
Borough of Lemoyne

MS₄ Program

Pollutant Reduction Plan (PRP)

For

UNT to Susquehanna River (Appendix E) &

Chesapeake Bay (Appendix D)

2018 – 2023 MS₄ Permit

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ARRO Project No. 6811.10



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1. INTRODUCTION

Lemoyne Borough, Cumberland County was classified as an urbanized area per the 2010 U.S. Census. The Pennsylvania Department of Environmental Protection (PA DEP) has notified the Borough that they are required to renew the National Pollutant Discharge Elimination System (NPDES) Small Municipal Separate Storm Sewer Systems (MS4) permit. The requirements for Lemoyne Borough are defined by the PA DEP Ms4 requirements as:

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Cumberland County						
LEMOYNE BORO	PAG133552	No		Unnamed Tributaries to Susquehanna River	Appendix E - Siltation (5)	Other Habitat Alterations (4c)
				Susquehanna River	Appendix C - PCB (5)	
				Chesapeake Bay Nutrients/Sediment	Appendix D - Nutrients, Siltation (4a)	

This combined Pollutant Reduction Plan (PRP) has been developed to satisfy the requirements of: 1) Chesapeake Bay Pollutant Reduction Plan (CBPRP) requirements; and 2) PRP for the Unnamed Tributary (UNT) to Susquehanna River. All of the storm sewer sheds identified in this plan are tributary to the Chesapeake Bay.

2. POLLUTANT REDUCTION PLAN (PRP)

A. Public Participation

Lemoyne Borough encouraged a plan that included public participation and buy in. The Borough publicly advertised notice of public review, 30 day comment period and public meeting in the Patriot News on May 23, 2017; a copy of the advertisement is located in Appendix A.

The Borough posted a copy of the complete draft Pollutant Reduction Plan on the Borough Website prior to the public notice. A hard copy was also made available at the Borough office during normal business hours.

The Borough received written comment from May 25, 2017 to July 7, 2017; a copy of all written comments is provided in Appendix B. A public meeting was held on July 6, 2017 at 7:00 PM; a summary of comments received is provided in Appendix C.

The Borough would like to acknowledge the valuable input received from the public and Borough Stormwater Committee in the development of the PRP. The Borough's record of consideration for all timely comments received is provided in Appendix D. This PRP reflects careful planning of Lemoyne with respect to the impaired waters of the commonwealth, local flooding, erosion problems, and the financial impact to the residents.

B. Map

In accordance with PA DEP guidelines for development of the PRP, Lemoyne has completed mapping of the regulated MS4 Storm Sewer Sheds; the required mapping is provided in Appendix E. Mapping of the Borough was broken out into a series of mapping, consistent with the design process for the development of the PRP. This methodology also provides for clarity of the data being presented. The mapping includes the following:

- Lemoyne Borough MS4 Conveyance System – includes collection and conveyance to the regulated outfalls, identifies outfall, outfall location with latitude and longitude, and waters of the commonwealth and Chapter 93 designation.
- Lemoyne Borough Attaining/Non-Attaining Streams – defines streams attainment status and associated impairment.
- Lemoyne Borough MS4 Drainage Area Land Use – defines land use based upon zoning to assist in determination of land use contribution to local impairments.
- Lemoyne Borough MS4 Drainage Area Analysis – provides topographic map utilized in determining storm sewer shed to outfalls.
- Lemoyne Borough MS4 Drainage Area Impervious/Pervious Analysis – provides aerial mapping utilizing Geographic Information System (GIS) data to identify the drainage area and amount of impervious area within each storm sewer shed.
- Lemoyne Borough MS4 Drainage Area Runoff Rate and Volume Analysis – provides rate and volume of runoff per storm sewer shed to identify potential local flooding issues.
- Lemoyne Borough Municipal Storm Sewer Shed – provides a comparison of the 2010 Census Urbanized Area boundary to define regulated MS4 outfalls and the portion of the storm sewer sheds that the Borough is responsible for.
- Lemoyne Borough Existing BMP Structures – identifies existing Best Management Practices accounted for in the reduction of the base pollutant loading.
- Lemoyne Borough Geology – in combination with NRCS soils data, geology is evaluated for the suitability for potential BMP implementation.
- Lemoyne Borough Potential BMP Structures – provides identification of potential BMPs identified by the Borough that were evaluated.
- Lemoyne Borough Proposed BMP Structures – provides identification of the selected BMPs identified by the Borough for implementation.

C. Pollutants of Concern

Lemoyne Borough, in accordance with the PA DEP Municipal requirements table and the impaired waters mapping provided herein, is subject to Appendix D and Appendix E of the MS4 permit.

Appendix D – Chesapeake Bay

Appendix D is the requirement for development of a Chesapeake Bay Pollutant Reduction Plan (CBPRP). In accordance with the PRP guidelines, the goal of the CBPRP is for the following reductions:

- 3% reduction of Total Nitrogen (TN)
- 5% reduction of Total Phosphorous (TP)
- 10% reduction of Sediment (TSS)

Furthermore, the PA DEP PRP instructions state: “Permittees are encouraged to select appropriate BMPs to achieve the 10% sediment loading reduction objective, as it is expected that, overall within the Bay watershed, the TP (5%) and TN (3%) goals will be achieved when a 10% reduction in sediment is achieved.” The PRP has been prepared to meet the required 10% reduction of sediment.

Appendix E – UNT to Susquehanna River

Appendix E is the requirement for development of a Pollutant Reduction Plan (PRP) for the identified impaired waterway. Lemoyne Borough is responsible for developing a PRP for the UNT to Susquehanna River to address siltation. In accordance with the PRP guidelines, the goal of the PRP is for the following reductions:

- 3% reduction of Total Nitrogen (TN)
- 5% reduction of Total Phosphorous (TP)
- 10% reduction of Sediment (TSS)

Furthermore, the PA DEP PRP instructions state: “If the impairment is based on siltation only, a minimum 10% sediment reduction is required. If the impairment is based on nutrients only or other surrogates for nutrients (e.g., “Excessive Algal Growth” and “Organic Enrichment/Low D.O.”), a minimum 5% TP reduction is required. If the impaired is due to both siltation and nutrients, both sediment (10% reduction) and TP (5% reduction) must be addressed.” The PRP has been prepared to meet the required 10% reduction of sediment.

D. Existing Loading for Pollutants of Concern

Based upon the storm sewer shed delineation, the existing loading for TSS, TP and TN was calculated for each storm sewer shed. Since Lemoyne Borough is subject to the requirements of Appendix E, the pollutant loading for the storm sewer sheds tributary to the UNT to Susquehanna River were calculated separately. The pollutant loading for the remaining storm sewer sheds tributary to the Chesapeake Bay were calculated. The total pollutant loading to the Chesapeake Bay is the sum of loads calculated for Appendix E and the loads calculated for the remainder of Appendix D. Pollutant loadings were calculated based upon PA DEP’s “Developed Land Loading Rates for PA Counties” (Attachment B of the PRP instructions) for Cumberland County; the calculated pollutant loadings are provided in Appendix F. The calculations are summarized below:

Base Pollutant Loading (No Existing BMPs) Summary:

Appendix E - UNT to Susquehanna River

Drainage Area ID	Drainage Area (Ac)			PA DEP Land Loading		
	Impervious	Pervious	Total	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Unnamed Tributary to the Susquehanna River	49.83	189.45	239.28	5,853.82	119.72	161,047.18
				5,853.82	119.72	161,047.18

Required Reduction Percent	3%	5%	10%
Required Reduction (Lbs/Year)	175.61	5.99	16,104.72

Appendix D - Chesapeake Bay

Drainage Area ID	Drainage Area (Ac)			PA DEP Land Loading		
	Impervious	Pervious	Total	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Susquehanna River	275.28	304.94	580.22	15,065.95	409.24	662,081.47
				15,065.95	409.24	662,081.47

Required Reduction Percent	3%	5%	10%
Required Reduction (Lbs/Year)	451.98	20.46	66,208.15

TOTAL COMBINED REQUIRED REDUCTION:	627.59	26.45	82,312.87
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D.1. Existing BMP Load Reductions

Based upon the mapping (see Attachment E), Lemoyne Borough identified existing BMPs that would reduce the existing pollutant loading. Attachment E provides a summary of the existing BMPs, along with ownership, operation and maintenance requirements. The percent of pollutant reductions for each BMP was determined based upon the recommendation reports of the Chesapeake Bay Expert Panel. The existing BMP pollutant load reduction calculations are provided in Attachment G. The existing loading for TSS, TP and TN was re-calculated for each storm sewer shed accounting for the pollutant load reduction from the existing BMPs, see Attachment H. The design base pollutant loading and required pollutant reduction goal is summarized below:

Base Pollutant Loading (With Existing BMPs) Summary:

Appendix E - UNT to Susquehanna River

Drainage Area ID	Drainage Area (Ac)			PA DEP Land Loading		
	Impervious	Pervious	Total	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Unnamed Tributary to the Susquehanna River	49.83	189.45	239.28	5,853.82	119.72	161,047.18
Existing BMP Load Reduction				49.55	3.28	5,791.03
				5,804.27	116.44	155,256.15

Required Reduction Percent 3% 5% 10%

Required Reduction (Lbs/Year) 174.13 5.82 15,525.61

Appendix D - Chesapeake Bay

Drainage Area ID	Drainage Area (Ac)			PA DEP Land Loading		
	Impervious	Pervious	Total	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Susquehanna River	275.28	304.94	580.22	15,065.95	409.24	662,081.47
Existing BMP Load Reduction				241.90	13.88	26,041.82
				14,824.05	395.36	636,039.65

Required Reduction Percent 3% 5% 10%

Required Reduction (Lbs/Year) 444.72 19.77 63,603.97

TOTAL COMBINED REQUIRED REDUCTION: 618.85 25.59 79,129.58

E. Selected BMP's

Lemoyne Borough developed a potential BMP concept plan to identify potential BMPs to be implemented, see Attachment E. The associated pollutant loading reductions for each BMP were calculated and are provided in Attachment I; a summary description of the potential BMPs evaluated is also provided in Attachment I. The percent of pollutant reductions for each BMP were determined based upon the recommendation reports of the Chesapeake Bay Expert Panel, PA DEP BMP Effectiveness Value table, and manufacture literature including independent laboratory testing (appropriate manufacture data is provided in Attachment J).

Lemoyne Borough evaluated the following factors in selection of the BMPs to be implemented achieve the required pollutant load reduction. These factors included:

- Return-on-investment for dollar per pound of pollutant removed (See Appendix M)
- Overall BMP cost (see Appendix L)
- Secured grant funding
- Availability of land to implement BMPs
- Local flooding and erosion problems
- Drainage areas associated with identified waterways
- Consistency with Economic Development initiatives

Based upon the potential BMP evaluation, Lemoyne Borough developed the proposed BMPs to be implemented under the MS4 permit from 2018 – 2023. The proposed BMPs are identified on Map 11: Lemoyne Borough Proposed BMP Structures. The proposed BMP pollutant reduction is summarized below and in attachment K:

Selected BMPs Option:

Option 1:

	Drainage Area ID	Prop. BMP ID	BMP Description	Pollutant Reduction		
				TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Unnamed Tributary to the Susquehanna River						
	OF-002	BMP 002-BS1	Bioswale	907.26	22.62	35,691.41
Susquehanna River						
	OF-008	BMP 008-VS2	Vegetated Swale	133.94	4.39	38,624.36
	OF-008	BMP 008-VS3	Vegetated Swale	133.94	4.39	38,624.36
				1,175.15	31.40	112,940.13
Required Reduction (Lbs/Year)				618.85	25.59	79,129.58
Net Reduction:				556.30	5.81	33,810.55

F. Funding Mechanism

Lemoyne Borough, through the planning phase, evaluated the cost associated with the selected plan; the selected BMP implementation cost is summarized below:

PRP Cost Summary:

	Drainage Area ID	Prop. BMP ID	BMP Description	Project Cost
Unnamed Tributary to the Susquehanna River				
	OF-002	BMP 002-BS1	Bioswale	\$69,420.80
Susquehanna River				
	OF-008	BMP 008-VS2	Vegetated Swale	\$98,831.46
	OF-008	BMP 008-VS3	Vegetated Swale	\$108,841.98
				\$277,094.24

Lemoyne Borough, in the 2017 budget, established a separate Stormwater Budget. The required funding identified above will be funded through the Borough’s Stormwater Budget, as established through the General Fund. The General Fund revenues are based upon the Borough’s tax base, as regulated under the Borough Code.

The Borough’s stormwater committee continues to evaluate potential grant funding opportunities and apply for project specific grants.

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

Lemoyne Borough will own and operate the BMPs identified in the PRP. Specific requirements for each BMP are identified below:

BMP 002-BS1: Bioswale:

Location: Existing swale paralleling Riverview Road, located on private property within a drainage easement. Limits are from Westwind Road to the UNT to Susquehanna River.

Responsible Party: Lemoyne Borough

O&M Activities: Monitor storm sewer discharge areas and swale banks for scouring and erosion, immediately stabilized any areas of erosion. Maintain vegetation in natural state, where appropriate. Remove any invasive species that may develop.

Frequency of O&M Activities: Complete inspection of the restored corridor a minimum of once a year. Complete restoration and/or selective vegetation management as needed based upon inspections.

BMP 008-VS2: Vegetated Swale:

Location: Norfolk Southern Railroad right-of-way from approximately Arnold Street to Donald Avenue.

Responsible Party: Lemoyne Borough

O&M Activities: Monitor storm sewer discharge areas and swale banks for scouring and erosion, immediately stabilized any areas of erosion. Maintain vegetation in natural state, where appropriate. Remove any invasive species that may develop. Authorization for right-of-entry required from Norfolk Southern for access to the right-of-way.

Frequency of O&M Activities: Complete inspection of the restored corridor a minimum of once a year. Complete restoration and/or selective vegetation management as needed based upon inspections.

BMP 008-VS3: Vegetated Swale:

Location: Norfolk Southern Railroad right-of-way from approximately Donald Avenue to S. Seventh Street.

Responsible Party: Lemoyne Borough

O&M Activities: Monitor storm sewer discharge areas and swale banks for scouring and erosion, immediately stabilized any areas of erosion. Maintain vegetation in natural state, where appropriate. Remove any invasive species that may develop. Authorization for right-of-entry required from Norfolk Southern for access to the right-of-way.

Frequency of O&M Activities: Complete inspection of the restored corridor a minimum of once a year. Complete restoration and/or selective vegetation management as needed based upon inspections.

H. PRP Implementation Schedule

<u>Task</u>	<u>Implementation Date</u>
MS4 Permit Authorization	March 2018
BMP 008-VS2: Vegetated Swale	November 2020
BMP 008-VS3: Vegetated Swale	November 2021
BMP 002-BS1	November 2022
MS4 Permit Expiration	March 2023