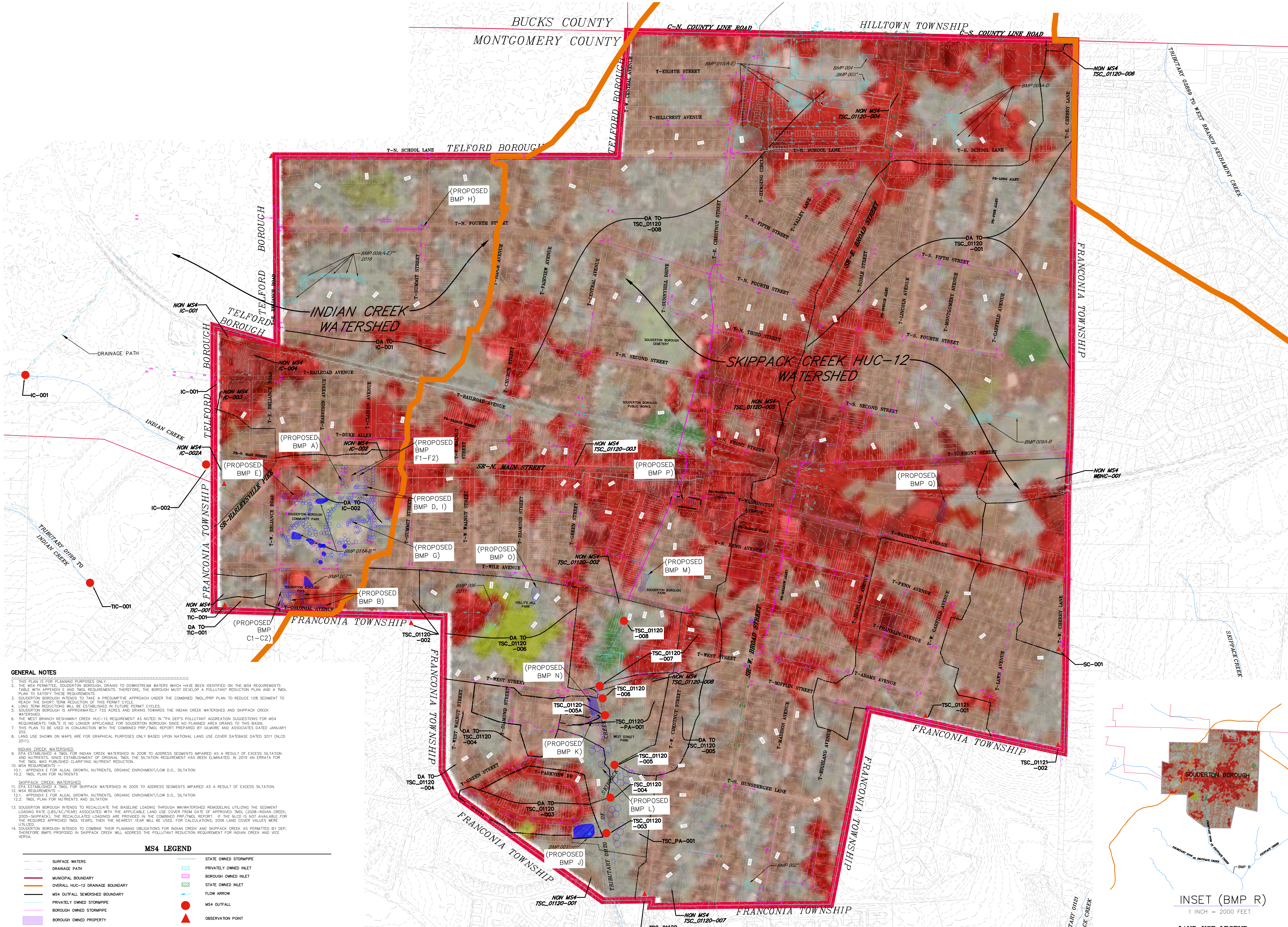
SOUDERTON BOROUGH MS4 PERMIT PROGRAM

SOUDERTON BOROUGH, MONTGOMERY COUNTY, PENNSYLVANIA

OUTFALL MAP

GILMORE & ASSOCIATES, INC
ENGINEERING & CONSULTING SERVICES

PROJECT No.: 2309027	
OWNERS INFO: SOUDERTON BOROUGH, 31 WEST SUMMIT STREET, SOUDERTON, PA 18964, 215-723-4371	
MUNICIPAL FILE No.: ----	
TAX MAP PARCEL No.: N/A	
TOTAL AREA: N/A	TOTAL LOTS: N/A
DATE: JANUARY 30, 2026	SCALE: AS NOTED
DRAWN BY: XXX	CHECKED BY: XXX
SHEET NO.: 3 OF4	



SOUDERTON BOROUGH MS4 OUTFALL MAP

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INSET (BMP R)

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- STATE OWNED STORMPIPE
- PRIVATELY OWNED INLET
- BOROUGH OWNED INLET
- STATE OWNED INLET
- FLOW ARROW
- MS4 OUTFALL
- OBSERVATION POINT

PARSING LEGEND

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- PRIVATE PROPERTY DIRECTLY TO SURFACE WATER

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	PRIVATELY OWNED BMP
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TSC-PA-XXX	PLANNED AREA TO TRIBUTARY TO SKIPPACK CREEK
IC-XXX	MS4 OUTFALL TO INDIAN CREEK
TIC-XXX	MS4 OUTFALL TO TRIBUTARY 01199 TO INDIAN CREEK

NON- MS4 DESIGNATION

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NON MS4 TIC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO INDIAN CREEK
NON MS4 WBNC-XXX	PARSED DRAINAGE AREA TO TRIBUTARY TO WEST BRANCH TO NESHAMINY CREEK
NON MS4 TSC-01120-XXX	PARSED DRAINAGE AREA TO TRIBUTARY 01120 TO SKIPPACK CREEK

LAND USE LEGEND

- OPEN SPACE
- DEVELOPED, LOW INTENSITY
- DEVELOPED, MEDIUM INTENSITY
- DEVELOPED, HIGH INTENSITY
- PASTURE/HAY
- DECIDUOUS FOREST
- SHRUB/SCRUB

225 112.5 0 225 675 1125 FEET

NOT APPROVED FOR CONSTRUCTION

MS4 MAP

SOUDERTON BOROUGH MS4 PERMIT PROGRAM

SOUDERTON BOROUGH, MONTOGOMERY COUNTY, PENNSYLVANIA

OUTFALL MAP

REV. | DESCRIPTION | DATE | BY

GILMORE & ASSOCIATES, INC
ENGINEERING & CONSULTING SERVICES

PROJECT No.: 2309027	
OWNERS INFO: SOUDERTON BOROUGH, 31 WEST SUMMIT STREET, SOUDERTON, PA 18964, 215-723-4371	
MUNICIPAL FILE No.: ----	
TAX MAP PARCEL No.: N/A	
TOTAL AREA: N/A	TOTAL LOTS: N/A
DATE: JANUARY 30, 2026	SCALE: AS NOTED
DRAWN BY: XXX	CHECKED BY: XXX
SHEET NO.: 4 OF4	

APPENDIX C1: BASELINE POLLUTANT LOADING CALCULATIONS (INDIAN CREEK)

Indian Creek Sewershed										
IC-001 w/ Parsed Area Non-MS4-IC-001 and Non-MS4-IC-004										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	83,709.97	20.69	1652.92	0.41	20.28	0.35	984.40	7.10	19963.67	26.0%
Developed, Low Intensity	147,411.49	36.43	4614.01	1.14	35.29	0.41	1093.78	14.47	38599.50	46.0%
Developed, Medium Intensity	59,485.44	14.70	5700.22	1.41	13.29	0.90	2158.19	11.96	28682.35	19.0%
Developed, High Intensity	23,597.26	5.83	4675.03	1.16	4.67	1.24	3107.29	5.79	14511.04	7.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	6,280.43	1.55	0.00	0.00	1.55	0.26	683.61	0.40	1059.60	2.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	0.96	751.71	0.00	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***320,484.58***	***79.20***	***16,642.18***	***4.12***	***75.08***			***39.72***	***102,816.15***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
IC-002 w/ Non-MS4-IC-002										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	29177.73	7.21	7096.50	1.75	5.46	0.35	984.40	1.91	5374.83	26.0%
Developed, Low Intensity	44430.21	10.98	13376.93	3.31	7.67	0.41	1093.78	3.14	8389.29	39.0%
Developed, Medium Intensity	27383.33	6.77	10685.32	2.64	4.13	0.90	2158.19	3.72	8913.32	24.0%
Developed, High Intensity	4953.20	1.22	0.00	0.00	1.22	1.24	3107.29	1.51	3790.89	4.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	7644.81	1.89	0.00	0.00	1.89	0.96	751.71	1.81	1420.73	7.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***113,589.30***	***28.07***	***31,158.76***	***7.70***	***20.37***			***12.10***	***27,889.08***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
Non-MS4-IC-002A										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	3814.65	0.94	3814.65	0.94	0.00	0.35	984.40	0.00	0.00	25.3%
Developed, Low Intensity	8300.67	2.05	8300.67	2.05	0.00	0.41	1093.78	0.00	0.00	55.3%
Developed, Medium Intensity	2917.44	0.72	2917.44	0.72	0.00	0.90	2158.19	0.00	0.00	19.4%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	1.24	3107.29	0.00	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	0.96	751.71	0.00	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***15,032.76***	***3.71***	***15,032.76***	***3.71***	***0.00***			***0.00***	***0.00***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
Non-MS4-IC-003										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	1970.21	0.49	1970.21	0.49	0.00	0.35	984.40	0.00	0.00	23.0%
Developed, Low Intensity	3764.62	0.93	3764.62	0.93	0.00	0.41	1093.78	0.00	0.00	43.7%
Developed, Medium Intensity	0.00	0.00	0.00	0.00	0.00	0.90	2158.19	0.00	0.00	0.0%
Developed, High Intensity	2867.41	0.71	2867.41	0.71	0.00	1.24	3107.29	0.00	0.00	33.3%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	0.96	751.71	0.00	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***8,602.23***	***2.13***	***8,602.23***	***2.13***	***0.00***			***0.00***	***0.00***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
TIC-001										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	0.00	0.00	0.00	0.00	0.00	0.35	984.40	0.00	0.00	0.0%
Developed, Low Intensity	3,872.80	0.96	0.00	0.00	0.96	0.41	1093.78	0.39	1050.03	100.0%
Developed, Medium Intensity	0.00	0.00	0.00	0.00	0.00	0.90	2158.19	0.00	0.00	0.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	1.24	3107.29	0.00	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	0.96	751.71	0.00	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***3,872.80***	***0.96***	***0.00***	***0.00***	***0.96***			***0.39***	***1,050.03***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
Non-MS4-TIC-001										
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Phosphorus Loading Rate (lbs/ac/yr)*****	***Sediment Loading Rate (lbs/ac/yr)*****	***Phosphorus Loading (lbs/yr)***	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	3872.80	0.96	3872.80	0.96	0.00	0.35	984.40	0.00	0.00	65.0%
Developed, Low Intensity	2,078.39	0.51	2078.39	0.51	0.00	0.41	1093.78	0.00	0.00	35.0%
Developed, Medium Intensity	0.00	0.00	0.00	0.00	0.00	0.90	2158.19	0.00	0.00	0.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	1.24	3107.29	0.00	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	0.96	751.71	0.00	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***5,951.19***	***1.47***	***5,951.19***	***1.47***	***0.00***			***0.00***	***0.00***	***100%***

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

Indian Creek Sewershed										
Total Indian Creek										
Type	**Drainage Area (m^2)**	**Drainage Area (ac.)**	**Parsed Area (m2)**	**Parsed Area (ac.)**	**Planned Area (ac.)**	**Phosphorus Loading Rate (lbs/ac/yr)****	**Sediment Loading Rate (lbs/ac/yr)****	**Phosphorus Loading (lbs/yr)**	**Sediment Loading (lbs/yr)**	**Coverage (%)**
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	122545.36	30.29	18407.08	4.55	25.74	0.35	984.40	9.01	25338.51	26.2%
Developed, Low Intensity	209858.18	51.86	32134.63	7.94	43.92	0.41	1093.78	18.01	48038.82	44.9%
Developed, Medium Intensity	89786.21	22.19	19302.99	4.77	17.42	0.90	2158.19	15.68	37595.67	19.2%
Developed, High Intensity	31417.87	7.76	7542.44	1.87	5.89	1.24	3107.29	7.30	18301.94	6.7%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	0.27	682.41	0.00	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	0.26	683.61	0.00	0.00	0.0%
Shrub/Scrub	6280.43	1.55	0.00	0.00	1.55	0.26	683.61	0.40	1059.60	1.3%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	0.96	735.88	0.00	0.00	0.0%
Pasture/Hay	7644.81	1.89	0.00	0.00	1.89	0.96	751.71	1.81	1420.73	1.6%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2.86	1925.12	0.00	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	0.27	683.29	0.00	0.00	0.0%
Total	***467,532.86***	***115.54***	***77,387.13***	***19.13***	***96.41***			***52.22***	***131,755.26***	***100%***

*Approved TMDL Date - 2008; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for East Perkiomen Watershed

APPENDIX C2: BASELINE POLLUTANT LOADING CALCULATIONS (SKIPPACKCREEK)

Skippack Creek Sewershed								
SC-001								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	714.65	0.18	0.00	0.00	0.18	994.05	175.95	1.5%
Developed, Low Intensity	24,939.21	6.16	0.00	0.00	6.16	1104.50	6807.03	52.3%
Developed, Medium Intensity	14,172.74	3.50	0.00	0.00	3.50	1931.19	6763.03	29.7%
Developed, High Intensity	7,892.30	1.95	0.00	0.00	1.95	2656.64	5180.45	16.5%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***47,718.91***	***11.79***	***0.00***	***0.00***	***11.79***		***18,926.46***	***100%***

Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-001 w/ Non-MS4-TSC-01120-005 and Non-MS4-TSC-01120-007								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	152,917.84	37.76	34729.39	8.58	29.18	994.05	29003.40	19.0%
Developed, Low Intensity	352,994.71	87.16	45495.86	11.23	75.93	1104.50	83863.58	44.0%
Developed, Medium Intensity	226,488.72	55.92	36523.79	9.02	46.90	1931.19	90578.60	28.0%
Developed, High Intensity	63,197.28	15.60	28819.48	7.12	8.48	2656.64	22538.93	8.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	12056.55021	2.98	0.00	0.00	2.98	789.86	2351.41	1.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***807,655.10***	***199.42***	***145,568.53***	***35.95***	***163.47***		***228,335.93***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
Non-MS4-TSC-01120-001								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	12,865.14	3.18	12865.14	3.18	0.00	994.05	0.00	56.0%
Developed, Low Intensity	10,173.53	2.51	10173.53	2.51	0.00	1104.50	0.00	44.0%
Developed, Medium Intensity	0.00	0.00	0.00	0.00	0.00	1931.19	0.00	0.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***23,038.68***	***5.69***	***23,038.68***	***5.69***	***0.00***		***0.00***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-002								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	545.62	0.13	0.00	0.00	0.13	994.05	129.23	3.3%
Developed, Low Intensity	12,209.28	3.01	0.00	0.00	3.01	1104.50	3324.55	76.4%
Developed, Medium Intensity	3,237.23	0.80	0.00	0.00	0.80	1931.19	1544.95	20.3%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***15,992.12***	***3.94***	***0.00***	***0.00***	***3.94***		***4,998.72***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
Non-MS4-TSC-01120-002								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	9,617.73	2.37	9617.73	2.37	0.00	994.05	0.00	22.5%
Developed, Low Intensity	13,206.56	3.26	13206.56	3.26	0.00	1104.50	0.00	30.9%
Developed, Medium Intensity	10,514.94	2.60	10514.94	2.60	0.00	1931.19	0.00	24.7%
Developed, High Intensity	3337.29	0.82	3337.29	0.82	0.00	2656.64	0.00	7.8%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	6028.91	1.49	6028.91	1.49	0.00	789.86	0.00	14.1%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***42,705.45***	***10.54***	***42,705.45***	***10.54***	***0.00***		***0.00***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-004								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	17,227.41	4.25	0.00	0.00	4.25	994.05	4224.71	37.0%
Developed, Low Intensity	20,816.23	5.14	0.00	0.00	5.14	1104.50	5677.13	45.0%
Developed, Medium Intensity	8,255.35	2.04	0.00	0.00	2.04	1931.19	3939.63	18.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	791.15	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	791.15	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	791.15	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	791.15	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***46,298.99***	***11.43***	***0.00***	***0.00***	***11.43***		***13,841.47***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-003								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	2,173.05	0.54	0.00	0.00	0.54	994.05	536.79	6.2%
Developed, Low Intensity	7,556.29	1.87	0.00	0.00	1.87	1104.50	2065.42	21.5%
Developed, Medium Intensity	25,500.40	6.30	0.00	0.00	6.30	1931.19	12166.50	72.3%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***35,229.74***	***8.71***	***0.00***	***0.00***	***8.71***		***14,768.70***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-005								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	6,645.56	1.64	0.00	0.00	1.64	994.05	1630.24	32.0%
Developed, Low Intensity	10,234.39	2.53	0.00	0.00	2.53	1104.50	2794.39	49.0%
Developed, Medium Intensity	3,953.94	0.98	0.00	0.00	0.98	1931.19	1892.57	19.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***20,833.88***	***5.15***	***0.00***	***0.00***	***5.15***		***6,317.19***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-005A								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	1,834.98	0.45	0.00	0.00	0.45	994.05	447.32	10.0%
Developed, Low Intensity	12,601.45	3.11	0.00	0.00	3.11	1104.50	3435.00	66.0%
Developed, Medium Intensity	4,526.60	1.12	0.00	0.00	1.12	1931.19	2162.93	24.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***18,963.03***	***4.68***	***0.00***	***0.00***	***4.68***		***6,045.25***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-006								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	25,121.76	6.20	0.00	0.00	6.20	994.05	6163.11	31.8%
Developed, Low Intensity	17,046.91	4.21	0.00	0.00	4.21	1104.50	4649.95	21.6%
Developed, Medium Intensity	18,841.32	4.65	0.00	0.00	4.65	1931.19	8980.03	23.9%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	17944.11	4.43	0.00	0.00	4.43	934.03	4137.75	22.7%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***78,954.10***	***19.49***	***0.00***	***0.00***	***19.49***		***23,930.84***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-007								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	0.00	0.00	0.00	0.00	0.00	994.05	0.00	0.0%
Developed, Low Intensity	3,259.58	0.80	0.00	0.00	0.80	1104.50	883.60	24.0%
Developed, Medium Intensity	10,437.22	2.58	0.00	0.00	2.58	1931.19	4982.47	76.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***13,696.80***	***3.38***	***0.00***	***0.00***	***3.38***		***5,866.07***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-008 w/ Non-MS4-TSC-01120-003 and Non-MS4-TSC-01120-004								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	153757.0	38.0	5667.2	1.40	36.56	994.05	36342.47	14.7%
Developed, Low Intensity	410357.6	101.3	16857.6	4.16	97.16	1104.50	107313.22	39.4%
Developed, Medium Intensity	368189.0	90.9	50951.4	12.58	78.33	1931.19	151270.11	35.3%
Developed, High Intensity	89158.2	22.0	22663.6	5.60	16.41	2656.64	43595.46	8.5%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	9306.9	2.3	0.00	0.00	2.30	789.86	1816.68	0.9%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	11998.5	3.0	0.00	0.00	2.96	934.03	2764.73	1.1%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***1,042,767.23***	***257.46***	***96,139.74***	***23.74***	***233.72***		***343,102.67***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01120-PA-001 w/ NON MS4_TSC_01120-008								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	28413.09	7.02	0.00	0.00	7.02	994.05	6978.23	53.7%
Developed, Low Intensity	19441.03	4.80	3304.84	0.82	3.98	1104.50	4395.91	36.7%
Developed, Medium Intensity	5085.74	1.26	2407.64	0.59	0.67	1931.19	1293.90	9.6%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***52939.85***	***13.08***	***5712.48***	***1.41***	***11.67***		***12668.04***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01121-001								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	8221.54	2.03	0.00	0.00	2.03	994.05	2017.92	8.1%
Developed, Low Intensity	55773.47	13.77	0.00	0.00	13.77	1104.50	15208.97	55.2%
Developed, Medium Intensity	30651.70	7.57	0.00	0.00	7.57	1931.19	14619.11	30.3%
Developed, High Intensity	6427.13	1.59	0.00	0.00	1.59	2656.64	4224.06	6.4%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***101,073.85***	***24.96***	***0.00***	***0.00***	***24.96***		***36,070.05***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
TSC-01121-002								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	17858.29	4.41	0.00	0.00	4.41	994.05	4383.76	25.0%
Developed, Low Intensity	42082.86	10.39	0.00	0.00	10.39	1104.50	11475.76	58.0%
Developed, Medium Intensity	12475.05	3.08	0.00	0.00	3.08	1931.19	5948.07	17.0%
Developed, High Intensity	0.00	0.00	0.00	0.00	0.00	2656.64	0.00	0.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***72,416.20***	***17.88***	***0.00***	***0.00***	***17.88***		***21,807.58***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewershed								
Non-MS4-TSC-01120-006								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/ac/yr)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	0.00	0.00	0.00	0.00	0.00	994.05	0.00	0.0%
Developed, Low Intensity	0.00	0.00	0.00	0.00	0.00	1104.50	0.00	0.0%
Developed, Medium Intensity	613.23	0.15	613.23	0.15	0.00	1931.19	0.00	50.0%
Developed, High Intensity	613.23	0.15	613.23	0.15	0.00	2656.64	0.00	50.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	0.00	0.00	0.00	0.00	0.00	934.03	0.00	0.0%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***1,226.46***	***0.30***	***1,226.46***	***0.30***	***0.00***		***0.00***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Creek Watershed

Skippack Creek Sewersheds								
Total Skippack Creek								
Land Type	***Drainage Area (m^2)***	***Drainage Area (ac.)***	***Parsed Area (m2)***	***Parsed Area (ac.)***	***Planned Area (ac.)***	***Sediment Loading Rate (lbs/acre)*****	***Sediment Loading (lbs/yr)***	***Coverage (%)***
Open Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Perennial Ice/Snow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
Developed, Open Space	437913.62	108.11	62879.48	15.53	92.58	994.05	92033.13	18.1%
Developed, Low Intensity	1012693.14	250.04	89038.38	21.98	228.06	1104.50	251894.48	41.8%
Developed, Medium Intensity	742943.16	183.47	101010.98	24.94	158.53	1931.19	306141.89	30.7%
Developed, High Intensity	170625.43	42.13	55433.58	13.70	28.43	2656.64	75538.90	7.0%
Barren Land (Rock/Sand/Clay)	0.00	0.00	0.00	0.00	0.00	789.01	0.00	0.0%
Deciduous Forest	27392.39	6.77	6028.91	1.49	5.28	789.86	4168.09	1.1%
Evergreen Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Mixed Forest	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Shrub/Scrub	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Grassland/Herbaceous	0.00	0.00	0.00	0.00	0.00	835.82	0.00	0.0%
Pasture/Hay	29942.65	7.39	0.00	0.00	7.39	934.03	6902.48	1.2%
Cultivated Crops	0.00	0.00	0.00	0.00	0.00	2230.54	0.00	0.0%
Woody Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Emergent Herbaceous Wetlands	0.00	0.00	0.00	0.00	0.00	789.86	0.00	0.0%
Total	***2421510.39***	***597.90***	***314391.34***	***77.64***	***520.27***		***736678.97***	***100%***

*Approved TMDL Date - 2005; For calculation purposes, closest available land cover from NLCD taken from 2006

**Sediment Loading Rates taken from MMW Output Landcover Loading Rates for Skippack Watershed

APPENDIX C3: EXISTING BMPS TO REDUCE POLLUTANT LOADING

C.	Existing BMPs to Reduce Pollutant Loading Summary Table								
BMP #	**Watershed**	**BMP Type**	**BMP Location**	**Drainage Area Treated (acres)**	**Latitude**	**Longitude**	**Date Installed**	**O&M Responsible Party**	**Pollutant Reduction (lbs/yr) [3]**
1	Skippack Creek	Detention Basin [1]	Parkview Drive	8.7			1995	Souderton Boro	1480.2
2	Skippack Creek	Detention Basin [1]	Madison Avenue	8.24			1995	Souderton Boro	1108.5
3	Skippack Creek	Detention Basin [1]	Broad Street (Behind Monroe Motors)	1.42			1995	W W Investment Company	169.1
7	Indian Creek	Rain Garden [2]	Souderton Borough Community Pool	0.52			2011	Souderton Boro	56.9
8(A-E)	Indian Creek	Rain Gardens [2]	Reliance Crossing	10.31			2016	Reliance Crossing	10125.4
11A	Indian Creek	Rain Garden [2]	Souderton Borough Community Park	1.24			2023	Souderton Boro	671.4
11B	Indian Creek	Rain Garden [2]	Souderton Borough Community Park	3.43			2023	Souderton Boro	2145.1
11C	Indian Creek	Tree Plantings [2]	Souderton Borough Community Park	N/A			2023	Souderton Boro	371.6

Total Skippack Creek	**2757.8**	**lbs/yr**
Total Indian Creek	**13370.4**	**lbs/yr**

1: Baseline loads in older TMDLs typically did not account for load reductions from urban stromwater BMPs existing at the time of TMDL preparation. In such cases, MS4s may consider structural BMPs installed prior to the TMDL approval date in estimating existing loads. Load reductions associated with BMPs installed prior to TMDL approval date may be credited in full.

2: MS4s may claim credit for structural BMPs implemented prior to development of the PRP to reduce existing loading estimates.

3: See individual pollutant reduction calculations

Existing Sediment Pollutant Loading Reduction Calculations : BMP 001								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs/yr)**	
8.7	Skippack	TSC-01120-003	Open Space	994.05	6%	0.1	51.89	
			Low Intensity	1104.5	21%	0.1	201.79	
			Medium Intensity	1931.19	73%	0.1	1226.50	
					100%	Total	**1480.2**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Sediment Pollutant Loading Reduction Calculations : BMP 002								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
8.24	Skippack	TSC-01120-001	Open Space	994.05	18%	0.1	150.88	
			Low Intensity	1104.5	50%	0.1	455.05	
			Medium Intensity	1931.19	32%	0.1	502.53	
					100%		**1108.5**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Sediment Pollutant Loading Reduction Calculations : BMP 003								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
1.42	Skippack	TSC-01120-008	Open Space	994.05	29%	0.1	40.33	
			Low Intensity	1104.5	57%	0.1	89.62	
			Medium Intensity	1931.19	14%	0.1	39.19	
					100%		**169.1**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Sediment Pollutant Loading Reduction Calculations : BMP 007								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
0.52	Indian	IC-002	Low Intensity	1093.78	100%	0.1	56.88	
					100%		**56.9**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Pollutant Loading Calculations : BMP 008 (A-E)								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
10.31	Indian	IC-001	Open Space	984.402	55%	0.8	4429.10	
			Low Intensity	1093.78	27%	0.8	2460.16	
			Medium Intensity	2158.19	18%	0.8	3236.18	
					100%		**10125.4**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Pollutant Loading Calculations : BMP 011A								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
1.24	Indian	IC-002	Open Space	984.402	100%	0.55	671.36	
					100%		**671.4**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Pollutant Loading Calculations : BMP 011B								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Land Use Loading Rate (lb/ac/yr)[1]**	**% Coverage**	**BMP Effectiveness Value [2]**	**Sediment Pollutant Reduction (lbs)**	
3.43	Indian	IC-002	Open Space	984.402	63%	0.55	1160.67	
			Low Intensity	1093.78	19%	0.55	386.89	
			Medium Intensity	2158.19	13%	0.55	508.93	
			Hay/Pasture	751.71	6%	0.55	88.63	
					100%		**2145.1**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

Existing Pollutant Loading Calculations : BMP 011C - Tree Planting Credits								
Drainage Area Treated (ac)	**Watershed**	**Downstream MS4 Outfall**	**Land Use**	**Average Land Use Loading Rate (lb/ac/yr)[1]**	**#of Trees**	**BMP Effectiveness Value**	**Sediment Pollutant Reduction (lbs)**	
N/A	Indian	IC-002	Open Space	984.402	149	0.2	371.61	
			Low Intensity	1093.78				
			Medium Intensity	2158.19				
			Hay/Pasture	751.71				
				1247.0205	1 tree=0.01 ac	0.01	**371.6**	**lbs/yr**
Sediment Pollutant Reduction (lbs)	*=(Drainage Area) x (% land use) x (Land Use Loading Rate) x (BMP Effective Value)*							

1: Based on Wikiwatershed modelling software

2: Based on DEP BMP Effectiveness Values Doc 3800-PM-BCW0100m, Last Revised 6/2018

APPENDIX C4: LAND USE LOADING RATES CROSS-REFERENCE WIKIWATERSHED VS. APPROVED TMDL)

Skippack Creek Land Use Loading Rates Cross Reference								
MMW NLCD Land Cover	*MMW Loading Rates*	*Table 16 TMDL*	*Table 16 TMDL*			*Model My Watershed (MMW)*		
Land Use			*Area (ac)*	*Unit Area Loading (lb/ac/yr)*	*Sediment Loading (lb/yr)*	*Area (ac)*	*Sediment Loading Rate (lb/ac/yr)*	*Sediment Loading (lb/yr)*
Open Water	Open Water							
Perennial Ice/Snow	Bare Rock							
Developed, Open Space	Ld_Mixed*					2973.33	994.05	2955642.663
Developed, Low Intensity	Ld_Mixed	Lo_Int_Dev	7440.3	23.66	176033	11893.34	1104.5	13136189.61
Developed, Medium Intensity	Md_Mixed					2856.79	1931.19	5517004.28
Developed, High Intensity	Hd_Mixed	Hi_Int_Dev	1233.1	36.99	45609	906.17	2656.64	2407367.469
Barren Land (Rock/Sand/Clay)	Bare Rock					12.35	789.01	9744.2735
Deciduous Forest	Forest	Decid_For	3921.6	2.13	10002	1791.4	789.86	1414921.635
Evergreen Forest	Forest	Conif_For	2162.2	2.72	4601	1791.4	789.86	1414921.635
Mixed Forest	Forest	Mixed_For	1398.6	2.55	3801	1791.4	789.86	1414921.635
Shrub/Scrub	Forest					1791.4	789.86	1414921.635
Grassland/Herbaceous	Open Land					113.58	835.82	94932.4356
Pasture/Hay	Hay/Pasture	Hay/Past	3815.3	36.81	140426	8069.14	934.03	7536818.834
Cultivated Crops	Cropland	Cropland	13897.2	553.09	7686445	1197.53	2230.54	2671138.566
Woody Wetlands	Wetland					353.09	789.86	278891.6674
Emergent Herbaceous Wetlands	Wetland						789.86	0
		Unpaved Road	4.9	1224.72	6001			
		Transition	1495	1524.84	2279628			
		Streambank			32831254			
		Total	35368.2		43183800	35540.75		40267416.34
							Δ=	**7%**

$$\Delta = \frac{Sediment\ Loading_{TMDL} - Sediment\ Loading_{MMW}}{Sediment\ Loading_{TMDL}} \text{ x } 100\%$$

*Ld.Mixed reduced by 10% for Open Space Land Cover

APPENDIX D: PROPOSED BMPS TO REDUCE POLLUTANT LOADING

Table E.1 Indian Creek PRP/TMDL BMP Summary Table

Proposed BMP	BMP Map #	BMP Description	BMP Location	Lat.	Long.	BMP Type	TSS Removal Efficiency (%)[1]	Treated Drainage Area (ac)	Load Reduction (lbs/yr)[2]	Estimated Project Cost	Cost/lb Removed	Basin Area (sf)	Projected Time of Completion	Responsible Party	O&M Requirements	Project Phase	Project Description
A	N/A	Rain Garden	Community Park (Parking Lot	40°18'53"	- 75°19'49"	BMP 6.4.5 Rain Garden / Bioretention	55	1.06	586.66	$ 100,000.00	$ 170.46	N/A	2026	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct one rain garden which will treat runoff through stormsewer disconnection.
B	N/A	Community Pool Rain Gardens	Community Pool along Reliance Road	40°18'49"	- 75°19'60"	BMP 6.4.5 Rain Garden / Bioretention	55	2.52	3256.89	$ 100,000.00	$ 30.70	TBD	2028	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct two interconnected rain gardens which will treat runoff through stormsewer disconnection.
C1 and C2	N/A	Tree Planting (60 Trees)	Community Pool	Varies	Varies	BMP 6.7.2 Landscape Restoration	20	3.02	265.25	$ 1,500.00	$ 5.65	N/A	2026	Souderton Borough	Refer to individual BMP O&M		The Borough intends to plant 60 trees around the existing Borough pool complex to provide shade canopy specifically at impervious areas
D	N/A	Community Park Rain Garden	Community Park (Behind Municipal Office)	40°18'51"	- 75°19'49"	BMP 6.4.5 Rain Garden / Bioretention	55	0.49	438.20	$ 100,000.00	$ 228.20	TBD	2028	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct one rain garden which will treat runoff through stormsewer disconnection.
E	N/A	Community Park Rain Garden	Community Park (Near Pavillion)	40°18'54"	- 75°19'53"	BMP 6.4.5 Rain Garden / Bioretention	55	0.53	318.84	$ 100,000.00	$ 313.64	TBD	2028	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct one rain garden which will treat runoff through stormsewer disconnection.
F1 and F2	N/A	Community Park Parking Lot Rain Garden	Community Park Parking Lot	40°18'52"	- 75°19'48"	BMP 6.4.5 Rain Garden / Bioretention	55	0.46	546.02	$ 150,000.00	$ 274.71	TBD	2027	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct two rain gardens within reconstructed parking area.
G	N/A	Tree Planting (365 Trees)	Community Park	Varies	Varies	BMP 6.7.2 Landscape Restoration	20	7.52	718.61	$ 10,000.00	$ 13.92	N/A	2026	Souderton Borough	Refer to individual BMP O&M		The Borough intends to plant 365 trees around the existing Borough community park to provide shade canopy throughout the area.
H	N/A	Advanced Hydrodynamic Separator	North Fourth Street	40°19'04"	- 75°19'28"	BMP 6.6.4 Water Quality Inserts	10	7.65	881.98	$ 50,000.00	$ 56.69	N/A	2028	Souderton Borough	Refer to individual BMP O&M		The Borough intends to retrofit the existing storage pipe chambers to provide water quality of the upcoming tributary area through advanced filtration
I	N/A	Community Park Rain Garden (Parking Lot)	Community Park (Parking Lot)	40°18'52"	- 75°19'48"	BMP 6.4.5 Rain Garden / Bioretention	55	0.92	1,092.04	$ 100,000.00	$ 91.57	TBD	2027	Souderton Borough	Refer to individual BMP O&M		The Borough intends to construct one rain garden which will treat runoff.

Indian Creek Sediment Reduction Requirements Summary				**Total Estimated Project Cost**
Baseline Sediment Loading (lbs/yr)	*131,755*	**Total Load Reduction (All BMPs) (lbs/yr)**	**8,104.50**	$ 761,500.00
Existing BMPs to Reduce Sediment Loading (lbs/yr) (Refer to Table D-1)	*13,370*			
Adjusted Existing Sediment Loading (lbs/yr)	*118,385*			
10% Sediment Reduction Requirement (lbs) (2018 PAG-03 General Permit Term 2024-2029)	**11839**			

1:Based on BMP Effectiveness Values 3800-PM-BCW0100m, Rev 06/2018

2:See Loading Reduction Calculations on individual BMP Summary Sheets

Table E.1 Skippack Creek PRP/TMDL BMP Summary Table

Proposed BMP	BMP Map #	BMP Description	BMP Location	Lat.	Long.	BMP Type	TSS Removal Efficiency (%)[1]	Treated Drainage Area (ac)	Load Reduction (lbs/yr)[2]	Estimated Project Cost	Cost/lb Removed	Basin Area (sf)	Projected Time of Completion	Responsible Party	O&M Requirements	Project Phase	Funding
J	001	Parkview Drive Basin	Parkview Drive	40°18'21"	- 75°19'51"	BMP 6.6.3 Dry Extended Detention Basin	60	8.7	8,914	$ 225,000.00	$ 25.24	TBD	2027	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
K	N/A	West Street Park Vegetated Swale	West Street Park; Adjacent to Parking Lot	40°18'27"	- 75°19'44"	BMP 6.4.8 Vegetated Swale	50	5.06	3244.64	$ 30,000.00	$ 9.25	N/A	2028	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
L	N/A	Tree Planting	West Street Park	Varies	Varies	BMP 6.7.2 Landscape Restoration	20	See BMP Calculation	105.37	$ 1,500.00	$ 14.24	N/A	2026	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
M	N/A	Rain Garden	Chestnut Street Playground	40°18'33"	- 75°19'32"	BMP 6.4.5 Rain Garden / Bioretention	55	1.73	1319.63	$ 150,000.00	$ 113.67	TBD	2028	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
N	N/A	Pervious Pavement	West Street Park - Parking Lot	40°18'28"	- 75°19'43"	BMP 6.4.1 Perious Pavement with Infiltration Bed	55	0.81	584.13	$ 250,000.00	$ 427.99	N/A	2027	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
O	N/A	Rain Garden	Holly Hill Park	40°18'37"	- 75°19'41"	BMP 6.4.5 Rain Garden / Bioretention	55	16.24	12467.60	$ 225,000.00	$ 18.05	TBD	2029	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
P	N/A	Rain Garden	Chestnut Street Parking	40°18'36"	- 75°19'24"	BMP 6.4.5 Rain Garden / Bioretention	55	0.38	403.62	$ 300,000.00	$ 743.28	TBD	2026	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
Q	N/A	Rain Garden	Lawn Avenue Park	40°18'24"	- 75°19'05"	BMP 6.4.5 Rain Garden / Bioretention	55	1.77	1551.34	$ 125,000.00	$ 80.58	TBD	2026	Souderton Borough	Refer to individual BMP O&M		General Funds/Grants
R	N/A	Stream Restoration	174 Cowpath Road			Stream Restoration	N/A	N/A	86,250.00	$ 337,500.00	$ 3.91	N/A	2029	Souderton Borough	Refer to individual BMP O&M		

Skippack Creek Sediment Reduction Requirements Summary				**Total Estimated Project Cost**
Baseline Sediment Loading (lbs/yr)	*736,678*	**Total Load Reduction (All BMPs) (lbs/yr)**	114,840.4	$ 1,644,000.0
Existing BMPs to Reduce Sediment Loading (lbs/yr) (Refer to Table D-1)	*2,758*			
Adjusted Sediment Loading (lbs/yr)	*733,920*			
10% Sediment Reduction Requirement (lbs) (Permit Term 2024-2029)	73392			

1:Based on BMP Effectiveness Values 3800-PM-BCW0100m, Rev 06/2018

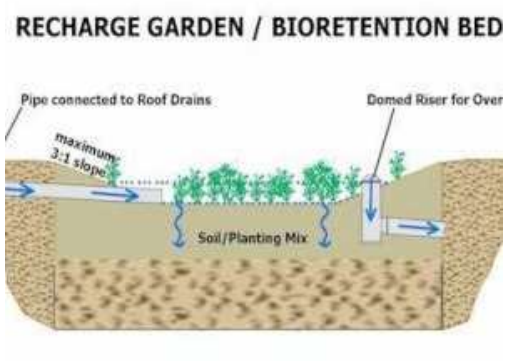
2:See Loading Reduction Calculations on individual BMP Summary Sheets

BMP # A

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'53", -75°19'49"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden which will treat runoff through storm sewer disconnection.
Estimated Project Cost:
$100,000
Project Funding: General Funds/Grants
Treated Drainage Area:
1.06 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	984.40	*80%*
Developed, Low	1093.78	*20%*
	Total	*100%*

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (1.06 ac x 0.80 x 984.40 lb/ac/yr x 0.55) +(1.06 ac x 0.20 x 1093.78 lb/ac/yr x 0.55) = **586.66 lbs/yr**

BMP # A

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'53", -75°19'49"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

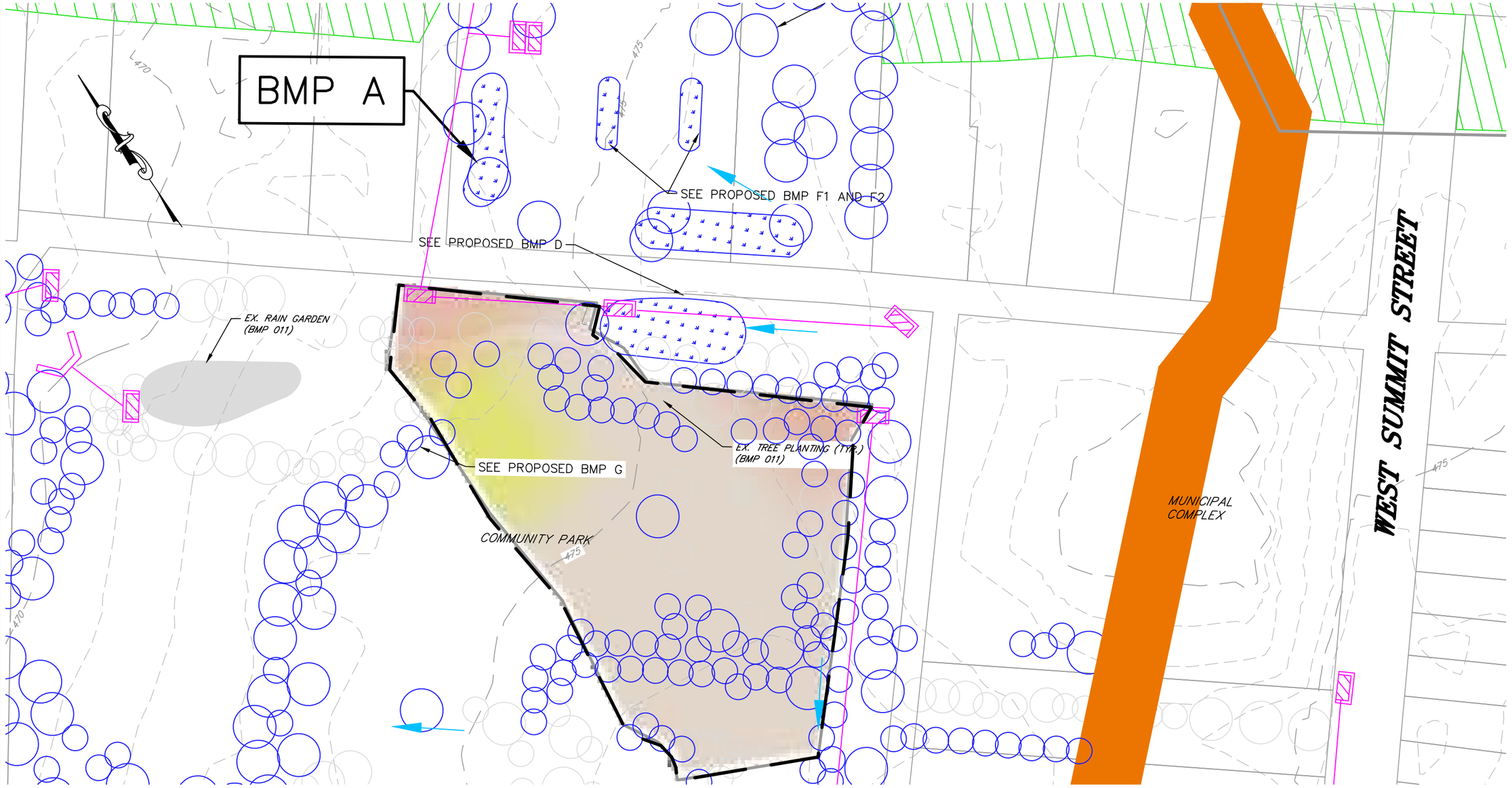
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP A
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

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BMP # B

BMP Description:	Tree Plantings (60 Trees)
Location:	Community Pool
Lat/Long:	Varies
BMP type:	Landscape Restoration

BMP Information

BMP 6.7.2: Landscape Restoration

Landscape Restoration is the general term used for actively sustainable landscaping practices that are implemented outside of riparian (or other specially protected) buffer areas. Landscape Restoration includes the restoration of forest (i.e. reforestation) and/or meadow and the conversion of turf to meadow. In a truly sustainable site design process, this BMP should be considered only after the areas of development that require landscaping and/or revegetation are minimized. The remaining areas that do require landscaping and/or revegetation should be driven by the selection and use of vegetation (i.e., native species) that does not require significant chemical maintenance by fertilizers, herbicides, and pesticides..

From PA BMP Manual

Project Description:
The Borough intends to plant 60 trees around the existing Borough pool complex to provide shade canopy specifically at impervious areas.
Estimated Project Cost:
$1,500
Project Funding: General Funds/Grants
BMP Efficiency: 20%

Total Planting Area: 3.02 ac
Land Use Loading Rate/ % Area:
Developed, Low: 1093.78/29.2%
Developed, Medium: 2158.19/32.4%
Developed, High: 3107.29/38.4%

Average Sediment Loading Rate based upon Land Use NLCD 2006 in Planting Area:
= Sum (Planting Area (ac) x % area x land use loading rate) / Total Planting Area (ac)
=((3.02 ac x 0.292 x 1093.78) +(3.02 x 0.324 x 2158.19) + (3.02 x .384 x 3107.29)) / 3.02
=2210 lb/ac/yr

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

Step #1 : Multiply Number of Trees by 0.01.
60 trees x 0.01 = 0.60 ac

Step #2: Multiply the acreage found in Step 1 by Average Sediment Loading Rate (see above)
0.60 ac x 2210 lb/ac/yr = 1326.27 lb/yr

Step #3: Multiply Step 2 by BMP Effectiveness value: 1326.27 lb/yr X 0.20 ***= 265.25 lbs/yr***

BMP # B

BMP Description:	Tree Planting (60 Trees)
Location:	Community Pool
Lat/Long:	Varies
BMP type:	Landscape Restoration

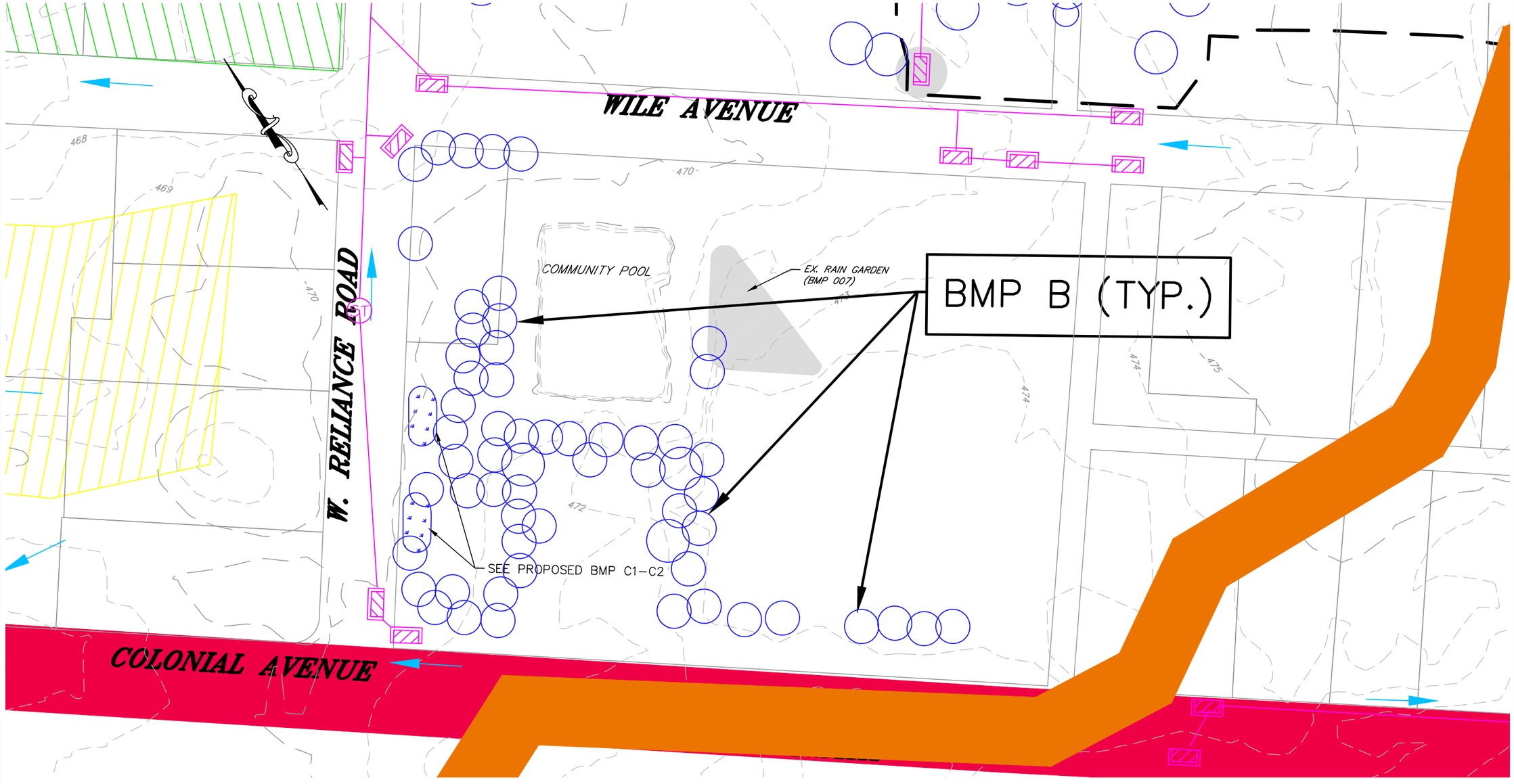
Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –

- Initial watering and weekly watering during dry periods may be necessary during the first growing season
- Check perimeter fencing to avoid browse damage from deer



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP B
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

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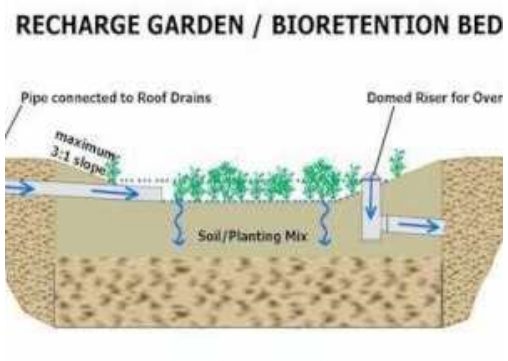
BMP # C1-C2

BMP Description:	Community Pool Rain Gardens
Location:	Community Pool along Reliance Road
Lat/Long:	40°18'49", -75°19'60"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



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Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

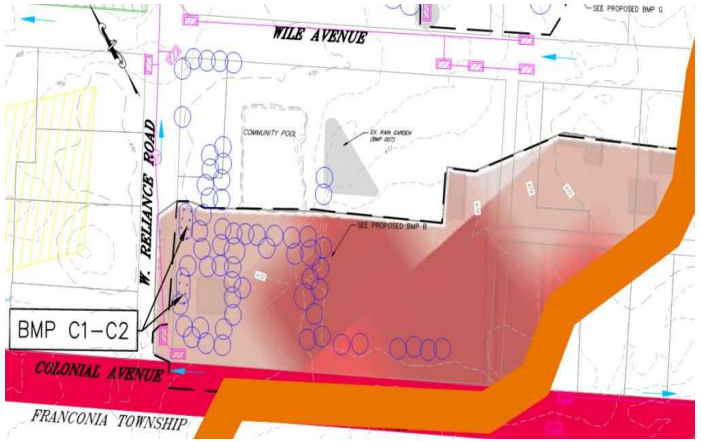
From PA BMP Manual

Project Description:
The Borough intends to construct two interconnected rain gardens and disconnect/divert runoff from an existing pipe conveyance on Reliance Road
Estimated Project Cost:
$100,000
Project Funding: General Funds/Grants
Treated Drainage Area:
2.52 acres
BMP Efficiency: 55%

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Low	1093.78	*23.1%*
Developed, Med	2158.19	*30.8%*
Developed, High	3107.29	*46.1%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (2.52 ac x 0.231 x 1093.78 lb/ac/yr x 0.55) +(2.52 ac x 0.308 x 2158.19 lb/ac/yr x 0.55) + (2.52 ac x 0.461 x 3107.29 lb/ac/yr x 0.55) = **3256.89 lbs/yr**

BMP # C1-C2

BMP Description:	Community Pool Rain Gardens
Location:	Community Pool along Reliance Road
Lat/Long:	40°18'49", -75°19'60"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement

LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP C1 AND C2
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

60 0 60 120 SCALE IN FEET

DRAWN BY: CMK

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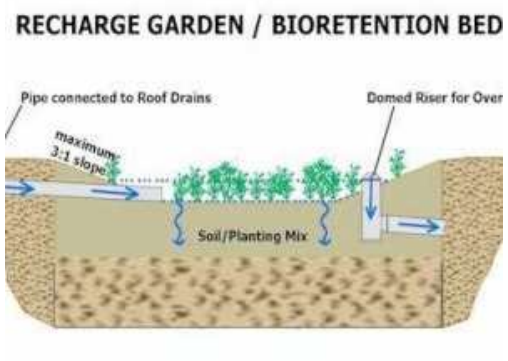
BMP # D

BMP Description:	Community Park Rain Garden
Location:	Community Park (Behind Municipal Office)
Lat/Long:	40°18'51", -75°19'49"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden which will treat runoff through storm sewer disconnection.
Estimated Project Cost:
$100,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.49 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Low	1093.78	*50.0%*
Developed, Med	2158.19	*50.0%*
	Total	*100%*

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.49 ac x 0.50 x 1093.78 lb/ac/yr x 0.55) +(0.49 ac x 0.50 x 2158.19 lb/ac/yr x 0.55) = **438.20 lbs/yr**

BMP # D

BMP Description:	Community Park Rain Garden
Location:	Community Park (Behind Municipal Office)
Lat/Long:	40°18'51", -75°19'49"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –

- Prune and weed vegetation, as needed

As needed –

- Respread mulch when erosion is evident

Greater than 1 inch storm –

- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –

- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –

- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –

- Water frequently

Every two to three years –

- Mulch replacement

HARRISON AVENUE

CLARION AVENUE

SR-NORTH MAIN STREET

WEST SUMMIT STREET

SEE PROPOSED BMP L

SEE PROPOSED BMP A

SEE PROPOSED BMP F1 AND F2

SEE PROPOSED BMP I

EX. RAIN GARDEN (BMP 011)

BMP D

SEE PROPOSED BMP E

SEE PROPOSED BMP G

EX. TREE PLANTING (TYP.) (BMP 011)

COMMUNITY PARK

MUNICIPAL COMPLEX

475

480

470

LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027

DATE: 03/31/2025

SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP D

SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

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SCALE: 120 60 0 60 FEET IN

DRAWN BY: CMK

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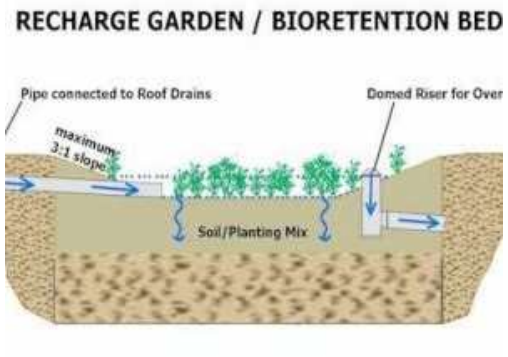
BMP # E

BMP Description:	Community Park Rain Garden
Location:	Community Park (Near Pavillion)
Lat/Long:	40°18'54", -75°19'53"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

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The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

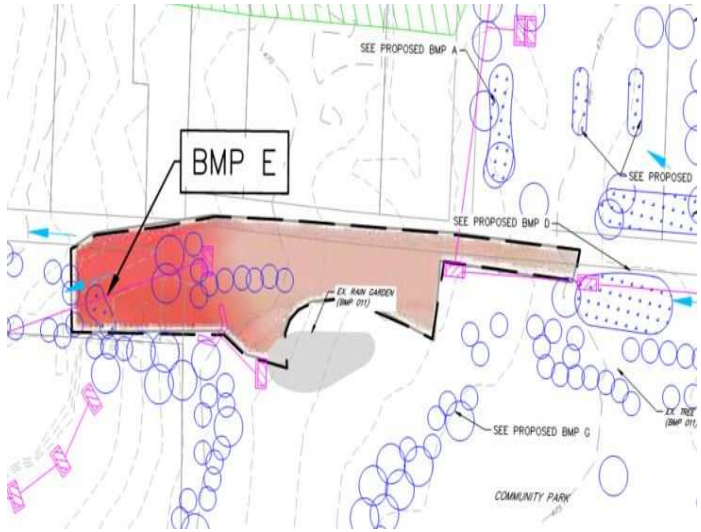
From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden which will treat runoff through storm sewer disconnection.
Estimated Project Cost:
$100,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.53 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Low	1093.78	*100.0%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.53 ac x 1 x 1093.78 lb/ac/yr x 0.55) = **318.84 lbs/yr**

BMP # E

BMP Description:	Community Park Rain Garden
Location:	Community Park (Near Pavillion)
Lat/Long:	40°18'54", -75°19'53"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

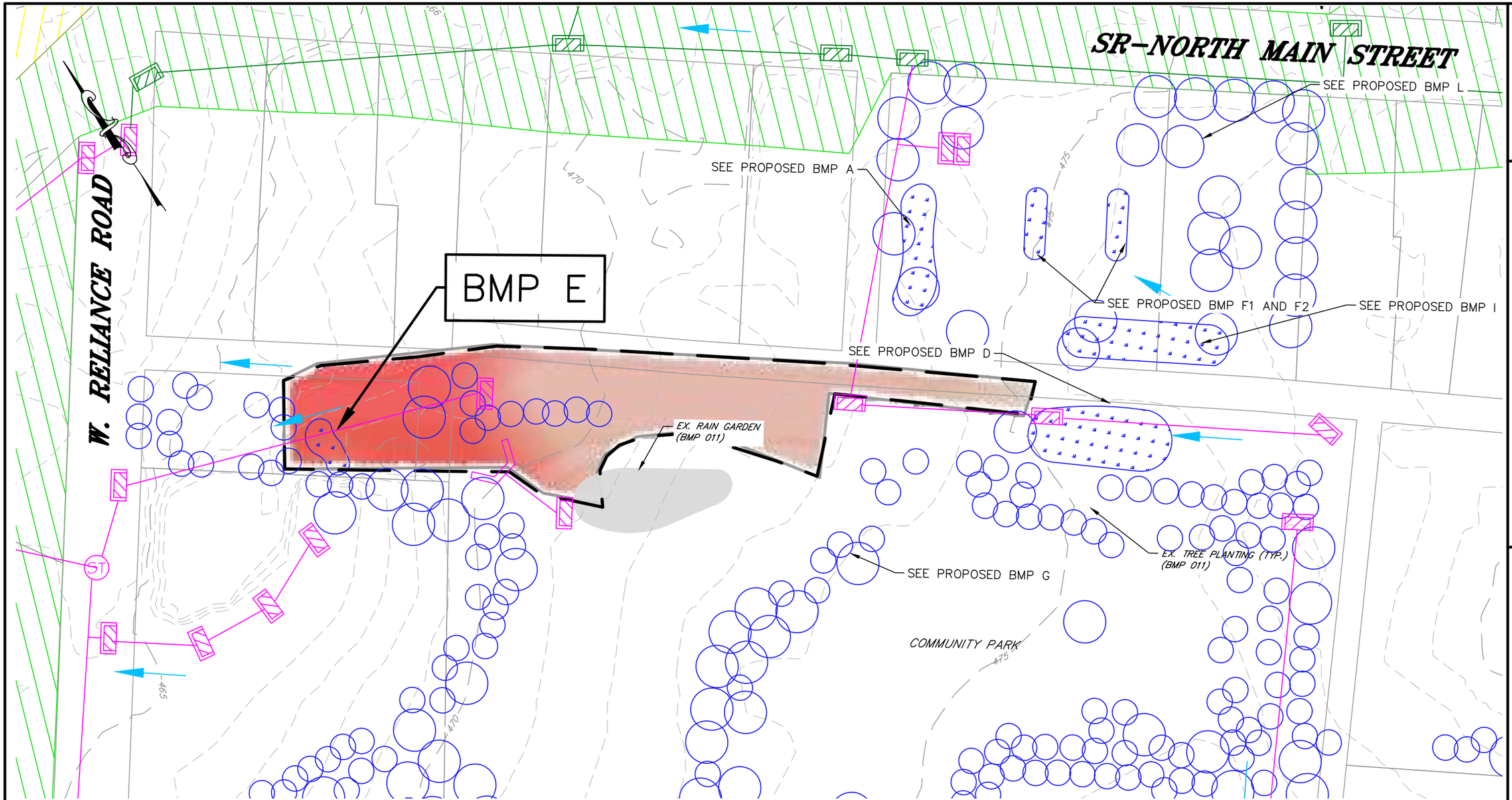
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP E
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

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ENGINEERING & CONSULTING SERVICES
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SCALE: 60 0 60 120 IN FEET

DRAWN BY: CMK

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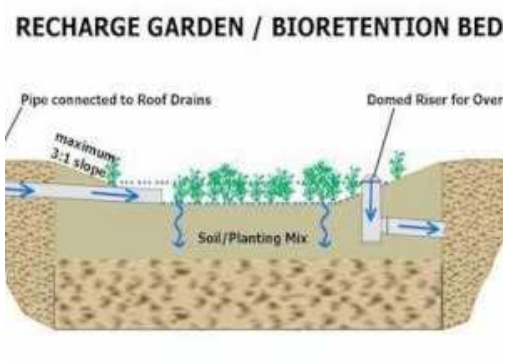
BMP # F1 AND F2

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'52", -75°19'48"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



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From PA BMP Manual

Project Description:
The Borough intends to construct two rain gardens within a parking lot reconstruction.
Estimated Project Cost:
$150,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.46 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Med	2158.19	*100.0%*
	Total	*100%*

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.46 ac x 1 x 2158.19 lb/ac/yr x 0.55) = **546.02 lbs/yr**

BMP # F1 AND F2

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'52", -75°19'48"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

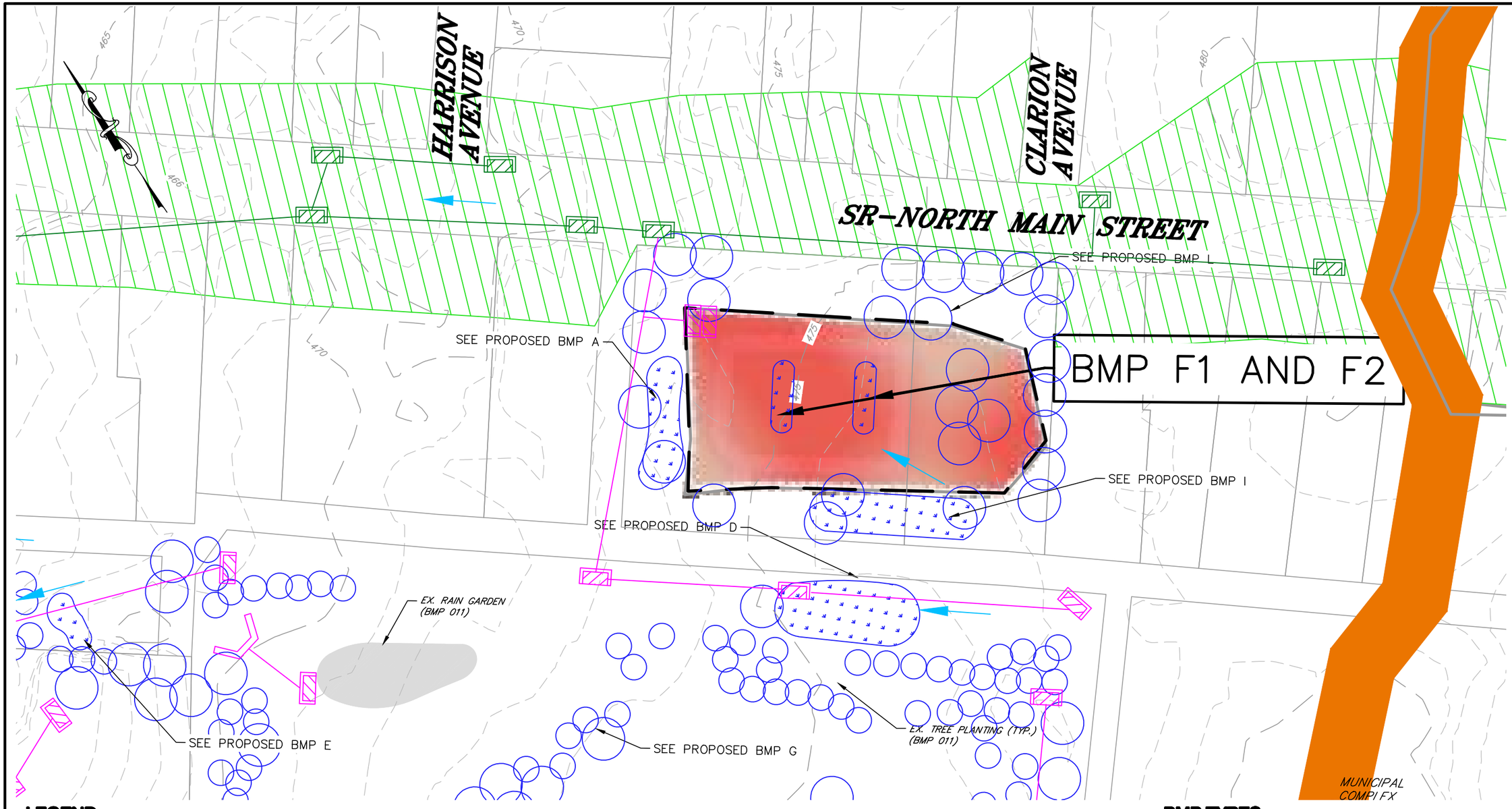
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309827
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT

BMPS F1 AND F2

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

SCALE: 120 60 0 60 IN FEET

DRAWN BY: CMK

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BMP # G

BMP Description:	Tree Plantings (365 Trees)
Location:	Community Park
Lat/Long:	Varies
BMP type:	Landscape Restoration

BMP Information

BMP 6.7.2: Landscape Restoration

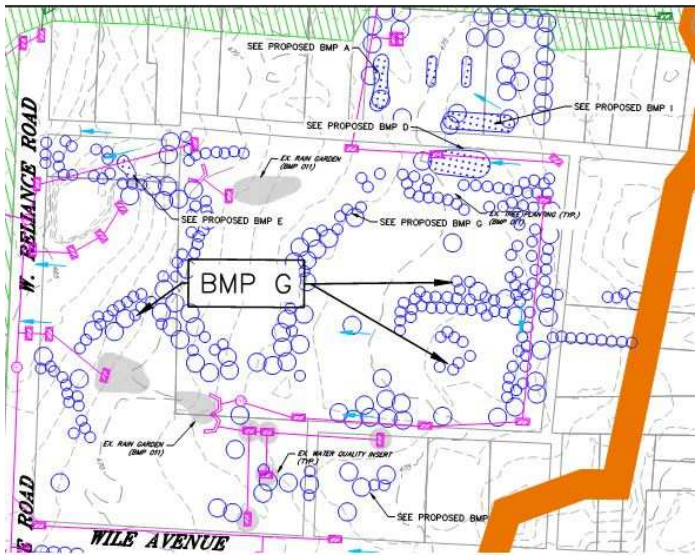
Landscape Restoration is the general term used for actively sustainable landscaping practices that are implemented outside of riparian (or other specially protected) buffer areas. Landscape Restoration includes the restoration of forest (i.e. reforestation) and/or meadow and the conversion of turf to meadow. In a truly sustainable site design process, this BMP should be considered only after the areas of development that require landscaping and/or revegetation are minimized. The remaining areas that do require landscaping and/or revegetation should be driven by the selection and use of vegetation (i.e., native species) that does not require significant chemical maintenance by fertilizers, herbicides, and pesticides..

From PA BMP Manual

Project Description:
The Borough intends to plant 365 trees around the existing community park to provide shade canopy throughout the area.
Estimated Project Cost:
$10,000
Project Funding: General Funds/Grants
BMP Efficiency: 20%

Total Planting Area: 7.52 ac
Land Use Loading Rate/ % Area:
Open Space: 984.40 / 100%

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

Step #1 : Multiply Number of Trees by 0.01.
365 trees x 0.01 = 3.65 ac

Step #2: Multiply the acreage found in Step 1 by Average Sediment Loading Rate (see above)
3.65 ac x 984.40 lb/ac/yr = 3,593.06 lb/yr

Step #3: Multiply Step 2 by BMP Effectiveness value: 3,593.06 lb/yr X 0.20 = ***718.61 lbs/yr***

BMP # G

BMP Description:	Tree Planting (365 Trees)
Location:	Community Park
Lat/Long:	Varies
BMP type:	Landscape Restoration

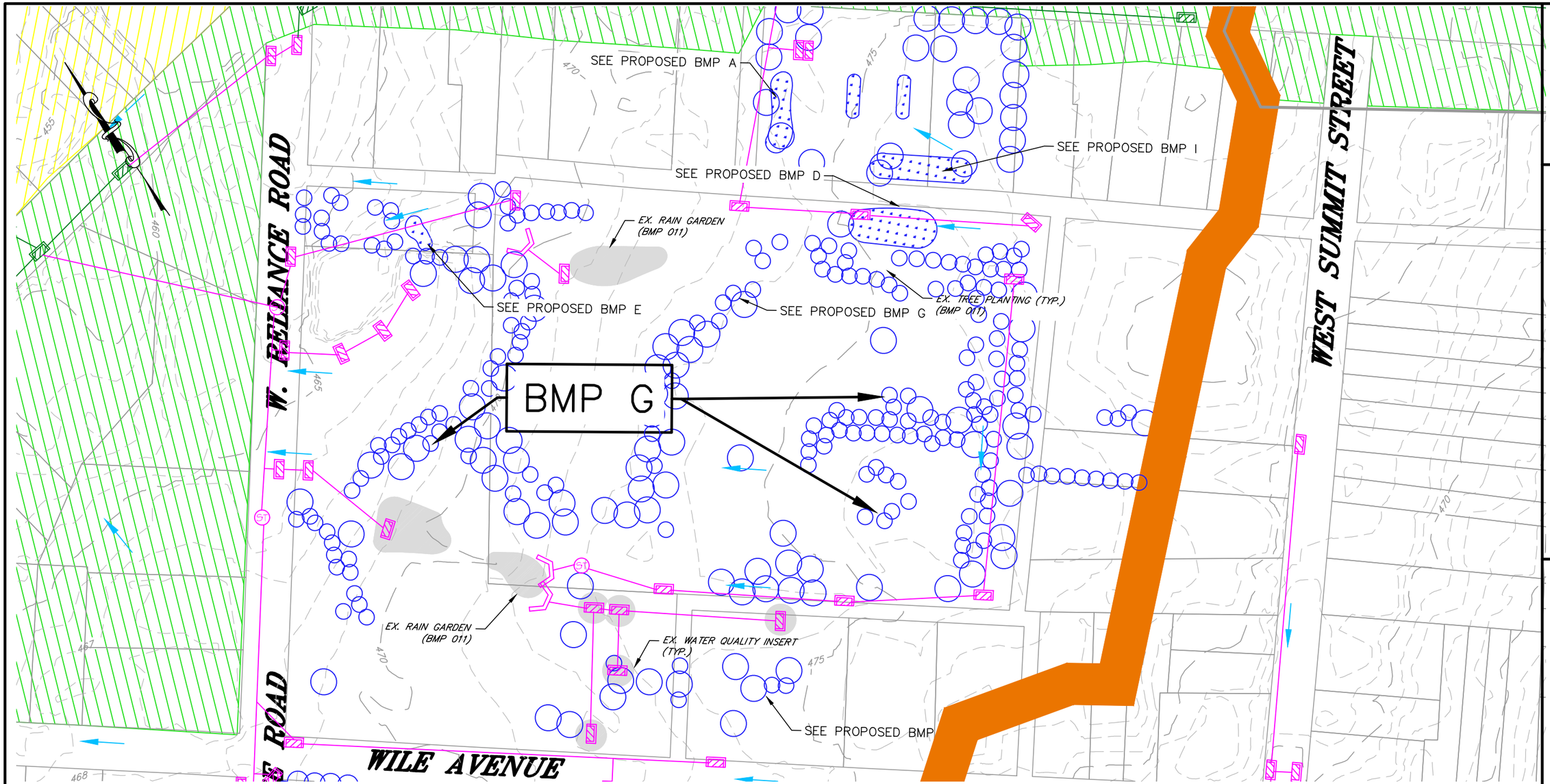
Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –

- Initial watering and weekly watering during dry periods may be necessary during the first growing season
- Check perimeter fencing to avoid browse damage from deer



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=100'

SOUDERTON BOROUGH PRP/TMDL

BMP G – TREE PLANTING

PROPOSED BMPS EXHIBITS

SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
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SCALE: 100 0 100 200 IN FEET

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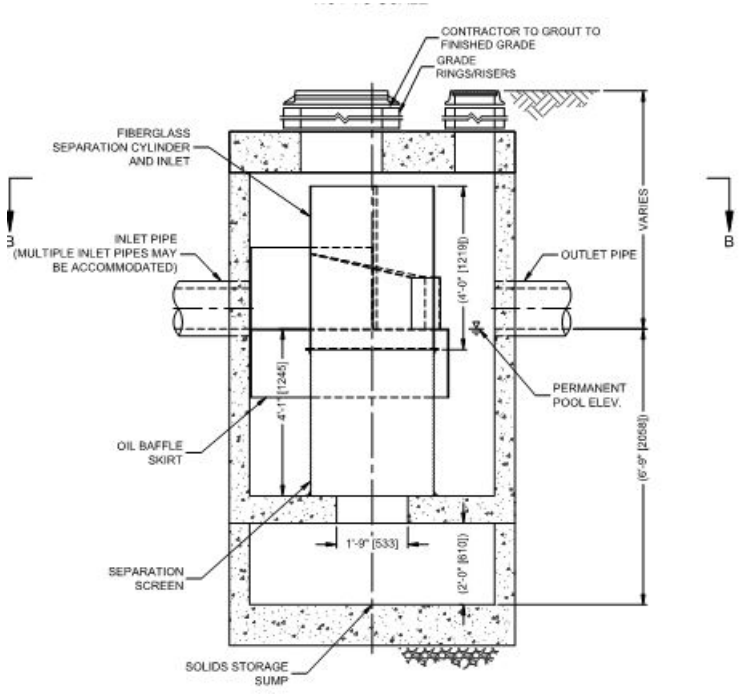
BMP # H

BMP Description:	Advanced Hydrodynamic Separator
Location:	North Fourth Street
Lat/Long:	40°19'04", -75°19'28"
BMP type:	Water Quality Device

BMP Information

BMP 6.6.4: Water Quality Filters & Hydrodynamic Devices



Project Description:
The Borough intends to install an advanced hydrodynamic separator at the referenced stormwater inlet to remove sediment, oil and grease, litter and debris

Estimated Project Cost:
$50,000

Project Funding: General Funds/Grants

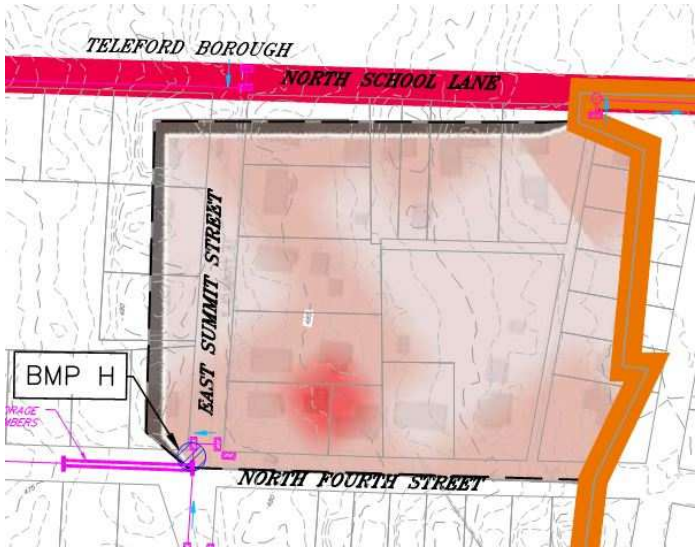
Treated Drainage Area:
7.65 acres

BMP Efficiency: 10%

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	984.40	*32.1%*
Developed, Low	1093.78	*59.0%*
Developed, Medium	2158.19	*8.98%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= (Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate

= 7.65 ac x 0.321 x 984.40 lb/ac/yr x 0.10) + (7.65 ac x 0.590 x 1093.78 lb/ac/yr x 0.10) + (7.65 ac x 0.089 x 2158.19 lb/ac/yr x 0.10) = **881.98 lbs/yr**

BMP # H

BMP Description:	Advanced Hydrodynamic Device
Location:	North Fourth Street
Lat/Long:	40°19'04", -75°19'28"
BMP type:	Water Quality Device

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

As needed –

- Empty when over half full of sediment and trash

Greater than 1 inch storm –

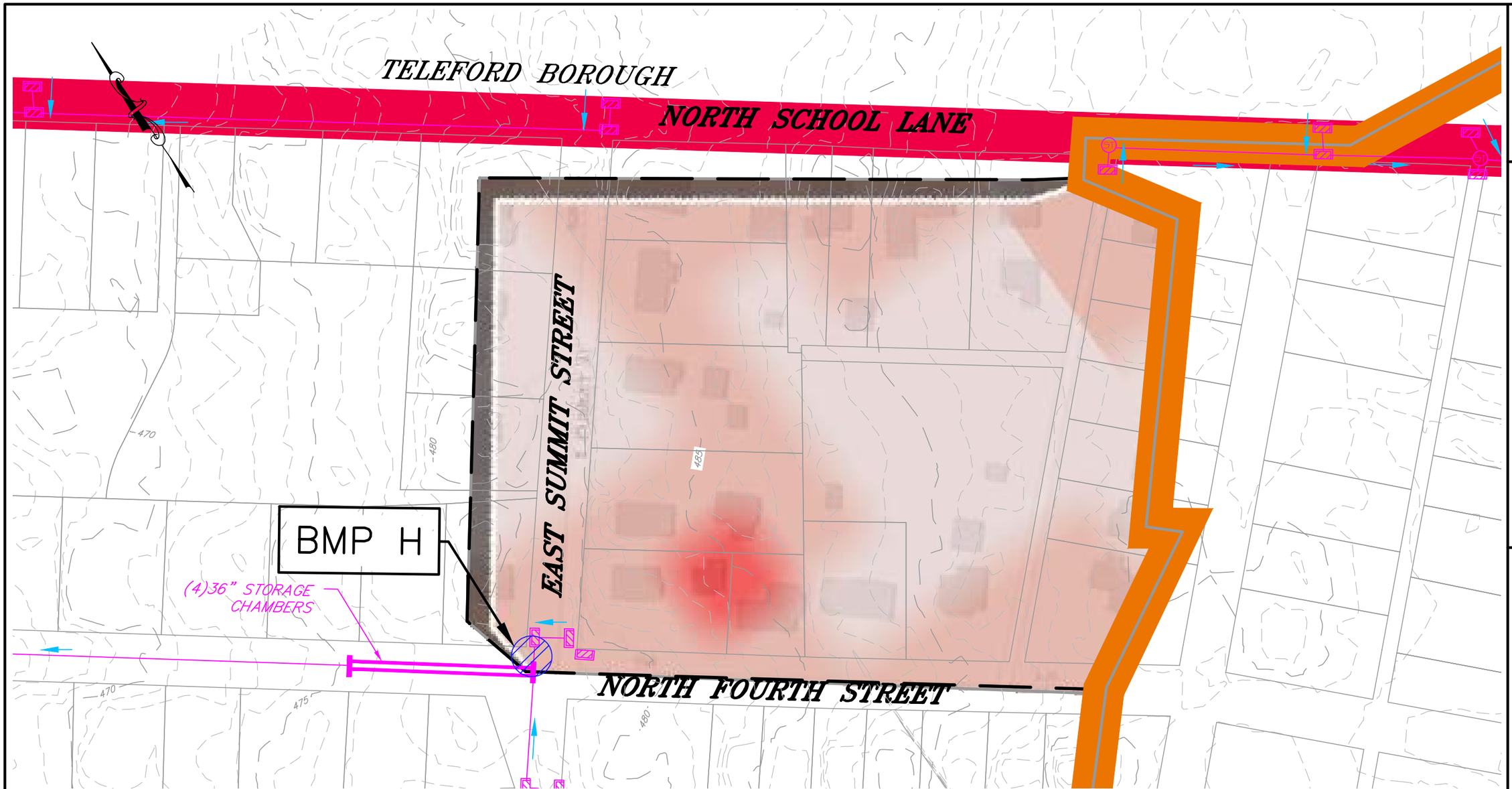
- Inspect to ensure the insert is functioning properly, empty as necessary

Biannually –

- Inspect and clean the inlet insert

Winter months –

- Inspect more frequently due to increase of sand and salt applications



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=100'

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP H

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

100 0 100 200 SCALE IN FEET

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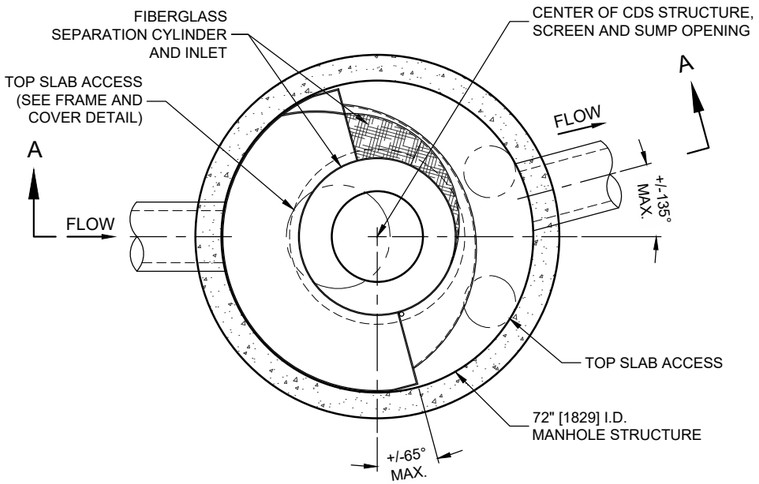
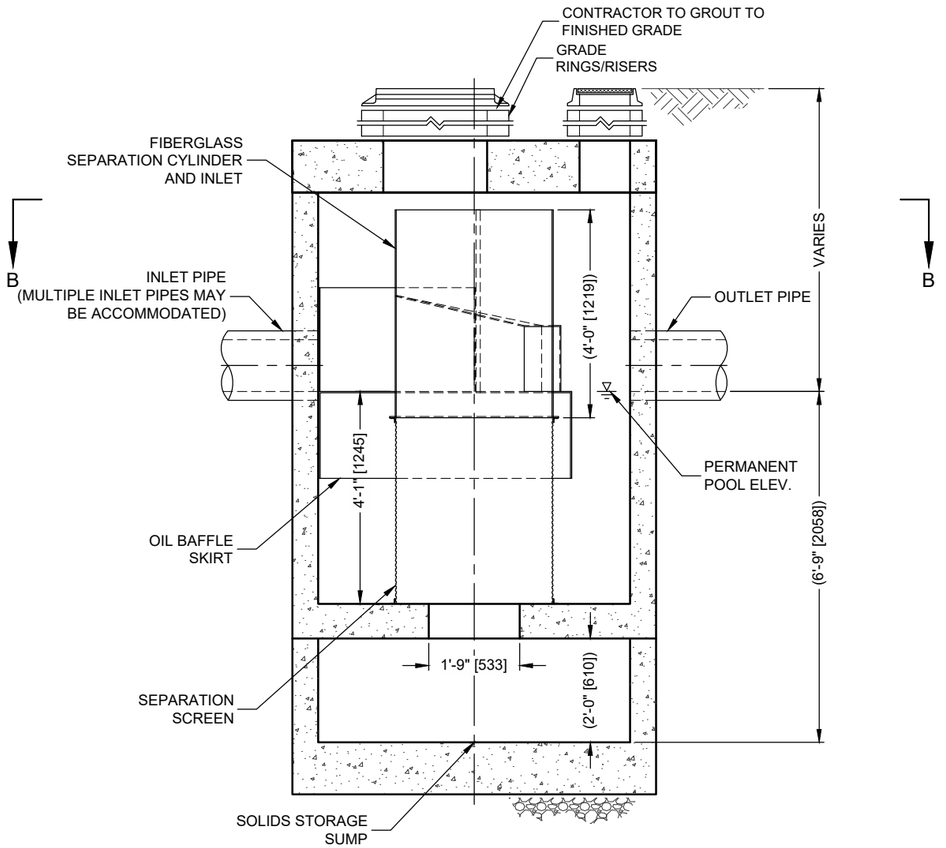


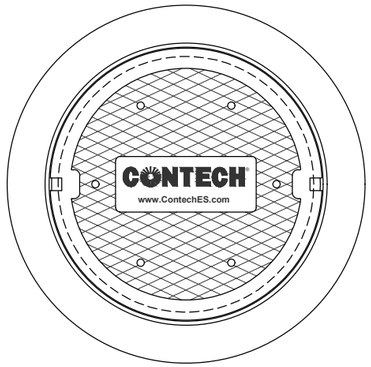
PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CDS3035-6-C DESIGN NOTES

CDS3035-6-C STANDARD CONFIGURATION IS SHOWN.



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

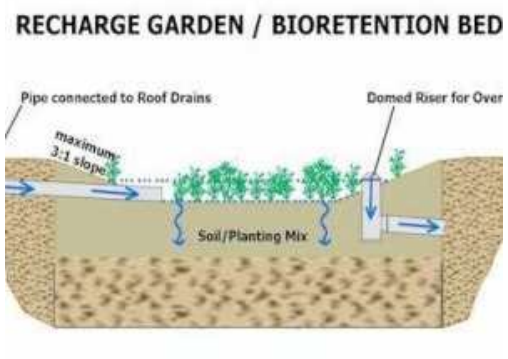
CDS3035-6-C
ONLINE CDS
STANDARD DETAIL

BMP # I

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'52", -75°19'48"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

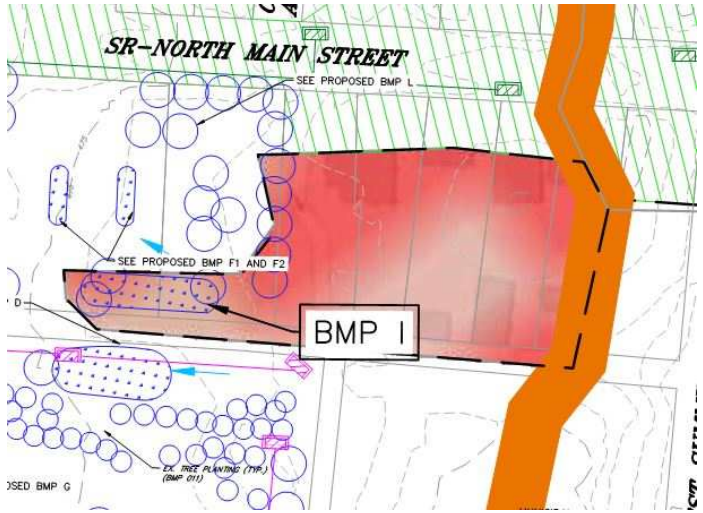
From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden which will treat runoff through storm sewer disconnection.
Estimated Project Cost:
$100,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.92 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Med	2158.19	*100.0%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.92 ac x 1 x 2158.19 lb/ac/yr x 0.55) = **1092.04 lbs/yr**

BMP # I

BMP Description:	Community Park Rain Garden
Location:	Community Park (Parking Lot)
Lat/Long:	40°18'52", -75°19'48"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

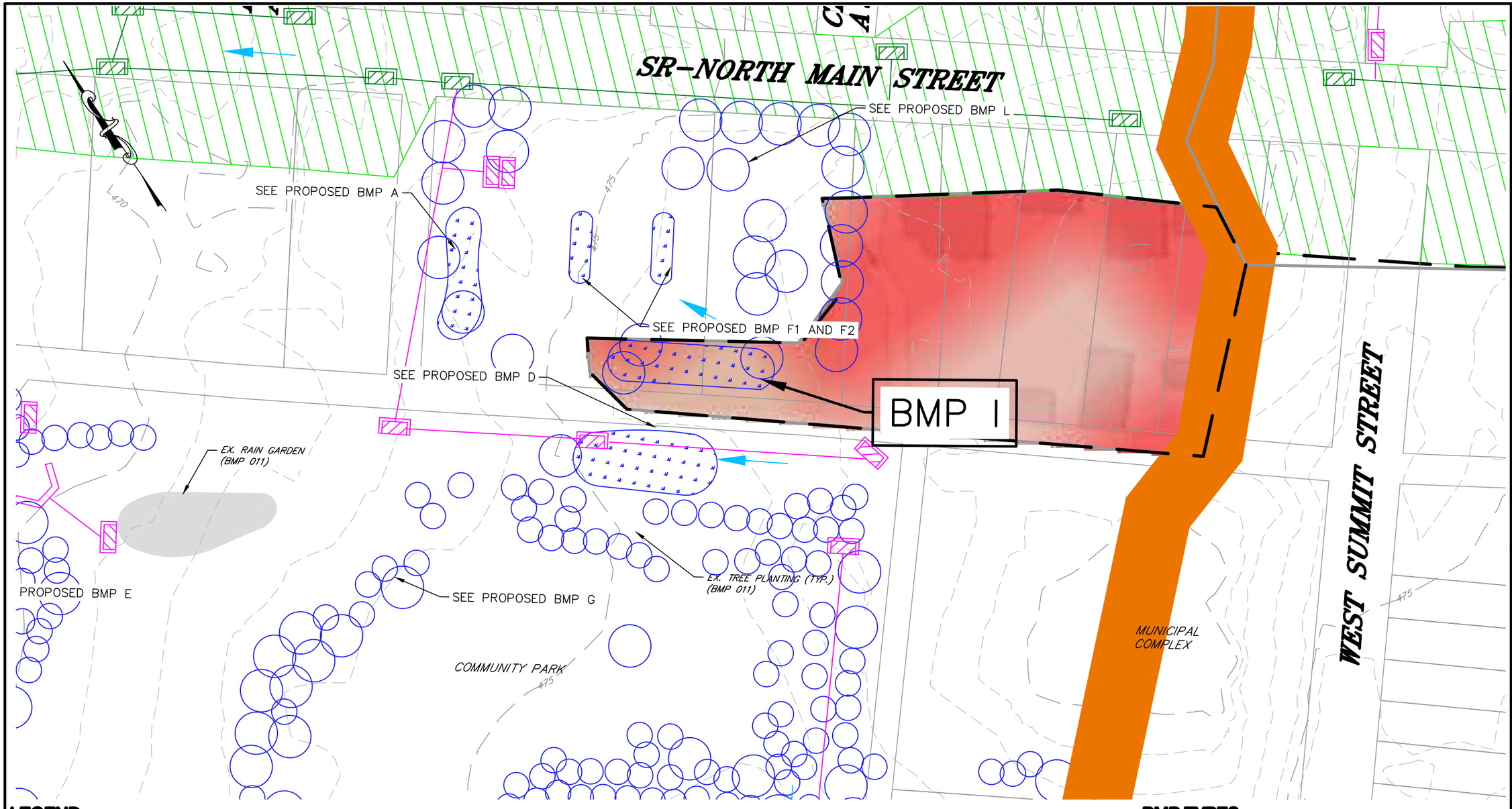
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP I

SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

SCALE: 60 0 60 120 IN FEET

DRAWN BY: CMK

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BMP # J

BMP Description:	Parkview Drive Basin Retrofit
Location:	Parkview Drive
Lat/Long:	40°18'21", -75°19'51"
BMP type:	Dry Extended Detention Basin

BMP Information

BMP 6.6.3: Dry Extended Detention Basin

A dry extended detention basin is an earthen structure constructed either by impoundment of a natural depression or excavation of existing soil, that provides temporary storage of runoff and functions hydraulically to attenuate stormwater runoff peaks. The dry detention basin, as constructed in countless locations since the mid-1970's and representing the primary BMP measure until now, has served to control the peak rate of runoff, although some water quality benefit accrued by settlement of the larger particulate fraction of suspended solids. This extended version is intended to enhance this mechanism in order to maximize water quality benefits.

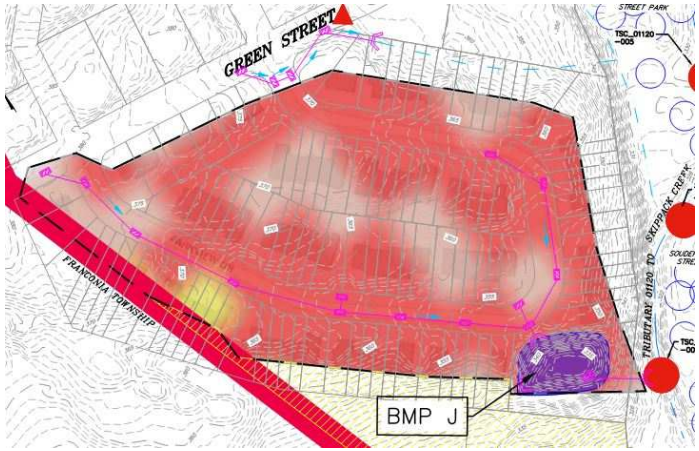
From PA BMP Manual

Project Description:
The Borough intends to retrofit the existing detention basin through removal of the low flow concrete channel, reconfiguration of the outlet structure to promote recharge and vegetation naturalization.
Year Constructed:
1995
Estimated Project Cost:
$225,000*
Project Funding: General Funds/Grants
Treated Drainage Area:
8.7 acres
BMP Efficiency: 60%
Map #: 001

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	994.05	*5.2%*
Developed, Low	1104.5	*21.1%*
Developed, Medium	1931.19	*73.7%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (8.70 ac x 0.052 x 994.05 lb/ac/yr x 0.60) + (8.70 ac x 0.211 x 1104.5 lb/ac/yr x 0.60)+ (8.7 ac x 0.737 x 1931.19 lb/ac/yr x 0.60) = **8914.12 lbs/yr**

BMP # J

BMP Description:	Parkview Drive Basin Retrofit
Location:	Parkview Drive
Lat/Long:	40°18'21", -75°19'51"
BMP type:	Dry Extended Detention Basin

Existing BMP:

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

As needed –

- Mowing and/or trimming of vegetation should be performed to sustain the system, but all detritus should be removed from the basin.

Greater than 1 inch storm –

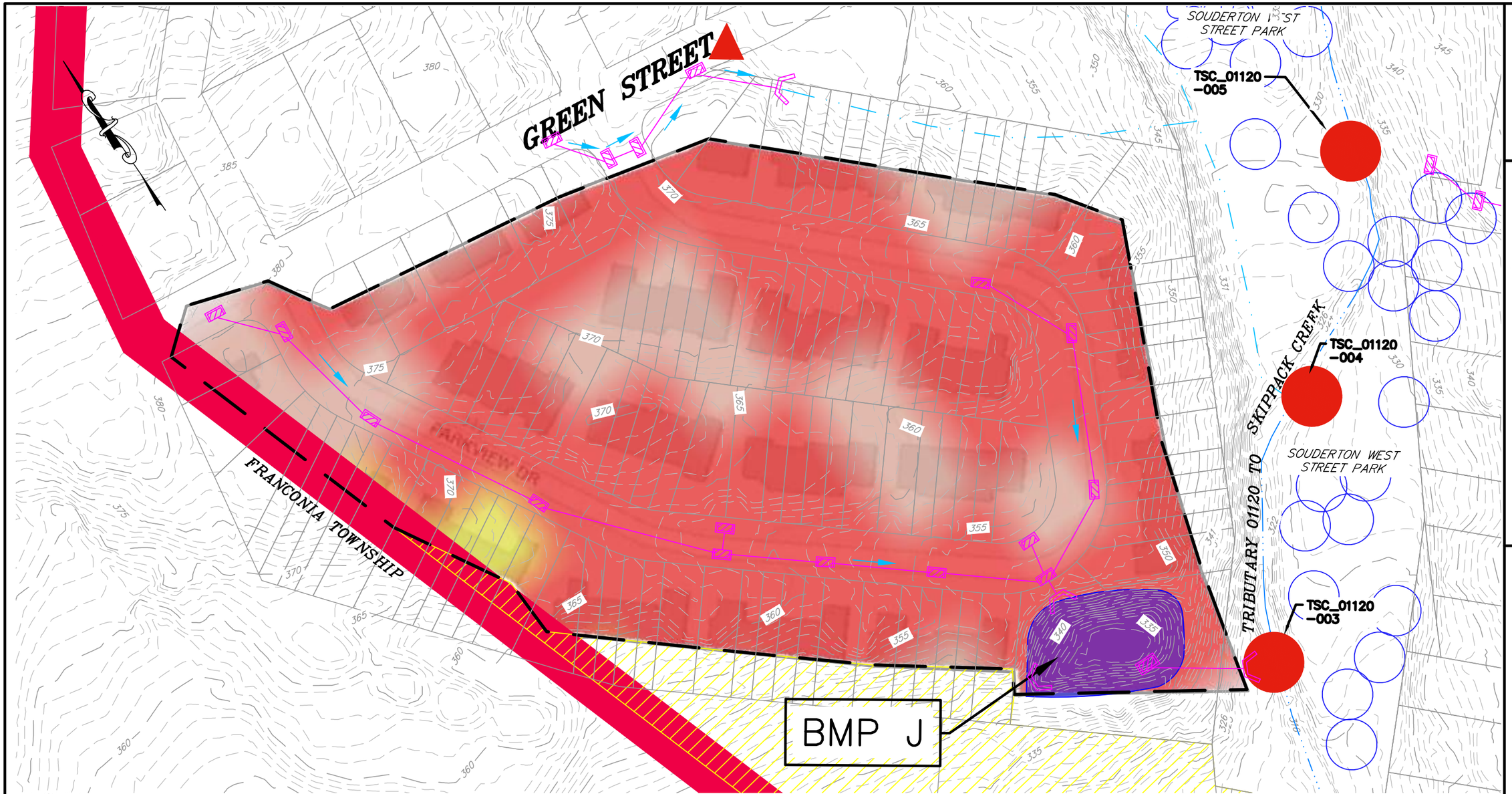
- All basin structures expected to receive and/or trap debris and sediment should be inspected for clogging and excessive debris and sediment accumulation

Quarterly –

- All basin structures expected to receive and/or trap debris and sediment should be inspected for clogging and excessive debris and sediment accumulation

Annually –

- Vegetated areas should be inspected annually for erosion, unwanted growth of exotic/invasive species and maintained at a minimum of 95%.



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=100'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP J
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

100 0 100 200 SCALE IN FEET

DRAWN BY: CMK

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BMP # K

BMP Description:	West Street Park Vegetated Swale
Location:	West Street Park
Lat/Long:	40°18'27", -75°19'44"
BMP type:	Vegetated Swale

BMP Information

BMP 6.4.8: Vegetated Swale

A Vegetated Swale is a broad, shallow, trapezoidal or parabolic channel, densely planted with a variety of trees, shrubs, and/or grasses. It is designed to attenuate and in some cases infiltrate runoff volume from adjacent impervious surfaces, allowing some pollutants to settle out in the process. In steeper slope situations, check dams may be used to further enhance attenuation and infiltration opportunities.

From PA BMP Manual

Project Description:
The Borough intends to construct a vegetated swale at the downstream end of an existing endwall discharge to provide water quality prior to entering the stream

Estimated Project Cost:
$30,000

Project Funding: General Funds/Grants

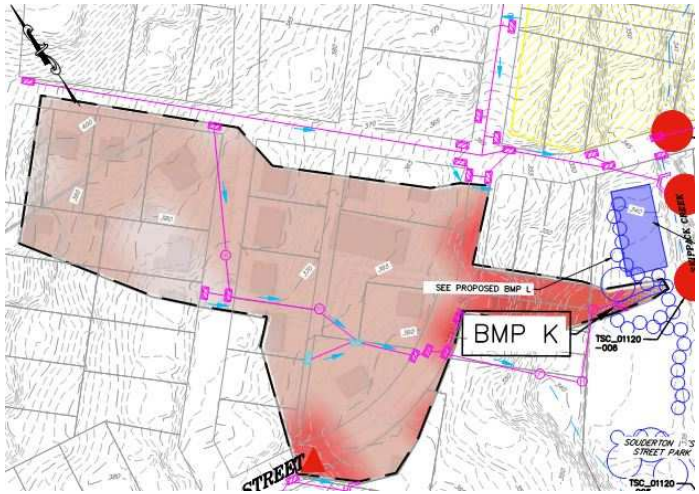
Treated Drainage Area:
5.06 acres

BMP Efficiency: 50%

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	994.05	*9.1%*
Developed, Low	1104.5	*68.2%*
Developed, Medium	1931.19	*22.7%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (5.06 ac x 0.091 x 994.05 lb/ac/yr x 0.50) + (5.06 ac x 0.682 x 1104.50 lb/ac/yr x 0.50)+ (5.06 ac x 0.227 x 1931.19 lb/ac/yr x 0.50) = **3244.64 lbs/yr**

BMP # K

BMP Description:	West Street Park Vegetated Swale
Location:	West Street Park
Lat/Long:	40°18'27", -75°19'44"
BMP type:	Vegetated Swale

Operations & Maintenance Program

**adapted from PA BMP Manual*

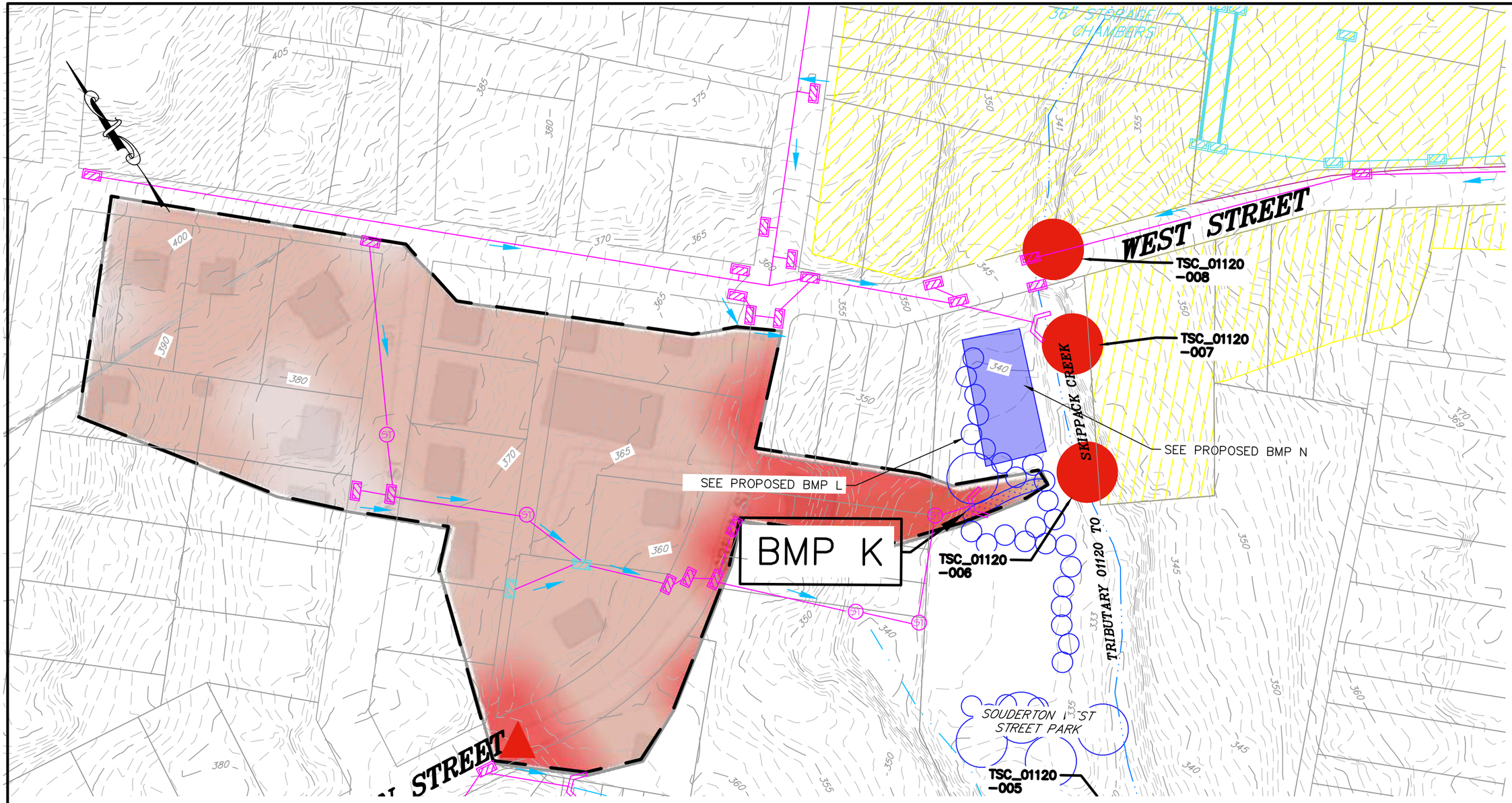
Responsible Party: Souderton Borough
Contact Number: 215-723-4371

As needed –

- Plant alternative grass species in the even of unsuccessful establishment
- Reseed bare areas; install appropriate erosion control measures when native soil is exposed or erosion channels are forming
- Rototill and replant swale if draw down time is more than 48 hours
- Inspect and correct check dams when signs of altered water flow (channelization, obstructions, erosion, etc.) are identified

Greater than 1 inch storm and Annually–

- Inspect and correct erosion problems, damage to vegetation, and sediment and debris accumulation
- Inspect vegetation on side slopes for erosion and formation of rills or gullies, correct as needed
- Inspect for pools of standing water; dewater and discharge to an approved location and restore to design grade
- Mow and trim vegetation to ensure safety, aesthetics, proper swale operation, or to suppress weeds and invasive vegetation; dispose of cuttings in a local composting facility; mow only when swale is dry to avoid rutting
- Inspect for litter; remove prior to mowing
- Inspect for uniformity in cross section and longitudinal slope, correct as needed
- Inspect swale inlet and outlet for signs of erosion or blockage, correct as needed.



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=100'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP K
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

100 0 100 200 FEET
SCALE IN

DRAWN BY: CMK

BMP # L

BMP Description:	Tree Plantings (53 Trees)
Location:	West Street Park
Lat/Long:	Varies
BMP type:	Landscape Restoration

BMP Information

BMP 6.7.2: Landscape Restoration

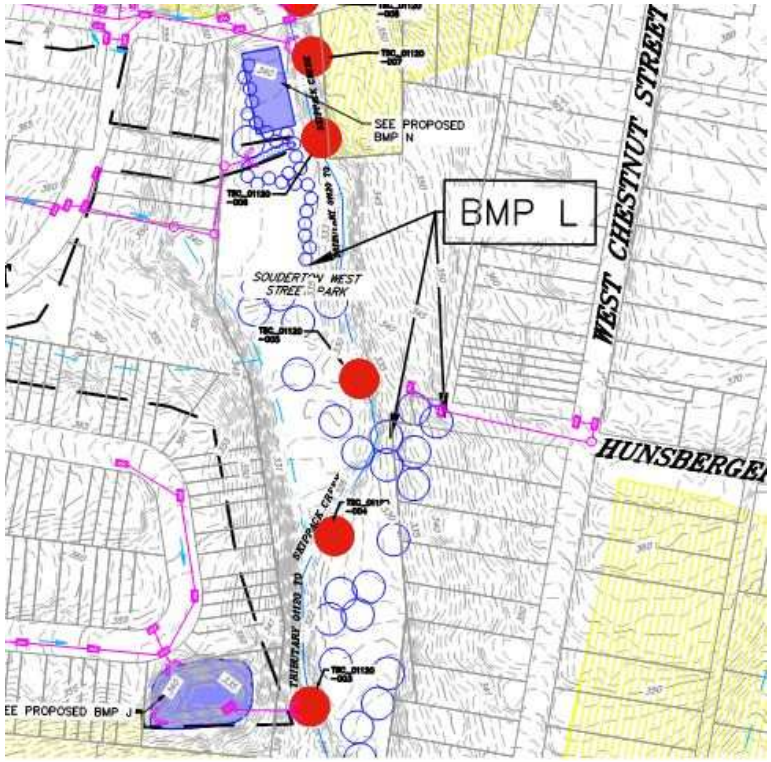
Landscape Restoration is the general term used for actively sustainable landscaping practices that are implemented outside of riparian (or other specially protected) buffer areas. Landscape Restoration includes the restoration of forest (i.e. reforestation) and/or meadow and the conversion of turf to meadow. In a truly sustainable site design process, this BMP should be considered only after the areas of development that require landscaping and/or revegetation are minimized. The remaining areas that do require landscaping and/or revegetation should be driven by the selection and use of vegetation (i.e., native species) that does not require significant chemical maintenance by fertilizers, herbicides, and pesticides..

From PA BMP Manual

Project Description:
The Borough intends to plant 53 trees around the existing community park to provide shade canopy throughout the area.
Estimated Project Cost:
$5,000
Project Funding: General Funds/Grants
BMP Efficiency: 20%

Total Planting Area: 6.93 ac
Land Use Loading Rate/ % Area:
Open Space: 994.05 / 100%

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

Step #1 : Multiply Number of Trees by 0.01.
53 trees x 0.01 = 0.53 ac

Step #2: Multiply the acreage found in Step 1 by Average Sediment Loading Rate (see above)
0.53 ac x 994.05 lb/ac/yr = 526.85 lb/yr

Step #3: Multiply Step 2 by BMP Effectiveness value: 526.85 lb/yr X 0.20 = ***105.37 lbs/yr***

BMP # L

BMP Description:	Tree Planting (53 Trees)
Location:	West Street Park
Lat/Long:	Varies
BMP type:	Landscape Restoration

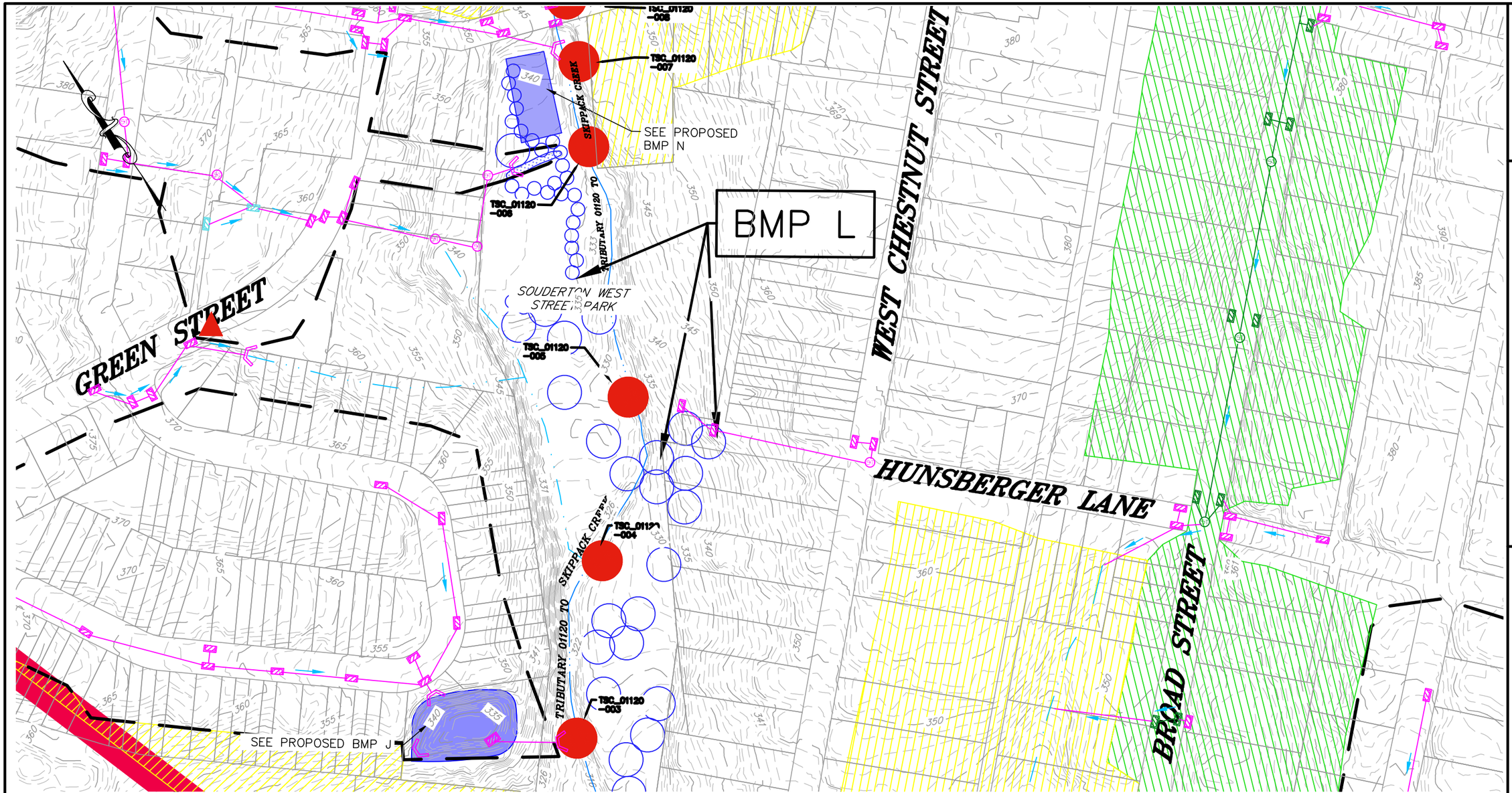
Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –

- Initial watering and weekly watering during dry periods may be necessary during the first growing season
- Check perimeter fencing to avoid browse damage from deer



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
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- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=150'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT
BMP L
SOUDERTON BOROUGH, MONTGOMERY COUNTY PENNSYLVANIA

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65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

SCALE: 300 150 0 150 FEET (IN)

DRAWN BY: CMK

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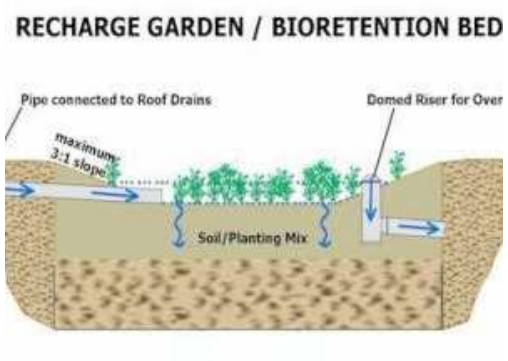
BMP # M

BMP Description:	Chestnut Street Rain Garden
Location:	Chestnut Street Playground
Lat/Long:	40°18'33", -75°19'32"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

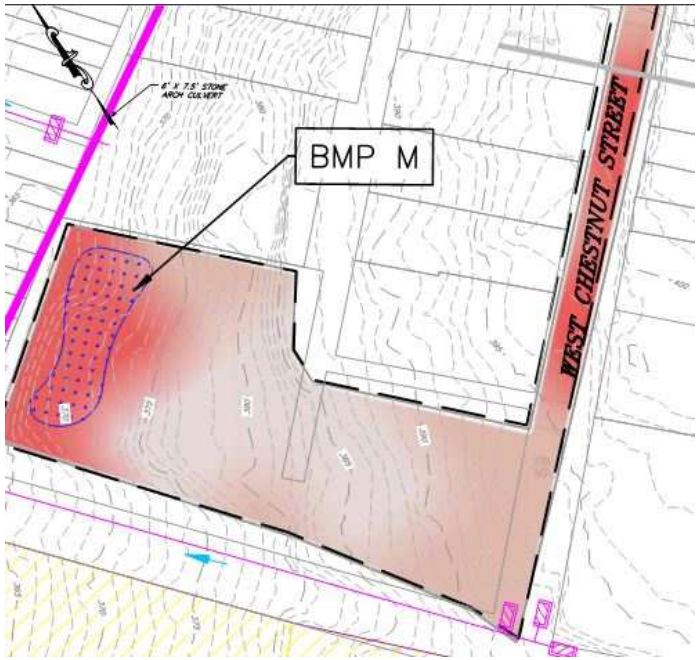
From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden within an existing lawn area that serves a playground which will treat overland runoff and runoff through storm sewer disconnection.
Estimated Project Cost:
$150,000
Project Funding: General Funds/Grants
Treated Drainage Area:
1.73 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	994.05	*25.0%*
Developed, Low	1104.50	*37.5%*
Developed, Medium	1931.19	*37.5%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= ((1.73 ac x 0.25 x 994.05 lb/ac/yr x 0.55) + (1.73 ac x 0.375 x 1104.5 lb/ac/yr x 0.55)+(1.73 ax x 0.375 x 1931.19 lb/ac/yr x 0.55) = **1319.63 lbs/yr**

BMP # M

BMP Description:	Chestnut Street Rain Garden
Location:	Chestnut Street Playground
Lat/Long:	40°18'33", -75°19'32"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

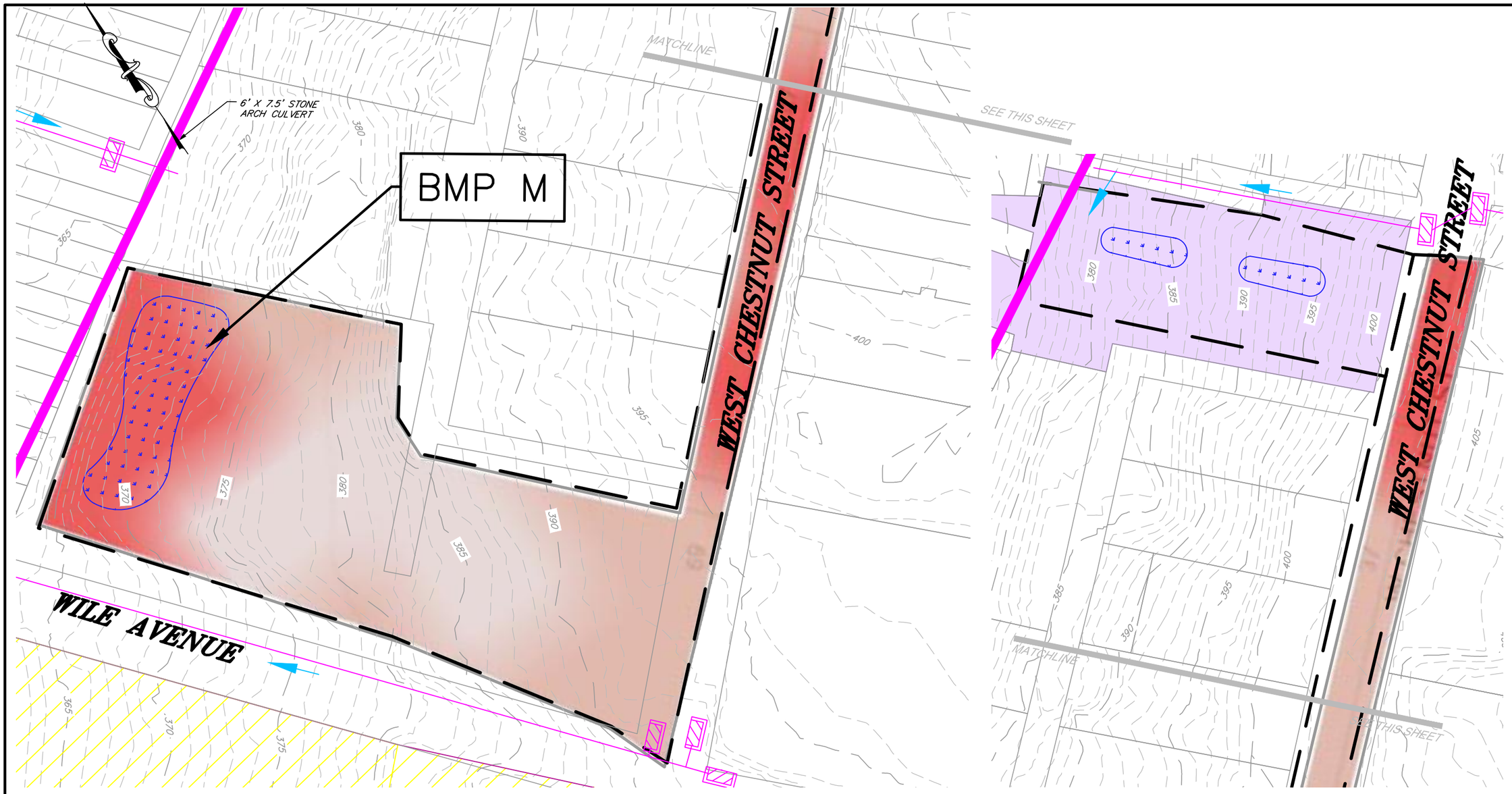
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP M

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

60 0 60 120 FEET
SCALE IN

DRAWN BY: CMK

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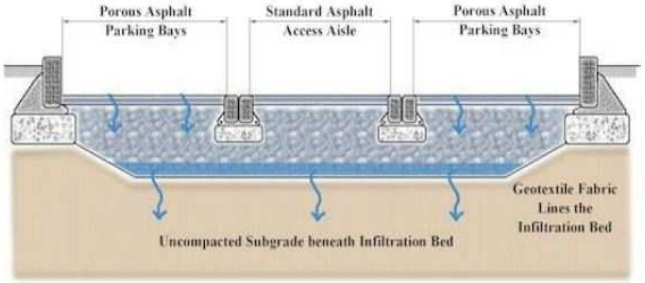
BMP # N

BMP Description:	West Street Park Pervious Pavement
Location:	West Street Park
Lat/Long:	40°18'28", -75°19'43"
BMP type:	Pervious Pavement

BMP Information

BMP 6.4.1: Pervious Pavement with Infiltration Bed



Description

A pervious pavement bed consists of a pervious surface course underlain by a stone bed of uniformly graded and clean-washed coarse aggregate, 1-1/2 to 2-1/2 inches in size, with a void space of at least 40%. The pervious pavement may consist of pervious asphalt, pervious concrete, or pervious pavement units. Stormwater drains through the surface, is temporarily held in the voids of the stone bed, and then slowly drains into the underlying, uncompacted soil mantle. The stone bed can be designed with an overflow control structure so that during large storm events peak rates are controlled, and at no time does the water level rise to the pavement level. A layer of geotextile filter fabric separates the aggregate from the underlying soil, preventing the migration of fines into the bed. The bed bottoms should be level and uncompacted. If new fill is required, it should consist of additional stone and not compacted soil.

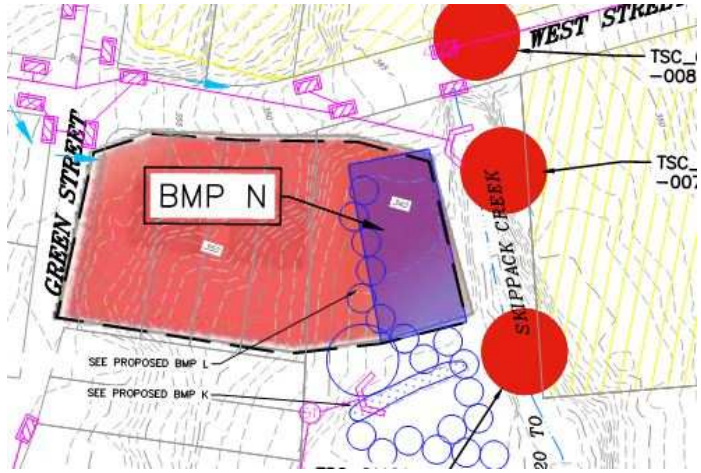
From PA BMP Manual

Project Description:
The Borough intends to remove and replace the existing asphalt parking area with pervious pavement.
Estimated Project Cost:
$250,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.81 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Low	1104.50	*75.0%*
Developed, Medium	1931.19	*25.0%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.81 ac x .75 x 1104.50 lb/ac/yr x 0.55) + (0.81 ac x 0.25 x 1931.19 lb/ac/yr x 0.55) = **584.13 lbs/yr**

BMP # N

BMP Description:	West Street Park Pervious Pavement
Location:	West Street Park
Lat/Long:	40°18'28", -75°19'43"
BMP type:	Pervious Pavement

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Construction –

- Do not allow construction staging, soil/mulch storage on pavement surfaces

As needed –

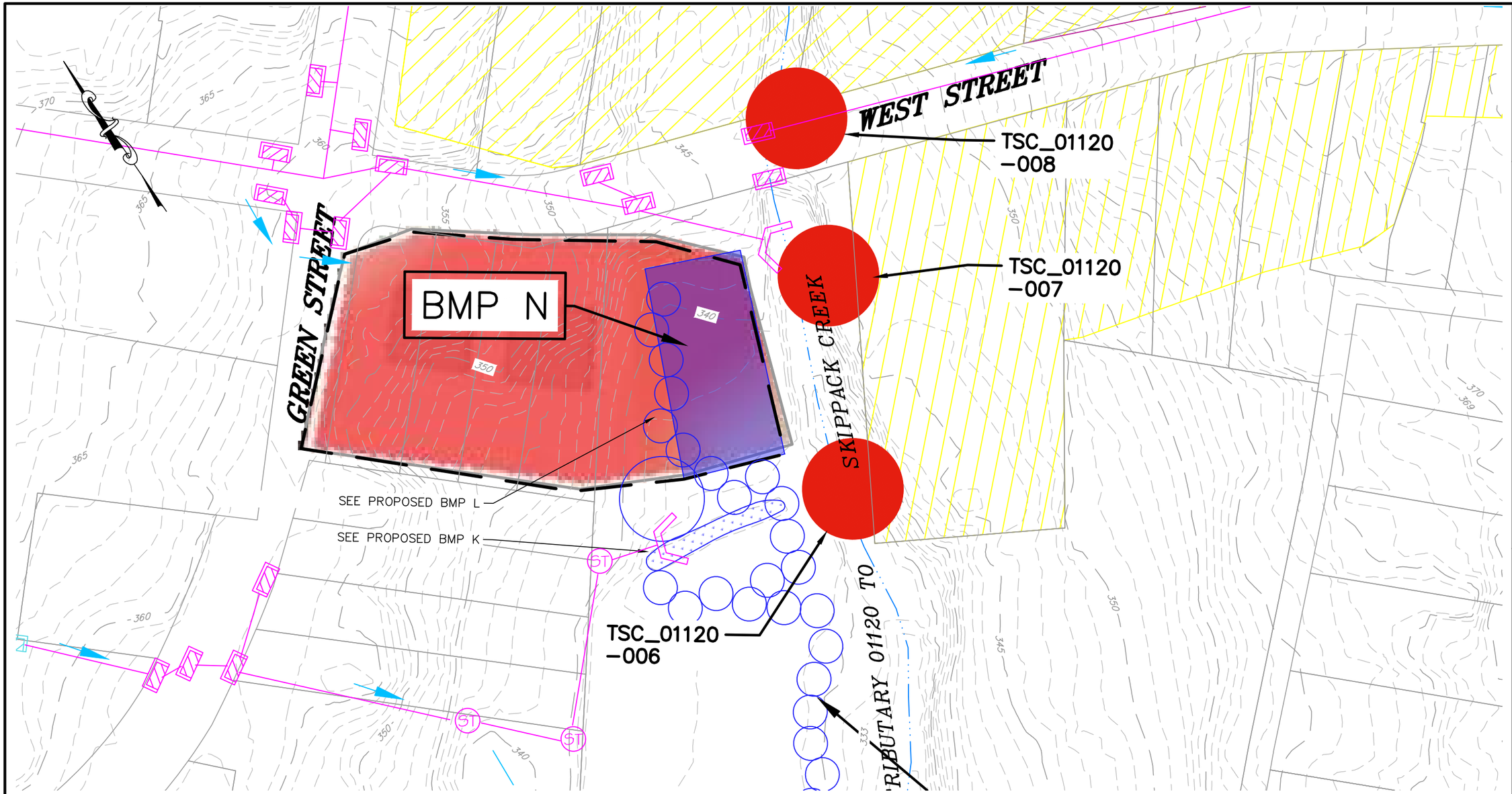
- Planted areas adjacent to pervious pavement should be well maintained to prevent soil washout onto pavement. If bare spots or erosion is observed, they should be replanted and stabilized at once.
- All trash and other litter that is observed should be removed.

Biannually –

- Vacuum the pavement surface with a commercial cleaning unit. Pavement washing systems or compressed air units are not recommended
- All inlet structures within or draining to the infiltration beds should be cleaned.

Winter Maintenance –

- Abrasives such as sand or cinders should not be applied on or adjacent to pervious pavement
- Snow plowing is allowable, but the blade should be slightly higher than usual (about an inch)
- Salt is acceptable for use as a deicer on the pervious pavement, though nontoxic, organic deicers, applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferable



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL
PROPOSED BMPS EXHIBIT

BMP N

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

SCALE: 120 60 0 60 FEET IN

DRAWN BY: CMK

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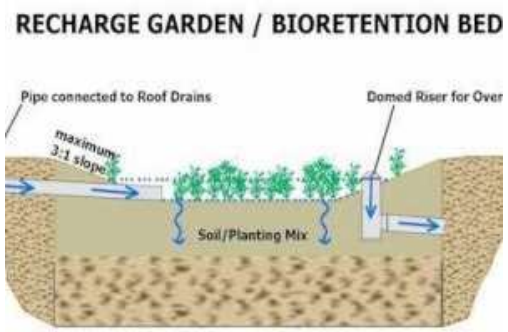
BMP # O

BMP Description:	Holly Hill Park Rain Garden
Location:	Holly Hill Park
Lat/Long:	40°18'37", -75°19'41"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

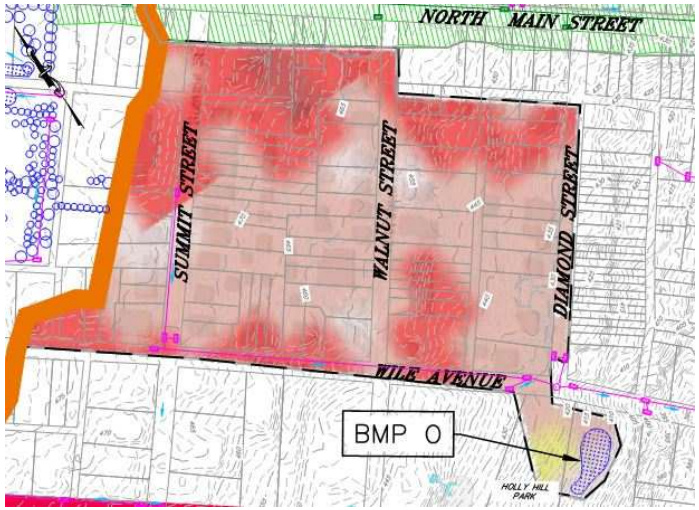
From PA BMP Manual

Project Description:
The Borough intends to construct one rain garden within an existing lawn area to treat runoff through storm sewer disconnection.
Estimated Project Cost:
$225,000
Project Funding: General Funds/Grants
Treated Drainage Area:
16.24 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	994.05	*11.0%*
Developed, Low	1104.50	*53.4%*
Developed, Medium	1931.19	*34.2%*
Developed, High	2656.64	*1.4%*
	Total	*100%*

LOCATION



*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= ((16.24 ac x 0.11 x 994.05 lb/ac/yr x 0.55) + (16.24 ac x 0.534 x 1104.5 lb/ac/yr x 0.55)+(16.24 ac x 0.342 x 1931.19 lb/ac/yr x 0.55)+(16.24 ac x 0.014 x 2656.64 lb/ac/yr x 0.55) = **12,464.60 lbs/yr**

BMP # O

BMP Description:	Holly Hill Park Rain Garden
Location:	Holly Hill Park
Lat/Long:	40°18'37", -75°19'41"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

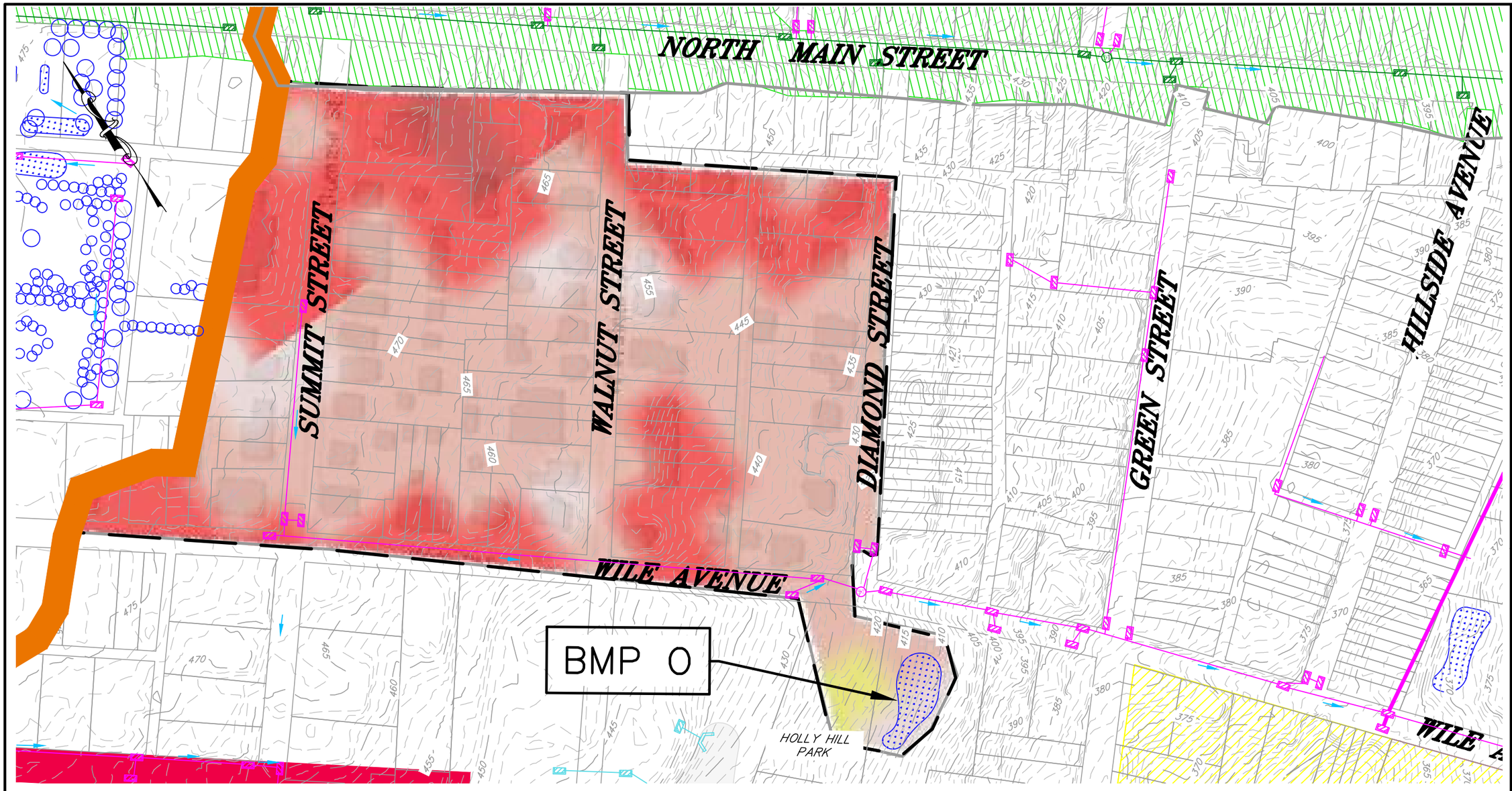
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP O

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=150'

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

300 150 0 150 FEET
SCALE IN

DRAWN BY: CMK

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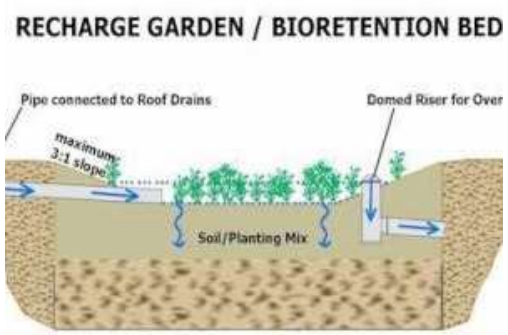
BMP # P

BMP Description:	Chestnut Street Rain Garden
Location:	Chestnut Street
Lat/Long:	40°18'36", -75°19'24"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quality reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

From PA BMP Manual

Project Description:
The Borough intends to incorporate pocket rain gardens into a proposed reconstructed paved parking lot.
Estimated Project Cost:
$300,000
Project Funding: General Funds/Grants
Treated Drainage Area:
0.38 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Developed, Medium	1931.19	*100%*
	Total	*100%*

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= *(Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate*

= (0.38 ac x 1 x 1931.19 lb/ac/yr x 0.55) = **403.62 lbs/yr**

BMP # P

BMP Description:	Chestnut Street Rain Garden
Location:	Chestnut Street
Lat/Long:	40°18'36", -75°19'24"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –
- Prune and weed vegetation, as needed

As needed –
- Respread mulch when erosion is evident

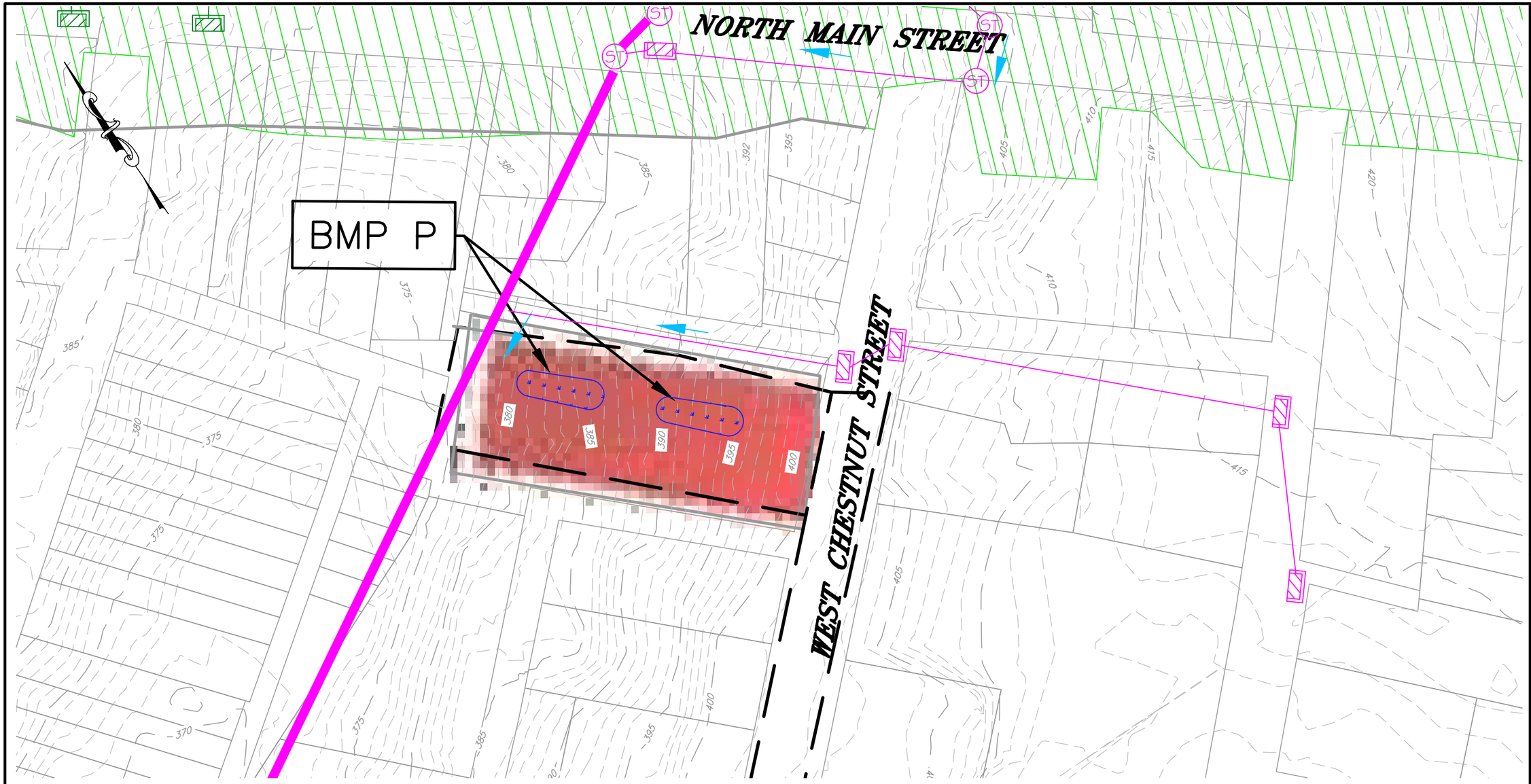
Greater than 1 inch storm –
- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –
- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –
- Water frequently

Every two to three years –
- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

JOB NO.: 2309027

DATE: 03/31/2025

SCALE: 1"=60'

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP P

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

G&A
GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

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SCALE IN

DRAWN BY: CMK

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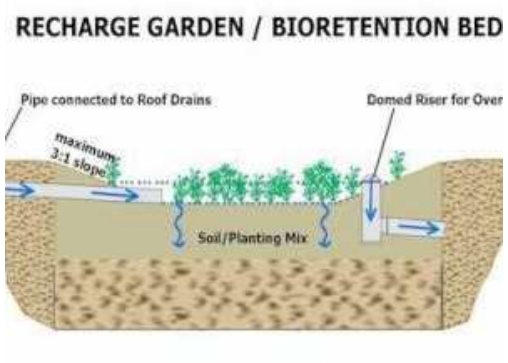
BMP # Q

BMP Description:	Lawn Avenue Park Rain Garden
Location:	Lawn Avenue Park
Lat/Long:	40°18'24", -75°19'05"
BMP type:	Rain Garden / Bioretention

BMP Information

BMP 6.4.5: Rain Garden/Bioretention



Bioretention is a method of treating stormwater by pooling water on the surface and allowing filtering and settling of suspended solids and sediment at the mulch layer, prior to entering the plant/soil/microbe complex media for infiltration and pollutant removal. Bioretention techniques are used to accomplish water quality improvement and water quantity reduction. Prince George's County, Maryland, and Alexandria, Virginia have used this BMP since 1992 with success in many urban and suburban settings.

Bioretention can be integrated into a site with a high degree of flexibility and can balance nicely with other structural management systems, including porous asphalt parking lots, infiltration trenches, as well as non-structural stormwater BMPs described in Chapter 5.

The vegetation serves to filter (water quality) and transpire (water quantity) runoff, and the root systems can enhance infiltration. The plants take up pollutants; the soil medium filters out pollutants and allows storage and infiltration of stormwater runoff; and the bed provides additional volume control. Properly designed bioretention techniques mimic natural ecosystems through species diversity, density and distribution of vegetation, and the use of native species, resulting in a system that is resistant to insects, disease, pollution, and climatic stresses.

From PA BMP Manual

Project Description:
The Borough intends to construct a rain garden behind the baseball fields.
Estimated Project Cost:
$125,000
Project Funding: General Funds/Grants
Treated Drainage Area:
1.77 acres
BMP Efficiency: 55%
Hydrologic Soil Group: D

Land Use NLCD 2006 in DA:

Land Use	*Loading Rate lb/ac/yr*	*% Coverage*
Open Space	994.05	*25.0%*
Developed, Low	1104.50	*12.5%*
Developed, Medium	1931.19	*62.5%*
	Total	*100%*

LOCATION

*See BMP Exhibit Enlargement below for more detail

Load Reduction Calculations

Load Reduction (lbs/yr) =

= (Drainage Area)x(% land use) x (Land Use Loading Rates) x BMP Efficiency Rate

= (1.77 ac x 0.25 x 994.05 lb/ac/yr x 0.55) + (1.77 ac x 0.125 x 1104.50 lb/ac/yr x 0.55) + (1.77 ac x 0.625 x 1931.19 lb/ac/yr x 0.55) = **1551.34 lbs/yr**

BMP # Q

BMP Description:	Lawn Avenue Park Rain Garden
Location:	Lawn Avenue Park
Lat/Long:	40°18'24", -75°19'05"
BMP type:	Rain Garden / Bioretention

Operations & Maintenance Program

**adapted from PA BMP Manual*

Responsible Party: Souderton Borough
Contact Number: 215-723-4371

During Establishment –

- Prune and weed vegetation, as needed

As needed –

- Respread mulch when erosion is evident

Greater than 1 inch storm –

- Inspect to ensure system is functioning properly, facility should drain within 72 hours

Biannually –

- Inspect for sediment buildup, erosion, vegetative conditions.
- Inspect tree and shrub health

Annually –

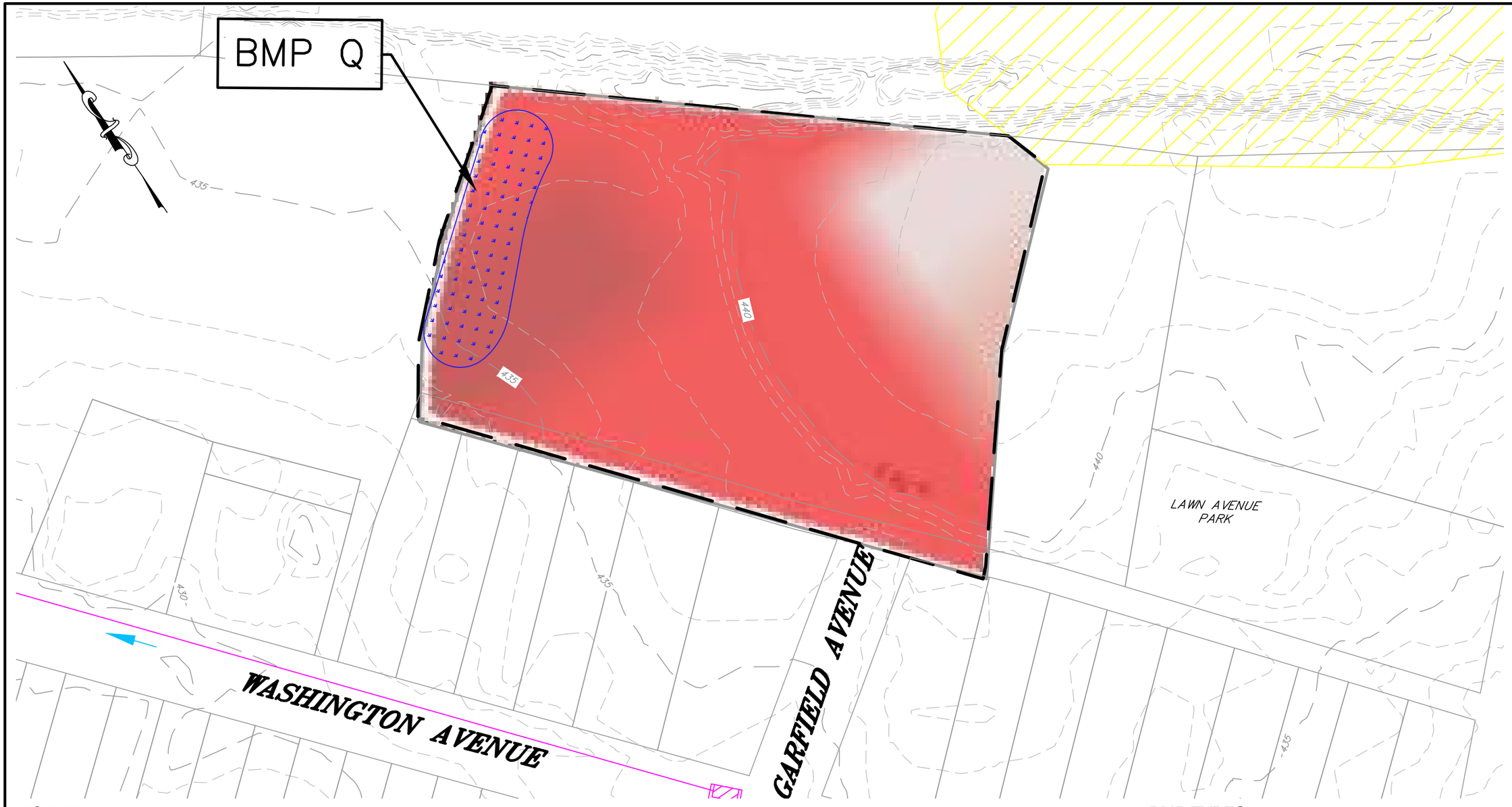
- Remove detritus
- Perennial plantings may be cut down at the end of the growing season

Drought Conditions –

- Water frequently

Every two to three years –

- Mulch replacement



LEGEND

- SEWERSHED BOUNDARY
- BOROUGH INLET
- PRIVATE INLET
- STATE INLET
- FLOW ARROW
- DRAINAGE PATH
- SURFACE WATER
- MS4 OUTFALL
- OBSERVATION POINT
- PARSED AREA – PRIVATE PROPERTY DIRECTLY TO STREAM
- PARSED AREA – STATE ROAD AND AREAS DRAINING TOWARDS STATE ROAD

BMP TYPES

- WATER QUALITY INSERT
- RAIN GARDEN AND VEGETATED SWALE
- TREE PLANTING
- DRY EXTENDED DETENTION BASIN
- PERVIOUS PAVEMENT

SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP Q

SOUDERTON BOROUGH, MONTGOMERY COUNTY
PENNSYLVANIA

JOB NO.: 2309027
DATE: 03/31/2025
SCALE: 1"=60'

GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES
65 EAST BUTLER AVENUE, SUITE 100, NEW BRITAIN, PA 18901 • (215) 345-4330

60 0 60 120 FEET
SCALE IN

DRAWN BY: CMK

BMP # R

BMP Description:	Tributary 01119 to Skippack Creek Stream Restoration
Location:	174 Cowpath Road (Franconia Township)
Lat/Long:	N/A
BMP type:	Streambank Restoration

Project Description:
The Township intends to remediate eroded streambanks and related creek flow regime problems along several sections along the tributary to the Skippack Creek. Stabilization and enhancement efforts will be installed at several locations to prevent or mitigate future erosion and scour.

Estimated Project Cost:
$315,000

Project Funding: General Funds/Grants

Restoration Length: 700 LF

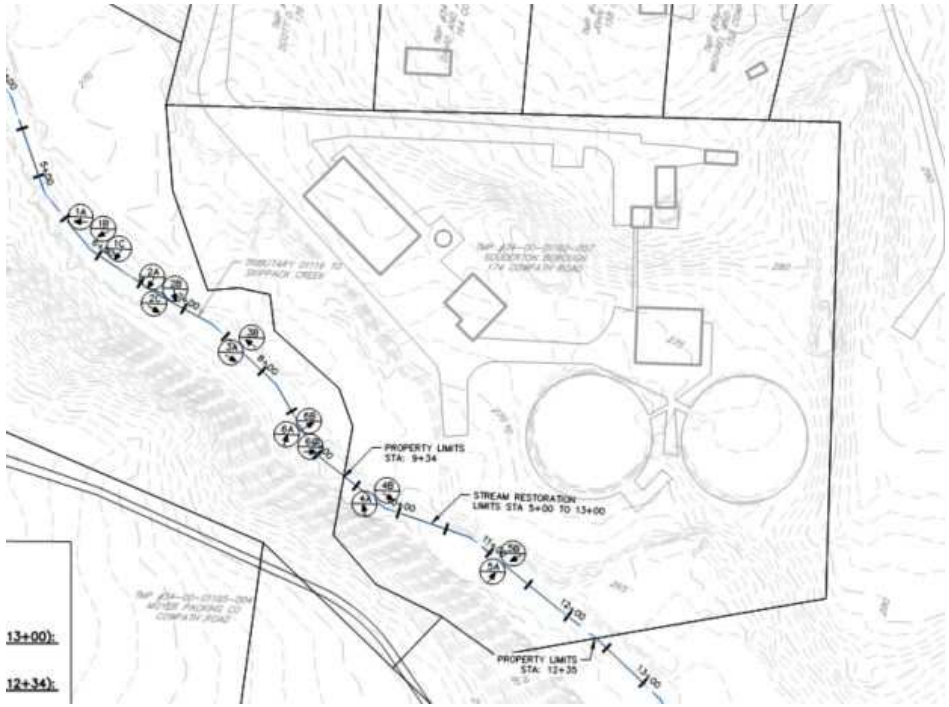
Siting Criteria:

- 1st Order Stream
- Addresses approximately 700 LF of streambank
- Impervious upstream areas are treated sufficiently through implementation of stormwater management ordinance

Load Reduction Credit:
*Mapshed default rate: 115 lb/ft

750 LF x 115 lb/ft = **86,250 lbs**

LOCATION



*See BMP Exhibit Enlargement below for more detail

BMP # R

BMP Description:	Tributary 01119 to Skippack Creek
Location:	174 Cowpath Road (Franconia Township)
Lat/Long:	N/A
BMP type:	Streambank Restoration

Operations & Maintenance Program

Responsible Party: Souderton Borough
Contact Number: 215-348-9915

As needed –

• Trash and debris removal, rodent removal and repairs of physical damage. Invasive and/or noxious species shall be removed immediately when noted, including but not limited to English Ivy, Japanese stilt grass, mulitflora rose, wineberry, cattails, phragmites, and poision ivy.

Quarterly –

Coir-fiber log toe protection: Inspected to ensure they remain anchored to slope and streambed. Jute matting shall be placed under the log prior to installation of new stakes and wires as needed to re-establish contact with bed/bank of the stream.

• If erosion or scour has occurred along slope behind the log, contact Doylestown Township for maintenance:

1) for small areas, additional logs shall be installed perpendicular to the stream flow to prevent further erosion in this area. If biolog is not available, erosion area may be filled with R-4 riprap and live stakes driven through the stone at 3ft on center to stabilize the stone.

2) If erosion or scour has occurred along the length of the biolog, it shall be filled with Class C well-graded stone. Class C stone shall consist of 1 part R-6 riprap + 2 parts R-5 riprap + 2 parts R-4 riprap.

Sloped banks with Jute Fabric and Vegetation

A. 100% vegetative coverage by herbaceous species must be maintained throughout all areas of the slope. Any areas that become void of vegetation must be immediately corrected by replanting, reseeding or other adequate measures necessary to prevent erosion that may jeopardize the structural integrity of the facility.

B. All vegetation throughout all areas of the facility must be mowed at a minimum of one time per year in the spring, and a maximum of three times per year. Minimum height of vegetation when mown shall be six (6”) inches.

C. Any erosion, slumping or other soil disturbances that are noted during routine maintenance shall be immediately repaired. Additional materials shall be added where necessary to return eroded areas to grade. All repaired areas shall be immediately re-vegetated with live stakes or other recommended herbaceous species.

1. To re-vegetate with live stakes, harvest live cuttings from existing onsite plant material per following specification on ‘Harvesting and Handling of Woody Cuttings.’

D. Invasive or noxious species (see above) shall be removed immediately when observed. For persistent weed species, spot treat with a weed killer approved for use in wetland areas.

Geotextile soil wrap with brush layers

A. There are minimal maintenance or inspection requirements for this type of installation. The embankment shall be inspected per the above noted schedule to insure structural stability and adequate growth of the brush layers.

B. Invasive or noxious species (see above) shall be removed immediately when observed. For persistent weed species, spot treat with a weed killer approved for use in wetland areas.

C. Any areas of soil wrap that become void of vegetation must be immediately corrected by installation of additional live stakes. Due to nature of the stabilization measure, it may be necessary to create a pilot hole by driving rebar into slope prior to installation of the live stake.

1. To re-vegetate with live stakes, harvest live cuttings from existing onsite plant material per following specification on 'Harvesting and Handling of Woody Cuttings.'

D. In the event that areas of the treated slope fail or erosion develops along or adjacent to the slope, Doylestown Township shall be contacted to address the problems beyond the scope of maintenance procedures.

Rock Diversions

A. There are minimal maintenance or inspection requirements for this type of installation. The rock shall be inspected per the above noted schedule to insure structural stability.

B. Keyway into embankment shall be inspected for erosion along edges of stone. Any areas of erosion shall be repaired/restored per Section 3 on Jute Matting with Vegetation.

Brush Mattress with Live Stakes

A. There are minimal maintenance or inspection requirements for this type of installation. The brush mattress area shall be inspected per the above noted schedule to insure stability.

B. If erosion has occurred along this area, contact Doylestown Township for inspection and/or repair.

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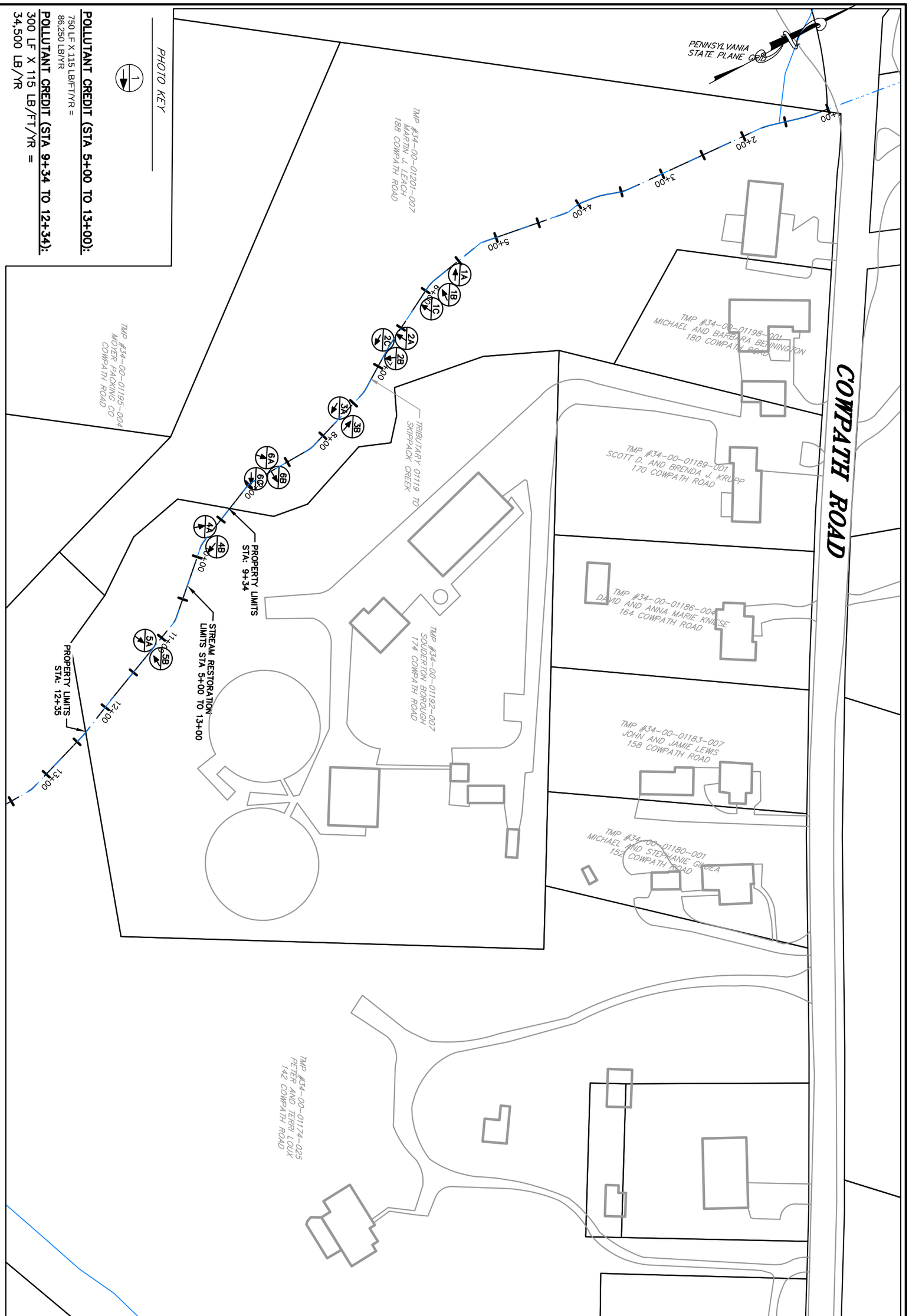

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SOUDERTON BOROUGH PRP/TMDL

PROPOSED BMPS EXHIBIT

BMP R

SOUDERTON BORO, MONTGOMERY COUNTY, PENNSYLVANIA

JOB NO.: 2309027

DATE: 06/17/25

SCALE: 1"=100'

DRAWN BY: CMK

100 0 100 200
SCALE IN FEET