

Gettysburg Borough

**COMBINED**

**POLLUTANT REDUCTION PLAN**

**Permit Term (2018-2023)**

**Final: August 24, 2017**  
**Revised: October 5, 2018**

**Prepared For:**  
GETTYSBURG BOROUGH  
59 East High Street  
Gettysburg, PA 17325



**Prepared By:**



50 West Middle Street, Gettysburg, PA 17325  
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## **Narrative**

### **INTRODUCTION**

Gettysburg Borough, located in Adams County, Pennsylvania, consists of a 1.66 square mile area. The Borough is approximately forty (40) miles southwest of Harrisburg, Pennsylvania. The population of the Borough was 7,620 at the 2010 census.

In Pennsylvania, Small Municipal Separate Storm Sewer Systems (MS4) must apply for National Pollutant Discharge Elimination System (NPDES) Permit Cover (PAG 13) if they are located in an Urbanized Area. The majority of Gettysburg Borough is located within the Urbanized Area 2010. The Borough also completely lies within the Chesapeake Bay Watershed. The 2018 NPDES Permit requires that any regulated MS4s that discharge to surface waters impaired for certain pollutants and/or those that discharge to waters in the Chesapeake Bay Watershed are required to develop Pollutant Reduction Plans (PRP).

### **BOROUGH BACKGROUND & HISTORY**

Gettysburg Borough was founded in 1786 and is named after an early settler and tavern owner, Samuel Getty. In the early days Gettysburg attracted many settlers and travelers because a convergence of major roads of the time was near it. The first transcontinental highway, Route 30, runs directly through the Borough.

The Borough is best known for its three (3) day battle during the US Civil War. The Battle of Gettysburg went from July 1-3, 1863 and resulted in over 51,000 deaths. The Battle of Gettysburg is considered the high water mark for the confederate army.

Today, the Borough is known for its institutions of higher learning. The Borough contains both Gettysburg College, established in 1832, and the Lutheran Theological Seminary, founded in 1826. The Harrisburg Area Community College (HACC) has also established a campus just outside of the Borough limits.

### **POLLUTANT REDUTION PLAN**

The Borough has elected to submit a combined Pollutant Reduction Plan to address local impaired water requirements (Permit Appendix E) and the Chesapeake Bay Watershed impairments (Permit Appendix D). Pennsylvania Department of Environmental Protection's (DEP) Pollutant Aggregation Process has permitted the Borough to combine all local watersheds into one large watershed that encompasses the entire Municipality. Through this process, the planning areas for Permit Appendices D and E pollutant reduction plans are the same.

The purpose of the Gettysburg Borough Pollutant Reduction Plan is to satisfy the 2018 NPDES Permit requirements to reduce the three (3) specific pollutants (sediment, phosphorus, and nitrogen) from being discharged to the receiving waters of the Commonwealth and Chesapeake Bay Watershed.

This plan was prepared utilizing the guidelines outlined in the following Pennsylvania Department of Environmental Protection (DEP) documents:

- 3800-PM-BCW0100k - National Pollutant Discharge Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions, last revised March 2017.
- 3800-PM-BCW0100m - National Pollutant Discharge Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values, last revised May 2016.
- MS4 Requirements Table (Municipal), last Revised May 9, 2017
- Pollutant Aggregation Suggestions for MS4 Municipal Requirements Table (Municipal), last revised May 9, 2017
- Pollutant Reduction Plan: A Methodology



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# Section A

## Public Participation

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## **Public Participation**

Gettysburg Borough provided a complete copy of this pollutant reduction plan for public review. A Public Notice describing the plan and inviting the public to review and issue written comments was published in the Gettysburg Times, a daily newspaper in Adams County, on July 12, 2017. Additionally, a notice was posted on the Gettysburg Borough website, [www.gettysburg-pa.gov](http://www.gettysburg-pa.gov), from July 12, 2017 through August 11, 2017. A copy of the proof of publication and a screen shot of the notice that was posted on the website are located in Appendix I.

Public comments were also solicited at the regularly scheduled Borough Council Workshop Meeting, held on July 24, 2017.

Public comments were received for a period of 30-days from the date of the Public Notice. A summary of these written comments are attached to this document in Appendix II. Appendix II also contains the Borough's official response to these comments.

Based upon the public comments received, the pollutant reduction plan was revised as dated August 24, 2017.

Revision to the baseline pollutant load calculation for both the Chesapeake Bay Watershed and Upper Rock Creek Watershed (local impaired waters) were made to address comments provided in the DEP Technical Deficiency Letter dated March 8, 2018. The revisions to the baseline resulted in the need to alter the location of proposed stream restoration BMPs. Therefore, the revised pollutant reduction plan was made available to public review.

A second Public Notice was published in the Gettysburg Times on June 18, 2018. An additional notice was also posted on the Gettysburg Borough website, [www.gettysburg-pa.gov](http://www.gettysburg-pa.gov), from June 18, 2018 through July 18, 2018. A copy of the proof of publications and screen shots of the notices that were posted on the website are located in Appendix I.

Public comments were also solicited at the regularly scheduled Borough Council Workshop Meeting, held on June 25, 2018.

Public comments were received for a period of 30-days from the date of the Public Notice. A summary of these written comments are attached to this document in Appendix II. Appendix II also contains the Borough's official response to these comments.

Based upon the public comments received, the pollutant reduction plan was revised as dated September 17, 2018.

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## Section B

### Maps

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## **Maps**

Maps developed for the analysis required by this plan have been included in this Section. The overall stormsheds map was utilized to designate the PRP planning area. Once the planning area was delineated, a land use map was developed for purposes of calculating the baseline pollutant loading. This process will be covered in greater detail in Section D.

The following maps are included:

- Gettysburg Borough Stormsheds (Overall)
- Gettysburg Borough Land Cover (Overall)



# GETTYSBURG BOROUGH OVERALL STORMSHEDS

**Legend**

- Stormwater Outfalls
- Observation Points
- Stormwater Inlets
- Storm Manholes
- ▲ Headwall/Endwall
- Streams
- ..... Swale
- Stormwater Pipes
- Stormsheds
- Basin
- HUC 12 Watersheds

Scale: 1" = 500'

0 250 500 1,000 Feet

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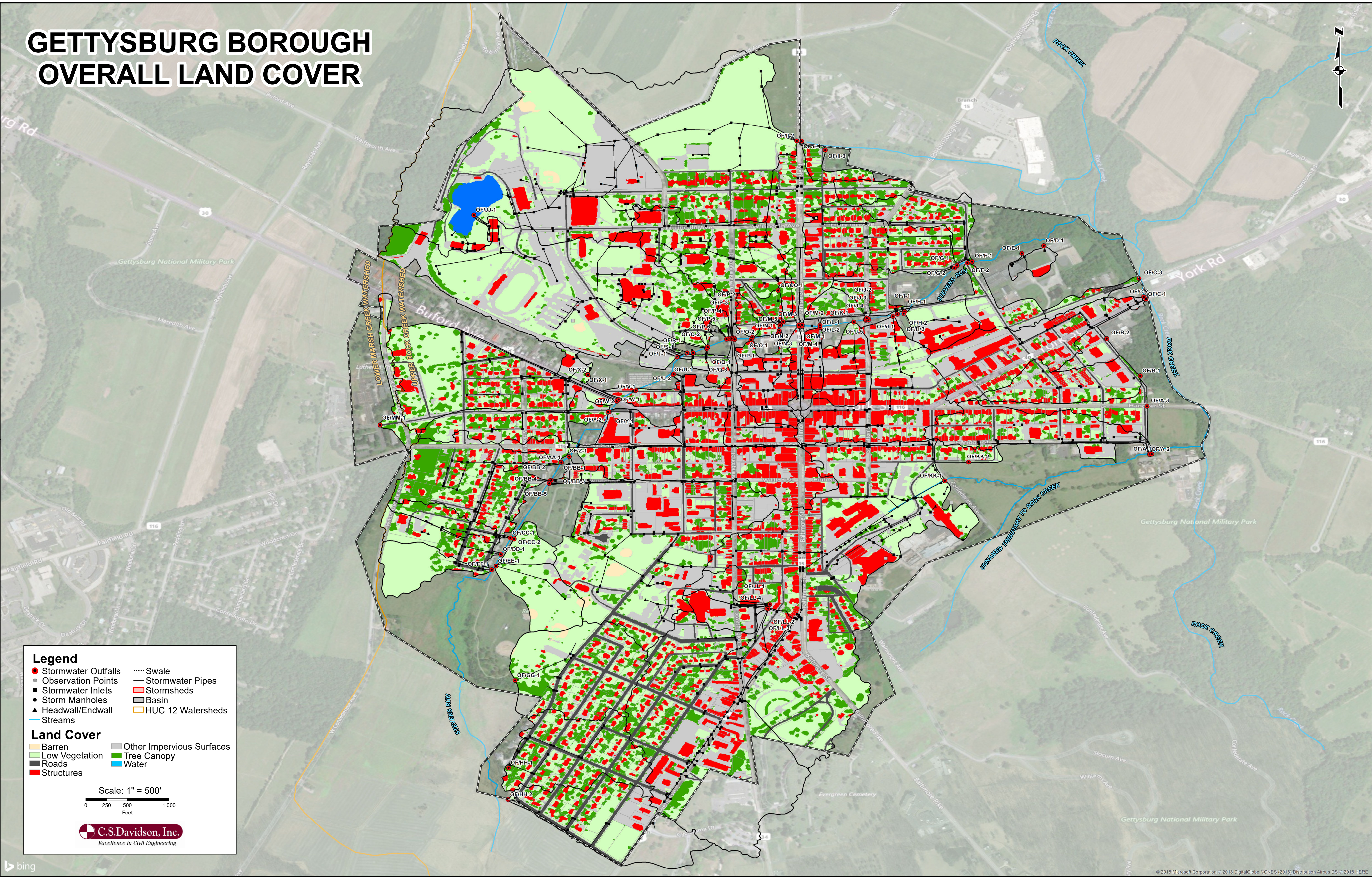
● Stormwater Outfalls      ..... Swale  
● Observation Points      — Stormwater Pipes  
■ Stormwater Inlets       Stormsheds  
● Storm Manholes       Basin  
▲ Headwall/Endwall       HUC 12 Watersheds  
— Streams



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# GETTYSBURG BOROUGH OVERALL LAND COVER



**Legend**

● Stormwater Outfalls

○ Observation Points

■ Stormwater Inlets

● Storm Manholes

▲ Headwall/Endwall

— Streams

..... Swale

— Stormwater Pipes

■ Stormsheds

■ Basin

■ HUC 12 Watersheds

**Land Cover**

■ Barren

■ Low Vegetation

■ Roads

■ Structures

■ Other Impervious Surfaces

■ Tree Canopy

■ Water

Scale: 1" = 500'

0

250

500

1,000

Feet

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## **Section C**

### Pollutants of Concern

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## **Pollutants of Concern**

The pollutants of concern were determined by referencing both the Municipal MS4 Requirements Table and the Pollutant Aggregation Table. Because there are several impaired streams within the planning area, the Borough has elected to address the pollutants of concern for the overall PRP Planning Area instead of individually.

### **Municipal MS4 Requirements Table:**

<b>Borough</b>	<b>NPDES ID</b>	<b>Individual Permit Required?</b>	<b>Reason</b>	<b>Impaired Downstream Waters or Applicable TMDL</b>	<b>Requirement(s)</b>	<b>Other Causes of Impairment</b>
Gettysburg	N/A	No	N/A	Stevens Run	Appendix E Nutrients, Siltation (5)	Unknown Toxicity (5), Water/Flow Variability (4c)
				Rock Creek	Appendix E Nutrients (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D Nutrients, Siltation (4a)	
				Unnamed Tributaries to Rock Creek	Appendix E Siltation (5)	Water/Flow Variability (4c)

### **Pollutant Aggregation Table:**

<b>Borough</b>	<b>Permit Number</b>	<b>HUC 12 Name</b>	<b>Impaired Downstream Waters or Applicable TMDL</b>	<b>Requirement(s)</b>
Gettysburg	N/A	Lower Rock Creek, Upper Rock Creek	Chesapeake Bay Nutrients/Sediments, Rock Creek, Stevens Run, Unnamed Tributaries to Rock Creek	Appendix D - Siltation/Nutrients Appendix E - Nutrients, Siltation

Consistent with the guidance provided in the DEP pollutant reduction plans instruction document, an assumption can be made that meeting the sediment reduction goal for a given watershed will also result in achieving the nutrient reduction goal. As such, this PRP will focus on sediment as the main pollutant of concern.



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## **Section D**

### **Existing Loading for Pollutants of Concern**

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## Existing Loading for Pollutants of Concern

The Borough elected to utilize the DEP Simplified Method for calculating the baseline pollutant load applicable for this PRP. The land cover map for the overall planning area included in Section B provides the basis for the values in the below table.

The Borough did utilize parsing to refine these values. All PennDOT state roads and sites with their own NPDES Permits were parsed out of the planning area. A map depicting the parsed areas is included at the end of this section. Dal-Tile Gettysburg Plant was the only site that was parsed out as a result of having its own NPDES Permit. A copy of the permit information from DEP eFacts has been included in Appendix III.

In addition to the parsing adjustments, the Borough took baseline reduction credits for structural BMPs that have been implemented prior to the development of the pollutant reduction plan. Details regarding the existing structural BMPs are included in Appendix IV.

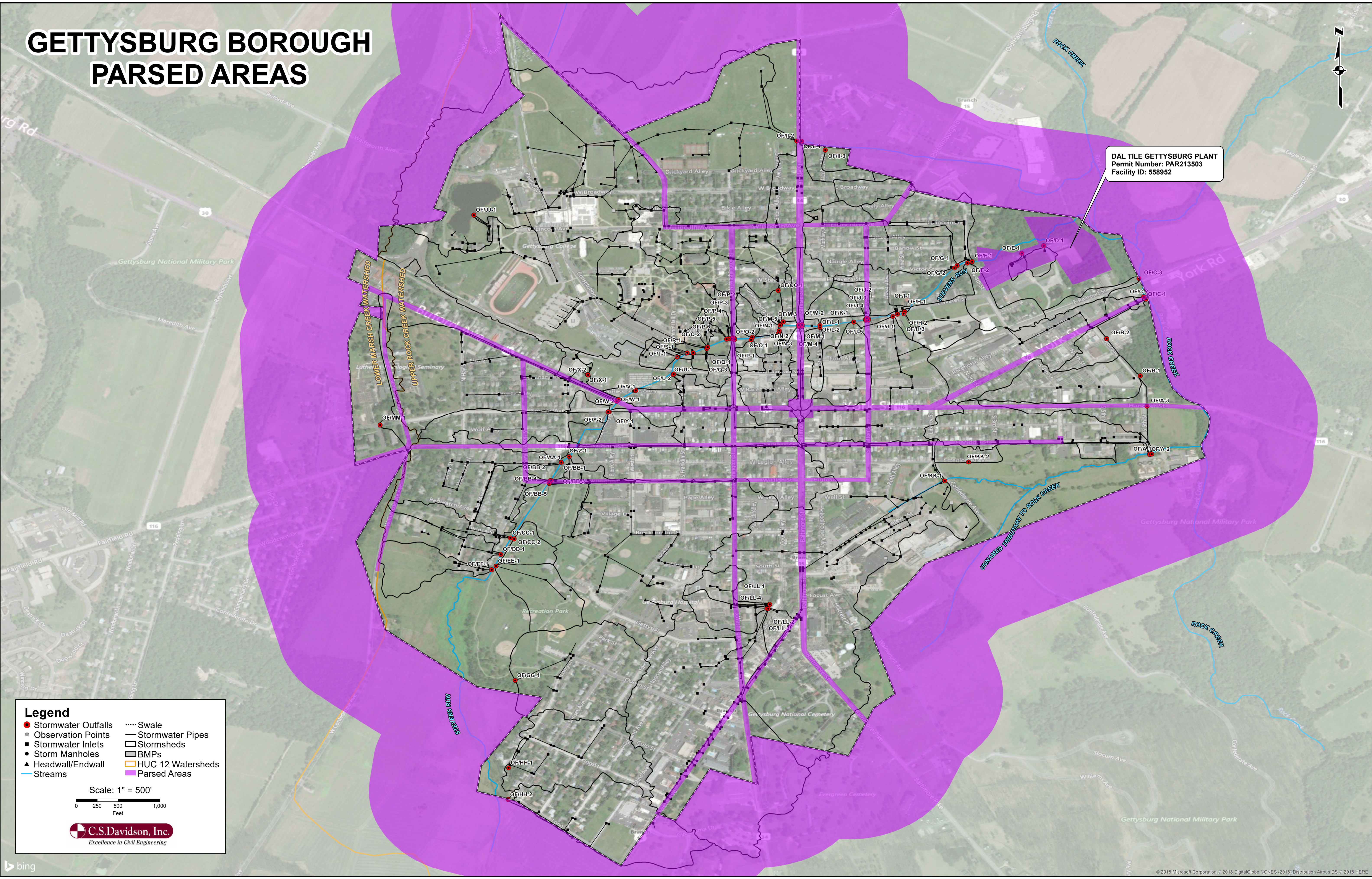
### Baseline Loading Calculations:

Chesapeake Bay Watershed				
Land Cover	Area (ac)	TN lbs/yr	TP lbs/yr	TSS lbs/yr
Impervious Area	458	15,319	962	640,979
Non-Impervious Area	444	10,219	356	92,306
Total	903	25,538	1,318	733,285
Areas to be Parsed Out	Area (ac)			
Impervious Area	60			
Non-Impervious Area	54			
Land Cover (After Parsing)	Area (ac)	TN lbs/yr	TP lbs/yr	TSS lbs/yr
Impervious Area	399	13,324	837	557,513
Non-Impervious Area	390	8,968	312	81,012
Total	789	22,293	1,149	638,525
Existing BMP Reduction Credits		416	17	43,345
Adjusted Totals		21,877	1,132	595,180
Required Reductions		TN lbs (3%)	TP lbs (5%)	TSS lbs (10%)
		656	57	59,518

As stated previously in Sections B and C, the Borough will be focusing on the sediment loading of the entire planning area as its pollutant of concern and to meet both Appendix D and E permit requirements. As such, proposed projects equating to the reduction of **59,518 pounds of sediment per year** will demonstrate that the goals of this plan have been met. These proposed projects are outlined in Section E.



# GETTYSBURG BOROUGH PARSED AREAS





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## **Section E**

### **BMPs to Achieve the Minimum Required Reductions**

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## **Summary of BMPs to Achieve the Minimum Required Reductions**

The Borough has chosen to pursue multiple projects to meet the **59,518 pounds of sediment per year** required reduction. A summary of the proposed projects and their reduction contribution is included below. An overall location map of the existing and proposed BMPs is included in the following pages of this section.

For the pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. The BMP Effectiveness Values Table, as provided by DEP, was utilized to determine each proposed BMPs' reduction effectiveness.

<b>Project No.</b>	<b>Project Name</b>	<b>BMP Type</b>	<b>Reduction Achieved (lbs. of sediment per year)</b>
1	Gettysburg Inner Loop Segment A	Stream Restoration	7,630
2	Gettysburg Area Recreational Authority Parking Lot Improvements	Dry Extended Detention Basins	295
3	Gettysburg Area Recreational Authority Parking Lot D Improvements	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	543
4	Mayor Alley Stream Restoration UNT to Rock Creek	Stream Restoration	1,122
5	Stream Bank Restoration UNT to Rock Creek (Culp's Farm)	Stream Restoration	44,880
6	Gettysburg Rec. Park Stream Bank Restoration & Rain Gardens	Bioretention-Rain Garden (A/B Soils w/ Underdrain) and Stream Restoration	N/A <del>22,607</del>
7	E. Broadway Street Improvements	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	3,125
8	Race Horse Alley Green Street Project	Permeable Pavement and Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2,007
9	Borough Garage Rain Garden	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	1,346
<b>Total Reductions:</b>			<b>60,948</b>

The proposed project summary above demonstrates that completion of these projects will be adequate to meet the pollutant reduction required.

$$\begin{array}{rcl} \mathbf{60,948 \text{ pounds}} & > & \mathbf{59,518 \text{ pounds}} \\ (\text{Proposed Reduction}) & > & (\text{Required Reduction}) \end{array}$$

These projects, in fact, may be able to meet 103% of the Borough's required reductions. The Borough intends to utilize any reductions completed over and above these permit requirements to meet reduction requirements of future permits. In the event that guidance is released by DEP that disallows forwarding credit, the Borough will likely limit the project scopes to the minimum requirements, despite the fiscal advantages of completing the projects in their planned entirety.

Additional information, including detailed project descriptions and calculations, as well as location maps, is included herein. An estimated implementation schedule for the projects is included in [Appendix V](#).



# GETTYSBURG BOROUGH EXISTING AND PROPOSED BMP LOCATIONS

EXISTING BMPs		
No.	BMP Name	BMP Type
1	227 N Washington St	Filtering Practices
2	339 Carlisle Street	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
3	Best Western Hotel	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
4	Bus Transfer Center 1	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
5	Bus Transfer Center 2	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
6	Central Energy Plant	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)
7	Eisenhower House	Filtering Practices
8	Future Stakes Land Development	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
9	Gettysburg College - Brua Drive	Filtering Practices
10	Gettysburg College- Dining Hall	Infiltration Practices w/ Sand, Veg.
11	Gettysburg College Union Building 1	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)
12	Gettysburg College Union Building 2	Filtering Practices
13	Gettysburg Hospital	Dry Extended Detention Basins
14	Habitat for Humanity- N 5th Street	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)
15	Lutheran Seminary Historical Trail	Bioretention-Rain Garden (A/B Soils w/ Underdrain)
16	Lutheran Seminary Western Gateway	Dry Extended Detention Basins
17	Musselman Stadium Renovation	Filtering Practices
18	Orchard Development 1	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)
19	Orchard Development 2	Filtering Practices
20	West Street Plaza	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)
21	York Dental	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

**Legend**

- Stormwater Outfalls
- Observation Points
- Stormwater Inlets
- Storm Manholes
- ▲ Headwall/Endwall
- Streams

- ..... Swale
- Stormwater Pipes
- Stormsheds
- BMPs
- HUC 12 Watersheds

Scale: 1" = 500'


0

250

500

1,000

Feet



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PROJECT NO. 6  
GETTYSBURG REC. PARK  
STREAM RESTORATION AND RAIN GARDENS

PROJECT NO. 8  
RACE HORSE ALLEY GREEN STREET PROJECT

PROJECT NO. 1  
GETTYSBURG INNER LOOP (SEG. A)  
STREAM BANK RESTORATION

PROJECT NO. 2  
GARA PARKING LOT IMPROVEMENTS

PROJECT NO. 3  
GARA PARKING LOT D IMPROVEMENTS

PROJECT NO. 4  
MAYOR ALLEY STREAM BANK RESTORATION

PROJECT NO. 7  
E. BROADWAY STREET IMPROVEMENTS

PROJECT NO. 9  
BOROUGH GARAGE RAIN GARDEN

PROJECT NO. 5  
STREAM BANK RESTORATION PROJECT 1  
UNT TO ROCK CREEK (E. MIDDLE STREET)



## **Project No. 1 – Gettysburg Inner Loop Segment A – Stream Bank Stabilization**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the Gettysburg Inner Loop Segment A – Stream Bank Stabilization. The project scope includes improvements to Stevens Run, including stream channel widening, stream bottom debris removal, and bank stabilization via a new precast modular retaining wall system. The stabilization will occur for a length of approximately 170 L.F. along the western and eastern banks.

The DEP specified effectiveness values for the “Stream Restoration” are provided below.

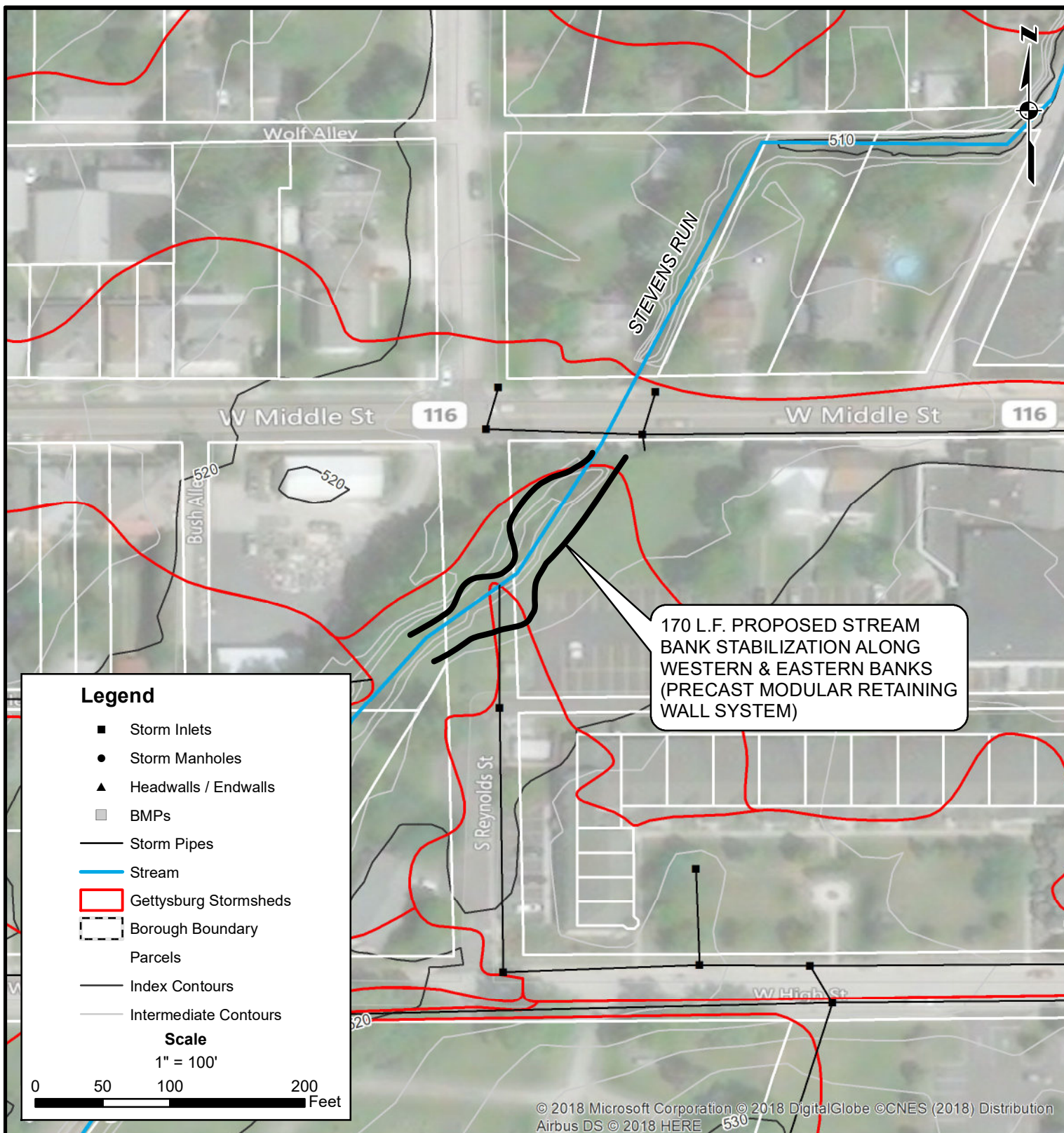
### **BMP Effectiveness Values Table:**

BMP Name	BMP Effectiveness Values			Description
	TN	TP	TSS	
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Gettysburg Inner Loop Segment A – Stream Bank Stabilization project will achieve a reduction of **7,630 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 12.8% of the Borough’s reduction goal.



## GETTYSBURGH BOROUGH



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### GETTYSBURG INNER LOOP SEGMENT A STREAM BANK STABILIZATION

GETTYSBURG BOROUGH ADAMS COUNTY, PENNSYLVANIA

DRAWN BY	HED
CHECKED BY	
SCALE	AS NOTED
DATE	06/01/2018
DWG. NO.	
FILE NO.	2383.5.15.00



## GETTYSBURG INNER LOOP SEGMENT A STREAM RESTORATION

### BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION

Stream Restoration

*DESCRIPTION* An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

170 FT

POLLUTANT TYPE	<u>Total Nitrogen</u> (TN)	<u>Total Phosphorus</u> (TP)	<u>Total Suspended Solids, Sediments (TSS)</u>
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### BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)

0.075  
(lbs/ft/yr)

0.068  
(lbs/ft/yr)

44.88  
(lbs/ft/yr)

ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)  
ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

N/A

N/A

N/A

LAND COVER DESCRIPTION  
LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)

Developed  
Impervious

0%

Developed  
Pervious

0%

Undeveloped

0%

ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)

13

12

7,630

## **Project No. 2 – Gettysburg Area Recreational Authority Parking Lot Improvements**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the Gettysburg Area Recreational Authority (GARA) Parking Lot Improvements. The project scope includes the conversion of an existing parking area to a new parking lot with stormwater management. A detention basin with an underdrain is proposed to treat stormwater runoff from the new parking lot.

The DEP specified effectiveness values for the “Dry Extended Detention Basin” are provided below.

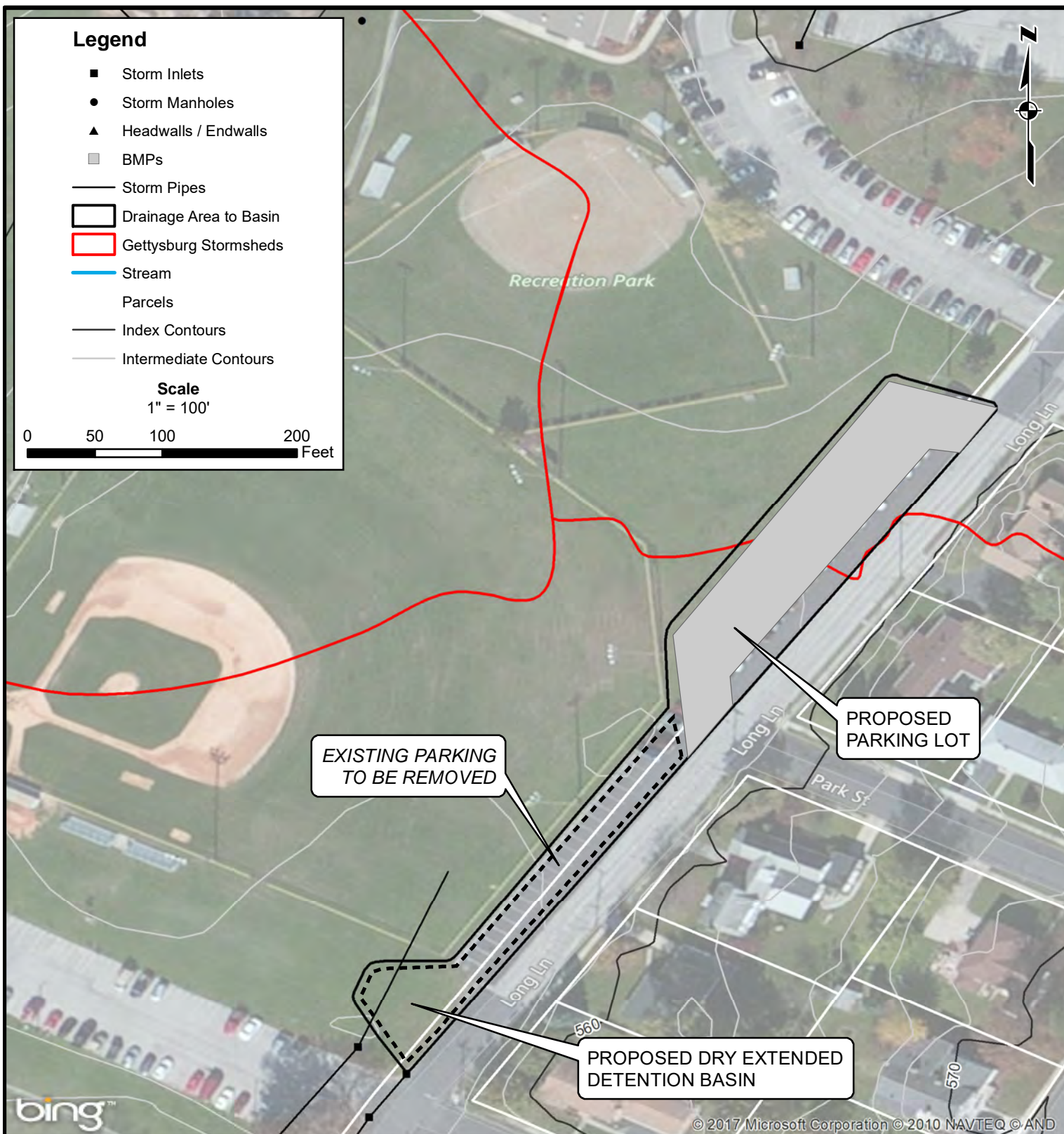
### **BMP Effectiveness Values Table:**

BMP Name	BMP Effectiveness Values			Description
	TN	TP	TSS	
Dry Extended Detention Basin	20%	20%	60%	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Gettysburg Area Recreational Authority (GARA) Parking Lot Improvements project will achieve a reduction of **295 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 0.5% of the Borough’s reduction goal.



## GETTYSBURGH BOROUGH



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### GETTYSBURG AREA RECREATIONAL AUTHORITY LONG LANE IMPROVEMENTS

GETTYSBURG BOROUGH ADAMS COUNTY, PENNSYLVANIA

DRAWN BY	HED
CHECKED BY	
SCALE	AS NOTED
DATE	07/05/2017
DWG. NO.	
FILE NO.	2383.5.15.00

**GETTYSBURG AREA RECREATIONAL AUTHORITY  
PARKING LOT IMPROVEMENTS**

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Dry Extended Detention Basins

*DESCRIPTION Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.*

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

FT

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
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**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

20.000

20.000

60.00

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**

0.5

ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

14

1

491

LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

62%

Developed  
Pervious

38%

Undeveloped

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

3

0

295

### **Project No. 3 – Gettysburg Area Recreational Authority Parking Lot D Improvements**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the Gettysburg Area Recreational Authority (GARA) Parking Lot D Improvements. The project scope includes the conversion of an existing parking area to a new parking lot with stormwater management. A rain garden with amended soils and underdrain is proposed to treat stormwater runoff from the new parking lot.

The DEP specified effectiveness values for the “Bioretention – Raingarden (A/B Soils w/ Underdrain)” are provided below.

#### **BMP Effectiveness Values Table:**

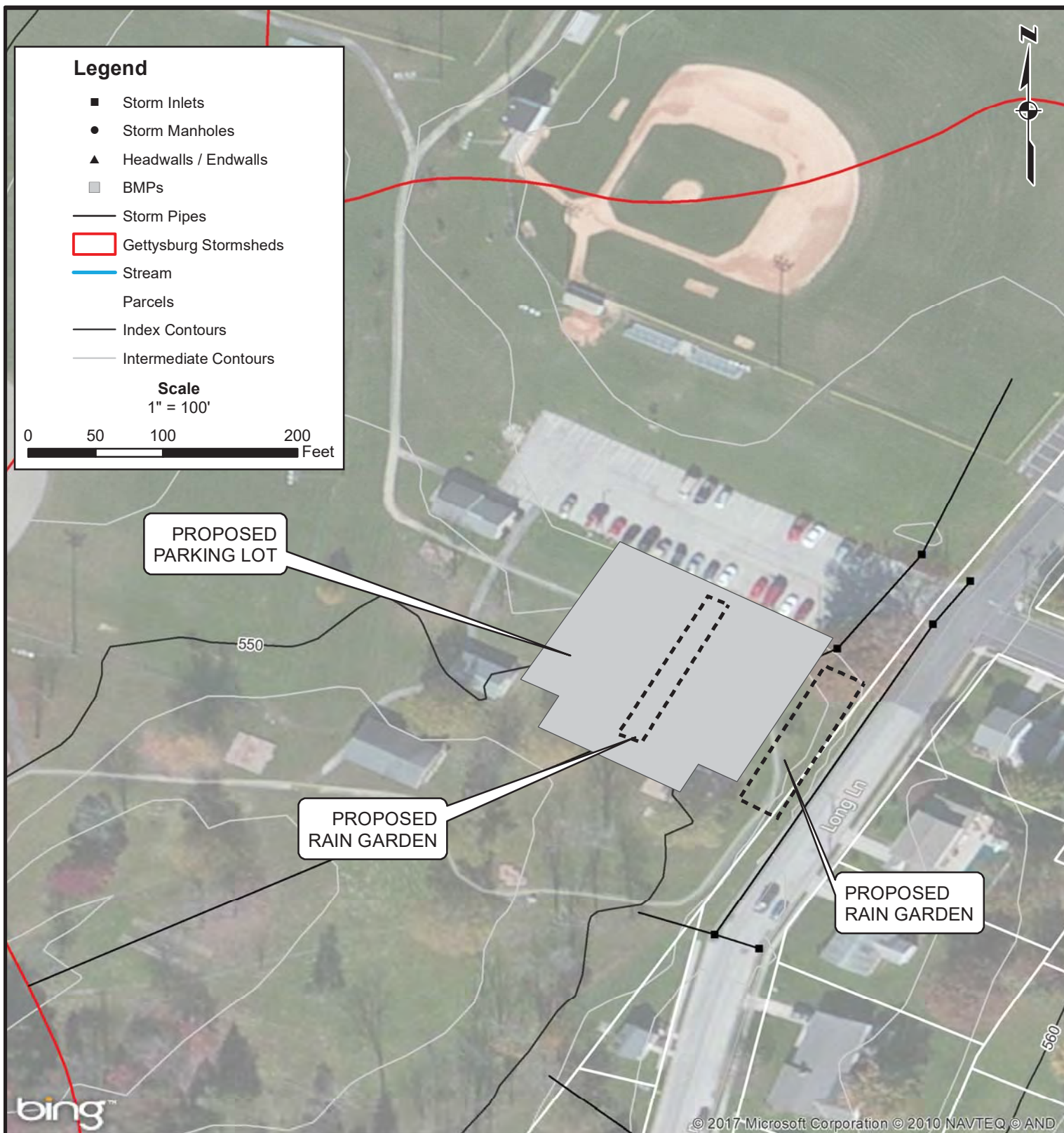
BMP Name	BMP Effectiveness Values			Description
	TN	TP	TSS	
Bioretention Raingarden (A/B Soils w/ Underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Gettysburg Area Recreational Authority (GARA) Parking Lot D Improvements project will achieve a reduction of **543 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 0.9% of the Borough’s reduction goal.





## GETTYSBURGH BOROUGH



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### GETTYSBURG AREA RECREATIONAL AUTHORITY PARKING LOT D IMPROVEMENTS

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

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SCALE	AS NOTED
DATE	07/05/2017
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FILE NO.	2383.5.15.00

**GETTYSBURG AREA RECREATIONAL AUTHORITY  
PARKING LOT D IMPROVEMENTS**

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

FT

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
----------------	--------------------------------	----------------------------------	--

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

70.000

75.000

80.00

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**  
ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

0.61

18

1

679

LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

Developed  
Pervious

Undeveloped

74%

26%

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

13

1

543

## **Project No. 4 – Mayor Alley Stream Restoration**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the stream bank restoration of an Unnamed Tributary of Rock Creek, near the intersection of Mayor Alley and Court Alley. The stabilization will occur for a length of 50 L.F. along the northern bank.

The DEP specified effectiveness values for “Stream Bank Restoration” is provided below. Due to stream restoration being proposed for only along one side of the channel, reduced effectiveness values are used in lieu of the default values.

### **BMP Effectiveness Values Table:**

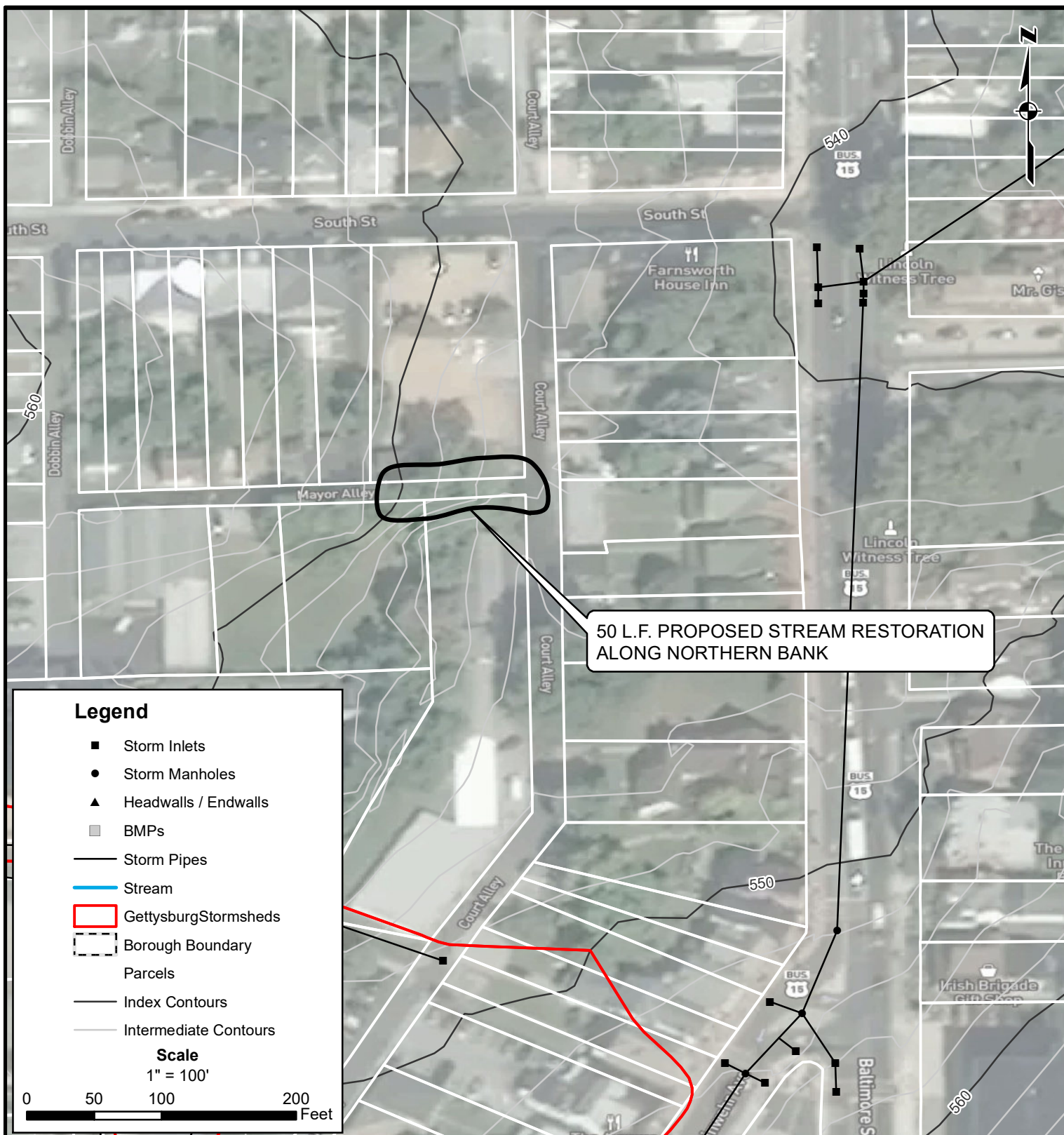
BMP Name	BMP Effectiveness Values			Description
	TN	TP	TSS	
Stream Restoration	0.038 <del>(0.075)</del> lbs/ft/yr	0.034 <del>(0.068)</del> lbs/ft/yr	22.44 <del>(44.88)</del> lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Mayor Alley Stream Restoration project will achieve a reduction of **1,122 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 1.9% of the Borough’s reduction goal.





## GETTYSBURGH BOROUGH



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### MAYOR ALLEY STREAM RESTORATION

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

DRAWN BY HED

CHECKED BY

SCALE AS NOTED

DATE 07/31/2018

DWG. NO.

FILE NO. 2383.5.15.00

**GETTYSBURG BOROUGH  
MAYOR ALLEY STREAM RESTORATION**

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Stream Restoration

*DESCRIPTION An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.*

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

50 FT

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
----------------	--------------------------------	----------------------------------	--

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)\***

0.038  
(lbs/ft/yr)

0.034  
(lbs/ft/yr)

22.44  
(lbs/ft/yr)

\*Stream restoration is proposed for only one (1) side of the stream therefore reduced effectiveness values are used in lieu of the default values

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**

0

ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

N/A

N/A

N/A

LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

0%

Developed  
Pervious

0%

Undeveloped

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

2

2

1,122

## **Project No. 5 – Unnamed Tributary to Rock Creek (Culp’s Farm) – Stream Bank Restoration**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the stream bank restoration of an Unnamed Tributary of Rock Creek, south of East Middle Street. The stabilization will occur for a length of 1,000 L.F.

The DEP specified effectiveness values for the “Stream Restoration” are provided below.

### **BMP Effectiveness Values Table:**

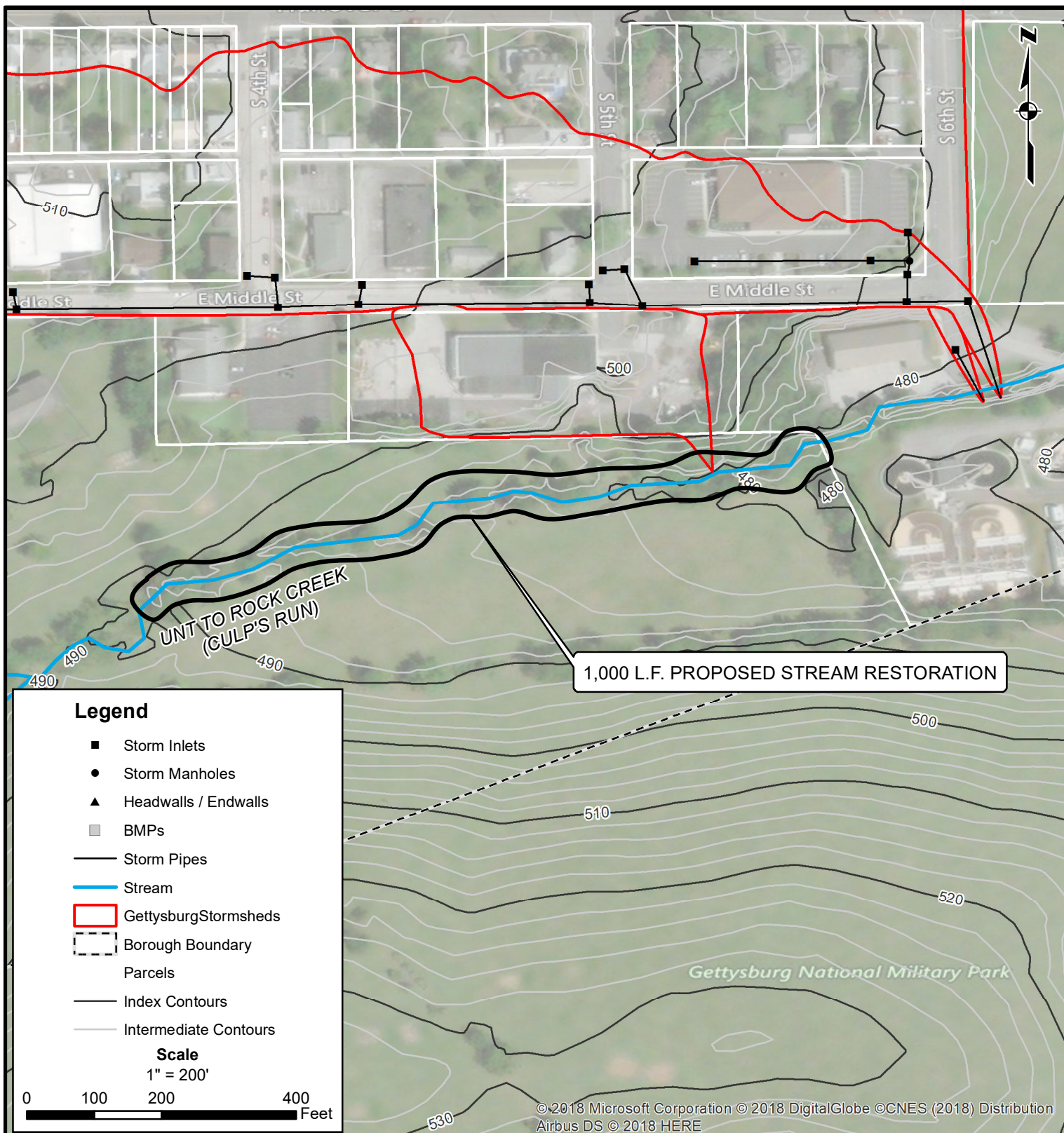
<b>BMP Name</b>	<b>BMP Effectiveness Values</b>			<b>Description</b>
	<b>TN</b>	<b>TP</b>	<b>TSS</b>	
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Unnamed Tributary to Rock Creek (Culp’s Farm) Stream Bank Restoration project will achieve a reduction of **44,880 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 75.4% of the Borough’s reduction goal.





## GETTYSBURGH BOROUGH



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### STREAM RESTORATION UNT TO ROCK CREEK (CULP'S RUN)

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

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FILE NO.	2383.5.15.00

**Stream Restoration**  
**UNT to Rock Creek (Culp's Farm)**

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Stream Restoration

*DESCRIPTION An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.*

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

1000 FT

POLLUTANT TYPE

Total Nitrogen  
(TN)

Total Phosphorus  
(TP)

Total Suspended Solids,  
Sediments (TSS)

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

0.075  
(lbs/ft/yr)

0.068  
(lbs/ft/yr)

44.88  
(lbs/ft/yr)

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**  
ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

N/A

N/A

N/A

LAND COVER DESCRIPTION

Developed  
Impervious

Developed  
Pervious

Undeveloped

**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

0%

0%

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

75

68

44,880

## **Project No. 6 – Gettysburg Recreation Park – Stream Bank Restoration and Rain Gardens**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the stream bank restoration of Stevens Run, west of South Howard Avenue. The stabilization will occur for a length of 425 L.F. In addition, the Borough will implement two (2) small rain gardens to capture runoff from the Park prior to discharging to Stevens Run.

The DEP specified effectiveness values for the “Stream Restoration” and “Bioretention – Raingarden (A/B Soils w/ Underdrain)” are provided below, which is assumptive of the proposed rain garden conditions.

### **BMP Effectiveness Values Table:**

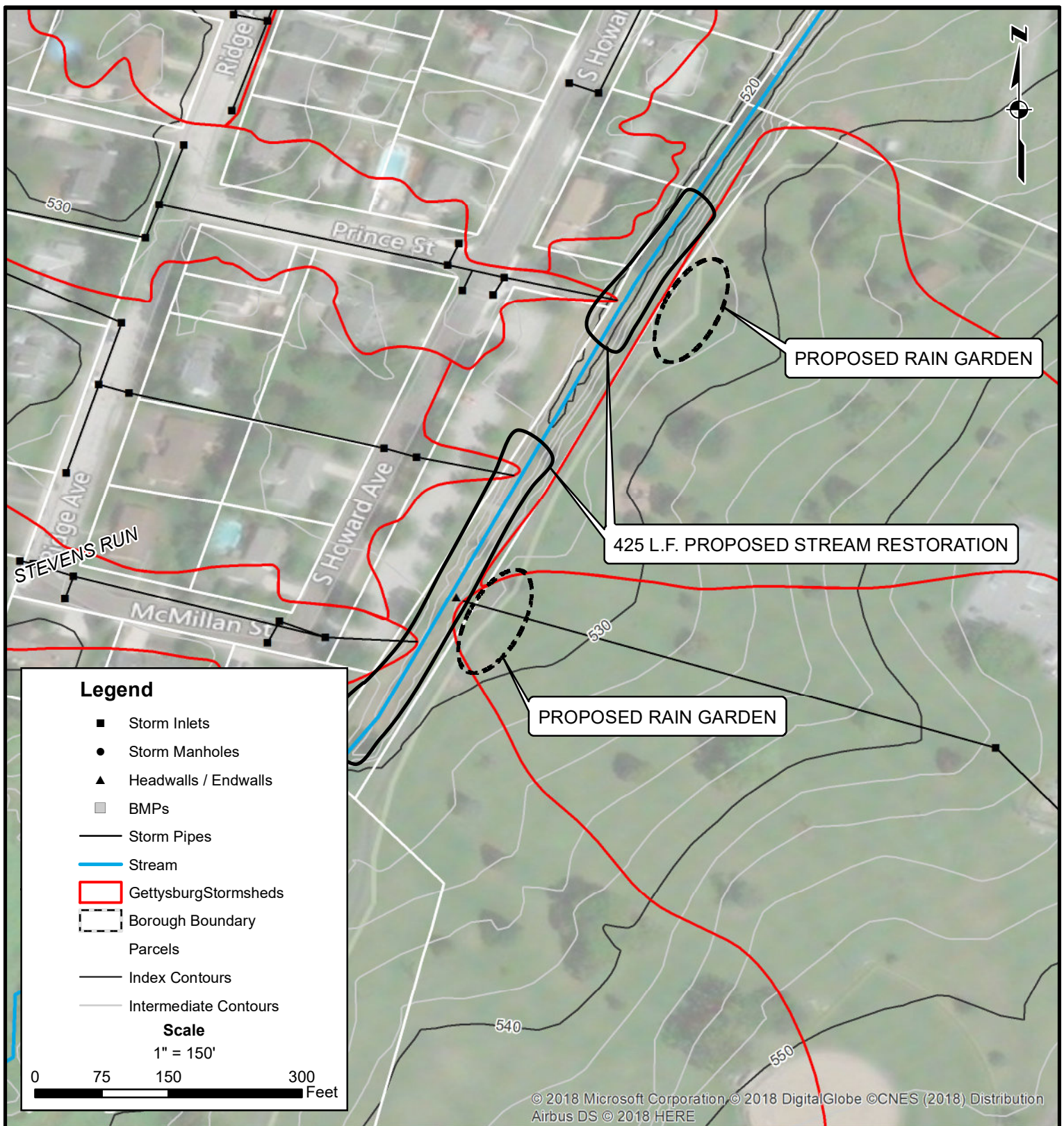
BMP Name	BMP Effectiveness Values			Description
	TN	TP	TSS	
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.
Bioretention Raingarden (A/B Soils w/ Underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Stevens Run Stream Bank Restoration project will achieve a reduction of **22,607 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 38.0% of the Borough’s reduction goal.





## GETTYSBURGH BOROUGH



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### GETTYSBURG REC. PARK STREAM BANK RESTORATION AND RAIN GARDENS

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

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FILE NO.	2383.5.15.00

## GETTYSBURG RECREATION PARKS RAIN GARDENS

### BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION* An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

POLLUTANT TYPE	<u>Total Nitrogen</u> (TN)	<u>Total Phosphorus</u> (TP)	<u>Total Suspended Solids, Sediments (TSS)</u>
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**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

	70.000	75.000	80.00
--	--------	--------	-------

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**  
ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

11.82

224	9		4,417
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LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

7%

Developed  
Pervious

93%

Undeveloped

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

157	7		3,533
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## **Project No. 7 – E. Broadway Street Improvements**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the E. Broadway Street Improvements Project.

The project scope includes converting a 15-foot wide strip of existing pavement into a rain garden and landscape area along E. Broadway for approximately 980 feet from the Carlisle Street intersection to the Harrisburg Street intersection.

The DEP specified effectiveness values for the “Bioretention – Raingarden (A/B Soils w/ Underdrain)” are provided below.

### **BMP Effectiveness Values Table:**

<b>BMP Name</b>	<b>BMP Effectiveness Values</b>			<b>Description</b>
	<b>TN</b>	<b>TP</b>	<b>TSS</b>	
Bioretention Raingarden (A/B Soils w/ Underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the E. Broadway Street Improvements project will achieve a reduction of **3,125 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 5.3% of the Borough’s reduction goal.



## GETTYSBURGH BOROUGH



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### E. BROADWAY STREET IMPROVEMENTS

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

DRAWN BY HED

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SCALE AS NOTED

DATE 07/05/2017

DWG. NO.

FILE NO. 2383.5.15.00

## E. BROADWAY STREET IMPROVEMENTS

### BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION* An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

FT

POLLUTANT TYPE	<u>Total Nitrogen</u> (TN)	<u>Total Phosphorus</u> (TP)	<u>Total Suspended Solids, Sediments (TSS)</u>
----------------	-------------------------------	---------------------------------	--

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

70.000

75.000

80.00

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**

5.2

ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

126

7

3,906

LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

41%

Developed  
Pervious

59%

Undeveloped

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

88

5

3,125

## **Project No. 8 – Race Horse Alley Green Street Project**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the Race Horse Alley Green Street Project.

The project scope includes converting the entire length of Race Horse Alley from existing pavement to permeable pavers. Additional improvements include rain gardens and landscaping. The BMP considered for this project will be the proposed rain gardens. Consideration for the permeable pavement will occur in the development of land cover areas as non-imperious area for the total contributory drainage area.

The DEP specified effectiveness values for the “Bioretention – Raingarden (A/B Soils w/ Underdrain)” are provided below.

### **BMP Effectiveness Values Table:**

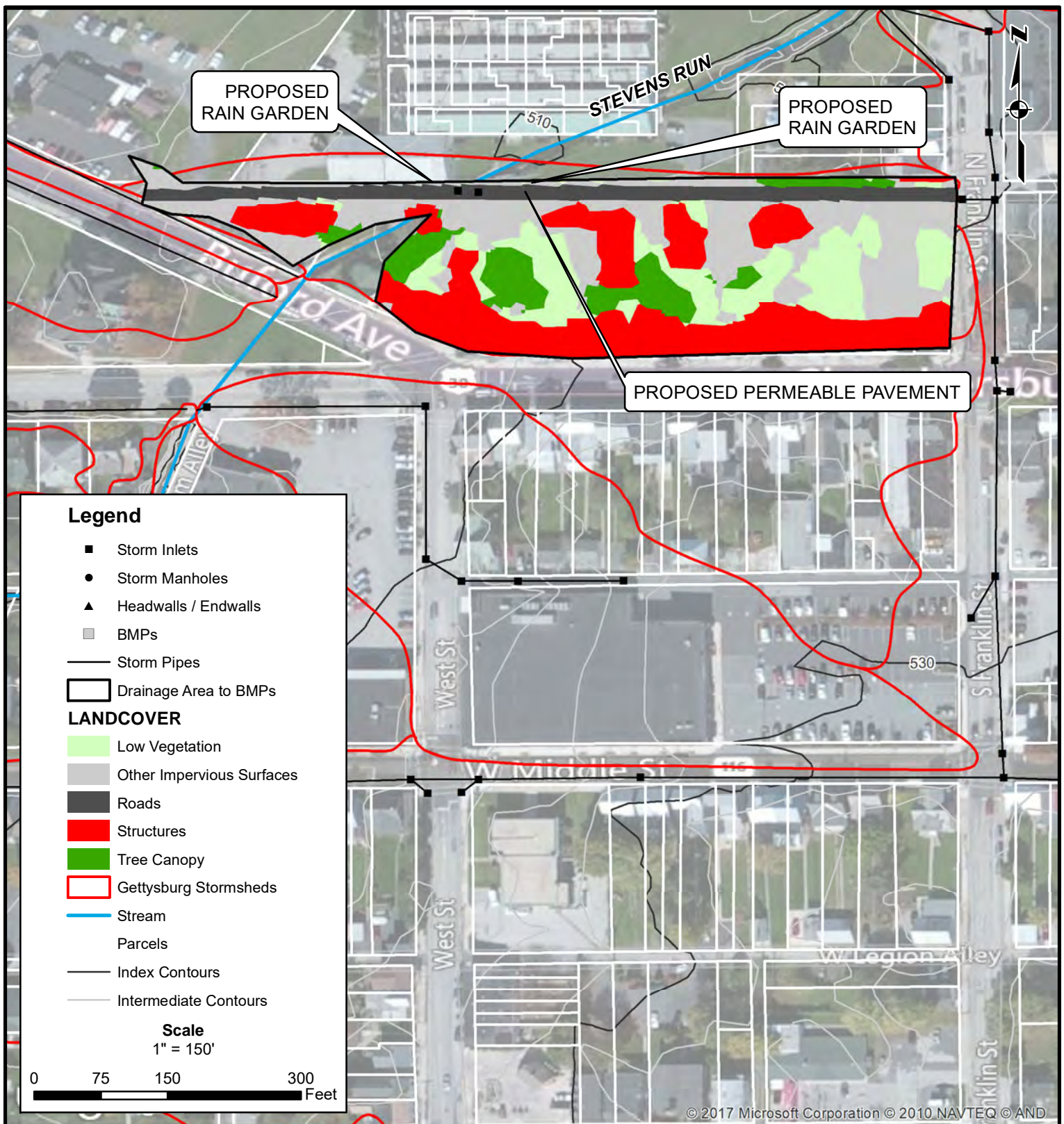
<b>BMP Name</b>	<b>BMP Effectiveness Values</b>			<b>Description</b>
	<b>TN</b>	<b>TP</b>	<b>TSS</b>	
Bioretention Raingarden (A/B Soils w/ Underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Race Horse Alley Green Street project will achieve a reduction of **2,007 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 3.4% of the Borough’s reduction goal.





## GETTYSBURGH BOROUGH



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### RACE HORSE ALLEY GREEN STREET PROJECT

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

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SCALE	AS NOTED
DATE	07/05/2017
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FILE NO.	2383.5.15.00



## RACE HORSE ALLEY GREEN STREET PROJECT

### BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION* An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

FT

POLLUTANT TYPE	<u>Total Nitrogen</u> (TN)	<u>Total Phosphorus</u> (TP)	<u>Total Suspended Solids, Sediments (TSS)</u>
----------------	-------------------------------	---------------------------------	--

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

70.000

75.000

80.00

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**

2.5

**ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)**

70

4

2,509

**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

LAND COVER DESCRIPTION

Developed  
Impervious

Developed  
Pervious

Undeveloped

64%

36%

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

49

3

2,007

## **Project No. 9 – Gettysburg Borough Garage Rain Garden**

In order to help meet the 59,518 pounds of sediment per year required reduction, one project that the Borough has elected to complete is the Gettysburg Borough Garage Rain Garden Project. The project scope includes the conversion of an existing grass strip to a rain garden that will collect and treat stormwater runoff generated by the Borough Garage's property.

The DEP specified effectiveness values for the "Bioretention – Raingarden (A/B Soils w/ Underdrain)" are provided below.

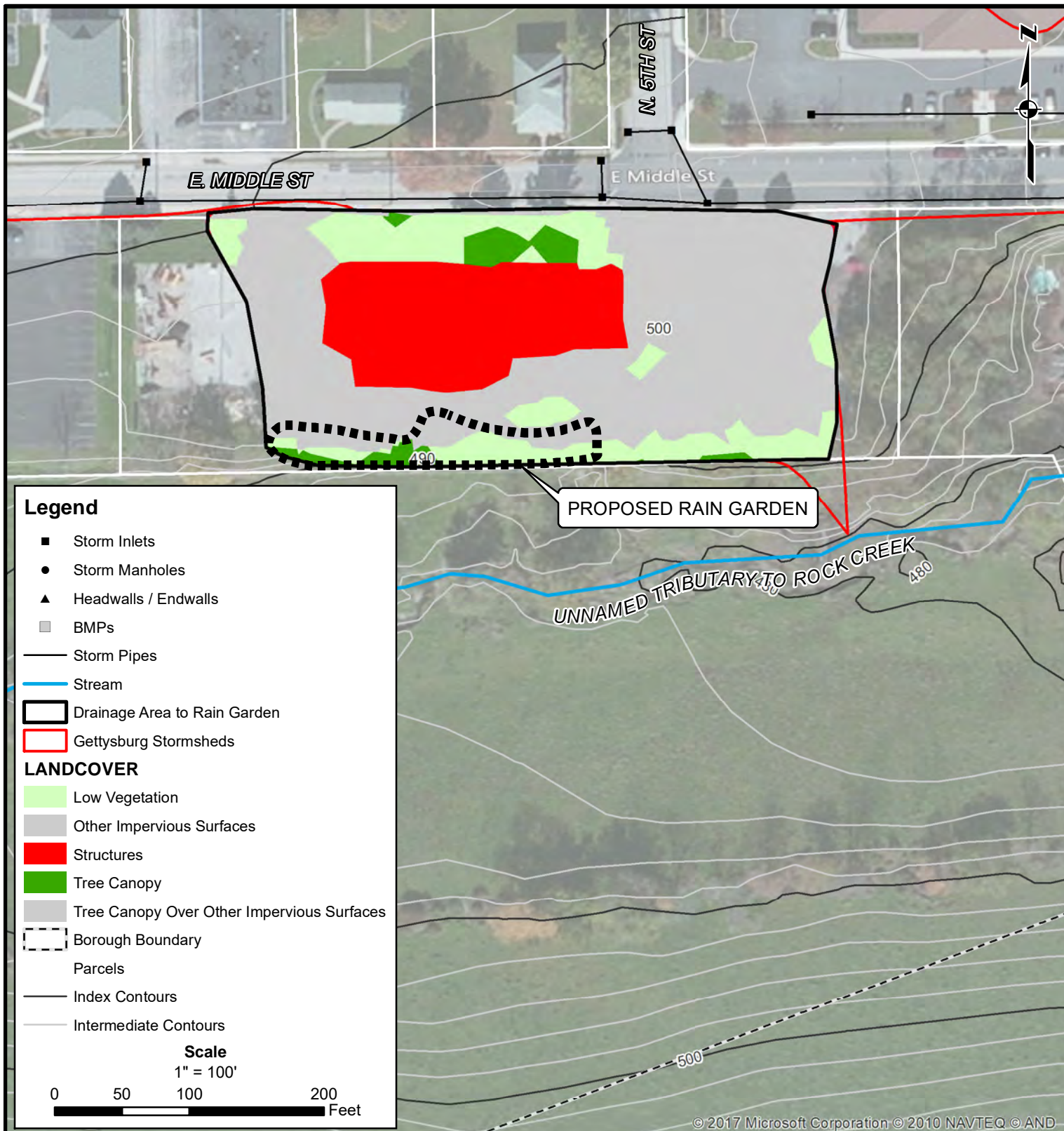
### **BMP Effectiveness Values Table:**

<b>BMP Name</b>	<b>BMP Effectiveness Values</b>			<b>Description</b>
	<b>TN</b>	<b>TP</b>	<b>TSS</b>	
Bioretention Raingarden (A/B Soils w/ Underdrain)	70%	75%	80%	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

For pollutant reduction calculations, the DEP Simplified Method was utilized to remain consistent with how the baseline loading was determined. A project location map and detailed calculations are included herein.

The included calculations demonstrate that the Borough Garage Rain Garden project will achieve a reduction of **1,346 pounds per year** of sediment out of the required 59,518 pounds per year of sediment to be removed.

This project achieves 2.3% of the Borough's reduction goal.



## GETTYSBURGH BOROUGH



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### GETTYSBURG BOROUGH GARAGE RAIN GARDEN

GETTYSBURG BOROUGH

ADAMS COUNTY, PENNSYLVANIA

DRAWN BY HED

CHECKED BY

SCALE AS NOTED

DATE 07/05/2017

DWG. NO.

FILE NO. 2383.5.15.00

**GETTYSBURG BOROUGH  
BOROUGH GARAGE RAIN GARDEN**

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

WHEN SELECTING BMP TYPE "STREAM RESTORATION", PLEASE PROVIDE ANTICIPATED LENGTH OF STREAM RESTORATION TO OCCUR

FT

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
----------------	--------------------------------	----------------------------------	--

**BMP REMOVAL EFFICIENCY FOR EACH  
POLLUTANT TYPE (%)**

70.000

75.000

80.00

**ESTIMATED DRAINAGE AREA TO  
SELECTED BMP TYPE (Acres)**  
ESTIMATED POLLUTANT LOADING  
FROM ESTIMATED DRAINAGE AREA  
(lbs/year)

1.44

43

3

1,682

LAND COVER DESCRIPTION  
**LAND COVER BREAKDOWN FOR  
DRAINAGE AREA (%)**

Developed  
Impervious

Developed  
Pervious

Undeveloped

79%

21%

0%

**ESTIMATED POLLUTANT LOADING  
REDUCTION REMOVAL (lbs/year)**

30

2

1,346

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## **Section F**

### Funding Mechanisms

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## **Funding Mechanisms**

The total annual estimated cost of **\$188,738.00** provides pollutant reductions over and above the 10% required sediment reduction. The extended scope of these projects is provided with the assumption that these additional reductions can be fully credited toward future permit(s) as described in Section E. The Borough may limit the scope of the projects in the instance that additional reductions cannot be credited to future permit(s). The total estimated cost includes the cost of the structural BMP and project related expenses. A summary of cost per project is included below:

### **Project Cost Breakdown:**

<b>Project No.</b>	<b>Project Name</b>	<b>Cost</b>	<b>Funding Obtained</b>	<b>Percent of Required Reduction</b>
1	Gettysburg Inner Loop Segment A	\$404,000	Yes	12.8%
2	Gettysburg Area Recreational Authority Parking Lot Improvements	\$12,000	Yes	0.5%
3	Gettysburg Area Recreational Authority Parking Lot D Improvements	\$8,000	Yes	0.9%
4	Mayor Alley Stream Restoration UNT to Rock Creek	\$12,500	No	1.9%
5	Stream Bank Restoration UNT to Rock Creek (Culp's Farm)	\$350,000	No	75.4%
6	Gettysburg Rec. Park Stream Restoration and Rain Gardens	N/A	No	N/A
7	E. Broadway Street Improvements	\$65,000	No	5.3%
8	Race Horse Alley Green Street Project	\$188,000	No	3.4%
9	Borough Garage Rain Garden	\$18,000	No	2.3%
	Estimated Construction Cost:	\$1,170,000		102.5%
<b>NOTE:</b>	The above-mentioned estimated costs were based upon the following assumptions: (1) Rain garden project costs are based upon the following formula: <i>(Basin Surface Area (Ac.) X \$25,000) X (1 + (Drainage Area to Basin X 0.01))</i> (2) Stream restoration projects will cost \$250 for every one (1) linear (L.F.) of restoration			

The Borough has already secured funding for Project Nos. 1, 2, and 3. The estimated cost for Project No. 6 was not included because it is not anticipated that this project is necessary to meet the required reductions but was included as a possible alternate.

Accounting for the already secured funding, the total anticipated funding needed for implementation of the proposed projects to achieve over and above the 10% required sediment reduction over the next five years' results in **\$188,738** per year. A breakdown of the total estimated cost and annual cost to achieve over and above the 10% required sediment reduction is provided on the following page.

Funding Needed for Projects No. 4, 5, 7, 8, and 9 .....	\$746,000
Construction Contingency (10%) .....	<u>\$74,600</u>
Total Estimated Construction Cost .....	\$820,600
Engineering and Permitting (15%) .....	<u>\$123,090</u>
Total Estimated Cost to Achieve Minimum Required Reduction .....	\$943,690
<b>Total Estimated Cost to Achieve 10% Required Reduction over the Next 5 Years.....</b>	<b>\$188,738</b>

The Borough does plan to explore grant opportunities to help with the cost of these projects. If grants are not awarded to the Borough, the Borough may use money from a combination of its General Fund and its Capital Reserve Account to fund the projects.

The Borough also plans to establish a Stormwater Authority to regulate stormwater as a utility and gain revenue for stormwater related purposes.

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## **Section G**

### **BMP Operation and Maintenance (O&M)**

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## **Summary of BMP Operation and Maintenance (O&M)**

The long-term operation and maintenance (O&M) of the proposed BMPs will be the responsibility of the Borough. Specific O&M procedures for each project are as follows:

### **Project No. 1: Gettysburg Inner Loop Segment A – Stream Bank Restoration**

The O&M described below is applicable for the **stream restoration** BMP of the above-mentioned project.

The vegetation used in this BMP will be susceptible to the following threats:

- Browsing
- Invasion by exotic species
- Competition for nutrients by adjacent herbaceous vegetation
- Human disturbance

Maintenance to be performed regularly is watering, mulching, and weed control in the form of herbicides, mowing at 8-12 inches high, and/or weed mats. Restoration sight will be monitored for invasive plants and deer damage.

### **Project No. 2: GARA Parking Lot Improvements- Rain Garden**

The O&M described below is applicable for the **rain garden** BMP of the above-mentioned project.

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.

### **Project No. 3: GARA Parking Lot D Improvements- Rain Garden**

The O&M described below is applicable for the **rain garden** BMP of the above-mentioned project.

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.



#### **Project No. 4: Mayor Alley Stream Restoration (UNT to Rock Creek)**

The Borough will perform bi-annual inspections for the first three years and annual inspections for subsequent years. Additional inspections should occur following large storm events. The project will experience a five-year initial monitoring period to ensure proper vegetation and stability in addition to ensuring invasive species are not established. Following the initial five-year monitoring period, a regular maintenance plan will be followed.

The following normal O&M of the project will be required to allow the system to develop into and maintain its full ecological potential:

- Avoid encroachment into the proposed floodplain area. Encroachments will detract from the functions and services of the wetlands and stream system.
- Manage any invasive species that may try to out-compete the proposed native riparian planting community until viable successional processes can naturally be sustained. Invasive species control should be implemented at a minimum one time per year using the appropriate methods described below based on site conditions.
- Visually inspect the floodplain and channel. Appropriate corrective measures shall be identified by a qualified professional to address any noted instabilities. The Owner shall be responsible for any necessary corrective measures.

#### **Project No. 5: Stream Bank Restoration UNT to Rock Creek (Culp's Farm)**

The Borough will perform bi-annual inspections for the first three years and annual inspections for subsequent years. Additional inspections should occur following large storm events. The project will experience a five-year initial monitoring period to ensure proper vegetation and stability in addition to ensuring invasive species are not established. Following the initial five-year monitoring period, a regular maintenance plan will be followed.

The following normal O&M of the project will be required to allow the system to develop into and maintain its full ecological potential:

- Avoid encroachment into the proposed floodplain area. Encroachments will detract from the functions and services of the wetlands and stream system.
- Manage any invasive species that may try to out-compete the proposed native riparian planting community until viable successional processes can naturally be sustained. Invasive species control should be implemented at a minimum one time per year using the appropriate methods described below based on site conditions.
- Visually inspect the floodplain and channel. Appropriate corrective measures shall be identified by a qualified professional to address any noted instabilities. The Owner shall be responsible for any necessary corrective measures.

### **Project No. 6: Gettysburg Recreation Park Stream Restoration and Rain Gardens**

The Borough will perform biannual inspections for the first three years and annual inspections for subsequent years. Additional inspections should occur following large storm events. The project will experience a five year initial monitoring period to ensure proper vegetation and stability in addition to ensuring invasive species are not established. Following the initial five-year monitoring period, a regular maintenance plan will be followed.

The following normal O&M of the project will be required to allow the system to develop into and maintain its full ecological potential:

- Avoid encroachment into the proposed floodplain area. Encroachments will detract from the functions and services of the wetlands and stream system.
- Manage any invasive species that may try to out-compete the proposed native riparian planting community until viable successional processes can naturally be sustained. Invasive species control should be implemented at a minimum one time per year using the appropriate methods described below based on site conditions.
- Visually inspect the floodplain and channel. Appropriate corrective measures shall be identified by a qualified professional to address any noted instabilities. The Owner shall be responsible for any necessary corrective measures.

The O&M described below is applicable for the **rain garden** BMP of the above-mentioned project.

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.

### **Project No. 7: E. Broadway Street Improvements – Rain Garden**

The O&M described below is applicable for the above-mentioned project.

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.

### **Project No. 8: Race Horse Alley Green Street Project-Rain Garden and Permeable Pavement**

The O&M described below is applicable for **rain garden** BMP of the above-mentioned project.

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.

The O&M described below is applicable for **permeable pavement** BMP for the above-mentioned project.

- Vacuuming of the pavement should be done 2-3 times annually
- If soil deposits occur they should be cleaned immediately.
- Construction staging, soil/mulch storage, etc. are not allowed on the pavement unless the pavement is protected.
- Planted areas adjacent to the pavement must be maintained.
- All inlets going to the underdrain must be cleaned twice annually.

### **Project No. 9: Borough Garage Rain Garden**

The O&M described below is applicable for the above-mentioned project:

- Pruning and weeded may be required until the vegetation is fully established.
- Waste and debris may need to be removed yearly.
- Perennial plantings may be trimmed at the end of the growing season.
- When erosion is evident, mulch should be re-spread as needed also; the area may need completely re-mulched every 2-3 years.
- The area should be inspected at least twice annually for sediment build up, erosion, vegetative conditions, etc.
- Trees and shrubs should be inspected twice annually to evaluate their health.

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# Appendix I

## Proof of Publication

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**Proof of Publication**  
**Public Comment Period**  
**June 18, 2018 – July 18, 2018**

## PUBLIC NOTICE

Gettysburg Borough has revised their Pollutant Reduction Plan (PRP) to meet the requirements of its Municipal Separate Storm Sewer (MS4) permit with the Department of Environmental Protection (DEP). The PRP includes estimates of the existing pollutants that are discharged to streams within the Borough and the associated reductions that are required by DEP. The plan also identifies proposed storm water improvements needed to meet these pollutant reduction requirements, possible funding sources, and ongoing operation and maintenance responsibilities for the proposed stormwater improvements. A public review period of the revised draft PRP will begin on June 18, 2018 and will continue for 30 days until July 18, 2018. The revised draft will be available for public inspection at the Borough office located at 59 E. High Street, Gettysburg, Mondays through Fridays between the hours of 8:00 am and 3:30 pm. During this period, comments will be accepted in writing or by email ([cmc@csdavidson.com](mailto:cmc@csdavidson.com)) to the Borough office or verbally at the Borough Council Workshop Meeting on June 25, 2018.

**Proof of Publication**  
**Public Comment Period**  
**July 12, 2017 – August 11, 2017**

## PUBLIC NOTICE Gettysburg Borough has created a Pollutant Reduction Plan

[Save](#)[Share](#)

### Details for PUBLIC NOTICE Gettysburg Borough has created a Pollutant Reduction Plan

12 hrs ago

PUBLIC NOTICE Gettysburg Borough has created a Pollutant Reduction Plan (PRP) to meet the requirements of its Municipal Separate Storm Sewer (MS4) permit with the Department of Environmental Protection (DEP). The PRP includes estimates of the existing pollutants that are discharged to streams within the Borough and the associated reductions that are required by DEP. The plan also identifies proposed stormwater improvements needed to meet these pollutant reduction requirements, possible funding sources, and ongoing operation and maintenance responsibilities for the proposed stormwater improvements. A public review period of the draft PRP will begin on July 12, 2017 and will continue for 30 days until August 11, 2017. The draft will be available for public inspection at the Borough office located at 59 E. High Street, Gettysburg, Mondays through Fridays between the hours of 8:00 am and 3:30 pm. During this period, comments will be accepted in writing or by email ([cmc@csdavidson.com](mailto:cmc@csdavidson.com)) to the Borough office or verbally at the Borough Council Workshop Meeting on July 24, 2017.

Borough Engineer | Gettysburg, PA

Secure | https://www.gettysburgpa.gov/public-works/pages/borough-engineer

• Surveying


• Land Development (LD)

• GIS

• Street & Roadway Design

• Project Management

C.S. Davidson, Inc.



The C.S. Davidson Team

Attachment	Size
Gettysburg Borough Pollutant Reduction Plan - DRAFT (July 2017)	22.99 MB
Gettysburg Borough MS4 Presentation (June 2017)	5.47 MB
Homeowners Guide to BMP Stormwater Maintenance (MS4 Compliance)	5.79 MB

Gettysburg Pennsylvania

Borough Office: 59 East High Street, Gettysburg, PA 17325 | 717-334-1160

Virtual Towns & Schools Website

Login



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## **Appendix II**

### **Public Comments / Record of Consideration**

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## **Public Comments/Record of Consideration**

### **Public Comment Period (June 18, 2018 – July 18, 2018)**

#### **PUBLIC COMMENTS**

One comment was received during the regularly scheduled Borough Council Workshop Meeting held on June 25, 2018. Mr. Philip Goble, 132 East Middle Street, said that the horse manure and urine that washes in the stormwater should be taken into consideration.

During the 30-day public comment period, which ran from June 18, 2018 through July 18, 2018, the Borough met with Gettysburg National Military Park and Gettysburg Area Recreational Authority on separate occasions to discuss proposed Pollutant Reduction Projects.

Borough staff met with Gettysburg Area Recreational Authority (GARA) during the public comment period to discuss the Gettysburg Rec. Park project. The intent of the meeting was to discuss the scope of the project and future coordination with GARA.

Borough staff also met with representatives from the National Park Service for Gettysburg National Military Park during the public comment period to discuss the Stream Bank Restoration (UNT to Rock Creek / Culp's Run) project. The intent of the meeting was to discuss the scope of the project and determine if the National Park Service would be willing to allow the Borough to perform the project on federally owned property. The representatives from the National Park Service for Gettysburg National Military Park appeared to be receptive to the project and encouraged the Borough to perform an additional 220 linear feet of stream restoration. The length of stream restoration for this project now totals approximately 1,000 linear feet.

No additional comments were received during the 30-day public comment period.

#### **RECORD OF CONSIDERATION**

As per the meetings held during the public comment period, the Borough will continue to work with the National Park Service and Gettysburg Area Recreational Authority for implementation of the proposed projects. The Borough strives to work together with these entities to promote the area's rich character and continuously improve the health and welfare of the community. The Borough also recognizes comments received by its residents and appreciates active participation from the community.

## **Public Comment Period (July 12, 2017 – August 11, 2017)**

### **PUBLIC COMMENTS**

One comment was received during the regularly scheduled Borough Council Workshop Meeting held on July 24, 2017. Pat Naugle, President of the Watershed Alliance of Adams County offered the alliance's assistance in pursuing funding or in providing volunteer manpower on projects identified in the pollution reduction plan.

During the 30-day public comment period, which ran from July 12, 2017 through August 11, 2017, Gettysburg College expressed interest in the 2018 Pollutant Reduction Plan. A meeting was held on July 7, 2017 with Gettysburg College representatives, Borough staff, and the Borough Engineer. The intent of the meeting was to discuss the College's interest in possible collaboration with the Borough for stormwater improvements projects such that the Borough could receive reduction credits for such projects. In addition the College notified the Borough of a few existing BMPs that were already included in the Plan.

No additional comments were received during the 30-day public comment period.

### **RECORD OF CONSIDERATION**

As per the meeting held on July 7, 2017, the Borough would consider collaborating with Gettysburg College on future stormwater improvements projects. The Borough and Gettysburg College have a long-standing history of working together to continuously improve the health and welfare of the community. In addition the Borough will consider collaborating with the Watershed Alliance of Adams County to complete projects identified by the plan.

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## **Appendix III**

### Areas Parsed Out of Stormsheds

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<b>eFACTS on the Web</b>
<b>DEP Information</b>
About DEP
Contact Us
DEP Home
<b>Search eFACTS</b>
Authorization Search
Client Search
Facility Search
Inspection Search
Mammography Search
Name Search
Pollution Prevention
Sites by
County/Municipality
Site Search
<b>Reports</b>
Emission Summary
Facility Emissions
<b>Other Sites</b>
eMapPA
eNotice
EPA ECHO
EPA Envirofacts
Permits, Licensing, and Certification
The PA Code

## Facility Search Details

Facility ID:	558952
Facility Name:	DAL TILE GETTYSBURG PLANT
Address:	211 N FOURTH STREET GETTYSBURG, PA 17325 Gettysburg Borough, Adams County
Status:	Active
Program:	Clean Water

## Facility Search Sub-Facility Details

Sub Facility Name	Type:	Other ID:	Status:	eMap PA Location:
STORMWATER 001	Discharge Point	001	Active	<a href="#">View Map in eMapPa</a>
STORMWATER 002	Discharge Point	002	Active	<a href="#">View Map in eMapPa</a>
STORMWATER 003	Discharge Point	003	Active	<a href="#">View Map in eMapPa</a>
STORMWATER 004	Discharge Point	004	Active	<a href="#">View Map in eMapPa</a>

## Facility Search Permit Details

Authorization	Status:	Permit Number:	Date Received:
<a href="#">PAG-03 Discharge of Stormwater Assoc w Industrial Activities (337986)</a>	Issued	PAR213503	09/12/2000
<a href="#">PAG-03 Discharge of Stormwater Assoc w Industrial Activities (585696)</a>	Issued	PAR213503	02/02/2005
<a href="#">PAG-03 Discharge of Stormwater Assoc w Industrial Activities (814801)</a>	Issued	PAR213503	11/23/2009
<a href="#">PAG-03 Discharge of Stormwater Assoc w Industrial Activities (1040614)</a>	Issued	PAR213503	08/26/2014

## Facility Search Inspection Details

Inspection Type	Inspection Date	Result
Storm Water Industrial-Non-Sampling (2232379)	11/19/2013	No Violations Noted

## Facility Search Tank Remediation

No records matched the criteria.
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**Corrective Action/Tank Closure requirements remain outstanding for incidents in Inactive status.**

## Facility Search Land Recycling Information

No records matched the criteria.
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## Facility Search Air Emissions

No records matched the criteria.
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## **Appendix IV**

### Existing BMPs to Reduce Baseline

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**Gettysburg Borough**  
**Existing BMPs Pollutant Reduction Credit Summary**

Project Name / Location	BMP Type	Contributory Drainage Area (AC.)	Impervious Area (%)	Non Impervious Area (%)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	Detailed Description of BMP	Latitude	Longitude	BMP Address (Actual or Nearest)	Operation and Maintenance (O&M) Responsibilities	Approx. Date Installed
227 N Washington St	Filtering Practices	0.09	99	1	1	0	147	A small underground infiltration trench which captures stormwater runoff from the house	39.834350	-77.232977	227 N Washington St	Owner	2013
339 Carlisle Street	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	0.97	71	29	18	1	1,205	A Rectangle shape with 3/4 of a circle on one end and a radius on the other with an approximate area of 152 sf	39.836224	-77.230425	339 Carlisle St	Owner	2014
Best Western Hotel	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	0.29	4	96	4	0	86	An approximately 2,246 SF rain garden located in the parking lot which captures stormwater from the parking lot	39.818928	-77.235889	301 Steinwehr Ave	Owner	2017
Bus Transfer Center 1	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	0.15	100	0	3	0	248	A shrub and grass lined rain garden with a triangular shaped and smoothed curved corners. The rain garden collects stormwater for the ACTA Bus Transfer Center parking lot	39.832352	-77.230669	103 Carlisle St	Owner	2012
Bus Transfer Center 2	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	0.47	99	1	9	0	770	A shrub and grass lined rectangular shape with smooth arcs for the short sides. This rain garden collects stormwater for the ACTA Bus Transfer Center parking lot	39.832357	-77.230529	103 Carlisle St	Owner	2012
Central Energy Plant	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	2.37	58	42	27	1	2,196	An approximately 14,000 SF permeable pavement which has a perforated PVC and AASHTO #57 underdrain	39.833840	-77.238585	62 Constitution Ave	Owner	2012
Eisenhower House	Filtering Practices	0.46	64	36	5	0	526	An infiltration trench with an underdrain of perforated PVC and AASHTO #57 stone. This underdrain has a minimum soil cover of one (1) foot	39.835520	-77.232372	300 Carlisle St	Owner	2011
Future Stakes Land Development	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	1.62	35	66	27	1	1,193	Two (2) elliptical shaped rain gardens totaling approximately 754 SF located in the parking lot which captures stormwater from the parking lot	39.820485	-77.234752	297 Steinwehr Ave	Owner	2016
Gettysburg College - Brua Drive	Filtering Practices	3.29	2	98	28	1	882	Two (2) stormwater facilities totaling approximately 380 SF with adjoining drainage areas	39.833437	-77.234993	102 W Water St	Owner	2012
Gettysburg College- Dining Hall	Infiltration Practices w/ Sand, Veg.	0.13	8	92	2	0	54	An infiltration trench which utilizes a Stormtech SC-310 chamber system and receives water from two (2) storm systems	39.837050	-77.237399	31 W Lincoln Ave	Owner	2016
Gettysburg College Union Building 1	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	0.97	100	0	13	0	1,402	Four (4) small areas of permeable pavement totaling approximately 1,860 SF that shares a drainage area with other BMPs	39.836464	-77.235934	2 Lincoln Square	Owner	2017
Gettysburg College Union Building 2	Filtering Practices	1.60	63	37	17	1	1,807	Atlantis D-Rain tanks	39.836464	-77.235934	2 Lincoln Square	Owner	2017
Gettysburg Hospital	Dry Extended Detention Basins	7.44	97	3	43	2	8,982	A large detention basin which utilizes a "snout" oil and debris separator. This basin receives water by direct runoff to the basin and via two endwalls which allow stormwater to flow from the other inlets and discharge into the basin	39.824787	-77.236286	147 Gettys St	Owner	2013
Habitat for Humanity -N 5th Street	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	1.39	97	3	18	1	1,958	A 25'x40' parking area made of permeable pavement located along an unnamed driveway directly behind 92 and 94 North 5th Street	39.832280	-77.222371	92 & 94 N 5th St	Owner	2010
Lutheran Seminary Historical Trail	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2.13	100	0	43	2	3,519	A large grass lined detention basin	39.832781	-77.242711	147 Seminary Ridge	Owner	2017
Lutheran Seminary Western Gateway	Dry Extended Detention Basins	0.66	23	77	3	0	279	A grass lined detention basin	39.832032	-77.243260	61 Seminary Ridge	Owner	2012
Musselman Stadium Renovation	Filtering Practices	3.78	93	7	43	2	5,871	An infiltration trench located directly below the parking lot which receives stormwater from the parking lot via inlets	39.834176	-77.239028	62 Constitution Ave	Owner	2012

Gettysburg Borough  
Existing BMPs Pollutant Reduction Credit Summary

Project Name / Location	BMP Type	Contributory Drainage Area (AC.)	Impervious Area (%)	Non Impervious Area (%)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	Detailed Description of BMP	Latitude	Longitude	BMP Address (Actual or Nearest)	Operation and Maintenance (O&M) Responsibilities	Approx. Date Installed
Orchard Development 1	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	1.48	93	7	19	1	2,011	Approximately 2,320 SF of permeable pavement with a perforated SLCPP and AASHTO #57 stone underdrain	39.833015	-77.231822	140 Carlisle St	Owner	2011
Orchard Development 2	Filtering Practices	0.59	84	16	7	0	841	An infiltration trench that has a perforated SLCPP underdrain.	39.833136	-77.231356	140 Carlisle St	Owner	2011
West Street Plaza	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	6.53	98	2	84	4	9,197	Approximately 5,445 SF of permeable pavement which allows stormwater from the plaza to be released into the ground	39.828330	-77.236169	240 West St	Owner	2009
York Dental	Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)	0.12	98	2	2	0	171	Permeable pavement parking lot	39.832127	-77.224018	353 York St	Owner	2017

TOTAL REDUCTION CREDITS:      416      17      43,345

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

227 N Washington Street

**DESCRIPTION**

A small underground infiltration trench which captures stormwater runoff from the house

**LATITUDE / LONGITUDE**

39.834350, -77.232977

**CONDITION**

N/A

**DATE INSTALLED**

2013

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION**

Filtering Practices

*DESCRIPTION Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.09		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	3	0	184
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	99%	1%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	1	0	147

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

<b>BMP NAME</b>	<b>339 Carlisle Street</b>
<b>DESCRIPTION</b>	A rectangle shape with 3/4 of a circle on one end and a radius on the other with an approximate area of 152 SF
<b>LATITUDE / LONGITUDE</b>	39.836224, -77.230425
<b>CONDITION</b>	N/A
<b>DATE INSTALLED</b>	2014
<b>OPERATION &amp; MAINTENANCE</b>	Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.97		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	26	1	1,507
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	71%	29%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	18	1	1,205

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**Best Western Hotel**

**DESCRIPTION**

An approximately 2,246 SF rain garden located in the parking lot which captures stormwater from the parking lot

**LATITUDE / LONGITUDE**

39.818928, -77.235889

**CONDITION**

N/A

**DATE INSTALLED**

2017

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION* An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.29		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	6	0	107
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	4%	96%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	4	0	86



## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**Bus Transfer Center 1**

**DESCRIPTION**

A shrub and grass lined rain garden with a triangular shaped and smoothed curved corners. The rain garden collects stormwater for the ACTA Bus Transfer Center parking lot.

**LATITUDE / LONGITUDE**

39.832352, -77.230669

**CONDITION**

N/A

**DATE INSTALLED**

2012

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.15		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	4	0	310
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	100%	0%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	3	0	248

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**Bus Transfer Center 2**

**DESCRIPTION**

A shrub and grass lined rain garden with smooth arcs for the short sides. The rain garden collects stormwater for the ACTA Bus Transfer Center parking lot.

**LATITUDE / LONGITUDE**

39.832357, -77.230529

**CONDITION**

N/A

**DATE INSTALLED**

2012

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.47		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	14	1	962
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	99%	1%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	9	0	770

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

<b>BMP NAME</b>	<b>Central Energy Plant</b>
<b>DESCRIPTION</b>	An approximately 14,000 SF permeable pavement which has a perforated PVC and AASHTO #57 underdrain
<b>LATITUDE / LONGITUDE</b>	39.833840, -77.238585
<b>CONDITION</b>	N/A
<b>DATE INSTALLED</b>	2012
<b>OPERATION &amp; MAINTENANCE</b>	Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	2.37		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	61	2	3,137
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	58%	42%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	27	1	2,196

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

Eisenhower House

**DESCRIPTION**

An infiltration trench with an underdrain of perforated PVC and AASHTO #57 stone. This underdrain has a minimum soil cover of one (1) foot

**LATITUDE / LONGITUDE**

39.835520, -77.232372

**CONDITION**

N/A

**DATE INSTALLED**

2011

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION**

Filtering Practices

*DESCRIPTION Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.46		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	12	0	658
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	64%	36%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	5	0	526

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

<b>BMP NAME</b>	<b>Future Stakes Land Development</b>
<b>DESCRIPTION</b>	Two (2) elliptical shaped rain gardens totaling approximately 754 SF located in the parking lot which captures stormwater from the parking lot
<b>LATITUDE / LONGITUDE</b>	39.820485, -77.234752
<b>CONDITION</b>	N/A
<b>DATE INSTALLED</b>	2016
<b>OPERATION &amp; MAINTENANCE</b>	Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	1.62		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	39	1	1,491
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	35%	66%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	27	1	1,193

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

<b>BMP NAME</b>	<b>Gettysburg College - Brua Drive</b>		
<b>DESCRIPTION</b>	Two (2) stormwater facilities totaling approximtely 380 SF with adjoining drainage areas		
<b>LATITUDE / LONGITUDE</b>	39.833437, -77.234993		
<b>CONDITION</b>	N/A		
<b>DATE INSTALLED</b>	2012		
<b>OPERATION &amp; MAINTENANCE</b>	Owner		
<b>BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION</b>	Filtering Practices		
<i>DESCRIPTION</i>	<i>Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.</i>		
<b>POLLUTANT TYPE</b>	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	3.29		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	70	1	1,102
<b>LAND COVER DESCRIPTION</b>	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	2%	98%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	<b>28</b>	<b>1</b>	<b>882</b>



## EXISTING BMP POLLUTANT LOADING CALCULATIONS

<b>BMP NAME</b>	<b>Gettysburg College - Dining Hall</b>
<b>DESCRIPTION</b>	An infiltration trench which utilizes a Stormtech SC-310 chamber system and receives water from two (2) storm systems
<b>LATITUDE / LONGITUDE</b>	39.837050, -77.237399
<b>CONDITION</b>	N/A
<b>DATE INSTALLED</b>	2016
<b>OPERATION &amp; MAINTENANCE</b>	Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Infiltration Practices w/ Sand, Veg.

*DESCRIPTION A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff.*

	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	85.000	85.000	95.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.13		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	3	0	57
	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	8%	92%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	2	0	54

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

Gettysburg College Union Building 1

**DESCRIPTION**

Four (4) small areas of permeable pavement totaling approximately 1,860 SF that shares a drainage area with other BMPs

**LATITUDE / LONGITUDE**

39.836464, -77.235934

**CONDITION**

N/A

**DATE INSTALLED**

2017

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.97		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	28	1	2,003
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	100%	0%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	13	1	1,402

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

Gettysburg College Union Building 2

**DESCRIPTION**

Atlantis D-Rain Tanks

**LATITUDE / LONGITUDE**

39.836464, -77.235934

**CONDITION**

N/A

**DATE INSTALLED**

2017

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Filtering Practices

*DESCRIPTION Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	1.6		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	42	1	2,259
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	63%	37%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	17	1	1,807

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

Gettysburg Hospital

**DESCRIPTION**

A large detention basin which utilizes a "snout" oil and debris separator. This basin receives water by direct runoff to the basin and via two endwalls which allow stormwater to flow from the other inlets and discharge into the basin

**LATITUDE / LONGITUDE**

39.824787, -77.236286

**CONDITION**

N/A

**DATE INSTALLED**

2013

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Dry Extended Detention Basins

*DESCRIPTION Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	20.000	20.000	60.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	7.44		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	214	8	14,970
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	97%	3%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	43	2	8,982

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

Habitat for Humanity - N 5th Street

**DESCRIPTION**

A 25'x40' parking area made of permeable pavement located along an unnamed driveway directly behind 92 and 94 North 5th Street

**LATITUDE / LONGITUDE**

39.832280, -77.222371

**CONDITION**

N/A

**DATE INSTALLED**

2010

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	1.39		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	40	2	2,797
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	97%	3%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	18	1	1,958

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME** Lutheran Seminary Historical Trail

**DESCRIPTION** A large grass lined detention basin

**LATITUDE / LONGITUDE** 39.832781, -77.242711

**CONDITION** N/A

**DATE INSTALLED** 2017

**OPERATION & MAINTENANCE** Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION** Bioretention - Raingarden (A/B Soils w/ Underdrain)

*DESCRIPTION An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in A or B soil.*

POLLUTANT TYPE	<u>Total Nitrogen</u> (TN)	<u>Total Phosphorus</u> (TP)	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	70.000	75.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	2.13		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	62	2	4,399
LAND COVER DESCRIPTION	<u>Developed</u> <u>Impervious</u>	<u>Developed</u> <u>Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	100%	0%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	43	2	3,519

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME** Lutheran Seminary Western Gateway

**DESCRIPTION** A grass lined detention basin

**LATITUDE / LONGITUDE** 39.832032, -77.243260

**CONDITION** N/A

**DATE INSTALLED** 2012

**OPERATION & MAINTENANCE** Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Dry Extended Detention Basins

*DESCRIPTION Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	20.000	20.000	60.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.66		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	15	0	466
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	23%	77%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	3	0	279



## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME** Musselman Stadium Renovation

**DESCRIPTION** An infiltration trench located directly below the parking lot which receives stormwater from the parking lot via inlets

**LATITUDE / LONGITUDE** 39.834176, -77.239028

**CONDITION** N/A

**DATE INSTALLED** 2012

**OPERATION & MAINTENANCE** Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Filtering Practices

*DESCRIPTION Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.*

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	3.78		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	107	4	7,339
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	93%	7%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	43	2	5,871

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**Orchard Development 1**

**DESCRIPTION**

Approximately 2,320 SF of permeable pavement with a perforated SLCPP and AASHTO #57 stone underdrain

**LATITUDE / LONGITUDE**

39.833015, -77.231822

**CONDITION**

N/A

**DATE INSTALLED**

2011

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	1.48		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	42	2	2,873
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	93%	7%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	19	1	2,011

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**Orchard Development 2**

**DESCRIPTION**

An infiltration trench that has a perforated SLCPP underdrain

**LATITUDE / LONGITUDE**

39.833136, -77.231356

**CONDITION**

N/A

**DATE INSTALLED**

2011

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Filtering Practices

*DESCRIPTION Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.*

	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>POLLUTANT TYPE</b>			
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	40.000	60.000	80.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.59		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	16	1	1,052
<b>LAND COVER DESCRIPTION</b>	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	84%	16%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	7	0	841

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**West Street Plaza**

**DESCRIPTION**

Approximately 5,445 SF of permeable pavement which allows stormwater from the plaza to be released into the ground

**LATITUDE / LONGITUDE**

39.828330, -77.236169

**CONDITION**

N/A

**DATE INSTALLED**

2009

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP) TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	6.53		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	187	7	13,139
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	97%	3%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	84	4	9,197

## EXISTING BMP POLLUTANT LOADING CALCULATIONS

**BMP NAME**

**York Dental**

**DESCRIPTION**

Permeable pavement parking lot

**LATITUDE / LONGITUDE**

39.832127, -77.224018

**CONDITION**

N/A

**DATE INSTALLED**

2017

**OPERATION & MAINTENANCE**

Owner

**BEST MANAGEMENT PRACTICE (BMP)  
TYPE SELECTION**

Permeable Pavement w/o Sand or Veg. (A/B Soils w/ Underdrain)

*DESCRIPTION* Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain. This BMP has an underdrain, no sand or vegetation and is in A or B soil.

POLLUTANT TYPE	<u>Total Nitrogen (TN)</u>	<u>Total Phosphorus (TP)</u>	<u>Total Suspended Solids, Sediments (TSS)</u>
<b>BMP REMOVAL EFFICIENCY FOR EACH POLLUTANT TYPE (%)</b>	45.000	50.000	70.00
<b>ESTIMATED DRAINAGE AREA TO SELECTED BMP TYPE (Acres)</b>	0.12		
<b>ESTIMATED POLLUTANT LOADING FROM ESTIMATED DRAINAGE AREA (lbs/year)</b>	3	0	244
LAND COVER DESCRIPTION	<u>Developed Impervious</u>	<u>Developed Pervious</u>	<u>Undeveloped</u>
<b>LAND COVER BREAKDOWN FOR DRAINAGE AREA (%)</b>	98%	2%	0%
<b>ESTIMATED POLLUTANT LOADING REDUCTION REMOVAL (lbs/year)</b>	2	0	171

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# **Appendix V**

## **BMP Implementation Schedule**

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## **Implementation of Proposed BMPs**

The Borough has chosen to pursue multiple projects to meet the **59,518 pounds of sediment per year** required reduction. Below is the estimated implementation schedule for the proposed BMPs.

<b>Project No.</b>	<b>Project Name</b>	<b>BMP Type</b>	<b>Year</b>
1	Gettysburg Inner Loop Segment A	Stream Restoration	2018
2	Gettysburg Area Recreational Authority Parking Lot Improvements	Dry Extended Detention Basins	2018
3	Gettysburg Area Recreational Authority Parking Lot D Improvements	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2018
4	Mayor Alley Stream Restoration UNT to Rock Creek	Stream Restoration	2019
5	Stream Bank Restoration UNT to Rock Creek (Culp's Farm)	Stream Restoration	2020
6	Gettysburg Rec. Park Stream Bank Restoration & Rain Gardens	Bioretention-Rain Garden (A/B Soils w/ Underdrain) and Stream Restoration	N/A
7	E. Broadway Street Improvements	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2019
8	Race Horse Alley Green Street Project	Permeable Pavement and Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2022
9	Borough Garage Rain Garden	Bioretention-Rain Garden (A/B Soils w/ Underdrain)	2023