Borough of Mount Joy

MS4 Program

Pollutant Reduction Plan (PRP)

For

UNT to Donegal Creek (Appendix E), Chiques/Little Chiques Creek (Appendix E), & Chesapeake Bay (Appendix E)

2018 – 2023 MS4 Permit

June 2017

Revised September 2017

ARRO Project No. 10863.11

ARRO Consulting, Inc.
108 West Airport Road
Lititz, PA 17543
717-569-7021

TABLE OF CONTENTS

1. INTRODUCTION

Mount Joy Borough, Lancaster 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 Mount Joy 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
Lancaster						
MOUNT JOY BORO	PAG133658	No		Unnamed Tributaries to Donegal Creek	Appendix E-Siltation (4a)	
				Chesapeake Bay Nutrients/Sediment	Appendix D-Nutrients, Siltation (4a)	
				Chiques Creek	Appendix E-Nutrients (4a)	
				Donegal Creek	Appendix E-Nutrients, Organic Enrichment/Low D.O., Suspended Solids (4a)	
				Little Chiques Creek	Appendix E-Nutrients, Siltation	
				Susquehanna River	Appendix B-Pathogens (5), Appendix C-PCB (5)	

PADEP has published the Pollutant Aggregation suggestions for MS4 municipal requirements table; per the aggregation instructions, the aggregate total required reduction may be analyzed and BMP's may be implemented in the identified watersheds, tributary to the same HUC 12 watershed. The aggregated requirements for Mount Joy Borough are:

MS4 Name	NPDES ID	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Lancaster County				
MOUNT JOY BORO	PAG133658	Donegal Creek, Little Chiques Creek, Lower Chiques Creek	Chesapeake Bay Nutrients\Sediment, Chiques Creek, Donegal Creek, Little Chiques Creek, Unnamed Tributaries to Donegal Creek	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
		Cabin Creek-Susquehanna River	Susquehanna River	Appendix B-Pathogens, Appendix C-PCB
		Cabin Creek-Susquehanna River, Hartman Run-Susquehanna River	Chesapeake Bay Nutrients\Sediment, Chiques Creek, Susquehanna River	Appendix D-Siltation/Nutrients, Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids

This combined Pollutant Reduction Plan (PRP) has been developed to satisfy the requirements of: 1) PRP for the Little Chiques Creek; and 2) PRP for the Unnamed Tributary (UNT) to Donegal Creek.

2. POLLUTANT REDUCTION PLAN (PRP)

A. Public Participation

Mount Joy 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 local paper on June 28, 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 July 5, 2017 to August 4, 2017; a copy of all written comments is provided in Appendix B. A public meeting was held on August 7, 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 Staff 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 Mount Joy 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, Mount Joy Borough 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 mappings, 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:

- Mount Joy 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.
- Mount Joy Borough Attaining/Non-Attaining Streams – defines streams attainment status and associated impairment.
- Mount Joy Borough MS3 Drainage Area Land Use – defines land use based upon zoning to assist in determination of land use contribution to local impairments.
- Mount Joy Borough MS3 Drainage Area Analysis – provides topographic map utilized in determining storm sewer shed to outfalls.
- Mount Joy Borough MS3 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.
- Mount Joy Borough MS3 Drainage Area Runoff Rate and Volume Analysis – provides rate and volume of runoff per storm sewer shed to identify potential local flooding issues.
- Mount Joy 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.
- Mount Joy Borough Existing BMP Structures – identifies existing Best Management Practices accounted for in the reduction of the base pollutant loading.
- Mount Joy Borough Geology – in combination with NRCS soils data, geology is evaluated for the suitability for potential BMP implementation.
- Mount Joy Borough Potential BMP Structures – provides identification of potential BMPs identified by the Borough that were evaluated.

- Mount Joy Borough Proposed BMP Structures – provides identification of the selected BMPs identified by the Borough for implementation.

C. Pollutants of Concern

Mount Joy Borough, in accordance with the PA DEP Municipal requirements table and the impaired waters mapping provided herein, is subject to an aggregation of 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.

UNT to Donegal Creek (Appendix E) & Little Chiques Creek (Appendix E)

Appendix E is the requirement for development of a Pollutant Reduction Plan (PRP) for the identified impaired waterway. Mount Joy Borough is responsible for developing a PRP for the UNT to Donegal Creek & Little Chiques Creek 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.

Aggregate Analysis

In accordance with the pollutant aggregation table, the Borough may evaluate the aggregate total of the watersheds tributary to the Chesapeake Bay, Donegal Creek, and Little Chiques Creek. In accordance with the PRP guidelines, the aggregated goal of the PRP is for the following reduction:

- 10% reduction of Sediment (TSS)

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 Mount Joy Borough is subject to the requirements of Appendix E, the pollutant loading for the storm sewer sheds tributary to the UNT to Donegal Creek and Little Chiques/Chiques 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; the pollutant loads calculated also represent the aggregated pollutant loading. Pollutant loadings were calculated based upon PA DEP's "Developed Land Loading Rates for PA Counties" (Attachment B of the PRP instructions) for Lancaster 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 Donegal Creek

	Drainage Area (Ac)			PA DEP Land Loading
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek	94.63	211.03	305.66	180,381.45
				180,381.45

Required Reduction Percent 10%

Required Reduction (Lbs/Year) **18,038.15**

Appendix E - Little Chiques Creek

	Drainage Area (Ac)			PA DEP Land Loading
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TSS (lbs/year)**
Little Chiques Creek	287.23	682.59	969.82	555,557.75
				555,557.75

Required Reduction Percent 10%

Required Reduction (Lbs/Year) **55,555.78**

TOTAL COMBINED REQUIRED REDUCTION (No Existing BMPs): Appendix D (Chesapeake Bay) & Aggregated Total:	**73,593.92**

D.1. Existing BMP Load Reductions

Based upon the mapping (see Attachment E), Mount Joy 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 Donegal Creek

	Drainage Area (Ac)			PA DEP Land Loading
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek	94.63	211.03	305.66	180,381.45
Existing BMP Load Reduction				42,712.95
				137,668.50

Required Reduction Percent 10%

Required Reduction (Lbs/Year) **13,766.85**

Appendix E - Little Chiques Creek

	Drainage Area (Ac)			PA DEP Land Loading
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TSS (lbs/year)**
Little Chiques Creek	287.23	682.59	969.82	555,557.75
Existing BMP Load Reduction				22,940.78
				532,616.97

Required Reduction Percent 10%

Required Reduction (Lbs/Year) **53,261.70**

TOTAL COMBINED REQUIRED REDUCTION: Appendix D- Chesapeake Bay & Aggregated Total:**	**67,028.55**

E. Selected BMP's

Mount Joy 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).

Mount Joy Borough evaluated the following factors in selection of the BMPs to be implemented to 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, Mount Joy Borough developed the proposed BMPs to be implemented under the MS4 permit from 2018 – 2023. The proposed BMPs are identified on Map 11: Mount Joy Borough Proposed BMP Structures. The proposed BMP pollutant reduction is summarized below and in attachment K:

Selected BMPs Option: Based upon PA DEP Pollutant Aggregation Table

				Pollutant Reduction
	Drainage Area ID	**Prop. BMP ID**	**BMP Description**	**TSS (lbs/year)**
Little Chiques Creek				
	OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	11,208.45
	OP-008	BMP OP008-VS1	Vegetated Swale	77,062.44
				88,270.88

Required Reduction (Lbs/Year)	**67,028.55**
Net Reduction:	21,242.33

F. Funding Mechanism

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

Selected BMPs Option: Based upon PA DEP Pollutant Aggregation Table

	Drainage Area ID	**Prop. BMP ID**	**BMP Description**	**Project Cost**
Little Chiques Creek				
	OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	$56,960.00
	OP-008	BMP OP008-VS1	Vegetated Swale	$90,120.00
				$147,080.00

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.

Mount Joy Borough received notice from PA DEP on June 29, 2017 that they were awarded funding as follows:

BMP 008-VS1: Vegetated Swale	$64,633
BMP 008-BR1: Wet Pond Basin Retrofit	$40,422
Total funding:	$105,055

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

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

BMP 008-VS1: Vegetated Swale:

Location:	North of Rotary Park. Limits are from Fairview Street to Old Market Street
Responsible Party:	Mount Joy Borough
O&M Activities:	Monitor storm sewer discharge areas and swale banks for scouring and erosion, immediately stabilize 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-BR1: Wet Pond Basin Retrofit:

Location:	Approximately north of 537 West Main Street.
Responsible Party:	Mount Joy Borough
O&M Activities:	Monitor storm sewer discharge areas and basin banks for scouring and erosion, immediately stabilize any areas of erosion. Maintain vegetation in natural state, where appropriate.
Frequency of O&M Activities:	Complete inspection of the basin a minimum of once a year. Complete restoration and/or selective vegetation management as needed based upon inspections.

H. PRP Implementation Schedule

Task	Implementation Date
MS4 Permit Authorization	March 2018
BMP 008-VS1: Vegetated Swale	November 2021
BMP 008-BR1: Wet Pond Basin Retrofit	November 2022
MS4 Permit Expiration	March 2023

ATTACHMENT A

PUBLIC NOTICE

NOTICE OF PUBLIC COMMENT PERIOD AND PUBLIC MEETING FOR

NPDES STORMWATER DISCHARGE POLLUTANT REDUCTION PLAN

Mount Joy Borough is hereby giving notice of the 30-day public comment period for its National Pollutant Discharge Elimination (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) Pollutant Reduction Plan (PRP). The Plan proposes best management practices to satisfy the PRP requirements for the following impaired waterways: Unnamed Tributaries to Donegal Creek (Appendix E – Nutrients, Siltation); Chiques Creek (Appendix E – Nutrients, Siltation); Susquehanna River (Appendix D –Nutrients, Siltation)

The plans are available for public examination as noted below. The public is invited to review these documents and provide written comments to the individual listed below:

Pollutant Reduction Plan: Mount Joy Borough
21 E. Main St.
Mount Joy, PA 17552
Phone: 717-653-2300
Comments to: Dave Salley, Stormwater Enforcement Officer
dsalley@mountjoypa.org

Visit times are Monday through Friday, between 7:00 am and 4:00 pm. or visit the Borough website at http://mountjoyborough.com/.

The minimum 30-day public comment period will begin July 5, 2017 and end August 4, 2017.

A public meeting for the Plan will be held on August 7, 2017 during the regularly scheduled Borough Council meeting. Borough Council meeting is held at 21 E. Main St., Mount Joy, PA 17552, beginning at 7:00 PM.

MOUNT JOY BOROUGH

Please Publish: June 28, 2017

LNP MEDIA GROUP, Inc., P.O. Box 1328, Lancaster, PA 17608

Account:	250776	Ad ID:	3794491
Client Type:	LT	Description:	NOTICE OF PUBLIC COMMENT PERIOD AND
Name:			
Company:	MOUNT JOY BOROUGH	Run Dates:	06/28/17 to 06/28/17
Address:	21 EAST MAIN ST	Class:	107
	PO BOX 25	Orig User:	CARNESEN
	MT. JOY, PA 17552	Lines:	61
Telephone:	(717) 653-2300	Agate Lines:	106

Other Charges:	$10.00	Gross:	$312.56
Discount:	$0.00		
Surcharge:	$0.00	Paid Amount:	- $0.00
Credits:	$0.00		
Bill Depth:	7.611	Amount Due:	$312.56

NOTICE OF PUBLIC COMMENT PERIOD AND PUBLIC MEETING FOR NPDES STORMWATER DISCHARGE POLLUTANT REDUCTION PLAN

Mount Joy Borough is hereby giving notice of the 30-day public comment period for its National Pollutant Discharge Elimination (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) Pollutant Reduction Plan (PRP). The Plan proposes best management practices to satisfy the PRP requirements for the following impaired waterways: Unnamed Tributaries to Donegal Creek (Appendix E – Nutrients, Siltation); Chiques Creek (Appendix E – Nutrients, Siltation); Susquehanna River (Appendix D –Nutrients, Siltation)

The plans are available for public examination as noted below. The public is invited to review these documents and provide written comments to the individual listed below:

Pollutant Reduction Plan:
Mount Joy Borough
21 E. Main St.
Mount Joy, PA 17552
Phone: 717-653-2300
Comments to: Dave Salley, Stormwater Enforcement Officer
dsalley@mountjoypa.org

Visit times are Monday through Friday, between 7:00 am and 4:00 pm, or visit the Borough website at http://mountjoyborough.com/

The minimum 30-day public comment period will begin July 5, 2017, and end August 4, 2017.

A public meeting for the Plan will be held on August 7, 2017, during the regularly scheduled Borough Council meeting. Borough Council meeting is held at 21 E. Main St., Mount Joy, PA 17552, beginning at 7:00 PM.

MOUNT JOY BOROUGH

ATTACHMENT B

WRITTEN PUBLIC COMMENTS

From: Bruce Haigh [mailto:bhaigh@comcast.net]
Sent: Monday, July 17, 2017 10:25 AM
To: David Salley <dsalley@mountjoypa.org>
Cc: Stacie Gibbs <Staci@mountjoypa.org>
Subject: BMP OP007-BS1 Bioswale

Dave: Good Morning

Pollution Reduction Plan, Attachment I Potential BMP Pollutant Loading Reduction, Little Chiques Creek, BMP OP007-BS1: Bioswale (page un numbered)

Questions

1. Is ARRO proposing to install a Bioswale inside the BMP to replace the concrete low flow channel or is the Bioswale on the discharge channel on the other side of Pinkerton Road which happens to be in East Donegal Township?

2. Who is the Point of Contact that owns this BMP. Name and telephone number please.

Regards Bruce

Bruce W. Haigh PE
President
Whittemore and Haigh Engineering Inc.
504 Rose Petal Lane, Suite 203
Mount Joy PA 17552
610.698.7697
e-mail: Bhaigh@whei.net
web site: www.whei.net

From: Bruce Haigh [mailto:bhaigh@comcast.net]
Sent: Thursday, July 27, 2017 9:36 PM
To: David Salley <dsalley@mountjoypa.org>
Cc: Stacie Gibbs <Staci@mountjoypa.org>
Subject: Pollution Reduction Plan

Dave: Good Evening

The Borough PRP as posted on the Borough website is missing several pages. See Existing BMP Summary Sheet

For the Unnamed Tributary to Donegal Creek there is Worksheet 4 or Base Pollutant Loading (No Existing BMP) sheet for drainage area OP005 however there is an existing BMP OP005-147

For the Little Chiques Creek there is no Worksheet 4 or Base Pollutant Loading (No existing BMP) sheet for drainage areas OP-012 and OP-013 however there are existing BMPs OP013-146, OP012-159, OP013-174 and OP012-230

Just though you might want to know.

Regards Bruce

Bruce W. Haigh PE
President
Whittemore and Haigh Engineering Inc.
504 Rose Petal Lane, Suite 203
Mount Joy PA 17552
610.698.7697
e-mail: Bhaigh@whei.net
web site: www.whei.net

Arbor Rose Community Association

HORST
PROPERTY
MANAGEMENT

320 Granite Run Drive • PO Box 3330 • Lancaster, PA 17604-3330
P: 717-581-9850 • F: 717-581-9816 • HorstPropertyManagement.com

July 28, 2017

Mr. David Salley
Storm water Enforcement Officer
Mount Joy Borough
21 E. Main Street
Mount Joy PA 17552

Re: Borough of Mount Joy MS4 Storm water Permit Pollution Reduction Plan

Dear Mr. Salley:

The Board of Directors of the Arbor Rose Community Association (ARCA) are providing the following Public Comments regarding the Borough's NPDES MS4 Pollution Reduction Plan (PRP) as far as it impacts the Arbor Rose Community Association membership consisting of eighty-six (86) individual single family residential dwellings. The Public Comment Period runs from July 5, 2017 through August 4, 2017. The comments were prepared jointly by Mr. Bruce W. Haigh, PE, President ARCA who has fifty (50) years' experience in Civil engineering and Construction and Mr. Andy Sherwood, Treasurer who has over thirty (30) years' experience in Construction, Quality Assurance and Training with the Nuclear Power industry.

The Board of Directors wants to first publically thank You, Mrs. Stacie Gibbs, Alternate Storm water Enforcement Officer and Mr. Dennis Nissley, Public Works Director for your individual and joint long standing demonstrated commitment to the Storm water Management Program. We believe that the storm water management program is an important program and we also realize that it is an unfunded Federal and State mandate. The Borough Staff is commend for recently obtaining two Chesapeake Bay Plan grants.

In general we found the Pollution Reduction Plan (PRP) difficult to navigate and analyze. This is because the Table of Contents contains no numbering system either sequentially or by section. None of the pages in the attachment are numbered. We recommend numbering by attachment. Attachment E- Mapping: Map Index lists Maps by Map number 1 through 11 with Map Titles however the Individual Maps do not contain a Map number only a Title. The Map numbers are also not included in Section 2. Pollutant Reduction Plan B. Map on page 3. The maps are small scale reproductions and can only be thoroughly examined in PDF format where they can be enlarged to 400%. Full scale maps need to be included in the official submittal.

ARCA is the owner of a dry detention basin located on lot 41 in Arbor Rose Estates. The dry detention basin was approved by the Subdivision and Land Development Plan for Arbor Rose Estates dated September 3, 1997. In 1999 the basin was expanded by

approximately 0.8 acres to accommodate the Jay Greider Subdivision Plan. The outlet structure, emergency spill way and berm were not changed. The Board of Directors has submitted prior Open Records Requests for the storm water management reports and construction plans for both the Arbor Rose Estates detention basin and the 12 lot Jay Greider expansion. The Borough has informed us that the public records do not exist. These records are classified as "permanent records" and are required to be retained by the Borough for as long as the detention basin exists. Since these records do not exist any attempt by the Borough Engineer to convert this dry detention basin to a wet pond will require a new, full and complete Storm water Management Report In order to quantify Pre and Post Construction storm water runoff and basin routing.

ARCA maintains the combined dry detention basin consistent with a Storm water Management Agreement dated April 18, 1997. From 1997 through the Spring of 2016 the basin functioned as a sedimentation basin to accommodate on-going construction in Phase 3 of Arbor Rose Estates. By letter dated April 14, 2016 ARCA received approval from the Borough Engineer for engineering plans to convert the sedimentation basin into the 1997 Land Development approved dry detention basin. By letter dated September 14, 2016 the Borough Engineer inspected and approved the conversion work effort.

The dry detention basin lies within the Little Chiques Creek watershed, the OP005 drainage area as shown on Map 4, Mount Joy Borough MS4 Drainage Area and Land Use. It is identified as BMP structure -141 on Map 10 Mounty Joy Borough Existing Best Management Practice Structures.

In a letter dated December 17, 2015 from ARCA to Mr. Charles E. Glessner, Mount Joy Borough President and Mr. Scott Hershey, Borough Manager the Association appealed a storm water NOV for trash in the low flow channel when in fact it was sediment and the detention basin was still fully functioning as an approved sedimentation basin. In that letter the ARCA Board of Directors requested under item No. 9: "That the Borough establish a Stakeholders Advisory Committee under the authority of the Public Works Committee to provide stakeholder input into the Storm water program". That recommendation/request was never responded to or implemented by the Borough

Since December 2015 and during the entire time that the Borough Engineer was preparing the PRP no one from either the Borough Engineer or the Borough Staff has contacted either Horst Property Management or any member of the ARCA Board of Directors to seek information or to discuss the PRP as it impacts ARCA. The first time we heard about any impacts to ARCA was when the PRP was posted on the Borough web site.

This is important for the following reasons.as it pertains to Drainage Area OP005. The mapping system being used by the Borough Engineer is out of date and very inaccurate. This is reflected in the actual conveyance system overlay mapping on Maps 1 through 10. Approximately half of the storm water conveyance system which has been in place since 2012 is missing. Some of this conveyance system has been in place since prior to 2005. This raises the question as to how did the Borough Engineer establish the storm water conveyance system mapping and is the rest of the Borough storm water conveyance system mapping as deficient as it is for drainage area OP005.

Map 8, Mount Joy Borough Existing Best Management Practice Structures depicts the drainage area for BMP-141. This depiction is grossly miss-represented. The actual drainage area for BMP-141 extends the entire length of Rose Petal Lane, Florin Avenue, Peace Avenue, major sections of the Country Homes at Mount Joy, Martin Avenue, Glen

Avenue and even up across Donegal Spring Road. This information was provided to Borough Staff in both 2015 and 2016 when ARCA filed two separate complaints with the Lancaster County Conservation District regarding illegal discharge of sediment from Sedimentation "C" of Country Homes of Mount Joy. This information was also provided to the Borough Engineer on September 13, 2016 when he performed his Final Inspection on the conversion of the sedimentation basin on Lot 41 (BMP-141) to a dry detention basin.

Attachment F Existing Loading for Pollutants of Concern 3. Little Chiques Creek (Appendix E) lists OP-005 as 141.799 acres. This is from a 5_8_17 Excel spreadsheet. On the 6/22/17 Worksheet 4 just two pages later OP-005 is listed as 142.109 acres. This is supposedly from the same 5_8_17 Excel spreadsheet. There are numerous other inconsistencies. This indicates that differing inconsistent data bases were used to prepare the PRP.

In Attachment G, Existing BMP Pollutant Reduction 3. Little Chicques Creek (Appendix E) Existing BMP Summary BMP-141 drainage area is listed as 39.18 acres. The actual drainage area for BMP-141 as explained above is approximately 100 acres. Since the drainage area is incorrect then the existing pollutant reduction is by logic incorrect. In Worksheet 4, dated 6/22/17 that follows for BMP-141 the drainage area is now shown as 38.868 acres. Continuing on to the Expert Panel Pollutant Reduction Efficiency Calculations, no date, the drainage area is now 38.9 acres.

In Attachment I Potential BMP Pollutant Loading Reduction 3. Little Chiques Creek (Appendix E) BMP OP005-BR1: Wet Pond – Basin Retrofit is listed. This is the ARCA existing detention basin. It is listed as being on Private Property. The Borough Engineer wants to convert a dry detention basin on Private property into a wet pond and never thought it might be appropriate to talk to the property owner before he published the RPR for Public comment. First the Borough rejects any ARCA Board of Directors December 2015 recommendation for Stakeholder involvement then the Borough Engineer proposes coming onto private property without any prior discussion or consultation. There are four privately owned BMPs, OP002-BRI, OP005-BR1, OP006-BR1, and OP007-BS1. Did the Borough Engineer consult with any of these private property owners during the preparation of and publishing the PRP for Public Comment?

Further down under Potential BMP Pollutant Loading Reduction, Little Chiques Creek (appendix E) Worksheet 4, dated 6/22/2017 for BMP OP005-BR1, Wet Pond - Basin Retrofit the drainage area is listed as 141.205 acres. The drainage area for BMP OP005-141 (OP005-BR1) has now gone from 39.18 acres to 38.868 acres to 38.9 acres to 141.205 acres. The 141.205 acres is the drainage area of OP005 not the drainage area of BMP-141. The correct drainage area for BMP-141 as previously explained is approximately a 100 acres sub-drainage area out of the larger OP005 141.2 acre drainage area. Now go down a couple of more pages to Expert Panel Pollutant Reduction Efficiency Calculations and the drainage area for BMP OP005-BRI is now 38.181 acres. At issue here is the complete lack of Quality Control/Quality Assurance on the part of the Borough Engineer. 38.868 rounded is 38.9 so we have three values (39.18, 38.9 and 38.2). Either we have three different individuals inputting data or we have three different data sources. The 141.205 is just flat wrong for the drainage area of BMP OP005-BR1.

In the Pollutant Reduction table that follows for OP-005 Wet Pond-Basin retrofit, BMP OP005-BRI a drainage area of 6,150,872 square feet is used for pollutant reduction.

This is 141.2 acres. This is not the drainage area of BMP.OP005-BR1. It is the total drainage area of OP005. This is a 5_8_17 Excel Spreadsheet

Continuing on to a 6/22/17 sheet Proposed BMP Pollutant Reduction Drainage Area OP-005, Proposed BMP ID BMP OP005-BRI, Description Wet Pond – Basin Retrofit shows a TN reduction of 564.35 lbs./year; TP reduction of 38.51 lbs./year and TSS reduction of 38,097.15 lbs./year. This appears to be based on a drainage area to BMP OP005-BR1 of 141.2 acres where the true actual drainage area is approximately 100 acres. The Pollutant reduction is therefore overstated by approximately 42%.

In Attachment L, Planning Estimates of Opinions of probable Cost BMP OP005-BR1: Wet Pond – Basin Retrofit dated May 5, 2017, Prepared by; MRK, Checked by No one. All Opinions of Probable Construction Cost should be signed and sealed by a licensed Professional Engineer.

What is the basis for this Opinion of Probable Construction Cost? In order to capture the pollutants you have to capture the difference between the Pre and Post Development 2 year/24 hour return event runoff volume, allow it to infiltrate and allow the sediment to settle in the wet pond. You can do this by either increasing the storage volume in the basin (excavation) or by restricting the outflow by modifying the outlet structure.

For BMP-002-BR1 the runoff volume is 2.74 acre feet (4,420 cubic yards) and the Borough Engineer proposed to excavate 1,920 cubic yards or 43%. For BMP OP006-BR1 the runoff volume is 1.88 acre feet (3,033 cubic yards) and the Borough Engineer proposes to excavate 1,840 cubic yards or 60%. For BMP OP005-BRI (ARCA dry detention basin) on the other hand the improperly calculated runoff volume is 9.03 acre feet (14,568 cubic yards) and the borough Engineer proposes to excavate a mere 400 cubic yards or a mere 0.03%. Since the runoff volume of 9.03 acre feet is overstated by 75% the actual runoff volume is closer to 5.13 acre feet (8,275 cubic yards).

BMP-OP005 –BR1 is approximately 5 acres in size. Under a previous Open Records Request the Board of Directors requested the original (1997) Storm water Management Report and the Borough Open Records Officer was unable to locate it nor was the Borough Engineer able to locate it. Detention Basins in the 1990 were generally designed with one (1") of freeboard. Any proposed changes to the Outlet the Borough Engineer is considering must be such to still meet regulatory requirements to safely pass the 100-year return storm event. If the Borough Engineer intends to trap 5.13 acre feet under the 2 year return storm event he will have used up that same storage volume when the 100 year return storm event occurs. By excavating 400 cubic yards he has increased the basin storage capacity by 0.25 acre feet. He must now account for the difference between 5.13 acre feet minus 0.25 acre feet or 4.88 acre feet. By simple math and rough calculations 4.88 acre feet/5.00 acres basin floor = 0.98 feet. Since the basin most likely was only designed for 1.00' freeboard to the basin berm elevation the Borough Engineer has now not only topped the emergency spill way but he may also be overtopping the down flow basin berm. This would require a complete redesign of the of the 30' wide emergency spillway from grass to riprap and strengthening of the berm. This is extremely expensive and not currently considered in the Opinion of Probable Construction Costs.

The Board of Directors, based upon the Association long standing history with this basin, questioned the Borough Engineer's "Probable Construction Costs" of $74,630.49. On July 24, 2017 the Board of Directors submitted an Open Records Request for "all engineering calculations to include perk test, storm water runoff and basin routing

calculations to support the "Opinion of Probable Construction Costs". The Borough Engineer would need this data in order to determine construction costs, determine if storm water would infiltrate and determine if storm water infiltration would cause sinkholes. On July 26, 2017 the Board of Directors received a response to our Open Records Request. Quote "The Borough of Mount Joy has not identified any records that meet your July 24, 2017 RTKL request".

In 2016 the ARCA converted the former sedimentation basin (wet pond) on lot 41 into the approved a dry detention basin, BMP OP005 – 141, which had been approved in the original Land Development Plan (1997) in order to **eliminate standing water and reduce the potential for sinkhole creation.** The cost of this conversion was $29,250.00 and required a Special Assessment to the ARCA membership of $400.00 per property owner. According to Association financial records between 2008 and 2016 the association (86 members) **spent a total of $44,800.00 to repair seven (7) small sinkholes, maintain the rip rap and remove sediment.** The Borough Staff and the Borough Engineer were both well aware of the problem with sinkholes in this basin and they are completely ignoring the issue.

How then did the Borough Engineer determine his "Opinion of Probable Construction Costs" of $74,630.49? It is obvious now based upon our Open Records request that it was not based upon any field studies or engineering calculation. It is a desk top engineering estimate Prepared by; MRK, Checked by No one and not Approved by a licensed Professional Engineer as is the professional standard. This applies to all "Opinion of probable construction Costs".

There are several additional issue that the Board of Directors wants to bring to your attention.

None of the thirteen (13) Opinion of probable Construction Costs contained in the PRP has a line item for Inspection and Maintenance Costs. In order to perform a valid ROI Analysis the amortized annual Inspection and Maintenance costs must be included. For the ARCA detention basin BMP OP005-141, based upon the last eight (8) years' experience this is approximately $5,000 annually. If the purpose of converting a dry detention basin to a wet pond is primarily to trap sediment then you have to periodically clean out the sediment. Water may infiltrate but sediment never has or will.

The Opinion of Probable Construction Cost for BMP-OP005-BR! Is also deficient in several other major construction cost consideration. BMP OP005-BR1 has three major inlets coming into an active detention basin. A 66" pipe off Arbor Rose Avenue and two 36" pipe off Florin Avenue. There is no line item for dewatering which will be a major cost consideration. Furthermore when ARCA regraded the basin floor in 2016 the contractor was compelled to use low tire pressure excavation and grading equipment and he was limited as to when (Dry periods) he could work in the basin. This all drives up construction costs which the Borough Engineer has not considered.

Using the PADEP simplified method of construction cost estimating of $47.00/lb of sediment removed with 38,097 lbs. removed adjusted for 100 acres/141.2 acres @ 50% efficiency this a simplified construction cost estimate of $634,000.00. The Borough Engineers "Opinion of Probable Construction Costs" is totally erroneous. For the above stated reasons the Board of Directors based upon the past history of the detention basin believe that the actual construction costs could be in the range of $200,000.00 to $250,000.00 of the Borough's taxpayers' money. The Borough Engineer has most likely underestimated construction cost by a factor of roughly 2.7.0 to 3.4.

Since there appears to be not even the minimal engineering design input and analysis put into these Opinions of Probable Construction Costs the entire Return on Investment Analysis is fatally flawed invalid.

Attachment M, Return on Investment Analysis: Since the incorrect drainage area for BMP OP005-BR1 of 141.2 acres was used in the Pollution Reduction calculations and the Opinion of Probable construction Costs is understated the ROI Summary for this BMP is also incorrect and invalid.

The Borough Engineer has failed to recognize a long standing sinkhole problem in this particular basin and has performed no documented field investigations or preliminary engineering. The "Opinion of Probable Construction Costs" for this work effort on lot 41 states a "Right of Way Cost". This lead the Board of Directors to believe that the Borough is intending to pay for the construction costs out of the Borough's General Fund budget but would expect ARCA to pay for Operations and Maintenance, i.e. sinkhole repairs and sediment removal. Unfortunately in Pennsylvania there is no funding mechanism for storm water projects for Boroughs other than the Public Work budget of the General Fund. That means that storm water competes with road repairs, snowplowing, street sweeping, yard waste pickup, etc. In the future Association members would be paying for sediment removal from lot 41 in their annual dues while at the same time paying for a Bio swale on Borough property or right of way through their property taxes. Storm water is an unfunded Federal and State Mandate. Borough Council is well aware of this and is not at all happy with the situation. Legislative action similar to Act 62 of 2016 needs to be taken. Hopefully it will happen.

We are particularly concerned that we found so many errors and lack of professional quality work regarding a single ARCA owned BMP OP005-141. This raises the concerning question regarding the rest of the PRP: Does there exists similar errors and omissions? For the PRP to be a valid decision making document for Borough Council and the tax payers use it must be based upon properly delineated drainage areas, properly mapped individual storm water conveyance systems (sewer shed) to the individual existing BMP, proper calculation of Pollution Reduction and valid "Opinion of Probable Construction Costs". In the case of BMP OP005-141 there were major errors and omissions in all four factors that went into the ROI Analysis.

The Borough Storm water Enforcement Officer and Borough Council have to ask themselves if the engineering performed by the Borough Engineer Consulting firm for the rest of the Borough Storm water system as contained in the PRP is any more accurate. You cannot map storm water conveyance systems from aerial photographs. You have to obtain the inverts of the pipes not just the invert of the top of inlet grate. It is even more problematic when one uses outdated and incomplete aerial mapping.

The Board of Directors is respectfully recommending that Borough Council pull this PRP from Public Comment, verify the basic storm water drainage area and conveyance system data, do the preliminary engineering required and then submit the Borough Engineer work to an independent third party Professional Engineer firm for review before re-advertising the revised PRP.

The Board of Directors of ARCA, nor do we believe that the individual Association members, would under any circumstance support with either Association dues or their taxpayer dollars for the conversion of BMP-OP005-141 into a wet pond.

Sincerely,
On Behalf of the Board of Directors
Arbor Rose Community Association

Bruce W. Haigh, PE, LTC (Ret)
President

Andy Sherwood
Treasurer

Mr. & Mrs. Gregory M. & Emelita H. Gurican
603 Arbor Rose Ave.
ARBOR ROSE ESTATES
Mount Joy, PA 17552

August 1, 2017

Mr. David Salley
Storm Water Enforcement Officer
Mount Joy Borough
21 East Main St.
Mount Joy, PA 17552

RE: MS4 Storm Water permit Pollution Reduction Plan (PRP)

Dear Sir;

By way of introduction, let me first state that my wife and I have been residents of Arbor Rose Estates here in Mount Joy since 1998, we were the third structure built in the development and the second family to occupy a home. Our home lies immediately adjacent to the Dry Storm Basin discussed in the ARCA President's letter of July 27, 2017 to you. My wife and I appreciate all of the services provided by the Borough and County, albeit we find that the school tax burden paid to the Donegal School District borders on being draconian.

That said, the purpose of this letter is to provide you with direct homeowner feedback in support of the letter submitted by Messrs. Haigh and Sherwood of the Homeowner's Association (a.k.a., ARCA), referenced above. We fully concur with all of the tenants of said letter, which can be summarized as follows:

1. The PRP is significantly deficient in scope, content, format, referencing, and substantiation of calculations and results, with misconstrued data and failure to address the required public records deemed necessary by law.

2. The PRP further fails to recognize the Storm water Management Agreement dated April 18, 1997 - which in part was part of parcel of the basis for which my wife and I decided to purchase the property we now occupy.

3. MAPs used in the PRP are grossly inadequate and misrepresent the drainage areas of concern.

4. Failure of the PRP to recognize that the homeowner's rights as the owners of the Dry Storm Basin being private property and under the control of its owners and NOT the government.
5. The PRP provided NO justification of the calculations performed to determine drainage area analyses and said calculations were NOT subject to a proper audit for reconciliation against standards of good practice.

6. Furthermore, along the same lines as #5 above - Cost Analyses were not verified or scrutinized adequately to determine their authenticity and being based on inaccurate

(area) data calculations makes such Cost Analyses totally speculative, i.e., mere guesswork!

7. Additionally, the PRP fails to take into consideration the creation of sinkholes which we have personally witnessed in the basin over the many years since 1998, no less the expense which the ACRA and all its homeowners have been forced to endure to make repairs. *Nota bene,* AT NO COST TO THE TAXPAYERS OF MOUNT JOY BOROUGH, THE COUNTY, THE STATE, OR THE FEDERAL GOVERNMENT!!

Other Concerns:

Should the Borough prevail in forcing the conversion of the Dry Basin, previously approved by the Borough in April 2016, to a wet pond (basin) retention area, we have the following additional objections:

- Firstly, such wet pond areas are habitats for mosquitos and all water loving insects – and we would expect swarming to occur. Who will bear the costs of insect controls needed to prevent Zieka virus carrying mosquitos and disease carrying flies in the neighborhood – and not just the homes immediately adjacent to the new wet basin, but the entire surrounding community which could be affected with infestations?

- Second, have you ever seen the swarming of hundreds if not thousands of Canadian Geese in the water retention basins of Mount Joy after every rainfall period where there is a significant accumulation of water? In our Dry Retention Basin, the water does not last very long, so neither does the presence of Canadian Geese. However, should the Dry Basin be converted to a Wet Pond area – then you can be damn sure that the migration of these geese will be more permanent, and with that comes potential tons of excrement (Canadian Geese feces) which will be added to the by basin, and surrounding berm areas – causing additional pollution loads, no pun intended!! How will that be handled by the Borough/County/State? Please DO NOT expect the homeowners of the Arbor Rose Estates to pick up the bill for the cost of cleaning up bird poop.

In conclusion, we concur entirely with the ACRA recommendations that:

1. The PRP be withdrawn from public comment and further consideration until all its flaws have been adequately and completely addressed.

2. Any calculations of drainage areas, retention acreage, estimated costs of conversion from Dry Retention Basin to Wet Pont and maintenance thereof be certified by an independent agency or PE and a CPA for cost estimates.

3. Should the conversion occur – then the total costs of said project including the follow-up maintenance of basin(s) should be shared by all taxpayers of the Borough and/or county and NOT placed on the individual homeowners of Arbor Rose Estates!

Sincerely yours,

Gregory M. Gurican, RN

Gregory M. Gurican, RN, CPHQ
ASDN, BSEE, MSNE, MBA
Sr. Nuclear Safety & Licensing Engr. (Ret.)

Cc:

1. Representative David Hickernell, 222 South Market St., Suite 103, Elizabethtown, PA 17022
2. Mr. Bruce W. Haigh, PE, LTC (Ret) – President ARCA
3. Mr. Andy Sherwood – Treasurer ARCA

August 2, 2017

Mr. David Salley
Storm water Enforcement Officer
Mount Joy Borough
21 E. Main Street
Mount Joy PA 17552

Re: Borough of Mount Joy MS4 Storm water Permit Pollution Reduction Plan (PRP)

Dear Mr. Salley:

I want to first publically thank You, Mrs. Stacie Gibbs, Alternate Storm water Enforcement Officer and Mr. Dennis Nissley, Public Works Director for your individual and joint long standing demonstrated commitment to the Storm water Management Program. You have done the behind the scenes thankless work required to develop an effective storm water management program. The Borough Staff is commend for recently obtaining two Chesapeake Bay Plan grants. I believe that the storm water management program is an important program and I also realize that it is an unfunded Federal and State mandate.

I are providing the following written Public Comments regarding the Borough's NPDES MS4 Pollution Reduction Plan (PRP). The Public Comment Period runs from July 5, 2017 through August 4, 2017. I am submitting these public comments as a resident and taxpayer in the Borough and as a licensed professional engineer with fifty (50) years' experience in engineering and construction. These public comments are an extension to the public comments I provided as President of Arbor Rose Community Association in a letter dated July 28, 2017. These are comments are broader in perspective and in many instances more technical in nature.

Over the last two years I have personally appeared numerous times before both the Public Works Committee and Borough Council monthly meetings and made comments regarding the storm water management program, its importance and inherent shortcoming in the manner PADEP runs the program. Both public bodies have been receptive to my comments but have apparently not seen fit to implement my requests.

In 2015 I served as Secretary of the Arbor Rose Community Association (ARCA). In a letter dated December 17, 2015 from ARCA to Mr. Charles E. Glessner, Mount Joy Borough President and Mr. Scott Hershey, Borough Manager the Association appealed a storm water NOV for trash in the low flow channel when in fact it was sediment and the detention basin was still fully functioning as an approved sedimentation basin. In that letter the ARCA Board of Directors requested under item No. 9: "That the Borough establish a Stakeholders Advisory Committee under the authority of the Public Works Committee to provide stakeholder input into the Storm water program". That recommendation/request was never responded to or implemented by the Borough

In reviewing the PRP I noticed that there is listed four (4) Proposed BMP projects that are located on Private Property. These are BMPs, OP002-BRI, OP005-BR1, OP006-BR1, and OP007-BS1. BMP OP005-BR1 is the ARCA dry detention basin. I contacted the private property owners of two of the remaining three proposed BMP pollution reduction projects. During the entire time that the Borough Engineer was preparing the PRP no one from either the Borough Engineer or the Borough Staff has contacted any of

these three private property owners to discuss the proposed construction on their private property. The first time any of us heard about these proposed construction activities was when the PRP was posted on the Borough web site. None of us read whatever local newspaper the Public Notice was published.

Borough Council has tried over the last year to be more transparent yet the Borough publishes a PRP that involves and impacts private property and no one sees fit to forward, discuss or consult with private property owners prior to put the PRP out for Public Comment. I realize that some may claim that this is a Draft PRP but what happened is still unacceptable and not in the least transparent. The responsibility lies with the Borough Engineer who is the "lead" in this endeavor.

Comments follow as identified as C followed by a number.

C1: The Borough Engineer selected Pollution Reduction Plan BMP OP008-VS1 is listed in the PADEP Strom water Best Management Practices Manual as BMP 6.4.8. Vegetated swale. **In order to receive credit under a PAG-13 MS4 permit the selected BMP must demonstrate that it meets the performance standards of the PADEP Strom water Best Management Practices Manual.** The contributing drainage area for proposed BMP OP008-VS1 is 256.183 acres. The PADEP BMP 6.4.8 maximum recommended contributing drainage area is 10 acres. It is therefore highly unlikely that the Borough Engineer proposed BMP OP008-VS1 will function properly for required pollution reduction unless the larger drainage area is broken into multiple smaller vegetated swales by the use of small detention ponds and check dams to reduce the flow velocity and allow the vegetated swale to function properly. **These costs are not included in the Borough Engineer Opinion of Probable Construction Costs. The actual construction cost will be significantly higher.**

C2: In general I found the Pollution Reduction Plan (PRP) difficult to navigate and analyze. This is because the Table of Contents contains no numbering system either sequentially or by Section or Attachment. None of the pages in the attachment are numbered. I recommend numbering by Section and Attachment. Attachment E- Mapping: Map Index lists Maps by Map number 1 through 11 with Map Titles however the Individual Maps do not contain a Map number only a Title. The Map numbers are also not included in Section 2. Pollutant Reduction Plan B. Map on page 3. The maps are small scale reproductions and can only be thoroughly examined in PDF format where they can be enlarged to 400%. Full scale maps need to be included in the official submittal.

C3: Drainage area mapping was performed using aerial photographs and overlaid by topographic contours. This is difficult to with any degree of accuracy in an Urban environment. Several of the drainage areas are not fully mapped.

C4: Map 1: MS4 Conveyance System. The storm water conveyance system mapping is based upon outdated mapping. This is particularly evident in the storm water sewer shed mapping of Arbor Roe Estates, the Orchards, Life Styles Country Homes of Mount Joy, Florin Hill and the Lakes. Mapping of storm water sewer sheds is critical since it established both the existing pollution loading to a BMP but also the pollution reduction to a proposed BMP enhancement. Same comment for Map 7 and 8

C5: Map 2: Attainment/Non-Attainment Streams. The watershed boundaries of both the unnamed tributary to Donegal Creek and the Little Chiques Creek where they bisect the MS$ Urban Land should be shown on this map. Same comment for maps 4, 6, 7, 8, 10 and 11.

C6: Map 3: No Comment

C7: Map 4 See comment C8 – C20 regarding Map 5.

C8 – C20: Map 5: See Table 1 Drainage Area Comparison (Enclosure 1). I compared the Map 5 MS4 Drainage area Pervious Impervious acreage to the Attachment F Worksheet 4 acreage and then the Attachment F Base Pollutant Drainage (No Existing BMP) acreage to the Attachment G Existing BMP Summary Table acreage. All yellow highlighted cells represent a discrepancy between data used in the PRP. See Notes 1 through 13 as Comments C8 – C20.

C21: Map 6. Storm water volume is normally referred to in acre-feet not cubic-feet.

C22: Map 7: See comment C3.

C23 – C57: Map 8. See Table 2 Existing BMP Drainage area Designation and Contributing Area Comparison (Enclosure 1). For each individual existing BMP I first compared the Drainage Area Designated in the Table on Map 8 with Existing BMP Summary Table in Attachment G. Twenty-one (21) of the thirty-nine (39) BMP drainage area do not match. There is No OP012 or OP013 on Map 8. I then compared the "Existing BMP Worksheet 4", "Pollutant Reduction Calculation", Existing BMP Executive Summary" and Attachment I "Proposed MBP PRP Calculations. There are another eight (8) discrepancies. The most glaring is BMP-141 which is the Arbor Rose Estates Dry Detention Basin. Since Impervious area is used for calculating pollutant reduction I then compared "Impervious Area Existing BMP Summary" to "Impervious Area Pollution Reduction Calculation". There are another five (5) discrepancies)

.C58: Since the Drainage areas have not been properly or fully delineated and then the storm water sewer shed were not properly mapped and then there was numerous discrepancies in data inputs for area it leads me to the conclusion that there is a real problem with quality control/quality assurance.

C59: Since the existing pollutant loading and the proposed pollution reduction are flawed based upon comments C3 through C58 then the analysis in the PRP is also flawed and not useful to Borough Council as a decision making tool.

C60: Map 9. The vast majority of the Borough Urban Planning Area is under laid by Geology that is prone to sinkholes. Why then is the Borough Engineer proposing wet ponds as Potential BMPs?

C61: Map 10: This map and all calculations that went into Potential BMP except for BMP OP008-BR1 should be deleted in its entirety. It should never have been included in the PRP for Public Comment without first being reviewed by the Borough Stakeholders. The PRP Instructions **DO NOT** require a listing of **"Potential BMPs"**. The Instructions and the Permit only require the permit holder to submit **"Proposed BMPs".** The Potential BMP are an internal Planning document not a PRP Public Comment document. The Borough has

met its requirements under the NPDES MS4 PRP to reduce pollutant loading of TSS by 10% with the selection of BMP OP008-VS1. It will be five (5) years (2023) before the Borough has to offer up another BMP and a lot can change in five years. Never offer anything to PADEP or the Chesapeake Bay Plan unless you are willing to give it up.

C62: Map 11: This map should be renumbered Map 10 and based upon the recent Grant money BMP OP008-BR1 should be added.

C63 – C64: The Borough should investigate "Parssing" in two instances. According to the PRP Instructions and the MS4 NPDES Permits Frequently Asked Questions, PennDOT Roads Right of Way can be parssed out of the Urban Planning Area. In addition since the streets in Florin Hill have not been dedicated the Borough should investigate parsing out this drainage area.

C65: Delete Attachment I

C66: Attachment Manufactures Technical Data. This is not technical data. It is marketing data. Where is the cost per lbs of pollutant loading? Where is the Operation and Maintenance requirements? Does the sediment trapped off of impervious surface qualify as PADEP Clean Fill? What is the testing and disposal requirements for sediment coming off a roadway as the Borough Engineer is proposing?

C67: Delete all Opinion of Probable Construction Costs except for BMP-OP008-VS1 and BMP OP008-BR1

C68: All Opinion of Probable Construction Costs should be signed by a licensed Professional Engineer.

C69: Under separate Open Records requests I asked for engineering calculations, perk tests, soil borings and basin routing calculations for BMPs OP005-BR1, OP006-BR1, OP008-BR1 and 002-BR1. I was informed that there was no data available. This means that the Opinion of Probable Construction Costs for Proposed BMP OP008-BRI of $56,875.00 is nothing more than a desk top SWAG estimate.

C70: In the engineering profession when doing preliminary budgetary cost estimates which BMP OP008-BR1 is you include a Contingency of between 50% to 00%. There is a 30% Contingency which is totally inadequate for a Planning estimate when there has been zero field investigation or preliminary engineering.

C71: BMP OP008-BR1 (BMP 122) is an active dry detention basin with a drainage area of approximately 31.50 acres. It has three (3) different flow paths into the basin. There is no line item in the cost estimate for control of storm water during construction. This was a significant issue for ARCA in the late Summer of 2016 when ARCA converted BMP 141 into a dry detention basin.

C72: The estimates engineering costs for BMP OP008-BR1 are $8,886.00. This proposed BMP must comply with the technical requirements of BMP 6.6.2 of the Pennsylvania Storm water Best Management Practices Manual in order to comply with the requirements of the Boroughs PAG-13 MS4 permit. The Borough Engineer will have to do the following for his fee of $8,886.00. Test pits

maybe 6'-8' deep to determine depth to bedrock; infiltration (perk) testing to determine if and at what rate storm water runoff will infiltrate; topographic survey of all inlets in the 31.50 acre drainage area to establish location, pipe inverts, pipe lengths and slope; prepare a Pre and Post Development storm water Management Report to include basin routing; design a new basin configuration to include at the minimum an new outlet structure and emergency spill way and then prepare Plans and Specifications for Bid. Does the Borough Engineer staff individual (listed as MRK) really believe that ARRO can do all of this for $8.886.00

C73: Based upon my experience in the Construction Industry and dealing with active detention basins I believe a more realistic Opinion of Probable Construction Costs is in the range of $175,000 - $225,000 or approximately $20.00/lb. sediment removal.

C74: Attachment M, Return on Investment. When someone tells you that "Something is too Good to be True, then it is most likely too Good to be True". PADEP allows use of the Simplified Method for estimating costs to remove one pound (lb.) of pollutants i.e. sediment (TSS). That budgetary Planning number is $47.00/lb. pollutant removed. The Borough Engineer ROI cost for BMP OP008-VS1 is $1.17/lb. This is a measly 3% of the PADEP budgetary planning number. Please refer to Comment 1. The PADEP standard for a vegetated swale drainage area is 10 acre maximum contributing to the vegetated swale. BMP OP008-VS1 contributing drainage area is 256 acres. The Borough Engineer is mistaking taking credit for 25 times pollutant reduction per unit construction cost. The pollutant removal is based upon reducing the flow velocity and maintaining a constant calm depth of water to allow the TSS to settle out. PADEP Storm water Best Management Practices Manual, BMP 6.4.8: Vegetated Swale Design Considerations 7 specifically states "swales serving greater than 10-acre drainage areas will provide a lesser degree of water quality treatment, unless special provision are made to manage the increased flow". **There is some flexibility but PADEP will not approve a vegetated swale with a contributing drainage area 25 times the PADEP Storm water Best Management Practices Manual standard 6.4.8.**

C75: There is a possible alternative solution to BMP OP008-VS1 by which the Borough could possibly meet their pollutant loading reduction requirements. Pollutants are carried in what we refer to as the first flush. In Pennsylvania the calculations are based upon the 2 year 24 hours return storm event. In neighboring States the pollution reduction is based upon the first 1" of runoff after initial abstraction (Ia). Therefore it is feasible for purposes of meeting the Chesapeake Bay Plan to design BMP structures that will hold and slowly release the 2 year 24 hour return storm event (containing the pollutants) but at the same time pass through without retention the larger storm events. The following alternative that needs to be investigated is to extend BMP OP008-VS1 up past the Lions Club swimming pool all the way to the vicinity of the Mount Joy Dinner and Turkey Hill. This area is currently un-detained surface flow. In the vicinity of the Mount Joy Dinner and Turkey Hill install a "**wet extended detention basin without infiltration**". Use a liner to prevent infiltration since there is existing ground water contamination in this area (PPL/UGI gas works). Install an outlet structure that will slowly release the 2 year 24 hour storm event over 72 hours. Install a broad crested weir to overflow all storm events greater than the 2 year 24 hour storm event. The extended vegetated swale in conjunction with the wet

extended detention basin without infiltration will allow the Borough to take credit for the pollution reduction from a larger portion of this 256 acre contributing drainage area. There would still be a portion of this drainage area on the southeast side of Manheim Street that will exceed the 10 acre limit at Rotary Park and there still be drainage acreage upstream which could not be counted in the pollution reduction calculations.

C76: Except for BMP OP006-BR1 ($25.42/lb.) and BMP 02-BR1 ($16.59) all of the Borough Engineer Opinions of Probable Construction Costs are less than $5.19/lb. of sediment removal. Either PADEP is way off base or the Borough Engineer is way off base. My experience tells me that true Probable Costs are someplace in between

C77: In this entire PRP there is little if any mention of Operation and Maintenance Costs. Structural BMPs especially Wet Ponds and Nutrient Sediment Boxes require extensive maintenance. When is the Public works staff supposed to perform this work without taking away from road work, pothole repairs etc. The Borough needs to select BMPs that function like Mother Nature and have low maintenance costs. Engineers in general have a tendency to want to design and build structures when allowing Nature to work by itself if often cheaper and more productive.

C78: The NPDES MS4 in Pennsylvania is an unfunded Federal and State mandate driven by the Chesapeake Bay Program. First wastewater treatment plants, since there were an existing point source, were asked to bear the burden of the Chesapeake Bay Plan. Now Municipalities are being asked to bear the burden. Anyone who really understand the TSS issue will tell you that the real source problem is Agricultural practices. The Borough needs to press its local elected officials for legislative action similar to Act 62 of 2016 or watershed solutions which I am well aware the Borough staff has been working on. The Municipal MS4 solution will be the most costly per pound of pollutant removed and it will only get worst in the future.

C79; Section 2A. Public Participation states "Mount Joy Borough encouraged a plan that included public participation and buy in. This comment is disingenuous since Borough Council refused to get the Stakeholders involved as requested by the Arbor Rose Community Association Board of directors in December 2015 and the Borough Engineer failed to notify, inform, discuss or consult with three possibly all four of the Private Property owners where he is proposing structural BMPs. The Borough should use this required PRP section to explain the numerous Public participation activities that Dave Salley, Stacie Gibbs and Dennis Nissley have organized and orchestrated over the last two to three years.

C80: Section E. Selected BMPs states "The Borough evaluated seven (7) factors in selection of the BMPs to be implemented to achieve the required pollution load reduction". The critical evaluation factor that is missing is short term and long term operation and maintenance (O&M) requirements and costs. Non Structural BMPS tend to have higher short term O&M costs than Structural BMP. Non Structural BMPs tend to have lower long term O&M costs than Structural BMPs

C81: Section F: Funding Mechanism. The proposed funding is through the Borough's Storm water Budget as established by the General Fund. The storm water

budget is part of the Public Works budget which means that storm water will now be competing with road repairs. See Comment 77.

C82: Section H: PRP Implementation Schedule. The PRP is proposing an implementation date of November 2021 for BMP OP008-VS1 with a MS4 permit expiration of Mach 2023 (Amendments to PRP). Vegetated swales require two full growing seasons to be properly established. This would be the growing season of 2021 and 2022. Adjust the BMP OP008-VS1 implementation date to Spring 2021.

C83: Under the PRP the Borough is required to reduce pollutant loading (TSS) by 58,683 lbs/year. The Borough Engineer alleges that BMP OP008-VS1 will reduce pollutant loading by 77,062 lbs./year therefore BMP-OP008-BRI would not be required to meet the pollutant loading reductions. We know that this is false. BMP-OP008-BR1 will reduce pollutant loading by another 11,208 lbs/year (TSS). The Borough may be short of the 58,683 lbs./year and require another BMP.

C84: The Borough has received Grant money in the amount of $40,422 for BMP OP008-BR1. The grant will allow some funds to be used for engineering. The response to my Open Records request indicted that NO preliminary engineering has been performed. I strongly recommend that this summer that the Borough Engineer perform limited preliminary engineering by digging several slit trench in the basin floor in order to determine soil profile and depth to bedrock. He should also perform infiltration testing at the elevation of the proposed new basin floor. The first question that needs to be answered before the borough moves forward with BMP OP008-BR1 is will storm water infiltrate consistent with the PADEP Storm water Best Management Practices Manual.

C85: I find it interesting that the Borough Engineer has calculated pollutant reduction to the one hundredth of a pound and the Opinions of Probable Cost Opinions are down to the last penny. This would indicate that an Engineer did not prepare the PRP since when dealing with a required pollutant reduction of 58,683 lbs/year an Engineer would round out to the nearest pound. Engineers also typically round off cost estimates for construction projects to the nearest 100 or 10 dollars not carry it out to the penny.

C86 The Chesapeake Bay Plan and the NPDES MS4 PRP is all about pollutant reduction and water quality. The PADEP Storm water Best Management Practice Manual most effective BMP is Non Structural BMP 5.6.3 Re-Vegetation and Re-Forest Disturbed Areas Using Native Species. The Borough has a large Little Chiques Creek Park within the MS4 Urban Planning Area and this BMP was not even considered. WHY?

C87: The residents of the Borough of Mount Joy are known for organizing Community events. I prefer not to call them "Community Organizers". Between Main Street Mount Joy, Mount Joy Chamber of Commerce, Rotary, Lions Club, American legion, VFW, Historic Society, Home Owners Associations, Churches, Boy Scouts, Girl Scouts, Library etc., etc there is seldom a week that goes by without some community event. This has been clearly demonstrated to all by the rebuild of Kids Joy Land, the Annual Car Show, Music in the Park, and Summer Slam at Little Chiques Park (I could go on if I have missed anyone). Borough Council needs to reach out to these Stakeholders for their participation in the Storm water

Management program. There is a lot of willing volunteer labor to replace tax payer real property taxes. Borough Staff have demonstrated that they are qualified to do just that.

The Borough Storm water Enforcement Officer and Borough Council have to ask themselves if this PRP is 1) forward thinking not just relaying on structural BMPs (Engineers love to build things) and 2) sustainable over the long run considering on going operation and maintenance costs.

Once again I want to personally and publically thank Dave Salley, Stacie Gibbs and Dennis Nissley for their commitment and dedication to the Borough and to the Borough Storm water Management Program.

It is extremely disheartening that my tax payer money went towards the production of a PADEP mandated NPDES MS4 PRP replete with numerous serious technical issues. I never thought that when I first decided to provide Public Comments and started examining the PRP in its entirety that I would have 87 separate comments. I have two wonder granddaughters, age 5 and 2 who live locally. I missed seeing them over the last ten days because I was reviewing this PRP.

I am respectfully recommending that Borough Council pull this PRP from Public Comment, verify the basic storm water drainage area and conveyance system data, clean up all of the errors and omissions, do the very preliminary engineering required, re-run the analysis and then submit the Borough Engineer's work to an independent third party Professional Engineer firm and the Borough Stakeholders of Borough Council choosing for review before re-advertising the revised PRP.

Respectfully Submitted

Bruce W. Haigh, PE

Bruce W. Haigh, PE, LTC (Ret)
504 Rose Petal Lane
Mount Joy PA 17552
(717) 928-4526
bhaigh@comcast.net

Encl: Table 1: Drainage Area Comparison 8/2/2017
Table 2: Existing BMP Drainage Area Designation and Contributing Area Comparison 8/2/2017

TABLE 1					
Drainage Area Comparisons					
Borough of Mount Joy Pollution Reduction Plan					
Bruce W. Haigh, PE Comments 8/2/2017					
Drainage Area	Attachment F Existing Loading for Pollutants of Comcern (Appendix E)	Map 5 MS4 Drainage Area Pervious Impervious Analysis Acreage	Attachment F Worksheet 4 Acreage	Attachment F Base Pollutant Loading (No Existing BMP) Acreage	Attachment G Existing BMP Summary Table Acraeage
Unnamed Tributary to Donegal Creek					
OF-001		1.798	1.798	1.800	1.800
OF-002		8.675	8.675	8.700	28.490
OF-003		1.203	1.203	1.200	0.000
OF-004		40.657	40.657	40.700	6.410
OP-001		139.841	139.841	139.800	84.370
OP-002		23.266	1.203	23.300	0.000
OP-003		56.953	56.953	57.000	4.410
OP-004		26.574	26.574	26.600	41.590
OP-005					3.620
Subtotal	298.97	297.169	275.106	297.300	165.270
Little Chiques Creek Water Shed					
OF-005		69.041	69.041	69.000	0.040
OF-006		4.524	4.524	4.500	0.000
OF-007		19.927	72.066	19.900	7.560
OF-008		43.967	48.379	44.000	6.530
OF-009		33.723	33.723	33.700	0.000
OP-005		141.799	142.109	141.800	39.180
OP-006		28.732	72.066	28.700	3.700
OP-007		92.575	99.355	92.800	23.760
OP-008		338.594	447.276	338.600	48.580

OP-009		108.064	110.425	108.100	45.320
OP-010		53.447	98.641	53.400	0.000
OP-011		46.303	46.336	46.300	0.000
OP-012					57.590
OP-013					10.730
SubTotal	980.89	980.696	1243.941	980.800	174.670

Note 1. Attachment F Worksheet 4 dranage area for OP-002 is the exact same as shown for Worksheet 4 drainage area OF-002
Note 2. Drainage area OP-006 is shown on Map 5 as entirely within the Borough MS4 boundary therefore Map 5 and Attchment F, Worksheet 4 should be the same
Note 3. Approximatley 40% of drainage area OP-010 is outside the Borough MS4 boundary there Attachement F worksheet 4 should be 40% larger than Map 5 listed drainage area
Note 4. Drainage area OP-011 is shown on Map 5 as entirely within the Borough MS4 boundary therefore Map 5 and Attchment F, Worksheet 4 should be the same
Note 5. For OF-002 you can not have a drainage rea for Existing BMPs (28.49 acres) larger that the total draiange area (8.70 acres)
Note 6. Thre is no draiange area OF-005 to the unnamed tributary of Donegal Creek shown on Map 5.
Note 7. There exists a un designated (unlabled) and drainage area to the unnamed tributart to Donelgal Creek situated between OF-003, OP-002, OP-003 and OP-008 drainage to Little Chiques Creek
Note 8. There is no draiange reas to the Little Chiques Creek designated OP-012 and OP-013 on Map 5.
Note 9. There is an undesignated (unlabaled) and undelineated drainage area to the Litte Chiques Creek on Map 5 located on the south side of Route 230 between draiange areas OF-008 and OP-011.
Note 10. There is an undesignated (unlabaled) and undelineated drainage area to the Litte Chiques Creek on Map 5 located on the south side of Route 230 between draiange area OP-011 and the Borough boundary.
Note 11. For OP-004 there is a portion of property for Mary Mother of the Catholkic Church which is outside the Borough Ms4 but part of the draiange area.
Note 12. OP-009 not fuly delienated
Note 13: OF-002 not fully delineated

TABLE 2

Existing BMP Drainage Area Designation and Contributing Area Comparison

Borough of Mount Joy Pollution Reduction Plan

Bruce W. Haigh, PE Comments 8/2/2017

BMP No.	Map 8 Darainage Area Designation	Existing BMP Summary Draianage Area Designation Attachment G (acres)	Existing BMP Worksheet 4 Drainage Area (acres)	Pollution Rediction Calculations 5-8-17 (acres)	Existing BMP Executive Summary Drainage Area 5-8-17 (Acres)	Impervious Area (acres) Existing BMP Summary (acres)	Impervious Area (acres) Pollution Reduction Calculation 5-8-17 (acres)	Attachment I Proposed BMP PRP Calculations Drainage Area (acres)
101	OP001	OP001	30.379	30.400	34.710	6.753	6.410	
102	OF001	OF001	1.796	1.800	1.800			
106	OF004	OF004	2.700	2.700	2.700			
107	OF004	OF004	2.152	2.200	2.150			
117	OP001	OP001	47.439	47.400	47.860			
119	OF005	OF005	0.037	0.000	0.040			
122	OP008	OP009	31.490	31.500	31.490			29.991
125	OF002	OF002	28.489	28.500	28.490			25.680
139	OP004	OP004	5.062	5.100	32.500	6.366	0.508	
140	OP004	OP004	6.618	6.600	9.090	1.444	1.061	
141	OP005	OP006	38.868	38.900	39.180			141.205
144	OF008	OF008	3.372	3.400	3.370			
146	OP011	OP013	5.055	5.100	5.050			
147	OP005	OP005	3.619	3.600	3.620			
149	OP003	OP003	4.409	4.400	4.410			
151	OP008	OP009	1.195	1.200	1.190			
152	OP009	OP010	3.958	4.000	3.960			
153	OP009	OP010	3.186	3.200	3.190			
155	OF007	OF007	7.557	7.600	7.560			
156	OF008	OP009	3.165	3.200	3.160			
159	OP010	OP012	5.511	5.500	5.850			
164	OF004	OF004	1.227	1.200	1.230			

170	OP009	OP010	6.679	6.700	6.680			
174	OP011	OP013	5.678	5.700	5.680			
181	OP007	OP008	34.200	34.200	40.030	10.209	10.105	36.345
182	OP006	OP007	20.057	20.100	20.060			23.308
213	OF008	OF008	1.005	1.000	1.010			
215	OF008	OF008	1.481	1.500	1.480			
230	OP010	OP012	46.286	46.300	51.740	12.087	10.700	
234	OP008	OP009	1.334	1.300	1.330			
241	OP006	OP007	3.704	3.700	3.700			
242	OP007	OP008	2.657	2.700	2.660			
245	OP)07	OP008	2.280	2.300	2.280			
246	OP008	OP009	5.432	5.400	5.430			
251	OP008	OP009	0.947	0.900	0.950			
253	OP008	OP009	2.036	2.000	2.040			
254	OP008	OP009	2.454	2.500	2.450			
255	OP003	OP003	0.031	0.000	0.030			
256	OF004	OF004	0.329	0.300	0.330			
			373.874		420.480			

From: Laura Bear [mailto:firebirds_28@comcast.net]
Sent: Thursday, August 3, 2017 7:38 AM
To: David Salley <dsalley@mountjoypa.org>
Cc: bhaigh@comcast.net
Subject: Public Comments regarding NPDES Storm Water Discharge

Dear Mr. Salley,

My husband John Bear and I are residents at 509 Rose Petal Lane in the Arbor Rose Estates development within the borough. It was brought to our attention through a letter from our homeowners association, that the borough is considering converting the current dry detention basin in the development to a wet pond. This plan seems to have been created based on flawed information according to our HOA. There was a request for information by our HOA from the borough engineer and the borough itself. This information was not given. According to the information from Horst Property Management there have not been updated maps since our HOA took measures to address sediment problems within the past few years. Each home was assessed $400 by our HOA to correct sediment issues and to remain in compliance with environmental standards. (Please don't expect me to quote specifics....I'm not an engineer...only a homeowner.) It has been brought to our attention that if the dry basin is converted to a wet pond ARCA (Arbor Rose Community Association) will be financially responsible for issues that may occur in the future regarding sediment problems or sinkholes. Also, we believe the taxpayers of Mount Joy will be responsible financially for the creation of this wet pond as there is no federal or state funding for it. My husband and I feel strongly as taxpayers and voters, that the plan for this wet pond within the Arbor Rose Estates dry basin SHOULD NOT continue. It would not add any benefit environmentally and pose a financial risk for ARCA.

Thank you for your consideration,

John and Laura Bear

509 Rose Petal Lane

Mount Joy

ATTACHMENT C

PUBLIC MEETING COMMENTS

Refer to Attachment D

ATTACHMENT D

RECORD OF CONSIDERATION OF ALL TIMELY COMMENTS RECEIVED

4750 Delbrook Road
Mechanicsburg, PA 17050
T 717.975.3995
F 717.975.2686

MEMORANDUM

TO: David Salley

FROM: Michael R. Knouse, P.E.

RE: Mount Joy Borough PRP Q&A

PROJECT NO.: 10863.11

DATE: August 14, 2017

c: File

Mount Joy Borough received questions pertaining to the Municipal Separate Storm Sewer (MS4) Pollutant Reduction Plan (PRP) at the August 7, 2017 public meeting presentation and public meeting comment period. As noted by Borough Council at the beginning of the presentation, the purpose of the meeting was to receive any additional public comment as required by the Pennsylvania Department of Environmental Protection (PA DEP). As directed by Borough Council, we are providing responses to verbal and written questions resulting from the public meeting. It is our understanding that Borough Staff will be addressing questions pertaining to the MS4 program at this evenings Public Works meeting.

1. On Slide 3 – The Plan is defined as containing the identification of "Potential" BMPs – 'Best Management Practices' as well as proposed BMPs. For the benefit of the Borough Council and Mayor as well as the public – your consulting firm ARRO should have provided a "primer" to define terms and jargon used by Environmental Engineers – so all would have a bases for understanding the results of ARRO's work and good decisions might be made by the Borough. Hence, a.) What is the definition of a BMP? 2.) What is the institutional criteria/scientific data (work) to support any selected BMP; i.e., what are the standards by which a BMP is measured, and what reference works support the selection of same? What did ARRO rely upon to conducts its work?

   A) **Best Management Practice (BMP) - means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce pollutant loading to surface waters of this Commonwealth. The term includes treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. The term includes activities, facilities, measures, planning or procedures used to minimize accelerated erosion and sedimentation and manage stormwater to protect, maintain, reclaim and restore the quality of waters and the existing and designated uses of waters within this Commonwealth before, during and after earth disturbance activities. (25 Pa. Code § 92a.2) (PA DEP document 3800-PM-BCW0100d).**

B) In accordance with PA DEP's Pollutant Reduction Plan (PRP) instructions (PA DEP document 3800-PM-BCW0100k): All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in PRPs. For BMPs not listed in 3800-PM-BCW0100m or expert panel reports, MS4s may use effectiveness values from other technical resources; such resources must be documented in the PRP.

2. On Slide 4 – Appendix-C PCB purports that an "investigation" of each suspected source be completed. 1.) What were the criteria used for the conduct of said investigation? 2.) Where are the investigation components defined? 3.) Who conducted the investigation? 4.) Using what means of carrying out said investigation?

   Per PA DEP Municipal Requirement Table, Mount Joy Borough was identified with the requirement for "Appendix C – PCB" for the Susquehanna River. In accordance with PA DEP document 3800-PM-BCW0100d, Appendix C has the following submission dates:

   1. **Map and Inventory – due with Annual MS4 Status Report due no later than September 30, 2017**
   2. **Inventory - due with Annual MS4 Status Report due no later than September 30, 2020**
   3. **Investigation - due with Annual MS4 Status Report due no later than September 30, 2022**

   Appendix C is not due with Notice of Intent (NOI) due September 16, 2017; therefore, the Borough has not prepared the Pollutant Control Measures (PCMs).

3. On Slide 5 – Appendix E – Siltation discusses drainage analyses and stormwater discharges. 1.) Where is the Drainage Analysis Model defined? 2.) Why was it chosen over other models? 3. What were the advantages/disadvantage of the selected model in calculating loading rates? And watershed – outfalls? And, 4.) What was the engineering justification for selection of the drainage model and its use in the Borough's plan?

   PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) Instructions defines the acceptable methods for determining the existing loading for pollutants of concern. Methodologies were also presented by PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016. The methods are generally defined as:

   1. **Simplified method – utilizes PA DEP "Statewide MS4 Land Cover Estimates" to calculate loading rate in the Urbanized Area. The method uses estimates that are conservative, resulting in a higher pollutant base load.**

   2. **Defined drainage area analysis – delineation of Municipal Storm Sewer Sheds (MS3s), determination of actual land coverage and calculation of**

base pollutant loading based upon "Developed Land Loading Rates for PA Counties (PA DEP document 3800-PM-BCW0100k). The methodology results in a reduced base load that is representative of the specific characteristics of the Borough.

3. **Modeling – PA DEP requires municipalities that that require a Total Maximum Daily Load (TMDL) Plan to calculate the pollutant loading using the MapShed model developed by the Pennsylvania State University. PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016 acknowledged that modeling efforts for municipalities required only to submit a PRP are a time consuming and costly means of calculating the pollutant loading. ARRO has prepared TMDL plans using MapShed and is aware of the increased cost associated with performing the modeling. ARRO is also aware limitations of the software to analyze on the MS3 level versus the watershed level that the software was developed for.**

4. On Slide 8 – BPMs 1.) Where is the listing of all "potential" BMPs which the Borough could choose from to determine which should be the developed as proposed BMPs to be implemented? 2.) How does the Borough know and determine that the listing or the potential BMPs was complete, i.e., all-inclusive and without omissions which might be appropriate to consider, perhaps in lieu of those chosen by the consultant ARRO? 3.) Where are the details of said potential and proposed BMPs? And, lastly: 4,) How were the construction costs calculated, by whom, and how verified to be accurate in determining grant funding?

   All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in PRPs. For BMPs not listed in 3800-PM-BCW0100m or expert panel reports, MS4s may use effectiveness values from other technical resources; such resources must be documented in the PRP.

   The Potential BMPs were identified based upon the following criteria:

   1. **Physical availability of land**
   2. **Pollutant loading within defined MS3**
   3. **BMPs with higher effectiveness values**
   4. **Ability to retrofit existing BMPs to increase effectiveness value**

   Note:

   - **PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016 indicated that the Pennsylvania Stormwater Best Management Practice Manual may not be used for calculation the pollutant load reductions.**

- **Pollutant load reduction calculations were included in the PA DEP BMP grant applications. Mount Joy Borough was awarded funding for two of the applications submitted.**

The planning opinion of probable cost were prepared by Michael R. Knouse, P.E. Costs were calculated based upon actual existing feature dimensions (i.e. swale length, basin bottom area) to determine a representative cost for planning purpose. A calculation of dollars per pound of sediment was conducted to aid in the selection of the Proposed BMPs from the list of Potential BMPs.

Note:

- **PA DEP does not require the planning estimates and/or the PRP to be signed and sealed by the professional engineer responsible for the development of the plan.**
- **The planning opinion of probable costs use percentages for contingency, engineering, legal and right-of-way acquisition consistent with the PA DEP BMP grant.**
- **Current sources of BMP costs are available. Sources include but are not limited to: the Chesapeake Expert Panel Reports; modeling programs such as Chesapeake Assessment Scenario Tool (CAST).**

6. Public noted that the PRP is a technical document that is difficult to read.

   PA DEP specifies the format and content requirements of the PRP in the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k). The PRP is a technical document prepared in accordance with these guidelines to satisfy the requirements of the Borough's MS4 permit. It is for this reason that Mount Joy Borough has discussed the MS4 program throughout public meetings.

7. The required date for submission of the PRP was questioned.

   Mount Joy Borough is required to submit the Notice of Intent and PRP to PA DEP by September 16, 2017. This date is confirmed by the notification received directly from PA DEP, as well as listed in the "2018 MS4 PERMIT NOI/APPLICATION DUE DATE REPORT" published by PA DEP.

8. How would the public know if one of the other potential BMPs was selected to be implemented?

   The Borough, through submission of the PRP to PA DEP, is committing to the implementation of the two (2) proposed BMPs identified in the plan. The Borough may amend the PRP during the five-year permit cycle. Amendments to the PRP must follow the same public notice and comment procedures followed in the development of this PRP.

The Borough also publicly acknowledged that as part of the PA DEP BMP grant application, the Borough directly corresponded with the affected Homeowners Association (HOA). As a result, the HOA offered a letter of support for inclusion in the grant application.

9. When will responses to written comments be received.

   PA DEP requires all written comments received to be included in the PRP. In accordance with the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k), "The applicant shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. Attach a copy of the permittee's record of consideration of all timely comment received in the public comment period to the PRP.

10. Is the BMP identified in drainage area OP-005 still considered as part of the PRP to be submitted to PA DEP.

    The referenced BMP was evaluated as a potential BMP, but is not part of the Proposed BMPs being submitted to satisfy the plan. The plan recommends implementation of the following BMPs:
    - **BMP OP008-BR1 – Basin retrofit (Pink Alley)**
    - **BMP OP008-VS1 – Vegetated Swale (Rotary Park)**

11. A question was raised to the evaluation of the swale at Rotary Park as a bioswale, noting that it is a vegetated swale.

    Pollutant load reductions were analyzed for the swale at Rotary Park for both the construction of a vegetated swale and also as a bioswale for comparison purposes.

12. A question was raised to the applicability of BMPs being designed in accordance with the Pennsylvania Stormwater Best Management Practice Manual.

    PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016 indicated that the Pennsylvania Stormwater Best Management Practice Manual may not be used for calculation the pollutant load reductions. Furthermore, PA DEP acknowledged that loading ratios identified in the manual will be exceeded when retrofitting existing facilities.

13. How was the required 10% reduction established? What percent reduction will bring the Bay into compliance? Will there be future reduction requirements?

PA DEP was required to submit their strategy for meeting the goals of the Chesapeake Bay Program Report to the Environmental Protection Agency (EPA) for approval. EPA approved the 10% sediment reduction methodology submitted by PA DEP.

The Chesapeake Bay Strategy defines the long-term goals to be achieved.

The MS4 program does not have a defined termination, therefore, it is anticipated that program requirements will continue into future years. PA DEP has indicated that there is no defined expectation for the next five-year permit at this time.

14. Why was investigation (sink hole, infiltration testing, etc.) of the other potential BMPs not conducted?

    The suggested investigation is not warranted since the BMPs are not being proposed for implementation. The suggested investigation would result in expenditure of Borough funds for projects that are not contemplated at this time.

15. Could the train station project be incorporated into the plan?

    ARRO will work with Borough staff to determine if the project is applicable to the PRP.

16. Can any reduction above the required amount be carried into future permit cycles.

    ARRO has posed this question to PA DEP; PA DEP has not developed a policy addressing this matter. Therefore, PA DEP was unable to answer this question at this time.

Mount Joy Borough
Pollutant Reduction Plan
Record of consideration of all timely comments received

7/17/17 – Mr. Bruce Haigh, P.E.

1. The potential bioswale (BMP OP007-BS1) analyzed the replacement of the existing concrete low-flow channel in the existing stormwater basin.
2. Property owner information is not relevant to the Pollutant Reduction Plan.

7/27/17 – Mr. Bruce Haigh, P.E.

1. All Pollutant Reduction Pages were posted on the Borough website, and/or incorporated by posted amendment.
2. All Pollutant Reduction Pages were posted on the Borough website, and/or incorporated by posted amendment.
3. All Pollutant Reduction Pages were posted on the Borough website, and/or incorporated by posted amendment.

7/28/17 – Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

1. Paragraph 3, page 1 of 7: PA DEP specifies the format and content requirements of the PRP in the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k). The PRP is a technical document prepared in accordance with these guidelines to satisfy the requirements of the Borough's MS4 permit. It is for this reason that Mount Joy Borough has discussed the MS4 program throughout public meetings. The maps included in the pdf and hard copies placed for public review are full size, 34" x 44".
2. Paragraph 4, page 1 of 7: The implementation of proposed Best Management Practices (BMPs) will require design for implementation in accordance with the permit requirements. The ARCA dry detention basin was not selected as the proposed BMP under this plan, therefore, no additional consideration is needed.
3. Paragraph 2, 3 and 4 on page 2 of 7 outline an operation and maintenance obligation of ARCA and Notice of Violation issue. These matters are relevant to the Borough's MS4 permit, but are not relevant to the development of the PRP.
4. Paragraph 5, page 2 of 7: The Borough, through submission of the PRP to PA DEP, is committing to the implementation of the two (2) proposed BMPs identified in the plan. The Borough may amend the PRP during the five-year permit cycle. Amendments to the PRP must follow the same public notice and comment procedures followed in the development of this PRP. Mount Joy Borough has rights to the two facilities identified, therefore, no additional public outreach was required. Owners of potential BMP's evaluated were not contacted, as the facilities were used in evaluating the most cost effective solutions. Owners of existing BMPs have continued operation and maintenance obligations.

The Borough also publicly acknowledged that as part of the PA DEP BMP grant application, the Borough directly corresponded with the affected Homeowners Association (HOA). As a result, the HOA offered a letter of support for inclusion in the grant application.

5. Paragraph 5, page 2 of 7: Existing municipal storm sewer conveyance facilities are maintained by a third-party consultant. GIS data was furnished to ARRO Consulting, Inc. for use in evaluation of the Pollutant Reduction Plan. Sufficient data was available to determine the municipal storm sewer shed to each outfall to accurately calculate the base pollutant loading.
6. Paragraph 6, page 2 of 7: The existing BMP reduction calculations for existing BMP 141 were conservative, as calculated based upon the information noted in 5 above. The Pollutant Reduction Plan has been revised for consistency from existing to potential BMP analysis.
7. Paragraph 1, page 3 of 7: All outfall, existing and potential BMP drainage areas have been reviewed for consistency and updated accordingly. It is noted that several of the deficiencies noted were not deficient. Generally, deficiencies noted by the commentator are a difference between the total drainage area identified and the regulated area. PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) defines the requirements of the regulated area. Expanded tables of total and regulated drainage areas have been added to the mapping and calculations.
8. Paragraph 2, page 3 of 7: see number 7 above.
9. Paragraph 3, page 3 of 7: see number 7 above.
10. Paragraph 4, page 3 of 7: see number 7 above.
11. Paragraph 5, page 3 of 7: see number 7 above.
12. Paragraph 1, page 4 of 7: see number 7 above.
13. Paragraph 2 AND 3, PAGE 4 OF 7: The planning opinion of probable costs were prepared by Michael R. Knouse, P.E. Costs were calculated based upon actual existing feature dimensions (i.e. swale length, basin bottom area) to determine a representative cost for planning purpose. A calculation of dollars per pound of sediment was conducted to aid in the selection of the Proposed BMPs from the list of Potential BMPs.

Note:

- PA DEP does not require the planning estimates and/or the PRP to be signed and sealed by the professional engineer responsible for the development of the plan.
- The planning opinion of probable costs use percentages for contingency, engineering, legal and right-of-way acquisition consistent with the PA DEP BMP grant.
- Current sources of BMP costs are available. Sources include but are not limited to: the Chesapeake Expert Panel Reports; modeling programs such as Chesapeake Assessment Scenario Tool (CAST).

14. Paragraph 5, page 4 of 7: Existing basin modification evaluations were performed based upon the understanding that rate control facilities were designed based upon rate control through the 100-year design storm. The purpose of the Pollutant Reduction Plan is to focus on water quality and reduction of pollutants of concern, primarily sediment for the Borough of Mount Joy. Planning estimates were calculated based upon this principal and did not include further evaluation of potential BMP's.
15. Paragraph 6, page 4 of 7: Mount Joy Borough provided written notice to this right-to know request.
16. Paragraph 1, page 5 of 7: Existing BMP 141 was evaluated as a potential BMP but has not been selected for implementation. Therefore, no additional analysis is required. The Borough will maintain record of your concerns for future MS4 program requirements.
17. Paragraph 2, page 5 of 7: see response under number 13 above.
18. Paragraph 3, page 5 of 7: Planning estimates of opinion of probable cost were performed for initial BMP conversion only. Mount Joy Borough has a continuing obligation under the MS4 permit for operation, maintenance and inspection of implemented BMP's.
19. Paragraph 4, page 5 of 7: Planning estimates of opinion of probable cost were performed for initial BMP conversion only. Selected BMPs were field verified to determine the extent of work. The BMP in question was not selected, therefore, the comment is not relevant.
20. Paragraph 6, page 5 of 7: The figures presented do not accurately reflect existing conditions within Mount Joy Borough. Current sources of BMP costs are available. Sources include but are not limited to: the Chesapeake Expert Panel Reports; modeling programs such as Chesapeake Assessment Scenario Tool (CAST).
21. Paragraph 1, page 6 of 7: The return-on-investment analysis was performed for use in determining the most cost-effective BMP's for implementation based on sediment removal. Refer to previous responses contained above with respect to Opinion of Probable Cost.
22. Paragraph 2, page 6 of 7: The drainage area for potential BMP OP005-BR1 was validated through this process.
23. Paragraph 3, page 6 of 7: The comment appears to be aimed at the cost associated for municipalities required to implement Pollutant Reduction Plans. The comment further delves into potential BMP OP005-BR1, which was not selected under the draft plan. Mount Joy Borough would like to note that they have developed a Pollutant Reduction Plan in the interest of the citizens and tax payers of the Borough. The Borough was successful in two (2) grant applications through PA DEP for implementation of the two (2) selected BMP's.
24. Paragraph 4, page 6 of 7: All outfall, existing and potential BMP drainage areas have been reviewed for consistency and updated accordingly. It is noted that several of the deficiencies noted were not deficient. Generally, deficiencies noted by the commentator are a difference between the total drainage area identified and the

regulated area. PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) defines the requirements of the regulated area. Expanded tables of total and regulated drainage areas have been added to the mapping and calculations. It is also noted that the comments are primarily related to an existing BMP identified as a potential BMP, but not selected as a proposed BMP. In all cases, the calculations were conservative; existing BMP effectiveness values have also been reduced for a more conservative approach. The recommendation of the Pollutant Reduction Plan remains unchanged.

25. Paragraph 5, page 6 of 7: The recommendations of the commentator are inconsistent with the requirements of the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k). Refer to comment number 5 above pertaining to storm sewer data.
26. Paragraph 6, page 6 of 7: Mount Joy Borough is required to submit the Notice of Intent and PRP to PA DEP by September 16, 2017. This date is confirmed by the notification received directly from PA DEP, as well as listed in the "2018 MS4 PERMIT NOI/APPLICATION DUE DATE REPORT" published by PA DEP.
27. Paragraph 1, page 7 of 7: The Pollutant Reduction Plan clearly indicates implementation of the following BMPs:
    - BMP OP008-BR1 – Basin retrofit (Pink Alley)
    - BMP OP008-VS1 – Vegetated Swale (Rotary Park)

8/1/17 – Mr. & Mrs. Gurican

1. Response to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E. above clearly indicate all requirements of PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) instructions have been satisfied.
2. The BMP identified in the agreement referenced has not been identified for implementation, no further action required.
3. Response to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E. above clearly indicate all requirements of PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) instructions have been satisfied.
4. The BMP identified in the comment has not been identified for implementation, no further action required. Mount Joy Borough reiterates that under the consideration of comments to ARCA, comment 4, the Borough reached out to property owners that were being considered for implementation.
5. All calculations were performed in accordance with PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) instructions and the PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016.
6. Please refer to response number 13 to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

7. Mount Joy Borough, through the selection of the two (2) proposed BMP's, did not select facilities prone to sinkhole formation. Furthermore, as attributed by the success of the PA DEP BMP implementation grant, and lack of waste full spending in the development of the Pollutant Reduction Plan, the Borough has minimized the impact on tax payers.
8. Other Concerns – the existing BMP referenced has not been selected as part of this plan, no further consideration given.
9. Conclusion comments – the conclusion comments have been adequately addressed in the response to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E. above; no further consideration required.

8/2/17 – Mr. Bruce Haigh, P.E.

C1. PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016 indicated that the Pennsylvania Stormwater Best Management Practice Manual may not be used for calculation the pollutant load reductions. Furthermore, PA DEP acknowledged that loading ratios identified in the manual will be exceeded when retrofitting existing facilities.

C2. PA DEP specifies the format and content requirements of the PRP in the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k). The PRP is a technical document prepared in accordance with these guidelines to satisfy the requirements of the Borough's MS4 permit. It is for this reason that Mount Joy Borough has discussed the MS4 program throughout public meetings. The maps included in the pdf and hard copy placed for public review are full size, 34" x 44".

C3. Existing municipal storm sewer conveyance facilities are maintained by a third-party consultant. GIS data was furnished to ARRO Consulting, Inc. for use in evaluation of the Pollutant Reduction Plan. Sufficient data was available to determine the municipal storm sewer shed to each outfall to accurately calculate the base pollutant loading.
C4. See response to C3 above.
C5. Boundaries have been identified in accordance with the regulated area requirements of the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k).
C6. No comment received.
C7. All outfall, existing and potential BMP drainage areas have been reviewed for consistency and updated accordingly. It is noted that several of the deficiencies noted were not deficient. Generally, deficiencies noted by the commentator are a difference between the total drainage area identified and the regulated area. PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) defines the requirements of the

regulated area. Expanded tables of total and regulated drainage areas have been added to the mapping and calculations.

C8. See response to C7 above.

C21. No response required.

C22. See C3 above.

C23-57. See C7 above.

C58. See C7 above.

C59. See C7 above.

C60. Wet ponds were evaluated as a potential BMP due to the ability to convert existing BMPs. As noted in previous responses, the selected BMPs were reviewed in the field to determine any existing site constraints. Field evaluation of all alternative BMPs was determined not to be a financially responsible solution for the Borough.

C61. Mount Joy Borough has determined it appropriate to show the tax payers that a plan was developed based upon compliance, as well as a being financially responsible.

C62. Proposed BMP mapping reflects PA DEP BMP grant funding received, and recommendations of report.

C63-64. Under the PennDOT regulations, Borough's are responsible for the storm sewer conveyance piping within PennDOT right-of-way. Based upon connectivity, and requirements under the PA DEP document 3800-PM-BCW0100k – Pollutant Reduction Plan (PRP) instructions, the Borough determined that parsing was not feasible.

C65. No response required.

C66. The Nutrient Sediment Box evaluated in the plan was specifically subject to PA DEP approval. The date released was a direct result of the approval by PA DEP, and does not require further documentation. ARRO Consulting, Inc., in coordination with another client, was involved in the approval process for this BMP. Since the BMP is not selected for further implementation, no further consideration is required.

C67. No response required.

C68. Please refer to response number 13 to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

C69. Mount Joy Borough responded to the right-to-know request in accordance with prevailing laws.

C70. The planning estimates of opinion of probable cost are consistent with industry standard.

C71. Please refer to response number 19 to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

C72. All MS4s must use the BMP effectiveness values contained within DEP's BMP Effectiveness Values document (3800-PM-BCW0100m) or Chesapeake Bay Program expert panel reports for BMPs listed in those resources when determining pollutant load reductions in PRPs. For BMPs not listed in 3800-PM-BCW0100m or expert panel reports, MS4s may use effectiveness values from other technical resources; such resources must be documented in the PRP.

The Potential BMPs were identified based upon the following criteria:

1. Physical availability of land
2. Pollutant loading within defined MS3
3. BMPs with higher effectiveness values
4. Ability to retrofit existing BMPs to increase effectiveness value

Note:

- PA DEP in the "PRP/TMDL Plans, MS4 Workshop" conducted in the fall of 2016 indicated that the Pennsylvania Stormwater Best Management Practice Manual may not be used for calculation the pollutant load reductions.

C73. Comment received, no further consideration required.

C74. Please refer to response number 21 to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

C75. Comment received, no further consideration required.

C76. Please refer to response number 13 to items in correspondence dated 7/28/17, from the Arbor Rose Community Association (ARCA) – Mr. Bruce Haigh, P.E.

C77. The publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k) requires the identification of long term operation and maintenance responsibilities. The Pollutant Reduction Plan has been prepared to satisfy this requirement.

C78. Comment received, no further consideration required.

C79. The public participation is consistent with the publication titled "Pollutant Reduction Plan (PRP) instructions" (PA DEP document 3800-PM-BCW0100k). Other activities references are reported in the Borough's annual MS4 report.

C80. Comment received, no further consideration required.

C81. Based upon PA DEP's announcement of BMP grants, the Borough received funding for the two (2) proposed BMP's. This modification was released as an amendment during the public comment period. The final Pollutant Reduction Plan reflects these updates.

C82. The implementation schedule is required for the municipality to implement the proposed BMP's under the upcoming permit cycle. No further action is required.

C83. The calculations provided in the Pollutant Reduction Plan satisfy the aggregated reduction of Sediment by 10%.

C84. Comment received, no further consideration required.

C85. Calculations were prepared for consistency with PA DEP land loading ratios. Preliminary estimates of probable cost were prepared based upon unit cost and percentages for ease. Final Pollutant Reduction Plan provides estimates rounded to the nearest whole dollar.

C86. Comment received, no further consideration required.

C87. The Borough will continue to evaluate the target audience and the Public Outreach and Education Program under the upcoming permit cycle. No further consideration for the Pollutant Reduction Plan.

General Conclusion – As documented through the response to timely comments received, the Pollutant Reduction Plan meets the requirements of the PA DEP regulations as outlined in PA DEP document 3800-PM-BCW0100k. Mr. Bruce Haigh, P.E. is reminded of his responsibilities as a registered professional engineer of the Commonwealth of Pennsylvania of his ethical and code of conduct responsibilities. The comments submitted herein, directly translate to past concerns of enforcement of the Borough Stormwater provisions relevant to an existing BMP. Therefore, no further consideration of these comments is warranted.

8/3/17 – Mrs. & Mr. Bear

1. The existing BMP within the Arbor Rose Community Association has not been selected for implementation; therefore, no further consideration is required.

ATTACHMENT E

MAPPING

MAP INDEX

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
MS4 Conveyance System

ARRO

OUTFALL ID TABLE		
FACILITY IDENTIFIER	LATITUDE	LONGITUDE
OF001	40° 6' 59.796"	-76° 31' 38.4708"
OF002	40° 6' 46.1772"	-76° 31' 52.734"
OF003	40° 6' 45.36"	-76° 31' 50.2098"
OF004	40° 6' 45.1872"	-76° 31' 47.9172"
OF005	40° 6' 37.548"	-76° 29' 29.544"
OF006	40° 6' 32.0394"	-76° 29' 25.2852"
OF007	40° 6' 37.8288"	-76° 29' 25.9182"
OF008	40° 6' 32.8422"	-76° 29' 23.8848"
OF009	40° 6' 29.2068"	-76° 29' 24.6618"
OP001	40° 6' 34.9956"	-76° 31' 56.6292"
OP002	40° 6' 25.0806"	-76° 31' 49.9008"
OP003	40° 6' 25.164"	-76° 31' 42.9096"
OP004	40° 6' 3.4806"	-76° 31' 27.9984"
OP005	40° 6' 8.4168"	-76° 31' 1.689"
OP006	40° 6' 18.1332"	-76° 30' 56.5194"
OP007	40° 6' 9.8352"	-76° 30' 15.4188"
OP008	40° 6' 55.0944"	-76° 30' 2.5056"
OP009	40° 6' 15.6666"	-76° 29' 35.0982"
OP010	40° 6' 36.255"	-76° 28' 40.3176"
OP011	40° 6' 29.1672"	-76° 28' 30.7626"

WATER BODY TABLE	
Water Body	Chapter 93 Designated Use
Unnamed Tributary to Donegal Creek	Trout Stocking
Little Chiques Creek	Trout Stocking

Legend

- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\landfleet\GIS\mount_joy\MS4 MasterMap Documents\01_MJ-MS4ConveyanceSystem.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Attaining/Non-Attaining Streams

ARRO

Water Body	Attaining	Non-Attaining	Impairment
Donegal Creek	No	Yes	Appendix E-Nutrients, Organic Enrichment/Low D.O., Suspended Solids (4a)
Susquehanna River	No	Yes	Appendix 8-Pathogens (5), Appendix CPCB (5)
Unnamed Tributary to Donegal Creek	No	Yes	Appendix E-Siltation (4a)
Little Chiques Creek	No	Yes	Appendix E-Nutrients, Siltation (5)
Chiques Creek	No	Yes	Appendix E-Nutrients (4a)
Chesapeake Bay Nutrients/Sediment	No	Yes	Appendix D-Nutrients, Siltation (4a)

Legend

- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- MS3 Drainage Area
- Non-Attaining Streams
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\Landfile4\gis\mount_joy\MS4 Master\Map Documents\02_MJ-Attaining\NonAttainingStreams.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
MS4 Drainage Area & Land Use

ARRO

OP001
OF001
OF002
OF004
OF003
OP008
OF005
OF009
OF007
OP010
OF008
OP011
OF006
OP002
OP003
OP005
OP006
OP009
OP007
OP004
Little Chiques Creek

0 250 500 1,000 Feet

Land Use Legend

- Campus Industrial
- Commercial Business District
- Conservation District
- General Commercial
- General Industrial
- Light Industrial
- Low Density Residential
- Medium Density Residential
- Medium High Residential
- Neighborhood Commercial

Legend

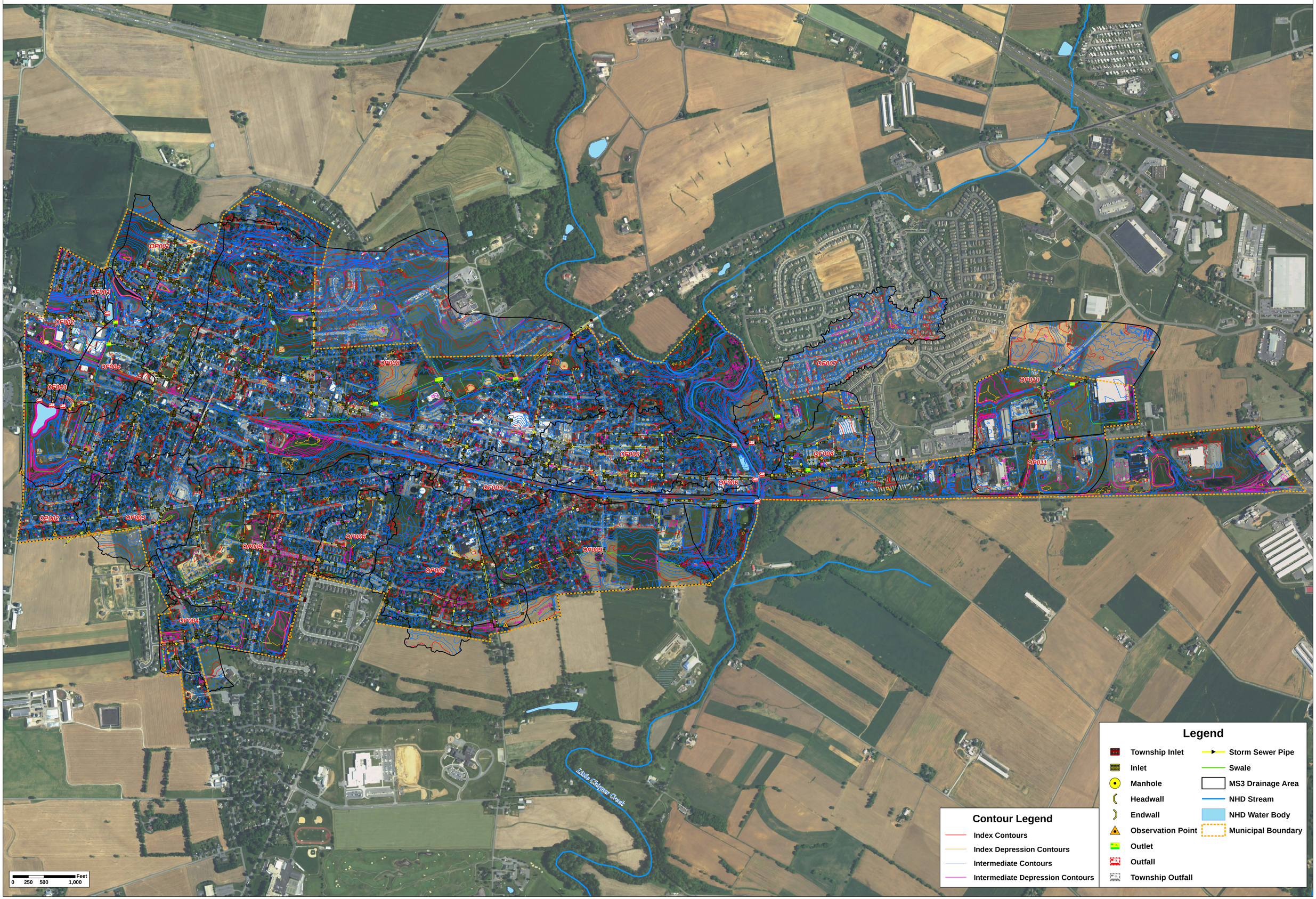
- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- MS3 Drainage Area
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\Landfile\gis\mount_joy\MS4 Master\Map Documents\03_MJ-MS4DrainageAreaLandUse.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
MS4 Drainage Area Analysis

ARRO



\\Landfill4\gis\mount_joy\MS4 MasterMap Documents\04_MJ-MS4DrainageAreaAnalysis.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
MS4 Drainage Area Pervious/Impervious Analysis

ARRO

Drainage Area ID	Drainiage Area (SF)			Drainage Area (AC)			%
	Impervious	Pervious	Total	Impervious	Pervious	Total	Impervious
OF001	37337.18	40995.98	78333.15	0.857	0.941	1.798	48%
OF002	73386.00	304482.00	377868.00	1.685	6.990	8.675	19%
OF003	6628.60	45760.76	52389.36	0.152	1.051	1.203	13%
OF004	677391.94	1093633.96	1771025.90	15.551	25.106	40.657	38%
OF005	1497066.97	1510347.05	3007414.01	34.368	34.673	69.041	50%
OF006	128134.92	68951.61	197086.53	2.942	1.583	4.524	65%
OF007	898210.10	2240983.71	3139193.81	20.620	51.446	72.066	29%
OF008	885662.60	1221739.61	2107402.21	20.332	28.047	48.379	42%
OF009	403641.35	1065311.16	1468952.51	9.266	24.456	33.723	27%
OP001	1427503.07	4663985.11	6091488.18	32.771	107.070	139.841	23%
OP002	262638.27	750847.00	1013485.27	6.029	17.237	23.266	26%
OP003	700615.65	1780259.83	2480875.48	16.084	40.869	56.953	28%
OP004	243426.96	914114.86	1157541.82	5.588	20.985	26.574	21%
OP005	1337976.05	4852307.82	6190283.87	30.716	111.394	142.109	22%
OP006	398582.65	853016.27	1251598.92	9.150	19.583	28.733	32%
OP007	1051699.82	3276184.72	4327884.54	24.144	75.211	99.355	24%
OP008	5008809.21	14474521.43	19483330.63	114.986	332.289	447.276	26%
OP009	972026.51	3838086.40	4810112.91	22.315	88.110	110.425	20%
OP010	776386.76	3520432.50	4296819.26	17.823	80.818	98.641	18%
OP011	868636.31	1149751.86	2018388.17	19.941	26.395	46.336	43%

Legend

- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- MS3 Drainage Area
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\Lancfile4\gis\mount_joy\MS4 Master\Map Documents\05_MJ-MS4DrainageAreaPervious-ImperviousAnalysis.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
MS4 Drainage Area Runoff Rate and Volume Analysis

ARRO

Drainage Area ID	Runoff Rate (Cfs)			Runoff Volume (CF)
	2-year, 24 hour	25-year, 24 hour	100-year, 24 hour	2-year, 24 hour
OF001	4.4	6.5	7.4	12,218
OF002	12.7	18.7	21.4	43,869
OF003	4.9	7.2	8.2	5,582
OF004	28.3	41.7	47.6	252,684
OF005	171.6	252.8	288.9	478,046
OF006	13.7	20.1	23.0	35,567
OF007	127.9	188.5	215.4	405,184
OF008	107.3	158.2	180.8	311,917
OF009	58.4	56.0	98.3	187,248
OP001	111.7	164.6	188.1	741,709
OP002	39.2	57.8	66.1	5,582
OP003	101.1	149.0	170.2	318,910
OP004	40.1	59.1	67.5	137,014
OP005	220.7	325.2	371.7	737,830
OP006	54.8	80.8	92.3	405,184
OP007	163.1	240.4	274.7	532,263
OP008	251.4	370.5	423.4	2,434,867
OP009	55.5	81.8	93.5	563,776
OP010	140.1	206.4	235.9	490,638
OP011	104.9	154.5	176.6	301,620

Legend

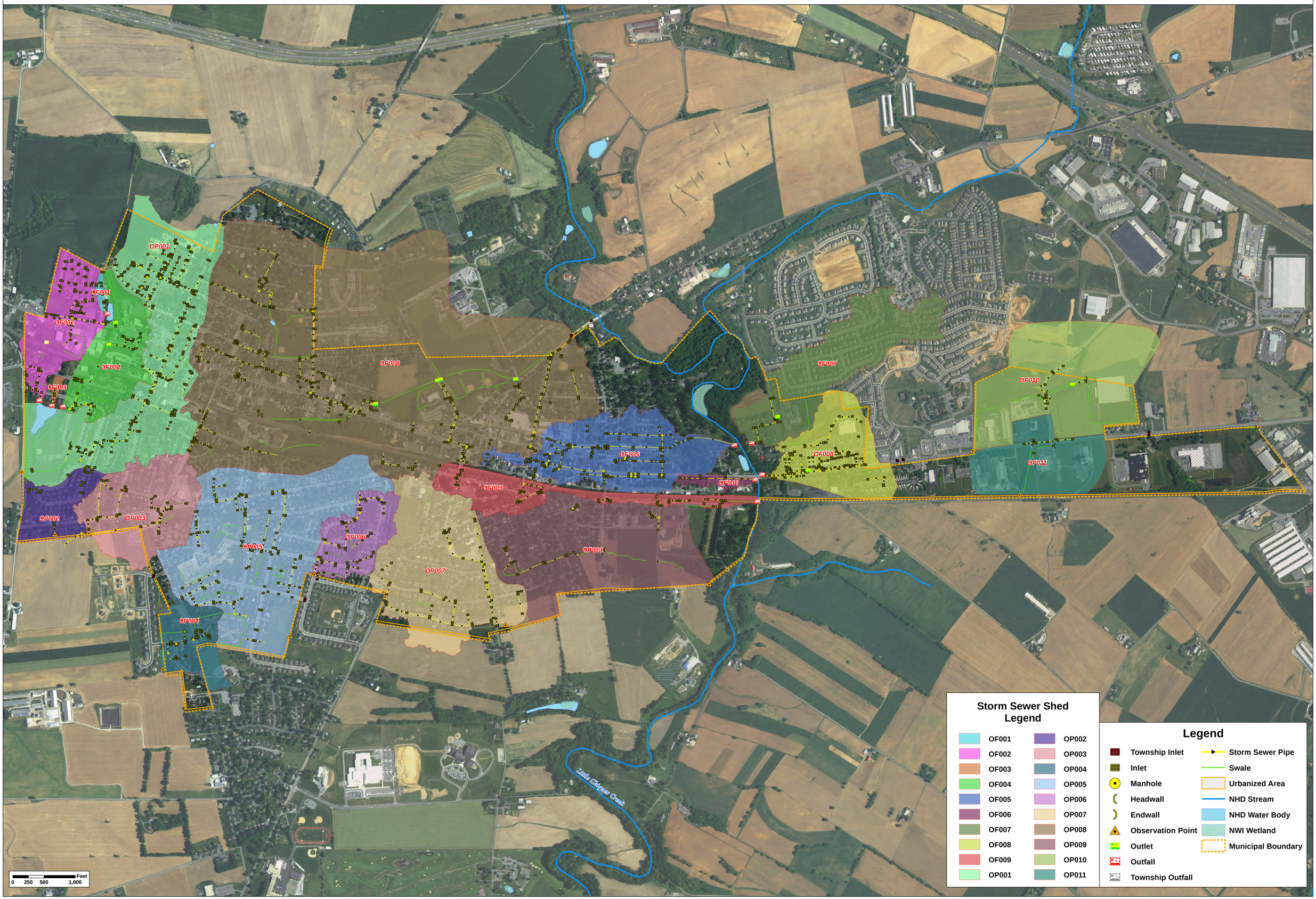
- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- MS3 Drainage Area
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\Lancfile4\gis\mount_joy\MS4 Master\Map Documents\06_MJ-MS4DrainageAreaRunoffRate&VolumeAnalysis.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Municipal Storm Sewer Sheds

ARRO

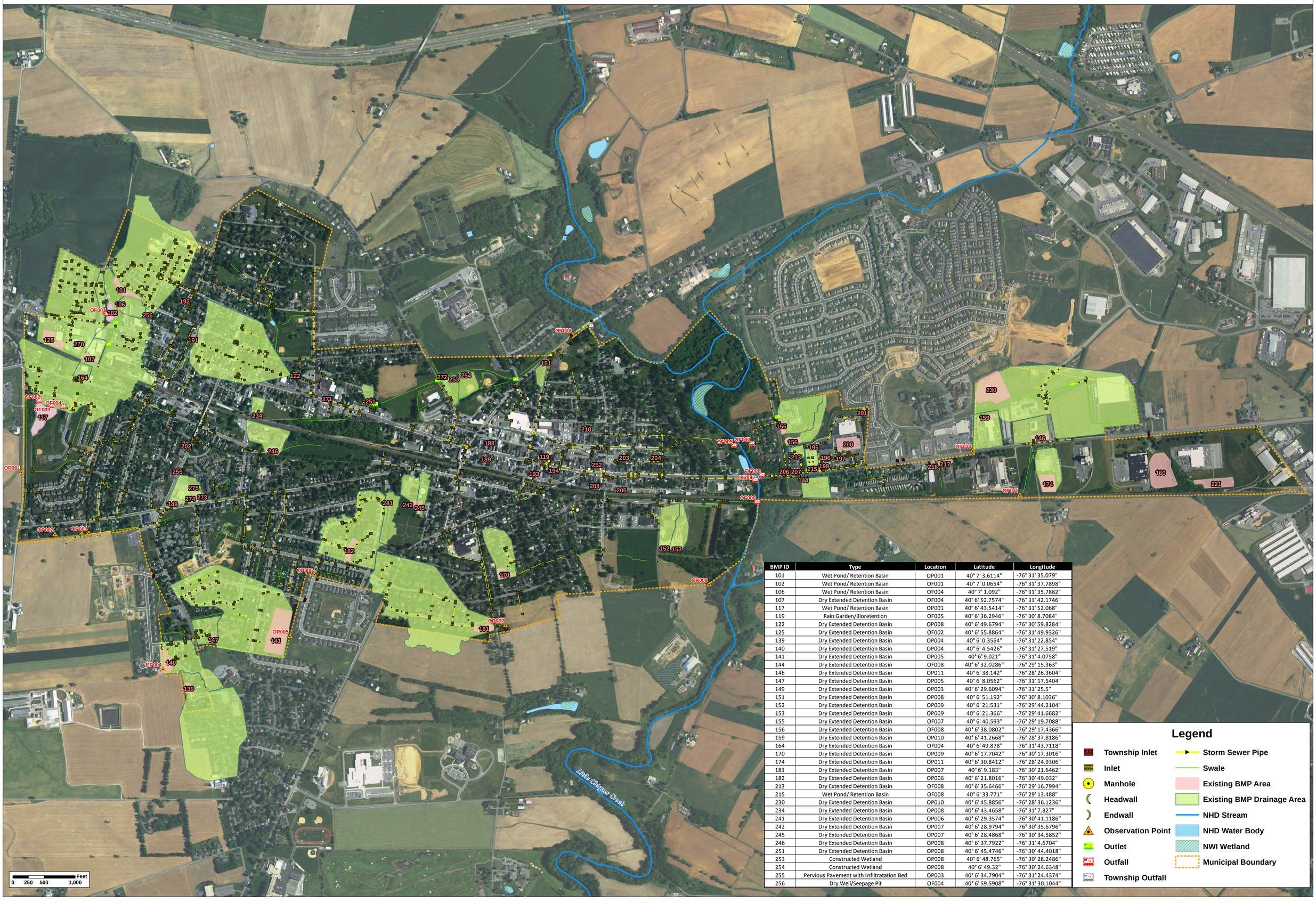


\\Landfield\gis\mount_joy\MS4 Master\Map Documents\07_MJ-Municipal Storm Sewer Sheds.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Existing Best Management Practice Structures

ARRO



BMP ID	Type	Location	Latitude	Longitude
101	Wet Pond/ Retention Basin	OP001	40° 7' 3.6114"	-76° 31' 35.079"
102	Wet Pond/ Retention Basin	OP001	40° 7' 0.0654"	-76° 31' 37.7898"
106	Wet Pond/ Retention Basin	OF004	40° 7' 1.092"	-76° 31' 35.7882"
107	Dry Extended Detention Basin	OF004	40° 6' 52.7574"	-76° 31' 42.1746"
117	Wet Pond/ Retention Basin	OP001	40° 6' 43.5414"	-76° 31' 52.068"
119	Rain Garden/Bioretention	OP005	40° 6' 36.2946"	-76° 30' 8.7084"
122	Dry Extended Detention Basin	OP008	40° 6' 49.6794"	-76° 30' 59.8284"
125	Dry Extended Detention Basin	OF002	40° 6' 55.8864"	-76° 31' 49.9326"
139	Dry Extended Detention Basin	OP004	40° 6' 0.3564"	-76° 31' 22.854"
140	Dry Extended Detention Basin	OP004	40° 6' 4.5426"	-76° 31' 27.519"
141	Dry Extended Detention Basin	OP005	40° 6' 9.021"	-76° 31' 4.0758"
144	Dry Extended Detention Basin	OF008	40° 6' 32.0286"	-76° 29' 15.363"
146	Dry Extended Detention Basin	OP011	40° 6' 38.142"	-76° 28' 26.3604"
147	Dry Extended Detention Basin	OP005	40° 6' 8.0562"	-76° 31' 17.5404"
149	Dry Extended Detention Basin	OP003	40° 6' 29.6094"	-76° 31' 25.5"
151	Dry Extended Detention Basin	OP008	40° 6' 51.192"	-76° 30' 8.1036"
152	Dry Extended Detention Basin	OP009	40° 6' 21.531"	-76° 29' 44.2104"
153	Dry Extended Detention Basin	OP009	40° 6' 21.366"	-76° 29' 41.6682"
155	Dry Extended Detention Basin	OF007	40° 6' 40.593"	-76° 29' 19.7088"
156	Dry Extended Detention Basin	OF008	40° 6' 38.0802"	-76° 29' 17.4366"
159	Dry Extended Detention Basin	OP010	40° 6' 41.2668"	-76° 28' 37.8186"
164	Dry Extended Detention Basin	OF004	40° 6' 49.878"	-76° 31' 43.7118"
170	Dry Extended Detention Basin	OP009	40° 6' 17.7042"	-76° 30' 17.3016"
174	Dry Extended Detention Basin	OP011	40° 6' 30.8412"	-76° 28' 24.9306"
181	Dry Extended Detention Basin	OP007	40° 6' 9.183"	-76° 30' 21.6462"
182	Dry Extended Detention Basin	OP006	40° 6' 21.8016"	-76° 30' 49.032"
213	Dry Extended Detention Basin	OF008	40° 6' 35.6466"	-76° 29' 16.7994"
215	Wet Pond/ Retention Basin	OF008	40° 6' 33.771"	-76° 29' 13.488"
230	Dry Extended Detention Basin	OP010	40° 6' 45.8856"	-76° 28' 36.1236"
234	Dry Extended Detention Basin	OP008	40° 6' 43.4658"	-76° 31' 7.827"
241	Dry Extended Detention Basin	OP006	40° 6' 29.3574"	-76° 30' 41.1186"
242	Dry Extended Detention Basin	OP007	40° 6' 28.9794"	-76° 30' 35.6796"
245	Dry Extended Detention Basin	OP007	40° 6' 28.4868"	-76° 30' 34.5852"
246	Dry Extended Detention Basin	OP008	40° 6' 37.7922"	-76° 31' 4.6704"
251	Dry Extended Detention Basin	OP008	40° 6' 45.4746"	-76° 30' 44.4018"
253	Constructed Wetland	OP008	40° 6' 48.765"	-76° 30' 28.2486"
254	Constructed Wetland	OP008	40° 6' 49.32"	-76° 30' 24.6348"
255	Pervious Pavement with Infiltratation Bed	OP003	40° 6' 34.7904"	-76° 31' 24.4374"
256	Dry Well/Seepage Pit	OF004	40° 6' 59.5908"	-76° 31' 30.1044"

Legend

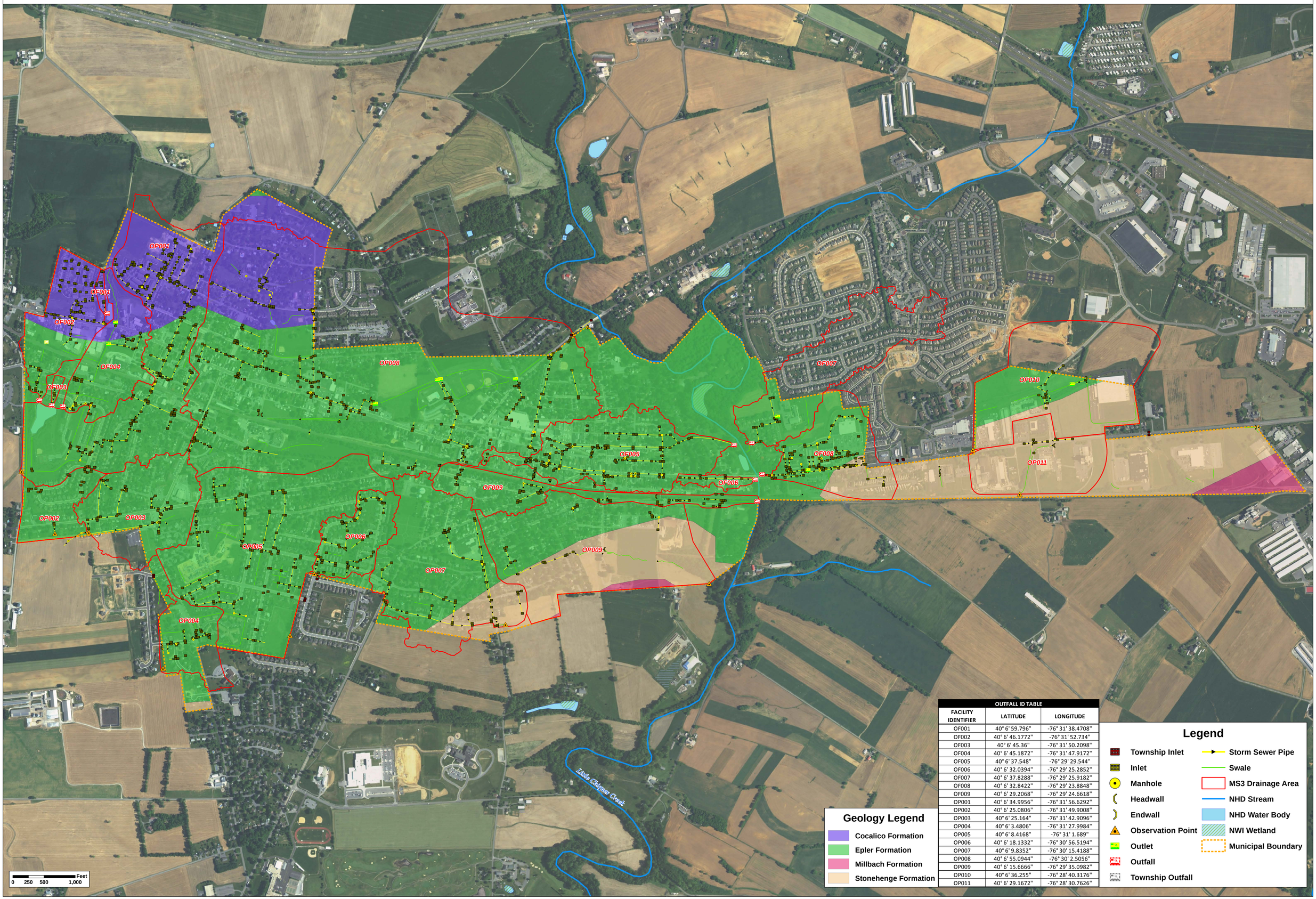
- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- Existing BMP Area
- Existing BMP Drainage Area
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\arch\e4\GIS\mount_joy\MS4 Master\Map Documents\08_MJ-ExistingBMPstructures.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Geology

ARRO



Geology Legend

- Cocalico Formation
- Epler Formation
- Millbach Formation
- Stonehenge Formation

OUTFALL ID TABLE

FACILITY IDENTIFIER	LATITUDE	LONGITUDE
OF001	40° 6' 59.796"	-76° 31' 38.4708"
OF002	40° 6' 46.1772"	-76° 31' 52.734"
OF003	40° 6' 45.36"	-76° 31' 50.2098"
OF004	40° 6' 45.1872"	-76° 31' 47.9172"
OF005	40° 6' 37.548"	-76° 29' 29.544"
OF006	40° 6' 32.0394"	-76° 29' 25.2852"
OF007	40° 6' 37.8288"	-76° 29' 25.9182"
OF008	40° 6' 32.8422"	-76° 29' 23.8848"
OF009	40° 6' 29.2068"	-76° 29' 24.6618"
OP001	40° 6' 34.9956"	-76° 31' 56.6292"
OP002	40° 6' 25.0806"	-76° 31' 49.9008"
OP003	40° 6' 25.164"	-76° 31' 42.9096"
OP004	40° 6' 3.4806"	-76° 31' 27.9984"
OP005	40° 6' 8.4168"	-76° 31' 1.689"
OP006	40° 6' 18.1332"	-76° 30' 56.5194"
OP007	40° 6' 9.8352"	-76° 30' 15.4188"
OP008	40° 6' 55.0944"	-76° 30' 2.5056"
OP009	40° 6' 15.6666"	-76° 29' 35.0982"
OP010	40° 6' 36.255"	-76° 28' 40.3176"
OP011	40° 6' 29.1672"	-76° 28' 30.7626"

Legend

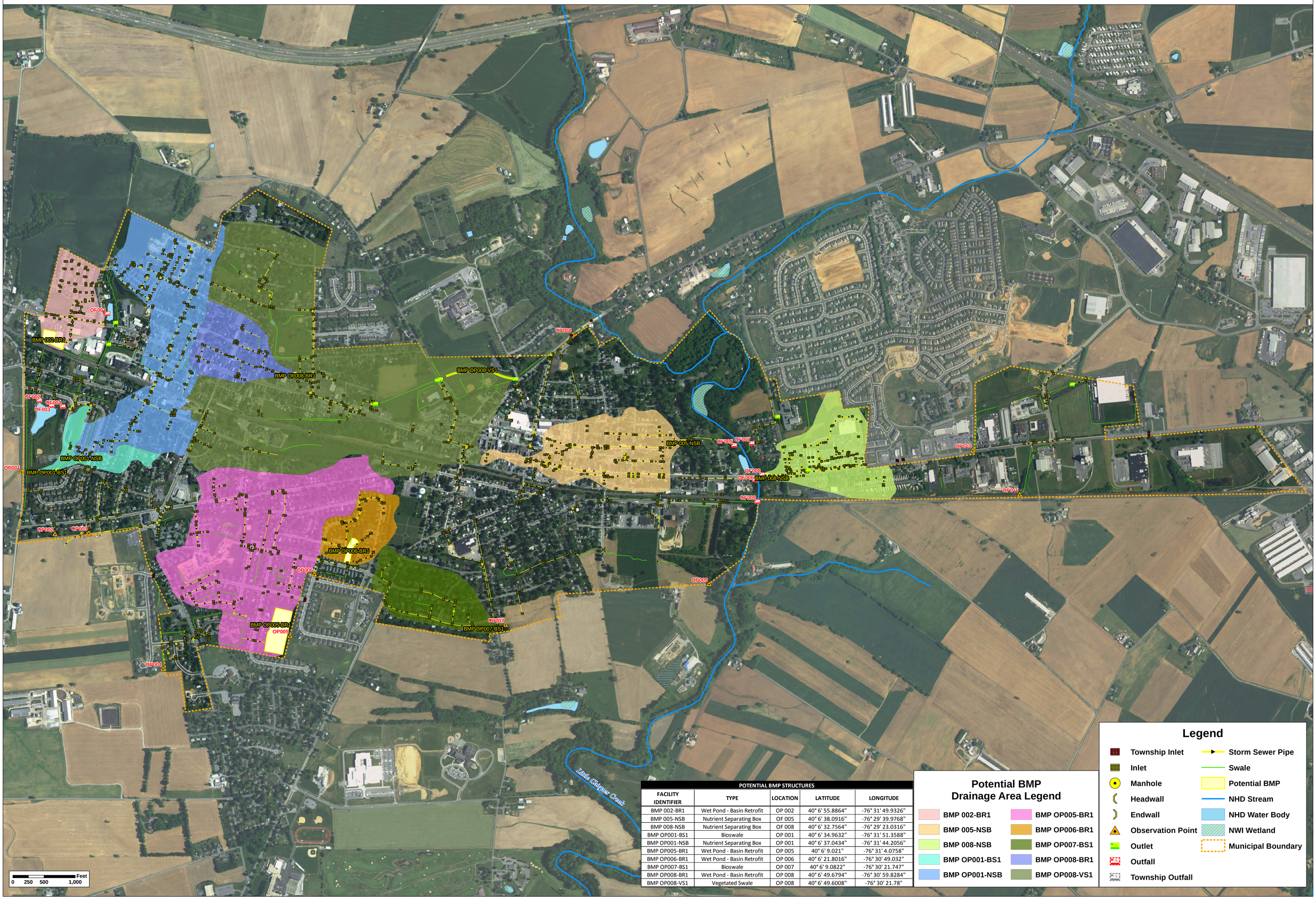
- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- MS3 Drainage Area
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\Landtek\gis\mount_joy\MS4 MasterMap Documents\09_MJ-MS4Geology.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Potential Best Management Practice Structures

ARRO



POTENTIAL BMP STRUCTURES

FACILITY IDENTIFIER	TYPE	LOCATION	LATITUDE	LONGITUDE
BMP 002-BR1	Wet Pond - Basin Retrofit	OP 002	40° 6' 55.8864"	-76° 31' 49.9326"
BMP 005-NSB	Nutrient Separating Box	OF 005	40° 6' 38.0916"	-76° 29' 39.9768"
BMP 008-NSB	Nutrient Separating Box	OF 008	40° 6' 32.7564"	-76° 29' 23.0316"
BMP OP001-BS1	Bioswale	OP 001	40° 6' 34.9632"	-76° 31' 51.3588"
BMP OP001-NSB	Nutrient Separating Box	OP 001	40° 6' 37.0434"	-76° 31' 44.2056"
BMP OP005-BR1	Wet Pond - Basin Retrofit	OP 005	40° 6' 9.021"	-76° 31' 4.0758"
BMP OP006-BR1	Wet Pond - Basin Retrofit	OP 006	40° 6' 21.8016"	-76° 30' 49.032"
BMP OP007-BS1	Bioswale	OP 007	40° 6' 9.0822"	-76° 30' 21.747"
BMP OP008-BR1	Wet Pond - Basin Retrofit	OP 008	40° 6' 49.6794"	-76° 30' 59.8284"
BMP OP008-VS1	Vegetated Swale	OP 008	40° 6' 49.6008"	-76° 30' 21.78"

Potential BMP Drainage Area Legend

- BMP 002-BR1
- BMP 005-NSB
- BMP 008-NSB
- BMP OP001-BS1
- BMP OP001-NSB
- BMP OP005-BR1
- BMP OP006-BR1
- BMP OP007-BS1
- BMP OP008-BR1
- BMP OP008-VS1

Legend

- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- Potential BMP
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

\\arcfile\GIS\mount_joy\MS4 MasterMap Documents\10_MJ-PotentialBMPstructures.mxd

Mount Joy Borough
Established 1851 in Lancaster County, PA

Mount Joy Borough
Proposed Best Management Practice Structures

ARRO

Facility Identifier	Type	Location	Latitude	Longitude
BMP OP008-VS1	Vegetated Swale	OP008	40.113778	-76.50605

Proposed BMP Drainage Area

BMP OP008-VS1

Legend

- Township Inlet
- Inlet
- Manhole
- Headwall
- Endwall
- Observation Point
- Outlet
- Outfall
- Township Outfall
- Storm Sewer Pipe
- Swale
- Proposed BMP
- NHD Stream
- NHD Water Body
- NWI Wetland
- Municipal Boundary

Feet
0 250 500 1,000

\\arcfile\4\GIS\mount_joy\MS4 Master\Map Documents\11_M1-ProposedBMPstructures.mxd

ATTACHMENT F

EXISTING LOADING FOR POLLUTANTS OF CONCERN

1. Aggregated Recap (Chesapeake Bay (Appendix D) Combined)
2. UNT to Donegal Creek (Appendix E)
3. Little Chiques Creek (Appendix E)

EXISTING LOADING FOR POLLUTANTS OF CONCERN

Aggregated Recap (Chesapeake Bay (Appendix D) Combined)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Base Pollutant Loading (No Existing BMPs) Summary:

Appendix E - UNT To Donegal Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek	94.63	211.03	305.66	8,339.35	222.64	180,381.45
				8,339.35	**222.64**	**180,381.45**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**250.18**	**11.13**	**18,038.15**

Appendix E - Little Chiques Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Little Chiques Creek	287.23	682.59	969.82	26,247.93	690.95	555,557.75
				26,247.93	**690.95**	**555,557.75**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**787.44**	**34.55**	**55,555.78**
TOTAL COMBINED REQUIRED REDUCTION (No Existing BMPs): Appendix D (Chesapeake Bay) & Aggregated Total:				**1,037.62**	**45.68**	**73,593.92**

EXISTING LOADING FOR POLLUTANTS OF CONCERN

UNT to Donegal Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Base Pollutant Loading (No Existing BMPs) Summary:

Appendix E - UNT To Donegal Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek	94.63	211.03	305.66	8,339.35	222.64	180,381.45
				8,339.35	**222.64**	**180,381.45**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**250.18**	**11.13**	**18,038.15**

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Land Use: MS4 Regulated Area
Watershed Description: Unnamed Tributary to Donegal Creek

OF-001

Description	Area (SF)	Area (Ac.)
Pervious	40,996	0.941
Impervious	37,337	0.857
		1.798

OF-002

Description	Area (SF)	Area (Ac.)
Pervious	847,302	19.451
Impervious	875,042	20.088
		39.540

OF-003

Description	Area (SF)	Area (Ac.)
Pervious	45,761	1.051
Impervious	6,629	0.152
		1.203

OF-004

Description	Area (SF)	Area (Ac.)
Pervious	1,093,634	25.106
Impervious	677,392	15.551
		40.657

OP-001

Description	Area (SF)	Area (Ac.)
Pervious	4,363,923	100.182
Impervious	1,380,947	31.702
		131.884

OP-002

Description	Area (SF)	Area (Ac.)
Pervious	720,049	16.530
Impervious	258,869	5.943
		22.473

OP-003

Description	Area (SF)	Area (Ac.)
Pervious	1,404,962	32.253
Impervious	694,991	15.955
		48.208

OP-004

Description	Area (SF)	Area (Ac.)
Pervious	675,936	15.517
Impervious	190,758	4.379
		19.897

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Worksheet 4:

Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

OF-001

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	40,996	0.941	77	2.99	0.60	1.06	3,635.37
Impervious	C	37,337	0.857	98	0.20	0.04	2.76	8,582.29
		78,333	1.798					12,217.66

OF-002

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,002,399	23.012	77	2.99	0.60	1.06	88,888.95
Impervious	C	930,444	21.360	98	0.20	0.04	2.76	213,871.20
		1,932,843	44.372					302,760.15

OF-003

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	45,761	1.051	77	2.99	0.60	1.06	4,057.91
Impervious	C	6,629	0.152	98	0.20	0.04	2.76	1,523.74
		52,390	1.203					5,581.65

OF-004

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,093,634	25.106	77	2.99	0.60	1.06	96,979.33
Impervious	C	677,392	15.551	98	0.20	0.04	2.76	155,704.78
		1,771,026	40.657					252,684.11

OP-001

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	4,663,985	107.070	77	2.99	0.60	1.06	413,584.58
Impervious	C	1,427,503	32.771	98	0.20	0.04	2.76	328,124.71
		6,091,488	139.841					741,709.29

OP-002

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	45,761	1.051	77	2.99	0.60	1.06	4,057.91
Impervious	C	6,629	0.152	98	0.20	0.04	2.76	1,523.74
		52,390	1.203					5,581.65

OP-003

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,780,260	40.869	77	2.99	0.60	1.06	157,866.72
Impervious	C	700,616	16.084	98	0.20	0.04	2.76	161,042.95
		2,480,875	56.953					318,909.67

OP-004

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	914,115	20.985	77	2.99	0.60	1.06	81,060.25
Impervious	C	243,427	5.588	98	0.20	0.04	2.76	55,953.92
		1,157,542	26.574					137,014.18

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Base Pollutant Loading (No Existing BMPs)

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

MS4 Regulated Area Watershed Description: Unnamed Tributary to Donegal Creek

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
Drainage Area ID	Impervious	Pervious	Total	Impervious	Pervious	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
OF-001	37,337	40,996	78,333	0.9	0.9	1.8	33.03	20.93	53.96	1.33	0.34	1.67	1,268.9	179.7	1,448.6
OF-002	875,042	847,302	1,722,344	20.1	19.5	39.5	774.00	432.60	1,206.60	31.14	7.00	38.14	29,739.2	3,713.9	33,453.0
OF-003	6,629	45,761	52,390	0.2	1.1	1.2	5.86	23.36	29.23	0.24	0.38	0.61	225.3	200.6	425.9
OF-004	677,392	1,093,634	1,771,026	15.6	25.1	40.7	599.17	558.37	1,157.54	24.10	9.04	33.14	23,021.8	4,793.6	27,815.4
OP-001	1,380,947	4,363,923	5,744,870	31.7	100.2	131.9	1,221.48	2,228.05	3,449.53	49.14	36.07	85.20	46,932.9	19,127.7	66,060.6
OP-002	258,869	720,049	978,918	5.9	16.5	22.5	228.98	367.63	596.61	9.21	5.95	15.16	8,797.9	3,156.1	11,954.0
OP-003	694,991	1,404,962	2,099,953	16.0	32.3	48.2	614.74	717.32	1,332.06	24.73	11.61	36.34	23,619.9	6,158.2	29,778.1
OP-004	190,758	675,936	866,694	4.4	15.5	19.9	168.73	345.11	513.84	6.79	5.59	12.37	6,483.1	2,962.7	9,445.8
				94.6	**211.0**	**305.7**			**8,339.35**			**222.64**			**180,381.45**
	Required Reduction Percent								**3%**			**5%**			**10%**
	Required Reduction (Lbs/Year)								**250.18**			**11.13**			**18,038.15**
	Required Reduction (Tons/Year)								0.13			0.01			9.02

EXISTING LOADING FOR POLLUTANTS OF CONCERN

Little Chiques Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Base Pollutant Loading (No Existing BMPs) Summary:

Appendix E - Little Chiques Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Little Chiques Creek	287.23	682.59	969.82	26,247.93	690.95	555,557.75
				26,247.93	**690.95**	**555,557.75**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**787.44**	**34.55**	**55,555.78**

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Land Use: MS4 Regulated Area
Watershed Description: Little Chiques Creek

OF-005

Description	Area (SF)	Area (Ac.)
Pervious	1,510,347	34.673
Impervious	1,497,067	34.368
		69.041

OF-006

Description	Area (SF)	Area (Ac.)
Pervious	68,952	1.583
Impervious	128,135	2.942
		4.524

OF-007

Description	Area (SF)	Area (Ac.)
Pervious	681,246	15.639
Impervious	186,772	4.288
		19.927

OF-008

Description	Area (SF)	Area (Ac.)
Pervious	1,092,215	25.074
Impervious	822,973	18.893
		43.967

OF-009

Description	Area (SF)	Area (Ac.)
Pervious	1,065,311	24.456
Impervious	403,642	9.266
		33.723

OP-005

Description	Area (SF)	Area (Ac.)
Pervious	4,839,877	111.108
Impervious	1,336,904	30.691
		141.799

OP-006

Description	Area (SF)	Area (Ac.)
Pervious	853,016	19.583
Impervious	398,568	9.150
		28.732

OP-007

Description	Area (SF)	Area (Ac.)
Pervious	2,992,678	68.702
Impervious	1,048,367	24.067
		92.770

OP-008

Description	Area (SF)	Area (Ac.)
Pervious	10,629,469	244.019
Impervious	4,119,679	94.575
		338.594

OP-009

Description	Area (SF)	Area (Ac.)
Pervious	3,177,062	72.935
Impervious	1,048,123	24.062
		96.997

OP-010

Description	Area (SF)	Area (Ac.)
Pervious	1,674,602	38.444
Impervious	653,543	15.003
		53.447

OP-011

Description	Area (SF)	Area (Ac.)
Pervious	1,148,790	26.373
Impervious	868,178	19.931
		46.303

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

OF-005

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,510,347	34.673	77	2.99	0.60	1.06	133,931.87
Impervious	C	1,497,067	34.368	98	0.20	0.04	2.76	344,114.61
		3,007,414	69.041					478,046.48

OF-006

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	68,952	1.583	77	2.99	0.60	1.06	6,114.37
Impervious	C	128,135	2.942	98	0.20	0.04	2.76	29,452.99
		197,087	4.524					35,567.36

OF-007

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	2,240,984	51.446	77	2.99	0.60	1.06	198,721.97
Impervious	C	898,210	20.620	98	0.20	0.04	2.76	206,461.85
		3,139,194	72.066					405,183.82

OF-008

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,221,740	28.047	77	2.99	0.60	1.06	108,339.25
Impervious	C	885,663	20.332	98	0.20	0.04	2.76	203,577.69
		2,107,402	48.379					311,916.95

OF-009

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,065,311	24.456	77	2.99	0.60	1.06	94,467.77
Impervious	C	403,641	9.266	98	0.20	0.04	2.76	92,780.68
		1,468,953	33.723					187,248.45

OP-005

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	4,852,308	111.394	77	2.99	0.60	1.06	430,284.33
Impervious	C	1,337,976	30.716	98	0.20	0.04	2.76	307,546.10
		6,190,284	142.109					737,830.43

OP-006

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	2,240,984	51.446	77	2.99	0.60	1.06	198,721.97
Impervious	C	898,210	20.620	98	0.20	0.04	2.76	206,461.85
		3,139,194	72.066					405,183.82

OP-007

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	3,276,185	75.211	77	2.99	0.60	1.06	290,519.68
Impervious	C	1,051,700	24.144	98	0.20	0.04	2.76	241,742.87
		4,327,885	99.355					532,262.56

OP-008

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	14,474,521	332.289	77	2.99	0.60	1.06	1,283,545.88
Impervious	C	5,008,809	114.986	98	0.20	0.04	2.76	1,151,320.86
		19,483,331	447.276					2,434,866.74

OP-009

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	3,196,028	73.371	77	2.99	0.60	1.06	283,411.69
Impervious	C	1,048,255	24.065	98	0.20	0.04	2.76	240,951.09
		4,244,283	97.435					524,362.77

OP-010

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	3,520,432	80.818	77	2.99	0.60	1.06	312,178.66
Impervious	C	776,387	17.823	98	0.20	0.04	2.76	178,459.64
		4,296,819	98.641					490,638.29

OP-011

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)
Pervious	C	1,149,752	26.395	77	2.99	0.60	1.06	101,955.65
Impervious	C	868,636	19.941	98	0.20	0.04	2.76	199,664.04
		2,018,388	46.336					301,619.69

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Base Pollutant Loading (No Existing BMPs)

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

MS4 Regulated Area Watershed Description: Little Chiques Creek

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
Drainage Area ID	Impervious	Pervious	Total	Impervious	Pervious	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
OF-005	1,497,067	1,510,347	3,007,414	34.4	34.7	69.0	1,324.20	771.12	2,095.32	53.27	12.48	65.75	50,879.3	6,620.1	57,499.4
OF-006	128,135	68,952	197,087	2.9	1.6	4.5	113.34	35.20	148.54	4.56	0.57	5.13	4,354.8	302.2	4,657.0
OF-007	186,772	681,246	868,017	4.3	15.6	19.9	165.20	347.82	513.02	6.65	5.63	12.28	6,347.6	2,986.0	9,333.6
OF-008	822,973	1,092,215	1,915,188	18.9	25.1	44.0	727.94	557.64	1,285.58	29.28	9.03	38.31	27,969.6	4,787.3	32,756.9
OF-009	403,642	1,065,311	1,468,953	9.3	24.5	33.7	357.03	543.91	900.94	14.36	8.80	23.17	13,718.2	4,669.4	18,387.6
OP-005	1,336,904	4,839,877	6,176,781	30.7	111.1	141.8	1,182.53	2,471.05	3,653.58	47.57	40.00	87.57	45,436.0	21,213.9	66,649.9
OP-006	398,568	853,016	1,251,585	9.1	19.6	28.7	352.54	435.52	788.06	14.18	7.05	21.23	13,545.7	3,738.9	17,284.6
OP-007	1,048,367	2,992,678	4,041,044	24.1	68.7	92.8	927.31	1,527.94	2,455.25	37.30	24.73	62.04	35,629.8	13,117.4	48,747.1
OP-008	4,119,679	10,629,469	14,749,148	94.6	244.0	338.6	3,643.97	5,426.98	9,070.95	146.59	87.85	234.44	140,011.4	46,590.6	186,602.0
OP-009	1,048,123	3,177,062	4,225,185	24.1	72.9	97.0	927.09	1,622.08	2,549.17	37.30	26.26	63.55	35,621.5	13,925.5	49,547.0
OP-010	653,543	1,674,602	2,328,145	15.0	38.4	53.4	578.08	854.99	1,433.06	23.26	13.84	37.09	22,211.3	7,340.0	29,551.3
OP-011	868,178	1,148,790	2,016,968	19.9	26.4	46.3	767.93	586.53	1,354.45	30.89	9.49	40.39	29,505.9	5,035.3	34,541.2
				287.2	**682.6**	**969.8**			**26,247.93**			**690.95**			**555,557.75**

Required Reduction Percent	**3%**	**5%**	**10%**
Required Reduction (Lbs/Year)	**787.44**	**34.55**	**55,555.78**
Required Reduction (Tons/Year)	0.39	0.02	27.78

ATTACHMENT G

EXISTING BMP POLLUTANT REDUCTIONS

1. Existing BMP Summary
2. UNT to Donegal Creek (Appendix E)
3. Little Chiques Creek (Appendix E)

EXISTING BMP POLLUTANT REDUCTIONS

Existing BMP Summary

Mount Joy Borough
10863.11
Existing BMP Summary

				Total Area				MS4 Regulated Area					
BMP No.	MS3	Type	Watershed	Pervious SqFt	Impervious SqFt	% Pervious	% Impervious	Pervious SqFt	Impervious SqFt	% Pervious	% Impervious	Latitude	Longitude
101	OP001	Wet Pond/ Retention Basin	UNT to Donegal Creek	1,217,902.99	294,131.49	80.55	19.45	1,044,130.59	279,200.25	78.90	21.10	40.11766993	-76.5264111
102	OF001	Wet Pond/ Retention Basin	UNT to Donegal Creek	28,083.02	50,149.32	35.90	64.10	28,083.02	50,149.32	35.90	64.10	40.11668463	-76.5271642
106	OF004	Wet Pond/ Retention Basin	UNT to Donegal Creek	50,471.93	67,141.23	42.91	57.09	50,471.93	67,141.23	42.91	57.09	40.1169695	-76.5266079
107	OF004	Dry Extended Detention Basin	UNT to Donegal Creek	25,854.89	67,905.87	27.58	72.42	25,854.89	67,905.87	27.58	72.42	40.11465548	-76.5283822
117	OP001	Wet Pond/ Retention Basin	UNT to Donegal Creek	1,323,787.48	761,062.48	63.50	36.50	1,308,061.42	758,368.81	63.30	36.70	40.11209508	-76.5311302
119	OF005	Rain Garden/Bioretention	Little Chiques Creek	1,593.06	20.57	98.73	1.27	1,593.06	20.57	98.73	1.27	40.11008171	-76.5024189
122	OP008	Dry Extended Detention Basin	Little Chiques Creek	774,494.90	597,214.35	56.46	43.54	774,494.90	597,214.35	56.46	43.54	40.11380047	-76.5166195
125	OF002	Dry Extended Detention Basin	UNT to Donegal Creek	623,681.89	716,424.57	46.54	53.46	623,681.89	601,997.54	50.88	49.12	40.1155237	-76.5305369
139	OP004	Dry Extended Detention Basin	UNT to Donegal Creek	1,138,400.83	277,193.77	80.42	19.58	198,367.91	22,124.83	89.97	10.03	40.10009933	-76.5230155
140	OP004	Dry Extended Detention Basin	UNT to Donegal Creek	332,959.72	62,920.80	84.11	15.89	242,080.11	46,207.63	83.97	16.03	40.1012621	-76.5243112
141	OP005	Dry Extended Detention Basin	Little Chiques Creek	4,487,717.48	1,663,154.25	72.96	27.04	4,487,717.48	1,663,154.25	72.96	27.04	40.10250599	-76.5177988
144	OF008	Dry Extended Detention Basin	Little Chiques Creek	28,739.61	118,142.65	19.57	80.43	28,739.61	118,142.65	19.57	80.43	40.10889715	-76.4876008
146	OP011	Dry Extended Detention Basin	Little Chiques Creek	92,720.23	127,454.87	42.11	57.89	92,720.23	127,454.87	42.11	57.89	40.11059454	-76.4739896
147	OP005	Dry Extended Detention Basin	UNT to Donegal Creek	90,771.97	66,887.49	57.57	42.43	90,771.97	66,887.49	57.57	42.43	40.10223813	-76.5215389
149	OP003	Dry Extended Detention Basin	UNT to Donegal Creek	77,048.00	114,989.21	40.12	59.88	77,048.00	114,989.21	40.12	59.88	40.10822504	-76.5237497
151	OP008	Dry Extended Detention Basin	Little Chiques Creek	40,773.65	11,268.81	78.35	21.65	40,773.65	11,268.81	78.35	21.65	40.11421972	-76.5022512
152	OP009	Dry Extended Detention Basin	Little Chiques Creek	68,867.43	103,554.74	39.94	60.06	68,867.43	103,554.74	39.94	60.06	40.10598086	-76.4956138
153	OP009	Dry Extended Detention Basin	Little Chiques Creek	95,680.31	43,096.48	68.95	31.05	95,680.31	43,096.48	68.95	31.05	40.10593462	-76.4949078
155	OF007	Dry Extended Detention Basin	Little Chiques Creek	234,125.59	95,068.49	71.12	28.88	234,125.59	95,068.49	71.12	28.88	40.11127584	-76.4888078
156	OF008	Dry Extended Detention Basin	Little Chiques Creek	136,410.90	1,440.52	98.96	1.04	136,410.90	1,440.52	98.96	1.04	40.11057845	-76.4881768
159	OP010	Dry Extended Detention Basin	Little Chiques Creek	108,586.22	146,438.66	42.58	57.42	93,635.17	146,417.22	39.01	60.99	40.11146277	-76.4771722
164	OF004	Dry Extended Detention Basin	UNT to Donegal Creek	17,997.24	35,453.63	33.67	66.33	17,997.24	35,453.63	33.67	66.33	40.11385461	-76.5288087
170	OP009	Dry Extended Detention Basin	Little Chiques Creek	201,101.94	89,829.52	69.12	30.88	201,101.94	89,829.52	69.12	30.88	40.10491817	-76.5048056
174	OP011	Dry Extended Detention Basin	Little Chiques Creek	118,768.87	128,582.29	48.02	51.98	118,768.87	128,582.29	48.02	51.98	40.10856736	-76.4735918
181	OP007	Dry Extended Detention Basin	Little Chiques Creek	1,299,105.85	444,700.35	74.50	25.50	1,049,598.65	440,157.29	70.45	29.55	40.1025514	-76.5060135
182	OP006	Dry Extended Detention Basin	Little Chiques Creek	512,060.25	361,620.10	58.61	41.39	512,060.25	361,620.10	58.61	41.39	40.10605637	-76.5136205
213	OF008	Dry Extended Detention Basin	Little Chiques Creek	14,703.49	29,091.54	33.57	66.43	14,703.49	29,091.54	33.57	66.43	40.10990163	-76.488
215	OF008	Wet Pond/ Retention Basin	Little Chiques Creek	13,185.78	51,332.69	20.44	79.56	13,185.78	51,332.69	20.44	79.56	40.10938102	-76.4870802
230	OP010	Dry Extended Detention Basin	Little Chiques Creek	1,727,336.85	526,518.50	76.64	23.36	1,550,152.29	466,075.26	76.88	23.12	40.11274563	-76.4767014
234	OP008	Dry Extended Detention Basin	Little Chiques Creek	26,371.56	31,758.29	45.37	54.63	26,371.56	31,758.29	45.37	54.63	40.11207364	-76.518841
241	OP006	Dry Extended Detention Basin	Little Chiques Creek	119,468.53	41,873.35	74.05	25.95	119,468.53	41,873.35	74.05	25.95	40.10815534	-76.5114224
242	OP007	Dry Extended Detention Basin	Little Chiques Creek	44,099.70	71,648.65	38.10	61.90	44,099.70	71,648.65	38.10	61.90	40.10804986	-76.5099115
245	OP007	Dry Extended Detention Basin	Little Chiques Creek	76,854.25	22,474.09	77.37	22.63	76,854.25	22,474.09	77.37	22.63	40.10791329	-76.5096074
246	OP008	Dry Extended Detention Basin	Little Chiques Creek	79,803.55	156,833.63	33.72	66.28	79,803.55	156,833.63	33.72	66.28	40.11049826	-76.5179641
251	OP008	Dry Extended Detention Basin	Little Chiques Creek	31,000.03	10,235.18	75.18	24.82	31,000.03	10,235.18	75.18	24.82	40.11263175	-76.5123338
253	OP008	Constructed Wetland	Little Chiques Creek	86,154.26	2,550.04	97.13	2.87	86,154.26	2,550.04	97.13	2.87	40.11354561	-76.507847
254	OP008	Constructed Wetland	Little Chiques Creek	92,117.46	14,767.50	86.18	13.82	92,117.46	14,767.50	86.18	13.82	40.11369968	-76.5068433
255	OP003	Pervious Pavement with Infiltratation Bed	UNT to Donegal Creek	462.85	888.48	34.25	65.75	462.85	888.48	34.25	65.75	40.10966385	-76.523455
256	OF004	Dry Well/Seepage Pit	UNT to Donegal Creek	11,259.04	3,086.03	78.49	21.51	11,259.04	3,086.03	78.49	21.51	40.11655315	-76.5250293

Mount Joy Borough

			Location		(Lat/Long provide decimal to 4 places)		O&M		Site Data								
									Drainage Area (acres)		BMP Information			Pollutant Reduction Calculations (LB/YR)			
Ex. BMP Number	MS3	BMP Type/Description (DEP Manual)	Municipality	Watershed	Latitude	Longitude	Activities	Frequency	Impervious (Ac.)	Pervious (Ac.)	BMP Surface area (SF)	Volume Treated (Acre ft)	2 yr. pre/post increase	TN	TP	TSS	Assumed Pollutant Reduction %
101	OP001	Wet Pond/Retention Basin	Mount Joy Borough	UNT to Donegal Creek	40.117670	-76.526411	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	6.41	23.97	50,419.00	3.60	1.69	296.42	11.70	10,830.42	See Attached
102	OF001	Wet Pond/Retention Basin	Mount Joy Borough	UNT to Donegal Creek	40.116685	-76.527164	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.15	0.64	37,479.00	0.32	0.21	22.30	1.27	1,407.15	See Attached
106	OF004	Wet Pond/Retention Basin	Mount Joy Borough	UNT to Donegal Creek	40.116970	-76.526608	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.54	1.16	8996	0.46	0.29	32.36	1.77	1,927.38	See Attached
107	OF004	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.114655	-76.528382	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.56	0.59	8,738	0.41	0.28	3.66	0.26	242.12	See Attached
117	OP001	Wet Pond/Retention Basin	Mount Joy Borough	UNT to Donegal Creek	40.112095	-76.531130	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	17.41	30.03	102,709	6.66	3.68	508.68	23.81	24,260.66	See Attached
119	OF005	Rain Garden	Mount Joy Borough	Little Chiques Creek	40.110082	-76.502419	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.00	0.04	980	0.003	0.001	0.33	0.01	5.99	See Attached
122	OP008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.113800	-76.516619	Inspect BMPs; remove sediment, trash and other debris.	At least once a year and after storm events exceeding 1 inch of rainfall.	17.78	13.71	6,362	4.728	2.748	46.18	2.77	2,369.17	See Attached
125	OF002	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.115524	-76.530537	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	16.39	11.75	62,850	4.81	3.04	44.64	2.96	2,651.06	See Attached
1391	OP004	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.100099	-76.523016	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.51	4.55	10,069	0.52	0.2	6.04	0.24	162.14	See Attached
140	OP004	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.101262	-76.524311	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	5.56	1.06	57,057	0.74	0.32	8.22	0.36	263.15	See Attached
141	OP005	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.102506	-76.517799	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	38.18	103.02	227,907	17.912	9.032	188.12	9.63	7,619.43	See Attached
144	OF008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.108897	-76.487601	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.71	0.66	1,432	0.682	0.47	5.96	0.44	414.12	See Attached
146	OP011	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.110595	-76.473990	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.93	2.13	26,128	0.861	0.543	8.00	0.53	473.81	See Attached
147	OP005	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.102238	-76.521539	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.08	1.54	10,824	0.54	0.31	5.28	0.31	267.11	See Attached
149	OP003	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.108225	-76.523750	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.77	2.64	11,336	0.76	0.49	7.05	0.47	424.57	See Attached
151	OP008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.114220	-76.502251	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.259	0.94	4,652	0.142	0.067	1.54	0.07	56.17	See Attached
152	OP009	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.105981	-76.495614	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.38	1.58	13,072	0.687	0.438	6.34	0.43	382.13	See Attached
153	OP009	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.105935	-76.494908	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.99	2.20	11,388	0.222	0.422	4.35	0.23	188.41	See Attached
155	OF007	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.111276	-76.488808	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.18	5.38	17,812	0.978	0.503	10.18	0.53	425.72	See Attached
156	OF008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.110578	-76.488177	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.03	3.13	22,569	0.285	0.086	3.55	0.12	64.69	See Attached
159	OP010	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.111463	-76.477172	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	3.36	2.15	22,161	0.963	0.617	8.87	0.60	538.66	See Attached
164	OF004	Dry Extended Detention Basin	Mount Joy Borough	UNT to Donegal Creek	40.113855	-76.528809	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.81	0.41	6,267	0.22	0.15	2.03	0.14	128.38	See Attached
170	OP009	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.104918	-76.504806	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	4.62	2.06	31,571	0.883	0.463	9.11	0.49	393.44	See Attached
174	OP011	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.108567	-76.473592	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	2.95	2.73	58,376	0.92	0.563	8.72	0.56	489.06	See Attached
181	OP007	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.102551	-76.506014	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	10.11	24.10	32,560	4.459	2.309	46.26	2.43	1,955.97	See Attached
182	OP006	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.106056	-76.513620	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	8.30	11.76	39,600	2.951	1.689	29.07	1.71	1,453.45	See Attached
213	OF008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.109902	-76.488000	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.34	0.67	5,815	0.183	0.12	1.66	0.12	105.32	See Attached
215	OF008	Wet Pond	Mount Joy Borough	Little Chiques Creek	40.109381	-76.487080	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.18	0.30	4,184	0.298	0.205	19.81	1.18	1,369.81	See Attached
230	OP010	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.112746	-76.476701	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	10.70	35.59	191,493	5.615	2.704	60.19	2.94	2,263.46	See Attached
234	OP008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.112074	-76.518841	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.61	0.73	7,065	0.221	0.137	2.08	0.13	119.49	See Attached
241	OP006	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.108155	-76.511422	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.96	2.74	3,194	0.464	0.231	4.90	0.25	194.68	See Attached
242	OP007	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.108050	-76.509912	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	1.65	1.01	5,737	0.468	0.301	4.29	0.29	262.83	See Attached
245	OP007	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.107913	-76.509607	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.52	1.76	10,546	0.132	0.275	2.96	0.14	110.07	See Attached
246	OP008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.110498	-76.517964	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	3.60	1.83	20,104	0.648	0.99	8.97	0.62	567.99	See Attached
251	OP008	Dry Detention Basin	Mount Joy Borough	Little Chiques Creek	40.112632	-76.512334	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.24	0.71	1,006	0.117	0.058	1.24	0.06	48.37	See Attached
253	OP008	Constructed Wetland	Mount Joy Borough	Little Chiques Creek	40.113546	-76.507847	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.059	1.98	3,472	0.061	0.189	18.50	0.51	362.15	See Attached
254	OP008	Constructed Wetland	Mount Joy Borough	Little Chiques Creek	40.113700	-76.506843	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.34	2.12	2,612	0.265	0.111	24.04	0.81	706.41	See Attached
255	OP003	Pervious Pavement/Infiltration Facility	Mount Joy Borough	UNT to Donegal Creek	40.109664	-76.523455	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.02	0.01	937	0.01	0.004	0.10	0.01	17.72	See Attached
256	OF004	Infiltration Facility - Dry Well/Seepage Pit	Mount Joy Borough	UNT to Donegal Creek	40.116553	-76.525029	Inspect BMPs; remove sediment, trash and other debris; vacum sweep.	At least once a year and after storm events exceeding 1 inch of rainfall.	0.07	0.26	2,413	0.76	0.49	5.60	0.16	131.10	See Attached
TOTAL:									172.24	303.63				1,467.60	71.06	65,653.76	

EXISTING BMP POLLUTANT REDUCTIONS

UNT to Donegal Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 101	**Wet Pond/Retention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,323,331	30.379	71	4.08	0.82	0.75	83,221.94	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,323,331	30.379					83,221.94	1.91
Post-Development									
Pervious	C	1,044,131	23.970	77	2.99	0.60	1.06	92,589.56	
Impervious	C	279,200	6.410	98	0.20	0.04	2.76	64,176.75	
		1,323,331	30.379					156,766.30	3.60
						Net Increase:		73,544.36	1.69
BMP 102	**Wet Pond/Retention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	78,232	1.796	71	4.08	0.82	0.75	4,919.89	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		78,232	1.796					4,919.89	0.11
Post-Development									
Pervious	C	28,083	0.645	77	2.99	0.60	1.06	2,490.30	
Impervious	C	50,149	1.151	98	0.20	0.04	2.76	11,527.28	
		78,232	1.796					14,017.58	0.32
						Net Increase:		9,097.68	0.21

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 106	**Wet Pond/Retention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	117,613	2.700	71	4.08	0.82	0.75	7,396.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		117,613	2.700					7,396.48	0.17
Post-Development									
Pervious	C	50,472	1.159	77	2.99	0.60	1.06	4,475.66	
Impervious	C	67,141	1.541	98	0.20	0.04	2.76	15,433.03	
		117,613	2.700					19,908.69	0.46
						Net Increase:		12,512.20	0.29
BMP 107	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	93,761	2.152	71	4.08	0.82	0.75	5,896.45	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		93,761	2.152					5,896.45	0.14
Post-Development									
Pervious	C	25,855	0.594	77	2.99	0.60	1.06	2,292.71	
Impervious	C	67,906	1.559	98	0.20	0.04	2.76	15,608.79	
		93,761	2.152					17,901.50	0.41
						Net Increase:		12,005.05	0.28

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 117	**Wet Pond/Retention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	2,066,430	47.439	71	4.08	0.82	0.75	129,954.16	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		2,066,430	47.439					129,954.16	2.98
Post-Development									
Pervious	C	1,308,061	30.029	77	2.99	0.60	1.06	115,993.95	
Impervious	C	758,369	17.410	98	0.20	0.04	2.76	174,318.05	
		2,066,430	47.439					290,311.99	6.66
						Net Increase:		160,357.83	3.68
BMP 125	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,225,679	28.138	71	4.08	0.82	0.75	77,080.82	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,225,679	28.138					77,080.82	1.77
Post-Development									
Pervious	C	511,619	11.745	77	2.99	0.60	1.06	45,368.43	
Impervious	C	714,061	16.393	98	0.20	0.04	2.76	164,133.37	
		1,225,679	28.138					209,501.81	4.81
						Net Increase:		132,420.99	3.04

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 139	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	220,493	5.062	71	4.08	0.82	0.75	13,866.40	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		220,493	5.062					13,866.40	0.32
Post-Development									
Pervious	C	198,368	4.554	77	2.99	0.60	1.06	17,590.52	
Impervious	C	22,125	0.508	98	0.20	0.04	2.76	5,085.60	
		220,493	5.062					22,676.11	0.52
						Net Increase:		8,809.71	0.20
BMP 140	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	288,288	6.618	71	4.08	0.82	0.75	18,129.91	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		288,288	6.618					18,129.91	0.42
Post-Development									
Pervious	C	242,080	5.557	77	2.99	0.60	1.06	21,466.75	
Impervious	C	46,208	1.061	98	0.20	0.04	2.76	10,621.25	
		288,288	6.618					32,088.00	0.74
						Net Increase:		13,958.09	0.32

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 147	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	157,659	3.619	71	4.08	0.82	0.75	9,914.93	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		157,659	3.619					9,914.93	0.23
Post-Development									
Pervious	C	90,772	2.084	77	2.99	0.60	1.06	8,049.32	
Impervious	C	66,887	1.536	98	0.20	0.04	2.76	15,374.70	
		157,659	3.619					23,424.02	0.54
						Net Increase:		13,509.09	0.31
BMP 149	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	192,037	4.409	71	4.08	0.82	0.75	12,076.88	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		192,037	4.409					12,076.88	0.28
Post-Development									
Pervious	C	77,048	1.769	77	2.99	0.60	1.06	6,832.33	
Impervious	C	114,989	2.640	98	0.20	0.04	2.76	26,431.33	
		192,037	4.409					33,263.65	0.76
						Net Increase:		21,186.77	0.49
BMP 164	**Dry Extended Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	53,451	1.227	71	4.08	0.82	0.75	3,361.43	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		53,451	1.227					3,361.43	0.08
Post-Development									
Pervious	C	17,997	0.413	77	2.99	0.60	1.06	1,595.93	
Impervious	C	35,454	0.814	98	0.20	0.04	2.76	8,149.34	
		53,451	1.227					9,745.27	0.22
						Net Increase:		6,383.84	0.15

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Unnamed Tributary to Donegal Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 255	**Pervious Pavement/Infiltration Facility**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,351	0.031	71	4.08	0.82	0.75	84.98	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,351	0.031					84.98	0.00
Post-Development									
Pervious	C	463	0.011	77	2.99	0.60	1.06	41.04	
Impervious	C	888	0.020	98	0.20	0.04	2.76	204.23	
		1,351	0.031					245.27	0.01
						Net Increase:		160.29	0.00
BMP 256	**Infiltration Facility - Dry Well/Seepage Pit**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	14,345	0.329	71	4.08	0.82	0.75	902.14	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		14,345	0.329					902.14	0.02
Post-Development									
Pervious	C	11,259	0.258	77	2.99	0.60	1.06	998.41	
Impervious	C	3,086	0.071	98	0.20	0.04	2.76	709.35	
		14,345	0.329					1,707.76	0.04
						Net Increase:		805.63	0.02

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Expert Panel Pollutant Reduction Efficiency Calculations:
Unnamed Tributary to Donegal Creek
x = (12 x Ep)/IA
Ep = Post - Predevelopment volume increase
IA = Impervious Area (Ac)

					Pollutant % Removal - RR			Pollutant % Removal - ST		
BMP ID	**BMP Description**	**EP**	**IA**	**x**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
BMP 101	Wet Pond/Retention Basin	1.69	6.410	3.16				38%	63%	77%
BMP 102	Wet Pond/Retention Basin	0.21	1.151	2.18				38%	63%	77%
BMP 106	Wet Pond/Retention Basin	0.29	1.541	2.24				38%	63%	77%
BMP 107	Dry Extended Detention Basin	0.28	1.559	2.12	5%	10%	10%			
BMP 117	Wet Pond/Retention Basin	3.68	17.410	2.54				38%	63%	77%
BMP 125	Dry Extended Detention Basin	3.04	16.393	2.23	5%	10%	10%			
BMP 139	Dry Extended Detention Basin	0.20	0.508	4.78	5%	10%	10%			
BMP 140	Dry Extended Detention Basin	0.32	1.061	3.62	5%	10%	10%			
BMP 147	Dry Extended Detention Basin	0.31	1.536	2.42	5%	10%	10%			
BMP 149	Dry Extended Detention Basin	0.49	2.640	2.21	5%	10%	10%			
BMP 164	Dry Extended Detention Basin	0.15	0.814	2.16	5%	10%	10%			
BMP 255	Pervious Pavement/Infiltration Facility	0.00	0.020	2.16	10%	20%	55%			
BMP 256	Infiltration Facility - Dry Well/Seepage Pit	0.02	0.071	3.13	66%	80%	85%			

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMP Pollutant Reduction

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

Unnamed Tributary to Donegal Creek

OP-001

BMP 101 Wet Pond/Retention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 101	279,200	1,044,131	1,323,331	6.4	24.0	30.4	246.96	533.09	**780.05**	9.93	8.63	**18.56**	9,488.9	4,576.6	**14,065.5**
Expert Panel Performance Standards									38%			63%			77%
Pollutant Reduction									**296.42**			**11.70**			**10,830.42**

OF-001

BMP 102 Wet Pond/Retention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 102	50,149	28,083	78,232	1.2	0.6	1.8	44.36	14.34	**58.70**	1.78	0.23	**2.02**	1,704.4	123.1	**1,827.5**
Expert Panel Performance Standards									38%			63%			77%
Pollutant Reduction									**22.30**			**1.27**			**1,407.15**

OF-004

BMP 106 Wet Pond/Retention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 106	67,141	50,472	117,613	1.5	1.2	2.7	59.39	25.77	**85.16**	2.39	0.42	**2.81**	2,281.9	221.2	**2,503.1**
Expert Panel Performance Standards									38%			63%			77%
Pollutant Reduction									**32.36**			**1.77**			**1,927.38**

OF-004

BMP 107 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 107	67,906	25,855	93,761	1.6	0.6	2.2	60.06	13.20	**73.27**	2.42	0.21	**2.63**	2,307.8	113.3	**2,421.2**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**3.66**			**0.26**			**242.12**

OP-001

BMP 117 Wet Pond/Retention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 117	758,369	1,308,061	2,066,430	17.4	30.0	47.4	670.80	667.84	**1,338.64**	26.99	10.81	**37.80**	25,773.9	5,733.4	**31,507.3**
Expert Panel Performance Standards									38%			63%			77%
Pollutant Reduction									**508.68**			**23.81**			**24,260.66**

OF-002

BMP 125 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 125	714,061	511,619	1,225,679	16.4	11.7	28.1	631.61	261.21	**892.82**	25.41	4.23	**29.64**	24,268.1	2,242.5	**26,510.6**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**44.64**			**2.96**			**2,651.06**

OP-004

BMP 139 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 139	22,125	198,368	220,493	0.5	4.6	5.1	19.57	101.28	**120.85**	0.79	1.64	**2.43**	751.9	869.5	**1,621.4**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**6.04**			**0.24**			**162.14**

OP-004

BMP 140 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 140	46,208	242,080	288,288	1.1	5.6	6.6	40.87	123.60	**164.47**	1.64	2.00	**3.64**	1,570.4	1,061.1	**2,631.5**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**8.22**			**0.36**			**263.15**

OP-005

BMP 147 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 147	66,887	90,772	157,659	1.5	2.1	3.6	59.16	46.34	**105.51**	2.38	0.75	**3.13**	2,273.2	397.9	**2,671.1**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**5.28**			**0.31**			**267.11**

OP-003

BMP 149 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 149	114,989	77,048	192,037	2.6	1.8	4.4	101.71	39.34	**141.05**	4.09	0.64	**4.73**	3,908.0	337.7	**4,245.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**7.05**			**0.47**			**424.57**

OF-004

BMP 164 Dry Extended Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 164	35,454	17,997	53,451	0.8	0.4	1.2	31.36	9.19	**40.55**	1.26	0.15	**1.41**	1,204.9	78.9	**1,283.8**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**2.03**			**0.14**			**128.38**

OP-003

BMP 255 Pervious Pavement/Infiltration Facility

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 255	888	463	1,351	0.0	0.0	0.0	0.79	0.24	**1.02**	0.03	0.00	**0.04**	30.2	2.0	**32.2**
Expert Panel Performance Standards									10%			20%			55%
Pollutant Reduction									**0.10**			**0.01**			**17.72**

OF-004

BMP 256 Infiltration Facility - Dry Well/Seepage Pit

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 256	3,086	11,259	14,345	0.1	0.3	0.3	2.73	5.75	**8.48**	0.11	0.09	**0.20**	104.9	49.4	**154.2**
Expert Panel Performance Standards									66%			80%			85%
Pollutant Reduction									**5.60**			**0.16**			**131.10**

EXISTING BMP POLLUTANT REDUCTIONS

Little Chiques Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 119	**Rain Garden**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,614	0.037	71	4.08	0.82	0.75	101.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,614	0.037					101.48	0.00
Post-Development									
Pervious	C	1,593	0.037	77	2.99	0.60	1.06	141.27	
Impervious	C	21	0.000	98	0.20	0.04	2.76	4.73	
		1,614	0.037					145.99	0.00
						Net Increase:		44.52	0.00
BMP 122	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,371,709	31.490	71	4.08	0.82	0.75	86,264.38	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,371,709	31.490					86,264.38	1.98
Post-Development									
Pervious	C	774,495	17.780	77	2.99	0.60	1.06	68,679.28	
Impervious	C	597,214	13.710	98	0.20	0.04	2.76	137,275.21	
		1,371,709	31.490					205,954.49	4.73
						Net Increase:		119,690.12	2.75

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 141	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	6,150,872	141.205	71	4.08	0.82	0.75	386,817.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		6,150,872	141.205					386,817.48	8.88
Post-Development									
Pervious	C	4,487,717	103.024	77	2.99	0.60	1.06	397,953.83	
Impervious	C	1,663,154	38.181	98	0.20	0.04	2.76	382,291.30	
		6,150,872	141.205					780,245.13	17.91
						Net Increase:		393,427.65	9.03
BMP 144	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	146,882	3.372	71	4.08	0.82	0.75	9,237.17	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		146,882	3.372					9,237.17	0.21
Post-Development									
Pervious	C	28,740	0.660	77	2.99	0.60	1.06	2,548.52	
Impervious	C	118,143	2.712	98	0.20	0.04	2.76	27,156.17	
		146,882	3.372					29,704.69	0.68
						Net Increase:		20,467.53	0.47

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 146	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	220,175	5.055	71	4.08	0.82	0.75	13,846.42	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		220,175	5.055					13,846.42	0.32
Post-Development									
Pervious	C	92,720	2.129	77	2.99	0.60	1.06	8,222.08	
Impervious	C	127,455	2.926	98	0.20	0.04	2.76	29,296.67	
		220,175	5.055					37,518.75	0.86
						Net Increase:		23,672.33	0.54
BMP 151	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	52,042	1.195	71	4.08	0.82	0.75	3,272.86	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		52,042	1.195					3,272.86	0.08
Post-Development									
Pervious	C	40,774	0.936	77	2.99	0.60	1.06	3,615.65	
Impervious	C	11,269	0.259	98	0.20	0.04	2.76	2,590.24	
		52,042	1.195					6,205.89	0.14
						Net Increase:		2,933.03	0.07

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 152	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	172,422	3.958	71	4.08	0.82	0.75	10,843.33	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		172,422	3.958					10,843.33	0.25
Post-Development									
Pervious	C	68,867	1.581	77	2.99	0.60	1.06	6,106.90	
Impervious	C	103,555	2.377	98	0.20	0.04	2.76	23,803.01	
		172,422	3.958					29,909.91	0.69
						Net Increase:		19,066.59	0.44
BMP 153	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	138,777	3.186	71	4.08	0.82	0.75	8,727.43	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		138,777	3.186					8,727.43	0.20
Post-Development									
Pervious	C	95,680	2.197	77	2.99	0.60	1.06	8,484.57	
Impervious	C	43,096	0.989	98	0.20	0.04	2.76	9,906.12	
		138,777	3.186					18,390.69	0.42
						Net Increase:		9,663.26	0.22

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 155	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	329,194	7.557	71	4.08	0.82	0.75	20,702.44	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		329,194	7.557					20,702.44	0.48
Post-Development									
Pervious	C	234,126	5.375	77	2.99	0.60	1.06	20,761.37	
Impervious	C	95,068	2.182	98	0.20	0.04	2.76	21,852.37	
		329,194	7.557					42,613.74	0.98
						Net Increase:		21,911.30	0.50
BMP 156	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	137,851	3.165	71	4.08	0.82	0.75	8,669.23	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		137,851	3.165					8,669.23	0.20
Post-Development									
Pervious	C	136,411	3.132	77	2.99	0.60	1.06	12,096.40	
Impervious	C	1,441	0.033	98	0.20	0.04	2.76	331.12	
		137,851	3.165					12,427.52	0.29
						Net Increase:		3,758.29	0.09
BMP 159	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	240,052	5.511	71	4.08	0.82	0.75	15,096.47	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		240,052	5.511					15,096.47	0.35
Post-Development									
Pervious	C	93,635	2.150	77	2.99	0.60	1.06	8,303.21	
Impervious	C	146,417	3.361	98	0.20	0.04	2.76	33,655.34	
		240,052	5.511					41,958.56	0.96
						Net Increase:		26,862.09	0.62

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 170	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	290,931	6.679	71	4.08	0.82	0.75	18,296.17	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		290,931	6.679					18,296.17	0.42
Post-Development									
Pervious	C	201,102	4.617	77	2.99	0.60	1.06	17,832.96	
Impervious	C	89,830	2.062	98	0.20	0.04	2.76	20,648.14	
		290,931	6.679					38,481.10	0.88
						Net Increase:		20,184.93	0.46
BMP 174	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	247,351	5.678	71	4.08	0.82	0.75	15,555.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		247,351	5.678					15,555.48	0.36
Post-Development									
Pervious	C	118,769	2.727	77	2.99	0.60	1.06	10,531.97	
Impervious	C	128,582	2.952	98	0.20	0.04	2.76	29,555.82	
		247,351	5.678					40,087.80	0.92
						Net Increase:		24,532.32	0.56
BMP 181	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,489,756	34.200	71	4.08	0.82	0.75	93,688.13	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,489,756	34.200					93,688.13	2.15
Post-Development									
Pervious	C	1,049,599	24.095	77	2.99	0.60	1.06	93,074.44	
Impervious	C	440,157	10.105	98	0.20	0.04	2.76	101,174.20	
		1,489,756	34.200					194,248.64	4.46
						Net Increase:		100,560.52	2.31

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 182	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	873,680	20.057	71	4.08	0.82	0.75	54,944.22	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		873,680	20.057					54,944.22	1.26
Post-Development									
Pervious	C	512,060	11.755	77	2.99	0.60	1.06	45,407.57	
Impervious	C	361,620	8.302	98	0.20	0.04	2.76	83,121.71	
		873,680	20.057					128,529.27	2.95
						Net Increase:		73,585.06	1.69
BMP 213	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	43,795	1.005	71	4.08	0.82	0.75	2,754.19	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		43,795	1.005					2,754.19	0.06
Post-Development									
Pervious	C	14,703	0.338	77	2.99	0.60	1.06	1,303.85	
Impervious	C	29,092	0.668	98	0.20	0.04	2.76	6,686.96	
		43,795	1.005					7,990.81	0.18
						Net Increase:		5,236.62	0.12

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 215	**Wet Pond**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	64,518	1.481	71	4.08	0.82	0.75	4,057.45	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		64,518	1.481					4,057.45	0.09
Post-Development									
Pervious	C	13,186	0.303	77	2.99	0.60	1.06	1,169.27	
Impervious	C	51,333	1.178	98	0.20	0.04	2.76	11,799.29	
		64,518	1.481					12,968.56	0.30
						Net Increase:		8,911.10	0.20
BMP 230	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	2,016,228	46.286	71	4.08	0.82	0.75	126,797.00	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		2,016,228	46.286					126,797.00	2.91
Post-Development									
Pervious	C	1,550,152	35.587	77	2.99	0.60	1.06	137,461.65	
Impervious	C	466,075	10.700	98	0.20	0.04	2.76	107,131.68	
		2,016,228	46.286					244,593.33	5.62
						Net Increase:		117,796.34	2.70
BMP 234	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	58,130	1.334	71	4.08	0.82	0.75	3,655.68	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		58,130	1.334					3,655.68	0.08
Post-Development									
Pervious	C	26,372	0.605	77	2.99	0.60	1.06	2,338.53	
Impervious	C	31,758	0.729	98	0.20	0.04	2.76	7,299.94	
		58,130	1.334					9,638.47	0.22
						Net Increase:		5,982.78	0.14

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 241	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	161,342	3.704	71	4.08	0.82	0.75	10,146.51	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		161,342	3.704					10,146.51	0.23
Post-Development									
Pervious	C	119,469	2.743	77	2.99	0.60	1.06	10,594.02	
Impervious	C	41,873	0.961	98	0.20	0.04	2.76	9,624.97	
		161,342	3.704					20,218.99	0.46
						Net Increase:		10,072.49	0.23
BMP 242	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	115,748	2.657	71	4.08	0.82	0.75	7,279.21	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		115,748	2.657					7,279.21	0.17
Post-Development									
Pervious	C	44,100	1.012	77	2.99	0.60	1.06	3,910.59	
Impervious	C	71,649	1.645	98	0.20	0.04	2.76	16,469.10	
		115,748	2.657					20,379.70	0.47
						Net Increase:		13,100.49	0.30
BMP 245	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	99,328	2.280	71	4.08	0.82	0.75	6,246.58	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		99,328	2.280					6,246.58	0.14
Post-Development									
Pervious	C	76,854	1.764	77	2.99	0.60	1.06	6,815.14	
Impervious	C	22,474	0.516	98	0.20	0.04	2.76	5,165.88	
		99,328	2.280					11,981.02	0.28
						Net Increase:		5,734.44	0.13

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 246	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	236,637	5.432	71	4.08	0.82	0.75	14,881.70	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		236,637	5.432					14,881.70	0.34
Post-Development									
Pervious	C	79,804	1.832	77	2.99	0.60	1.06	7,076.68	
Impervious	C	156,834	3.600	98	0.20	0.04	2.76	36,049.65	
		236,637	5.432					43,126.33	0.99
						Net Increase:		28,244.63	0.65
BMP 251	**Dry Detention Basin**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	41,235	0.947	71	4.08	0.82	0.75	2,593.21	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		41,235	0.947					2,593.21	0.06
Post-Development									
Pervious	C	31,000	0.712	77	2.99	0.60	1.06	2,748.97	
Impervious	C	10,235	0.235	98	0.20	0.04	2.76	2,352.65	
		41,235	0.947					5,101.62	0.12
						Net Increase:		2,508.41	0.06
BMP 253	**Constructed Wetland**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	88,704	2.036	71	4.08	0.82	0.75	5,578.46	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		88,704	2.036					5,578.46	0.13
Post-Development									
Pervious	C	86,154	1.978	77	2.99	0.60	1.06	7,639.83	
Impervious	C	2,550	0.059	98	0.20	0.04	2.76	586.15	
		88,704	2.036					8,225.98	0.19
						Net Increase:		2,647.53	0.06

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMPs

Worksheet 4:
Drainage Area: Little Chiques Creek
2-year Rainfall: 2.99 in

Existing BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 254	**Constructed Wetland**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	106,885	2.454	71	4.08	0.82	0.75	6,721.81	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		106,885	2.454					6,721.81	0.15
Post-Development									
Pervious	C	92,117	2.115	77	2.99	0.60	1.06	8,168.63	
Impervious	C	14,768	0.339	98	0.20	0.04	2.76	3,394.45	
		106,885	2.454					11,563.07	0.27
						Net Increase:		4,841.27	0.11

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Expert Panel Pollutant Reduction Efficiency Calculations:
Little Chiques Creek
x = (12 x Ep)/IA
Ep = Post - Predevelopment volume increase
IA = Impervious Area (Ac)

					Pollutant % Removal - RR			Pollutant % Removal - ST		
BMP ID	**BMP Description**	**EP**	**IA**	**x**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
BMP 119	Rain Garden	0.00	0.000	25.97				40%	63%	78%
BMP 122	Dry Detention Basin	2.75	13.710	2.40	5%	10%	10%			
BMP 141	Dry Detention Basin	9.03	38.181	2.84	5%	10%	10%			
BMP 144	Dry Detention Basin	0.47	2.712	2.08	5%	10%	10%			
BMP 146	Dry Detention Basin	0.54	2.926	2.23	5%	10%	10%			
BMP 151	Dry Detention Basin	0.07	0.259	3.12	5%	10%	10%			
BMP 152	Dry Detention Basin	0.44	2.377	2.21	5%	10%	10%			
BMP 153	Dry Detention Basin	0.22	0.989	2.69	5%	10%	10%			
BMP 155	Dry Detention Basin	0.50	2.182	2.77	5%	10%	10%			
BMP 156	Dry Detention Basin	0.09	0.033	31.31	5%	10%	10%			
BMP 159	Dry Detention Basin	0.62	3.361	2.20	5%	10%	10%			
BMP 170	Dry Detention Basin	0.46	2.062	2.70	5%	10%	10%			
BMP 174	Dry Detention Basin	0.56	2.952	2.29	5%	10%	10%			
BMP 181	Dry Detention Basin	2.31	10.105	2.74	5%	10%	10%			
BMP 182	Dry Detention Basin	1.69	8.302	2.44	5%	10%	10%			
BMP 213	Dry Detention Basin	0.12	0.668	2.16	5%	10%	10%			
BMP 215	Wet Pond	0.20	1.178	2.08				38%	61%	76%
BMP 230	Dry Detention Basin	2.70	10.700	3.03	5%	10%	10%			
BMP 234	Dry Detention Basin	0.14	0.729	2.26	5%	10%	10%			
BMP 241	Dry Detention Basin	0.23	0.961	2.89	5%	10%	10%			
BMP 242	Dry Detention Basin	0.30	1.645	2.19	5%	10%	10%			
BMP 245	Dry Detention Basin	0.13	0.516	3.06	5%	10%	10%			
BMP 246	Dry Detention Basin	0.65	3.600	2.16	5%	10%	10%			
BMP 251	Dry Detention Basin	0.06	0.235	2.94	5%	10%	10%			
BMP 253	Constructed Wetland	0.06	0.059	12.46				40%	63%	78%
BMP 254	Constructed Wetland	0.11	0.339	3.93				40%	63%	78%

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Existing BMP Pollutant Reduction

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

Little Chiques Creek

OF-005

BMP 119 Rain Garden

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 119	21	1,593	1,614	0.0	0.0	0.0	0.02	0.81	**0.83**	0.00	0.01	**0.01**	0.7	7.0	**7.7**
Expert Panel Performance Standards									40%			63%			78%
Pollutant Reduction									**0.33**			**0.01**			**5.99**

OP-008

BMP 122 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 122	597,214	774,495	1,371,709	13.7	17.8	31.5	528.25	395.43	**923.68**	21.25	6.40	**27.65**	20,296.9	3,394.7	**23,691.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**46.18**			**2.77**			**2,369.17**

OP-005

BMP 141 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 141	1,663,154	4,487,717	6,150,872	38.2	103.0	141.2	1,471.10	2,291.25	**3,762.35**	59.18	37.09	**96.27**	56,524.0	19,670.3	**76,194.3**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**188.12**			**9.63**			**7,619.43**

OF-008

BMP 144 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 144	118,143	28,740	146,882	2.7	0.7	3.4	104.50	14.67	**119.17**	4.20	0.24	**4.44**	4,015.2	126.0	**4,141.2**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**5.96**			**0.44**			**414.12**

OP-011

BMP 146 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 146	127,455	92,720	220,175	2.9	2.1	5.1	112.74	47.34	**160.08**	4.54	0.77	**5.30**	4,331.7	406.4	**4,738.1**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**8.00**			**0.53**			**473.81**

OP-008

BMP 151 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 151	11,269	40,774	52,042	0.3	0.9	1.2	9.97	20.82	**30.78**	0.40	0.34	**0.74**	383.0	178.7	**561.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**1.54**			**0.07**			**56.17**

OP-009

BMP 152 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 152	103,555	68,867	172,422	2.4	1.6	4.0	91.60	35.16	**126.76**	3.68	0.57	**4.25**	3,519.4	301.9	**3,821.3**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**6.34**			**0.43**			**382.13**

OP-009

BMP 153 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 153	43,096	95,680	138,777	1.0	2.2	3.2	38.12	48.85	**86.97**	1.53	0.79	**2.32**	1,464.7	419.4	**1,884.1**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**4.35**			**0.23**			**188.41**

OF-007

BMP 155 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 155	95,068	234,126	329,194	2.2	5.4	7.6	84.09	119.54	**203.63**	3.38	1.93	**5.32**	3,231.0	1,026.2	**4,257.2**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**10.18**			**0.53**			**425.72**

OF-008

BMP 156 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 156	1,441	136,411	137,851	0.0	3.1	3.2	1.27	69.65	**70.92**	0.05	1.13	**1.18**	49.0	597.9	**646.9**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**3.55**			**0.12**			**64.69**

OP-010

BMP 159 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 159	146,417	93,635	240,052	3.4	2.1	5.5	129.51	47.81	**177.32**	5.21	0.77	**5.98**	4,976.1	410.4	**5,386.6**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**8.87**			**0.60**			**538.66**

OP-009

BMP 170 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 170	89,830	201,102	290,931	2.1	4.6	6.7	79.46	102.67	**182.13**	3.20	1.66	**4.86**	3,052.9	881.5	**3,934.4**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**9.11**			**0.49**			**393.44**

OP-011

BMP 174 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 174	128,582	118,769	247,351	3.0	2.7	5.7	113.73	60.64	**174.37**	4.58	0.98	**5.56**	4,370.0	520.6	**4,890.6**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**8.72**			**0.56**			**489.06**

OP-007

BMP 181 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 181	440,157	1,049,599	1,489,756	10.1	24.1	34.2	389.33	535.88	**925.21**	15.66	8.67	**24.34**	14,959.2	4,600.5	**19,559.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**46.26**			**2.43**			**1,955.97**

OP-006

BMP 182 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 182	361,620	512,060	873,680	8.3	11.8	20.1	319.86	261.44	**581.30**	12.87	4.23	**17.10**	12,290.0	2,244.4	**14,534.5**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**29.07**			**1.71**			**1,453.45**

OF-008

BMP 213 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 213	29,092	14,703	43,795	0.7	0.3	1.0	25.73	7.51	**33.24**	1.04	0.12	**1.16**	988.7	64.4	**1,053.2**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**1.66**			**0.12**			**105.32**

OF-008

BMP 215 Wet Pond

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 215	51,333	13,186	64,518	1.2	0.3	1.5	45.41	6.73	**52.14**	1.83	0.11	**1.94**	1,744.6	57.8	**1,802.4**
Expert Panel Performance Standards									38%			61%			76%
Pollutant Reduction									**19.81**			**1.18**			**1,369.81**

OP-010

BMP 230 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 230	466,075	1,550,152	2,016,228	10.7	35.6	46.3	412.26	791.45	**1,203.70**	16.58	12.81	**29.40**	15,840.0	6,794.5	**22,634.6**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**60.19**			**2.94**			**2,263.46**

OP-008

BMP 234 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 234	31,758	26,372	58,130	0.7	0.6	1.3	28.09	13.46	**41.56**	1.13	0.22	**1.35**	1,079.3	115.6	**1,194.9**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**2.08**			**0.13**			**119.49**

OP-006

BMP 241 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 241	41,873	119,469	161,342	1.0	2.7	3.7	37.04	61.00	**98.03**	1.49	0.99	**2.48**	1,423.1	523.6	**1,946.8**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**4.90**			**0.25**			**194.68**

OP-007

BMP 242 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 242	71,649	44,100	115,748	1.6	1.0	2.7	63.38	22.52	**85.89**	2.55	0.36	**2.91**	2,435.1	193.3	**2,628.3**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**4.29**			**0.29**			**262.83**

OP-007

BMP 245 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 245	22,474	76,854	99,328	0.5	1.8	2.3	19.88	39.24	**59.12**	0.80	0.64	**1.43**	763.8	336.9	**1,100.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**2.96**			**0.14**			**110.07**

OP-008

BMP 246 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 246	156,834	79,804	236,637	3.6	1.8	5.4	138.72	40.74	**179.47**	5.58	0.66	**6.24**	5,330.1	349.8	**5,679.9**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**8.97**			**0.62**			**567.99**

OP-008

BMP 251 Dry Detention Basin

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 251	10,235	31,000	41,235	0.2	0.7	0.9	9.05	15.83	**24.88**	0.36	0.26	**0.62**	347.9	135.9	**483.7**
Expert Panel Performance Standards									5%			10%			10%
Pollutant Reduction									**1.24**			**0.06**			**48.37**

OP-008

BMP 253 Constructed Wetland

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 253	2,550	86,154	88,704	0.1	2.0	2.0	2.26	43.99	**46.24**	0.09	0.71	**0.80**	86.7	377.6	**464.3**
Expert Panel Performance Standards									40%			63%			78%
Pollutant Reduction									**18.50**			**0.51**			**362.15**

OP-008

BMP 254 Constructed Wetland

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 254	14,768	92,117	106,885	0.3	2.1	2.5	13.06	47.03	**60.09**	0.53	0.76	**1.29**	501.9	403.8	**905.7**
Expert Panel Performance Standards									40%			63%			78%
Pollutant Reduction									**24.04**			**0.81**			**706.41**

ATTACHMENT H

EXISTING LOADING WITH BMPs FOR POLLUTANTS OF CONCERN

1. Aggregated Recap, Chesapeake Bay (Appendix D)
2. UNT to Donegal Creek (Appendix E)
3. Little Chiques Creek (Appendix E)

EXISTING LOADING WITH BMPs FOR POLLUTANTS OF CONCERN

Aggregated Recap, Chesapeake Bay (Appendix D)

Base Pollutant Loading (With Existing BMPs) Summary:

Appendix E - UNT To Donegal Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek	94.63	211.03	305.66	8,339.35	222.64	180,381.45
Existing BMP Load Reduction				942.39	43.47	42,712.95
				7,396.95	**179.17**	**137,668.50**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**221.91**	**8.96**	**13,766.85**

Appendix E - Little Chiques Creek

	Drainage Area (Ac)			PA DEP Land Loading		
Drainage Area ID	**Impervious**	**Pervious**	**Total**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Little Chiques Creek	287.23	682.59	969.82	26,247.93	690.95	555,557.75
Existing BMP Load Reduction				525.21	27.60	22,940.78
				25,722.72	**663.35**	**532,616.97**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**771.68**	**33.17**	**53,261.70**

TOTAL COMBINED REQUIRED REDUCTION: Appendix D- Chesapeake Bay & Aggregated Total:**	**993.59**	**42.13**	**67,028.55**
Maximum Permitted Reduction for Storm Sewer System Solids Removal (50%)	496.80	21.06	33,514.27

** Per PA DEP Pollutant Aggregation Table and Instructions, the aggregate total required reduction may be analyzed and BMPs may be implemented in the identified watersheds to meet the required 10% Sediment Reduction. Reduction in specific watershed is not required when identified in the same HUC 12 watershed.

EXISTING LOADING WITH BMPs FOR POLLUTANTS OF CONCERN

UNT to Donegal Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Mount Joy Borough
Base Pollutant Loading With Existing BMPs Summary:

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 Donegal Creek	94.63	211.03	305.66	8,339.35	222.64	180,381.45
BMP Reductions				942.39	43.47	42,712.95
Base Pollutant Loading With Existing BMPs				**7,396.95**	**179.17**	**137,668.50**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**221.91**	**8.96**	**13,766.85**
Required Reduction (Tons/Year)				0.11	0.00	6.88

EXISTING LOADING WITH BMPs FOR POLLUTANTS OF CONCERN

Little Chiques Creek (Appendix E)

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Mount Joy Borough
Base Pollutant Loading With Existing BMPs Summary:

Drainage Area ID	Drainage Area (Ac)			PA DEP Land Loading		
	Impervious	Pervious	Total	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Little Chiques Creek	287.23	682.59	969.82	26,247.93	690.95	555,557.75
BMP Reductions				525.21	27.60	22,940.78
Base Pollutant Loading With Existing BMPs				**25,722.72**	**663.35**	**532,616.97**
Required Reduction Percent				3%	5%	10%
Required Reduction (Lbs/Year)				**771.68**	**33.17**	**53,261.70**
Required Reduction (Tons/Year)				0.39	0.02	26.63

ATTACHMENT I

POTENTIAL BMP POLLUTANT LOADING REDUCTION

1. Potential BMP Description
2. UNT to Donegal Creek (Appendix E)
3. Little Chiques Creek (Appendix E)
4. Street Sweeping Analysis

POTENTIAL BMP POLLUTANT LOADING REDUCTION

Potential BMP Description

UNT to Donegal Creek

BMP 002-BR1: Wet Pond – Basin Retrofit
The analysis evaluated the conversion of the existing dry detention basin, located south of 1050 West Main Street parking and extending into the area south of 1040 West Main. The pond is located on private property. Construction activities include: excavation to provide wet storage area; installation of new outlet structure; installation of amended soils to promote infiltration; and installation of wet plantings to promote nutrient removal.

BMP OP001-BS1: Bioswale
The analysis evaluated the modification of an existing swale into a bioswale, increasing the swales width and reducing flow depth and velocity. The BMP would parallel Farmington Way, starting approximately 133 Farmington Way and extending to an inlet north of 101 Farmington Way. The BMP would be located within private property. Construction activities include: Re-grading/expanding channel; installing ballast and amended soils; bioswale plantings; and stabilization of existing storm outlets.

BMP OP001-NSB: Nutrient Sediment Box
The analysis evaluated the installation of a nutrient sediment box on a segment of storm sewer prior to OP-001. The box would be located within public right-of-way. The nutrient sediment box is a proprietary storm sewer solids removal device that collects sediments, reduces nutrients, and also collects trash, while allowing functionality of storm sewer system.

Little Chiques Creek

BMP 005-NSB: Nutrient Sediment Box
The analysis evaluated the installation of a nutrient sediment box on a segment of storm sewer between 250 Park Ave and 246 Park Ave. The box would be located within public right-of-way. The nutrient sediment box is a proprietary storm sewer solids removal device that collects sediments, reduces nutrients, and also collects trash, while allowing functionality of storm sewer system.

BMP 008-NSB: Nutrient Sediment Box
The analysis evaluated the installation of a nutrient sediment box on a segment of storm sewer approximately at 605 E Main Street. The box would be located within public right-of-way. The nutrient sediment box is a proprietary storm sewer solids removal device that collects sediments, reduces nutrients, and also collects trash, while allowing functionality of storm sewer system.

BMP OP005-BR1: Wet Pond – Basin Retrofit

The analysis evaluated the conversion of the existing dry detention basin, located between Florin Ave, Blossom Trail, and Arbor Rose Ave. The pond is located on private property. Construction activities include: excavation to provide wet storage area; modification of the outlet structure; installation of amended soils to promote infiltration; and installation of wet plantings to promote nutrient removal.

BMP OP006-BR1: Wet Pond – Basin Retrofit

The analysis evaluated the conversion of the existing dry detention basin, located east of Glenn Ave and north of School Lane. The pond is located on private property. Construction activities include: excavation to provide wet storage area; modification of the outlet structure; installation of amended soils to promote infiltration; and installation of wet plantings to promote nutrient removal.

BMP OP007-BS1: Bioswale

The analysis evaluated the modification of an existing swale into a bioswale, increasing the swales width and reducing flow depth and velocity. The BMP is located within private property. Limits are 319 Locust Lane to Pinkerton Road. Construction activities include: Re-grading/expanding channel; installing ballast and amended soils; bioswale plantings; and stabilization of existing storm outlets.

BMP OP008-BR1: Wet Pond – Basin Retrofit

The analysis evaluated the conversion of the existing dry detention basin, located north of 537 West Main Street to a wet pond. The pond is located on public property. Construction activities include: excavation to provide wet storage area; modification of the outlet structure; installation of amended soils to promote infiltration; and installation of wet plantings to promote nutrient removal.

BMP OP008-VS1: Vegetated Swale

The analysis evaluated the modification of an existing swale into a vegetated swale, increasing the swales width and reducing flow depth and velocity. The BMP would be constructed north of Rotary Park. Limits are from Fairview Street to Old Market Street. The BMP would be located within public property. Construction activities include: Re-grading/expanding channel; finish grading, seeding and matting; and stabilization of existing storm outlets.

POTENTIAL BMP POLLUTANT LOADING REDUCTION

UNT to Donegal Creek (Appendix E)

Potential BMP Summary:

				Pollutant Reduction		
	Drainage Area ID	**Prop. BMP ID**	**BMP Description**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**
Unnamed Tributary to Donegal Creek						
	OF-002	BMP 002-BR1	Wet Pond - Basin Retrofit	133.92	10.37	13,255.28
	OP-001	BMP OP001-BS1	Bioswale	2,181.61	63.87	55,867.68
	OP-001	BMP OP001-NSB	Nutrient Separating Box	549.49	14.40	49,988.53
				2,865.03	**88.65**	**119,111.49**
*Maximum Permitted Reduction for Storm Sewer System Solids Removal (50%)				110.95	4.48	6,883.42

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Potential BMPs

Worksheet 4:
Drainage Area: Urbanized MS4 Regulated Area
2-year Rainfall: 2.99 in

Potential BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 002-BR1	**Wet Pond - Basin Retrofit**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,225,679	28.138	71	4.08	0.82	0.75	77,080.82	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,225,679	28.138					77,080.82	1.77
Post-Development									
Pervious	C	511,619	11.745	77	2.99	0.60	1.06	45,368.43	
Impervious	C	714,061	16.393	98	0.20	0.04	2.76	164,133.37	
		1,225,679	28.138					209,501.81	4.81
						Net Increase:		132,420.99	3.04
BMP OP001-BS1	**Bioswale**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	4,908,699	112.688	71	4.08	0.82	0.75	308,699.43	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		4,908,699	112.688					308,699.43	7.09
Post-Development									
Pervious	C	3,276,456	75.217	77	2.99	0.60	1.06	290,543.72	
Impervious	C	1,632,243	37.471	98	0.20	0.04	2.76	375,186.09	
		4,908,699	112.688					665,729.82	15.28
						Net Increase:		357,030.39	8.20
BMP OP001-NSB	**Nutrient Separating Box**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	4,301,695	98.753	71	4.08	0.82	0.75	270,526.03	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		4,301,695	98.753					270,526.03	6.21
Post-Development									
Pervious	C	2,827,827	64.918	77	2.99	0.60	1.06	250,761.04	
Impervious	C	1,473,868	33.835	98	0.20	0.04	2.76	338,782.10	
		4,301,695	98.753					589,543.14	13.53
						Net Increase:		319,017.11	7.32

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Expert Panel Pollutant Reduction Efficiency Calculations:

x = (12 x Ep)/IA
Ep = Post - Predevelopment volume increase
IA = Impervious Area (Ac)

					PA DEP BMP Effectiveness Values Pollutant % Removal			Existing BMP Efficiency Pollutant % Removal			Adjusted BMP Effectiveness Values Pollutant % Removal		
BMP ID	**BMP Description**	**EP**	**IA**	**x**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
BMP 002-BR1	Wet Pond - Basin Retrofit	3.04	16.393	2.23	20%	45%	60%	5%	10%	10%	15%	35%	50%
BMP OP001-BS1	Bioswale	8.20	37.471	2.62	70%	75%	80%				70%	75%	80%
BMP OP001-NSB	Nutrient Separating Box	7.32	33.835	2.60	20%	19%	80%				20%	19%	80%

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Potential BMP Pollutant Reduction

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

OF-002
Wet Pond - Basin Retrofit

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 002-BR1	714,061	511,619	1,225,679	16.4	11.7	28.1	631.61	261.21	**892.82**	25.41	4.23	**29.64**	24,268.1	2,242.5	**26,510.6**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									15%			35%			50%
Pollutant Reduction									**133.92**			**10.37**			**13,255.28**

OP-001
Bioswale

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP001-BS1	1,632,243	3,276,456	4,908,699	37.5	75.2	112.7	1,443.76	1,672.83	**3,116.59**	58.08	27.08	**85.16**	55,473.4	14,361.2	**69,834.6**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									70%			75%			80%
Pollutant Reduction									**2,181.61**			**63.87**			**55,867.68**

OP-001
Nutrient Separating Box

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP001-NSB	1,473,868	2,827,827	4,301,695	33.8	64.9	98.8	1,303.68	1,443.78	**2,747.45**	52.44	23.37	**75.82**	50,090.9	12,394.8	**62,485.7**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									20%			19%			80%
Pollutant Reduction									**549.49**			**14.40**			**49,988.53**

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Proposed BMP Pollutant Reduction

Drainage Area ID	Prop. BMP ID	BMP Description	Pollutant Reduction		
			TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
OF-002	BMP 002-BR1	Wet Pond - Basin Retrofit	133.92	10.37	13,255.28
OP-001	BMP OP001-BS1	Bioswale	2,181.61	63.87	55,867.68
OP-001	BMP OP001-NSB	Nutrient Separating Box	549.49	14.40	49,988.53
			2,865.03	**88.65**	**119,111.49**

REQUIRED POLLUTANT REDUCTION (Lbs/Year)	**221.91**	**8.96**	**13,766.85**
Maximum Permitted Reduction for Storm Sewer System Solids Ren	110.95	4.48	6,883.42

POTENTIAL BMP POLLUTANT LOADING REDUCTION

Little Chiques Creek (Appendix E)

Potential BMP Summary:

				Pollutant Reduction		
	Drainage Area ID	Prop. BMP ID	BMP Description	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Little Chiques Creek						
	OF-005	BMP 005-NSB	Nutrient Separating Box	374.83	12.19	46,450.99
	OF-008	BMP 008-NSB	Nutrient Separating Box	268.10	8.00	29,484.64
	OP-005	BMP OP005-BR1	Wet Pond-Basin Retrofit	564.35	38.51	38,097.15
	OP-006	BMP OP006-BR1	Wet Pond-Basin Retrofit	87.20	6.84	7,267.23
	OP-007	BMP OP007-BS1	Bioswale	693.09	19.77	17,065.72
	OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	138.55	11.06	11,845.83
	OP-008	BMP OP008-VS1	Vegetated Swale	702.66	18.93	77,062.44
				2,828.78	**115.31**	**227,273.98**
*Maximum Permitted Reduction for Storm Sewer System Solids Removal (50%)				389.09	16.63	26,618.73

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Proposed BMPs

Worksheet 4:
Drainage Area: Urbanized MS4 Regulated Area
2-year Rainfall: 2.99 in

Potential BMP Calculations:

Cover/Type/Condition	Soil Type	Area (SF)	Area (Ac)	CN	S	Ia (0.2*S)	Q Runoff (in)	Runoff Volume (CF)	Acre-Ft
BMP 005-NSB	**Nutrient Separating Box**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	2,505,835	57.526	71	4.08	0.82	0.75	157,587.54	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		2,505,835	57.526					157,587.54	3.62
Post-Development									
Pervious	C	915,437	21.016	77	2.99	0.60	1.06	81,177.53	
Impervious	C	1,590,397	36.511	98	0.20	0.04	2.76	365,567.48	
		2,505,835	57.526					446,745.01	10.26
						Net Increase:		289,157.47	6.64
BMP 008-NSB	**Nutrient Separating Box**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,922,036	44.124	71	4.08	0.82	0.75	120,873.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,922,036	44.124					120,873.48	2.77
Post-Development									
Pervious	C	961,615	22.076	77	2.99	0.60	1.06	85,272.34	
Impervious	C	960,422	22.048	98	0.20	0.04	2.76	220,761.80	
		1,922,036	44.124					306,034.15	7.03
						Net Increase:		185,160.66	4.25
BMP OP005-BR1	**Wet Pond-Basin Retrofit**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	6,150,872	141.205	71	4.08	0.82	0.75	386,817.48	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		6,150,872	141.205					386,817.48	8.88
Post-Development									
Pervious	C	4,487,717	103.024	77	2.99	0.60	1.06	397,953.83	
Impervious	C	1,663,154	38.181	98	0.20	0.04	2.76	382,291.30	
		6,150,872	141.205					780,245.13	17.91
						Net Increase:		393,427.65	9.03

BMP OP006-BR1	**Wet Pond-Basin Retrofit**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	873,680	20.057	71	4.08	0.82	0.75	54,944.22	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		873,680	20.057					54,944.22	1.26
Post-Development									
Pervious	C	512,060	11.755	77	2.99	0.60	1.06	45,407.57	
Impervious	C	361,620	8.302	98	0.20	0.04	2.76	83,121.71	
		873,680	20.057					128,529.27	2.95
						Net Increase:		73,585.06	1.69
BMP OP007-BS1	**Bioswale**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,583,179	36.345	71	4.08	0.82	0.75	99,563.35	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,583,179	36.345					99,563.35	2.29
Post-Development									
Pervious	C	1,096,981	25.183	77	2.99	0.60	1.06	97,276.16	
Impervious	C	486,198	11.162	98	0.20	0.04	2.76	111,757.04	
		1,583,179	36.345					209,033.20	4.80
						Net Increase:		109,469.85	2.51
BMP OP008-BR1	**Wet Pond-Basin Retrofit**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	1,371,709	31.490	71	4.08	0.82	0.75	86,264.38	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		1,371,709	31.490					86,264.38	1.98
Post-Development									
Pervious	C	774,495	17.780	77	2.99	0.60	1.06	68,679.28	
Impervious	C	597,214	13.710	98	0.20	0.04	2.76	137,275.21	
		1,371,709	31.490					205,954.49	4.73
						Net Increase:		119,690.12	2.75
BMP OP008-VS1	**Vegetated Swale**								
Pre-Development									
Pervious	C	0	0.000	77	2.99	0.60	1.06	0.00	
Meadow	C	11,159,335	256.183	71	4.08	0.82	0.75	701,790.91	
Impervious	C	0	0.000	98	0.20	0.04	2.76	0.00	
		11,159,335	256.183					701,790.91	16.11
Post-Development									
Pervious	C	7,605,223	174.592	77	2.99	0.60	1.06	674,402.43	
Impervious	C	3,554,112	81.591	98	0.20	0.04	2.76	816,945.35	
		11,159,335	256.183					1,491,347.78	34.24
						Net Increase:		789,556.87	18.13

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

Expert Panel Pollutant Reduction Efficiency Calculations:

x = (12 x Ep)/IA
Ep = Post - Predevelopment volume increase
IA = Impervious Area (Ac)

					PA DEP BMP Effectiveness Values Pollutant % Removal			Existing BMP Efficiency Pollutant % Removal			Adjusted BMP Effectiveness Values Pollutant % Removal		
Potential BMP ID	**BMP Description**	**EP**	**IA**	**x**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**	**TN**	**TP**	**TSS**
BMP 005-NSB	Nutrient Separating Box	6.64	36.511	2.18	20%	19%	80%				20%	19%	80%
BMP 008-NSB	Nutrient Separating Box	4.25	22.048	2.31	20%	19%	80%				20%	19%	80%
BMP OP005-BR1	Wet Pond-Basin Retrofit	9.03	38.181	2.84	20%	45%	60%	5%	5%	10%	15%	40%	50%
BMP OP006-BR1	Wet Pond-Basin Retrofit	1.69	8.302	2.44	20%	45%	60%	5%	5%	10%	15%	40%	50%
BMP OP007-BS1	Bioswale	2.51	11.162	2.70	70%	75%	80%				70%	75%	80%
BMP OP008-BR1	Wet Pond-Basin Retrofit	2.75	13.710	2.40	20%	45%	60%	5%	5%	10%	15%	40%	50%
BMP OP008-VS1	Vegetated Swale	18.13	81.591	2.67	10%	10%	50%				10%	10%	50%

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Potential BMP Pollutant Reduction

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

OF-005
Nutrient Separating Box

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 005-NSB	1,590,397	915,437	2,505,835	36.5	21.0	57.5	1,406.75	467.39	**1,874.14**	56.59	7.57	**64.16**	54,051.2	4,012.5	**58,063.7**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									20%			19%			80%
Pollutant Reduction									**374.83**			**12.19**			**46,450.99**

OF-008
Nutrient Separating Box

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP 008-NSB	960,422	961,615	1,922,036	22.0	22.1	44.1	849.52	490.96	**1,340.48**	34.17	7.95	**42.12**	32,640.9	4,214.9	**36,855.8**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									20%			19%			80%
Pollutant Reduction									**268.10**			**8.00**			**29,484.64**

OP-005
Wet Pond-Basin Retrofit

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP005-BR1	1,663,154	4,487,717	6,150,872	38.2	103.0	141.2	1,471.10	2,291.25	**3,762.35**	59.18	37.09	**96.27**	56,524.0	19,670.3	**76,194.3**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									15%			40%			50%
Pollutant Reduction									**564.35**			**38.51**			**38,097.15**

OP-006

Wet Pond-Basin Retrofit

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP006-BR1	361,620	512,060	873,680	8.3	11.8	20.1	319.86	261.44	**581.30**	12.87	4.23	**17.10**	12,290.0	2,244.4	**14,534.5**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									15%			40%			50%
Pollutant Reduction									**87.20**			**6.84**			**7,267.23**

OP-007

Bioswale

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP007-BS1	486,198	1,096,981	1,583,179	11.2	25.2	36.3	430.06	560.07	**990.13**	17.30	9.07	**26.37**	16,523.9	4,808.2	**21,332.2**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									70%			75%			80%
Pollutant Reduction									**693.09**			**19.77**			**17,065.72**

OP-008

Wet Pond-Basin Retrofit

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP008-BR1	597,214	774,495	1,371,709	13.7	17.8	31.5	528.25	395.43	**923.68**	21.25	6.40	**27.65**	20,296.9	3,394.7	**23,691.7**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									15%			40%			50%
Pollutant Reduction									**138.55**			**11.06**			**11,845.83**

OP-008

Vegetated Swale

	Drainage Area (SF)			Drainage Area (Ac)			PA DEP Land Loading								
BMP ID	**Impervious**	**Pervious**	**Total**	**Impervious**	**Pervious**	**Total**	**TN - Impervious Area (lbs/year)**	**TN - Pervious Area (lbs/year)**	**TN (lbs/year)**	**TP - Impervious Area (lbs/year)**	**TP - Pervious Area (lbs/year)**	**TP (lbs/year)**	**TSS - Impervious Area (lbs/year)**	**TSS - Pervious Area (lbs/year)**	**TSS (lbs/year)**
BMP OP008-VS1	3,554,112	7,605,223	11,159,335	81.6	174.6	256.2	3,143.71	3,882.92	**7,026.63**	126.47	62.85	**189.32**	120,790.0	33,334.8	**154,124.9**
BMP Effectiveness Value (3800-PM-BCW0100m) & Manufacture Literature									10%			10%			50%
Pollutant Reduction									**702.66**			**18.93**			**77,062.44**

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Proposed BMP Pollutant Reduction

Drainage Area ID	Prop. BMP ID	BMP Description	Pollutant Reduction		
			TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
OF-005	BMP 005-NSB	Nutrient Separating Box	374.83	12.19	46,450.99
OF-008	BMP 008-NSB	Nutrient Separating Box	268.10	8.00	29,484.64
OP-005	BMP OP005-BR1	Wet Pond-Basin Retrofit	564.35	38.51	38,097.15
OP-006	BMP OP006-BR1	Wet Pond-Basin Retrofit	87.20	6.84	7,267.23
OP-007	BMP OP007-BS1	Bioswale	693.09	19.77	17,065.72
OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	138.55	11.06	11,845.83
OP-008	BMP OP008-VS1	Vegetated Swale	702.66	18.93	77,062.44
			2,828.78	**115.31**	**227,273.98**

REQUIRED POLLUTANT REDUCTION (Lbs/Year)	**778.17**	**33.26**	**53,237.45**
Maximum Permitted Reduction for Storm Sewer System Solids Ren	389.09	16.63	26,618.73

POTENTIAL BMP POLLUTANT LOADING REDUCTION

Street Sweeping Analysis

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11
Street Sweeping

PA DEP Land Loading:		TN (lbs/acre/year)	TP (lbs/acre/year)	TSS (lbs/acre/year)
Lancaster	Impervious	38.53	1.55	1480.43
	Pervious	22.24	0.36	190.93
	Undeveloped	10	0.33	234.6

Street Sweeping Pollutant Loading Reduction

All Streets - AST-S4: Spring and Fall - one pass every other week; monthly otherwise (Aprox. 20 passes/yr).

	Street Length		Drainage Area (Ac)		PA DEP Land Loading								
BMP ID	Length (Ft)	Length (Mi)	Impervious (Ac/mi)	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
All Streets - AST-S4	141,134	26.73	2.0	53.5	2,059.81	0.00	**2,059.81**	82.86	0.00	**82.86**	79,143.8	0.0	**79,143.8**
Expert Panel Performance Standards							2%			5%			10%
Pollutant Reduction							**41.20**			**4.14**			**7,914.38**

All Streets - AST1P2W - one pass every 2 weeks (Aprox. 25 passes/yr)

	Street Length		Drainage Area (Ac)		PA DEP Land Loading								
BMP ID	Length (Ft)	Length (Mi)	Impervious (Ac/mi)	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
All Streets - AST1P2W	141,134	26.73	2.0	53.5	2,059.81	0.00	**2,059.81**	82.86	0.00	**82.86**	79,143.8	0.0	**79,143.8**
Expert Panel Performance Standards							2%			5%			11%
Pollutant Reduction							**41.20**			**4.14**			**8,705.82**

All Streets - AST1P4W - one pass every 4 weeks (Aprox. 10 passes/yr)

	Street Length		Drainage Area (Ac)		PA DEP Land Loading								
BMP ID	Length (Ft)	Length (Mi)	Impervious (Ac/mi)	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
All Streets - AST1P4W	141,134	26.73	2.0	53.5	2,059.81	0.00	**2,059.81**	82.86	0.00	**82.86**	79,143.8	0.0	**79,143.8**
Expert Panel Performance Standards							1%			3%			6%
Pollutant Reduction							**20.60**			**2.49**			**4,748.63**

All Streets - AST1P12W - one pass every 12 weeks.

	Street Length		Drainage Area (Ac)		PA DEP Land Loading								
BMP ID	Length (Ft)	Length (Mi)	Impervious (Ac/mi)	Total	TN - Impervious Area (lbs/year)	TN - Pervious Area (lbs/year)	TN (lbs/year)	TP - Impervious Area (lbs/year)	TP - Pervious Area (lbs/year)	TP (lbs/year)	TSS - Impervious Area (lbs/year)	TSS - Pervious Area (lbs/year)	TSS (lbs/year)
Borough Streets - AST1P12W	141,134	26.73	2.0	53.5	2,059.81	0.00	**2,059.81**	82.86	0.00	**82.86**	79,143.8	0.0	**79,143.8**
Expert Panel Performance Standards							0%			1%			2%
Pollutant Reduction							**0.00**			**0.83**			**1,582.88**

Table 17. Pollutant Reductions Associated with Different Street Cleaning Practices

Practice #	Description [1]	Approx Passes/Yr [2]	TSS Removal (%)	TN Removal (%)	TP Removal (%)
SCP-1	AST- 2 PW	~100	21	4	10
SCP-2	AST- 1 PW	~50	16	3	8
SCP-3	AST- 1 P2W	~25	11	2	5
SCP-4	AST- 1 P4W	~10	6	1	3
SCP-5	AST- 1 P8W	~6	4	0.7	2
SCP-6	AST- 1 P12W	~4	2	0	1
SCP-7	AST- S1 or S2	~15	7	1	4
SCP-8	AST- S3 or S4	~20	10	2	5
SCP-9	MBT- 2PW	~100	1.0	0	0
SCP-10	MBT- 1 PW	~50	0.5	0	0
SCP-11	MBT- 1 P4W	~10	0.1	0	0

AST: Advanced Sweeping Technology MBT: Mechanical Broom Technology
[1] See Table 15 for the codes used to define street cleaning frequency
[2] Depending on the length of the winter shutdown, the number of passes/yr may be lower than shown

Table 15. Adapting the WINSLAMM Model for the Chesapeake Bay Watershed

Three different sweeping start/stop dates to reflect regional differences in climate across the watershed:
- Sweeping occurs over the entire year
- Sweeping suspended December 1, restarts March 15
- Sweeping suspended December 15, restarts February 15

Six different fixed sweeping schedules

2PW = 2 passes per week	1P4W = 1 pass every 4 weeks
1PW = 1 pass every week	1P8W = 1 pass every 8 weeks
1P2W = 1 pass every 2 weeks	1P12W = 1 pass every 12 weeks

Four seasonal sweeping schedules (more intensive in Spring or Fall)
- S1: Spring – One pass every week from March to April. Monthly otherwise
- S2: Spring – One pass every other week from March to April. Monthly otherwise
- S3: Spring and fall – One pass every week (March to April, October to November). Monthly otherwise
- S4: Spring and fall – One pass every other week during the season. Monthly otherwise

Two Levels of Sweeper Technology

MBC = Mechanical broom cleaning	VAC = Vacuum assisted cleaning

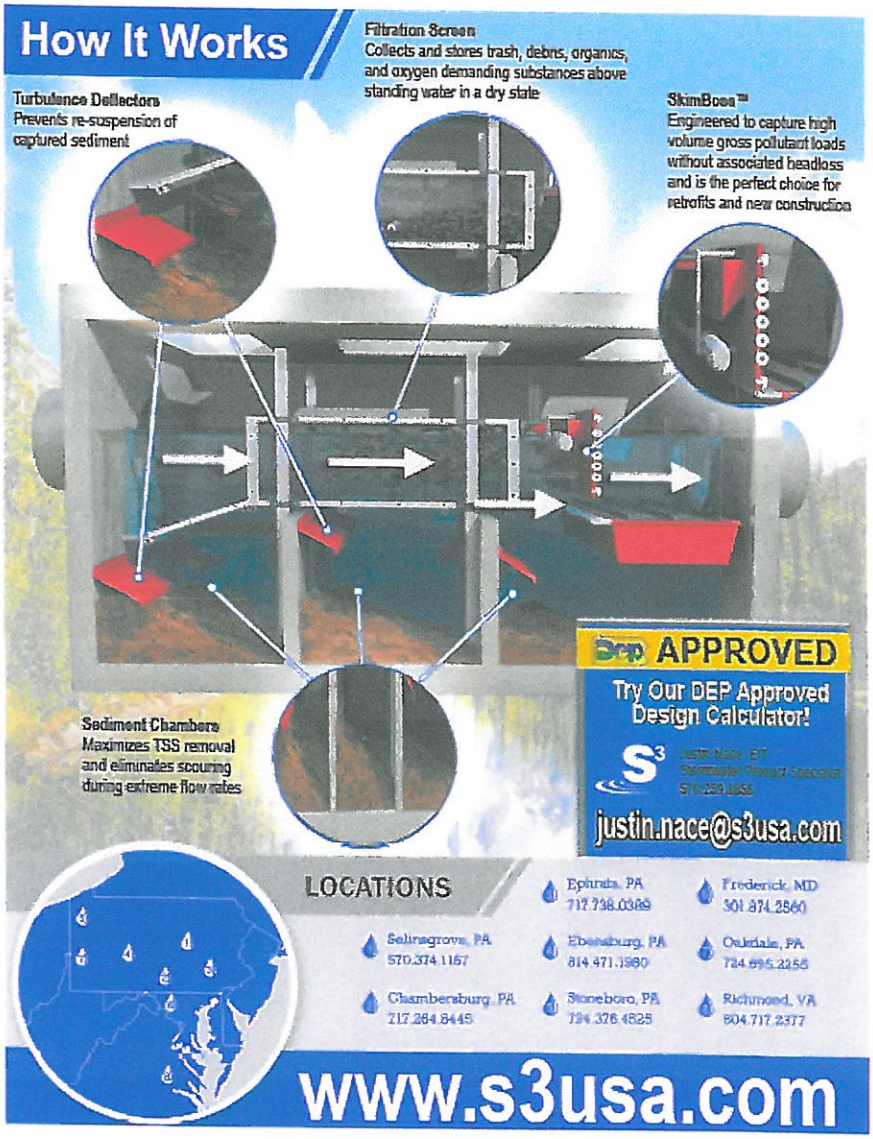
Four Options for Street Parking Density and No Parking Enforcement

For more details, consult the technical memo (Tetra Tech, Inc., 2015)

ATTACHMENT J

MANUFACTURERS TECHNICAL DATA


APPROVED
S3 STORMWATER SOLUTION SOURCE
Suntree Technologies
Nutrient Separating Baffle Box™
PADEP Approved
MS4-Credited Water Quality Device
Suntree Technologies Inc.
The Suntree Nutrient Separating Baffle Box™ (NSBB) is an advanced stormwater treatment system utilizing screening and hydrodynamic separation to capture pollutants. The patented screening system, suspended above the sedimentation chambers, captures and stores trash and debris in a dry state. The oil skimmer with hydrocarbon booms traps and absorbs oil into a polymer based media for permanent removal. In use since 1994, it is a widely accepted stormwater treatment solution among civil engineers, municipalities, and developers nationwide. The Suntree NSBB™ is PADEP approved and is also approved for use on MS4 pollutant reduction plans.
Removal Rates
80% TSS
20% TN
19% TP
www.s3usa.com


How It Works
Filtration Screen
Collects and stores trash, debris, organics, and oxygen demanding substances above standing water in a dry state
Turbulence Deflectors
Prevents re-suspension of captured sediment
SkimBoss™
Engineered to capture high volume gross pollutant loads without associated headloss and is the perfect choice for retrofits and new construction
Sediment Chambers
Maximizes TSS removal and eliminates scouring during extreme flow rates
DEP APPROVED
Try Our DEP Approved Design Calculator!
justin.nace@s3usa.com
LOCATIONS
Ephrata, PA 717.738.0389
Frederick, MD 301.874.2560
Selinsgrove, PA 570.374.1167
Ebensburg, PA 814.471.1980
Oakdale, PA 724.695.2255
Chambersburg, PA 717.264.8445
Stoneboro, PA 724.376.4825
Richmond, VA 804.717.2377
www.s3usa.com

ATTACHMENT K

SELECTED BMP POLLUTANT LOADING REDUCTION

1. BMP Description

2. BMP Pollutant Loading Reduction

SELECTED BMP POLLUTANT LOADING REDUCTION

BMP Description

Aggregate Analysis – (Appendix D- Chesapeake Bay)

Little Chiques Creek - Appendix E:

BMP OP008-BR1: Wet Pond – Basin Retrofit
The analysis evaluated the conversion of the existing dry detention basin, located north of 537 West Main Street to a wet pond. The pond is located on public property. Construction activities include: excavation to provide wet storage area; modification of the outlet structure; installation of amended soils to promote infiltration; and installation of wet plantings to promote nutrient removal.

BMP OP008-VS1: Vegetated Swale
The analysis evaluated the modification of an existing swale into a vegetated swale, increasing the swales width and reducing flow depth and velocity. The BMP would be constructed north of Rotary Park. Limits are from Fairview Street to Old Market Street. The BMP would be located within public property. Construction activities include: Re-grading/expanding channel; finish grading, seeding and matting; and stabilization of existing storm outlets.

SELECTED BMP POLLUTANT LOADING REDUCTION

BMP Pollutant Loading Reduction

Selected BMPs Option: Based upon PA DEP Pollutant Aggregation Table

				Pollutant Reduction			
	Drainage Area ID	**Prop. BMP ID**	**BMP Description**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**	**Project Cost**
Little Chiques Creek							
	OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	131.68	10.48	11,208.45	$56,960.00
	OP-008	BMP OP008-VS1	Vegetated Swale	702.66	18.93	77,062.44	$90,120.00
				834.34	**29.41**	**88,270.88**	**$147,080.00**
Required Reduction (Lbs/Year)				**993.59**	**42.13**	**67,028.55**	
Net Reduction:				-159.25	-12.71	21,242.33	

ATTACHMENT L

PLANNING ESTIMATES OF OPINION OF PROBABLE COST

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 2, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP 002-BR1: Wet Pond - Basin Retrofit

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	M&P	1	LS	$1,500.00	$1,500.00
3	Erosion and Sedimentation Control	1	LS	$2,500.00	$2,500.00
4	Finish Grading and Seeding	2,320	SY	$6.00	$13,920.00
5	Excavation	1,930	CY	$30.00	$57,900.00
6	Rip Rap	25	Ton	$90.00	$2,250.00
7	Outlet Structure Modification	1	LS	$2,500.00	$2,500.00
8	Soil Amendment	705	CY	$25.00	$17,625.00
9	Wet Plantings	600	Ea	$18.00	$10,800.00
	Subtotal				$118,995.00
	Contingency (30%)				$35,705.00
	Construction Sub-Total				$154,700.00
	Engineering (20%)				$30,940.00
	Right-of-Way (5%)				$7,735.00
	Legal (3%)				$4,641.00
					.
	TOTAL				**$198,016.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 2, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP OP001-BS1: Bioswale

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$15,000.00	$15,000.00
2	Excavation	260	CY	$18.00	$4,680.00
3	Finish Grading and Seeding - Bioswale	133	SY	$10.00	$1,330.00
4	Erosion Control Matting	133	SY	$10.00	$1,330.00
5	Rip Rap	80	Ton	$75.00	$6,000.00
6	6" Gravel	240	Ton	$20.00	$4,800.00
7	6" Amended soils	265	Ton	$25.00	$6,625.00
8	Selective Plantings	780	Ea	$12.00	$9,360.00
9	Plantings	2,350	SY	$12.00	$28,200.00
10	Educational Signs	2	Ea	$500.00	$1,000.00
	Subtotal				$78,325.00
	Contingency (30%)				$23,575.00
	Construction Sub-Total				$101,900.00
	Engineering (20%)				$20,380.00
	Right-of-Way (5%)				$5,095.00
	Legal (3%)				$3,057.00
	TOTAL				**$130,432.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date: May 2, 2017
Project Number: 10863.11
Project Name: Pollutant Reduction Plan (PRP)

Prepared By: MRK
Checked By: MDH

BMP OP001-NSB: Nutrient Sediment Box

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	Erosion and sedimentation control	1	LS	$2,500.00	$2,500.00
3	Excavation	1	LS	$10,000.00	$10,000.00
4	Crane Rental	1	LS	$7,500.00	$7,500.00
5	Finish grading and seeding	75	SY	$8.00	$600.00
	Storm Sewer Payment Items				
6	Nutrient Seperating Baffle Box - Materials	1	LS	$60,000.00	$60,000.00
7	Nutrient Seperating Baffle Box - Installation	1	LS	$15,000.00	$15,000.00
	Subtotal				$105,600.00
	Contingency (30%)				$31,700.00
	Contstruction Sub-Total				$137,300.00
	Engineering (20%)				$27,460.00
	Right-of-Way (5%)				$0.00
	Legal (3%)				$0.00
	TOTAL				**$164,760.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP 005-NSB: Nutrient Sediment Box

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	Erosion and sedimentation control	1	LS	$2,500.00	$2,500.00
3	Excavation	1	LS	$10,000.00	$10,000.00
4	Crane Rental	1	LS	$7,500.00	$7,500.00
5	Finish grading and seeding	75	SY	$8.00	$600.00
	Storm Sewer Payment Items				
6	Nutrient Separating Baffle Box - Materials	1	LS	$60,000.00	$60,000.00
7	Nutrient Separating Baffle Box - Installation	1	LS	$7,500.00	$7,500.00
	Subtotal				$98,100.00
	Contingency (30%)				$29,500.00
	Construction Sub-Total				$127,600.00
	Engineering (20%)				$25,520.00
	Right-of-Way (5%)				$0.00
	Legal (3%)				$0.00
	TOTAL				**$153,120.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP 008-NSB: Nutrient Sediment Box

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	Erosion and sedimentation control	1	LS	$2,500.00	$2,500.00
3	Excavation	1	LS	$10,000.00	$10,000.00
4	Crane Rental	1	LS	$7,500.00	$7,500.00
5	Finish grading and seeding	75	SY	$8.00	$600.00
	Storm Sewer Payment Items				
6	Nutrient Separating Baffle Box - Materials	1	LS	$60,000.00	$60,000.00
7	Nutrient Separating Baffle Box - Installation	1	LS	$7,500.00	$7,500.00
	Subtotal				$98,100.00
	Contingency (30%)				$29,500.00
	Construction Sub-Total				$127,600.00
	Engineering (20%)				$25,520.00
	Right-of-Way (5%)				$0.00
	Legal (3%)				$0.00
	TOTAL				**$153,120.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP OP005-BR1: Wet Pond - Basin Retrofit

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	M&P	1	LS	$1,500.00	$1,500.00
3	Erosion and Sedimentation Control	1	LS	$2,500.00	$2,500.00
4	Finish Grading and Seeding	500	SY	$10.00	$5,000.00
5	Excavation	400	CY	$20.00	$8,000.00
6	Rip Rap	75	Ton	$90.00	$6,750.00
7	Outlet Structure Modification	1	LS	$2,500.00	$2,500.00
8	Soil Amendment	200	CY	$25.00	$5,000.00
9	Wet Plantings	200	Ea	$18.00	$3,600.00
	Subtotal				$44,850.00
	Contingency (30%)				$13,550.00
	Construction Sub-Total				$58,400.00
	Engineering (20%)				$11,680.00
	Right-of-Way (5%)				$2,920.00
	Legal (3%)				$1,752.00
	TOTAL				**$74,752.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP OP006-BR1: Wet Pond - Basin Retrofit

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$15,000.00	$15,000.00
2	M&P	1	LS	$1,500.00	$1,500.00
3	Erosion and Sedimentation Control	1	LS	$2,500.00	$2,500.00
4	Finish Grading and Seeding	2,200	SY	$6.00	$13,200.00
5	Excavation	1,840	CY	$30.00	$55,200.00
6	Rip Rap	75	Ton	$90.00	$6,750.00
7	Outlet Structure Modification	1	LS	$2,500.00	$2,500.00
8	Soil Amendment	670	CY	$25.00	$16,750.00
9	Wet Plantings	550	Ea.	$18.00	$9,900.00
	Subtotal				$123,300.00
	Contingency (30%)				$37,000.00
	Construction Sub-Total				$160,300.00
	Engineering (20%)				$32,060.00
	Right-of-Way (5%)				$8,015.00
	Legal (3%)				$4,809.00
	TOTAL				**$205,184.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP OP007-BS1: Bioswale

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	Excavation	425	CY	$30.00	$12,750.00
3	Erosion control matting	0	SY	$15.00	$0.00
4	Finish grading and seeding - Bioswale	365	SY	$10.00	$3,650.00
5	Finish grading and seeding - Basin	0	SY	$6.00	$0.00
6	12" Gravel	110	Ton	$20.00	$2,200.00
7	6" Amended soils	60	Ton	$25.00	$1,500.00
8	Plantings	200	Ea	$25.00	$5,000.00
9	Rip Rap	75	Ton	$90.00	$6,750.00
	Subtotal				$41,850.00
	Contingency (30%)				$12,650.00
	Construction Sub-Total				$54,500.00
	Engineering (20%)				$10,900.00
	Right-of-Way (5%)				$2,725.00
	Legal (3%)				$1,635.00
	TOTAL				**$69,760.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date:	May 5, 2017	Prepared By:	MRK
Project Number:	10863.11	Checked By:	MDH
Project Name:	Pollutant Reduction Plan (PRP)		

BMP OP008-BR1: Wet Pond - Basin Retrofit

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	M&P	1	LS	$1,500.00	$1,500.00
3	Erosion and Sedimentation Control	1	LS	$2,500.00	$2,500.00
4	Finish Grading and Seeding	325	SY	$6.00	$1,950.00
5	Excavation	1	LS	$10,000.00	$10,000.00
6	Rip Rap	7	Ton	$90.00	$630.00
7	Outlet Structure Modification	1	LS	$4,000.00	$4,000.00
8	Soil Amendment	0	CY	$25.00	$0.00
9	Wet Plantings	200	Ea	$18.00	$3,600.00
	Subtotal				$34,180.00
	Contingency (30%)				$10,320.00
	Construction Sub-Total				$44,500.00
	Engineering (20%)				$8,900.00
	Right-of-Way (5%)				$2,225.00
	Legal (3%)				$1,335.00
					.
	TOTAL				**$56,960.00**

The ARRO Group, Inc.
107 West Airport Road
Lititz, PA 17542

OPINION OF PROBABLE CONSTRUCTION COST

Date: May 5, 2017
Project Number: 10863.11
Project Name: Pollutant Reduction Plan (PRP)

Prepared By: MRK
Checked By: MDH

BMP OP008-VS1: Vegetated Swale

Item No.	Description	Qty.	Unit	Unit Price	Total Cost
	Miscellaneous/Site Work Payment Items				
1	Mobilization	1	LS	$10,000.00	$10,000.00
2	Excavation	1,300	CY	$20.00	$26,000.00
3	Erosion control matting	135	SY	$15.00	$2,025.00
4	Finish grading and seeding - Bioswale	0	SY	$10.00	$0.00
5	Finish grading and seeding - Basin	135	SY	$6.00	$810.00
6	12" Gravel	0	Ton	$20.00	$0.00
7	6" Amended soils	0	Ton	$25.00	$0.00
8	Plantings	500	Ea	$25.00	$12,500.00
9	Rip Rap	60	Ton	$90.00	$5,400.00
10	Educational Signage	2	Ea	$500.00	$1,000.00
	Subtotal				$57,735.00
	Contingency (30%)				$17,365.00
	Construction Sub-Total				$75,100.00
	Engineering (20%)				$15,020.00
	Right-of-Way (5%)				$0.00
	Legal (3%)				$0.00
					.
	TOTAL				**$90,120.00**

ATTACHMENT M

RETURN ON INVESTMENT ANALYSIS

Mount Joy Borough
Pollutant Reduction Plan (PRP)
ARRO No.: 10863.11

ROI Summary:

			Pollutant Reduction						
Drainage Area ID	**Prop. BMP ID**	**BMP Description**	**TN (lbs/year)**	**TP (lbs/year)**	**TSS (lbs/year)**	**Estimate Project Total**	**$ per lbs of TN Removed**	**$ per lbs of TP Removed**	**$ per lbs of TSS Removed**
Unnamed Tributary to Donegal Creek									
OF-002	BMP 002-BR1	Wet Pond - Basin Retrofit	133.92	10.37	13,255.28	$198,016.00	$1,478.58	$19,089.82	$14.94
OP-001	BMP OP001-BS1	Bioswale	2,181.61	63.87	55,867.68	$130,432.00	$59.79	$2,042.19	$2.33
OP-001	BMP OP001-NSB	Nutrient Separating Box	549.49	14.40	49,988.53	$130,432.00	$237.37	$9,054.70	$2.61
Little Chiques Creek									
OF-005	BMP 005-NSB	Nutrient Separating Box	374.83	12.19	46,450.99	$153,120.00	$408.51	$12,561.32	$3.30
OF-008	BMP 008-NSB	Nutrient Separating Box	268.10	8.00	29,484.64	$153,120.00	$571.14	$19,132.39	$5.19
OP-005	BMP OP005-BR1	Wet Pond-Basin Retrofit	564.35	38.51	38,097.15	$74,752.00	$132.46	$1,941.23	$1.96
OP-006	BMP OP006-BR1	Wet Pond-Basin Retrofit	87.20	6.84	7,267.23	$205,184.00	$2,353.16	$29,998.59	$28.23
OP-007	BMP OP007-BS1	Bioswale	693.09	19.77	17,065.72	$69,760.00	$100.65	$3,527.72	$4.09
OP-008	BMP OP008-BR1	Wet Pond-Basin Retrofit	138.55	11.06	11,845.83	$56,960.00	$411.11	$5,149.81	$4.81
OP-008	BMP OP008-VS1	Vegetated Swale	702.66	18.93	77,062.44	$90,120.00	$128.25	$4,760.21	$1.17