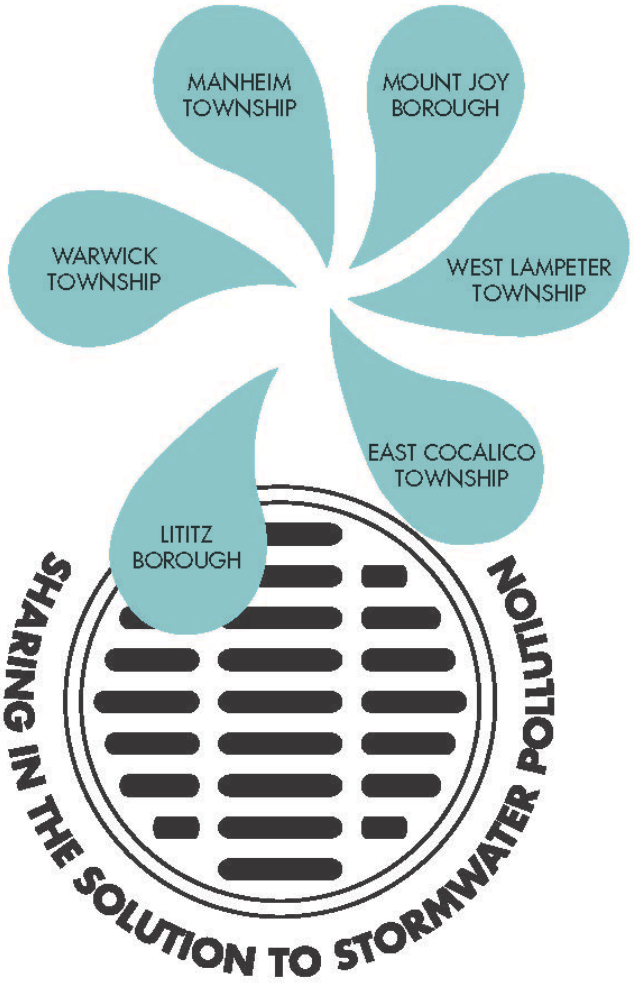
EFC

2013

Lancaster County Municipal Stormwater Management Financing Feasibility Study



Prepared for

East Cocalico Township

Lititz Borough

Manheim Township

Mount Joy Borough

Warwick Township

West Lampeter Township

Prepared by the Environmental Finance Center for the National Fish & Wildlife Foundation and the Lancaster County Clean Water Consortium

October 2013

This report was prepared by the Environmental Finance Center with support from the National Fish & Wildlife Foundation's Chesapeake Bay Stewardship Fund, Local Government Capacity Building Initiative.

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Executive Summary

Background

Throughout the Chesapeake Bay watershed, communities are facing more significant nutrient reduction expectations as a result of National Pollutant and Discharge Elimination System Municipal Separate Storm Sewer System (NPDES MS4) Permits, Total Maximum Daily Load (TMDL) allocations, and Watershed Implementation Plans (WIPs). The majority of these communities already struggle with the challenge of balancing addressing aging and long-neglected stormwater infrastructure systems in desperate need of maintenance and a host of other costly community priorities. Few of these communities have dedicated revenue streams for stormwater management, leaving local governments little in the way of resources to support stormwater program needs.

In Pennsylvania, permitted communities, which tend to be significantly smaller and carry the additional constraint of developing a Chesapeake Bay Pollutant Reduction Plan (CBPRP), seem to be at a particular disadvantage. Stormwater programming that meets local priorities and addresses local infrastructure needs and pending requirements is expensive, and many Pennsylvania communities are coming to recognize that collaboration with neighbors, nongovernmental organizations, state agencies, and the private sector will be necessary to accomplish stormwater goals efficiently and effectively.

It was this very challenge that led the Lancaster County Clean Water Consortium (LCCWC) to request the technical assistance of the Environmental Finance Center (EFC) at the University of Maryland. The EFC was asked to work with six municipalities located in Lancaster County – East Cocalico, Manheim, Warwick, and West Lampeter Townships and Lititz and Mount Joy Boroughs – to conduct a stormwater management financing feasibility study.

Because of breadth of diversity among the municipalities in terms of geography, hydrology, community priorities, regulatory requirements, and political climates, each jurisdiction's stormwater financing strategy needed to be as unique as the location it serves, reflecting the nature and characteristics of the community. With support from the National Fish and Wildlife Foundation (NFWF), the EFC worked directly with these six municipalities over the course of a year. The objective of this effort was to identify the current level of stormwater service, determine the future level of service needed to deliver a comprehensive stormwater management program, and highlight any and all opportunities to work collaboratively across the collective municipalities.

And, while the goal of the stormwater management financing study was to enhance each municipality's existing program and help them meet state and federal requirements more thoroughly, it was equally important that community water quality priorities were also properly addressed as all prepared for increased future nutrient reduction expectations. The EFC's approach included conducting in-depth interviews, data collection, and analysis of stormwater-related activities and expenses for each of the participating municipalities. The project also included a collection of outreach activities that helped to educate, inform, and engage citizens, businesses, and elected officials about the need to properly manage stormwater locally.

From the onset, the municipalities mutually agreed that the most important outcome of the stormwater management financing feasibility study should be the identification of an equitable, adequate, and sustainable financing structure to properly manage stormwater beyond 2013. The communities were also eager to learn of ways that the municipalities could generate cost savings by working collaboratively.

Findings

Based on the Project Team's evaluation, it was determined that there were several ways in which each municipality could improve their stormwater program. Some of the recommendations were straightforward and require very little change to implement while other recommendations were found to be more costly in terms of additional resources needed to achieve future improvements. There were easily attainable opportunities for collaboration identified that would achieve some cost-effective improvements. It was determined that all six municipalities would benefit from having a dedicated funding mechanism put in place specifically for stormwater, although the recommendations for each municipality varied based on their past stormwater activities. The highlighted recommendations made for each municipality are described below:

Manheim Township – As Manheim Township prepares for their new MS4 Phase II permit requirements, a significant rise in future costs in order to maintain their existing stormwater system is anticipated. After carefully reviewing all of Manheim Township's permit obligations and conducting a very thorough analysis of their entire stormwater program, the Project Team found current budgeting practices to be adequate in meeting the existing regulatory requirements but insufficient to meet anticipated future expenditures if they are to continue to deliver a comprehensive program.

Based on the needs identified by the Project Team, Manheim Township will incur approximately $10.1 million in stormwater expenses over the next five years. The Project Team recommends a dedicated stormwater user fee be implemented to distribute the costs of paying for repairs and improvements, with a flat rate fee for residential parcels estimated to be between $70 and $85 per property per year and a 4-tiered rate structure for non-residential properties based on the estimated impervious surface of a total parcel. The estimated revenue generated from a fee over five years would be adequate to cover anticipated future costs and will generate between approximately $9 million and $11 million.

Warwick Township – By staying on their current path, Warwick Township should be able to manage stormwater properly in the future providing they continue to make regular repairs and replace infrastructure as their system ages. As they prepare for their new permit requirements, however, maintaining the existing stormwater system will have significant future costs that will not be sufficiently covered by general funds and grants alone. In order to maintain the high level of service they have provided in the past and be able to deliver a more comprehensive stormwater management program in the future, the Township will need to support its program using a variety of funds and not rely so heavily on grants as it has in the past.

After assessing available resources, reviewing stormwater program data, and analyzing current and future spending, it was determined that the best course of action for Warwick Township would be to continue to pay for other costs to implement the stormwater program using general fund appropriations and grants as they have been doing for the last several years. In addition, the Project Team found an estimated revenue stream totaling $639,268 over five years needed to support a municipal stormwater asset management reserve program, and it is recommended that the Township utilize a dedicated user fee to support very specific, yet essential tasks that would include the costs of repairing and replacing the entire storm sewer pipe system and maintaining and renovating all municipally-owned best management practices (BMPs).

The Project Team recommends a dedicated stormwater user fee be implemented to support an infrastructure repair and replacement program, with a flat rate fee for residential parcels estimated to be between $15 and $20 per property per year and a 4-tiered rate structure for non-residential properties based on the estimated impervious surface of a total parcel. The estimated revenue

generated from a fee over five years would be adequate to cover anticipated future costs to support an asset management reserve program and will generate between approximately $678,000 and $687,000.

East Cocalico Township, Lititz Borough, Mount Joy Borough, and West Lampeter Township – After conducting a thorough analysis of each municipal stormwater management program, it became evident that these four municipalities lacked specific data needed to estimate stormwater management costs accurately. Thus, many of the recommendations contained in this report focus on programmatic improvements that will lead to each municipality being able to determine costs as their programs advance. In the meantime, the Project Team utilized data provided by Manheim and Warwick Townships to estimate costs for East Cocalico and West Lampeter Townships and Lititz and Mount Joy Boroughs. The stormwater management program costs for each municipality over five years was estimated between $267,000 and $545,000 using Warwick Township's approach and between $2 million and $4 million using Manheim Township's approach.

The Project Team recommends each municipality implement a dedicated stormwater user fee to begin the investment of properly managing stormwater locally, with a flat rate fee for residential parcels starting at a minimum of $15 per property per year and a 4-tiered rate structure for non-residential properties based on the estimated impervious surface of a total parcel. Given the size and current capacity of the four municipalities, a proposed fee would not need to be at the level recommended for Manheim Township and would be closer to that recommended for Warwick Township. If the fee is set at the minimal rate, the estimated revenue generated from a fee over five years for each municipality is between $329,000 and $566,300.

Opportunities for Multi-Jurisdictional Collaboration

Multi-jurisdictional collaboration is nothing new to the water service industry; it has been practiced effectively for years in the wastewater and drinking water sectors and is quickly moving towards being a proven practice for stormwater, particularly for small capacity and resource strapped communities like the ones in this study. Adopting aspects of regionalization where possible is an appropriate approach for many Lancaster County municipalities to adopt as they grapple with rising costs and increased regulatory expectations. Working collaboratively and restructuring aspects of each jurisdiction's stormwater program will create efficiencies that translate to reduced implementation costs over time.

The differences in size, location, overall need, and current program structure would make it difficult for the six municipalities to immediately begin to work jointly on all aspects of their program. However, there are several areas where some level of multi-jurisdictional collaboration could be implemented relatively easily and could prove to be an effective first step and establish a foundation for a greater level of collaboration on more complex aspects of stormwater management in the future. These include:

- Capacity
- Education
- Outreach/Public events
- Written material
- Equipment
- Develop procedures and shared documents
- Monthly meetings, either formal or informal
- Trainings
- Grants
- Contractor and vendors
- Studies

Conclusions

There was great diversity in how the six municipalities in this study currently approach their stormwater management activities, yet they shared enough common threads that they are undeniably tied to one another. Perhaps the strongest, and most fortunate, commonality was the determination to improve the way stormwater was being managed and elevate its priority locally. Each is willing to being more proactive moving forward and understood that program deficiencies must be addressed.

The internal structure, size, geographic makeup, and age of all of their systems made each municipality unique, yet there were clearly ways they could cooperate, collaborate, and reduce implementation costs in the future. A dedicated fee for stormwater programming needs, tailored to the local nature, characteristics, and need of each community, will enable these municipalities to improve the level of stormwater management and ensure that local priorities as well as state and federal expectations are met consistently. Most importantly, though, these improvements strengthen the quality of life for residents and businesses alike.

Chapter 1: Introduction

Background

Effectively managing stormwater is one of the greatest resource management challenges faced by communities throughout the region. Like all infrastructure, stormwater management systems can have significant upfront capital costs and require long-term management and maintenance to function effectively. As communities struggle to best allocate limited resources, stormwater management systems are frequently overlooked until an emergency occurs, costing millions in damages and repairs, or until a mandate forces a community to take action.

While most communities rely on general funds for stormwater management activities, this means stormwater programs compete for dollars with other critical community priorities like emergency services, planning and zoning, and roads. Having a dedicated revenue stream that is specifically set aside for maintenance and upgrades is often critical to the effective management of stormwater systems at the local level.

The significance of this looms even larger as Chesapeake Bay communities constantly face more stringent regulations, from National Pollutant and Discharge Elimination System Municipal Separate Storm Sewer System (NPDES MS4) Permits to Total Maximum Daily Load (TMDL) allocations to Watershed Implementation Plans (WIPs). In Pennsylvania, MS4 permitted communities in the Bay watershed must also create Chesapeake Bay Pollutant Reduction Plans (CBPRP) and implement stormwater management plans. Although often an effective driver, federal and state mandates are not always accompanied by the type of technical assistance, information, and resources needed to successfully guide the development and implementation of sustainable stormwater management plans and programs.

Compounding this is the fact that the Chesapeake Bay region lags far behind the rest of the country in terms of the total number of communities who have established a how-to-pay plan for their stormwater management, yet now has some of the greatest nutrient reduction expectations in the country. The local political landscape in Pennsylvania further complicates a locality's ability to manage stormwater, since there are 961 municipalities with MS4s located in urbanized areas[1] across the state, each with significant looming costs to manage their stormwater. These communities strive to serve their stakeholders with limited resources while preserving their autonomy and local pride.

As a result, municipalities across Pennsylvania have begun to realize that collaboration is necessary in order to cost-effectively address regulatory mechanisms and manage stormwater. Since Lancaster County has been deemed one of the major contributors to the poor health of the Chesapeake Bay, municipalities in the County know they need to properly manage stormwater to help improve local water quality, and in turn the Bay and its tributaries. In Lancaster County alone there are 46 municipalities who hold a MS4 permit.[2]

These factors led the Lancaster County Clean Water Consortium (LCCWC) to request the technical assistance of the Environmental Finance Center (EFC) at the University of Maryland on behalf of six municipalities located in Lancaster County – East Cocalico, Manheim, Warwick, and West Lampeter Townships and Lititz and Mount Joy Boroughs – to conduct a stormwater financing feasibility study.

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[1] MS4s within Urbanized Areas in Pennsylvania, Grouped by Region, Commonwealth of Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, Retrieved from: http://www.portal.state.pa.us/portal/server.pt/community/stormwater_management/10628/npdes_ms4%C2%A0information/669119.

[2] Ibid.

Because of differences in geography, hydrology, community priorities, regulatory requirements, and political climates, each stormwater financing strategy is as unique as the location it serves, and financing recommendations must also be specifically designed to reflect the nature and characteristics of a jurisdiction. This report chronicles the EFC's work with the six municipalities, identifying the needed level of service for a comprehensive stormwater program for each individual municipality, as well as highlighting opportunities to work collaboratively across municipalities.

Goals of the Lancaster County Municipal Financing Initiative

The goal of EFC's stormwater efforts in Lancaster County was to enhance each municipality's existing program, thus raising the level of service in a way that helps meet state and federal requirements more thoroughly, addressing community water quality priorities, and preparing for future nutrient reduction expectations. In addition, the goal of this project was to identify ways in which municipalities in Lancaster County and beyond can work collaboratively to manage stormwater, as a way to enhance each individual stormwater program while reducing the long-term costs collectively.

It is imperative that municipalities in the County enhance their existing stormwater management programs and position themselves to meet the existing requirements and more stringent future requirements when they are imposed. Stormwater programs of this nature will require the support of a more robust and reliable funding stream than current practices provide. The following outlines the project approach, objectives, and criteria used by the EFC Project Team to help ensure that the long-term stormwater program goals for the participating municipalities are met.

Project Approach

The Project Team took an in-depth approach to helping each municipality plan for a sustainable stormwater management program. This approach included both technical and outreach processes. While the Project Team looked at each municipality individually, a comparison across the six municipalities was also completed to identify ways in which the municipalities (participating in this study and beyond) can work together to manage stormwater.

The technical process began with an assessment of each municipality's current stormwater management program. The Project Team gathered all relevant data from appropriate staff and consultants and worked with municipal staff to evaluate the existing program structure, determine current capacity, and identify trends in funding levels. Once the Project Team assessed the current program, the team conducted a gap analysis to develop a projected level of service that detailed the stormwater management program components needed to achieve a comprehensive program, which included collaborative recommendations with neighboring municipalities where appropriate.

While the original intention was to assign costs to the components of each municipal program, the Project Team found it difficult to collect the data necessary to provide accurate costs the municipalities. In some cases, the Project Team was able to identify estimated costs of a stormwater program, and utilized these estimates as a basis for the municipalities who did not have specific cost data available.

Once costs were identified, the Project Team retrieved parcel data from the Lancaster County Planning Commission (LCPC) to conduct a rate structure analysis to estimate the revenues needed to support the enhanced level of service for each municipality. The final recommendations reflect the needed revenue based on the cost estimates for each municipality to sustain a comprehensive stormwater management program.

Providing residents and businesses the opportunity to understand and have a voice in the development of the stormwater management program is an integral part of the process. The Project

Team worked closely with municipal staff to craft an outreach and marketing plan, provide educational materials, a project logo, attend existing events, and present the project's progress to the public and elected officials throughout the year. See Chapter 4 for more details on specific outreach activities conducted throughout the study.

Project Objectives and Criteria

The purpose of this study was to develop an equitable, adequate, and sustainable financing structure for each municipality to properly manage stormwater beyond 2013, which included ways in which the municipalities could generate cost savings by working collaboratively. This must take into account the escalating costs associated with meeting TMDL and WIP obligations, as well as the new MS4 permits anticipated to be issued in the fall of 2013 by the Pennsylvania Department of Environmental Protection (DEP).

Although all of the participating municipalities currently fund stormwater management primarily through general fund appropriations, this source of funding is not sufficient to cover the costs anticipated with a comprehensive stormwater management program, and is not necessarily the fairest method for addressing this need. As part of the study, the Project Team developed the following set of objectives and criteria for stormwater management financing:

Objective 1. To allocate the costs associated with managing stormwater in a way that is fair and equitable to all residents and businesses located within the municipality.

- Criteria: Allocate costs relative to use of the stormwater system by each property regardless of tax-exempt status and based on contribution to the problem.

Objective 2. Generate an adequate estimate of revenue on an average yearly basis needed to maintain an appropriate level of service for managing stormwater.

- Criteria: Fund stormwater in a way that does not negatively impact other services or raise property taxes, while at the same time is estimated to yield enough revenue to meet current and future stormwater obligations.

Objective 3. Recommend a funding level that is accountable, appropriately sufficient, and realistic.

- Criteria: Fund stormwater management in a way that enables property owners to fully understand the level of service realistically necessary to meet current and future obligations towards managing stormwater.
- Criteria: Provide a clear accounting based on best available data of recommended expenditures needed beyond 2013.

Objective 4. Engage each community in a way that allows for information sharing, data gathering, and education about the need for adequately managing and funding stormwater in the future.

- Criteria: Host multi-municipal gatherings and conduct outreach activities as deemed appropriate throughout the year.

With the above objectives and criteria guiding the Project Team's approach throughout this study, the EFC has developed recommendations designed to assist the public, community leaders, and elected officials with a better understanding of the current funding and capacity of managing stormwater in each municipality to date; the level of service and costs associated with future stormwater management; and the best and most appropriate way to finance stormwater management in the long-term in order to meet the proposed level of service needed for each municipality.

Project Funding

This effort was funded by the National Fish and Wildlife Foundation's (NFWF) Chesapeake Bay Stewardship Fund. Through this fund, NFWF has piloted the Chesapeake Bay Local Government Capacity Building Initiative (LGCBI), which connects communities with appropriate technical assistance providers to assist in the implementation of projects that improve water quality in local and regional streams. The EFC intends to use the experiences of working with six communities in Lancaster County through the LGCBI as a model for other interested communities in Pennsylvania and eventually throughout the Mid-Atlantic region.

Chapter 2: Regulatory Requirements Governing Stormwater in Pennsylvania

There are numerous state and federal regulations that mandate that control measures be put in place in order to properly manage and treat stormwater. However, these regulations require communities to bring their stormwater management programs to a level of service that they have neither the capacity nor the funds to manage effectively. The following is a description of the stormwater-related regulations that municipalities must balance with other municipal obligations and costs.

Total Maximum Daily Loads (TMDLs)

The Clean Water Act (CWA) requires that impaired waterways be regulated with pollution diets of the substance responsible for impairing the body of water.[3] In the Chesapeake Bay region, nitrogen, phosphorus, and sediment have been deemed as the primary culprits to declining water quality. In order to satisfy the commitment made by the Obama Administration under Executive Order 15308 to protect and restore the Chesapeake Bay, TMDLs establish load allocations for nitrogen, phosphorus, and sediment for impaired waterways. Sources of pollution include run-off from agriculture, wastewater facilities, septic systems, and stormwater.

Watershed Implementation Plans (WIPs)

In order to address the TMDLs, WIPs are required by jurisdictions to account for how they plan to meet their pollution allocations.[4] The Phase II WIPs require the states to subdivide the allocation loads to the county level, allowing for a more localized approach to reduction.[5] The counties are then responsible for implementing and financing best management practices (BMPs) to meet reduction goals.

Municipal Separate Storm Sewer System (MS4) Permits

As precipitation flows over impervious surfaces, it picks up chemicals, debris, sediment, and other pollutants that left untreated, could harm local waterways. Municipalities often convey their stormwater through MS4 systems, which discharge untreated runoff into local waterways. As part of the CWA, the NPDES Stormwater Program regulates stormwater discharge from municipal sources.[6] Municipalities must then obtain MS4 permits from the state regulatory agency to discharge stormwater and prevent other harmful pollutants from entering a MS4. The MS4 permit addresses and attempts to curtail non-point pollution on the urban side responsible for water quality.

MS4 permits are further divided by what type of community they cover, namely Phase I or Phase II. Phase I communities are medium and large cities or counties with a population density of 100,000 or more and obtain individual permits.[7] Phase II communities are smaller communities in or outside urbanized areas and are regulated by general permits. All six municipalities in this project are Phase

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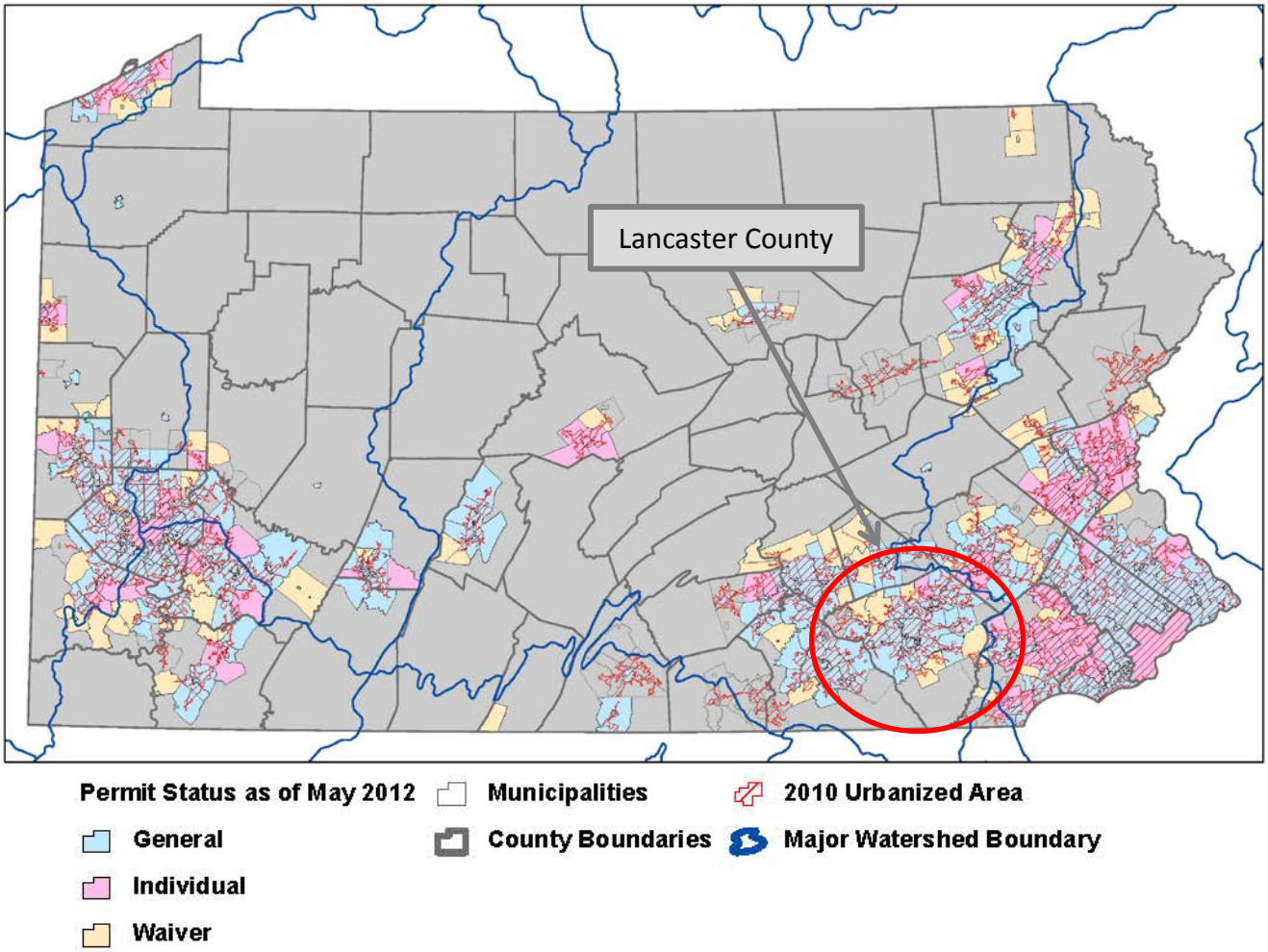
[3] Total Maximum Daily Loads, US EPA, Retrieved from: http://www.epa.gov/reg3wapd/tmdl/.
[4] Frequently Asked Questions about the Bay TMDL, US EPA, Retrieved from: http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/FrequentlyAskedQuestions.html.
[5] Pennsylvania Chesapeake Watershed Implementation Plan Phase II, Prepared by Pennsylvania DEP, March 30, 2012, Retrieved from: http://www.epa.gov/reg3wapd/pdf/pdf_chesbay/PhaseIIWIPS/PAFINALPhase2WIP3-30-2012.pdf.
[6] Stormwater Basic Information, US EPA, Retrieved from: http://cfpub.epa.gov/npdes/stormwater/swbasicinfo.cfm.
[7] Stormwater Discharges From MS4s, US EPA, Retrieved from: http://cfpub.epa.gov/npdes/stormwater/munic.cfm.

II communities with general MS4 permits. Figure 1 shows all of the Phase I and Phase II municipalities in Pennsylvania.

Figure 1: Map of all MS4 Permitted Municipalities in Pennsylvania, 2010[8]



Chesapeake Bay Pollution Reduction Plans (CBPRPs)

The Pennsylvania MS4 permit program requires MS4s that discharge into waterways that drain to the Chesapeake Bay to also prepare and implement a CBPRP. In order to meet the load allocations required by the TMDLs, the submitted CBPRP must include the implementation of BMPs to reduce nitrogen, phosphorous, and sediment. The CBPRP is what connects the MS4 permit to the TMDL regulation, ensuring nutrient and sediment reduction from the urban sector.

Chapter 102: The Erosion and Sediment Standards

In addition to the CBPRP, another requirement in the MS4 is taken from Chapter 102 in the Pennsylvania Code. The purpose of Chapter 102 is to protect Pennsylvania's surface waters from sediment and stormwater pollution.[9] This is achieved through BMPs that decrease erosion and

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[8] Map of Pennsylvania's NPDES MS4 Permitting Program, Pennsylvania Department of Environmental Protection, Retrieved from: http://files.dep.state.pa.us/Water/BPNPSM/StormwaterManagement/MS4_2010_UA.pdf.

[9] Erosion and Sediment Control and Stormwater Management, Title 25 Pa. Code Chapter 102, Retrieved from: http://www.portal.state.pa.us/portal/server.pt?open=18&objID=504340&mode=2.

sedimentation as well as managing post construction stormwater runoff. Chapter 102 is incorporated in the MS4 permit via minimum control measures (MCMs) 4 and 5, construction site stormwater run-off control and post-construction stormwater management in new development and redevelopment, respectively.

Act 167: Stormwater Management Plan

Pennsylvania Act 167, known as the stormwater management plan, provides regulation for land and water use for flood control and stormwater management purposes.[10] The plan requires counties to prepare, update, and adopt plans for stormwater management.[11] Implementation of a stormwater plan under Act 167 helps municipalities meet their MS4 permit regulations, namely their MCMs. Having a written plan is integral to a successful stormwater management program in order to fully comprehend the requirements of the MS4 permit and the steps necessary to achieve compliance. Lancaster County has developed a countywide Act 167 Plan, and municipalities in the County will adopt an ordinance consistent with the plan as approved by the PA DEP.

Senate Bill 351 (SB 351)

On July 9th, 2013 Governor Corbett of Pennsylvania signed SB 351 into law after a 49-1 victory in the Senate and a 135-66-1 vote for the bill in the House.[12] SB 351 serves to amend Title 53, which lays out the general rights and authorities of municipalities in Pennsylvania. In particular, SB 351 provides municipality with the legal authorization to create stormwater authorities whereas before municipalities were reluctant to create an authority due to threat of litigation and non-legitimacy.[13]

The passage of SB 351 paves the way for municipalities to implement a stormwater authority that would be able to collect revenue from users in order to pay for the maintenance of stormwater conveyance systems and install and maintain BMPs to treat the stormwater. Having a dedicated revenue stream to stormwater is important for municipalities in which stormwater system maintenance does not receive adequate funding from general funds or grants. Therefore, it is important that municipalities have the option to take care of stormwater management in terms of both compliance and environmental stewardship.

Agricultural Regulations

Agriculture production remains a large part of Lancaster County's identity, with nearly 6,000 farms that contribute more than $4 billion to the local economy each year.[14] Agricultural activity is also a large contributor to the poor health of local streams and the Chesapeake Bay.[15] Thus, all farms are required to have Conservation Plans and Manure Management Plans in place with measures that attempt to curtail non-point pollution on the agricultural side responsible for water quality.

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[10] Pennsylvania Act 167, Lancaster County Government Online, Retrieved from: http://www.co.lancaster.pa.us/lanco/cwp/view.asp?Q=468968.

[11] The Pennsylvania Stormwater Management Act 167 Planning Program, Pennsylvania DEP, Retrieved from: ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/3930-FS-DEP1840.pdf.

[12] Regular Session 2013-2014 Senate Bill 351, Pennsylvania General Assembly, Retrieved from: http://www.legis.state.pa.us/cfdocs/billinfo/bill_history.cfm?syear=2013&sind=0&body=S&type=B&bn=351.

[13] PennFuture Praises State Senate Passage of Stormwater Legislation, PR Newswire, April 16th, 2013, Harrisburg, PA, Retrieved from: http://www.prnewswire.com/news-releases/pennfuture-praises-state-senate-passage-of-stormwater-legislation-203273951.html.

[14] Farming in Lancaster County, Lancaster Farmland Trust, Retrieved from: http://www.lancasterfarmlandtrust.org/heritage/farming-lancaster.html.

[15] Act 167 Storm Water Management Plan for Lancaster County, Technical Report, June 2006,Retrieved from: http://files.dep.state.pa.us/water/Watershed%20Management/WatershedPortalFiles/StormwaterManagement/Approved%20Plans/Act%20167%202006%20Lancaster%20Countywide.pdf.

Although agriculture is not the primary focus of this report, the Project Team recognizes the importance of this community's role in improving water quality. Each of the participating municipalities with an agricultural community continues to foster relationships with farmers to educate this community on their role in improving water quality and the agricultural regulations that govern the Chesapeake Bay restoration effort.

Chapter 3: Initial Findings

Access to Available Information and Resources

The way municipalities manage stormwater has changed significantly over the last decade. With these new changes comes tighter reporting and tracking on MS4 permits, TMDL requirements, as well as an understanding of WIP obligations. More than ever, there is a need for municipal staff to drastically increase their level of education and understanding of the rules, requirements, and guidelines to effectively manage stormwater. There are many websites where information can be easily accessed, although searching for the best resources may be time consuming for an already heavily burdened staff. When the time to understand the expectations and requirements of local, state, and federal regulations is at its greatest, it is also the time of most confusion in terms of how best to access the right information, what applies to each municipality, and what the expectations are regarding the level of performance needed to meet the new regulatory changes. In this study, the Project Team found some municipalities to be proactive in their plans to better manage stormwater, but these municipalities were unable to acquire necessary approval by state authorities to move forward on certain plans. Such was the case of the TMDL Update and Chesapeake Bay Pollution Reduction Plan for Lititz Run completed by LandStudies, Inc. in February 2013 for Lititz Borough and Warwick Township[16]. They could not submit a completed plan because of uneasiness by the state to provide approval of the plan before exact requirements were firmly established. This example demonstrates the willingness by some municipalities to plan ahead and their eagerness to comply with all requirements. All six in this study demonstrated this enthusiasm but were frustrated by the lack of information and guidance they received at the state and federal level in moving forward at a pace that would produce results.

All six municipalities were affected in some way by the limited information available. Municipal staff members were found to have many other responsibilities beyond stormwater and had very limited time to search for answers needed to prioritize certain aspects of their program. All municipalities rely heavily on engineering consultants but this costs money that could otherwise be allocated for design and construction of stormwater projects. The Project Team found that transforming the way stormwater is managed can be done much more easily if there were places to quickly access data such as internet forums, consolidated resources, and access to one-on-one guidance on their actions. This includes getting timely answers from state and federal authorities on issues of compliance that may be particular to a municipality rather than a general question. All six did a very commendable job of using what limited information was available and doing what they could with very limited resources dedicated for stormwater.

Recommendation for Improvements

Information sharing among municipalities should be encouraged on a regular basis. This can be done in several ways. First, the six municipalities working together on this project will now be very knowledgeable about each other's programs and program needs. A network (either formal or informal) can be set up between these six to share information either through a list-serve, a simple shared Dropbox site, or even a shared website. It can also be done through monthly informal lunch meetings simply to touch base using a system of round robin-style updates. All six can also improve utilization of existing resources such as StormwaterPA.org or US EPA's NPDES MS4 Webpage. All should enlist the support of organizations such as the LCCWC, which they are all members of, as the ideal organization to disseminate information, share in trainings, and compare questions and approaches with each other. By forming a network of municipalities working as a group, state and

[16] TMDL Update and Chesapeake Bay Pollution Reduction Plan, Lititz Run, Lancaster County, PA, February 1st, 2013, Prepared by LandStudies, Inc.

federal agencies are much more likely to have the capacity to readily respond collectively rather than answer each individual community who has the same questions and concerns.

Level of Understanding of Overall Stormwater Program Requirements

Recently, one of the participating municipalities summed up their earlier understanding of overall stormwater program requirements prior to the study with the following statement: "We didn't know what we didn't know." This simple statement accurately describes the Project Team's assessment of the level of understanding most municipalities have regarding what is required of them to be in compliance with their MS4 permit and meet their program needs. In other words, four out of six of the municipalities were generally unclear about the precise level of work necessary to meet all elements of the program requirements. One thing was clear among those involved in this project – all seemed to have significantly benefited from the study's process over the course of one year by learning in much more detail exactly what each municipality needed to do to improve its stormwater program. This also coincided with several workshops that were held in Lancaster County and all six municipalities participated as much as possible.

The Project Team found that the municipalities were limited in areas of internal tracking and proper documentation, which are required in order to effectively meet the six MCMs found in their MS4 permit. During the course of the year, each municipality has taken important steps to improve the ways they meet certain MCMs, but without more direct support and additional financial resources dedicated to stormwater, they may continue to fall short of where each needs to be with the issuance of their new MS4 Permit and meeting other state and federal requirements.

It should be noted that Manheim Township had sufficient capacity on staff through the use of their engineers to get access to the most appropriate and up to date stormwater information necessary to manage their program in the past. Manheim Township also has a larger tax base than the other five municipalities, which allows for on-going support of their stormwater program even though it is not dedicated toward stormwater and remains relatively insufficient in meeting future stormwater needs. Although Warwick Township does not have the same tax base compared to Manheim Township, they do have strong leadership through their Township Manager, who makes it a point to embed stormwater into many elements of other Township-related activities. This allows for integration of stormwater across other departments and leverages other activities within the Township to lower stormwater program costs. It also helps to keep a larger number of municipal staff well informed about stormwater. The other municipalities were not as fortunate to have an adequate tax base, capacity, or strong leadership, so the learning curve during the early part of the project was greater for those municipalities.

Mount Joy Borough is a good example of overall program improvement after being informed of areas for improvement within their existing program. The Borough recently was successful in receiving grant funding to set up a demonstration rain garden site on the Borough property that has positively influenced the direction of their entire stormwater program. Mount Joy Borough is becoming more like Warwick Township in terms of integrating and prioritizing stormwater throughout many of their other programs. Before this study began, Mount Joy Borough did not fully recognize the importance of meeting MCMs in terms of tracking and reporting. By going through in greater detail exactly what was required and discussing ways to improve deficiencies, the stormwater staff quickly made adjustments and redirected their priorities to avoid falling short. They made measurable strides in their program without additional capacity or without any dedicated revenue but through willingness to improve and through public education. Although Mount Joy Borough has made progress throughout the year, it stands to reason that much more could be achieved throughout the Borough with additional support and more dedicated resources which would keep them on track to meet state and federal requirements as well significantly

improve water quality. Mount Joy Borough municipal staff have also taken advantage of every training opportunity and made an effort to get as many members of their team to attend trainings as was possible. The Borough stands as a community that is on the path to be one of the more notable in the Lancaster area given the political support and appreciation of the staff's increased understanding and improved management of their stormwater program.

It should also be noted that some communities have been known to fear the level of exposure that these six participating municipalities have had throughout the intense analysis undertaken this year on their stormwater program. All six started this process with the same understanding that by ignoring the fact that gaps exist within the stormwater program and not disclosing all aspects of their program, very few improvements could be made that will help them in the long run. As almost every MS4 permitted community across the country knows, there are always some ways to improve a program. Our overall assessment is that each municipality had gaps and deficiencies within various aspects of their program. Each community learned ways in which to improve their program by more strategically planning for the long term, and each has committed to developing a more sustainable and comprehensive stormwater program if provided with the support to do so.

Recommendation for Improvements

All of the municipalities can benefit from attending training in all areas related to stormwater. Elected officials should encourage as many staff members working on anything related to stormwater to attend these trainings that take place in Lancaster County, more so than any other surrounding county. They are usually free and require only a short time commitment. Elected officials should ask for regular updates from staff on various improvements made to the program so they remain knowledgeable and informed on progress made. Municipal stormwater staff would benefit from taking sections in this report dedicated to their specific municipality (Chapters 5-10) and focusing on suggested areas for improvement and develop a timeline for making improvements.

Relaying the Importance of Stormwater Management to Elected Officials, General Public, and Businesses

Relaying the message to a community on the importance of proper stormwater management can often be one of the greatest challenges facing municipal staff. The six participating municipalities were no exception. At a time when the level of stormwater services being provided by a MS4 Phase II municipality are rapidly changing, municipal staff are required to quickly respond to an inordinate amount of questions and concerns from citizens and elected officials, sometimes without the understanding of why managing stormwater locally needs to be done at all. When a Board of Supervisors or Commissioners is not fully supportive of managing the increasing costs associated with implementing proper stormwater management, it adds additional challenges and requires time to convince the general public and businesses of the need for a more comprehensive program. Municipal staff found the public's attitude of "my cost, their gain" to be difficult to overturn. Considerable staff effort is required to demonstrate the need to care about stormwater issues among elected officials, general public, businesses and in particular, developers.

One of the ways in which improved stormwater management gets adequate attention, particularly from elected officials, is when a MS4 permit is renewed or when word spreads of other municipalities getting audited or inspected. This was the case in recent years when many municipalities in Pennsylvania were audited or inspected and several were penalized for deficiencies within their program. This publicity tends to bring greater awareness to the need for improving stormwater programs but this awareness does not typically trickle down to citizens and businesses or result in any additional resources for the staff. The resulting action is often reactive rather than being a proactive approach by a municipality. Additionally, the incentive to properly manage stormwater through other municipalities being penalized often creates disdain and angst toward

state and federal regulatory agencies. Instead, municipal staff should focus on highlighting the costs of not managing stormwater (flooding, poor water quality, emergency-related costs) versus the benefits of managing stormwater (stream restoration, conservation, recreation, economic activity, beautification).

Another way that stormwater management often gets local attention is when funds are being sought for capital improvement projects by municipal staff to address a problem. Unfortunately, this only attracts the attention of local officials for a short period of time. Stormwater services will always compete with other public issues that require action and attention by elected officials unless approved resources are designated to the program and these resources are managed by informed and well-trained municipal staff.

Within the six participating municipalities, the Project Team found almost all elected officials were very supportive of this study. For example, the Manheim Township Commissioners were very receptive and well informed on stormwater. They also understood the importance of informing and educating the public on proper stormwater management and how it helps the municipality continue its work in the future. The well-informed elected officials in Manheim Township may be the direct result of the stormwater staff efforts to consistently update and inform the Commissioners on their program activities. The Project Team found that the majority of elected officials in the six municipalities were very supportive and informed of the study.

Sometimes tying the message of stormwater to an important feature, element, or characteristic of a community may be more beneficial in conveying the message of stormwater across the jurisdiction. Warwick Township, for example, made stormwater a local priority and raised its understanding and importance by tying it to fly fishing, something quite important to the community in terms of its recreational value as a water quality issue rather than a compliance issue. People resonated with clean streams and fishing and valued it more in Warwick Township and more easily understood the connection to stormwater. Mount Joy Borough was also successful at pushing the idea of beautification, the environment, and the economy by promoting a rain garden and rain barrel program. Citizens connect the value of these programs to the aesthetic value of their community and are becoming more engaged and aware of stormwater because of these efforts.

In Lancaster County, agriculture is a major component of the history, culture, and economy that should not be overlooked when educating and informing the general public. West Lampeter Township, for example, has a current project working with the Lancaster Farmland Trust, which connects directly with the farming community within the municipality. The goal of the project managed by the Trust is to help farmers create conservation plans and manure management plans, and identify BMPs on their farms with credit and support going back to the Township. With the large farming population within the Township, this is a more specific targeted approach that will engage an important sector of the local population who does not always associate with stormwater concerns. In fact, the Project Team attended a meeting on January 31st, 2013 that was attended by approximately 100 area farmers, an unusually large number, who are involved in this effort strengthening a stronger partnership between the municipality and the community, as well as providing an opportunity to educate citizens on stormwater.

Recommendation for Improvements

One way to better communicate the importance of stormwater to decision makers and the public may be to invite speakers and credible experts from outside municipal staff. Additional ways to bolster community support includes installing signs that explain what a new stormwater project site is or by better marketing efforts at local events such as the Watershed Expo hosted by the Chiques Creek Watershed Alliance and held every year in Rapho Township. By conveying a consistent

message of the importance of managing stormwater across neighboring jurisdictions, support will eventually increase for each municipality.

West Lampeter and East Cocalico Townships were found to be the most limited of the six municipalities in terms of staff to help educate the general public and elected officials, but intend to make use of what other jurisdictions are doing within Lancaster to partner to the extent that is practical. It is also recommended that these two municipalities make it a stronger priority to educate and inform elected officials on a regular basis, as well as gain public buy-in through public meetings and disseminating information at local events. Since elected officials must always balance community priorities, it is important for municipal staff to take the lead in keeping the elected officials informed of stormwater regulations, as well as opportunities to manage stormwater cost efficiently.

Since it is clear that state-level support to provide more technical assistance to municipalities is not expected to increase significantly over the next five years, it is more important than ever that all six municipalities use their jurisdictional partnerships to educate and inform elected officials and citizens on the importance of proper stormwater management during the next permit cycle. The more communities that act together through a regional approach that crosses jurisdictional boundaries, the more access they will have to educate the public and share information. The six municipalities should also be sure to utilize the services of the Lancaster County Conservation District's (LCCD) educational materials available for promotion.

Stormwater Management Training for Municipal Staff

Not uncommon to Pennsylvania or even in the Mid-Atlantic region, the Project Team found that training expressly related to the MS4 permit was generally lacking. Although all of the municipalities took advantage of the workshops offered by the LCCWC, LCPC, and the Lancaster Inter Municipal Committee (LIMC), this training does not typically include all personnel working on the various stormwater functions for each jurisdiction. It was stated by some that it was difficult to devote entire staff time to attend the ample trainings offered. Training is particularly important with the new MS4 permit under the MCM 6 entitled "Pollution Prevention/ Good Housekeeping" that requires documentation of regular trainings for stormwater staff.

Warwick Township does a good job of training staff on how to handle reports of illicit discharge but there was no organized effort to organize trainings within the six municipalities. There are small efforts underway by local organizations, but there is no designated leader in the area to lead and coordinate this effort currently.

Recommendations for Improvements

Part of the concern of devoting more time to training beyond the compliance factor is the limitations on understanding the exact value that these trainings will provide to the stormwater staff. One way to improve in this area would be for engineers, road crews, stormwater managers, and other staff to coordinate trainings among multiple jurisdictions; acquire training videos that could be shared or copied; and plan regular set brief meetings at a break room or other convenient location to quickly review, update, and coordinate information between all personnel. Locations and compiled listings of all trainings could be housed in places like stormwaterpa.org or organizations like the Alliance for the Bay, who can even take on implementing short trainings or make videos that could be housed on their website given small amounts of funding available. This makes the case for greater collaboration across municipalities, as it will be easier to garner funding for a group of municipalities to all gain access to the same informational materials and trainings.

Tracking, Documentation, and Record Keeping of Stormwater Management Activities

Almost universal across all jurisdictions was the lack of proper tracking and record keeping. The way in which documentation was recorded varied considerably for each municipality. Proper tracking is important for several reasons. The first is to ensure consistency between various departments regarding duties performed, the number of inspections occurring, and tracking progress made. The state and federal requirements are much more stringent about this beginning with the new MS4 permit. Centralized systems for documentation and tracking are important for the purposes of writing complete annual reports and showing all progress and potential problems within a particular aspect of the program. Improvements in record keeping, tracking, and proper documentation are highly recommended for all municipalities, as it is the cheapest and easiest improvement that could be made to each program.

The Project Team found it difficult to collect information throughout this project. Many times the information did not exist, it was not in a central location, or it was not recorded on paper. This limited the Project Team's ability to readily identify program gaps and make recommended improvements. Designing a better system now will go a very long way to identifying future levels of service needed to meet all state and federal regulations.

Recommendations for Improvements

One way to greatly improve the efficiency of developing and managing a stormwater program would be to designate a new position of a stormwater utility manager or stormwater coordinator. By assigning the responsibility of MCM tracking and documentation to a single person, instead of piece-mealing information from various sources, a better sense of the state of the stormwater program can be assessed in addition to centralizing the knowledge base. The Project Team recommends each municipality consider purchasing software to help address the administrative components of the MS4 permit. An example is a software program called MS4Web Permit Manager, which facilitates a municpality's stormwater tracking, recording, and documentation needs. With additional field technology, the software provides the ability to record and track while out in the field, which could be instrumental to aid in quickly assimilating annual reports and could introduce the concept of asset management for the entire conveyance system.

Limited Capacity to Manage Stormwater

All six municipalities currently suffer from limited capacity. Most of the municipal staff had stormwater as just one component of their total work responsibility and within each municipality several staff members were assigned some part of stormwater. This required a balance of adding more work to an already heavy workload. The Project Team found that greater coordination and regular communication between the different staff members managing stormwater is needed. Fragmentation was found among certain personnel who may have the added responsibility of managing one aspect of the program without clear coordination with another person who may have a similar responsibility. There is a sense of "no new hires" pervasive throughout the six municipalities, but perhaps due to the limited understanding by elected officials as to the tremendous level of work needed by the stormwater staff to deliver a level of service that meets the required permit obligations.

Recommendations for Improvements

There are cost efficiencies to be gained in the long run by having a dedicated person in charge of communication and coordination between various departments responsible for stormwater. Another recommendation would be to house stormwater under one department such as is suggested for Manheim Township's approach rather than have its duties fragmented between different divisions.

Through dedicated stormwater funds, a program could gain a stormwater coordinator or share one between multiple municipalities in order to develop templates, protocols, and procedures for all.

Long Term Planning for Implementation of Stormwater Projects

Of the six municipalities involved in the stormwater study, only one had done any long term planning for capital improvements, operations and maintenance, green infrastructure, or an assessment of future capacity needs. The reason that most do not have any type of projections is primarily due to very limited funds dedicated towards stormwater that go beyond regular maintenance or emergency repair work. The exception to this was Manheim Township, which had capital improvement projects and a good understanding of where they needed to be for the foreseeable future. This level of planning helped the Project Team identify, categorize, and estimate where others needed to be to begin budgeting and planning more accurately. Another exception, although very different in their approach, is Warwick Township, who needed dedicated funding to support long-term capital improvement projects. However, the Township wanted to maintain their current level of funding from the General Fund for stormwater and where possible, keep any additional revenue necessary to support the full stormwater program to a minimum.

Recommendations for Improvements

Many communities across the United States operate their stormwater program at a minimal level, mainly due to the lack of understanding as to the importance it has on water quality and community infrastructure improvements. Long term planning does not play as large a role as it should in stormwater. This is analogous to the wastewater and drinking water industry in the past. The value of understanding all of the current assets or infrastructure along with a condition assessment and replacement or repair schedule is not appreciated as it should be until the costs of last minute repairs are compared to prioritizing and planning for necessary upgrades to an aging system. It is the Project Team's recommendation that the participating municipalities consider adopting an asset management program for stormwater. This recommendation is rather a new concept for the Mid-Atlantic in terms of managing stormwater but can significantly benefit these and other municipalities at minimal cost with the potential for significant savings, similar to what was achieved in other water resource departments.

Chapter 4: Public Outreach

It is very difficult to surmise the value of a resource if that value is unknown to its users. Therefore, public outreach and education is an important step towards gaining community buy-in for a stormwater management program. Effective public outreach and education is not only necessary for a successful campaign toward better stormwater management, but it is a required regulatory component of the MS4 permit.

In order to gain public support on the value of proper stormwater management, the Project Team engaged residents, elected officials, and municipal staff of the six communities. While public outreach and education was not a large component of the funding received for the project, the Project Team was still able to take advantage and participate in activities already planned by municipalities. The goal of this project's outreach effort was to supply the communities with readily available materials and tools to use for their own stormwater education.

The Project Team began its public outreach component of the study with its "kick-off" outreach meeting at West Lampeter Township on November 20th, 2012. The purpose of this meeting was to determine the educational and outreach goals of the project, review the outreach and marketing timeline, discuss the project logo, and brainstorm other outreach materials. The marketing timeline may be found in Appendix A.

Project Logo

With the input and guidance of the six municipalities, the Project Team enlisted the help of a graphic designer to help create a logo to brand the project. The logo was based on Lancaster City's raindrop logo for the "Save It!" campaign, aimed at increasing public awareness of stormwater issues.[17] The Project Team received permission from Lancaster City municipal staff to use their logo as a model for the project. One advantage of basing the logo on Lancaster City's design is the added recognition the project logo received due to public familiarity. Lancaster City's logo and the logo for the six municipalities are depicted in Appendix B.

The Project Team printed the logo on stickers and magnets for each community's respective Public Works Department (PWD) vehicles. The purpose of this was to raise public awareness for the project, inform the public works staff, and show unity among the participating municipalities.

Outreach Materials

In addition to the logo, the Project Team also created a general stormwater management fact sheet for all municipalities and more detailed residential handout for each municipality to disseminate to the public, found in Appendix C. The purpose of these materials was to provide the municipalities with information to share with the community that was uniform across the municipalities. The municipalities and the Project Team felt that uniformity among the communities was important to the success in educating the public and generating the necessary community buy-in to help improve each individual municipal stormwater program.

While uniformity is key in some aspects of stormwater education, so too are creating materials unique to each municipality. The residential handouts were customized for each community and also included the raindrop logo. The residential handouts included information on how residents contributed to stormwater and BMPs available specifically to homeowners to decrease the volume of stormwater generated on residential properties. The handout cited practices such as installing a rain barrel and lawn care tips. At the request of Manheim Township's elected officials, a more

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[17] Website for the "Save It!" stormwater campaign and logo, Retrieved from: http://www.saveitlancaster.com/.

specific handout was created to include detailed information on soil tests and fertilizer selection (See Appendix C).

Public Works Department Talking Points

A successful outreach campaign is dependent on educating those who interact with the public. Therefore, it was imperative to provide the public works staff for each municipality simple talking points when engaging the public on stormwater issues. The Project Team provided a script to the municipalities that described the meaning of the project logo, a quick definition of stormwater, why stormwater is an issue, and ways for residents to become involved with stormwater management. A copy of this script is provided in Appendix D.

Council Meetings

In order to keep elected official abreast of study findings, the Project Team was available to make presentations at council meetings. The Project Team presented a project update and/or project findings and recommendations to the following groups of elected officials:

- West Lampeter Board of Supervisors on January 7th, 2013;
- Mount Joy Borough Public Works Committee on January 14th, 2013;
- Lititz Borough Council on February 26th, which prompted local press coverage for the project[18];
- Manheim Township Board of Commissioners on June 24th, 2013;
- Warwick Township Board of Commissioners on October 2nd, 2013; and
- East Cocalico Board of Commissioners on October 16th, 2013.

Bringing stormwater to the attention of elected officials helps facilitate a stormwater dialogue between municipal staff and elected officials. By engaging and educating the elected officials, the importance of proper stormwater management can more easily make its way on future council agendas.

Agricultural Community Engagement

The farming community is an important sector in Lancaster County and one that needs to be kept part of the stormwater conversation. Therefore, the Project Team presented at the West Lampeter Township Farmers Meeting on January 31st, 2013 to a large group of farmers alongside the LCCD, Lancaster Farmland Trust, and other local agricultural outreach organizations. The purpose of this meeting was to educate farmers on the plans and practices required of them (Conservation Plans and Manure Management Plans), provide resources to help farmers implement such plans and practices, and get feedback directly from farmers. The Project Team found that this type of information sharing and giving the agricultural community a chance to voice their opinions and concerns is essential to successfully engaging this sector and ensuring they do their part in managing stormwater.

Public Engagement

The Project Team was invited to events hosted by the municipalities, which served two purposes – to act as a stormwater educational presence at events *and* to learn how communities promote environmental stewardship. For example, on May 14th, 2013 the Project Team attended Warwick Township's annual Watershed Day. The Watershed Day serves as an educational event for all 5th

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[18] Press coverage in the Lancaster Intelligencer Journal/Lancaster New Era on February 28th, 2013, Retrieved from: http://lancasteronline.com/article/local/820429_Lititz-welcomes-Coolest-Small-Town-title.html.

graders in the Warwick Township School District (which includes residents of Lititz Borough) and also helps fulfill MCMs 1 & 2 for both municipalities. This is one example of how neighboring municipalities that share a school district and local stream benefit from participating in watershed days.

While the Warwick Township Watershed Day was geared towards 5th graders, the Project Team also attended events that engaged the general public as a whole. On June 14th, 2013 the Project Team set up a booth at Lititz Borough's 2nd Friday event. On this particular Friday, the event was dedicated to the Borough's Fire and Police Departments. The Project Team was given a table to share with the Borough's public works staff, which was showcasing a newly purchased inlet cleaning truck. The Project Team engaged the public by providing a fishing game for children and speaking with parents about general stormwater education and passing out the residential handouts. Pictures from the events may be found in Appendix E.

The Project Team also attended events that were in neighboring municipalities. On June 19th, 2013 the Project Team was given a table at the Chiques Creek Watershed Expo, which was hosted by the Chiques Creek Watershed Alliance and located at the Lancaster Leiderkranz in Rapho Township. While Rapho Township is not one of the communities participating in this project, the Little Chiques Creek flows through Mount Joy Borough and directly into Chiques Creek. This event is another example of how communities in the same local watershed can share public outreach events and fulfill MCM requirements. The project team provided general stormwater education and solicited feedback from the public. Pictures from the Watershed Expo may be found in Appendix E.

The Project Team was invited to attend Mount Joy Borough's volunteer day in which the Boy and Girl Scouts helped the Borough staff and landscapers plant flowers and trees in the Borough's demonstration rain garden located on municipal property. Borough staff and councilmen pitched in and worked alongside the Scouts. Pictures from the event may be found in Appendix E.

Local Partner Meetings

The EFC's technical assistance was provided to the six municipalities because the LCCWC sponsored this regional partnership. The Project Team provided monthly updates to the LCCWC throughout the project and attended a LCCWC Steering Committee Meeting to provide a project update to this group, which is made up of many local municipal representatives and local water resource stakeholders throughout Lancaster County.

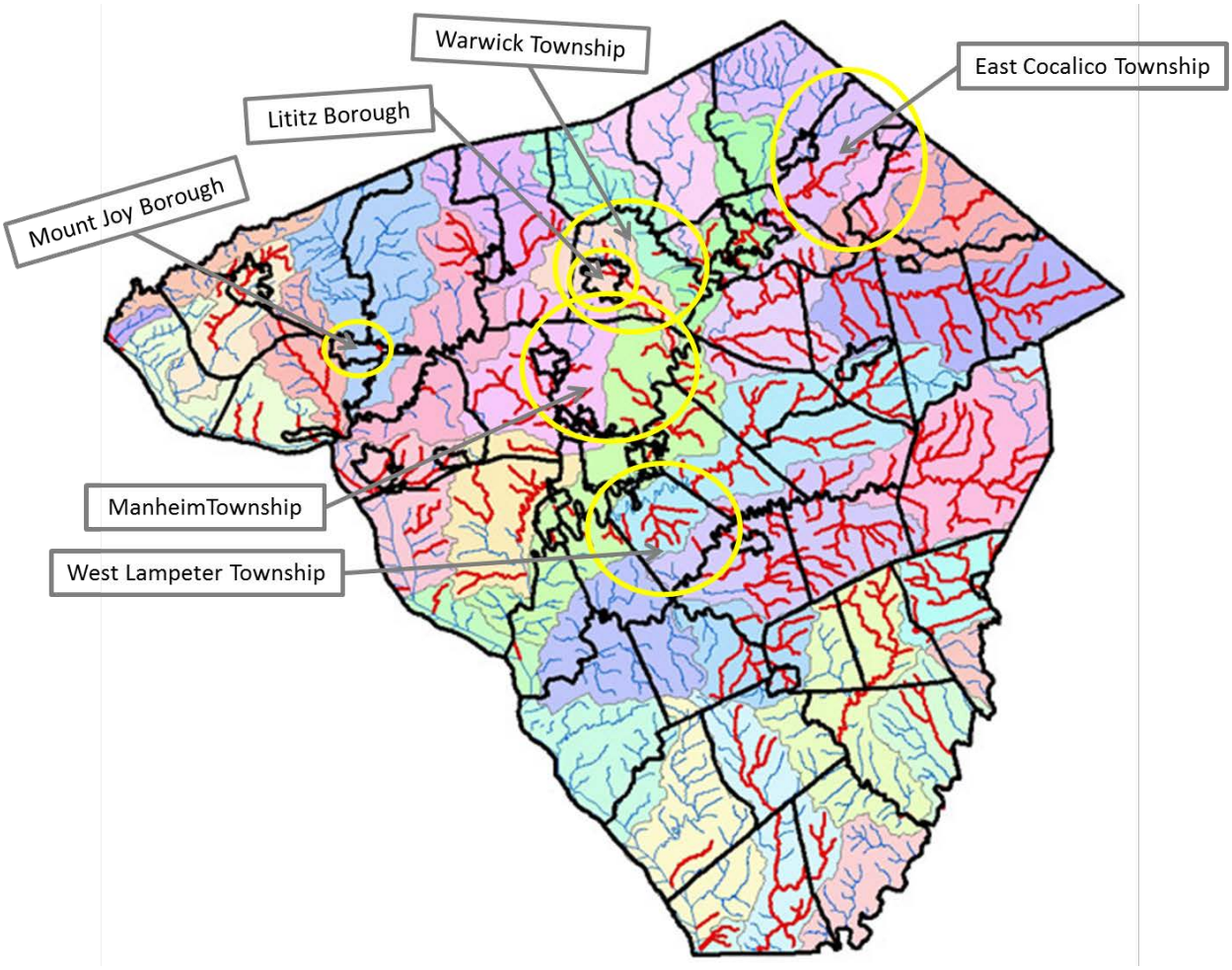
The Project Team quickly realized at the beginning of the study that in addition to the LCCWC, there are many local partners in the County working toward managing stormwater and providing resources to municipalities. Therefore, the Project Team found it essential to meet with local partners to get a better sense of the legal, political, environmental, social, and economic landscape in the community surrounding stormwater. In addition to meeting with the LCCWC periodically, the Project Team met with the following organizations:

- LIMC
- LCPC
- Lancaster County Conservancy/Live Green
- Lancaster City
- LCCD
- Multiple engineering, landscape architecture, and consulting firms

The Project Team also participated in two watershed forums hosted by the LCPC, which brought together a vast array of water resource stakeholders, including many of the participating municipalities in the study. This proved valuable in the Project Team's understanding of the landscape in the County and what resources, constraints, and collaborative opportunities exist.

Chapters 5 through 10 outline the findings and recommendations for each of the six participating municipalities' stormwater management programs. Figure 2 shows the map of impaired streams in Lancaster County (according to the PA DEP) and highlights the location of each of the six participating municipalities.

Figure 2: Lancaster County Impaired Streams Map[19]



[19] Lancaster County Watersheds, What is a Watershed?, Lancaster County Conservation District, Retrieved from: http://lancasterwatersheds.org/whatis.php.

Chapter 5: Individual Municipal Analysis – East Cocalico Township

East Cocalico Township is located in the Northern section of Lancaster County and serves as a connection point for many commuters and travelers, alike. Located at the intersection of the Pennsylvania Turnpike and Route 222, the community has attracted residential and industrial growth throughout the years. With a population of 10,304[20], it is one of the mid-range municipalities of the six who participated in this study. Growth is anticipated to continue due to the Township's access and proximity to many urban centers in the region.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. East Cocalico Township provided the following:

Priorities

1. Develop an understanding of true costs associated with inventorying, routinely evaluating, maintaining and replacing the Township's stormwater infrastructure and complying with the current and future regulatory requirements.
2. Inventorying all public and private stormwater facilities (swales, pipes, detention facilities, BMP's, conservation areas, etc.) and all related discharges within the Township and clarifying the ownership, maintenance, and monitoring responsibilities.
3. Develop a method for documenting and highlighting all the various voluntary and required stormwater improvements and BMPs implemented by the Township, private residents, farmers and businesses to ensure appropriate credit is acknowledged towards future permit compliance.
4. Develop an understanding of the protocols and costs involved in implementing a regular testing program to evaluate the water quality in the streams entering and exiting the Township so that the effectiveness of the Township's overall program can be documented over time.
5. Through public education and outreach determine what non-municipal resources such as schools, watershed associations and/or other volunteers could assist in reducing costs and/or providing resources to assist with inventorying, testing, etc.
6. Educate the public on the current and future potential regulatory requirements and solicit feedback on ways to most effectively improve water quality in our streams and waterways and maintain the stormwater infrastructure.
7. Develop a method to address the impacts of future proposed linear roadway improvement projects such as road widening by the Township, Pennsylvania Department of Transportation (PennDOT), or the Turnpike Commission in an efficient and cost-effective way.
8. Develop a method for evaluating maintenance of private stormwater management facilities and BMPs for compliance with prior approved plans and commitments relative to maintenance.

[20] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search population ACS 5-year population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

9. Develop a method for evaluating agricultural operations with respect to farming methods, stream bank protection, compliance with conservation plans, compliance with nutrient management plans, etc.

Goals

1. Develop financing method to create a self-sustaining stormwater management program that addresses the needs, priorities & goals of the Township.
2. Understand potential financial impacts to the Township if future laws or regulatory requirements result in the Township being responsible for any portion of stormwater facilities that are currently the legal responsibility of PennDOT, private property owners, homeowners associations or businesses.
3. Identify existing underutilized stormwater management facilities and evaluate an effective method for encouraging or incentivizing the retrofitting of these existing private stormwater management facilities to maximize the effectiveness of these facilities and the land areas currently dedicated to them to attenuate peak flows and improve water quality.
4. Improving the quality of the water within the streams and waterways in the Township and reducing the Township's contribution of contaminants to these watersheds and downstream receiving waterways.
5. Reducing the volume and rate of runoff discharged to the streams within the Township during storm events and encourage on-site reuse of runoff.[21]

Since the EFC's focus was to look at how each municipality *finances* its stormwater management activities and then provide recommendations about how to improve the program with greater cost efficiency, the goal of the study transpired to help East Cocalico Township assess its current municipal stormwater program and provide the Township with financing recommendations to help them improve their current program and implement cost-saving measures to create a comprehensive and sustainable stormwater program. This goal ensures that the Township has the resources and capacity to improve and maintain a higher level of service to its residents and businesses and address all stormwater-related compliance activities.

Assessment of East Cocalico Township's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

[21] Information provided by East Cocalico Township directly to the Project Team.

For each MCM, there are specific stormwater BMPs that East Cocalico Township can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Township engineer to determine the current level of service for each MCM. A discussion of the findings is below.

Overall Stormwater Program Findings

Stormwater Infrastructure

East Cocalico Township is diverse in its makeup, comprised of both large and small industry and commerce, residential neighborhoods, historic Reamstown, and a large agricultural sector. The Township has experienced steady growth since its housing boom in the 1970/80s, and due to its location serves as a commuter-friendly suburb for residents and easy access point for businesses.

With the housing boom came an extensive conveyance system in the 1980s. While developments have widespread cross pipes and drainage, there is still a large portion of the Township that remains rural. The Township staff shared with the Project Team that the East Cocalico Water Authority has been unable to provide water to new developments in the past few years, and there has been a lag in demand. Since such a large portion of the Township remains agricultural, it is essential to connect this sector's contribution to the health of local water quality and educate farmers about the importance of sound agricultural practices. The Project Team found that there is a strong connection in the Township to agriculture and its impact on local and regional water quality.

Although there are no TMDLs in the Township, one of the major concerns is the water quality in local streams. Since the Township is located in the Northern part of the County, the soil is wet and erosive, and as growth has been steady in recent years, urban stormwater runoff has become a contributor to poor water quality in addition to agriculture. Since this issue was identified by the Township staff, the Project Team strongly recommends the Township develop more stringent policies so growth is limited in areas where water contamination is already high. The Project Team found that the Township has strong enforcement procedures in place for new and redevelopment, and promotes the use of green infrastructure (GI) and low impact development (LID) practices to minimize stormwater runoff in any growth areas.

The Project Team found that while they have all outfalls mapped, like many communities, the Township still does not have the entire conveyance system mapped. The Township staff expressed that they are working to upgrade their mapping system, and the Project Team recommends that this task be prioritized. In the latest meeting with the Township, the Project Team learned that this task has advanced tremendously throughout the year. Once the existing system is fully mapped, the Township will have a much better understanding of the characteristics of the system and begin to develop a strategic repair and replacement plan before the system becomes too old to maintain and must all be replaced. The commitment to addressing stormwater issues through implementation of new projects and maintenance of existing infrastructure is a necessary component to ensuring a robust and comprehensive stormwater management program.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Township's stormwater program comes from general funds, a practice common throughout the country. Based on the available data collected by the Project Team during the study, capital spending on large projects has either been pushed back or funded through general fund appropriations.

The Project Team found that the Township invests minimally in stormwater management through its General Fund. The Road Department receives minimal funding to manage stormwater through general fund appropriations, and in the most recent budget (2013) sets aside these funds for MS4 reporting, a small flood plain project, and mapping.[22] Although these are necessary expenditures for the Township to manage stormwater, there are additional costs that must be set-aside to pay for stormwater-related activities.

The Project Team found Township staff eager to invest more thoroughly in meeting stormwater requirements. Since 2008, stormwater management has been competing against other public requirements like public safety and roadway maintenance for limited Township resources, which are not growing, due to the effects of the recent recession, as fast as demanded. Participation in this study and the improved knowledge the staff has gained over the year will help staff work with elected officials to educate them on the importance of investing in stormwater management.

Current Capacity for Handling Stormwater

At the beginning of this study, the Project Team found that the Township staff did not fully understand what is needed to properly manage stormwater, from both an administrative (tracking, documentation, developing written procedures, etc.) and technical perspective (baseline stream health, prioritized list of projects, etc.). Through participation in this study, and the staff's commitment to improving its municipal program, the Project Team found that the staff's knowledge improved quickly. Throughout the project, the Township has improved its documentation by compiling a binder that incorporates all stormwater-related activities, which will help the Township more fully understand what is needed to improve the existing program.

The Project Team found that many of the essential staff currently works on stormwater, whether or not it is part of their job description. However, it should be noted that of the six municipalities participating in this study, East Cocalico Township has the fewest staff working on stormwater-related tasks. The Township Manager works closely with the Roadmaster, Zoning Officer, and contracted engineer through Becker Engineering to help address the administrative and technical components of the MS4 permit.

The Road Department is comprised of five crew members, including the Roadmaster. In meeting with the Township staff, the Project Team found that the Roadmaster is very knowledgeable of the system, yet this institutional knowledge was not well documented. While the Roadmaster believes that the entire crew knows the system well, the Project Team was unable to determine whether the current staff is adequate in meeting the technical components of the MS4. After reviewing the findings in this report, Township staff should meet internally to determine whether additional road staff should be hired to improve the stormwater program's level of service.

In order to adequately address the administrative components of the MS4 permit, the Township should invest in hiring a stormwater coordinator, either on its own or shared between neighboring municipalities. If done so collectively, the Township should bring together neighboring municipalities to develop an intergovernmental agreement. Either way, hiring a stormwater coordinator will allow staff who currently have taken on all of the stormwater-related tasks the time to focus on other Township functions, creating greater efficiency at the Township overall.

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[22] East Cocalico Township 2013 General Fund Budget, Final Budget, Retrieved from: http://www.co.lancaster.pa.us/eastcocalicotwp/lib/eastcocalicotwp/01-general_fund_-_final_(done_12-20-12).pdf.

MCM Findings: 1. Public Education & Outreach

The Project Team found that East Cocalico Township currently provides a minimal level of service to its community regarding public education and outreach. The Township has been focused on disseminating stormwater education to a broad audience, and plans to move toward the direction of a more targeted approach. The Township has a partial list of its target audience, sends out a newsletter three times a year with stormwater information always included, and has a portion of its website dedicated to stormwater education and resources.

There are many ways in which the Township can improve its level of service, but in order to do so existing staff must work with a new stormwater coordinator or the Cocalico Creek Watershed Association (CCWA) to help implement activities required for MCM 1. The Project Team also recommends continuing to share information with neighboring municipalities and the other five municipalities who participated in this study, as it was found invaluable to all participants to hear what others were doing and whether these activities were a success.

In order for East Cocalico Township to increase its level of service regarding MCM 1, the Township should work with a coordinator and/or local groups to develop a written Public Education & Outreach Plan, finalize its list of target audience groups, work with neighboring municipalities to share materials and information and plan regional events, and track all its activities related to MCM 1. In addition, the Township staff should plan regular meetings with elected officials and the public to educate them on why stormwater needs to be managed locally, which will facilitate the necessary dialogue for the Township to support a greater investment in stormwater management. The Project Team found that in other municipalities, effective outreach means targeting specific groups such as elected officials, developers, farmers, businesses, schools, and home owners associations (HOAs), as different messages resonate with each audience.

MCM Findings: 2. Public Participation & Involvement

The Project Team found that East Cocalico Township is in the beginning phases of developing an adequate level of service to its community regarding public involvement and participation. In meeting with the Township staff, the Project Team learned that they are interested in utilizing high school students to help monitor streams, working more closely with the CCWA, and currently working with the Boy Scouts for National Night Out. The Project Team recommends the Township continue tapping into these local groups to help engage different audiences. For example, the Township should become more involved with the CCWA's stream clean-up day and work with local schools and/or youth groups. As an example, the Township should consider hosting an annual watershed day for younger students, which has been very successful in Warwick Township (see Chapter 9 for more details).

In order for the Township to improve its level of service for MCM 2 into the future, it should continue reaching out to local groups through a more targeted approach that resonates with different stakeholder groups. The Township should also develop a written Public Participation & Involvement Plan, which should include a dedicated annual public meeting for stormwater where the public can give their input, at least one annual public event such as a stream clean-up, tree planting, or watershed day, and tracking system for all activities related to MCM 2.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that East Cocalico Township currently provides a minimal level of service to its community regarding IDD&E. While the Township inspects at least 20% of its outfalls each year, the Township needs to develop a more formal process for handling IDD&E and public notification. The Township staff identified mapping as one of its weaknesses, not uncommon among some of the participating municipalities. Since mapping was written into the 2013 budget, the Project Team

recommends this task be completed as soon as possible, since this baseline understanding is necessary for the Township to strategically and cost-efficiently manage stormwater.

In order to increase the level of service for MCM 3, the Township needs to develop a more formal process for handling illicit discharge complaints. The Township could easily develop a procedure for public notification of IDD&E and tracking system for inspections and complaints. One of the recommended tasks of a stormwater coordinator should be to develop formal procedures for IDD&E. It is anticipated that when the new MS4 permits are issued, more stringent requirements will be incorporated for this MCM. At this time, Township staff should consider hiring additional staff to ensure all screening and inspections are completed each year.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that East Cocalico Township currently provides a high level of service to its community regarding construction site runoff control. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources at the conservation district to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that East Cocalico Township has an exceptional relationship with the LCCD, so much so that the LCCD gave the Township and Becker Engineering its first annual Conservation Agency Award in 2012, based on their partnership on conservation issues.[23] During the pre-construction meeting, developers and design engineers are trained on the stringent standards that the Township enforces. During construction, the Zoning Officer and contracted engineer coordinate with the Township's LCCD representative to inspect all sites.

In order to maintain the level of service for this MCM, the Project Team recommends the Township staff develop a tracking system in-house for all construction projects with stormwater components. The Project Team found Township staff eager to be accountable on their own in order to maintain the high level of service for this MCM.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that East Cocalico Township currently provides a medium/high level of service to its community regarding post construction site runoff control. The Township has a limited number of post construction stormwater management (PCSM) BMPs which are relatively easy to maintain. For all BMPs, the Township has a written plan to document the installation and maintenance, and the Township staff and/or contracted engineer inspects all PCSM BMPs to ensure they are built as designed. LID standards are encouraged within the Act 167 ordinance as developed by Lancaster County.

The main challenge the Township staff expressed to the Project Team was that the owners of facilities do not know what maintenance is needed. The Project Team encourages the Township to provide more sufficient training to developers and HOAs as well as create a long-term inspection schedule so there is follow-up to ensure maintenance occurs regularly. In order to stay on top of the publically-owned BMPs, Township staff must develop an ongoing inventory list of all post

[23] Hummer, Alice, East Cocalico scores first place win, *The Ephrata Review*, April 4, 2012, Retrieved from: http://ephratareview.com/2012/04/east-cocalico-scores-first-place-win/.

construction stormwater management (PCSM) BMPs (public, private, and agricultural) and formalize a process for maintaining Township-owned BMPs over time.

In order to maintain the level of service for this MCM, the Township must have an inventory of all BMPs; continue its written operations and maintenance (O&M) program for Township-owned facilities; provide training opportunities to ensure developers are up to date on all stormwater management regulations, LID and GI alternatives; continue inspecting sites to ensure PCSM BMPs were implemented as designed; and track all inspections and maintenance activities.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that East Cocalico Township currently provides a minimal level of service to its community regarding pollution prevention and good housekeeping. The Road Department implements the Township's O&M program by maintaining their limited number of publically-owned BMPs; manually cleans inlets by prioritizing flood-prone and contaminated areas; annually contracts with a private company to sweep streets; trains new hires; and provides each road crew member with the LIMC Good Housekeeping Manual. Although the Township meets its requirements, they must develop more strategic plans for this MCM.

The Township staff shared with the Project Team that they put aside funding each year in the Capital Reserve Fund to purchase new equipment. The Project Team recommends the Township invest in new equipment to help improve the efficiency of the Road Department's tasks. The Project Team found that the Township currently cleans ditches and drains manually and does not have a street sweeper. In order to keep costs low, the Project Team recommends the Township meet with neighboring municipalities to determine existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals by improving internal capacity and investing in shared equipment. The Township must also develop better tracking of all stormwater-related activities, continue to map the entire storm sewer system with the goal of ultimately developing an infrastructure repair and replacement program, and regularly train staff in different components of stormwater-related good housekeeping measures. In addition, the Township needs to determine the baseline stream health and prioritized projects list based on cost efficiency.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract the plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

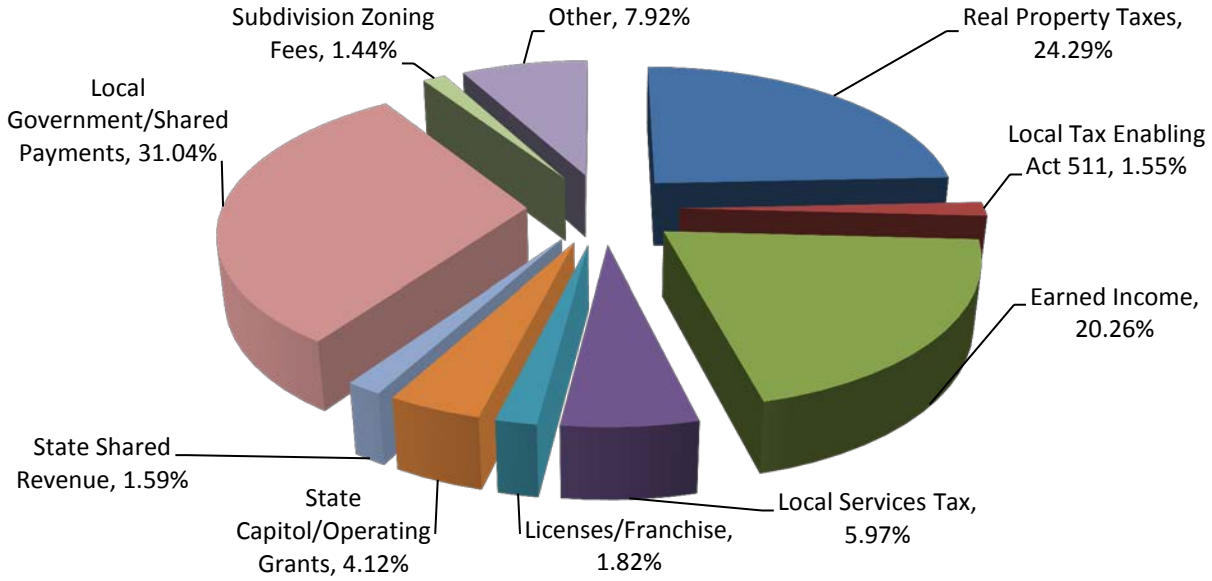
Consideration of Funding Methods for Stormwater in East Cocalico Township

Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in East Cocalico Township is partially through grant funding and leveraging relationships with local organizations, but with the majority of the revenue derived from general fund appropriations. There is also minimal funding set aside each year for equipment purchases in the Township's Capital Reserve Fund. East Cocalico Township's general fund comes from several sources such as real property taxes, local tax enabling act taxes, licenses, and permits (see Figure 3 for breakdown). This revenue is then distributed to sources as appropriate and deemed necessary, such as personnel, police, fire/emergency management, general government expenses, and roads.[24]

Figure 3: East Cocalico Township's 2013 General Fund Revenue Breakdown[25]



Currently, general fund allocations for stormwater programming in East Cocalico Township are not adequate for the Township to properly manage stormwater in the near and long terms. As priorities shift and costs rise, the Township needs to determine a more sustainable plan to pay for stormwater.

In order to enhance the level of service to meet future anticipated regulatory requirements, the Township must more aggressively invest in administration, operations & maintenance, and capital projects to repair and replace its infrastructure. The Township should consider supplementing its current funding approach with a dedicated stormwater fee to support a more strategic and comprehensive stormwater program.

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[24] East Cocalico Township 2013 General Fund Budget, Final Budget.
[25] Ibid.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying on occasional grant awards is clearly not sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 1 below:

Table 1: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for East Cocalico Township's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. This does not mean, however, that current funding levels for various activities now being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for East Cocalico Township to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[26]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

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[26] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of East Cocalico Township, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals**.** Table 2 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 2: Stormwater User Fee Examples in Pennsylvania[27]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown

[27] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000
City of Lancaster, Lancaster County (2013)	59,263[28]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[29]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:

[28] 2011 US Census Bureau ACS 5-year Estimates.
[29] Ibid.

(1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.

(2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.

(3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.

(4) Parks, recreation grounds and facilities.

(5) Sewers, sewer systems or parts thereof.

(6) Sewage treatment works, including works for treating and disposing of industrial waste…."[30]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

East Cocalico Township's Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for East Cocalico Township, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Township, the Project Team found that current budgeting practices are not adequate in meeting the existing regulatory requirements. With tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team and municipal staff agreed that a more comprehensive program will ensure a more viable stormwater management program for the future.

Two of the municipalities who participated in this study, Manheim and Warwick Townships, worked with the Project Team to determine the estimated costs projected over five years that is needed to properly manage stormwater. Each of these municipalities took a vastly different approach to estimating costs. Since the Project Team found it difficult to collect meaningful cost data for the other four participating municipalities, including East Cocalico Township, the team utilized Manheim

[30] Purdon's Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

and Warwick Townships' approaches to develop cost estimates. A discussion of these approaches and how they were adapted for East Cocalico Township follows.

Manheim Township's Approach

Manheim Township, the largest of the municipalities participating in this study, plans to develop a separate Stormwater Department within the Township. All stormwater-related costs, even if currently paid for using general fund appropriations, will be moved to a stormwater budget. This budget will be supported through a dedicated stormwater user fee. The Project Team found that in Manheim Township a 5-year revenue stream totaling approximately $10.1 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater program housed in the Stormwater Department. [31] See Chapter 7 for the full analysis of Manheim Township's financing structure.

Using population as the factor, East Cocalico Township's costs were estimated at approximately $2.8 million over five years if the Township uses Manheim Township's approach to managing stormwater (see Table 3).

Table 3: East Cocalico Township's Budget using Manheim Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Manheim Township	37,768	1.00	$10,085,237	$2,017,047
East Cocalico Township	10,304	0.27	$2,751,490	$550,298

Warwick Township's Approach

Warwick Township, often hailed as the most proactive Township managing stormwater in the County, plans to continue supporting most of its stormwater-related costs using general fund appropriations and grants. The Township wants to utilize a dedicated stormwater user fee to support an asset management program that focuses on two components – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs. The Project Team found that a 5-year revenue stream totaling $639,268, when adjusted for inflation at a rate of 2.5% per year, will be needed to support a municipal stormwater asset management program for Warwick Township.[32] See Chapter 9 for the full analysis of Warwick Township's financing structure.

Using population as the factor, East Cocalico Township's costs were estimated at approximately $373,795 over five years if the Township uses Warwick Township's approach to managing stormwater (see Table 4).

[31] Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

[32] Ibid.

Table 4: East Cocalico Township's Budget using Warwick Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Warwick Township	17,622	1.00	$639,268	$127,854
East Cocalico Township	10,304	0.58	$373,795	$74,759

It must be noted that the Project Team only supports this approach for Warwick Township because of the high level of service being provided to the community currently. Since East Cocalico Township needs to increase its level of service, the Township should utilize Warwick Township's approach as a jumping off point and include additional costs associated with properly managing stormwater in its stormwater budget.

Recommendations for East Cocalico Township's Level of Service Expenditures

Given the size of the Township, it is likely not feasible (or necessary) to develop a Stormwater Department. Therefore, Manheim Township's costs represent the "Cadillac" version of stormwater management. On the flip side, Warwick Township's costs represent a low cost estimate to managing stormwater since the costs only factor in asset management *and* the costs are based on the useful life of materials. This means that Warwick Township will bring in annual reserves through its dedicated fee to pay for its asset management program over time. Thus, the Project Team recommends that East Cocalico Township use a blended approach that uses Warwick Township as its baseline, and then includes additional costs necessary for the Township to properly manage stormwater. Further discussion is required by Township staff to determine how best to allocate costs. The following provides a discussion of the additional costs that the Township must invest in to meet its current and future state and federal regulations:

Personnel costs

The Project Team recommended earlier in this chapter that the Township invest in hiring a stormwater coordinator. In many respects, simply hiring a coordinator will allow the Township to meet most, if not all, of its administrative compliance components, allowing existing staff to focus on more pertinent tasks. The Township could hire a coordinator on its own or as a shared position with neighboring municipalities. The Township must engage neighboring municipalities to determine if a shared coordinator should be hired. Either way, the Project Team recommends investing in a coordinator to help with administrative MS4 permit tasks and keep the Township on track with meeting its MCMs.

The Project Team also recommended earlier in this chapter that the Township meet internally to determine if additional road crew members are needed to adequately address the technical components of the MS4 activities. In order for the Township to meet existing and future regulatory requirements, the Township should strongly consider hiring additional road crew members.

Capital costs

The $373,795 estimated 5-year costs using Warwick Township's approach supports an asset management program, including a pipe infrastructure repair and replacement program (assuming the average useful life of the pipes is 30 years) and a BMP renovation (assuming the average useful life is 20 years) and maintenance (assuming maintenance every 5 years) program. The Project Team highly recommends the Township invest in an asset management program and sets up its dedicated fee to generate at a minimum $373,795 over five years.

The Project Team recommends the Township also invest in a study to determine the baseline health of its streams and thus, the most cost-effective water quality improvement projects (which will

result in additional capital costs once projects are identified). The Township staff identified a project conducted at the CCWA that prioritized 27 projects along the Cocalico Creek. This study can be used in place of investing in an additional study. However, if utilized, the Township staff should work with their contracted engineer to determine which of these 27 projects are located in the Township, and which of those should be implemented and specify in which year the project will be implemented. Once the Township identifies which projects to implement and when, the costs should be written into a stormwater budget and a dedicated fee (or grants where possible) should be used to support water quality improvement project costs.

Lastly, the Project Team recommended earlier in this chapter that the Township consider investing in equipment. In order to keep costs low, the Project Team recommends the Township meet with neighboring municipalities to determine all existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively.

Operations & Maintenance costs

If the Township purchases new equipment, there will be annual O&M costs associated with this equipment that will need to be factored into the stormwater program's costs. These costs will be included once it is determined what equipment, if any, will be purchased.

The Township must develop a more comprehensive understanding of its pipes in order to implement an asset management program properly. If the current funding allocated for mapping does not cover the entire cost, the Township should invest funds until the map is complete.

There are additional costs that are fairly minimal compared to the large capital and personnel costs needed to properly manage stormwater that the Township must consider. These costs include outreach materials, contract fees (namely for engineer's time), and hosting outreach and engagement events[33]. See Chapter 7 for Manheim Township's costs associated with these activities, which could be used as a reference for East Cocalico Township.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for East Cocalico Township

Although the Project Team was unable to develop a specific estimated budget for East Cocalico Township, the Project Team recommends the Township create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

[33] Warwick Township estimated that their annual Watershed Day costs $2,225.

Once it became clear that there was a significant need to have a dedicated funding source to cover the stormwater costs in East Cocalico Township, the Project Team considered what financing mechanism would be most appropriate to generate these funds. The Project Team initially considered assessing a property tax, but since the value of a property is not an indicator of the amount of runoff, the property tax was not seen to be the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since it is anticipated that development and growth continue in the Township, increasing the amount of impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. The major concern with this approach is the investment required by the Township to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). Therefore, the fee calculations will begin more simply and transition over time to a more accurate method, balancing the administrative burden of billing with an equitable distribution of charges.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since East Cocalico is a Township, it will need to set up a stormwater fee by either creating a new authority or utilizing its existing authority to bill its customers for stormwater.

The East Cocalico Township Authority (ECTA) provides a safe water supply and sanitary sewer conveyance and treatment to customers within the Township. The Authority has expanded to also collecting and transmitting sewage to the Ephrata Borough plants and the Adamstown Borough plant for treatment. If the existing Authority adds stormwater to its bill, the Authority must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[34] Since this Authority has a billing system in place and serves the entire Township, the Project Team recommends utilizing the existing Authority. Since it will be up to the existing Authority to administer this program, the Project Team recommends the Township discuss internally whether it is easier to administer a stormwater authority with an existing authority or by establishing a new authority.

Since the Township currently works with Ephrata and Adamstown Boroughs, it is also recommended that the Township meet with these municipalities to determine whether they are interested in setting up a dedicated stormwater fee. If that is the case, the municipalities and existing Authority will need to determine whether setting up a new regional stormwater authority generates fewer transaction costs and should be considered, as well.

Based on the experience of other communities, it is recommended that the Township set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report

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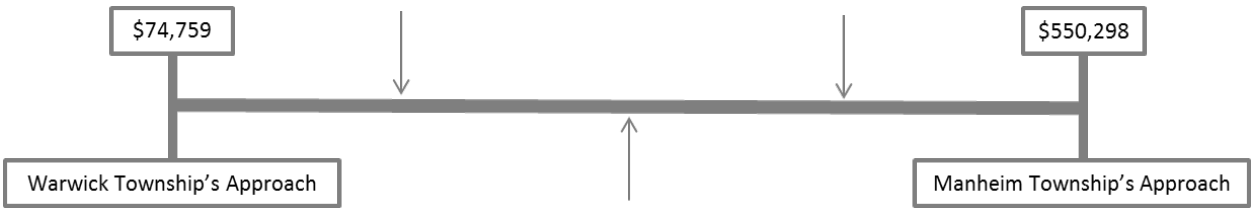
[34] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013, Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

that the outreach need is very high at first but declines as the utility rolls out. A help line and Township staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

Although a specific cost estimate was not generated, the Project Team recommends implementing a fee to improve the current level of service. This fee could be set low to begin generating revenue, and once the Township has a better understanding of its costs, the rate structure should be reevaluated. In all likelihood, the Township's true costs lie somewhere in between the estimates provided using Warwick and Manheim Townships' approaches, shown in Figure 4.

Figure 4: The Spectrum of East Cocalico Township's Estimated Annual Stormwater Costs



In determining an equitable funding strategy for collecting revenue to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the Township provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential[35]. The Project Team worked with the LCPC's land use codes, as this framework will be easy for East Cocalico Township to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Township, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Township to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 3,140 residential parcels worthwhile. A distribution of all the residential properties in the Township is depicted in Figure 5. All multi-family residences are classified by LCPC as commercial, and therefore will be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[35] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

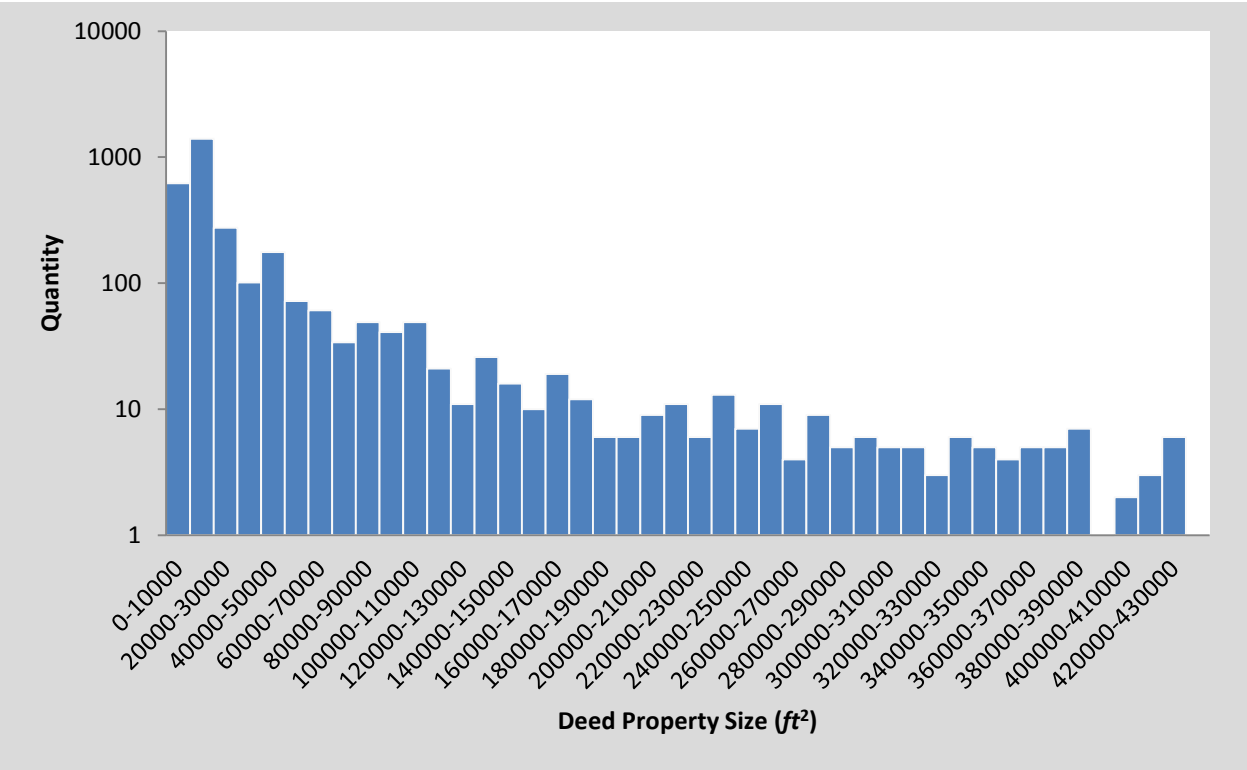


Figure 5. Distribution of Residential Property Sizes in East Cocalico Township. The median residential property is 14,375 *ft²*. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team suggests that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Township utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

For all 419 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 ft^2 of impervious surface.[36] The Project Team recommends using a similar method for East Cocalico Township. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill. It is then recommended, following the first few years of utilizing a tiered system, the Township invest in getting more accurate impervious surface data for all non-residential properties and then assess the fee based on each property's total impervious surface.

[36] The Cost of Dealing with Stormwater, Lancaster City, Retrieved from: http://www.saveitlancaster.com/thecost/.

After conducting a sensitivity analysis[37] using various fee structures, the Project Team found that there are many options for the Township to set its initial rates. It is recommended that the ERU be set at 6,632 ft^2 since that number represents the average residential impervious surface in the Township[38]. Depending on how much the Township wants to continue utilizing general fund appropriations and grants to supplement the user fee, the rate should be set at a minimum of $15 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if it is implemented as recommended later in this document.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee starting at $15 per year to generate the minimal revenue needed (based on Warwick Township's approach). The final rate chosen by East Cocalico Township should be consistent with the non-residential rate. Although many of the rate scenarios analyzed by the Project Team brought in adequate revenue to pay for stormwater-related expenses, it will be up to the Township to determine what should be supported through the dedicated fee and thus, where to set its rates. Table 5 shows the revenue yield for all rate scenarios developed by the Project Team.

Table 5: Annual Residential Property Revenue Generated (3,140 Residential Properties x Rate)

$15	**$20**	**$25**	**$30**	**$35**
$47,100	$62,800	$78,500	$94,200	$109,900
$40	**$45**	**$50**	**$55**	**$60**
$125,600	$141,300	$157,000	$172,700	$188,400
$65	**$70**	**$75**	**$80**	**$85**
$204,100	$219,800	$235,500	$251,200	$266,900

The residential fee is based on the assumption that an average property has approximately 6,632 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined once the Township determines which costs should be supported using a dedicated user fee.

Non-Residential – According to data provided by the LCPC, there are 419 non-residential properties in East Cocalico Township. This data included the land area of each property, and the average

[37] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[38] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 6 below.

Table 6: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	23.70
Commercial	44.49
Community Service	12.47
Cultural Activity	5.33
Agricultural	2.45

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 44.49% impervious area. This property will then be billed for 8,898 ft^2 of impervious surface (20,000 ft^2 x 44.49%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 7 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 7: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage (25%) (Q1)	14,514	<=15,000
Median (Q2)	30,879	>15,000 & <=31,000
Percentage (75%) (Q3)	68,736	>31,000 & <=69,000
Upper Bound (Q4)	2,917,636	>69,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided 6,632 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (105,000 ft^2[39]) was divided by 6,632 ft^2 to determine the number of ERUs that parcels in Q4 will pay. The final ERU for each tier was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 8 shows the summary of this analysis below.

[39] The median of all parcels in Q4 in East Cocalico Township is 104,651 ft^2, which was rounded to 105,000 ft^2 for ease of administration.

Table 8: Annual Non-Residential Property Revenue Generated by Tier

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/6,632 ft^2)	ERU x $ x Number of Parcels				
			$15	**$20**	**$25**	**$30**	**$35**
First tier: <=15,000	113	2.26	$3,834	$5,112	$6,389	$7,667	$8,945
Second tier: >15,000 & <=31,000	97	4.67	$6,801	$9,068	$11,335	$13,602	$15,869
Third tier: >31,000 & <=69,000	104	10.40	$16,230	$21,641	$27,051	$32,461	$37,871
Fourth tier: >69,000	105	15.83	$24,936	$33,248	$41,560	$49,872	$58,184
Total Non-Residential Revenue			$51,801	$69,068	$86,335	$103,602	$120,869
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/6,632 ft^2)**	**ERU x $ x Number of Parcels**				
			$40	**$45**	**$50**	**$55**	**$60**
First tier: <=15,000	113	2.26	$10,223	$11,501	$12,779	$14,057	$15,335
Second tier: >15,000 & <=31,000	97	4.67	$18,136	$20,403	$22,670	$24,937	$27,204
Third tier: >31,000 & <=69,000	104	10.40	$43,281	$48,691	$54,101	$59,511	$64,922
Fourth tier: >69,000	105	15.83	$66,496	$74,808	$83,120	$91,432	$99,744
Total Non-Residential Revenue			$138,136	$155,403	$172,670	$189,937	$207,204
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/6,632 ft^2)**	**ERU x $ x Number of Parcels**				
			$65	**$70**	**$75**	**$80**	**$85**
First tier: <=15,000	113	2.26	$16,613	$17,891	$19,168	$20,446	$21,724
Second tier: >15,000 & <=31,000	97	4.67	$29,472	$31,739	$34,006	$3,627	$38,540
Third tier: >31,000 & <=69,000	104	10.40	$70,332	$75,742	$81,152	$86,562	$91,972
Fourth tier: >69,000	105	15.83	$108,056	$116,368	$124,680	$132,992	$141,304
Total Non-Residential Revenue			$224,472	$241,739	$259,006	$243,627	$293,540

The total revenue potential for all fee structures is shown in Table 9 below.

Table 9: Total Revenue Potential

	$15	$20	$25	$30	$35
Residential	$47,100	$62,800	$78,500	$94,200	$109,900
Non-Residential	$51,801	$69,068	$86,335	$103,602	$120,869
Total Revenue (1-year)	$98,901	$131,868	$164,835	$197,802	$230,769
Total Revenue (5-year)	$494,506	$659,341	$824,176	$989,011	$1,153,846
	$40	$45	$50	$55	$60
Residential	$125,600	$141,300	$157,000	$172,700	$188,400
Non-Residential	$138,136	$155,403	$172,670	$189,937	$207,204
Total Revenue (1-year)	$263,736	$296,703	$329,670	$362,637	$395,604
Total Revenue (5-year)	$1,318,682	$1,483,517	$1,648,352	$1,813,187	$1,978,022
	$65	$70	$75	$80	$85
Residential	$204,100	$219,800	$235,500	$251,200	$266,900
Non-Residential	$224,472	$241,739	$259,006	$243,627	$293,540
Total Revenue (1-year)	$428,572	$461,539	$494,506	$494,827	$560,440
Total Revenue (5-year)	$2,142,858	$2,307,693	$2,472,528	$2,474,136	$2,802,198

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. The Township must first determine which expenditures should be included in the stormwater program budget, and which aspects of the program it wants to invest before assigning a fee structure.

It is important to note that if East Cocalico Township funds this program entirely by the user fee, then the fee would need to be set higher to pay for existing costs and the additional investments needed to support an adequate stormwater management program. It is highly recommended by the Project Team that the Township continue to supplement the program using general fund appropriations and grant funds where possible. This will decrease the user fee, minimizing any community backlash.

Lastly, it is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 6: Individual Municipal Analysis – Lititz Borough

Lititz Borough has a population of 9,350[40], making it the second smallest of the six municipalities who participated in this study. Similar to Mount Joy Borough, Lititz considers itself a "Main Street Community," made up of many local, small businesses clustered on Main Street. The Borough's historic industry and small town charm have generated lots of tourism, so much so that the Borough was recently voted "Coolest Small Town in America"[41]. The Borough is also comprised of a close-knit residential community that takes great pride in its historical preservation and environmental conservation efforts.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. Lititz Borough provided the following:

Priorities

1. MS4:
    a) TMDL Plan
    b) Chesapeake Bay Pollutant Reduction Plan
    c) Storm basin inspection procedure / repair notifications
2. Education:
    a) General outreach
    b) Storm inlet markers
3. Stream bank protection
4. Infrastructure:
    a) Identifying areas of street flooding
    b) Mapping storm piping /sizes
    c) replacement of old piping
    d) Street catch basin conditions

Goal

- Improve the quality of discharge into waterways within the Borough.

Needs

1. Federal and state regulatory guidelines;
2. Evaluation of entire storm sewer system;
3. Inventory of private swales and maintenance responsibilities;
4. Education assistance;

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[40] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search population ACS 5-year population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

[41] America's Coolest Small Towns 2013, Budget Travel, Retrieved from: http://www.budgettravel.com/contest/americas-coolest-small-towns-2013,14/#candidate-detail12246.

5. Survey existing conditions of waterways; and
6. Funding.[42]

Since the EFC's focus was to look at how each municipality *finances* its stormwater management activities and then provide recommendations about how to improve the program with greater cost efficiency, the goal of the study transpired to help Lititz Borough assess the current municipal stormwater program and provide the Borough with financing recommendations to help them improve their current program and implement cost saving measures to create a comprehensive and sustainable stormwater program. This goal ensures that the Borough has the resources and capacity to improve and maintain a higher level of service to its residents and businesses and address all stormwater-related compliance activities.

Assessment of Lititz Borough's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

For each MCM, there are specific stormwater BMPs that Lititz Borough can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Borough engineer to determine the current level of service for each MCM. A discussion of the findings is below.

Overall Stormwater Program Findings

Stormwater Infrastructure

Lititz Borough was founded in 1756, and prides itself on preserving its rich history through its focus on beautification, natural resource protection, and supporting the many small, often family-owned businesses. The Borough is made up of mostly a residential population, and the largest industries include Johnson & Johnson, Wood Stream, and Wilbur Chocolate. Since the community is so old, the conveyance system is likely also extremely old; however the Borough does not have a good understanding of the characteristics of its system.

At the beginning of the project, the Borough staff told the Project Team that an interior inspection of its infrastructure was one of its biggest needs because the potential for emergency repairs is much greater with such an old system in place. The Project Team recommends the Borough invest in pipe inspections and simultaneously develop a comprehensive map of its system as soon as

[42] Information provided by Lititz Borough directly to the Project Team.

possible. These two tasks must be completed so that the Borough can move forward developing an infrastructure repair and replacement program that is strategic and cost-efficient.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Borough's stormwater program primarily comes from general funds, a practice common throughout the country. In addition, the Borough relies heavily on public and private grants. The Borough has been very successful with receiving grants that pay for capital improvements and green infrastructure (GI) projects. There are a number of environmental and engineering firms located in Lititz Borough and Warwick Township that work closely with both municipalities to help access grants. Because of this success, the Borough has been able to keep costs low for taxpayers. In an article on the local newspaper website, Lititz Borough Council President stated that the Borough has the second lowest real estate tax rate in Lancaster County.[43]

Although commendable for its success in getting grant funds, in order to maintain a comprehensive stormwater management program over time, the Borough needs to support its program using a variety of funds and not rely so heavily on grants. The Project Team found that while the Borough has a good framework for handling the operations & maintenance components of the MS4, capital spending occurs only when grant funds are available. It is important to note that the Project Team was unable to collect data in a meaningful way on stormwater capital projects, which was seen across the board with all six municipalities.

The primary reason for this in most of the municipalities is that capital projects are completed when funds become available and not in a way where cost information can be easily verified. The Borough sets aside minimal funding for stormwater management to cover engineering costs, stormwater maintenance, and specific project costs. The Project Team found that the general fund appropriations do not adequately cover the administrative and capital costs to properly manage stormwater.

The Project Team found Borough staff eager to invest more thoroughly in meeting stormwater requirements. In the past, the Borough staff has been stifled by elected officials who are hesitant to use sparse resources on stormwater management. Participation in this study and the improved knowledge the staff has gained over the year will help staff work with elected officials to educate them on the importance of investing in stormwater management.

Current Capacity for Handling Stormwater

At the beginning of this study, the Project Team found that the Borough staff did not fully understand what is needed to address the administrative components of the MS4 permit. Through participation in this study, and the staff's commitment to improving its municipal program, the Project Team found that the staff's knowledge improved quickly.

The Project Team found that many of the essential staff currently works on stormwater, whether or not it is part of their job description. Throughout the study, this staff showed a commitment to learning about best practices and improving their program. This "all-hands-on-deck" approach witnessed by the Project Team shows a true commitment to the community, however, is not sustainable over time.

In order to adequately address the administrative components of the MS4 permit, the Borough should invest in hiring a stormwater coordinator, either on its own or shared between neighboring

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[43] Knowles, Laura, Lititz council adopts 2013 budget, welcomes student, *Intelligencer Journal/Lancaster New Era*, Retrieved from: http://lancasteronline.com/article/local/794703_Lititz-council-adopts-2013-budget--welcomes-student.html.

municipalities. If done so collectively, the Borough should bring together neighboring municipalities to develop an intergovernmental agreement. Either way, hiring a stormwater coordinator will allow staff who currently have taken on all of the stormwater-related tasks the time to focus on other Borough functions, creating greater efficiency at the Borough overall.

The PWD receives the majority of funding for stormwater from the general fund, since much of the technical components of the MS4 permit are conducted in-house. This staff is comprised of six road crew staff plus the Superintendent. All PWD staff receive regular training, and attended many of the project meetings. Although the existing staff is trained well, the Project Team found that likely additional PWD staff is needed to handle the more stringent requirements anticipated with the new MS4 permit cycle beginning in the fall of 2013. After reviewing the findings in this report, Borough staff should meet internally to determine whether additional public works staff should be hired to improve the stormwater program's level of service.

MCM Findings: 1. Public Education & Outreach

The Project Team found that Lititz Borough currently provides a minimal level of service to its community regarding public education and outreach. While the Borough shares MS4 education in the newspaper, they otherwise follow Warwick Township's leadership in educating the public about stormwater. Because the Warwick Township School District is located in the Borough, all 5th grade students participate in Warwick Township's annual Watershed Day, which targets students and parents.

While Lititz Borough's partnership with Warwick Township affords them the ability to participate in many events, the Borough should take on a more active role in educating its residents. The Project Team found that the Borough staff were very committed to improving stormwater outreach, however, needed additional training on how to implement the BMPs for MCM 1. The Project Team encourages the Borough to hire a stormwater coordinator to take on many of the administrative functions associated with MCM 1.

During the project, the Borough purchased new equipment for the PWD. On a Lititz Borough 2nd Friday event, the Project Team participated with the PWD staff to display the new equipment and host a table disseminating information and talking with residents about the impact of stormwater runoff. These types of local events that take place regularly in the Borough are essential to utilize for educating the public.

In addition to general public outreach, the Project Team found that the Lititz Borough Council was well informed about stormwater and the need to invest in its proper management. When the Project Team presented the study to the Council, they were very receptive and engaged. The Borough staff should continue to update the Council and generate their feedback in order to help tailor the stormwater program to the needs of the community.

In order for Lititz Borough to increase its level of service regarding MCM 1, the Borough needs to develop a written Public Education & Outreach Plan, develop a list of its target audience, play a more active role in partnering with Warwick Township and/or the Lititz Run Watershed Alliance (LRWA) to host events, continue sharing stormwater education with the public and elected officials, and track all public outreach and education activities.

MCM Findings: 2. Public Participation & Involvement

The Project Team found that Lititz Borough currently provides a minimal level of service to its community regarding public involvement and participation. Similar to MCM 1, Borough residents participate in many local events, such as Warwick Township and the LRWA's stream clean-up and Watershed Day, as well as other events hosted by Trout Unlimited. While the residents in the

Borough are highly engaged when it comes to environmental conservation and water quality, the Borough has not been a leader in this effort. The Project Team found that the Borough staff was committed to improving the level of service for this MCM, but like MCM 1 needed additional training to understand what was required for MCM 2.

In order to improve the level of service for this MCM, the Project Team recommends hiring a stormwater coordinator to help the Borough develop a written Public Participation & Involvement Plan, schedule an annual public meeting for stormwater where the public can give their input, develop materials and disseminate stormwater education to residents, businesses, and elected officials, and track all activities related to MCM 2.

A stormwater coordinator will also be able to help plan local events, which will enhance the event for all participating groups and lower the cost. The Project Team encourages the Borough to meet with Warwick Township once they have reviewed the findings and recommendations in this report. Warwick Township serves as a model for this MCM. Given the existing partnership between the Township and Borough, Lititz should begin working more closely with Warwick to learn from their success.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that Lititz Borough currently provides a minimal level of service to its community regarding IDD&E. While the Borough inspects at least 20% of its outfalls each year, the Borough needs to develop a more formal process for handling IDD&E and public notification. The Project Team found that the Borough staff is currently working with their contracted engineer through ARRO Consulting, Inc. to develop a comprehensive map of the conveyance system, which is needed in order to strategically repair and replace the Borough's infrastructure. This task should be prioritized until the full map is complete.

The Borough could easily develop a procedure for public notification of IDD&E and tracking system for inspections and complaints. One of the recommended tasks of a stormwater coordinator should be to develop formal procedures for IDD&E. It is anticipated that when the new MS4 permits are issued, more stringent requirements will be incorporated for this MCM. At this time, Borough staff should consider hiring additional public works staff to ensure all screening and inspections are completed each year.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that Lititz Borough currently provides a medium level of service to its community regarding construction site runoff control. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources at the conservation district to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that Lititz Borough works with their contracted engineer to inspect construction sites. Both the LCCD representative for the Borough and the Borough's engineer review all stormwater and Erosion & Sediment Control Plans. The engineer keeps track of all projects in an MS4 file.

In order to improve the level of service regarding MCM 4, the Project Team recommends the Borough begin tracking all projects in-house. By filing MS4-related projects into a separate system

and tracking projects in-house, the time needed to compile the MS4 Permit Annual Report will be minimized and the Borough's will improve its organizational efficiency.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that Lititz Borough currently provides a minimal level of service to its community regarding post construction site runoff control. The Borough has a procedure in place for inspecting all post construction stormwater management (PCSM) BMPs to ensure they were implemented as designed; the PWD Superintendent and engineer are working on finalizing the inventory of all public and private BMPs; and the public works crew maintains all Borough-owned stormwater basins and conducts operations and maintenance (O&M) as needed.

The Borough staff identified the biggest problem they have regarding this MCM was communication between the developer and homeowner. A few other municipalities who participated in this study expressed similar concerns. The Project Team recommends the Borough staff develop a more formal maintenance agreement that clearly defines who is responsible for maintaining a PCSM BMP. This agreement should be clearly conveyed to all parties during the pre-construction meeting, and again during the post-construction meeting. The Borough staff mentioned to the Project Team their interest in penalizing homeowners who do not maintain their BMPs. This minimal revenue could be used to support part of the stormwater program.

The Borough staff encourages Low Impact Development (LID) and green practices, and push for developers to further their implementation of these practices. In order to improve the Borough's current level of service, the Borough should continue with the practices in place, and include educational information for municipal staff, developers who work in the Borough, and residents to ensure that they are up to date on all stormwater management regulations, LID and GI alternatives.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that Lititz Borough currently provides a medium level of service to its community regarding pollution prevention and good housekeeping. The Borough is currently developing a process for maintaining publically-owned BMPs; cleans all inlets, ditches, and drains both manually and with their new jet vac; are currently working with their engineer to map the conveyance system; sweeps streets at least twice annually; trains all PWD staff on a regular basis; and has been very successful at receiving grant funding to implement water quality improvement projects, many with a GI component. Although the Borough meets its requirements, a dedicated fee for an asset management repair and replacement program will provide the resources necessary to increase the level of service for MCM 6.

The Project Team found that the Borough has the most advanced equipment of all the municipalities who participated in this study. The Borough has a street sweeper that is used for their streets, and services are exchanged between the Borough and Warwick Township to sweep Warwick's streets, as well. As mentioned previously in this chapter, the Borough purchased a new jet vac truck during this project. This truck will allow the PWD staff to be more efficient in their cleaning and maintenance of the conveyance system. The PWD Superintendent even sent a PWD crew member to Florida to see the truck be built and learn how it operates.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals. With the completion of an O&M schedule, the Borough will be able to address tasks more regularly and efficiently. The Project Team found that the PWD staff do mostly all of the activities for this MCM in-house, and are regularly trained. The Project Team recommends the Borough conduct some training in conjunction with Warwick Township public works staff as a way for staff to share their knowledge and continue working collaboratively to address MCM 6.

Lastly, the Project Team recommends the Borough develop better tracking of all stormwater-related public works activities. By tracking all activities over time, the Borough will be able to highlight trouble spots in the municipality and more strategically conduct good housekeeping measures. The Project Team found that the Borough is on the right track to increasing its level of service for MCM 6.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract this Plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

Consideration of Funding Methods for Stormwater in Lititz Borough

Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in Lititz Borough is primarily through grant funding and through general fund appropriations. Lititz Borough's general fund comes from several sources such as real estate taxes, licenses, and permits. This revenue is then distributed to sources as appropriate and deemed necessary, such as police, public works, parks and recreation, and personnel.

Currently, between the general fund allocations for stormwater programming in Lititz Borough and the reliance on grant funds, the Borough is able to meet its permit requirements. However, in order to enhance the level of service to meet future anticipated regulatory requirements, the Borough must more aggressively invest in stormwater education and engagement, capital projects, and developing an asset management program for its infrastructure. In order to adequately support these costs, the Project Team recommends the Borough implement a dedicated stormwater fee.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying heavily on grant awards is clearly not sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 10 below:

Table 10: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program. The Borough should continue to apply for grant funding where possible, but minimize any reliance on such funds to pay for stormwater management over the long term. Continuing to seek out opportunities to apply for grants in the future should not be discounted as a way to fund stormwater with the understanding that it will remain just a small slice of the total revenue needed.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for Lititz Borough's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. This does not mean, however, that current funding levels for various activities now

being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for Lititz Borough to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[44]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure

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[44] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of Lititz Borough, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals**.** Table 11 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 11: Stormwater User Fee Examples in Pennsylvania[45]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown

[45] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000
City of Lancaster, Lancaster County (2013)	59,263[46]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[47]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:

[46] 2011 US Census Bureau ACS 5-year Estimates.
[47] Ibid.

(1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.

(2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.

(3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.

(4) Parks, recreation grounds and facilities.

(5) Sewers, sewer systems or parts thereof.

(6) Sewage treatment works, including works for treating and disposing of industrial waste…."[48]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

Lititz Borough's Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for Lititz Borough, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Borough, the Project Team found that current budgeting practices are not adequate in meeting the existing regulatory requirements. With tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team needs to invest in personnel, public outreach, and a comprehensive asset management program to ensure a more viable stormwater management program for the future.

Two of the municipalities who participated in this study, Manheim and Warwick Townships, worked with the Project Team to determine the estimated costs projected over five years that is needed to properly manage stormwater. Each of these municipalities took a vastly different approach to estimating costs. Since the Project Team found it difficult to collect meaningful cost data for the other four participating municipalities, including Lititz Borough, the team utilized Manheim and

[48] Purdon's Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

Warwick Townships' approaches to develop cost estimates. A discussion of these approaches and how they were adapted for Lititz Borough follows.

Manheim Township's Approach

Manheim Township, the largest of the municipalities participating in this study, plans to develop a separate Stormwater Department within the Township. All stormwater-related costs, even if currently paid for using general fund appropriations, will be moved to a stormwater budget. This budget will be supported through a dedicated stormwater user fee. The Project Team found that in Manheim Township a 5-year revenue stream totaling approximately $10.1 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater program housed in the Stormwater Department. [49] See Chapter 7 for the full analysis of Manheim Township's financing structure.

Using population as the factor, Lititz Borough's costs were estimated at approximately $2.5 million over five years if the Borough uses Manheim Township's approach to managing stormwater (see Table 12).

Table 12: Lititz Borough's Budget using Manheim Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Manheim Township	37,768	1.00	$10,085,237	$2,017,047
Lititz Borough	9,350	0.25	$2,496,742	$499,348

Warwick Township's Approach

Warwick Township, often hailed as the most proactive Township managing stormwater in the County, plans to continue supporting most of its stormwater-related costs using general fund appropriations and grants. The Township wants to utilize a dedicated stormwater user fee to support an asset management program that focuses on two components – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs. The Project Team found that a 5-year revenue stream totaling $639,268, when adjusted for inflation at a rate of 2.5% per year, will be needed to support a municipal stormwater asset management program for Warwick Township.[50] See Chapter 9 for the full analysis of Warwick Township's financing structure.

Using population as the factor, Lititz Borough's costs were estimated at approximately $339,187 over five years if the Borough uses Warwick Township's approach to managing stormwater (see Table 13).

[49] Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

[50] Ibid.

Table 13: Lititz Borough's Budget using Warwick Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Warwick Township	17,622	1.00	$639,268	$127,854
Lititz Borough	9,350	0.53	$339,187	$67,837

It must be noted that the Project Team only supports this approach for Warwick Township because of the high level of service being provided to the community currently. Since Lititz Borough needs to invest in specific administrative and technical components, the Township should utilize Warwick Township's approach as a jumping off point and include additional costs associated with properly managing stormwater in its stormwater budget.

Recommendations for Lititz Borough's Level of Service Expenditures

Given the size of the Borough, it is likely not feasible (or necessary) to develop a Stormwater Department. Therefore, Manheim Township's costs represent the "Cadillac" version of stormwater management. On the flip side, Warwick Township's costs represent a low cost estimate to managing stormwater since the costs only factor in asset management *and* the costs are based on the useful life of materials. This means that Warwick Township will bring in annual reserves through its dedicated fee to pay for its asset management program over time. Thus, the Project Team recommends that Lititz Borough use a blended approach that uses Warwick Township as its baseline, and then includes additional costs necessary for the Borough to properly manage stormwater.

Out of the four municipalities utilizing a blended approach that models after Manheim and Warwick Townships, Lititz Borough should most use Warwick as its model. The close proximity and relationship that they currently have is a cause for greater consistency between the two municipalities, especially if they continue working collaboratively.

Further discussion is required by Borough staff to determine how best to allocate costs. The following provides a discussion of the additional costs that the Borough should invest in to meet its current and future state and federal regulations:

Personnel costs

The Project Team recommended earlier in this chapter that the Borough invest in hiring a stormwater coordinator. In many respects, simply hiring a coordinator will allow the Borough to meet most, if not all, of its administrative compliance components, allowing existing staff to focus on more pertinent tasks. The Borough could hire a coordinator on its own or as a shared position with Warwick Township and others. The Borough must engage Warwick Township and other neighboring municipalities to determine if a shared coordinator should be hired. Either way, the Project Team recommends investing in a coordinator to help with administrative MS4 permit tasks and keep the Borough on track with meeting its MCMs.

The Project Team also recommended earlier in this chapter that the Borough meet internally to determine if additional public works staff is needed to adequately address the technical components of the MS4 activities. In order for the Borough to meet existing and future regulatory requirements, the Borough should strongly consider hiring additional staff.

Capital costs

The $339,187 estimated 5-year costs using Warwick Township's approach supports an asset management program, including a pipe infrastructure repair and replacement program (assuming

the average useful life of the pipes is 30 years) and a BMP renovation (assuming the average useful life is 20 years) and maintenance (assuming maintenance every 5 years) program. The Project Team highly recommends the Borough invest in an asset management program and sets up its dedicated fee to generate at a minimum $339,187 over five years.

The Borough should continue to access grant funding to pay for large capital improvements. However, where possible, the Borough should also set aside capital funds to pay for larger stormwater projects. The Borough should work with Warwick Township and the local organizations they've worked with in the past like LandStudies, Inc. to determine prioritized projects based on cost effectiveness.

Operations & Maintenance costs

The Borough must develop a more comprehensive understanding of its pipes in order to implement an asset management program properly. If the current funding allocated for mapping does not cover the entire cost, the Borough should invest funds until the map is complete.

There are additional costs that are fairly minimal compared to the large capital and personnel costs needed to properly manage stormwater that the Borough must consider. These costs include outreach materials, contract fees (namely for engineer's time), and hosting outreach and engagement events[51]. See Chapter 7 for Manheim Township's costs associated with these activities, which could be used as a reference for Lititz Borough.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for Lititz Borough

Although the Project Team was unable to develop a specific estimated budget for Lititz Borough, the Project Team recommends the Borough create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

Once it became clear that there was a significant need to have a dedicated funding source to cover the stormwater costs in Lititz Borough, the Project Team considered what financing mechanism would be most appropriate to generate these funds. The Project Team initially considered assessing a property tax, but since the value of a property is not an indicator of the amount of runoff, the property tax was not seen to be the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since the Borough is almost fully developed, there is limited space to generate impervious surface reduction. It is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. The major concern

[51] Warwick Township estimated that their annual Watershed Day costs $2,225.

with this approach is the investment required by the Borough to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). Therefore, the fee calculations will begin more simply and transition over time to a more accurate method, balancing the administrative burden of billing with an equitable distribution of charges.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since Lititz is a Borough, it will have an easier time setting up a fee compared to Townships. The Borough should use existing examples such as Jonestown Borough as a model for implementing a fee.

Borough staff expressed interest to work with Warwick Township more collaboratively. The Project Team learned that Lititz owns the water plant and sells water to Warwick, who supplies water through its "operating" Warwick Township Municipal Authority (WTMA). Lititz Borough and Warwick Township own shares of the sewer plant. Due to the existing relationship between the municipalities, the Project Team recommends Lititz Borough meets with Warwick Township to determine whether it makes sense to set up a new multi-municipal authority or partner to work with Warwick's existing authority.

If Lititz Borough implements a dedicated fee on its own, the Project Team recommends utilizing the existing Lititz Sewer Authority (LSA) within the Borough to bill customers for stormwater. If the LSA does not have the administrative capacity to bill customers currently, it will need to develop a billing system. In this case, the existing authority must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[52] Further internal discussions are necessary to determine the billing system that is easiest to administer and will create fewest transaction costs.

Based on the experience of other communities, it is recommended that the Borough set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report that the outreach need is very high at first but declines as the utility rolls out. A help line and Borough staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

Although a specific cost estimate was not generated, the Project Team recommends implementing a fee to improve the current level of service. This fee could be set low to begin generating revenue, and once the Borough has a better understanding of its costs, the rate structure should be reevaluated. In all likelihood, the Borough's true costs lie somewhere in between the estimates provided using Warwick and Manheim Townships' approaches, shown in Figure 6.

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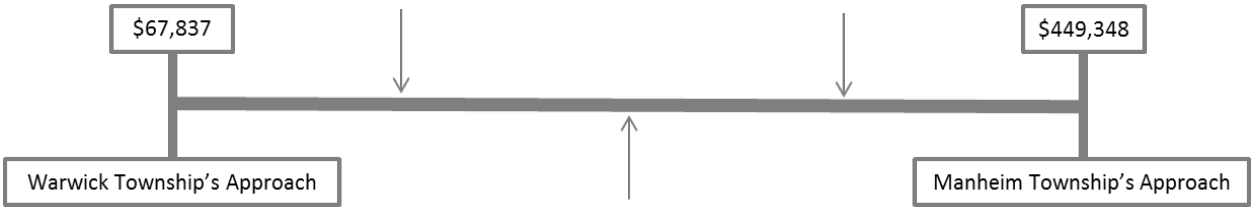
[52] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013, Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

Figure 6: The Spectrum of Lititz Borough's Estimated Annual Stormwater Costs



In determining an equitable funding strategy for collecting revenue to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the Borough provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential[53]. The Project Team worked with the LCPC's land use codes, as this framework will be easy for Lititz Borough to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Borough, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Borough to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 2,872 residential parcels worthwhile. A distribution of all the residential properties in the Borough is depicted in Figure 7. All multi-family residences are classified by LCPC as commercial, and therefore will be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[53] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

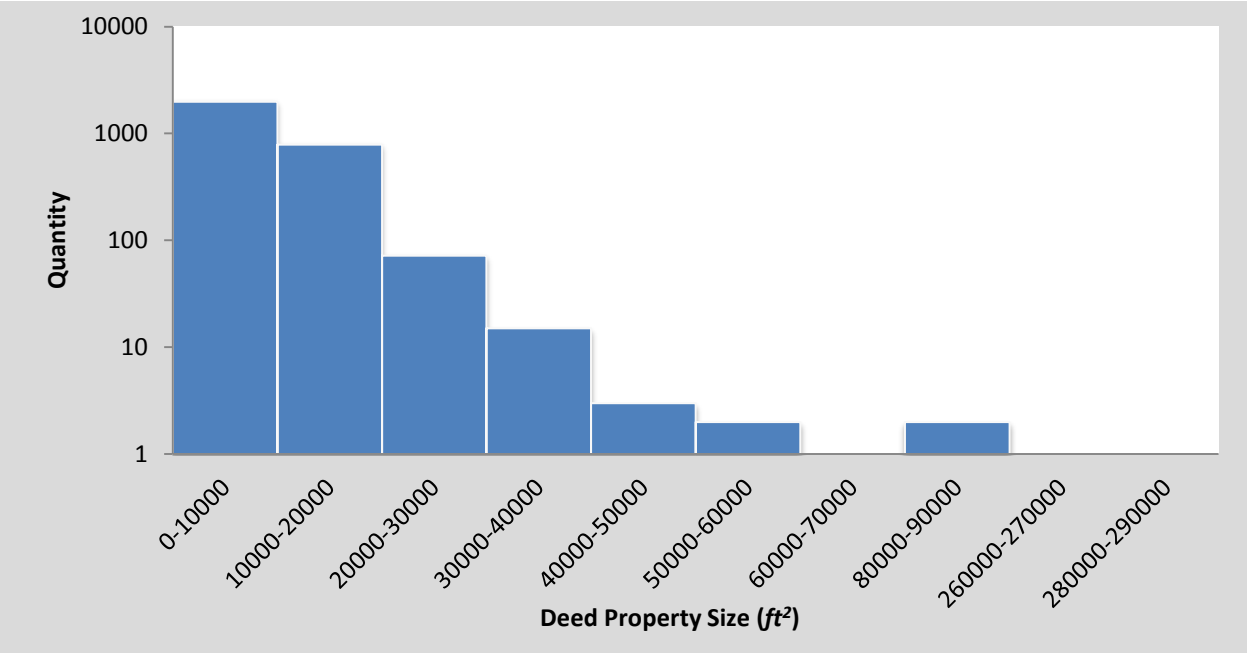


Figure 7. Distribution of Residential Property Sizes in Lititz Borough. The median residential property is 8,512 *ft²*. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team suggests that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Borough utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

Warwick Township felt strongly in keeping the rate structure simple and low for everyone since many residents and businesses have implemented a lot of private BMPs in order to manage stormwater on-site. Therefore, the Project Team created a simpler tiered version for Warwick Township, in addition to an impervious-based tiered system. Since Lititz Borough should think about consistency with Warwick Township, both versions will be laid out in this report. The Borough should meet with Warwick Township to determine how they will each move forward and develop consistency and partnership wherever feasible.

For all 228 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 *ft²* of impervious surface.[54] The Project Team recommends using a similar

[54] The Cost of Dealing with Stormwater, Lancaster City, Retrieved from: http://www.saveitlancaster.com/thecost/.

method for Lititz Borough. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill.

After conducting a sensitivity analysis[55] using various fee structures, the Project Team found that there are many options for the Borough to set its initial rates. It is recommended that the ERU be set at 2,461 ft^2 since that number represents the average residential impervious surface in the Borough[56]. Depending on how much the Borough wants to continue utilizing general fund appropriations and grants to supplement the user fee, the rate should be set at a minimum of $15 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if it is implemented as recommended later in this document.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee starting at $15 per year to generate the minimal revenue needed (based on Warwick Township's approach). The final rate chosen by Lititz Borough should be consistent with the non-residential rate. Although many of the rate scenarios analyzed by the Project Team brought in adequate revenue to pay for stormwater-related expenses, it will be up to the Borough to determine what should be supported through the dedicated fee and thus, where to set its rates. Table 14 shows the revenue yield for all rate scenarios developed by the Project Team.

Table 14: Annual Residential Property Revenue Generated (2,872 Residential Properties x Rate)

$15	$20	$25	$30	$35
$43,080	$57,440	$71,800	$86,160	$100,520
$40	**$45**	**$50**	**$55**	**$60**
$114,880	$129,240	$143,600	$157,960	$172,320
$65	**$70**	**$75**	**$80**	**$85**
$186,680	$201,040	$215,400	$229,760	$244,120

The residential fee is based on the assumption that an average property has approximately 2,461 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined once the Borough determines which costs should be supported using a dedicated user fee.

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[55] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[56] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

Non-Residential – According to data provided by the LCPC, there are 228 non-residential properties in Lititz Borough. This data included the land area of each property, and the average impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 15 below.

Table 15: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	49.24
Commercial	72.42
Community Service	20.73
Cultural Activity	51.07
Agricultural	1.45

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 72.42% impervious area. This property will then be billed for 14,484 ft^2 of impervious surface (20,000 ft^2 x 72.42%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 16 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 16: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage (25%) (Q1)	4,024	<=4,000
Median (Q2)	8,517	>4,000 & <=9,000
Percentage (75%) (Q3)	68,736	>9,000 & <=22,000
Upper Bound (Q4)	2,917,636	>22,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided 2,461 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (70,000 ft^2[57]) was divided by 2,461 ft^2 to determine the number of ERUs that parcels in Q4 will pay. In the simpler version, the same tiers are used; however, the ERUs simply increase by 1. Therefore, all properties in Q1 pay 2 ERUs, in Q2 3 ERUs, in Q3 4 ERUs, and in Q4 5 ERUs. The final ERU for each tier (for both the

[57] The median of all parcels in Q4 in East Cocalico Township is 70,092 ft^2, which was rounded to 70,000 ft^2 for ease of administration.

impervious-based and simple versions) was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 17 shows the summary of this analysis below for the impervious-based version.

Table 17: Annual Non-Residential Property Revenue Generated by Tier, Impervious-based Version

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/2,461 ft^2)	ERU x $ x Number of Parcels				
			$15	**$20**	**$25**	**$30**	**$35**
First tier: <=4,000	57	1.63	$1,390	$1,853	$2,316	$2,779	$3,243
Second tier: >4,000 & <=9,000	61	3.66	$3,346	$4,462	$5,577	$6,692	$7,808
Third tier: >9,000 & <=22,000	54	8.94	$7,241	$9,655	$12,068	$14,482	$16,896
Fourth tier: >22,000	56	28.44	$23,893	$31,857	$39,821	$47,785	$55,750
Total Non-Residential Revenue			$35,870	$47,826	$59,783	$71,739	$83,696
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/2,461 ft^2)**	**ERU x $ x Number of Parcels**				
			$40	**$45**	**$50**	**$55**	**$60**
First tier: <=4,000	57	1.63	$3,706	$4,169	$4,632	$5,095	$5,559
Second tier: >4,000 & <=9,000	61	3.66	$8,923	$10,039	$11,154	$12,269	$13,385
Third tier: >9,000 & <=22,000	54	8.94	$19,309	$21,723	$24,137	$26,550	$28,964
Fourth tier: >22,000	56	28.44	$63,714	$71,678	$79,642	$87,607	$95,571
Total Non-Residential Revenue			$95,652	$107,609	$119,565	$131,522	$143,478
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/2,461 ft^2)**	**ERU x $ x Number of Parcels**				
			$65	**$70**	**$75**	**$80**	**$85**
First tier: <=4,000	57	1.63	$6,022	$6,485	$6,948	$7,412	$7,875
Second tier: >4,000 & <=9,000	61	3.66	$14,500	$15,616	$16,731	$1,785	$18,962
Third tier: >9,000 & <=22,000	54	8.94	$31,377	$33,791	$36,205	$38,618	$41,032
Fourth tier: >22,000	56	28.44	$103,535	$111,499	$119,464	$127,428	$135,392
Total Non-Residential Revenue			$155,435	$167,391	$179,348	$175,243	$203,261

The total revenue potential for all fee structures using the impervious-based tiered version is shown in Table 18.

Table 18: Total Revenue Potential, Impervious-based Version

	$15	$20	$25	$30	$35
Residential	$43,080	$57,440	$71,800	$86,160	$100,520
Non-Residential	$35,870	$47,826	$59,783	$71,739	$83,696
Total Revenue (1-year)	$78,950	$105,266	$131,583	$157,899	$184,216
Total Revenue (5-year)	$394,748	$526,330	$657,913	$789,496	$921,078
	$40	$45	$50	$55	$60
Residential	$114,880	$129,240	$143,600	$157,960	$172,320
Non-Residential	$95,652	$107,609	$119,565	$131,522	$143,478
Total Revenue (1-year)	$210,532	$236,849	$263,165	$289,482	$315,798
Total Revenue (5-year)	$1,052,661	$1,184,243	$1,315,826	$1,447,409	$1,578,991
	$65	$70	$75	$80	$85
Residential	$186,680	$201,040	$215,400	$229,760	$244,120
Non-Residential	$155,435	$167,391	$179,348	$175,243	$203,261
Total Revenue (1-year)	$342,115	$368,431	$394,748	$405,003	$447,381
Total Revenue (5-year)	$1,710,574	$1,842,157	$1,973,739	$2,025,013	$2,236,904

Table 19 shows the summary of this analysis below for the simple version.

Table 19: Annual Non-Residential Property Revenue Generated by Tier, Simple Version

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/2,461 ft^2)	ERU x $ x Number of Parcels				
			$15	**$20**	**$25**	**$30**	**$35**
First tier: <=4,000	57	2.00	$1,710	$2,280	$2,850	$3,420	$3,990
Second tier: >4,000 & <=9,000	61	3.00	$2,745	$3,660	$4,575	$5,490	$6,405
Third tier: >9,000 & <=22,000	54	4.00	$3,240	$4,320	$5,400	$6,480	$7,560
Fourth tier: >22,000	56	5.00	$4,200	$5,600	$7,000	$8,400	$9,800
Total Non-Residential Revenue			$11,895	$15,860	$19,825	$23,790	$27,755
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/2,461 ft^2)**	**ERU x $ x Number of Parcels**				
			$40	**$45**	**$50**	**$55**	**$60**
First tier: <=4,000	57	2.00	$4,560	$5,130	$5,700	$6,270	$6,840
Second tier: >4,000 & <=9,000	61	3.00	$7,320	$8,235	$9,150	$10,065	$10,980
Third tier: >9,000 & <=22,000	54	4.00	$8,640	$9,720	$10,800	$11,880	$12,960
Fourth tier: >22,000	56	5.00	$11,200	$12,600	$14,000	$15,400	$16,800
Total Non-Residential Revenue			$31,720	$35,685	$39,650	$43,615	$47,580
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/2,461 ft^2)**	**ERU x $ x Number of Parcels**				
			$65	**$70**	**$75**	**$80**	**$85**
First tier: <=4,000	57	2.00	$7,410	$7,980	$8,550	$9,120	$9,690
Second tier: >4,000 & <=9,000	61	3.00	$11,895	$12,810	$13,725	$1,464	$15,555
Third tier: >9,000 & <=22,000	54	4.00	$14,040	$15,120	$16,200	$17,280	$18,360
Fourth tier: >22,000	56	5.00	$18,200	$19,600	$21,000	$22,400	$23,800
Total Non-Residential Revenue			$51,545	$55,510	$59,475	$50,264	$67,405

The total revenue potential for all fee structures using the simple tiered version is shown in Table 20.

Table 20: Total Revenue Potential, Simple Version

	$15	$20	$25	$30	$35
Residential	$43,080	$57,440	$71,800	$86,160	$100,520
Non-Residential	$11,895	$15,860	$19,825	$23,790	$27,755
Total Revenue (1-year)	$54,975	$73,300	$91,625	$109,950	$128,275
Total Revenue (5-year)	$274,875	$366,500	$458,125	$549,750	$641,375
	$40	$45	$50	$55	$60
Residential	$114,880	$129,240	$143,600	$157,960	$172,320
Non-Residential	$31,720	$35,685	$39,650	$43,615	$47,580
Total Revenue (1-year)	$146,600	$164,925	$183,250	$201,575	$219,900
Total Revenue (5-year)	$733,000	$824,625	$916,250	$1,007,875	$1,099,500
	$65	$70	$75	$80	$85
Residential	$186,680	$201,040	$215,400	$229,760	$244,120
Non-Residential	$51,545	$55,510	$59,475	$50,264	$67,405
Total Revenue (1-year)	$238,225	$256,550	$274,875	$280,024	$311,525
Total Revenue (5-year)	$1,191,125	$1,282,750	$1,374,375	$1,400,120	$1,557,625

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. The Borough must first determine which expenditures should be included in the stormwater program budget, and which aspects of the program it wants to invest before assigning a fee structure.

It is important to note that if Lititz Borough funds this program entirely by the user fee, then the fee would need to be set higher to pay for existing costs and the additional investments needed to support an adequate stormwater management program. It is highly recommended by the Project Team that the Borough continue to supplement the program using general fund appropriations and grant funds where possible. This will decrease the user fee, minimizing any community backlash.

Lastly, it is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 7: Individual Municipal Analysis – Manheim Township

With a population of 37,768[58], Manheim Township is the largest of the six municipalities who participated in this study. Given its size and location directly outside Lancaster City, the Township has developed over the years as a more affluent municipality within Lancaster County, and thus is able to provide a high level of service to its community.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. Manheim Township provided the following:

1. Evaluate the Township's current Capital Stormwater Program along with the MS4 Program, including their strategies and costs to determine where improvements can be made;
2. Evaluate the current ownership and maintenance responsibilities/policies of stormwater facilities to determine the optimum method of handling the ownership and maintenance responsibilities/policies of stormwater facilities;
3. Utilizing the best Capital Stormwater and MS4 Program approaches to determine the best strategy to implement funding methods to finance the Capital Stormwater and MS4 Programs;
4. Evaluate if future funding methods should support correction of existing runoff issues and if so should funding be limited to public right-of-way projects;
5. Educate the public on various funding options and solicit feedback; and
6. Evaluate the best methodology to capture and collate all efforts currently practiced within the Township that may benefit the Township in meeting the regulations implemented by the PA DEP and the Environmental Protection Agency (EPA).[59]

Since the EFC's focus was to look at how each municipality *finances* its stormwater management activities and then provide recommendations about how to improve the program with greater cost efficiency, the goal of the study transpired to help Manheim Township consolidate its current and future activities into a comprehensive stormwater management department within the local government. This goal ensures that the Township has the resources and capacity to fully address its MS4 permit requirements, and in general continue to provide a high level of service to its residents and businesses.

Assessment of Manheim Township's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)

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[58] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search ACS 5-year total population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

[59] Information provided by Manheim Township directly to the Project Team.

4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

For each MCM, there are specific stormwater BMPs that Manheim Township can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Township engineer to determine the current level of service for each MCM. A discussion of the findings is below.

Overall Stormwater Program Findings

Stormwater Infrastructure

Manheim Township is located just north of Lancaster City, where the 300-year old combined sewer system (CSS) cannot handle the large capacity from past and future development and population growth. The City has thus developed a 25-year Green Infrastructure Plan to alleviate the combined sewer overflows (CSO). While only a sliver of Manheim Township's infrastructure is a CSS, the Township still must work towards replacing that portion of its system, which is a costly endeavor.

The majority of the Township's system is not extremely old. In the 1970s, the Township was primarily a farming community and the concentration of homes remained just outside the City. In the early 1980s, the first housing boom took place in the Township, and then again in the later part of the decade. By the early 1990s, what was left of agricultural land became protected. Today, the Township is home to many developments, retirement communities, and commercial sector. Since the development has taken place in the past 30-40 years, the stormwater infrastructure is made up primarily of concrete and plastic.

The Project Team found that Township staff has a very good understanding of their land use, even with the rapid development that has taken place in the past, and is anticipated into the future. Because the Township continues to grow, and is made up of neighborhood developments and a large commercial sector, it is essential for the Township to fully understand its MS4. Township staff expressed to the Project Team that they are currently working on completing their inventory of all structures and piping (including dates of installation). The Project Team recommends that this be completed as soon as possible so the Township can better understand the state and age of its infrastructure, and then develop a strategic repair and replacement program before the system becomes too old to maintain.

Although not formalized yet, the Project Team found that the overall system is sufficient as long as a formal program be set up to maintain the existing infrastructure. The commitment to addressing stormwater issues through implementation of new projects and maintenance of existing infrastructure is a necessary component to ensuring a robust and comprehensive stormwater management program.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Township's stormwater program primarily comes from general funds, a practice common throughout the country, with some supplementation from public and private grants. Based on the available data collected by the Project Team during the study, capital spending has either been pushed back or funded through grants. The Project Team found that while the Township has a good framework for handling the administrative and operations & maintenance components of the MS4, capital spending has been lacking. Although it is important to

note that the Project Team was unable to collect data in a meaningful way on stormwater capital projects, which was seen across the board with all six municipalities. The primary reason for this is that capital projects are completed when funds become available and not in a way where cost information can be easily verified.

Current Capacity for Handling Stormwater

The Project Team found that the PWD supervisors have a high level of understanding when it comes to stormwater management. Like all municipalities in this study, Manheim Township contracts with an engineering firm to supplement stormwater-related tasks. The Project Team met with the Township engineer, who shed light on the Township's exceptional internal capacity, which confirmed the Project Team's findings.

The road crew in the municipality is comprised of approximately 20 staff which is combined with the Parks Department. Several of the PWD personnel dedicate a portion of their time to managing stormwater. However, additional staff is needed to strategically carry out stormwater management activities. For example, inlet cleaning is scheduled as time permits and conducted mostly after storm events. If additional staff were dedicated to this task, inlet cleaning could be done on a more routine basis. Additionally, Township staff expressed to the Project Team that much of the equipment is old and needs replaced. Replacing this equipment will improve efficiency, so that fewer staff is needed to conduct stormwater maintenance tasks. The Project Team recommends that not only this equipment be replaced, but that it be incorporated into an asset management program so that it is maintained and replaced to minimize emergency costs.

The Project Team also met with additional Township staff that makes up all staff dedicated to stormwater. Each person spends a portion of their time on administrative and/or technical components of stormwater, but does so as time permits. By developing a separate stormwater department within the Township government and investing in additional personnel, the Township will be able to provide a more robust level of service to its community. In addition, staff who currently help out on stormwater-related tasks, even if it is not in their job description, will be able to focus their time on other Township functions, creating greater efficiency at the Township overall.

MCM Findings: 1. Public Education & Outreach

The Project Team found that Manheim Township currently provides a medium level of service to its community regarding public education and outreach. The municipality sends out a quarterly Parks and Recreation newsletter that dedicates two pages on stormwater education, provides information on its website, and utilizes educational materials from the LCCD that is disseminated at the municipal office and local events. In addition, the Township has a list of its targeted audiences. The Township also works closely with Habitat Manheim Township to develop public outreach materials and spread the word in the community about the importance of managing stormwater.

When the Project Team presented the study to the Township's Board of Commissioners, they were not only very receptive to the technical components of the study but also eager to educate residents on how they can implement BMPs on private property. When the Project Team shared the outreach materials created through this effort, the Commissioners requested more specific information to share with the public. The Project Team found this level of engagement by the elected officials extremely valuable in helping the Township meet its public outreach and education goals.

Due to priority shifts within the Township, the municipality cancelled its monthly newsletter, and instead only provides a quarterly newsletter discussed above. In order for Manheim Township to increase its level of service regarding MCM 1, the Township should reactivate its monthly newsletter and develop a more detailed and strategic written Public Education and Outreach Plan for future activities. Manheim Township expressed an interest in working with other municipalities in the

County to utilize local media outlets (television and radio) as an additional method of outreach. The Project Team encourages the Township to lead this collective effort.

MCM Findings: 2. Public Participation & Involvement

The Project Team found that Manheim Township currently provides a medium level of service to its community regarding public involvement and participation. The Township holds at least two public meetings annually on stormwater-related ordinances and policies being implemented, which are advertised in the local newspaper and on the Township's website. Township staff expressed that while the meetings are advertised widely, there is typically minimal attendance. In addition, the Township solicits involvement from local businesses, but has not found businesses to be proactive in reaching out to the Township. The Township asks for local volunteers to help with clean up days and tree planting activities. The Township has also had to eliminate its community days, but has begun working with the School District to promote engagement with younger residents.

In order for Manheim Township to increase its level of service for MCM 2, the Township should continue to work with the schools and engage other local partners (Boy/Girl Scouts, neighboring municipalities, etc.) in a more targeted approach that resonates with different stakeholder groups, revive its community days, and develop a more detailed and strategic written Public Involvement and Participation Plan for future activities. Given the positive reaction of the Commissioners, the Project Team believes that the Township could increase its level of service for both MCMs 1 and 2 at a minimal cost.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that Manheim Township currently provides a minimal level of service to its community regarding IDD&E. While the Township inspects at least 20% of its outfalls each year and utilizes City View for relatively advanced mapping, the Township needs to develop a more formal process for handling IDD&E complaints. The Township could easily develop a procedure for public notification of IDD&E and more centrally located tracking system (currently fragmented between the police, codes, and public works departments. The additional staff recommended later in this chapter will help the Township better address this MCM, since it is anticipated that when the new MS4 permits are issued, more stringent requirements will be incorporated for this MCM.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that Manheim Township currently provides a minimal level of service to its community regarding construction site runoff control. This level of service was found almost across the board with all six municipalities. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources at the conservation district to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that Manheim Township utilizes its contracted engineer through CS Davidson to inspect sites when time and resources permit. Since the Township uses Microsoft Access to keep track of all inspections, the Project Team recommends that the Township continue this practice and add a section in Access to separate projects that need to be tracked for the MS4 permit. Incorporating a way to pull out all MS4-related projects will minimize the time needed to compile the MS4 Permit Annual Report and improve the Township's organizational efficiency.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that Manheim Township currently provides a medium level of service to its community regarding post construction site runoff control. The Township has a procedure in place for inspecting all post construction stormwater management (PCSM) BMPs and a written operations and maintenance (O&M) schedule for publically-owned BMPs. Within the Township's ordinance, it states that the owners of private PCSM BMPs must sign a maintenance agreement with the Township. In addition, the engineer inspects all PCSM BMPs to ensure they are implemented as designed and that a maintenance agreement is in place once constructed. Since 2006, the Township has developed an inventory of all public and private PCSM BMPs.

Many municipalities have identified sinkholes to be a serious issue in the area. In the past year alone, Manheim Township repaired 14 sink holes on public property. It is crucial given the geological makeup of the County that clearly defined policies are set to minimize emergency situations that sink holes present to local governments. Whether sink holes are created due to stormwater issues or simply the soils in the County, sink holes prove costly to taxpayers, as they often need to be repaired immediately, taking time away from the Public Works Department's daily tasks and can quickly become a public safety hazard.

In order to maintain the Township's current level of service, the Township should continue with the practices in place, and in addition conduct training for both its municipal staff and for developers who work in the Township to ensure that they are up to date on all stormwater management regulations, Low Impact Development (LID) and Green Infrastructure (GI) alternatives, and are informed of sink hole issues and how to mitigate those issues using best practices.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that Manheim Township currently provides a minimal level of service to its community regarding pollution prevention and good housekeeping. The PWD maintains all publically-owned BMPs; cleans inlets, ditches, and drains following storm events; sweeps streets annually; and trains staff annually. Although the Township meets its requirements, a consolidated stormwater department will provide the tools and resources necessary to increase the level of service for MCM 6.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals by adding capacity and purchasing new equipment. The Project Team recommends the Township invest in new equipment to help improve maintenance activities, develop better tracking of all stormwater-related public works activities, continue to map the entire storm sewer system with the goal of ultimately developing an infrastructure repair and replacement program, and regularly train staff in different components of stormwater-related good housekeeping measures. The Project Team found that the Township is on the right track to increasing its level of service for MCM 6.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract this Plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area

restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

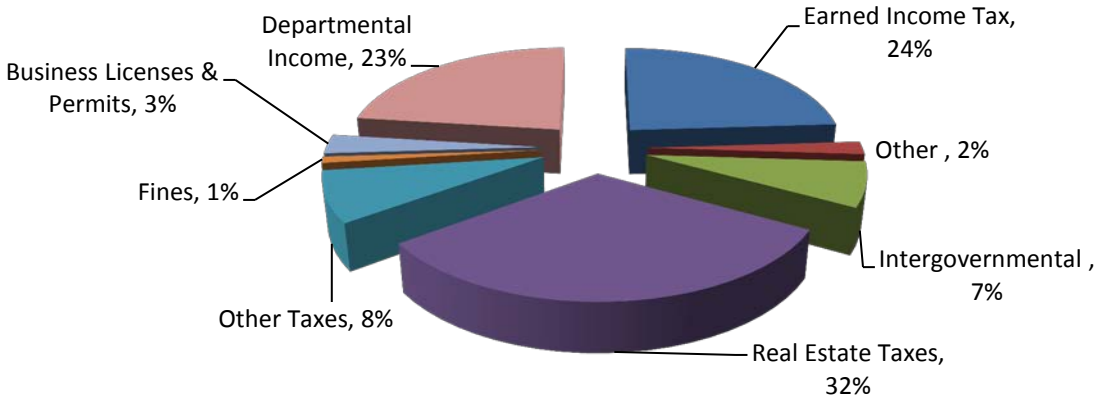
Consideration of Funding Methods for Stormwater in Manheim Township

Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in Manheim Township is partially through grant funding and leveraging relationships with local organizations, but with the majority of the revenue derived from general fund appropriations. Manheim Township's general fund comes from several sources such as real estate taxes, licenses, and permits (see Figure 8 for breakdown). This revenue is then distributed to sources as appropriate and deemed necessary, outlined in the Township's Service Delivery Plan. Such expenditures include public safety, planning and zoning, public works, parks, and recreation, in additional to general and administrative expenses.[60]

Figure 8: Manheim Township's 2013 General Fund Revenue Breakdown[61]



Currently, general fund allocations for stormwater programming in Manheim Township are adequate for the Township to meet its permit requirements. However, in order to enhance the level of service to meet future anticipated regulatory requirements, the Township must more aggressively invest in capital projects and developing an asset management program for its infrastructure. The Township is committed to developing a separate stormwater department to implement this program.

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[60] Manheim Township 2013 Budget, Section 4, Service Delivery Plan, page 6-7, Retrieved from: http://www.manheimtownship.org/DocumentCenter/View/2452.

[61] Manheim Township 2013 Budget, Section 3, Financing Plan, page 5, Retrieved from: http://www.manheimtownship.org/DocumentCenter/View/2408.

A warning trend noted in the Township's 2013 Budget shows that there is a decreasing trend of operating revenues per capita over time.[62] This signifies the need to look at alternate sources of revenue dedicated to stormwater, so that this trend does not affect the Township's ability to implement a long-term stormwater program. The most logical next step, therefore, is to ensure there is a dedicated funding stream, which will allow Township officials to enhance the level of service and manage stormwater in a way that is both adequate and reliable.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying on occasional grant awards is clearly not sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 21 below:

Table 21: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program.

[62] Manheim Township 2013 Budget, Section 1b, General Budget Information, page 32, Retrieved from: http://www.manheimtownship.org/DocumentCenter/View/2407.

It should also be noted that Manheim Township has been fairly effective in paying for several smaller projects with grant funds from federal and state sources. However, this funding has been sporadic in nature and only covered a small portion of the total revenue needed to manage stormwater. Continuing to seek out opportunities to apply for grants in the future should not be discounted as a way to fund stormwater with the understanding that it will remain just a small slice of the total revenue needed.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for Manheim Township's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. This does not mean, however, that current funding levels for various activities now being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for Manheim Township to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[63]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these

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[63] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of Manheim Township, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals. Table 22 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 22: Stormwater User Fee Examples in Pennsylvania[64]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000
City of Lancaster, Lancaster County (2013)	59,263[65]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[66]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

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[64] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.
[65] 2011 US Census Bureau ACS 5-year Estimates.
[66] Ibid.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:
>
> (1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.
>
> (2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.
>
> (3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.
>
> (4) Parks, recreation grounds and facilities.
>
> (5) Sewers, sewer systems or parts thereof.
>
> (6) Sewage treatment works, including works for treating and disposing of industrial waste…."[67]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

Manheim Township's Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for Manheim Township, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of

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[67] Purdon's Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Township, the Project Team found that current budgeting practices are adequate in meeting the existing regulatory requirements. However, with tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team and municipal staff agreed that a more comprehensive program will ensure a more viable stormwater management program into the future.

The Project Team found that a 5-year revenue stream totaling approximately $10.1 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater program. [68] The project team found consensus among the municipal staff in the Township on their desire to develop a specific stormwater department that includes all costs associated with managing stormwater. See Appendix F for an itemized list of the proposed budget for years 1-5. The following section describes the expenditures broken down by operating and capital expenditures projected in years 1-5.

Level of Service Expenditures

Operating Expenditures

Operating costs include personnel (wages and benefits), contracted services, general expenses, vehicle operations, facilities maintenance, and equipment maintenance needed to run and sustain a comprehensive program. These costs were determined internally within the Township and then discussed through in-person meetings with the Project Team. The Township has currently been spending general fund appropriations on many of these costs, which were consolidated into one budget for the purpose of developing a consolidated stormwater department. It is assumed that operating costs increase each year with inflation. A summary of the operating costs in the first year of the stormwater department is shown below:

- Salaries: $355,525; Benefits: $193,680

  This includes salaries and benefits for the existing PWD Director (25%), existing clerical position (25%), new PWD superintendence position, existing PWD Engineer (25%), new PWD maintenance positions (4 full time), new PWD crew leader, and overtime.

- Materials & Supplies: $36,080

  This includes departmental materials and supplies such as postage, office, computer, and photographic supplies, subscriptions and publications, storm drain repair materials, tools and safety equipment, uniforms, and minor equipment purchases.

- Contracted Services: $170,150

  This includes engineering fees, printing fees, sink hole repair fees, one call systems fees, and street sweeping twice per year.

- General Expenses: $11,275

  This includes advertising, training, telephone, equipment rental, and miscellaneous expenditures.

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[68] Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt.

- Vehicle Operations: $76,875

  This includes all routine maintenance required for existing and new vehicles.

- Facilities Maintenance: $20,193

  This includes all fixed costs and maintenance costs required for the stormwater department facility usage.

- Equipment Maintenance: $8,918

  This includes all routine maintenance required for existing and new equipment.

Table 23: Total Operating Expenditures, 5-Year Projection

Year 1	Year 2	Year 3	Year 4	Year 5
$872,695	$894,482	$916,814	$939,705	$963,167

Capital Expenditures

Capital costs consist of expenditures on purchasing new equipment, project installation, and inspection of stormwater infrastructure. This includes all equipment start-up costs and capital improvement plan (CIP) projects identified by Township staff. The total capital expenditures fluctuate each year, so that there are greater costs in year 1 to get the department started and fluctuating costs in the future depending on the priority projects identified in the CIP. A summary of the capital costs in the first year of the stormwater department is shown below:

- Equipment Start-up: $901,000

  This includes all equipment purchases needed in the first year of the stormwater department such as a Superintendent vehicle, pickup truck, utility truck, vactor truck, television truck, and street sweeper. In addition, this includes costs to convert the current utility building for stormwater management usage only and computer and camera costs.

- CIP Projects: $1,168,250

  This includes tree plantings, annual inlet repairs, BMP inspection, plan development and implementation, water quality improvement projects, and green infrastructure projects.

Table 24: Total Capital Expenditures, 5-Year Projection

Year 1	Year 2	Year 3	Year 4	Year 5
$1,168,250	$770,250	$1,160,250	$754,750	$1,644,873

Total Expenditures

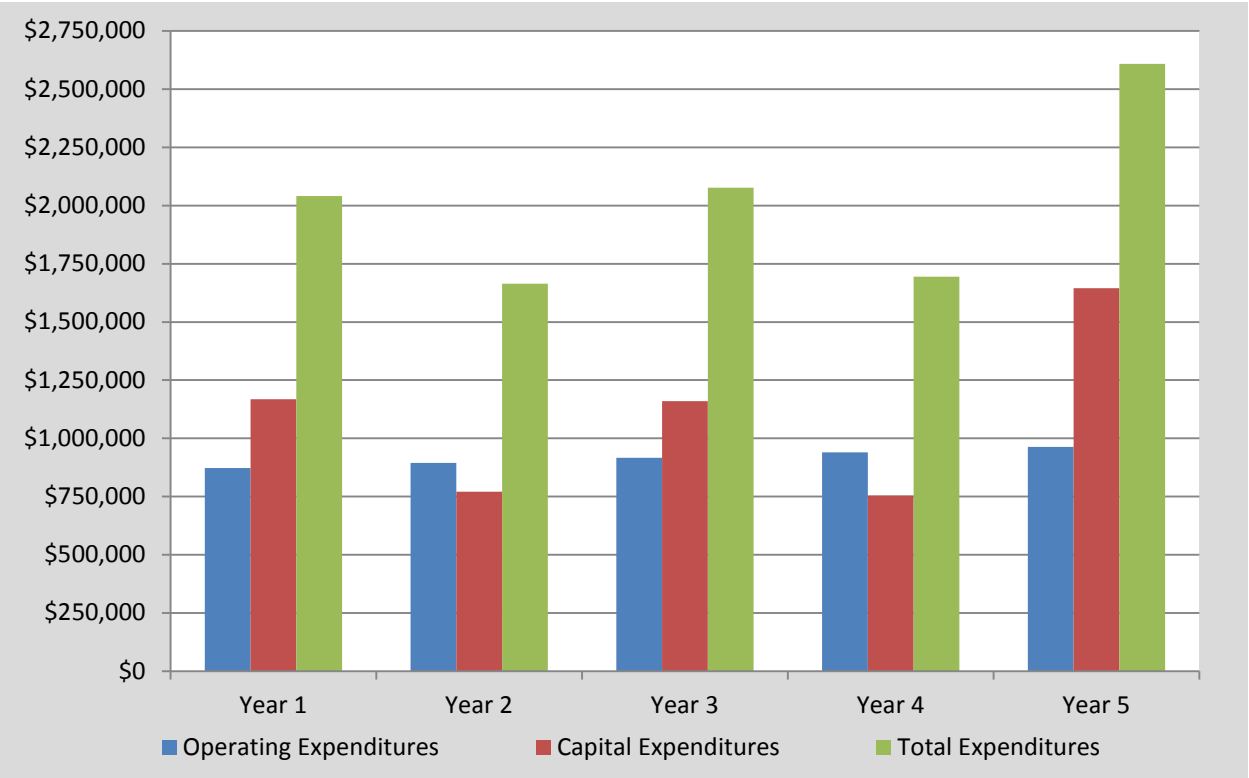

Figure 9. Proposed Stormwater Budget, Years 1-5. Operating and capital expenditures over five years total to $10.1 million.

Figure 9 shows the breakdown of operating and capital expenditures projected over five years. Based on the total expenditures for five years, a discussion of the necessary revenue to maintain a sustainable stormwater management program follows.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for Manheim Township

Based on the needs identified by the Project Team, Manheim Township will incur approximately $10.1 million in stormwater expenses over the next five years. Our key recommendation is to create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

Once it became clear that there was a significant need to have a dedicated funding source to cover the stormwater costs in Manheim Township, the Project Team considered what financing mechanism would be most appropriate to generate these funds. The Project Team initially considered assessing a property tax, but since the value of a property is not an indicator of the amount of runoff, the property tax was not seen to be the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since it is anticipated that development and growth continue in the Township, increasing the amount of impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. The major concern with this approach is the investment required by the Township to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). Therefore, the fee calculations will begin more simply and transition over time to a more accurate method, balancing the administrative burden of billing with an equitable distribution of charges.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since Manheim is a Township, it will need to set up a stormwater fee by either creating a new authority or utilizing its existing authority to bill its customers for stormwater.

The Township has a General Municipal Authority within the Township set up by the Board of Commissions and is also served by the Lancaster Area Sewer Authority (LASA).The Project Team recommends utilizing one of the existing authorities to bill its customers for stormwater. In either case, the existing authority must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[69]

The General Municipal Authority has financing functions and collects fees for infrastructure related to public water in the Township, but does not currently bill its customers regularly[70]. The Township has billing capabilities since it used to own its sewer system, but has not used this since it sold its sewer system to LASA. Since LASA now owns the system, they are responsible for regular billing.

If the Township decides to utilize its existing authority, it will need to begin regular billing for stormwater, and the revenue collected could then be transferred directly to the Stormwater Department once created. If the Township wants a stormwater line item added to its sewer bill that is sent to customers by LASA, the Township will need to work with LASA to specify each party's role and then amend the articles of incorporation. It is recommended by the Project Team for Manheim Township to discuss internally which option is easier to administer and will create fewer transaction costs between parties.

If the other municipalities included in LASA also want to implement a stormwater user fee, LASA could be used as a pilot regional municipal authority. In PA, much of the debate concludes with the

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[69] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013,Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

[70] Direct communication with Manheim Township Manager, August 22nd, 2013.

need to develop more multi-jurisdictional collaboration to reduce the looming stormwater costs. However, since Manheim Township is more advanced than many municipalities, they may want to move forward at a faster pace and utilize the General Municipal Authority. In the future when more municipalities implement fees, which is anticipated across the state, LASA could take over the billing for Manheim Township and others.

Based on the experience of other communities, it is recommended that the Township set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report that the outreach need is very high at first but declines as the utility rolls out. A help line and Township staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

In determining an equitable funding strategy for collecting approximately $10.1 million in revenue over the next five years to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the Township provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential[71]. The Project Team worked with the LCPC's land use codes, as this framework will be easy for Manheim Township to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Township, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Township to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 12,341 residential parcels worthwhile. A distribution of all the residential properties in the Township is depicted in Figure 10. All multi-family residences are classified by LCPC as commercial, and therefore could be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[71] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

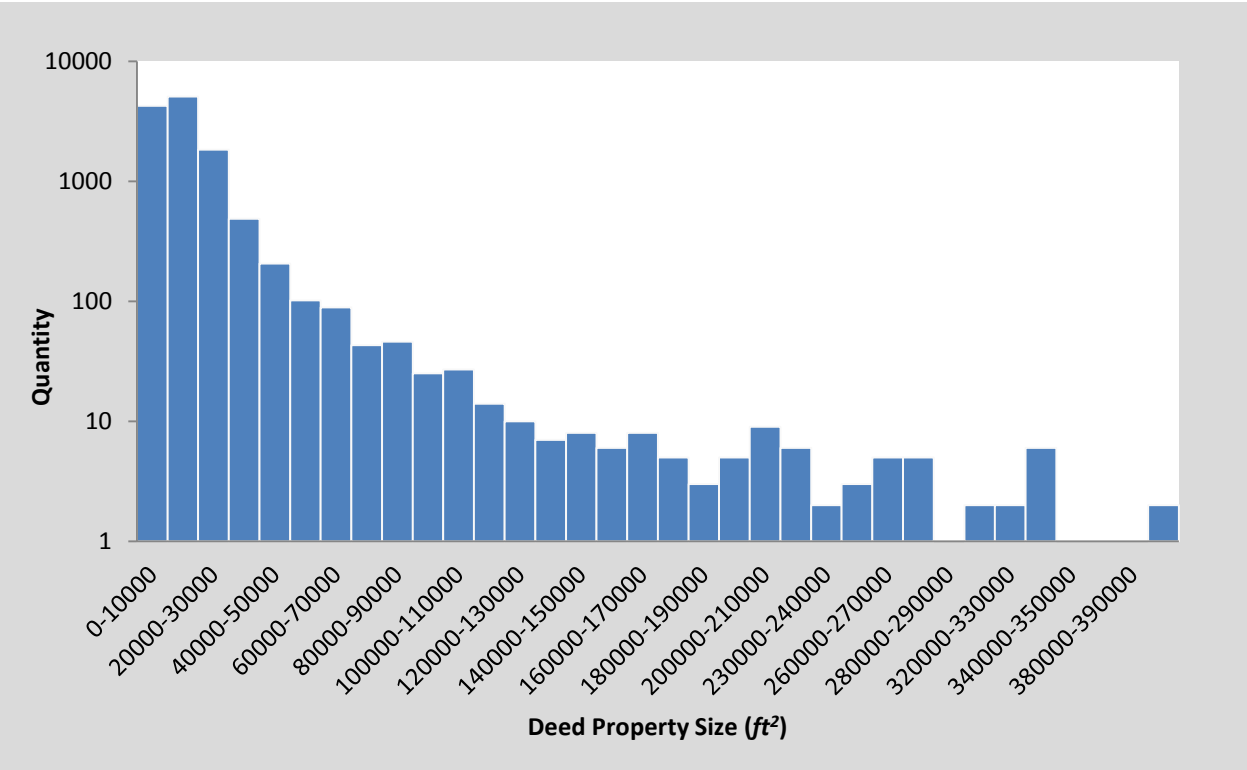

Figure 10. Distribution of Residential Property Sizes in Manheim Township. The median residential property is 12,632 ft^2. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team suggests that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Township utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

For all 935 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 ft^2 of impervious surface.[72]

The Project Team recommends using a similar method for Manheim Township. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill. It is then recommended, following the first few years of utilizing a tiered system, the Township invest in getting more accurate impervious surface data for all non-residential properties and then assess the fee based on each property's total impervious surface.

[72] The Cost of Dealing with Stormwater, Lancaster City, retrieved from: http://www.saveitlancaster.com/thecost/

After conducting a sensitivity analysis[73] using various fee structures, the Project Team found that there are many options for the Township to set its initial rates. It is recommended that the ERU be set at 4,527 ft^2 since that number represents the average residential impervious surface in the Township[74]. Depending on how much the Township wants to continue utilizing general fund appropriations and grants to supplement the user fee, the rate should be set between $70 and $85 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if it is implemented as recommended later in this document.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee between $70 and $85 per year. The final rate chosen by Manheim Township should be consistent with the non-residential rate. Table 25 shows the revenue yield for each scenario.

Table 25: Annual Residential Property Revenue Generated

Number of Parcels	$70	$75	$80	$85
12,341	$863,870	$925,575	$987,280	$1,048,985

The residential fee is based on the assumption that an average property has approximately 4,527 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined based on the necessary revenue ($10.1 million) minus supplemental revenue from alternative sources.

Non-Residential – According to data provided by the LCPC, there are 935 non-residential properties in Manheim Township. This data included the land area of each property, and the average impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 26 below.

[73] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[74] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

Table 26: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	82.08
Commercial	70.73
Community Service	24.15
Cultural Activity	6.87
Agricultural	5.13

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 70.73% impervious area. This property will then be billed for 14,146 ft^2 of impervious surface (20,000 ft^2 x 70.73%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 27 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 27: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage (25%) (Q1)	6,162	<=6,000
Median (Q2)	27,729	>6,000 & <=28,000
Percentage (75%) (Q3)	77,641	>28,000 & <=78,000
Upper Bound (Q4)	3,797,079	>78,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided by 4,527 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (146,964 ft^2) was divided by 4,527 ft^2 to determine the number of ERUs that parcels in Q4 will pay. The final ERU for each tier was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 28 shows the summary of this analysis below.

Table 28: Annual Non-Residential Property Revenue Generated by Tier

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/4,527 ft^2)	ERU x $ x Number of Parcels			
			$70	$75	$80	$85
First tier: <=6,000	232	1.33	$21,524	$23,062	$24,599	$26,137
Second tier: >6,000 & <=28,000	240	6.19	$103,910	$111,332	$11,875	$126,176
Third tier: >28,000 & <=78,000	230	17.23	$277,402	$297,217	$317,031	$336,846
Fourth tier: >78,000	233	32.46	$529,486	$567,306	$605,127	$642,947
Total Revenue Generated			$932,322	$998,917	$958,632	$1,132,106

The total revenue potential for all fee structures is shown in Table 29 below.

Table 29: Total Revenue Potential

	$70	$75	$80	$85
Residential	$863,870	$925,575	$987,280	$1,048,985
Non-residential	$932,322	$998,917	$958,632	$1,132,106
Total Revenue (1-year)	$1,796,192	$1,924,492	$1,945,912	$2,181,091
Total Revenue (5-year)	$8,980,961	$9,622,458	$9,729,562	$10,905,453

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. However, this assumes that the entire program is funded through a dedicated user fee. If Manheim Township funds this program entirely by the user fee, then the fee would need to be set at **$85** per year per ERU, where all residential properties pay 1 ERU. However, it is highly recommended by the Project Team that the Township continue to supplement the program using general fund appropriations and grant funds where possible. This will decrease the user fee, minimizing any community backlash.

The Project Team conducted a simple analysis to show the Township that its rates could be lowered by using alternative revenue sources, shown in Table 30 below.

Table 30: Revenue Potential Using Alternate Sources

	Total Revenue Needed	Grant Funds (3% of total revenue needed)	General Fund	User Fee Revenue
Total Revenue (1-year)	$2,017,047	$60,511	$100,000	$1,856,536
Total Revenue (5-year)	$10,085,237	$302,557	$500,000	$9,282,680

By factoring in grants and general fund appropriations, the total revenue needed through a user fee is lowered from $10.1 million to $9.3 million. Thus, if Manheim Township supplements its budget

with alternative revenue sources, the Project Team recommends the fee be set between **$70 and $80** per year per ERU, where all residential properties pay 1 ERU.

Lastly, it is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 8: Individual Municipal Analysis – Mount Joy Borough

Mount Joy Borough is located in the Northwest region of Lancaster County, and with a population of 7,365[75] is the smallest of the six municipalities who participated in this study. Similar to Lititz Borough, Mount Joy considers itself a "Main Street Community," made up of many local, small businesses clustered on Main Street. Historically, the Borough was considered a close-knit community. Although still close knit today, the Borough has struggled to generate the same level of community engagement and tourism that other small communities such as Lititz Borough attract.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. Mount Joy Borough provided the following:

Priorities

1. Assess condition of existing systems to identify problem areas, function ability, water quality conditions, and establish a maintenance program;
2. Evaluate current operations such as current operations & maintenance and stream bank protection;
3. Identify opportunities for community outreach and education targeted at private land owners, schools, community groups, and the general public; and
4. Assess policies, ordinances, and regulations for capital improvements, road maintenance, planned infrastructure including opportunities for GI, stormwater ordinances, coordination with the LCCD, and clarification and coordination with the state and federal government to better address guidelines and regulations.

Needs

1. Coordinate with Lancaster County Planning Commission (LCPC) for mapping inlets and outfalls;
2. Compile data from any existing land development plans;
3. Evaluate existing systems;
4. Assistance with education and outreach;
5. Provide recommendations to manage Borough-wide stormwater program;
6. Provide recommendations to fund Borough-wide stormwater program;
7. Develop a capital improvements plan to implement improvements in a systematic manner;
8. Develop a holistic approach (Borough, neighboring municipalities and other stakeholders) to stormwater management issues rather than isolated community plans; and
9. Assess "outside the box" ideas- credit "banking"- credits available for future needs in downtown revitalization, i.e. redeployment of existing property with limited ability to address stormwater management needs.

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[75] [75] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search ACS 5-year total population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

Goals

1. Improve quality of stormwater leaving the Borough and entering waterways;
2. Correct flooding and discharge along Little Chiques Creek;
3. Address flooding issues in flood prone areas/neighborhoods and developments;
4. Cleaner water leaving neighborhoods and subdivisions;
5. Integrate multiple sectors (agriculture, business, residential) into Borough/regional solutions;
6. Develop a holistic approach to solutions that go beyond Mount Joy Borough boundaries (similar to nutrient credit trading); and
7. Look at the possibility/feasibility of establishing a credit "bank" for future needs in downtown revitalization, i.e. redeployment of existing property with limited ability to address stormwater management needs. Would also provide economic development value.[76]

Many components of the priorities, needs, and goals outlined by the Borough are aligned with the EFC's focus and goals when undertaking a stormwater financing feasibility study. The main goal of the study for the Project Team was to assess the current municipal stormwater program and provide the Borough with financing recommendations to help them improve their current program and implement cost saving measures to create a comprehensive and sustainable stormwater program. This goal ensures that the Borough has the resources and capacity to improve and maintain a higher level of service to its residents and businesses and address all stormwater-related compliance activities.

Assessment of Mount Joy Borough's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

For each MCM, there are specific stormwater BMPs that Mount Joy Borough can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Borough engineer to determine the current level of service for each MCM. A discussion of the findings is below.

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[76] Information provided by Mount Joy Borough directly to the Project Team.

Overall Stormwater Program Findings

Stormwater Infrastructure

Mount Joy Borough was established in 1851 and has the old town charm of many communities scattered throughout the Mid-Atlantic region where historic homes are clustered in old neighborhoods behind and around Main Street, store fronts along Main Street look the same as they did 50 years ago, and there is an essence of stepping back in time to a simpler era. Although much of the infrastructure has been replaced, some of the infrastructure remains from this simpler era when Lancaster County was much less developed and still primarily agricultural.

The storm sewer conveyance system is made up of varying types of pipe depending on when it was installed. In the 1940s, terra cotta pipe was installed, but has mostly been replaced. By the 1980s, most of the wood pipe was replaced. The Borough is knowledgeable about the old parts of the system that have been replaced, however, does not have a map of the existing conveyance system. Without a comprehensive map, Borough staff does not fully understand the characteristics of their system – pipe size, location, and age. This knowledge is crucial to developing a cost-effective stormwater infrastructure repair and replacement program that is needed in the Borough.

The Project Team recommends that the Borough invest in mapping their conveyance system as soon as possible, so the Borough can better understand the characteristics of the existing system and begin to develop a strategic plan before the system becomes too old to maintain and must all be replaced. The commitment to addressing stormwater issues through implementation of new projects and maintenance of existing infrastructure is a necessary component to ensuring a robust and comprehensive stormwater management program.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Borough's stormwater program comes from general funds, a practice common throughout the country, with some supplementation from public and private grants and the Borough's Capital Fund. Based on the available data collected by the Project Team during the study, capital spending on large projects has either been pushed back or funded through bond financing.

The Project Team found that the Borough invests minimally in stormwater management through its General Fund and Capital Fund. The PWD receives minimal funding to manage stormwater through general fund appropriations, and while there is a line item in the Capital Fund for stormwater, no funding was allocated in 2013.[77] In previous years, a minimal amount of funding was allocated for stormwater for construction and maintenance activities through the Capital Fund.

The Project Team found Borough staff eager to invest more thoroughly in meeting stormwater requirements. In the past, the Borough staff has been stifled by elected officials who are hesitant to use sparse resources on stormwater management. Participation in this study and the improved knowledge the staff has gained over the year will help staff work with elected officials to educate them on the importance of investing in stormwater management.

Current Capacity for Handling Stormwater

The Borough Manager's background is in public works (was previous PWD Director), which is helpful in achieving success for stormwater at the municipal level. The Project Team found that many of the essential staff currently works on stormwater, whether or not it is part of their job description.

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[77] Borough of Mount Joy Capital Fund (30), 2013 Budget, Retrieved from: http://www.mountjoyborough.com/mount_joy_boro/lib/mount_joy_boro/borough_of_mount_joy/budget/2013/2013_capital_fund_budget.pdf.

Throughout the study, this staff showed a commitment to learning about best practices and improving their program. This “all-hands-on-deck” approach witnessed by the Project Team shows a true commitment to the community, however, is not sustainable over time.

The PWD staff consists of six members, including the PWD Director. The Borough Manager and PWD Director engaged the entire PWD staff in meetings with the Project Team and sent staff to local training events, increasing the team’s knowledge throughout the study. This is the first step towards improving internal capacity. However, Borough staff and the Project Team believe that additional public works staff should be hired in order to address stormwater management properly as well as adequately address the department’s other functions.

In order to adequately address the administrative components of the MS4 permit, the Borough should invest in hiring a stormwater coordinator, either on its own or shared between neighboring municipalities. If done so collectively, the Borough should bring together neighboring municipalities to develop an intergovernmental agreement. Either way, hiring a stormwater coordinator will allow staff who currently have taken on all of the stormwater-related tasks the time to focus on other Borough functions, creating greater efficiency at the Borough overall.

MCM Findings: 1. Public Education & Outreach

The Project Team found that Mount Joy Borough currently provides a medium level of service to its community regarding public education and outreach. The Borough increased its level of service from minimal at the beginning of the study through its success in receiving grant funding to construct a demonstration rain garden on Borough property and host rain garden workshops for the community, all of which has allowed the Borough to more actively conduct public outreach and generate community support. The Project Team strongly encourages the Borough to continue to invest in these types of activities using general funds since grant funding is not a reliable source over time, which will ensure the level of service remains and potentially increases.

The Project Team found that the Borough also hosts an annual public presentation with a portion of the meeting dedicated to stormwater, shares public information at community events, posts information on its website, and sends newsletter articles to residents. The Borough also developed a written Public Education & Outreach Plan in August 2012 and has a list of their target audience groups.

At the beginning of the study, Borough staff was eager to learn about effective ways to educate and engage their community. While they shared materials with the community, they were having trouble conveying their message to their audience. The Project Team found that throughout the study, Borough staff were highly motivated and attended various trainings to get themselves up to speed on managing stormwater and all of the MS4 permit activities.

With the launch of their rain garden project, the Project Team found that the staff was beginning its success in public outreach. The Project Team attended a volunteer planting day in which the Boy and Girl Scouts helped the contracted landscaper plant over 700 plants of multiple varieties in the rain garden. Borough staff and councilmen pitched in and worked alongside the Scouts. In addition, the Borough is hosting free rain garden workshops, which are posted on their website and have been well attended. The Borough staff reflected to the Project Team that they did not realize the community was interested in learning about stormwater, but once the staff received grant funds for the rain garden project, they learned that many residents and businesses wanted to pitch in.

In order for Mount Joy Borough to increase its level of service regarding MCM 1, the Borough should continue to educate and engage their elected officials and the public so they have the support to invest in outreach events like the rain garden project annually, work with other neighboring

municipalities to share materials and information and plan regional events, and track all its activities related to MCM 1.

MCM Findings: 2. Public Participation & Involvement

At the beginning of the study, the Project Team found that Mount Joy Borough was struggling to successfully engage the community. The rain garden project was a necessary launching pad for the Borough to increase its level of service to its community regarding public involvement and participation. In order for the Borough to provide a service that fully supports MCM 2, it must continue to invest in annual events, dedicate an annual public meeting for stormwater where the public can give their input, continue disseminating stormwater education to residents, businesses, and elected officials, and track all activities related to MCM 2.

In order for Mount Joy Borough to increase its level of service for MCM 2, it should also reach out to schools and engage other local partners (Boy/Girl Scouts, neighboring municipalities, watershed associations, etc.) in a more targeted approach that resonates with different stakeholder groups and develop a more detailed and strategic written Public Involvement and Participation Plan for future activities.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that Mount Joy Borough currently provides a minimal level of service to its community regarding IDD&E. While the Borough inspects at least 20% of its outfalls each year, the Borough needs to develop a more formal process for handling IDD&E and public notification. While the Borough has a map of all outfalls and inlets, it also needs to map its conveyance system, which should be a priority so that the Borough can set up a more strategic program and be cost efficient in its stormwater spending.

The Borough could easily develop a procedure for public notification of IDD&E and tracking system for inspections and complaints. One of the recommended tasks of a stormwater coordinator should be to develop formal procedures for IDD&E. It is anticipated that when the new MS4 permits are issued, more stringent requirements will be incorporated for this MCM. At this time, Borough staff should consider hiring additional Public Works staff to ensure all screening and inspections are completed each year.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that Mount Joy Borough currently provides a minimal level of service to its community regarding construction site runoff control. This level of service was found almost across the board with all six municipalities. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources at the conservation district to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that Mount Joy Borough utilizes its contracted engineer through ARRO Consulting, Inc. to inspect sites when time and resources permit. The engineer files all inspections, but does not separate projects out that are for MS4 annual reporting.

At the beginning of this study, the Borough did not have a strong relationship with the LCCD. The Project Team recommends that the Borough build a relationship and ask that all inspections be sent directly to them. It is up to the Borough to be proactive in its relationship with the LCCD, since the Borough is responsible for this MCM. The Project Team believes that with a stormwater coordinator,

the level of service for this MCM could be vastly improved. Current staff does not have the time and resources to check in with the LCCD, but a coordinator could work more closely with the LCCD and the Borough engineer to develop a tracking and filing system for development projects.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that the Borough is in the beginning phases of developing an adequate level of service regarding post construction site runoff control. While the Borough has minimal requirements for the use of structural and non-structural BMPs in new development and redevelopment projects, the Borough strongly relies on the LCCD to review plans, inspect sites, and track all projects. The Borough also does not currently have an Operations & Maintenance (O&M) program for its publically-owned BMPs.

However, the Project Team found that the Borough's engineer is beginning to develop an inventory of all post construction stormwater management (PCSM) BMPs and tracking system. In order to increase the level of service for this MCM, the Borough must finish its inventory of BMPs; create a written O&M plan for Borough-owned facilities; provide training opportunities to ensure developers are up to date on all stormwater management regulations, Low Impact Development (LID) and Green Infrastructure (GI) alternatives; inspect all sites to ensure PCSM BMPs were implemented as designed; and track all inspections in-house. A stormwater coordinator should take on some of these tasks, providing other staff more time to inspect sites and implement an O&M program.

The Borough staff mentioned to the Project Team that many of the home owners associations (HOAs) within the Borough do not have the funding to maintain their privately-owned BMPs. Public health and safety concerns can arise when proper maintenance is not being done, forcing the Borough to spend public funds in emergency situations. To mitigate these issues as best it can, the Borough needs to develop more stringent maintenance agreements for any new developments with BMPs and lay out these requirements in all pre-construction meetings.

Mount Joy Borough, like many municipalities participating in this study, identified sink holes to be a serious issue in the area. It is crucial given the geological makeup of the County that clearly defined policies are set to minimize emergency situations that sink holes present to local governments. Whether sink holes are created due to stormwater issues or simply the soils in the County, sink holes prove costly to taxpayers, as they often need to be repaired immediately, taking time away from the PWD's daily tasks and can quickly become a public safety hazard. The Project Team recommends policies be written into the stormwater ordinance to minimize development in sink hole "hot spot" areas.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that Mount Joy Borough currently provides a minimal level of service to its community regarding pollution prevention and good housekeeping. The PWD maintains publically-owned BMPs as-needed; cleans inlets, ditches, and drains using rented equipment; sweeps streets annually using rented equipment; and trains staff annually. Although the Borough meets its requirements, the Borough must develop more strategic plans for this MCM, including a written O&M plan and tracking system, and a water quality improvement plan to determine the baseline stream health and prioritized projects based on cost efficiency.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals by improving internal capacity and investing in new equipment. In order to keep costs low, the Project Team recommends the Borough meet with neighboring municipalities to determine existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively. The Borough must also develop better tracking of all stormwater-related

public works activities, continue to map the entire storm sewer system with the goal of ultimately developing an infrastructure repair and replacement program, and regularly train staff in different components of stormwater-related good housekeeping measures.

Throughout the study, the Borough staff attended many training events hosted by local organizations. By taking a proactive stance in stormwater management, the Project Team found that the Borough is on the right track to increasing its level of service for MCM 6.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract this Plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

Consideration of Funding Methods for Stormwater in Mount Joy Borough

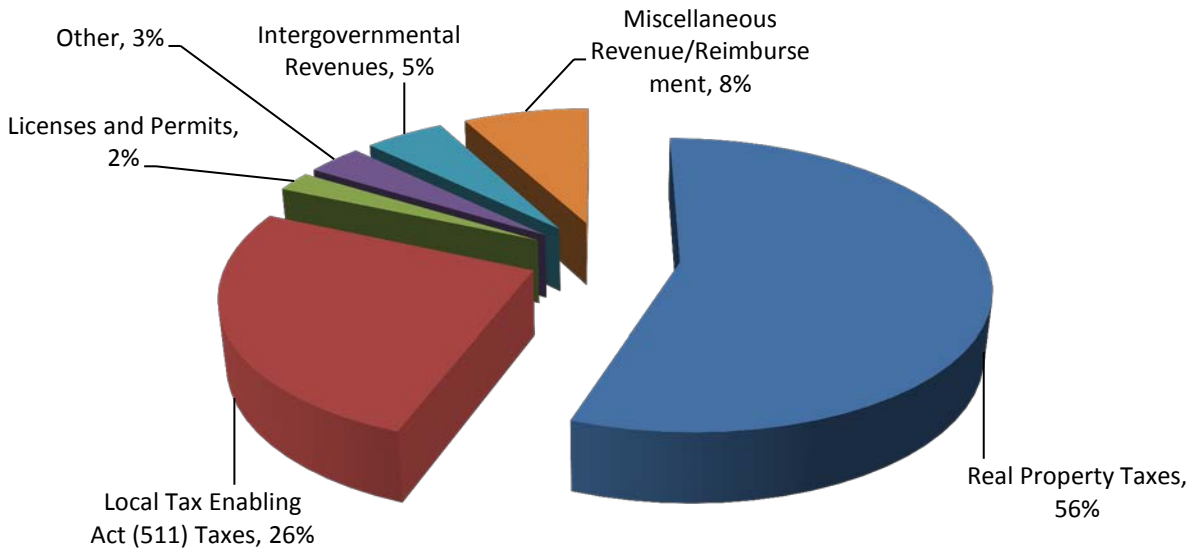
Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in Mount Joy Borough is partially through grant funding and capital funding, with the majority of the revenue derived from general fund appropriations. Mount Joy Borough's general fund comes from several sources such as real property taxes, local tax enabling act taxes, licenses, and permits (see Figure 11 for breakdown). This revenue is then distributed to sources as appropriate and deemed necessary, such as public safety, general government expenses, fire, public works, and planning and zoning.[78]

[78] Mount Joy Borough 2013 Budget, General Fund, http://www.mountjoyborough.com/mount_joy_boro/lib/mount_joy_boro/borough_of_mount_joy/budget/2013/2013_general_fund_budget.pdf.

Figure 11: Mount Joy Borough's 2013 General Fund Revenue Breakdown[79]



Currently, general fund allocations for stormwater programming in Mount Joy Borough are not adequate for the Borough to properly manage stormwater in the near and long terms. Borough staff shared with the Project Team that the Borough has been able to achieve a balance by minimizing waste, however, this is done so in a way that leaves the Borough operating minimally. As priorities shift and costs rise, the Borough needs to determine a more sustainable plan to pay for stormwater.

In order to enhance the level of service to meet future anticipated regulatory requirements, the Borough must more aggressively invest in administration, operations & maintenance, and capital projects to repair and replace its infrastructure. While the Borough has been recently successful in accessing grants, and should continue to do so, the Borough should supplement its current funding with a dedicated stormwater fee to support a more strategic and comprehensive stormwater program.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying on occasional grant awards is clearly not sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 31 below:

[79] Ibid.

Table 31: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for Mount Joy Borough's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. However, this does not suggest that current funding levels for various activities now being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for Mount Joy Borough to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and

adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[80]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

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[80] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of Mount Joy Borough, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals. Table 32 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 32: Stormwater User Fee Examples in Pennsylvania[81]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000

[81] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Lancaster, Lancaster County (2013)	59,263[82]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[83]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:
>
> (1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.
>
> (2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.
>
> (3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.

[82] 2011 US Census Bureau ACS 5-year Estimates.
[83] Ibid.

(4) Parks, recreation grounds and facilities.

(5) Sewers, sewer systems or parts thereof.

(6) Sewage treatment works, including works for treating and disposing of industrial waste….”[84]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

Mount Joy Borough’s Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for Mount Joy Borough, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Borough, the Project Team found that current budgeting practices may not be sufficient enough to meet all stormwater management activities. With tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team and municipal staff agreed that a more comprehensive program would ensure a more viable stormwater management program for the future.

Two of the municipalities who participated in this study, Manheim and Warwick Townships, worked with the Project Team to determine the estimated costs projected over five years that is needed to properly manage stormwater. Each of these municipalities took a vastly different approach to estimating costs. Since the Project Team found it difficult to collect meaningful cost data for the other four participating municipalities, including Mount Joy Borough, the team utilized Manheim and Warwick Townships’ approaches to develop cost estimates. A discussion of these approaches and how they were adapted for Mount Joy Borough follows.

Manheim Township’s Approach

Manheim Township, the largest of the municipalities participating in this study, plans to develop a separate Stormwater Department within the Township. All stormwater-related costs, even if currently paid for using general fund appropriations, will be moved to a stormwater budget. This budget will be supported through a dedicated stormwater user fee. The Project Team found that in Manheim Township a 5-year revenue stream totaling approximately $10.1 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater

[84] Purdon’s Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

program housed in the Stormwater Department.[85] See Chapter 7 for the full analysis of Manheim Township's financing structure.

Using population as the factor, Mount Joy Borough's costs were estimated at approximately $2 million over five years if the Borough uses Manheim Township's approach to managing stormwater (see Table 33).

Table 33: Mount Joy Borough's Budget using Manheim Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Manheim Township	37,768	1.00	$10,085,237	$2,017,047
Mount Joy Borough	7,365	0.20	$1,966,685	$393,337

Warwick Township's Approach

Warwick Township, often hailed as the most proactive Township managing stormwater in the County, plans to continue supporting most of its stormwater-related costs using general fund appropriations and grants. The Township wants to utilize a dedicated stormwater user fee to support an asset management program that focuses on two components – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs. The Project Team found that a 5-year revenue stream totaling $639,268, when adjusted for inflation at a rate of 2.5% per year, will be needed to support a municipal stormwater asset management program for Warwick Township.[86] See Chapter 9 for the full analysis of Warwick Township's financing structure.

Using population as the factor, Mount Joy Borough's costs were estimated at approximately $270,000 over five years if the Borough uses Warwick Township's approach to managing stormwater (see Table 34).

Table 34: Mount Joy Borough's Budget using Warwick Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Warwick Township	17,622	1.00	$639,268	$127,854
Mount Joy Borough	7,365	0.42	$267,178	$53,436

It must be noted that the Project Team only supports this approach for Warwick Township because of the high level of service being provided to the community currently. Since Mount Joy Borough needs to increase its level of service, the Borough should utilize Warwick Township's approach as a jumping off point and include additional costs associated with properly managing stormwater in its stormwater budget.

[85] Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

[86] Ibid.

Recommendations for Mount Joy Borough's Level of Service Expenditures

Given the size of the Borough, it is likely not feasible (or necessary) to develop a Stormwater Department. Therefore, Manheim Township's costs represent the "Cadillac" version of stormwater management. On the flip side, Warwick Township's costs represent a low cost estimate to managing stormwater since the costs only factor in asset management *and* the costs are based on the useful life of materials. This means that Warwick Township will bring in annual reserves through its dedicated fee to pay for its asset management program over time. Thus, the Project Team recommends that Mount Joy Borough use a blended approach that uses Warwick Township as its baseline, and then includes additional costs necessary for the Borough to properly manage stormwater. Further discussion is required by Borough staff to determine how best to allocate costs. The following provides a discussion of the additional costs that the Borough must invest in to meet its current and future state and federal regulations:

Personnel costs

The Project Team recommended earlier in this chapter that the Borough invest in hiring a stormwater coordinator. In many respects, simply hiring a coordinator will allow the Borough to meet most, if not all, of its administrative compliance components, allowing existing staff to focus on more pertinent tasks. The Borough could hire a coordinator on its own or as a shared position with neighboring municipalities. The Borough must engage neighboring municipalities to determine if a shared coordinator should be hired. Either way, the Project Team recommends investing in a coordinator to help with administrative MS4 permit tasks and keep the Borough on track with meeting its MCMs.

The Project Team also recommended earlier in this chapter that the Borough invest in hiring additional PWD staff to address the technical components of its permit. In order for the Borough to meet existing and future regulatory requirements, up to a four member road crew should be hired.

Capital costs

The $267,178 estimated 5-year costs using Warwick Township's approach supports an asset management program, including a pipe infrastructure repair and replacement program (assuming the average useful life of the pipes is 30 years) and a BMP renovation (assuming the average useful life is 20 years) and maintenance (assuming maintenance every 5 years) program. The Project Team highly recommends the Borough invest in an asset management program and sets up its dedicated fee to generate at a minimum $267,178 over five years.

The Project Team recommends the Borough also invest in a study to determine the baseline health of its streams and thus, the most cost-effective water quality improvement projects (which will result in additional capital costs once projects are identified).

Lastly, the Project Team recommended earlier in this chapter that the Borough consider investing in new equipment. In order to keep costs low, the Project Team recommends the Borough meet with neighboring municipalities to determine all existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively.

Operations & Maintenance costs

If the Borough purchases new equipment, there will be annual O&M costs associated with this equipment that will need to be factored into the stormwater program's costs. These costs will be included once it is determined what equipment, if any, will be purchased.

The Project Team recommended earlier in this chapter that the Borough invest in mapping its entire conveyance system, which should be prioritized. The Borough must develop a more comprehensive understanding of its pipes in order to implement an asset management program properly. The Project Team recommends the Borough seek grants to help develop this map as soon as possible, and if unsuccessful, invest in mapping using a dedicated user fee.

There are additional costs that are fairly minimal compared to the large capital and personnel costs needed to properly manage stormwater that the Borough must consider. These costs include outreach materials, contract fees (namely for engineer's time), and hosting outreach and engagement events[87]. See Chapter 7 for Manheim Township's costs associated with these activities, which could be used as a reference for Mount Joy Borough.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for Mount Joy Borough

Although the Project Team was unable to develop a specific estimated budget for Mount Joy Borough, the Project Team recommends the Borough create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

Once it became clear that there was a significant need to have a dedicated funding source to cover the stormwater costs in Mount Joy Borough, the Project Team considered what financing mechanism would be most appropriate to generate these funds. The Project Team initially considered assessing a property tax, but since the value of a property is not an indicator of the amount of runoff, the property tax was not seen to be the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since it is anticipated that development and growth continue in the Borough, increasing the amount of impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. The major concern with this approach is the investment required by the Borough to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). Therefore, the fee calculations will begin more simply and transition over time to a more accurate method, balancing the administrative burden of billing with an equitable distribution of charges.

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[87] Warwick Township estimated that their annual Watershed Day costs $2,225.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since Mount Joy is a Borough, it will have an easier time setting up a fee compared to Townships. The Borough should use existing examples such as Jonestown Borough as a model for implementing a fee.

The Mount Joy Borough Authority is a general purpose water and sewer authority. The Authority has worked closely with the PA DEP in the past to set up nutrient trading, and therefore, already has a relationship with the state's stormwater regulatory agency. If the Borough decides to utilize its existing authority, it will need to begin regular billing for stormwater, and the revenue collected could then be transferred to the Borough once created. The Authority serves portions of Rapho, East Donegal, and Mount Joy Townships. If the Borough utilizes its existing authority, it must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[88]

Since the Authority is multi-municipal, the Borough should meet with the participating municipalities to determine if they are interested in also establishing a dedicated stormwater fee. If all are on board, then this regional Authority could serve as pilot regional municipal authority. In PA, much of the debate concludes with the need to develop more multi-jurisdictional collaboration to reduce the looming stormwater costs. However, it is likely that not all municipalities are ready to implement a dedicated stormwater fee. If this is the case, the Borough should consider developing a new stormwater authority to support its municipal program, including all estimated costs discussed above. It is recommended by the Project Team to discuss internally which option is easier to administer and will create fewer transaction costs between parties.

Based on the experience of other communities, it is recommended that the Borough set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report that the outreach need is very high at first but declines as the utility rolls out. A help line and Borough staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

Although a specific cost estimate was not generated, the Project Team recommends implementing a fee to improve the current level of service. This fee could be set low to begin generating revenue, and once the Borough has a better understanding of its costs, the rate structure should be reevaluated. In all likelihood, the Borough's true costs lie somewhere in between the estimates provided using Warwick and Manheim Townships' approaches, shown in Figure 12.

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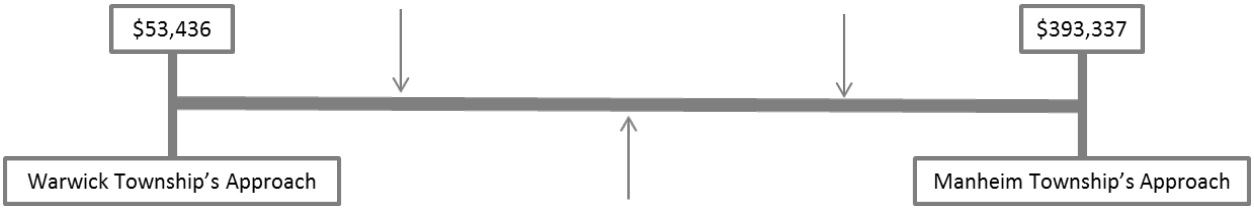
[88] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013, Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

Figure 12: The Spectrum of Mount Joy Borough's Estimated Annual Stormwater Costs



In determining an equitable funding strategy for collecting revenue to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the Borough provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential.[89] The Project Team worked with the LCPC's land use codes, as this framework will be easy for Mount Joy Borough to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Borough, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Borough to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 2,393 residential parcels worthwhile. A distribution of all the residential properties in the Borough is depicted in Figure 13. All multi-family residences are classified by LCPC as commercial, and therefore will be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[89] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

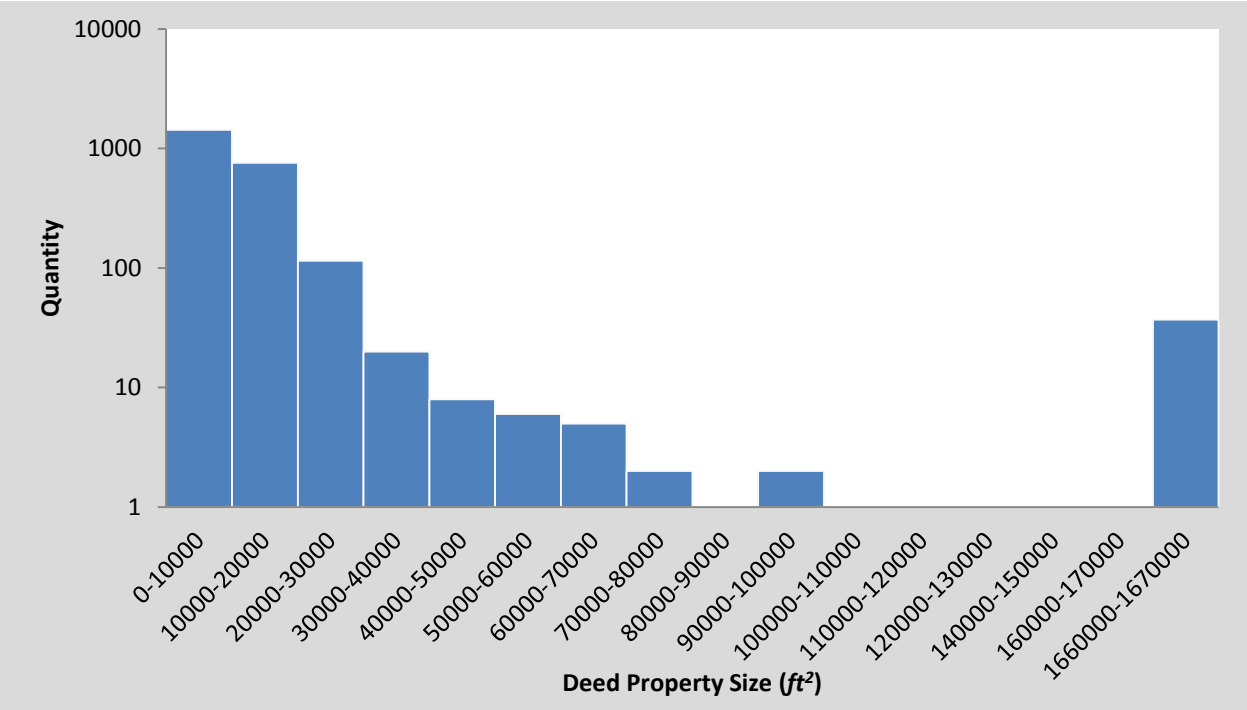


Figure 13. Distribution of Residential Property Sizes in Mount Joy Borough. The median residential property is 8,276 *ft²*. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team suggests that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Borough utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

For all 270 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 ft^2 of impervious surface.[90] The Project Team recommends using a similar method for Mount Joy Borough. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill. It is then recommended, following the first few years of utilizing a tiered system, the Township invest in getting more accurate impervious surface data for all non-residential properties and then assess the fee based on each property's total impervious surface.

[90] The Cost of Dealing with Stormwater, Lancaster City, Retrieved from: http://www.saveitlancaster.com/thecost/.

After conducting a sensitivity analysis[91] using various fee structures, the Project Team found that there are many options for the Borough to set its initial rates. It is recommended that the ERU be set at 3,405 ft^2 since that number represents the average residential impervious surface in the Borough[92]. Depending on how much the Borough wants to continue utilizing general fund appropriations and grants to supplement the user fee, the rate should be set at a minimum of $15 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if it is implemented as recommended later in this document.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee starting at $15 per year to generate the minimal revenue needed (based on Warwick Township's approach). The final rate chosen by Mount Joy Borough should be consistent with the non-residential rate. Although many of the rate scenarios analyzed by the Project Team brought in adequate revenue to pay for stormwater-related expenses, it will be up to the Borough to determine what should be supported through the dedicated fee and thus, where to set its rates. Table 35 shows the revenue yield for all rate scenarios developed by the Project Team.

Table 35: Annual Residential Property Revenue Generated (2,393 Residential Properties x Rate)

$15	$20	$25	$30	$35
$35,895	$47,860	$59,825	$71,790	$83,755
$40	**$45**	**$50**	**$55**	**$60**
$95,720	$107,685	$119,650	$131,615	$143,580
$65	**$70**	**$75**	**$80**	**$85**
$155,545	$167,510	$179,475	$191,440	$203,405

The residential fee is based on the assumption that an average property has approximately 3,405 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined once the Borough determines which costs should be supported using a dedicated user fee.

Non-Residential – According to data provided by the LCPC, there are 270 non-residential properties in Mount Joy Borough. This data included the land area of each property, and the average

[91] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[92] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 36 below.

Table 36: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	30.40
Commercial	53.10
Community Service	28.39
Cultural Activity	14.29

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 53.10% impervious area. This property will then be billed for 10,620 ft^2 of impervious surface (20,000 ft^2 x 53.10%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 37 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 37: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage 25% (Q1)	4,626	<=5,000
Median (Q2)	9,020	>5,000 & <=9,000
Percentage (75%) (Q3)	24,865	>9,000 & <=25,000
Upper Bound (Q4)	885,199	>25,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided by 3,405 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (62,000 ft^2 [93]) was divided by 3,405 ft^2 to determine the number of ERUs that parcels in Q4 will pay. The final ERU for each tier was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 38 shows the summary of this analysis below.

[93] The median of all parcels in Q4 in Mount Joy Borough is 61,642 ft^2, which was rounded to 62,000 ft^2 for ease of administration.

Table 38: Annual Non-Residential Property Revenue Generated by Tier

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/3,405 ft^2)	ERU x $ x Number of Parcels				
			$15	**$20**	**$25**	**$30**	**$35**
First tier: <=5,000	84	1.47	$1,850	$2,467	$3,084	$3,700	$4,317
Second tier: >5,000 & <=9,000	50	2.64	$1,982	$2,643	$3,304	$3,965	$4,626
Third tier: >9,000 & <=25,000	68	7.34	$7,489	$9,985	$12,482	$14,978	$17,474
Fourth tier: >25,000	68	18.21	$18,573	$24,764	$30,954	$37,145	$43,336
Total Non-Residential Revenue			$29,894	$39,859	$49,824	$59,789	$69,753

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/3,405 ft^2)	ERU x $ x Number of Parcels				
			$40	**$45**	**$50**	**$55**	**$60**
First tier: <=5,000	84	1.47	$4,934	$5,551	$6,167	$6,784	$7,401
Second tier: >5,000 & <=9,000	50	2.64	$5,286	$5,947	$6,608	$7,269	$7,930
Third tier: >9,000 & <=25,000	68	7.34	$19,971	$22,467	$24,963	$27,460	$29,956
Fourth tier: >25,000	68	18.21	$49,527	$55,718	$61,909	$68,100	$74,291
Total Non-Residential Revenue			$79,718	$89,683	$99,648	$109,612	$119,577

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/3,405 ft^2)	ERU x $ x Number of Parcels				
			$65	**$70**	**$75**	**$80**	**$85**
First tier: <=5,000	84	1.47	$8,018	$8,634	$9,251	$9,868	$10,485
Second tier: >5,000 & <=9,000	50	2.64	$8,590	$9,251	$9,912	$1,057	$11,233
Third tier: >9,000 & <=25,000	68	7.34	$32,452	$34,949	$37,445	$39,941	$42,438
Fourth tier: >25,000	68	18.21	$80,482	$86,673	$92,863	$99,054	$105,245
Total Non-Residential Revenue			$129,542	$139,507	$149,471	$149,921	$169,401

The total revenue potential for all fee structures is shown in Table 39 below.

Table 39: Total Revenue Potential

	$15	$20	$25	$30	$35
Residential	$35,895	$47,860	$59,825	$71,790	$83,755
Non-Residential	$29,894	$39,859	$49,824	$59,789	$69,753
Total Revenue (1-year)	$65,789	$87,719	$109,649	$131,579	$153,508
Total Revenue (5-year)	$328,946	$438,595	$548,244	$657,893	$767,542
	$40	$45	$50	$55	$60
Residential	$95,720	$107,685	$119,650	$131,615	$143,580
Non-Residential	$79,718	$89,683	$99,648	$109,612	$119,577
Total Revenue (1-year)	$175,438	$197,368	$219,298	$241,227	$263,157
Total Revenue (5-year)	$877,190	$986,839	$1,096,488	$1,206,137	$1,315,785
	$65	$70	$75	$80	$85
Residential	$155,545	$167,510	$179,475	$191,440	$203,405
Non-Residential	$129,542	$139,507	$149,471	$149,921	$169,401
Total Revenue (1-year)	$285,087	$307,017	$328,946	$341,361	$372,806
Total Revenue (5-year)	$1,425,434	$1,535,083	$1,644,732	$1,706,804	$1,864,029

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. The Borough must first determine which expenditures should be included in the stormwater program budget, and which aspects of the program it wants to invest before assigning a fee structure.

It is important to note that if Mount Joy Borough funds this program entirely by the user fee, then the fee would need to be set higher to pay for existing costs and the additional investments needed to support an adequate stormwater management program. It is highly recommended by the Project Team that the Borough continue to supplement the program using general fund appropriations and grant funds where possible. This will decrease the user fee, minimizing any community backlash.

Lastly, it is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 9: Individual Municipal Analysis – Warwick Township

Warwick Township is well known throughout Lancaster County as one of the most proactive communities managing stormwater. Due to the leadership exhibited by the Township Manager, the Township has developed an integrated water resource approach over the past two decades that incorporates stormwater management into every aspect of its municipal functions.

With a population of 17,622[94], Warwick Township is the second largest of the six municipalities who participated in this study. Given the continued investment in its local watersheds via promoting the benefits associated with improved stream health, the Township has developed into a prominent leader in the County, and is able to provide a high level of service to its community.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. Warwick Township provided the following:

Priorities

1. Understanding the condition of existing storm sewer system such as function ability, retrofit status, and maintenance costs;
2. Evaluating agricultural operations such as farming methods, stream bank restoration, nutrient management plans, and coordination with the LCCD to identify BMPs;
3. Community outreach and education for private property owners; and
4. Identifying and/or analyzing policies, ordinances, and regulations for capital improvements, road maintenance, and opportunities to incorporate green infrastructure; the County Stormwater Ordinance (Act 167); LCCD coordination; and state and federal guidelines.

Goals

1. Continue efforts to improve water quality leaving the Township and entering waterways;
2. Continue promotion of its watershed programs;
3. Cleaner water leaving developments; and
4. Engage residential portion of the community on watershed issues.

Needs

1. Update current inventory of inlets/outlets;
2. Update data from land development plans;
3. Continue education and outreach to public;
4. Provide recommendations to improving current Township-wide stormwater program;
5. Provide recommendations to fund Township-wide stormwater program; and
6. Continue development of a holistic approach to stormwater management practices across all sectors and the region.[95]

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[94] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search ACS 5-year total population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

[95] Information provided by Warwick Township directly to the Project Team.

Since the EFC's focus was to look at how each municipality *finances* its stormwater management activities and then provide recommendations about how to improve the program with greater cost efficiency, the goal of the study transpired to help Warwick Township develop a long-term strategic planning method for meeting its capital needs, specifically focused on storm sewer and municipally-owned BMP repair, replacement, and maintenance. This goal is aligned with the Township's desire to continue integrating stormwater management practices across all Township activities. In order for the Township to continue to provide a high level of service to its residents and businesses, a more strategic capital planning process is necessary in addition to the continual investment using General Funds and grants to pay for stormwater-related activities.

Assessment of Warwick Township's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

For each MCM, there are specific stormwater BMPs that Warwick Township can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Township engineer to determine the current level of service for each MCM. A discussion of the findings is below.

Overall Stormwater Program Findings

Stormwater Infrastructure

Warwick Township is located north of Manheim Township. Over the past decades, suburban sprawl has slowly expanded from Lancaster City and continued out into more rural areas. Warwick Township is an example of this growth, where much of the development over these decades is comprised of older and now newer neighborhoods, and the Township continues to experience residential growth (currently with 55+ community). In addition, the Township is made up of several cluster industries including entertainment, industrial, medical, and military businesses.

In meeting with the Township, the Project Team found that while they have all outfalls and inlets mapped, like many communities, the Township still does not have the entire conveyance system mapped. This task is currently being completed using MapShed through the Pennsylvania State University and will be finished in the fall of 2013. Once the system is mapped, the Township will have a better sense of the state and age of its infrastructure, and can therefore implement a more strategic asset management program to ensure it maintains its existing infrastructure and has a replacement program to avoid costly emergency repairs.

The Project Team found that the Township overall has a very good sense of its conveyance system including the basic pipe features, and has been working to fix "hot spots" and repair older

developments that did not come under the stringent regulations and policies in place today. It should be noted that all new development projects in Warwick Township come under a lot of scrutiny to manage all stormwater, which ensures that future costs are minimized. By setting up stringent regulations over the past decades, another example of the strong leadership in the community, the Township has set itself up to be able to implement a stormwater program with ease. With the recommendations outlined in this report, the Township will be able to put a program in place that strategically repairs and replaces infrastructure at the lowest cost to the community.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Township's stormwater program primarily comes from general funds, a practice common throughout the country. In addition, the Township relies heavily on public and private grants. The Township has been very successful with receiving grants that pay for capital improvements and public education. There are a number of environmental and engineering firms located in Warwick Township and Lititz Borough that work closely with both municipalities to help access grants. Because of this success, the Township has been able to keep costs low for taxpayers. The Township prides itself on maintaining low taxes for its residents; property taxes have not increased in 23 years.

Although commendable for its success in getting grant funds, in order to maintain a comprehensive stormwater management program over time, the Township needs to support its program using a variety of funds and not rely so heavily on grants. The Project Team found that while the Township has a good framework for handling the public education, engagement, and operations & maintenance components of the MS4, capital spending occurs only when grant funds are available. The Township does have a capital reserve fund for stormwater that has been in place a long time. It is important to note that the Project Team was unable to collect data in a meaningful way on stormwater capital projects, which was seen across the board with all six municipalities.

The primary reason for this in most of the municipalities is that capital projects are completed when funds become available and not in a way where cost information can be easily verified. The capital reserve fund in place currently does not adequately cover capital improvement costs, simply because this fund is being supported through general funds and as priorities shift, so too do general fund appropriations. The Township Manager expressed to the Project Team that finding a more sustainable funding source for capital projects was one of the main reasons for the Township's participation in this study.

Current Capacity for Handling Stormwater

As mentioned above, the Township Manager has shown leadership in managing stormwater, which trickles down to all municipal staff. Many of the staff has been employed at the Township for many years, generating a wealth of institutional knowledge. Although this has led to extremely high capacity for managing stormwater, both technically and administratively, there will be a time when this staff turns over. To ensure that this level of knowledge continues into the future, continual training for new staff is necessary. One observation made by the Project Team was that although the capacity exists, there are not formal policies or procedures in place to help new staff. The Project Team recommends utilizing the knowledge of current staff to develop written policies. As staff turnover occurs, the Project Team encourages new hires to "shadow" current staff in order to maintain the high level of internal capacity.

The PWD receives the majority of funding for stormwater from the general fund, since much of the technical components of the MS4 permit are conducted in-house. This staff is comprised of six road crew staff plus the Roadmaster. All of the PWD staff receives the LIMC Good Housekeeping Handbook, which is being utilized within the Township. Although the staff is provided with the

materials and basic training to help manage stormwater properly, the Project Team found that only the Roadmaster had adequate training to fully understand all of the necessary MS4 permit activities being implemented by the Township.

Since the Township would like to develop a more robust infrastructure and BMP renovation, repair, and maintenance program, the Project Team recommends that the Township provide more informal training opportunities for the public works staff to improve their knowledge of MS4 permit activities, as well as consider hiring additional staff if the Township wants to continue carrying out permit activities in-house.

MCM Findings: 1. Public Education & Outreach

The Project Team found that Warwick Township currently provides a high level of service to its community regarding public education and outreach. The municipality has a written Public Education & Outreach Plan that incorporates a monthly breakdown of activities, has signage on many stormwater projects throughout the Township to educate the community, and conducts various engagement activities that educates the general public and more targeted groups in the community. All events are advertised on the Township's website and in the local newspaper.

The Township has created a culture within the community where elected officials and the general public are educated and engaged in outreach events and in doing their part to manage stormwater. This high level of knowledge is primarily due to the way in which stormwater has been portrayed. Instead of focusing on compliance, the Township incentives good behavior by educating the public on the environmental, recreational, habitat, and beautification benefits to the community. To get the word out, the Township has been excellent in partnering with local organizations such as the Warwick Township School District, Lititz Run Watershed Association (LRWA), Boy and Girl Scouts, Lititz Borough, and local businesses.

The Township has worked closely with the agricultural community, as well to ensure that 100% of farms in the municipality have a Conservation Plan. Although all farms are required to have this plan, few communities see full participation with all farms. The Township has an excellent reputation for accessing grant funds, and in this case, they received a grant during which no farmer had to pay if they submitted a Conservation Plan within a certain time period. This helps build a positive relationship so farmers work with the local government, rather than against to meet shared environmental goals.

In order for Warwick Township to maintain its level of service regarding MCM 1, the Township should continue current practices and solicit neighboring municipalities to partner in its activities, spreading stormwater education to a wider audience. This will lower costs for the Township and help other municipalities who are struggling to educate their community. In addition, the Township should work toward improving its tracking and documentation of all MCM 1 tasks.

It should be noted that the Township Manager gave much credit to a municipal staff member who has been integral in developing the Township's Public Education & Outreach Plan and planning all stormwater events. The Project Team attended Warwick's Watershed Day with this staff member, who is soon to retire. The Township needs to either train an existing staff member or hire a new staff person prior to this staff member's retirement in order to pass on the knowledge needed to continue the program's success.

MCM Findings: 2. Public Participation & Involvement

The Project Team found that Warwick Township currently provides a high level of service to its community regarding public involvement and participation. The municipality has a written Public Participation & Involvement Plan, hosts LRWA meetings at the Township office, partners with local

organizations to host an annual Stream Clean-up and Watershed Day, and works with the Lancaster County Conservation District (LCCD) and Warwick Township High School to monitor and test the streams twice a year using high school volunteers.

The Project Team found that the Township's excellence in meeting MCM 2 can be traced back to the leadership exhibited by municipal staff and their ability to partner with local organizations, engaging a wide audience in the community on different levels and keeping costs at a minimum by leveraging private sponsors. For example, the Project Team attended the 16th annual Warwick Watershed Day on May 14th, 2013. This event has been taking place for many years and has grown to become an integral part of the Township's community. This event is held each year on various sites throughout the Township – along the stream, on an elected official's property, and the Trout Fishery. Each year, all 5th graders in the Warwick Township School District (which includes Lititz Borough residents) participate in this event, which brings in Zoo America to teach about wildlife, the LCCD to teach about stream health, and private businesses (Johnson & Johnson, for example) to teach about environmental and sustainable practices. This event is so engrained in the community that minimal planning is needed and the costs are very minimal.

Identical to MCM 1, the Township should continue current practices and solicit neighboring municipalities to partner in its activities in order to maintain its current level of service. Warwick Township should serve as a model for other municipalities struggling to educate and engage the public. Lastly, the same staff member responsible for the success of MCM 1 also plans all stormwater-related events, and thus, new hires and existing staff need to be included in the process before this staff member retires. All staff participates in events, but to ensure the internal knowledge remains there needs to be additional training and shadowing.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that Warwick Township currently provides a medium level of service to its community regarding IDD&E. The Township inspects at least 20% of its outfalls each year, has all outfalls and inlets mapped, is working toward developing a comprehensive map of its entire conveyance system using MapShed through Penn State, trains all staff to handle incoming complaints of illicit discharge, and files all hard copies of the IDD&E inspection forms. In addition, the Township provides educational outreach on illicit discharges via a newsletter and newspaper advertisement.

While the Township currently meets its MCM 3 requirements, there are a few simple ways in which the Township could improve its level of service regarding MCM 3, especially since more stringent requirements are anticipated in this category. It is recommended that the Township develop a more formal process for handling IDD&E complaints and that the Township transfers its inspection forms to an electronic format to keep better track in the long run.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that Warwick Township currently provides a high level of service to its community regarding construction site runoff control. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources available through the conservation district officer in order to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that Warwick Township was the only participating municipality who does not rely on the LCCD to inspect construction sites. In addition to inspections conducted by the LCCD staff, the Warwick Township Roadmaster and contracted engineer through ELA Group, Inc. conduct both regular and surprise inspections. The Township keeps track of all inspections but does not separate or duplicate MS4-related projects for its annual reporting.

In addition, the Township has developed a repertoire with developers and builders. It was conveyed to the Project Team that during pre-construction meetings the expectations are made clear for any development projects in the Township. In meeting with Township staff, it was made clear that many new development projects in the Township are putting BMPs in place to manage most, if not all, stormwater runoff on its property.

The Township should continue its current practices related to this MCM. The Project Team recommends that the only improvement needed is for the Township to pull out all MS4-related projects into a separate filing system, which will minimize the time needed to compile the MS4 Permit Annual Report and improve the Township's organizational efficiency.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that Warwick Township currently provides a high level of service to its community regarding post construction site runoff control. The Township has a procedure in place for inspecting all post construction stormwater management (PCSM) BMPs and is utilizing the LIMC's Good Housekeeping Handbook for its operations and maintenance (O&M) schedule for publically-owned BMPs. The Township has a full inventory of public, private, and agricultural BMPs within the municipality, which was developed through the LandStudies, Inc. TMDL report written for Warwick Township and Lititz Borough. In addition, there is a stormwater maintenance agreement developed for every lot.

Municipal staff expressed to the Project Team that they often run into situations where private residents or neighborhoods are unable to pay for stormwater BMP maintenance. In this case, the Township has utilized its public works staff to help fix issues or conduct maintenance, but has made the BMP owner pay for materials. Although this shows a true commitment from Township staff to address stormwater, helping fix and maintain private BMPs takes time and resources away from other important tasks. Therefore, the Project Team recommends that the municipality consider developing a different agreement with private BMP owners. This would allow the Township to charge a fee for taking over maintenance, since they already are conducting this work, for example.

Many municipalities have identified sink holes to be a serious issue in the area. It is crucial given the geological makeup of the County that clearly defined policies are set to minimize emergency situations that sink holes present to local governments. Within Warwick Township, the underground surface is made up of limestone and shale. It was suggested by Township staff that growth should be promoted in the shale areas since sink hole problems often occur in the limestone areas. Whether sink holes are created due to stormwater issues or simply the soils in the County, sink holes prove costly to taxpayers, as they often need to be repaired immediately, taking time away from the PWD's daily tasks and can quickly become a public safety hazard. The Project Team recommends policies be written into the stormwater ordinance to minimize development in sink hole "hot spots," and if a developer wants to build on a hot spot that there are clear procedures in place so that the Township does not end up using resources to pay for sink holes on private property.

In order to maintain the Township's current level of service, the Township should continue with the practices in place, and include educational information for municipal staff, developers who work in the Township, and residents to ensure that they are up to date on all stormwater management

regulations, Low Impact Development (LID) and Green Infrastructure (GI) alternatives, and are informed of sink hole issues and how to mitigate those issues using best practices.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that Warwick Township currently provides a medium level of service to its community regarding pollution prevention and good housekeeping. The PWD is utilizing LIMC's handbook to develop an O&M procedure; cleans inlets, ditches, and drains typically following inspections; sweeps streets annually; and trains staff throughout the year. Although the Township meets its requirements, a dedicated fee for infrastructure and BMP repair, renovation, and maintenance will provide the resources necessary to increase the level of service for MCM 6.

The Project Team found that the Township either has equipment or shares equipment with Lititz Borough in order to adequately meet this MCM. For example, the Township has a jet vac that is two years old that is used for cleaning. However, the Township does not have a street sweeper. Instead, they exchange services informally with Lititz Borough, so that the Borough owns the street sweeper and sweeps the Township in exchange for other services. The Project Team recommends that the Township develop a more formal agreement with Lititz Borough if they continue to share resources, which is recommended as it keeps costs lower for both communities.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals. With the completion of an O&M schedule, the Township will be able to address tasks more regularly and efficiently. Since much of the work is completed in house, more regularly scheduled training opportunities should be provided to the PWD staff so they become more knowledgeable in all components of stormwater-related good housekeeping measures. This could be done in conjunction with Lititz Borough public works staff as a way for staff to share their knowledge and continue working collaboratively to address MCM 6.

Lastly, the Project Team recommends the Township develop better tracking of all stormwater-related public works activities. By tracking all activities over time, the Township will be able to highlight trouble spots in the municipality and more strategically conduct good housekeeping measures. The Project Team found that the Township is on the right track to increasing its level of service for MCM 6.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract this Plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

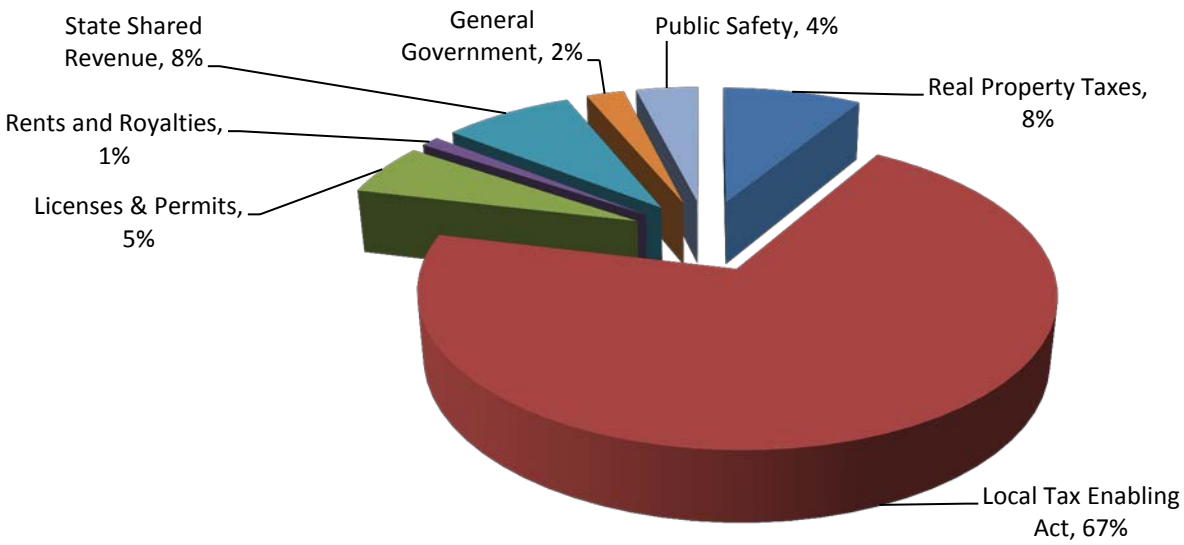
Consideration of Funding Methods for Stormwater in Warwick Township

Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in Warwick Township is through grant funding and leveraging relationships with local organizations, but with the majority of the revenue derived from general fund appropriations. Warwick Township's general fund comes from several sources such as real estate taxes, licenses, and permits (see Figure 14 for breakdown). This revenue is then distributed to sources as appropriate and deemed necessary, such as police, fire, planning and zoning, financial administration, and personnel.[96]

Figure 14: Warwick Township's 2013 General Fund Revenue Breakdown[97]



Currently, between the general fund allocations for stormwater programming in Warwick Township and the reliance on grant funds, the Township is able to meet its permit requirements. However, in order to enhance the level of service to meet future anticipated regulatory requirements, the Township must more aggressively invest in capital projects and developing an asset management program for its infrastructure. The Township is committed to implementing a dedicated stormwater fee to support the creation of a more strategic stormwater capital plan and program, the next logical step for the Township.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying heavily on grant awards is clearly not

[96] Warwick Township 2013 Budget/Forecast Worksheet, Fund 01 General Fund, http://www.warwicktownship.org/warwick/lib/warwick/warwick_township_fiscal_budget.pdf.
[97] Ibid.

sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 40 below:

Table 40: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program. The Township should continue to apply for grant funding where possible, but minimize any reliance on such funds to pay for stormwater management over the long term. Continuing to seek out opportunities to apply for grants in the future should not be discounted as a way to fund stormwater with the understanding that it will remain just a small slice of the total revenue needed.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for Warwick Township's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. This does not mean, however, that current funding levels for various activities now being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for Warwick Township to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[98]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

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[98] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of Warwick Township, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals**.**

Municipal staff shared with the Project Team the desire to continue with much of its current practices, supporting its administrative and O&M costs using general fund appropriations and grants where possible. Instead, a stormwater user fee will be utilized only to support the implementation component of a robust asset management program, i.e. paying for pipe repair and replacement and BMP renovation and maintenance. In many circumstances, the Project Team would not recommend this type of system, since it continues the piecemeal trend that exists in many local governments. Given the high level of service in the Township and its commitment to having a holistic approach to water resources, whereby all activities have a stormwater component, it makes sense for much of the program to be funded using the General Fund. However, Township staff will need to make it very clear to their elected officials and the public that since the fee will reflect only certain aspects of the stormwater program, general funds must still be allocated at the level they are now, and likely increased in the future. Table 41 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 41: Stormwater User Fee Examples in Pennsylvania[99]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000
City of Lancaster, Lancaster County (2013)	59,263[100]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[101]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

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[99] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.
[100] 2011 US Census Bureau ACS 5-year Estimates.
[101] Ibid.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:
>
> (1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.
>
> (2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.
>
> (3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.
>
> (4) Parks, recreation grounds and facilities.
>
> (5) Sewers, sewer systems or parts thereof.
>
> (6) Sewage treatment works, including works for treating and disposing of industrial waste…."[102]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

Warwick Township's Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for Warwick Township, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of

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[102] Purdon's Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Township, the Project Team found that while current budgeting practices are adequate in meeting the existing regulatory requirements, additional funds are needed to develop and implement a more strategic stormwater program. With tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team and municipal staff agreed that a more comprehensive program will ensure a more viable stormwater management program into the future.

The Project Team worked with municipal staff to identify the estimated costs of two essential components of the stormwater program in the Township – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs. It is important to note that the discussion of program funding needs focuses only on the two costs identified. The Township will continue to pay for other costs to implement the stormwater program – administrative, equipment, personnel, and operations & maintenance – using general fund appropriations and grants. It is possible in future years that developer fees will be enacted, and if this happens the Project Team recommends the revenue from those fees be used to pay for other stormwater-related costs in addition to what will be supported through a dedicated stormwater user fee.

The Project Team found that a 5-year revenue stream totaling $639,268, when adjusted for inflation at a rate of 2.5% per year, will be needed to support a municipal stormwater asset management program.[103] The Project Team found consensus among the municipal staff in the Township on their desire to continue with most of the stormwater program as is and utilize a dedicated user fee to support very specific, yet essential tasks. See Appendix G for an itemized list of the proposed budget for years 1-5. The following section describes the expenditures broken down by the two essential components being supported through the fee – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs.

Stormwater Asset Management Program Expenditures

Storm Sewer Replacement Program Costs

The Township estimated the total cost to replace the entire storm sewer system at $1,954,100 (see Table 42). Since the average useful life of the pipes in the Township is estimated at 30 years,[104] the total budget was divided by 30 to determine the annual cost of replacing the entire system. The annual cost without taking into account inflation is $65,137, which represents the straight line reserves the Township should generate each year, and assumes that 1/30 of the pipes will be replaced each year by the Public Works staff.

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[103]Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

[104] Warwick Township staff averaged the useful life of corrugated metal pipe (CMP) = 20 years and concrete = 50 years.

Table 42: Warwick Township Storm Sewer System Replacement Costs, 2013

Item	Quantity	Unit	Unit Cost	Total Cost
15" Storm Sewer Pipe	14,400	LF	$32.00	$460,800
18: Storm Sewer Pipe	4,800	LF	$37.00	$177,600
24" Storm Sewer Pipe	2,400	LF	$42.00	$100,800
36" Storm Sewer Pipe	1,200	LF	$57.00	$68,400
>36" Storm Sewer Pipe	1,200	LF	$70.00	$84,000
Grate Inlets and Manholes	500	EA	$1,500.00	$750,000
Headwalls and Endwalls	250	EA	$1,250.00	$312,500
Storm Sewer System Total Cost to Replace (30 Years)				$1,954,100

These costs were determined internally within the Township and then analyzed further by the Project Team to determine the annual reserves needed to pay for the replacement of the entire system, and ensure the long term viability of this fund. Since the cost of materials today is less than the cost of materials in the future, the Project Team took into account inflation each year, increasing the annual cost by 2.5%. In addition, 10% contingency costs were included each year to account for fluctuating costs and emergency-related events.

Table 43: Storm Sewer System Replacement Costs, 5-Year Projection

Year 1	Year 2	Year 3	Year 4	Year 5
$71,651	$73,442	$75,278	$77,160	$79,089

BMP Replacement and Required Maintenance Costs

The Township estimated the total cost to renovate and maintain all publically-owned BMPs at $262,000 over a 20-year period (see Table 44). The annual cost without taking into account inflation is $13,100. This assumes that all line items in Table 44 would be paid for over 20 years. However, a more in-depth analysis is needed to determine which BMPs will be renovated and/or replaced each year.

Table 44: Warwick Township BMP Replacement and Required Maintenance Costs, 2013

Item	Quantity	Unit	Unit Cost	Total Cost
Linear Park Basin (5+ Acres):				
Renovation (1 per 20 years)	1	EA	$55,000.00	$55,000
Dredging and Cleaning (1 per 5 years)	4	EA	$7,500.00	$30,000
Municipal Campus Basin (2-1/2+ Acres):				
Renovation (1 per 20 years)	1	EA	$35,000.00	$35,000
Dredging and Cleaning (1 per 5 years)	4	EA	$4,000.00	$16,000
Various Bio-Basins (6 @ 10,000 - 15,000 SF):				

Item	Quantity	Unit	Unit Cost	Total Cost
Renovation (1 per 20 years)	6	EA	$15,000.00	$90,000
Dredging and Cleaning (1 per 5 years)	24	EA	$1,500.00	$36,000
BMP Replacement and Required Maintenance Costs (20 Years)				$262,000

If the Township simply spreads the costs over 20 years, they will not have the funds to pay for the maintenance and renovation projects needed in the next few years. The Project Team conducted an analysis to determine how the costs should be estimated in each year in order to balance having the necessary funds to pay for repairs and maintenance with minimizing the stormwater fee for property owners.

The Project Team estimated in which year each BMP would be renovated and in which year each BMP would be maintained. The goal was to have all BMPs renovated once and maintained once in the first five years, typically in the year after the project is renovated since it can be assumed maintenance will be required in the first year, and then every five years. This meant spending a larger amount in the first five years to begin developing a constant reserve fund. After five years, the costs level out and only increase by inflation.[105] 10% contingency costs were included each year to account for fluctuating costs and emergency-related events. See Appendix G for a detailed table of BMP renovation and maintenance costs and the annual reserve fund for each line item. A summary of costs is provided below:

BMP Renovation Costs (20-year)

- Linear Park Basin: Total Cost = $55,000; Annual Reserve = $2,750; Year Complete = Year 1
- Municipal Campus Basin: Total Cost = $35,000; Annual Reserve = $1,750; Year Complete = Year 3
- Six Bio-Basins: Total Cost = $90,000 (Unit cost = $15,000); Annual Reserve = $4,500; Year Complete = 2 in Year 1; 2 in Year 2; 2 in Year 3

BMP Maintenance Costs (5-year)

- Linear Park Basin: Total Cost = $7,500; Annual Reserve = $1,500; Year Complete = Year 2
- Municipal Campus Basin: Total Cost = $4,000; Annual Reserve = $800; Year Complete = Year 4
- Six Bio-Basins: Total Cost = $9,000 (Unit cost = $1,500); Annual Reserve = $1,800; Year Complete = 2 in Year 2; 2 in Year 3; 2 in Year 4

Table 45: BMP Renovation and Maintenance Costs, 5-Year Projection

Year 1	Year 2	Year 3	Year 4	Year 5
$99,935	$48,637	$80,578	$17,418	$16,081

[105] Inflation was taken into account in all years.

Total Expenditures

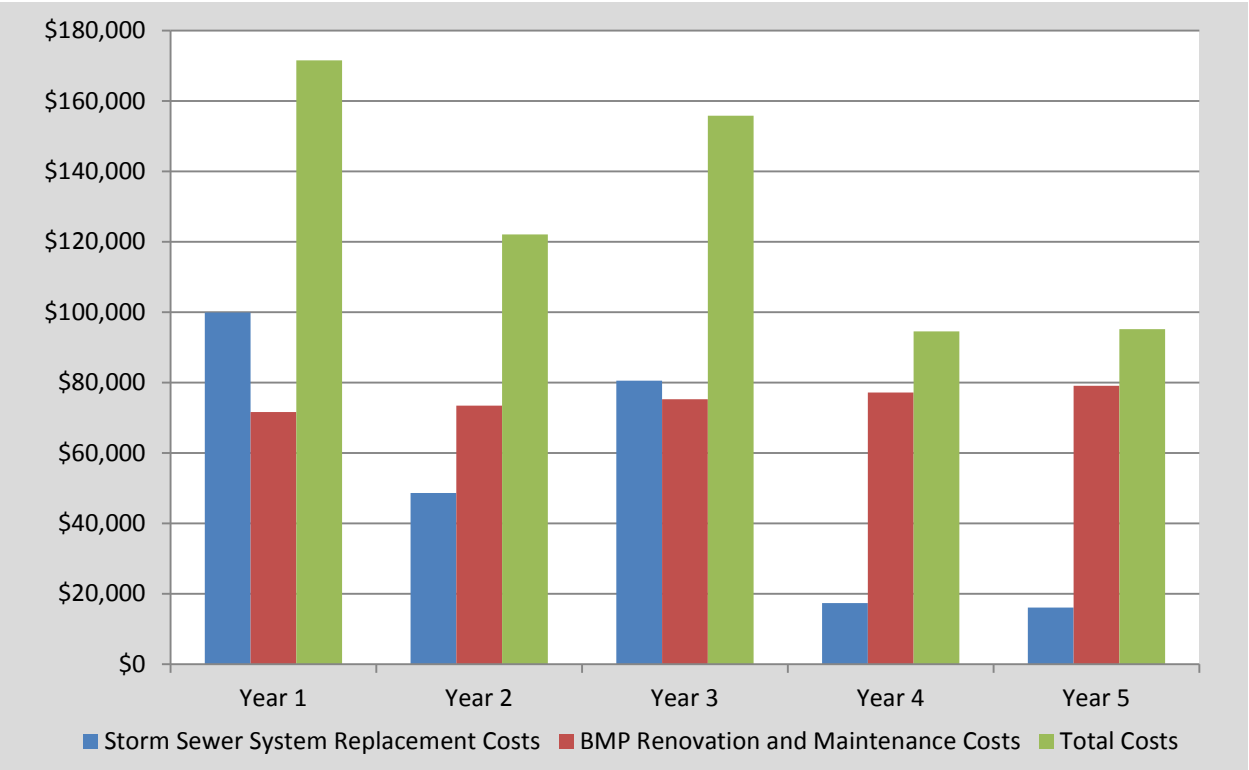

Figure 15. Proposed Stormwater Budget, Years 1-5. Storm sewer system replacement costs and BMP renovation and maintenance cost over five years total $262,000.

Figure 15 above shows the breakdown of expenditures projected over five years. Based on the total expenditures, a discussion of the necessary revenue to maintain an annual reserve fund to support the Township's stormwater asset management program follows.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for Warwick Township

Based on the needs outlined by Township staff and identified by the Project Team, Warwick Township will need to set aside reserve funds each year to pay for the "hard" costs of managing stormwater in the municipality, which totals an estimated $639,268 over a five year projection. Our key recommendation is to create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

Once it became clear that there was a significant need to have a dedicated funding source to cover long-term capital and maintenance costs in Warwick Township, the Project Team considered what financing mechanism would be most appropriate to generate these funds. Through discussions with Township staff, it was clear that no additional funding should come from property taxes; the municipality already provides a high level of service managing stormwater using general fund appropriations and grants, and in order to create a comprehensive program that is sustainable, the Project Team and Township staff decided a stormwater user fee is the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since it is anticipated that development and growth continue in the Township, increasing the amount of impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. From the Project Team's perspective, the major concern with this approach is the investment required by the Township to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). From Township staff's perspective, the major concern with this approach is that some larger properties will be hit with large fees even if the stormwater is managed on-site, which occurs more often than not with new development in the Township. The rate structure scenarios presented in this report lay out two options – one that is more impervious-based and another that reduces the burden for all non-residential properties.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since Warwick is a Township, it will need to set up a stormwater fee by either creating a new authority or utilizing its existing authority to bill its customers for stormwater.

The "operating" Warwick Township Municipal Authority (WTMA) provides the Township with municipal water and sewer services and bills residents quarterly.[106] Since Warwick is ahead of many municipalities in managing stormwater in the County, it is likely that they will be one of the first to set up a stormwater fee, and likely be unable to form a regional authority with neighboring municipalities. However, the Project Team recommends that the Township meet with Lititz Borough and neighboring municipalities to discuss the possibility of a regional stormwater authority supported through a dedicated user fee before implementing its own to get a sense of if and when others will be interested in participating.

If the Township partners with municipalities to set up a fee, a new authority will have to be created. If the Township sets up a fee on its own, the Project Team recommends the Township utilize its existing authority to bill customers for stormwater. In this case, the existing authority must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[107]

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[106] Warwick Township Municipal Authority, Warwick Township (Lancaster County, PA), http://www.warwicktownship.org/warwick/cwp/view.asp?a=3&q=656239&warwickNav=|7340|.

[107] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013, Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

If the Township adds a stormwater line item on the WTMA bill, the revenue could then be transferred directly to the Township once created to support an asset management program.

There are a variety of issues that exist when setting up stormwater billing, and few examples in Pennsylvania exist to use as a model. It is recommended by the Project Team for Warwick Township to discuss internally which option is easier to administer and will create fewer transaction costs.

Based on the experience of other communities, it is recommended that the Township set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report that the outreach need is very high at first but declines as the utility rolls out. A help line and Township staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

In determining an equitable funding strategy for collecting $629,268 in revenue over the next five years to pay for the development of a stormwater asset management program, the Project Team reviewed available data on all parcels located in the Township provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential.[108] The Project Team worked with the LCPC's land use codes, as this framework will be easy for Warwick Township to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Township, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Township to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Township staff made clear that simplicity is also a key factor in setting stormwater fee rates. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 5,403 residential parcels worthwhile. A distribution of all the residential properties in the Township is depicted in Figure 16. All multi-family residences are classified by LCPC as commercial, and therefore will be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[108] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

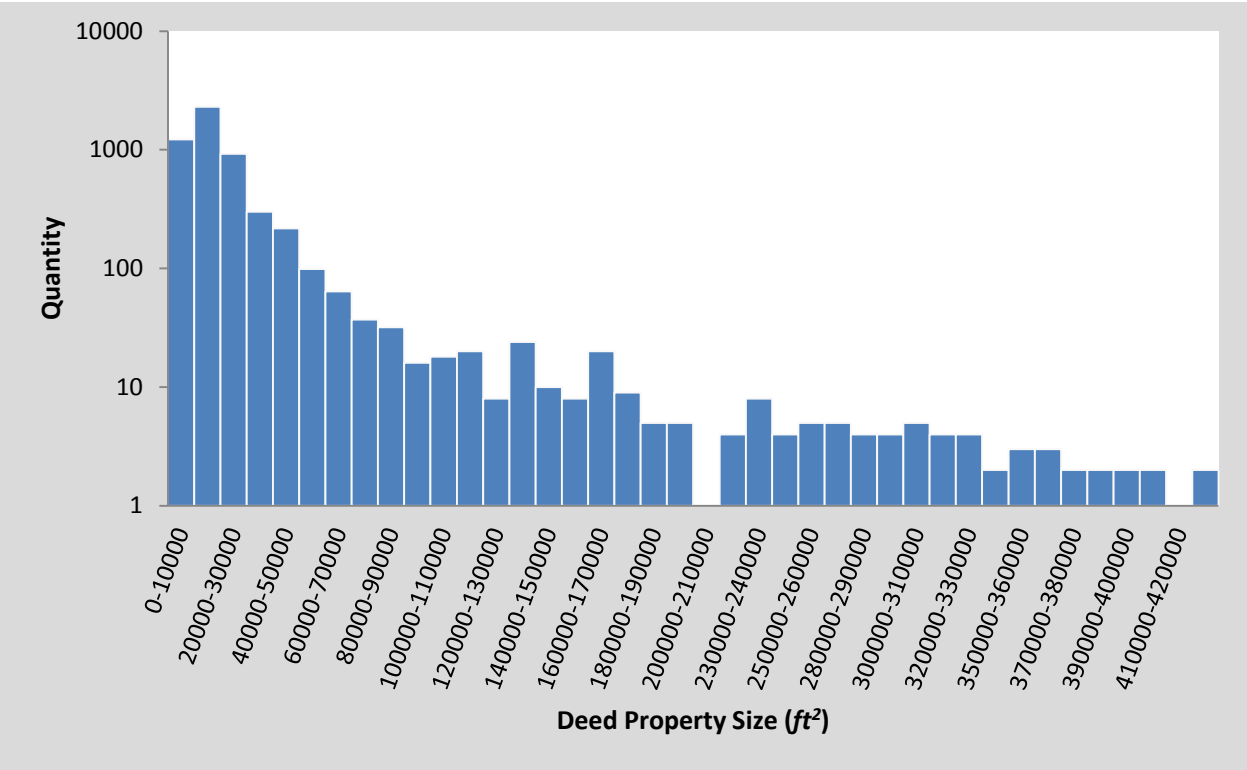

Figure 16. Distribution of Residential Property Sizes in Warwick Township. The median residential property is 16,117 ft^2. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team finds that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Township utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. Since the Township feels strongly in keeping the rate structure simple and low for everyone, and many residents and businesses have implemented a lot of private BMPs in order to manage stormwater on-site, the Project Team created a simpler tiered version as well. Both versions will be laid out in this report. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

For all 422 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 ft^2 of impervious surface.[109] The Project Team recommends using a similar method for Warwick Township. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill.

[109] The Cost of Dealing with Stormwater, Lancaster City, Retrieved from: http://www.saveitlancaster.com/thecost/.

After conducting a sensitivity analysis[110] using various fee structures, the Project Team found that there are many options for the Township to set its initial rates. It is recommended that the ERU be set at 6,155 ft^2 since that number represents the average residential impervious surface in the Township[111]. Depending on whether the Township wants to utilize a tiered fee based on impervious surface, or a simpler version, the rate should be set between $15 and $20 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, that should be considered if a fee is implemented.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee between $15 and $20 per year. The final rate chosen by Warwick Township should be consistent with the non-residential rate. Table 46 shows the revenue yield for each scenario.

Table 46: Annual Residential Property Revenue Generated

Number of Parcels	$15	$20
5,403	$81,045	$108,060

The residential fee is based on the assumption that an average property has approximately 6,155 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined based on the necessary revenue needed to support the program and whether the Township wants to err on the side of equity or err on the side of simplicity, two equally important components of rate setting.

Non-Residential – According to data provided by the LCPC, there are 422 non-residential properties in Warwick Township. This data included the land area of each property, and the average impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 47 below.

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[110] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[111] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

Table 47: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	49.78
Commercial	36.94
Community Service	31.41
Cultural Activity	9.16
Agricultural	2.04

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 36.94% impervious area. This property will then be billed for 7,388 ft^2 of impervious surface (20,000 ft^2 x 36.94%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 48 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 48: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage (25%) (Q1)	13,552	<= 14,000
Median (Q2)	34,313	>14,000 & <=35,000
Percentage (75%) (Q3)	64,864	>35,000 & <=65,000
Upper Bound (Q4)	1,609,106	>65,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided by 6,155 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (approximately 100,000 ft^2) was divided by 6,155 ft^2 to determine the number of ERUs that parcels in Q4 will pay. In the simpler version, the same tiers are used; however, the ERUs simply increase by 1. Therefore, all properties in Q1 pay 2 ERUs, in Q2 3 ERUs, in Q3 4 ERUs, and in Q4 5 ERUs. The final ERU for each tier (for both the impervious-based and simple versions) was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 49 shows the summary of this analysis below.

Table 49: Annual Non-Residential Property Revenue Generated by Tier, Impervious-based and Simple Versions

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/6,155 ft^2)	ERU (Simple Version)	ERU x $ x Number of Parcels			
				Impervious-based Version		Simple Version	
				$15	$20	$15	$20
First tier: <=14,000	111	2.27	2.00	$3,787	$5,050	$3,330	$4,440
Second tier: >14,000 & <=35,000	102	5.69	3.00	$8,700	$11,600	$4,590	$6,120
Third tier: >28,000 & <=78,000	104	10.56	4.00	$16,474	$21,966	$6,240	$8,320
Fourth tier: >78,000	105	16.25	5.00	$25,589	$34,119	$7,878	$10,500
Total Revenue Generated				$54,551	$72,734	$22,035	$29,380

The total revenue potential for all fee structures is shown in Table 50 below.

Table 50: Total Revenue Potential

	Impervious-based Version		Simple Version	
	$15	$20	$15	$20
Residential	$81,045	$108,060	$81,045	$108,060
Non-residential	$54,551	$72,734	$22,035	$29,380
Total Revenue (1-year)	$135,596	$180,794	$103,080	$137,440
Total Revenue (5-year)	**$677,979**	$903,972	$515,400	**$687,200**

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. If Warwick Township funds its stormwater asset management program entirely by the user fee, then the fee would need to be set at **$15** per year per ERU using the impervious-based version or **$20** per year per ERU using the simplified version, where all residential properties pay 1 ERU.

It is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 10: Individual Municipal Analysis – West Lampeter Township

West Lampeter Township is located just south of Lancaster City and has developed into a suburb of the City, with approximately half of the Township maintaining its rural composition. With a population of 15,032[112], it is one of the mid-range municipalities of the six who participated in this study. The Township hopes to continue developing more neighborhoods as suburban sprawl continues to expand across Lancaster County while still maintaining its strong agricultural sector.

At the beginning of the study, each municipality was asked to provide their priorities, needs, and goals to the Project Team. West Lampeter Township provided the following:

Priorities

1. Understanding the condition of existing storm sewer system such as identifying "hot spots", function ability, and maintenance costs;
2. Evaluating agricultural operations such as farming methods, stream bank restoration, nutrient management plans, and coordination with the LCCD to identify BMPs;
3. Identify opportunities for community outreach and education targeted at private land owners, schools, community groups, and the general public; and
4. Assess policies, ordinances, and regulations for capital improvements, road maintenance, planned infrastructure including opportunities for GI, stormwater ordinances, coordination with the LCCD, and clarification and coordination with the state and federal government to better address guidelines and regulations.

Needs

1. Coordinate with the Lancaster Inter-Municipal Committee (LIMC) for mapping inlets and outfalls;
2. Compile data from land development plans;
3. Evaluate existing systems in all sectors;
4. Assistance with education and outreach;
5. Provide recommendations to manage Township-wide stormwater program;
6. Provide recommendations to fund Township-wide stormwater program;
7. Develop a holistic approach to stormwater management practices across all sectors and in the region; and
8. Develop baseline data of existing conditions of waterways within the Township/region.

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[112] 2011 US Census Bureau ACS 5-year Estimates, used the advanced search option to search ACS 5-year total population estimates by municipality using: http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

Goals

1. Improve quality of stormwater leaving the Township and entering waterways;
2. Correct flooding in flood prone areas;
3. Cleaner water leaving developments;
4. Integrate multiple sectors (agriculture, business, residential) into Township and regional solutions.[113]

Many components of the priorities, needs, and goals outlined by the Township are aligned with the EFC's focus and goals when undertaking a stormwater financing feasibility study. The main goal of the study for the Project Team was to assess the current municipal stormwater program and provide the Township with financing recommendations to help them improve their current program and implement cost saving measures to create a comprehensive and sustainable stormwater program. This goal ensures that the Township has the resources and capacity to improve and maintain a higher level of service to its residents and businesses and address all stormwater-related compliance activities.

Assessment of West Lampeter Township's Current Stormwater Program

In the new NPDES MS4 permit being issued to all Phase II municipalities in Pennsylvania, there will be six MCMs consistent with those found in the old permit. Although the purpose of each MCM will be the same as previous permit cycles, the requirements to meet each MCM are anticipated to be more stringent in the future permit. The following six MCMs are the elements contained in the NPDES MS4 permit that outline specific areas the community must address:

1. Public Education & Outreach
2. Public Participation & Involvement
3. Illicit Discharge Detection & Elimination (IDD&E)
4. Construction Site Runoff Control
5. Post Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

For each MCM, there are specific stormwater BMPs that West Lampeter Township can implement to comply with its permit. Although there is flexibility to implement BMPs that fit the needs and resources within the community, there are significant costs associated with addressing each MCM.

The Project Team worked closely with municipal staff and the Township engineer to determine the current level of service for each MCM. A discussion of the findings is below.

Overall Stormwater Program Findings

Stormwater Infrastructure

West Lampeter Township remains mostly agricultural and residential, with a few prominent businesses and recreation areas located in the Township. There is a mix of old and newer infrastructure, as the Township has experienced surges of growth and was hit harder than other municipalities in the most recent economic downturn.

The majority of stormwater infrastructure is located in the Willow Street area and was installed in the 1960/70s. The infrastructure that remains just outside Lancaster City is older than what was

[113] Information provided by West Lampeter Township directly to the Project Team.

installed in Willow Street, although the Township does not know when the pipe system was installed. In the 1980/90s there was a development boom of fairly large neighborhoods and additional elementary schools to accommodate the growing residential population. Most recently, the Township was on track to develop more condensed residential neighborhoods, however, much of those units were not constructed due to the economic downturn, and are only recently being resurrected.

The Township staff explained to the Project Team that in the newer developments, there are stormwater wetland and detention areas that work well, but there have been complaints over concerns of West Nile, which the Township has had to address by treating these stormwater facilities.

Most agricultural land located in the Township is in production[114], and the average farm is approximately 90-150 acres. The Plain Sect makes up approximately 25% of the farmers in the Township, and the Project Team found that Township staff has worked hard to maintain a good relationship with this part of its community. Although not part of the stormwater infrastructure, per se, since agriculture makes up such a large part of the community, working closely with the farmers to implement best practices on their farms will help the Township meet its MS4 permit and reduce its costs on the urban side to managing stormwater.

Willow Valley is the largest industry in the Township and has been a prominent feature in Lancaster County for many years, mostly known as a retirement community. However, in addition it is also made up of a mix of retail, restaurants, and residential properties. Willow Valley is currently redeveloping its 87 acres.

The Township has a map of its outfalls and is currently working with the LIMC to map the rest of the Township's conveyance system. The Project Team recommends that the Township work closely with LIMC to complete this map as soon as possible so the Township can better understand the characteristics of the existing system and begin to develop a strategic plan before the system becomes too old to maintain and must all be replaced. The commitment to addressing stormwater issues through implementation of new projects and maintenance of existing infrastructure is a necessary component to ensuring a robust and comprehensive stormwater management program.

Current Funding for Stormwater

Preparing for new permit requirements and maintaining the existing stormwater system bears significant costs. Currently, funding for the Township's stormwater program comes from general funds, a practice common throughout the country, with some supplementation from public and private grants. Based on the available data collected by the Project Team during the study, capital spending on large projects appears to have been either been pushed back or funded through general fund appropriations.

The Project Team found that the Township invests minimally in stormwater management through its General Fund. The PWD receives minimal funding to manage stormwater through general fund appropriations, and sets aside these funds in the budget for materials & supplies, NPDES Phase II compliance, stormwater engineering, stormwater management and construction, and land and R/W acquisition.[115] The Township staff shared that there is a base amount ($10,000) allocated for stormwater maintenance each year, but other than this base amount the additional funding varies from year to year based on priorities and needs in the Township.

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[114] Farmers in the Township produce corn, soybean, dairy, tobacco, and poultry.

[115] West Lampeter Township 2013 Budget, Retrieved from: http://www.westlampeter.com/westlampeter/lib/westlampeter/2013_budget.pdf.

The Project Team found Township staff eager to invest more thoroughly in meeting stormwater requirements. The Township Manager expressed to the Project Team that the elected officials are also eager to better understand the investments needed to properly manage stormwater, and are open to suggestions from the municipal staff and others on ways to improve their municipal program. Although resources are sparse in the Township, the Board of Supervisors started a capital improvement account for MS4 and stormwater-related issues in the 2013 budget[116], which shows their commitment addressing stormwater locally. Participation in this study and the improved knowledge the staff has gained over the year will help staff continue to work with elected officials to educate them on the importance of investing in stormwater management.

Current Capacity for Handling Stormwater

At the beginning of this study, the Project Team found that the Township staff did not fully understand what is needed to properly manage stormwater. Through participation in this study, and the staff's commitment to improving its municipal program, the Project Team found that the staff's knowledge improved quickly.

The Project Team found that many of the essential staff currently works on stormwater, whether or not it is part of their job description. Throughout the study, this staff showed a commitment to learning about best practices and improving their program. This "all-hands-on-deck" approach witnessed by the Project Team shows a true commitment to the community, however, is not sustainable over time.

In order to adequately address the administrative components of the MS4 permit, the Township should invest in hiring a stormwater coordinator, either on its own or shared between neighboring municipalities. If done so collectively, the Township should bring together neighboring municipalities to develop an intergovernmental agreement. Either way, hiring a stormwater coordinator will allow staff who currently have taken on all of the stormwater-related tasks the time to focus on other Township functions, creating greater efficiency at the Township overall.

All public works staff receives annual refresher training and attend trainings hosted by local organizations. Although the Township feels that their public works staff is adequately trained, the Project Team was unable to determine whether the current number of PWD staff is adequate in meeting the technical components of the MS4. After reviewing the findings in this report, Township staff should meet internally to determine whether additional public works staff should be hired to improve the stormwater program's level of service.

MCM Findings: 1. Public Education & Outreach

The Project Team found that West Lampeter Township currently provides a minimal level of service to its community regarding public education and outreach. The Township is currently working to develop its written Public Education & Outreach Plan, has a volunteer Recycling Committee that provides environmental education, disseminates educational materials in the Township's monthly bills, and posts stormwater education on the Township's website. In addition, during the project the Township had an additional project working with the Lancaster Farmland Trust to help local farmers develop Conservation Plans and identify BMPs located on farms, as the Township staff believes there are more BMPs on these properties not accounted for currently.

The Project Team participated in the West Lampeter Township Farmers Meeting on January 31st, 2013 where the Lancaster Farmland Trust and other local organizations shared information with a packed room of farmers. The purpose of this meeting was to educate farmers on the plans and practices required of them (Conservation Plans and Manure Management Plans), provide resources

[116] Information provided by West Lampeter Township directly to the Project Team.

to help farmers implement such plans and practices, and get feedback directly from farmers. The Project Team found that this type of information sharing and giving the agricultural community a chance to voice their opinions and concerns is essential to successfully engaging this sector and ensuring they do their part in managing stormwater. The Project Team recommends similar meetings be held with different targeted groups – developers, businesses, and homeowners associations (HOAs).

When the Project Team presented the study to the Board of Supervisors, they were extremely receptive to both the technical and outreach components of the study. The Township Manager and essential staff managing stormwater have educated the Board enough so that they understand the need to improve their stormwater program. It should also be noted that one of the board members has been a huge supporter of proper stormwater management throughout the County and is a leader within the Township.

In order for West Lampeter Township to increase its level of service regarding MCM 1, the Township should continue to educate and engage their elected officials and the public so they have the support to invest in outreach events, finalize its written plan and list of target audience groups, work with other neighboring municipalities to share materials and information and plan regional events, and track all its activities related to MCM 1.

MCM Findings: 2. Public Participation & Involvement

The Project Team found that West Lampeter Township currently provides a minimal level of service to its community regarding public involvement and participation. The Township is currently working to develop its written Public Participation & Involvement Plan, has begun to engage the local high school, and is working with local farmers through the Lancaster Farmland Trust project. These activities are the first step towards developing a high level of service for this MCM.

In order for the Township to improve its level of service for MCM 2 into the future, it should continue reaching out to the Lampeter-Strasburg School District to engage young residents, as well as engage other local partners (Boy/Girl Scouts, neighboring municipalities, watershed associations, etc.) in a more targeted approach that resonates with different stakeholder groups. The Township should also finalize its written plan, which should include a dedicated annual public meeting for stormwater where the public can give their input, at least one annual public event such as a stream clean-up, tree planting, or watershed day, and tracking system for all activities related to MCM 2.

MCM Findings: 3. Illicit Discharge Detection & Elimination

The Project Team found that West Lampeter Township currently provides a medium level of service to its community regarding IDD&E. The Township inspects at least 20% of its outfalls each year, has a written program that was developed using a Center for Watershed Protection (CWP) tool, and has a schedule for inspecting all outfalls. The Project Team found that the mapping and outfall schedule within the Township is more advanced compared to other municipalities, since all outfalls are numbered and a map exists with the locations and year inspected which creates much more organizational efficiency.

In order to increase the level of service for MCM 3, the Township needs to develop a more formal process for handling illicit discharge complaints. The Township could easily develop a procedure for public notification of IDD&E and tracking system for inspections and complaints. It is anticipated that when the new MS4 permits are issued, more stringent requirements will be incorporated for this MCM. At this time, Township staff should consider hiring additional PWD staff to ensure all screening and inspections are completed each year.

MCM Findings: 4. Construction Site Runoff Control

The Project Team found that West Lampeter Township currently provides a minimal level of service to its community regarding construction site runoff control. This level of service was found almost across the board with all six municipalities. In Pennsylvania, the county conservation districts review and approve all Erosion & Sediment Control Plans for new development and are tasked with inspecting construction sites. Thus, municipalities are limited by the resources at the conservation district to meet this MCM. It is important to note, however, that while the conservation district typically reviews, approves, and inspects all new development, the municipality is still held accountable for this MCM. Because of this, municipalities should inspect sites in addition to the conservation district and file all projects separately to help with their MS4 annual reporting.

The Project Team found that while most municipalities in the study rely on their contracted engineer to inspect sites when time and resources permit, West Lampeter Township conducts spot inspections during construction in-house. The Township works closely with the LCCD to provide training opportunities to developers and builders. The LCCD provides initial approvals for new development and also conducts farming inspections per the request of the Township. The Township staff feels comfortable working with the LCCD, but relies on them to keep track of construction projects. The Project Team found Township staff eager to be accountable on their own in order to improve this MCM.

Due to the limited development taking place in recent years, the Township has not had to worry about stormwater runoff from construction projects. However, this may change in the future. In order to improve its level of service once development picks up, the Project Team recommends the Township develop a tracking and filing system in-house for all new construction projects instead of relying on the LCCD as heavily.

MCM Findings: 5. Post Construction Site Runoff Control

The Project Team found that the Township is in the beginning phases of developing an adequate level of service regarding post construction site runoff control. While the Township currently performs inspections both in-house and through its contracted engineer, Township staff are still working on developing an inventory list of all post construction stormwater management (PCSM) BMPs and currently does not have a formal process for maintaining Township-owned BMPs. The contracted engineer through ELA Group, Inc. is developing a spreadsheet for all new facilities being constructed in the Township. It should be noted that the Township has a minimal number of publically-owned facilities. The sooner the Township has a full understanding of its PCSM BMPs, the better.

In order to increase the level of service for this MCM, the Township must finish its inventory of BMPs; create a written operations and maintenance (O&M) plan for Township-owned facilities; provide training opportunities to ensure developers are up to date on all stormwater management regulations, Low Impact Development (LID) and Green Infrastructure (GI) alternatives; inspect all sites to ensure PCSM BMPs were implemented as designed; and track all inspections in-house.

The Township staff mentioned to the Project Team that many of the HOAs within the Township do not have the funding to maintain their privately-owned BMPs and often seek help from the Township. Since many of the stormwater facilities are located on private property, it is important for Township staff to work closely with private property owners /HOAs. Public health and safety concerns can arise when proper maintenance is not being done, forcing the Township to spend public funds in emergency situations. To mitigate these issues as best it can, the Township needs to develop more stringent maintenance agreements for any new developments with BMPs and lay out these requirements in all pre-construction meetings.

MCM Findings: 6. Pollution Prevention/ Good Housekeeping

The Project Team found that West Lampeter Township currently provides a minimal level of service to its community regarding pollution prevention and good housekeeping. The PWD maintains publically-owned BMPs as-needed; cleans drains; cleans catch basins manually following storm events; sweeps streets annually; and trains staff annually. Although the Township meets its requirements, the Township must develop more strategic plans for this MCM, including a written O&M plan and tracking system, and a water quality improvement plan to determine the baseline stream health and prioritized projects based on cost efficiency.

The Project Team recommends the Township invest in new equipment to help improve the efficiency of the PWD tasks. The Project Team found that the Township currently cleans ditches and drains manually and does not have a street sweeper. Instead, they exchange services informally with East Lampeter Township, so that they borrow the sweeper from East Lampeter Township annually in exchange for other services. Although Township staff expressed more interest in purchasing a street sweeper, the Project Team recommends first investing in a jet vac in order to improve efficiency for the cleaning and maintenance tasks associated with this MCM. The Project Team recommends that in the meantime the Township develop a more formal agreement with East Lampeter Township if they continue to share resources, which is recommended as it keeps costs lower for both communities.

In meeting with municipal staff, the Project Team found staff eager to develop a more comprehensive program to better meet its MCM 6 goals by improving internal capacity and investing in new equipment. In order to keep costs low, the Project Team recommends the Township meet with neighboring municipalities to determine existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively. The Township must also develop better tracking of all stormwater-related public works activities, continue to map the entire storm sewer system with the goal of ultimately developing an infrastructure repair and replacement program, and regularly train staff in different components of stormwater-related good housekeeping measures.

Anticipated Changes to the MS4 Permit

The PA DEP requires all MS4 permitted municipalities in the Bay watershed to develop a CBPRP by the summer of 2014. The purpose of this plan is to help municipalities strategically implement projects that improve local and regional water quality. The Project Team found that the municipalities typically contract this Plan out to their engineer, and there has been minimal guidance provided to municipalities about what should go into the plan.

In addition to developing a CBPRP, it is anticipated that more stringent requirements will take effect when the new MS4 permits are issued in the fall of 2013. In Maryland, the Department of the Environment (MDE) included a new requirement in its new permit cycle – a **20%** impervious area restoration requirement. It is anticipated that this impervious area restoration, designed to increase the level of runoff managed from existing impervious areas, will require implementing a number of stormwater BMPs. These BMPs will be either nonstructural practices (like diverting runoff from impervious areas to vegetated areas, bioswales, and tree planting) or more traditional structural practices (i.e. stormwater ponds, bio-retention facilities). Based on information received from MDE and Maryland municipalities, it is anticipated that a similar requirement be included in Pennsylvania.

Consideration of Funding Methods for Stormwater in West Lampeter Township

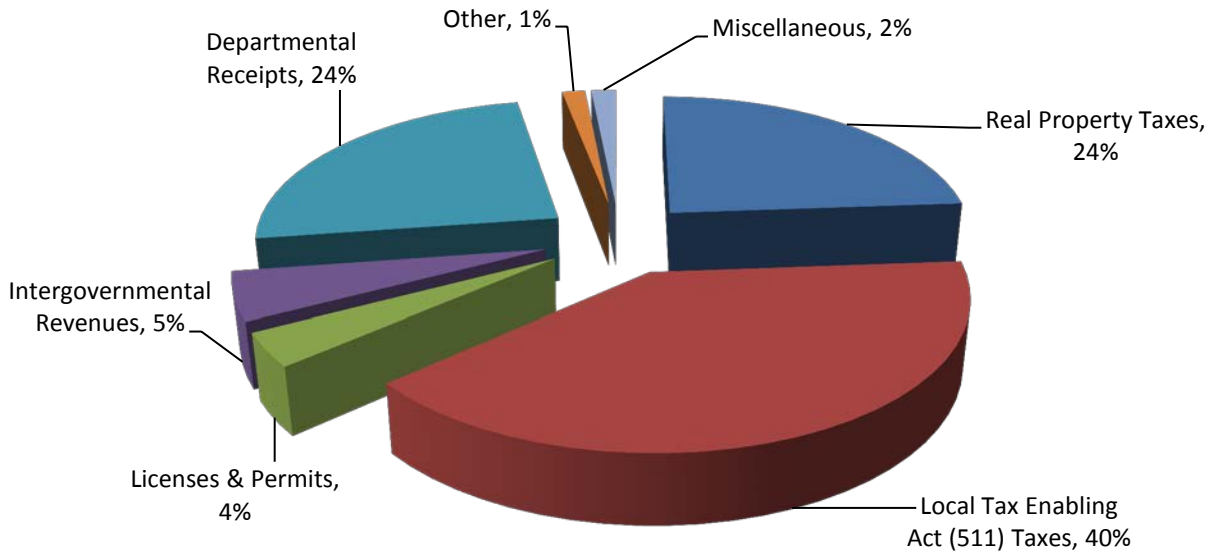
Properly managing stormwater is considered an essential service, but one that is often unseen or misunderstood by residents and businesses in a community. Stormwater infrastructure requires

upgrades and maintenance that is on par with the needs, costs, and annual maintenance as similar services such as wastewater, drinking water, or transportation. However, stormwater is rarely funded to the extent that any of these other services typically are, thus leaving a considerable gap in a stormwater program's level of service to the community.

Current Method of Funding Stormwater

The current method of funding stormwater in West Lampeter Township is partially through grant funding and leveraging relationships with local organizations, but with the majority of the revenue derived from general fund appropriations. West Lampeter Township's general fund comes from several sources such as real property taxes, local tax enabling act taxes, licenses, and permits (see Figure 17 for breakdown). This revenue is then distributed to sources as appropriate and deemed necessary, such as public safety, general government expenses, public works, and community development.[117]

Figure 17: West Lampeter Township's 2013 General Fund Revenue Breakdown[118]



Currently, general fund allocations for stormwater programming in West Lampeter Township are not adequate for the Township to properly manage stormwater in the near and long terms. As priorities shift and costs rise, the Township needs to determine a more sustainable plan to pay for stormwater.

In order to enhance the level of service to meet future anticipated regulatory requirements, the Township must more aggressively invest in administration, operations & maintenance, and capital projects to repair and replace its infrastructure. The Township should consider supplementing its current funding approach with a dedicated stormwater fee to support a more strategic and comprehensive stormwater program.

Assessment of Possible Revenue Sources and Funding Methods

Recognizing that the current funding method of having stormwater compete for general fund appropriations with other community priorities and relying on occasional grant awards is clearly not

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[117] West Lampeter Township 2013 Budget, Retrieved from: http://www.westlampeter.com/westlampeter/lib/westlampeter/2013_budget.pdf.
[118] Ibid.

sustainable, the Project Team explored the possibility of using other revenue and funding sources. Although many financing options were explored, only a few cover the costs of capital and operations and maintenance, as highlighted in Table 51 below:

Table 51: Funding Sources, Coverage of Costs, and Features

Funding Source	Coverage of Cost Type		Features
	Capital Improvements	Operations & Maintenance	
Grants	Yes	No	Not guaranteed, highly competitive, not sustainable in the long-term
PENNVEST Loan Program	Yes	No	Not guaranteed, highly competitive, must repay often with interest
Bond Financing	Yes	No	Dependent on fiscal capacity, can utilize for large, long-term expenditures, must repay with interest
General Fund	Yes	Yes	Not equitable, competes with other community priorities, changes from year-to-year
Permit Review Fees	No	No	Not significant revenue, may deter development
Inspection Fees	No	No	Not significant revenue, may deter development
Stormwater Utility Fee	Yes	Yes	Generates ample revenue, sustainable, dependable, equitable, requires significant public dialogue

While a host of fee systems exist to pay for local stormwater programs, not all provide sufficient revenue to support the large costs associated with a comprehensive stormwater management program. While all of the above were found to be useful in funding a specific portion of the entire stormwater management program in each municipality, only the **general fund appropriation** and a **stormwater utility fee** were considered by the Project Team as large enough pots of money to be capable of funding the entire program.

Consideration for Using General Fund Appropriations for Stormwater

As mentioned above, reliance on the general fund as the primary resource for West Lampeter Township's stormwater program means that stormwater continues to compete with other higher community priorities leaving the program vulnerable to budget cuts, particularly in future years when new stormwater regulations and nutrient reduction requirements will increase the price tag significantly. The general fund is derived primarily from taxes and the issue of equity and fairness of who pays for stormwater and how much they pay is not taken into consideration. In other words, those paying into the general fund are not paying based on their contribution to the problem of stormwater. In fact, many large properties, such as churches, schools, and government properties are not paying any taxes and therefore not paying anything towards services related to stormwater.

With general funds fluctuating from year to year and the revenue sources that make up the general fund varying in amount, stormwater management is unlikely to ever be adequately funded solely from this source. This does not mean, however, that current funding levels for various activities now

being covered by general fund dollars should be lessened or eliminated in future budgets; it means that in addition to using some general fund appropriations, another reliable and dedicated source of funding will be required for West Lampeter Township to properly manage stormwater. The ultimate financing strategy will require a combination of funding sources to fully round out and adequately fund the entire recommended program to the extent that is needed in the future. The most appropriate mechanism to consider in addition to using some general funds and seeking grants whenever possible is through implementation of a stormwater utility fee.

Consideration of a Stormwater Utility Fee

Since the 1970s, one of the most popular methods of paying for stormwater has been a stormwater utility fee. A stormwater utility fee, sometimes called a service charge, is a separate accounting structure with a dedicated source of funds collected and used only for the purpose of managing stormwater. In its most recent report, the Western Kentucky University Stormwater Utility Survey identified more than 1,400 stormwater utilities nationwide.[119]

The national trend has been to move away from relying solely on taxes for these programs and charge a fee that is stable, adequate to cover the costs of managing the program, and most importantly, equitable. A utility has increasingly become the choice for supporting stormwater *programs* because it is the clearest way to connect level of service/use (runoff) with the fee to be imposed. This type of fee-for-service has been implemented successfully for water, sewer, and solid waste/recycling programs, and has proven highly effective for stormwater, as well.

The Project Team believes that a stormwater utility, known in Pennsylvania as a stormwater authority, is the most equitable financing mechanism because it distributes program costs associated across all properties that contribute in some way to stormwater. Taxes and other fee systems often exclude certain properties from paying, such as those that are tax exempt, yet these properties are still contributing runoff to the system, and often at a rate far greater than that of the average residence.

How a Stormwater Fee Works

The basic premise behind a community's stormwater program is that all property owners receive some benefit from the system being maintained; therefore, all properties should be required to participate in the cost of maintaining that service. Most stormwater fee rates are therefore based on the size, or footprint, of the structural part of a property. This physical part of the property is known as ***impervious surface*** and includes all of the hard surfaces of a property such as a roof, patio, paved area, or sidewalk. The reason for basing a fee on impervious surface is that a hard surface does not allow water to infiltrate into the ground, thereby increasing the volume and flow of stormwater that a community must manage.

Effective stormwater fees make a direct connection between the anticipated expenses to properly manage the system and the revenue generated. In other words, the fee should be determined by the level of revenue needed to deliver stormwater management services to the community, with some allowance for the level to which a property contributes to runoff.

There are several ways to calculate a stormwater utility rate. The most simple, fair, and common method is based on a parcel's amount of impervious surface – the extent to which a parcel contributes to runoff. When implemented, the fee may take the form of a flat or tiered rate structure, or some combination of both. An Equivalent Residential Unit (ERU) is a unit of measure

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[119] Campbell, C. Warren (2013). Western Kentucky University 2013 Stormwater Utility Survey, Western Kentucky University, Bowling Green, page 1.

based on either the average impervious surface of a single family dwelling or residential parcel. A specific fee level is attached to an ERU, and the number of ERUs on a given property often serves as the basis for the stormwater charge.

In many cases for residential properties, a flat fee is often recommended over exact parcel based measurements due to the level of program development and administrative burden that would be involved. This flat fee becomes the rate charge for non-residential properties, since it is assumed that the typical residential property is 1 ERU. Determining the fee for non-residential parcels is typically done by calculating the exact amount of impervious surface on the site and then dividing the amount of impervious surface that was calculated for residential properties to determine the number of ERUs for a particular property. The property is then charged a rate (often the same as the residential flat rate) per ERU.

Implementing a stormwater user fee is a national trend on the increase in the US, primarily because these fee structures, if designed correctly, will collect a sufficient amount of revenue to support program costs in the most equitable manner possible. Also, utility-based stormwater programs tend to be more efficient, as the responsibility for managing stormwater is coordinated in one program rather than piecemeal across several departments. In the case of West Lampeter Township, a utility, or in Pennsylvania known as an authority, would create an adequate and stable source of funding dedicated solely to stormwater and allow for a comprehensive program, consistent in funding from year to year, and meets all regulatory requirements, nutrient reduction needs, and community goals**.** Table 52 below shows current stormwater user fees in Pennsylvania, including their ERU rate and total revenue collected.

Table 52: Stormwater User Fee Examples in Pennsylvania[120]

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Meadville, Crawford County (2012)	13,616	Single family detached residential = $90/year All other developed non-single family detached parcels = $90/year/ERU, where 1 ERU = 2,660ft^2 impervious surface Reference: Meadville Stormwater Management User Fee Ordinance	Unknown
Mount Lebanon, Allegheny County (2011)	33,137	Single family, townhouse, or duplex = $8/month All other properties = $8/month/ERU, where 1 ERU = 2,400ft^2 impervious surface Reference: Mt. Lebanon Stormwater Fee Ordinance	Unknown

[120] Data came from each individual municipality's website *and* the Western Kentucky University 2013 Stormwater Utility Survey.

Community (Year established)	Population	Fee Structure	Revenue Generated/ Year
City of Philadelphia (2010)	1,536,471	Residential = $13.48/month Non-residential = Gross Area: $0.526/500ft^2 Impervious Area: $4.145/500ft^2 Monthly Billing: $2.53 per account Reference: PWD Stormwater Billing & Stormwater Fact Sheet	$655,000
City of Lancaster, Lancaster County (2013)	59,263[121]	Single-family residential = $4-$12/quarter Multi-family residential = $12-$19/quarter Typical commercial = $237/quarter Tiered rate structure for all properties where 1 ERU = 1,000ft^2 Reference: The Cost of Dealing with Stormwater	Not implemented yet
Jonestown Borough, Lebanon County, PA (2012)	1,329[122]	Single-family, townhouse, or duplex = $70/year in year 1; $80/year in years 2-4 All other properties = $70/year/ERU in year 1; $80/year/ERU in years 2-4, where 1 ERU = 3,100ft^2 Reference: Stormwater Information	Unknown

Legal Basis in Pennsylvania Enabling Stormwater Authorities

The five stormwater user fee examples listed above are the only known stormwater utilities within Pennsylvania, and are in various stages of development and implementation. Historically, paying for stormwater has been a contentious issue within the state, since it is unclear whether such dedicated fees are enabled by state legislation.

In PA, utilities are typically regulated by the Pennsylvania Utility Commission (PUC), and the PUC will not at this time regulate stormwater. Thus, the creation of dedicated fees for stormwater often comes under the guise of an *authority.*

The contention, then, lies in the language written into the Pennsylvania Municipality Authorities Act, which states:

> "§5607. Purposes and powers
>
> (a) Scope of projects permitted.--Every authority incorporated under this chapter shall be a body corporate and politic and shall be for the purposes of financing working capital; acquiring, holding, constructing, financing, improving, maintaining and operating, owning or leasing, either in the capacity of lessor or lessee, projects of the following kind and character and providing financing for insurance reserves:
>
> (1) Equipment to be leased by an authority to the municipality or municipalities that organized it or to any municipality or school district located wholly or partially within the boundaries of the municipality or municipalities that organized it.

[121] 2011 US Census Bureau ACS 5-year Estimates.
[122] Ibid.

(2) Buildings to be devoted wholly or partially for public uses, including public school buildings, and facilities for the conduct of judicial proceedings and for revenue-producing purposes.

(3) Transportation, marketing, shopping, terminals, bridges, tunnels, flood control projects, highways, parkways, traffic distribution centers, parking spaces, airports and all facilities necessary or incident thereto.

(4) Parks, recreation grounds and facilities.

(5) Sewers, sewer systems or parts thereof.

(6) Sewage treatment works, including works for treating and disposing of industrial waste….”[123]

The Act does not differentiate between *sanitary* and *storm* sewer systems, thus creating much debate over the years as to whether storm sewer systems can be financed through an authority. A further discussion as to the legality of stormwater authorities is essential within a locality before imposing a stormwater fee, however, not the focus of this report.

In April 2013, historic legislation (Senate Bill 351) passed by a vote of 49-1 that enables stormwater authorities at the municipal level. Without this legislation, municipalities were reluctant to move forward in setting up a dedicated stormwater fee. This legislation paves way for municipalities to implement dedicated fees to ensure that stormwater is managed adequately and more cost efficiently in the long run, and it is anticipated that stormwater user fees will begin to develop more rapidly in the state than ever before due to SB 351.

West Lampeter Township’s Stormwater Financing Recommendations

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for West Lampeter Township, the Project Team worked with municipal staff to conduct a comprehensive review of all aspects of current spending on stormwater management. When considering the level of stormwater management service identified as necessary in the Township, the Project Team found that current budgeting practices are not adequate in meeting the existing regulatory requirements. With tighter fiscal budgeting and more stringent permit requirements anticipated in the future, the Project Team and municipal staff agreed that a more comprehensive program will ensure a more viable stormwater management program for the future.

Two of the municipalities who participated in this study, Manheim and Warwick Townships, worked with the Project Team to determine the estimated costs projected over five years that is needed to properly manage stormwater. Each of these municipalities took a vastly different approach to estimating costs. Since the Project Team found it difficult to collect meaningful cost data for the other four participating municipalities, including West Lampeter Township, the team utilized Manheim and Warwick Townships’ approaches to develop cost estimates. A discussion of these approaches and how they were adapted for West Lampeter Township follows.

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[123] Purdon’s Pennsylvania Statutes and Consolidated Statutes, Title 53 Pa. C.S.A. Municipalities Generally, Part V. Public Improvements, Utilities and Services, Subpart A. General Provisions, Chapter 56. Municipal Authorities, Retrieved from: http://www.municipalauthorities.org/wp-content/uploads/2008/11/Title_53_Ch_56_MAA_01-13.pdf.

Manheim Township's Approach

Manheim Township, the largest of the municipalities participating in this study, plans to develop a separate Stormwater Department within the Township. All stormwater-related costs, even if currently paid for using general fund appropriations, will be moved to a stormwater budget. This budget will be supported through a dedicated stormwater user fee. The Project Team found that in Manheim Township a 5-year revenue stream totaling approximately $10.1 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater program housed in the Stormwater Department. [124] See Chapter 7 for the full analysis of Manheim Township's financing structure.

Using population as the factor, West Lampeter Township's costs were estimated at approximately $4 million over five years if the Township uses Manheim Township's approach to managing stormwater (see Table 53).

Table 53: West Lampeter Township's Budget using Manheim Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Manheim Township	37,768	1.00	$10,085,237	$2,017,047
West Lampeter Township	15,032	0.40	$4,014,014	$802,803

Warwick Township's Approach

Warwick Township, often hailed as the most proactive Township managing stormwater in the County, plans to continue supporting most of its stormwater-related costs using general fund appropriations and grants. The Township wants to utilize a dedicated stormwater user fee to support an asset management program that focuses on two components – (1) the costs of repairing and replacing the entire storm sewer pipe system and (2) the costs of maintaining and renovating all municipally-owned BMPs. The Project Team found that a 5-year revenue stream totaling $639,268, when adjusted for inflation at a rate of 2.5% per year, will be needed to support a municipal stormwater asset management program for Warwick Township.[125] See Chapter 9 for the full analysis of Warwick Township's financing structure.

Using population as the factor, West Lampeter Township's costs were estimated at approximately $550,000 over five years if the Township uses Warwick Township's approach to managing stormwater (see Table 54).

Table 54: West Lampeter Township's Budget using Warwick Township's Approach

Municipality	Population	Factor	Budget (5-year)	Budget (1-year)
Warwick Township	17,622	1.00	$639,268	$127,854
West Lampeter Township	15,032	0.85	$545,311	$109,062

[124] Inflation was taken into account for all expenditures in years 2-5; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The percent change in the annual average CPI between 2003-2012 = 2.47%. (U.S. Department Of Labor Bureau of Labor Statistics, Washington, D.C. 20212, Consumer Price Index, All Urban Consumers, U.S. City Average, All Items, 1982-84=100, Retrieved from: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

[125] Ibid.

It must be noted that the Project Team only supports this approach for Warwick Township because of the high level of service being provided to the community currently. Since West Lampeter Township needs to increase its level of service, the Township should utilize Warwick Township's approach as a jumping off point and include additional costs associated with properly managing stormwater in its stormwater budget.

Recommendations for West Lampeter Township's Level of Service Expenditures

Given the size of the Township, it is likely not feasible (or necessary) to develop a Stormwater Department. Therefore, Manheim Township's costs represent the "Cadillac" version of stormwater management. On the flip side, Warwick Township's costs represent a low cost estimate to managing stormwater since the costs only factor in asset management *and* the costs are based on the useful life of materials. This means that Warwick Township will bring in annual reserves through its dedicated fee to pay for its asset management program over time. Thus, the Project Team recommends that West Lampeter Township use a blended approach that uses Warwick Township as its baseline, and then includes additional costs necessary for the Township to properly manage stormwater. Further discussion is required by Township staff to determine how best to allocate costs. The following provides a discussion of the additional costs that the Township must invest in to meet its current and future state and federal regulations:

Personnel costs

The Project Team recommended earlier in this chapter that the Township invest in hiring a stormwater coordinator. In many respects, simply hiring a coordinator will allow the Township to meet most, if not all, of its administrative compliance components, allowing existing staff to focus on more pertinent tasks. The Township could hire a coordinator on its own or as a shared position with neighboring municipalities. The Township must engage neighboring municipalities to determine if a shared coordinator should be hired. Either way, the Project Team recommends investing in a coordinator to help with administrative MS4 permit tasks and keep the Township on track with meeting its MCMs.

The Project Team also recommended earlier in this chapter that the Township meet internally to determine if additional PWD staff is needed to adequately address the technical components of its permit. In order for the Township to meet existing and future regulatory requirements, up to four road crew members should be considered. If the Township does not hire additional road crew members, the Township should contract more frequently with the engineer to alleviate the amount of in-house time required to inspect construction and post-construction sites, time that could be spent on other stormwater-related or general public works tasks.

Capital costs

The $545,311 estimated 5-year costs using Warwick Township's approach supports an asset management program, including a pipe infrastructure repair and replacement program (assuming the average useful life of the pipes is 30 years) and a BMP renovation (assuming the average useful life is 20 years) and maintenance (assuming maintenance every 5 years) program. The Project Team highly recommends the Township invest in an asset management program and sets up its dedicated fee to generate at a minimum $545,311 over five years.

The Project Team recommends the Township also invest in a study to determine the baseline health of its streams and thus, the most cost-effective water quality improvement projects (which will result in additional capital costs once projects are identified).

Lastly, the Project Team recommended earlier in this chapter that the Township consider investing in new equipment. In order to keep costs low, the Project Team recommends the Township meet

with neighboring municipalities to determine all existing equipment and develop a list of equipment needed, all of which could be shared through intergovernmental agreements and purchased cooperatively.

Operations & Maintenance costs

If the Township purchases new equipment, there will be annual O&M costs associated with this equipment that will need to be factored into the stormwater program's costs. These costs will be included once it is determined what equipment, if any, will be purchased.

The Project Team recommended earlier in this chapter that the Township work with LIMC to finalize the map of the Township's entire conveyance system, which should be prioritized. The Township must develop a more comprehensive understanding of its pipes in order to implement an asset management program properly.

There are additional costs that are fairly minimal compared to the large capital and personnel costs needed to properly manage stormwater that the Township must consider. These costs include outreach materials, contract fees (namely for engineer's time), and hosting outreach and engagement events[126]. See Chapter 7 for Manheim Township's costs associated with these activities, which could be used as a reference for West Lampeter Township.

Stormwater User Fee Rate Structure Analysis

Why This Study is Recommending a Stormwater User Fee for West Lampeter Township

Although the Project Team was unable to develop a specific estimated budget for West Lampeter Township, the Project Team recommends the Township create a dedicated stormwater user fee that will distribute the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to stormwater management needs.

As discussed earlier, the more impervious surface that a property has, the more stormwater it generates and the more responsible the property owner is to help the community manage stormwater. As private driveways, parking lots, swimming pools, decks, and other such structures allow residents and businesses to enjoy additional living and working conveniences, the burden of maintaining and repairing the infrastructure that supports those additional structures and surfaces should be shared by those contributing to the problem rather than the community at large. Just as a property owner is responsible for paying its share of waste disposal, water use, or electricity consumed, so should they recognize and be accountable for the stormwater created from their built environment.

Once it became clear that there was a significant need to have a dedicated funding source to cover the stormwater costs in West Lampeter Township, the Project Team considered what financing mechanism would be most appropriate to generate these funds. The Project Team initially considered assessing a property tax, but since the value of a property is not an indicator of the amount of runoff, the property tax was not seen to be the most equitable way to pay for a stormwater program.

A stormwater user fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since it is anticipated that development and growth continue in the Township, increasing the amount of impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. The major

[126] Warwick Township estimated that their annual Watershed Day costs $2,225.

concern with this approach is the investment required by the Township to assess properties based on their exact contribution to stormwater runoff (i.e. parcel-based impervious surface calculations). Therefore, the fee calculations will begin more simply and transition over time to a more accurate method, balancing the administrative burden of billing with an equitable distribution of charges.

Billing Recommendations

Since enabling legislation was passed very recently in Pennsylvania, there are few examples that exist in the state to use as a model for implementing dedicated stormwater user fees. In Pennsylvania, the government structure creates so many small, autonomous municipalities with unique circumstances based on municipality type. In the past, cities, boroughs, and home rule municipalities have had an easier time passing ordinances to set up stormwater fees in the state. Since West Lampeter is a Township, it will need to set up a stormwater fee by either creating a new authority or utilizing its existing authority to bill its customers for stormwater.

West Lampeter Township is served by the Suburban Lancaster Sewer Authority (SLSA) for sewage collection and conveyance services, along with Pequea Township and portions of Lancaster Township. If SLSA adds stormwater to its bill, the Authority must first amend its articles of incorporation to include the scope of its entire stormwater program and related activities.[127] Since this is a regional authority, the Project Team recommends West Lampeter Township discuss the possibility of adding stormwater services to the SLSA's scope. The Township and SLSA will then need to determine how the funds will be transferred back to the Township to manage stormwater.

Since the Authority is multi-municipal, the Township should meet with the participating municipalities to determine if they are interested in also establishing a dedicated stormwater fee. If all are on board, then this regional Authority could serve as pilot regional municipal authority. In PA, much of the debate concludes with the need to develop more multi-jurisdictional collaboration to reduce the looming stormwater costs. However, it is likely that not all municipalities are ready to implement a dedicated stormwater fee. If this is the case, the Township should consider developing a new stormwater authority to support its municipal program, including all estimated costs discussed above. The Township will need to administer billing in-house if it decides to establish a Township stormwater authority. It is recommended by the Project Team to discuss internally which option is easier to administer and will create fewer transaction costs between parties.

Based on the experience of other communities, it is recommended that the Township set up a strong administrative structure to deal with public questions and concerns, particularly when the user fee is first launched. Other communities who have implemented stormwater utilities report that the outreach need is very high at first but declines as the utility rolls out. A help line and Township staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

Although a specific cost estimate was not generated, the Project Team recommends implementing a fee to improve the current level of service. This fee could be set low to begin generating revenue, and once the Township has a better understanding of its costs, the rate structure should be reevaluated. In all likelihood, the Township's true costs lie somewhere in between the estimates provided using Warwick and Manheim Townships' approaches, shown in Figure 18.

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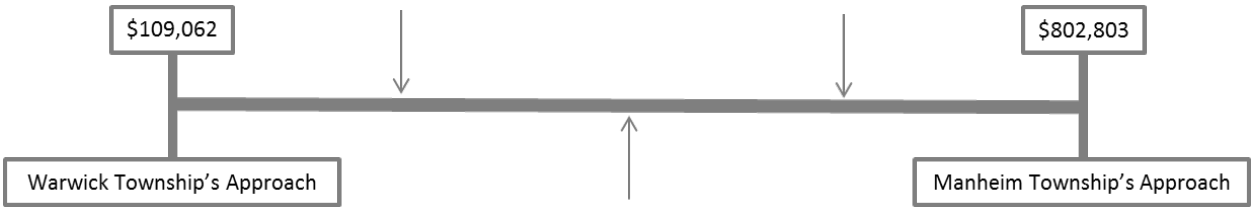
[127] McClinktock, Robert, *Amendment to the Municipal Authorities Act Allows Municipal Authorities to Manage Storm Sewer Systems,* Municipal Law Alert, July 27th, 2013, Retrieved from: http://www.lambmcerlane.com/blog/895453853-amendment-municipal-authorities-act-allows-municipal-authorities-manage-storm-water.

Figure 18: The Spectrum of West Lampeter Township's Estimated Annual Stormwater Costs



In determining an equitable funding strategy for collecting revenue to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the Township provided by GIS staff at the LCPC. The Project Team calculated potential revenue using a flat rate fee for parcels classified residential, and a combination of a tiered fee and ERU-based fee structure for all parcels classified as non-residential.[128] The Project Team worked with the LCPC's land use codes, as this framework will be easy for West Lampeter Township to implement moving forward.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties reflects a balance between equity and administrative burden. After reviewing the large number of residential units and the many different types of residential properties located within the Township, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the Township to properly estimate the total impervious surface for all residential properties in the community. Based on our experience working in other communities, it was agreed that calculating the level of impervious surface on every residential property would cause significant administrative burden. In addition to this being an overwhelming effort, the Project Team agreed that the risk of errors on bills could cause confusion about the billing calculation and increase the risk of complaints from the residential population. Additionally, the Project Team found that there was not a large enough spread among the sizes of the residential units to make taking on the task of developing unique bills for 4,456 residential parcels worthwhile. A distribution of all the residential properties in the Township is depicted in Figure 19. All multi-family residences are classified by LCPC as commercial, and therefore will be billed based on the non-residential fee structure discussed below. This means that an apartment building's management firm will be billed as a commercial property and can then determine how best to recuperate these costs from their buildings' residents.

[128] Multi-family units are classified commercial in the LCPC land use codes. The Project Team kept these properties in the non-residential category.

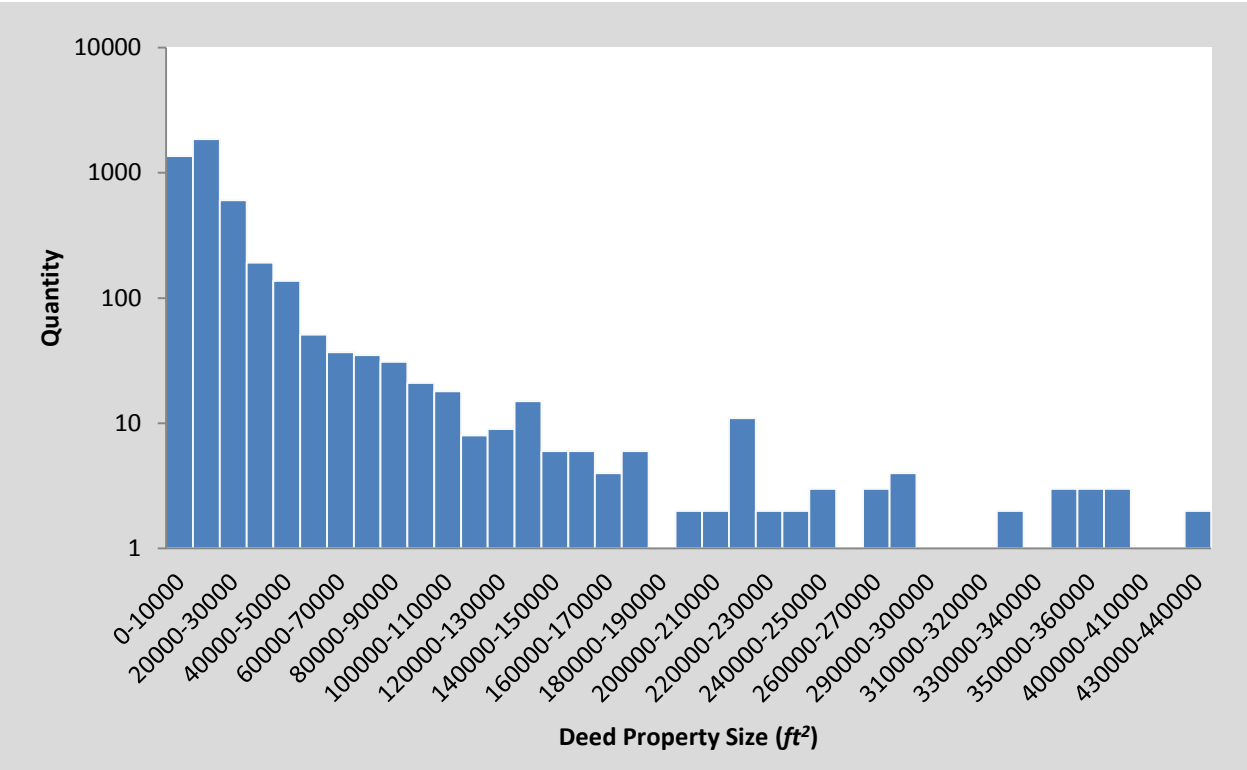


Figure 19. Distribution of Residential Property Sizes in West Lampeter Township. The median residential property is 13,068 *ft²*. This figure shows the property sizes are skewed to the left, indicating the distribution is composed of more small properties than large.

Summary of recommended rate structure for non-residential properties

Because the size and nature of non-residential units vary widely, the Project Team suggests that a parcel-based rate structure that takes a parcel's specific level of impervious surface into account to be the fairest method of assessing the stormwater fee on these properties. However, due to the time and capacity needed to develop the mapping and administrative processes to bill non-residential properties accurately, it is recommended that the Township utilize a tiered system that is based on average impervious surface estimates in the beginning years of the program. The Project Team learned that Lancaster City is also using a tiered system based on actual impervious data for their stormwater utility fee. The Project Team recommends consistency among municipalities in the County to increase the probability of community support for a fee.

For all 310 non-residential parcels, it is recommended that a user fee be assessed based on the categorical average impervious surface. Research conducted by the Project Team found that many communities utilize a tiered system for residential and/or non-residential properties. For example, Lancaster City seeks to charge a typical commercial property $237 per quarter and increases its fee in increments of 1,000 *ft²* of impervious surface.[129] The Project Team recommends using a similar method for West Lampeter Township. Using a tiered system, the land area will be assessed based on categorical impervious surface estimates to calculate the property owner's bill. It is then recommended, following the first few years of utilizing a tiered system, the Township invest in getting more accurate impervious surface data for all non-residential properties and then assess the fee based on each property's total impervious surface.

[129] The Cost of Dealing with Stormwater, Lancaster City, Retrieved from: http://www.saveitlancaster.com/thecost/.

After conducting a sensitivity analysis[130] using various fee structures, the Project Team found that there are many options for the Township to set its initial rates. It is recommended that the ERU be set at 6,267 ft^2 since that number represents the average residential impervious surface in the Township[131]. Depending on how much the Township wants to continue utilizing general fund appropriations and grants to supplement the user fee, the rate should be set at a minimum of $15 per year per ERU. With so many questions still left unknown, it is recommended that the fee be reviewed and adjusted as needed after each year. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if it is implemented as recommended later in this document.

Estimated total revenue from all properties

The estimated total revenue generated is distributed between residential and non-residential properties and is calculated as follows:

Residential – The residential properties should be assessed a flat fee starting at $15 per year to generate the minimal revenue needed (based on Warwick Township's approach). The final rate chosen by West Lampeter Township should be consistent with the non-residential rate. Although many of the rate scenarios analyzed by the Project Team brought in adequate revenue to pay for stormwater-related expenses, it will be up to the Township to determine what should be supported through the dedicated fee and thus, where to set its rates. Table 55 shows the revenue yield for all rate scenarios developed by the Project Team.

Table 55: Annual Residential Property Revenue Generated (4,456 Residential Properties x Rate)

$15	$20	$25	$30	$35
$66,840	$89,120	$111,400	$133,680	$155,960
$40	**$45**	**$50**	**$55**	**$60**
$178,240	$200,520	$222,800	$245,080	$267,360
$65	**$70**	**$75**	**$80**	**$85**
$289,640	$311,920	$334,200	$356,480	$378,760

The residential fee is based on the assumption that an average property has approximately 6,267 ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The fee at which 1 ERU is set will be determined once the Township determines which costs should be supported using a dedicated user fee.

Non-Residential – According to data provided by the LCPC, there are 310 non-residential properties in West Lampeter Township. This data included the land area of each property, and the average

[130] A sensitivity analysis is defined as "a technique used to determine how different values of an independent variable will impact a particular dependent variable under a given set of assumptions." (Source: http://www.investopedia.com/terms/s/sensitivityanalysis.asp#axzz24Ck0N3rj). In order to determine the appropriate fee structure to raise the amount of revenue necessary to fund a comprehensive stormwater management program, the Project Team created different scenarios using different rates and ERUs, therefore conducting a sensitivity analysis.

[131] The average impervious surface for residential properties is based on LCPC data provided to the Project Team (the average sum of building footprint and driveways on residential properties), which was determined using GIS data based on aerial photography.

impervious surface data by categorical land use (industrial, commercial, community service, cultural activity, and agricultural) for all properties.

To determine each tier, the Project Team first took all non-residential properties by category to determine each property's estimated impervious surface using categorical averages. The average percent impervious surface by category is shown in Table 56 below.

Table 56: Average Percent Impervious Surface by Parcel Type

Parcel type	Average impervious surface (%)
Industrial	26.12
Commercial	44.53
Community Service	20.80
Cultural Activity	4.00
Agricultural	2.75

Each non-residential property was then organized by parcel type and each individual parcel's land area was multiplied by the appropriate average impervious surface percentage. For example, a commercial property that is 20,000 ft^2 has an estimated 44.53% impervious area. This property will then be billed for 9,060 ft^2 of impervious surface (20,000 ft^2 x 44.53%). Once the estimated impervious surface was calculated for each property, the Project Team conducted a statistical analysis to determine the tiered structure. A quartile system was utilized to divide the tiers into four equal groups. Table 57 shows the quartiles for the sum of all non-residential parcels using their estimated impervious surface calculations.

Table 57: Non-Residential Statistical Data to Determine Tiers

Quartiles	Quartile Impervious Surface Upper Bound (ft^2)	Tier (ft^2)
Percentage (25%) (Q1)	12,376	<=12,000
Median (Q2)	38,165	>12,000 & <=38,000
Percentage (75%) (Q3)	81,697	>38,000 & <=82,000
Upper Bound (Q4)	1,444,150	>82,000

Using this 4-tiered system, the Project Team then determined the number of properties that fell into each tier. Then, the upper bound of each tier for quartiles 1-3 was divided 6,267 ft^2 to determine the number of ERUs that parcels in each tier will pay. So that parcels in the fourth quartile (Q4) were not all paying as if they were the upper bound, the median of all parcels in Q4 (118,00 ft^2[132]) was divided by 6,267 ft^2 to determine the number of ERUs that parcels in Q4 will pay. The final ERU for each tier was then multiplied by the flat fee scenarios and then again by the number of parcels in each tier to determine the total revenue generated from non-residential parcels. Table 58 shows the summary of this analysis below.

[132] The median of all parcels in Q4 in West Lampeter Township is 118,281 ft^2, which was rounded to 118,000 ft^2 for ease of administration.

Table 58: Annual Non-Residential Property Revenue Generated by Tier

Tier (ft^2)	Number of parcels	ERU (Upper Bound ft^2/6,267 ft^2)	ERU x $ x Number of Parcels				
			$15	**$20**	**$25**	**$30**	**$35**
First tier: <=12,000	76	1.91	$2,183	$2,910	$3,638	$4,366	$5,093
Second tier: >12,000 & <=38,000	79	6.06	$7,185	$9,580	$11,975	$14,371	$16,766
Third tier: >38,000 & <=82,000	78	13.08	$15,309	$20,412	$25,515	$30,618	$35,720
Fourth tier: >82,000	77	18.83	$21,747	$28,996	$36,245	$43,494	$50,744
Total Non-Residential Revenue			$46,424	$61,899	$77,374	$92,848	$108,323
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/6,267 ft^2)**	**ERU x $ x Number of Parcels**				
			$40	**$45**	**$50**	**$55**	**$60**
First tier: <=12,000	76	1.91	$5,821	$6,549	$7,276	$8,004	$8,731
Second tier: >12,000 & <=38,000	79	6.06	$19,161	$21,556	$23,951	$26,346	$28,741
Third tier: >38,000 & <=82,000	78	13.08	$40,823	$45,926	$51,029	$56,132	$61,235
Fourth tier: >82,000	77	18.83	$57,993	$65,242	$72,491	$79,740	$86,989
Total Non-Residential Revenue			$123,798	$139,272	$154,747	$170,222	$185,697
Tier (ft^2)	**Number of parcels**	**ERU (Upper Bound ft^2/6,267 ft^2)**	**ERU x $ x Number of Parcels**				
			$65	**$70**	**$75**	**$80**	**$85**
First tier: <=12,000	76	1.91	$9,459	$10,187	$10,914	$11,642	$12,370
Second tier: >12,000 & <=38,000	79	6.06	$31,136	$33,531	$35,926	$3,832	$40,716
Third tier: >38,000 & <=82,000	78	13.08	$66,338	$71,441	$76,544	$81,647	$86,750
Fourth tier: >82,000	77	18.83	$94,238	$101,487	$108,736	$115,985	$123,234
Total Non-Residential Revenue			$201,171	$216,646	$232,121	$213,106	$263,070

The total revenue potential for all fee structures is shown in Table 59 below.

Table 59: Total Revenue Potential

	$15	$20	$25	$30	$35
Residential	$66,840	$89,120	$111,400	$133,680	$155,960
Non-Residential	$46,424	$61,899	$77,374	$92,848	$108,323
Total Revenue (1-year)	$113,264	$151,019	$188,774	$226,528	$264,283
Total Revenue (5-year)	$566,321	$755,094	$943,868	$1,132,641	$1,321,415
	$40	$45	$50	$55	$60
Residential	$178,240	$200,520	$222,800	$245,080	$267,360
Non-Residential	$123,798	$139,272	$154,747	$170,222	$185,697
Total Revenue (1-year)	$302,038	$339,792	$377,547	$415,302	$453,057
Total Revenue (5-year)	$1,510,188	$1,698,962	$1,887,735	$2,076,509	$2,265,283
	$65	$70	$75	$80	$85
Residential	$289,640	$311,920	$334,200	$356,480	$378,760
Non-Residential	$201,171	$216,646	$232,121	$213,106	$263,070
Total Revenue (1-year)	$490,811	$528,566	$566,321	$569,586	$641,830
Total Revenue (5-year)	$2,454,056	$2,642,830	$2,831,603	$2,847,931	$3,209,150

For the fee to be adequate as well as equitable, the total expenditures should as closely equal the total revenue as possible. The Township must first determine which expenditures should be included in the stormwater program budget, and which aspects of the program it wants to invest before assigning a fee structure.

It is important to note that if West Lampeter Township funds this program entirely by the user fee, then the fee would need to be set higher to pay for existing costs and the additional investments needed to support an adequate stormwater management program. It is highly recommended by the Project Team that the Township continue to supplement the program using general fund appropriations and grant funds where possible. This will decrease the user fee, minimizing any community backlash.

Lastly, it is difficult to estimate the effect of a credit system being imposed on the program. However, based on a credit system imposed in later years, revenues may decrease depending on the parameters of the system, how many residents participate, and to what extent. An estimate of the impact of these credits must be considered in future years, and the rate structure must be reevaluated to ensure that a credit system does not infringe on meeting revenue needs. It is unclear just how effective the credit system will be and there are no data that supports an average amount to consider. For more information about a credit system, please see Chapter 11.

Chapter 11: Credit System and Exemptions

Explanation of Credit System

A stormwater credit is a reduction in the portion of the stormwater user fee that is made available if certain approved practices are put in place to reduce the impact of stormwater generated on a property. Many stormwater utilities around the country are required by law to have some type of credit system in place; not all states have a legal requirement, however, and some communities prefer not to put a credit system in place.

There are many factors to take into account when a community decides whether or not to develop a credit program for their stormwater program. One reason some communities avoid a credit system is the administrative burdens associated with a fair, easily understood, and straightforward credit program. Another is the challenge of needing additional capacity to inspect installations and verify the information submitted on an application for credit is accurate. Lastly, it is difficult to gauge the level of credit system participation a community can expect and therefore equally difficult to determine the impacts a credit system may have on revenue generation. It takes several years of local data before a community is able to determine the difference in revenue collected with their program.

These challenges aside, there are also many reasons why communities move ahead with putting a credit program in place, even when not legally required by state law. To begin, the ability to reduce a property owner's stormwater charge helps to define these as a fee rather than a tax. In addition, credit systems give a community a way of encouraging behavior change on private property, because while local governments can go to great lengths to limit runoff on public lands, this will have little impact on a community's stormwater issues if it cannot be coupled with addressing runoff on private lands.

Rarely, if ever, is a credit program available at 100% reduction of the imposed fee. It is usually a certain percentage allowed for credit that correlates with the cost, size, and the degree of sophistication of the approved practice. Receiving credit is typically the responsibility of the property owner, who must apply for the credit. To be considered eligible for the credit, the property owner should be current in paying any tax and fee. A stated number of years that a credit is good are determined, as the general policy is that if the approved practice is not found to be well maintained or becomes non-functional during the eligible credit years then the credit can be terminated at any time. Supporting documentation is usually required when submitting an application and some communities charge a small processing fee to cover the cost of review, which may help offset the loss of revenue from imposing a credit system.

A clearly understood enforcement policy should be put in place right from the beginning of an approved credit program. For example, should any of the six municipalities decide to develop a credit program, each would reserve the right to review any application for accuracy and also have the right to inspect at any time. Appropriate action of consequences for failing to meet or maintain the approved practice should have some notification period to correct the deficiency followed by steps that are followed if not remedied within the appropriate amount of time.

A stormwater credit manual is usually developed and should be written to be easily understood. The same is done for the application process, thus limiting the time needed to answer questions regarding the program.

Types of Credits

Both residential and non-residential credits can be included in a credit system. Residential credits are made available to residents based on the installation of a typical BMP applicable to homes such

as rain barrels and rain gardens. Non-residential credits are made available to all properties that are considered commercial, multi-family, education, or industrial for the installation of typical non-residential BMPs such as permeable pavement, tree canopy improvements, and other practices that treat runoff on-site or slow volume and allow infiltration. Common credits are usually broken up into categories as follows:

- Quantity credits: Credit can be made available to properties that reduce the rate and/or volume of stormwater runoff from a property. An example of this would be a retention or detention pond, storm sewers, storm culverts, or storm channels.
- Quality credits: Credit can be made available to properties that reduce pollutants in stormwater runoff through the deployment of BMPs and help manage stormwater. An example of a BMP would be vegetative swales, pervious pavements, infiltration basins, or constructed wetlands.
- Outreach: Credit can be made available to those who undertake a specific action to educate or engage on stormwater management issues.
- Education: Credit can be made available to those such as public and private schools who wish to get credit for including stormwater education into the curriculum or through school programs. This is not a very common credit but may be helpful, along with outreach, to help meet one of the six MCMs required within the NPDES MS4 Phase II Permit.
- Financial hardship: Credit can be made available to those considered to be unable to pay the stormwater fee based on economic need or some other financial hardship. This is not always a set dollar figure threshold but often used as a case-by-case basis. Other credits for elderly may fall under this category as well.

Exemptions

Occasionally, stormwater utilities will offer an exemption to a property that will clear the property owner of paying all or some of their stormwater fee. The general rule of thumb is to proceed with caution when granting exemptions. The basis for recommending a dedicated user fee in the first place is because it is the fairest and most equitable method of calculating a charge for the service needed to manage stormwater. Exemptions can be considered discriminatory in nature if not considered justifiable and fair. The other reason for proceeding with caution on granting exemptions is that it may severely restrict or reduce estimated revenue needed to maintain a certain level of service.

The most commonly exempted properties include undeveloped lots, vacant land, or agriculture. Other considerations for possible exemptions include public roads maintained by the state and county (popular exemption with many states), non-profits, federal or state properties, and elderly or welfare recipients (financial hardship). Finally, properties that were already designed and developed with on-site runoff management practices in place might also be candidates for an exemption.

Chapter 12: Moving Towards Regionalization – Opportunities for Multi-Jurisdictional Collaboration

Adopting a More Regional Approach to Stormwater

There are many ways to define regionalization. In the water sector, the idea of regionalization typically refers to a number of water systems coming together to help solve water problems by managing it through a centralized system or a coordinated approach. When the Safe Drinking Water Act of 1974 (PL 93-523) was passed, an emphasis was placed on water supply professionals to seriously consider regionalization issues. The idea of regionalization through multi-jurisdictional collaboration is nothing new to the water service industry; it has been practiced effectively for years in the wastewater and drinking water sectors and is just moving towards being a proven practice for stormwater, particularly for small MS4 Phase II communities like the ones in this study. Adopting aspects of regionalization can definitely be the right approach and perfect time for many Lancaster County municipalities to work towards as they grapple with rising costs and increased regulations to manage.

A regional approach to stormwater for the six municipalities does not necessarily mean the Project Team recommends one centralized authority be charged with managing all aspects of these distinct stormwater systems. Instead, there are ways to work collaboratively and restructure aspects of each stormwater program so that all could see efficiencies gained and total costs for managing stormwater reduced over time.

The differences within each of the community's size, location, overall need, and current program structure does not lend itself well right now for the Project Team to recommend all six municipalities work jointly on all aspects of their program. There are several areas, however, that certain aspects of regionalization, or at least a more formal collaboration, could prove very effective as follows:

- **Capacity**: Sharing a stormwater coordinator to help with tracking, reporting, outreach, and grant making is the cheapest and most effective thing that could be done by the six municipalities. Each would share in the cost yet all could reap in the many benefits that would more than pay for itself in a short period of time.
- **Education:** Sharing resources such as written materials, school curriculum, slogans, displays, etc. can make education among citizens and businesses very easy to achieve.
- **Outreach/Public events:** Holding events that include stormwater as part of the promoted activity will make meeting MCMs 1 and 2 simple and will ensure sending a uniform message about proper management of stormwater across the municipal boundaries, resulting in a more engaged and informed community.
- **Written material:** Some municipalities have already developed or are working on written materials. Collaboration would help to expand that material to those who are weak in this area and may be stronger in other areas.
- **Equipment:** Not all equipment can be shared but also not all municipalities can afford to buy the medium to large equipment necessary to perform regular maintenance. There already is some informal sharing taking place with certain equipment among a few municipalities. Others expressed interest in sharing as needed but with an agreement in place to fix anything that may break during usage. Others were willing to share but at a reduced cost for rental in order to help pay for the larger equipment.

- **Develop procedures and shared documents:** As some municipalities work towards improving their internal tracking, reporting, documentation, and procedures, others who do not have the capacity or understanding of this could benefit from being part of a group that has such systems already set up.
- **Monthly meetings, either formal or informal:** One of the best ways that all six municipalities can continue their growth in managing stormwater is by maintaining the relationship brought on by this study. There was always a good turnout at meetings arranged by the Project Team and can continue beyond this grant. The purpose of the regular meetings would be to share information, bring in speakers, compare documents and materials, and discuss ways to continue to collaborate. The meetings do not need to be lengthy, but can go a long way to help each municipality improve its program, regardless of the size of the municipality.
- **Trainings:** As mentioned earlier in this report, training opportunities for all six municipalities should continue to be explored. Collaboration allows this to be practical for a larger audience as well as economical if there is a cost associated with the training. If DVD training videos need to be purchased, the cost is significantly less when the total purchase is split between six localities.
- **Grants:** With state and federal funding being limited in recent years and highly competitive, grant makers find collaboration between multiple jurisdictions the most attractive way to utilize their funding. By applying for grants together, the six municipalities have significantly increased their chances of being successful.
- **Contractor and vendors:** It is cheaper to design and construct a stormwater project when the cost is shared among several municipalities. This can also be considered for monitoring, inventories, and installation of BMPs.
- **Studies**: This report is a perfect example of ways in which working together can benefit multiple jurisdictions when it was not financially possible for only one. An example is the Lititz Borough and Warwick Township TMDL Plan conducted by LandStudies, Inc. Many other studies that impact a municipality's stormwater program can be possible if there is collaboration.

Other Potential Benefits of Collaboration

Clearly, there are many ways in which the six municipalities can benefit and significantly strengthen their stormwater program by continuing to collaborate. The Project Team observed an abundance of local resources that were, for the most part, underutilized. These included resources provided by the LCCD, watershed organizations, neighboring municipalities who share more than just boundaries, school programs and activities, as well as the Boy Scout and Girl Scout troops. The best example of effective utilization of these resources was displayed by Warwick Township. Even with their success at utilizing local resources, there would be even more efficiencies to be gained had Warwick Township done this collectively with other municipalities. That is now clearly possible as a follow-up to this study and would require very little effort on any one municipality's part to make happen.

Chapter 13: Conclusions and Recommendations

Moving Beyond 2013

All six municipalities were very different in the way they currently approach stormwater, yet they all had commonalities that tied them together in one way or another. The strongest connection all six had was the determination to improve the way they managed stormwater and elevate it to a high priority for their jurisdiction. Each was committed to being more proactive beyond 2013 and understood there were several deficiencies within their current stormwater program, although the severity of deficiency varied somewhat drastically.

The internal structure, size, geographic makeup, and age of all of their systems made each municipality very unique. The Project Team strongly believes that the analysis and recommendations made in this report will stand as a case study to many other similar communities both within Pennsylvania and beyond who will easily identify with one or more of the communities analyzed in this report. Becoming a role model for others was always one of the intentions of this project and the participating municipalities chosen to partake in this study did an exemplary job of sharing their information with others. The path towards implementing a successful stormwater program for all six participating municipalities will not end with this report. In fact, the road to their success is only just beginning. By agreeing to share their valuable time and information throughout the year, they have all taken the first steps toward having a well-managed and comprehensive program. Upon completion of this study, the next step will be to take the critical analysis and recommendations provided in this report and give it the evaluation and consideration necessary to achieve success beyond 2013.

Each municipality recognized the importance of meeting their NPDES Phase II program requirements, but their participation in this study went beyond simply wanting to be in compliance with state and federal regulations. Improving water quality for a healthier community and environment, reducing flooding, and managing their aging assets before a system failure may occur were also very strong drivers for all involved.

Although the municipalities were not universal in their support of implementing a dedicated fee to pay for current and future stormwater needs, all were open to the need to restructure the way they managed their stormwater program and improve the use of available but limited resources.

As with the many differences found among each municipality on how they managed stormwater, it was important that the Project Team's recommendations reflected those differences and accounted for the uniqueness of each location. There was no "one-size-fits-all" approach that could be recommended for all of them. There were, however, important areas where programmatic improvements could be made for each location. Some of these improvements required little to no dedicated funding but could be accomplished by simply improving the organizational process of tracking, reporting, and documenting stormwater internally. These improvements would help to create greater efficiency within future stormwater program activities. There were also several opportunities where collaboration between municipalities could help achieve even greater savings, reduce costs, and bring overall improvements within all of their programs.

Out of the six municipalities, only two, Manheim and Warwick Townships, are at the point where a dedicated funding mechanism are deemed appropriate, necessary, and highly recommended. In fact, the timing of this recommendation is considered perfect since both townships have a solid grasp of long-term needs and are able to anticipate future costs and prioritize capital improvement projects as well as assess capacity needs for successful program implementation. With the start of the new NPDES Phase II permit being issued along with the future state and federal regulations, the

sooner a process is put in place, the more effective both townships will be in meeting long term obligations beyond 2013.

Lititz Borough is one municipality that lies on the cusp between the Project Team recommending a dedicated funding mechanism and waiting until project costs are more available. As outlined in Chapter 6, the Borough's current stormwater program is certainly not at the same level as Manheim and Warwick Townships, but Lititz Borough does have significant efficiencies that could be gained if they follow a more progressive path that further aligns themselves with stormwater projects and activities in Warwick Township. Clearly, not all stormwater program activities can be merged but for those that arise, having a dedicated funding stream equal or greater to Warwick Township will allow Lititz Borough to take advantage of joint projects, which will lower costs and promote programmatic efficiency across the Borough. Without more dedicated funding for stormwater, the opportunities for partnering and reaping the future benefits achieved by Warwick Township, Lititz Borough will fall significantly behind Warwick in meeting future stormwater obligations.

The remaining three municipalities – West Lampeter and East Cocalico Townships and Mount Joy Borough – all have several immediate opportunities to achieve some level of stormwater improvements as referenced in their individual chapters in this report. It is strongly advised that they give serious consideration to implementing a dedicated fee in the near future to ensure there have additional resources and capacity available to get them to where they want to be in the future. By following the example of Warwick Township, a small fee can begin to move them in the direction they want to be through the next permit cycle and beyond. There is definitely a need for more data and further cost analysis to be done before real costs estimates can be calculated, so starting with some funding should allow work to be completed and further analysis to be conducted on anticipated needs.

Each municipality has an opportunity to continue to learn from one another and can begin to collaborate on several important areas of their program as outlined in Chapter 12.The benefits of collaboration will bring future stormwater program costs down, reduce the need for significant additional capacity, create overall efficiencies within the program, help with reporting and compliance, put all in a better position to receive grant funding, and more importantly, strengthen Lancaster County as a whole by being the regional example of how to achieve sustainable stormwater management beyond 2013.

Project Team

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Hired in 2005 as the EFC's Agricultural Program Leader, Joanne Throwe became Assistant Director in 2007, Associate Director in 2008, and Director in 2009. In addition, she completed an 18-month assignment working with USDA/CSREES as shared-faculty to assist in the coordination of special agriculture projects. Ms. Throwe works with communities in the Mid-Atlantic region implementing innovative financing solutions for environmental protection. Her work experience includes extensive knowledge about agriculture, green infrastructure, biofuels, ecosystem services and solid waste management. Prior to joining the EFC, Ms. Throwe spent several years as a Development Resource Specialist at USDA's Foreign Agriculture Service and two years as an Agriculture Extension Agent for Peace Corps in the South Pacific. She holds a M.A. in Public Policy and Private Enterprise from the University of Maryland.

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Monica Billig joined EFC in August 2010 as a program/graduate assistant at the start of her graduate school career at the University of Maryland. Since she received her Master in Public Policy at the University of Maryland in May 2012, Ms. Billig joined the EFC full time as a Program Manager, opening up a Pennsylvania satellite program office, located in Lancaster, PA. In this role, Ms. Billig works with communities in Pennsylvania to help finance environmental and sustainable development initiatives, with a focus on stormwater management. Prior to joining EFC, Ms. Billig worked as a Research Associate at edCount, LLC, a Washington, DC based education policy consulting firm specializing in policy related to assessments, standards, and accountability. Ms. Billig received her B.A. in economics and a minor in mathematics from Smith College in Northampton, MA.

Michelle Weber, Project Assistant – mmweber@umd.edu

Michelle was hired in September 2012 as a graduate assistant. She recently graduated with a Master of Science from the Department of Environmental Science & Technology at the University of Maryland concentrating in Ecological Technology Design. She also received a certificate in Ecological Economics from the University of Maryland School of Public Policy. Her master's research involves preforming an economic feasibility study of a novel best management practice for nutrient reduction in the Chesapeake Bay watershed. Ms. Weber received a B.A. in biology and a minor in business from the University of Texas at Austin in 2011.

Acknowledgements

Special thanks to the Lancaster County Clean Water Consortium for its sponsorship in working with the six municipalities. Their continued support strengthens the collaboration among municipalities across Lancaster County, helping improve water quality in Lancaster's local streams and tributaries.

Special thanks to **Michelle Arthur**, EFC Project Assistant, for general project support.

Special thanks to **Toni Ames**, EFC Program Assistant, for help in coordinating outreach events and project materials.

Special thanks to the East Cocalico, Manheim, Warwick, and West Lampeter Township and Lititz and Mount Joy Borough staff for their collaboration, support, and willingness to participate in this study and provide the Project Team with relevant materials and data.

Special thanks to **Steve Gochenaur**, LCPC GIS Analyst, for sharing parcel-specific data on each municipality and taking the time to help the Project Team fully understand the data provided.

Special thanks to **Peggy Weickert**, University of Maryland graphic designer, for helping the Project Team create its project logo.

Special thanks to Lancaster City for its willingness to share information and project logo.

Appendix A: Outreach and Marketing Timeline

Lancaster County Municipal Stormwater Financing Initiative

Outreach & Marketing Strategy: Timeline

December 4, 2012

Where: Lancaster County, Pennsylvania

When: October 1st, 2012 – September 31st, 2013

Partners: UMD Environmental Finance Center, Lancaster County Clean Water Consortium (LCCWC), East Cocalico Township, Lititz Borough, Manheim Township, Mount Joy Borough, Warwick Township, and West Lampeter Township, Lancaster City

What: A public outreach, education and marketing plan that communicates stormwater issues in a collaborative manner, including water quality/quantity, infrastructure problems, and solutions for sustainable financing across municipalities in Lancaster County, PA.

Why: To improve stormwater and water quality conditions in across municipalities, comply with Municipal Separate Storm Sewer Systems (MS4) permit and create a dedicated, reliable funding source for infrastructure, operations, maintenance, and compliance needs.

Audience: Citizens, businesses, elected officials

Ongoing Activities

- Marketing activities listed below may be on-going throughout the project as appropriate or opportunities arise:
    - TV, radio, newspaper ads or announcements
    - Magazine articles regarding stormwater efforts in Lancaster County
    - Include stormwater project and information on individual municipality and county website and/or other web-based media
    - Presentations to HOAs, nonprofits, and other groups
    - Highlighting projects spanning the County
    - Provide fliers or other information on stormwater at library, Farmers Market, town meetings, and other locations as appropriate
    - Organize collaborative meetings that include all municipalities
    - Disseminate outreach materials (second Fridays in Lititz Borough, bi-annual public outreach event in West Lampeter Township, any other events specific to municipalities)
    - Distribute stormwater materials at LCCD meetings as well as Lancaster Inter-Municipal Committee (LIMC)
    - Maintain presence at LCCWC meetings as appropriate – present all updated materials (presence at education events such as envirothon?)
    - Disseminate materials at municipal-level conservation organizations:
        - West Lampeter Township: Recycling Committee, Pequea Creek Watershed Association
        - East Cocalico Township: Cocalico Creek Watershed Association

- Warwick Township: Lititz Run Watershed Association, Boy Scouts
- Mount Joy Borough: Main Street Mount Joy, Chiques Creek Watershed Alliance, Donegal Chapter of Trout Unlimited
- Manheim Township: Little Conestoga Watershed Alliance, Lancaster Area Sewer Authority, Habitat Manheim Township
- Lititz Borough: Lititz Run Watershed Association

October 2012

- Create factsheet to distribute to each municipality, West Lampeter Fair, Lebanon/Lancaster Watershed Forum, and LCCWC

November 2012

- Develop logo for municipal outreach materials
- Develop overall outreach and education messaging and marketing strategy for the public and events, to include multi-purpose two-pager on this project
- Meet with all municipalities & LCCWC (November 20th) to finalize outreach and marketing strategy timeline and brainstorm outreach opportunities and materials

December 2012

- Develop finalized list of key stakeholders in community – collect list of individuals from each municipality (this list is already being developed based on initial one-on-one meetings, see last page of this document)
- Reach out to Lancaster City & other key organizations conducting public outreach in community already (Live Green, LIMC, etc.)
- Finalize logo

January – July 2013

- Present stormwater project to key stakeholders (target audience based on municipality feedback)
- Brief municipalities on progress and outreach efforts as appropriate (bi-monthly)
- Have presence at local events – disseminate outreach materials, educate community about stormwater project and general issues
- Meet with elected officials as municipalities see appropriate
- Develop magnet w/ SW logo for public works trucks
    - Develop materials or hold education session for truck drivers
- Meet with Superintendent or Cynthia Burkhart to incorporate SW education into schools
- Present SW education material at Lancaster Farmland Trust meeting

August 2013

- Send draft recommendations to stakeholders for review

September 2013

- Deliver final report

Outreach List, by municipality

West Lampeter Township:

- Pequea Creek Watershed Association (contact: Kara Kalupson)
- Recycling Committee (contact: Ken Kulakowsky)
- Farmers (contact: Donald Herr)
- Willow Valley
- Lampeter-Strasburg School District
- YMCA

East Cocalico Township:

- Cocalico Creek Watershed Association (contact: Jay Synder)
- Conservation District (contact: Rebecca Buchanan)
- Ag Commission
- Zoning Board
- Cocalico School District

Warwick Township:

- Lititz Run Watershed Association (contact: Dan Zimmerman)
- Boy Scouts
- Water & Sewer Authority
- Donegal Chapter of Trout Unlimited (contact: Greg Wilson)
- Warwick School District

Mount Joy Borough:

- Main Street Mount Joy
- Chiques Creek Watershed Alliance
- Donegal Chapter of Trout Unlimited (contact: Wayne Boggs)
- Donegal School District

Manheim Township:

- Little Conestoga Watershed Alliance (contact: Don Nazario)
- Lancaster Area Sewer Authority (contact: Mike Kyle)
- Lancaster County Solid Waste Management Authority (LCSWMA) (contact: Jim Warner)
- Habitat Manheim Township
- Press (contact: Dave O'Conner)
- Manheim Township School District

Lititz Borough:

- Lititz Run Watershed Association (contact: Dan Zimmerman)
- Main Street Lititz (contact: Kelly Withum)
- Lititz Borough Flood Control Committee
- Warwick School District

Appendix B: Logos

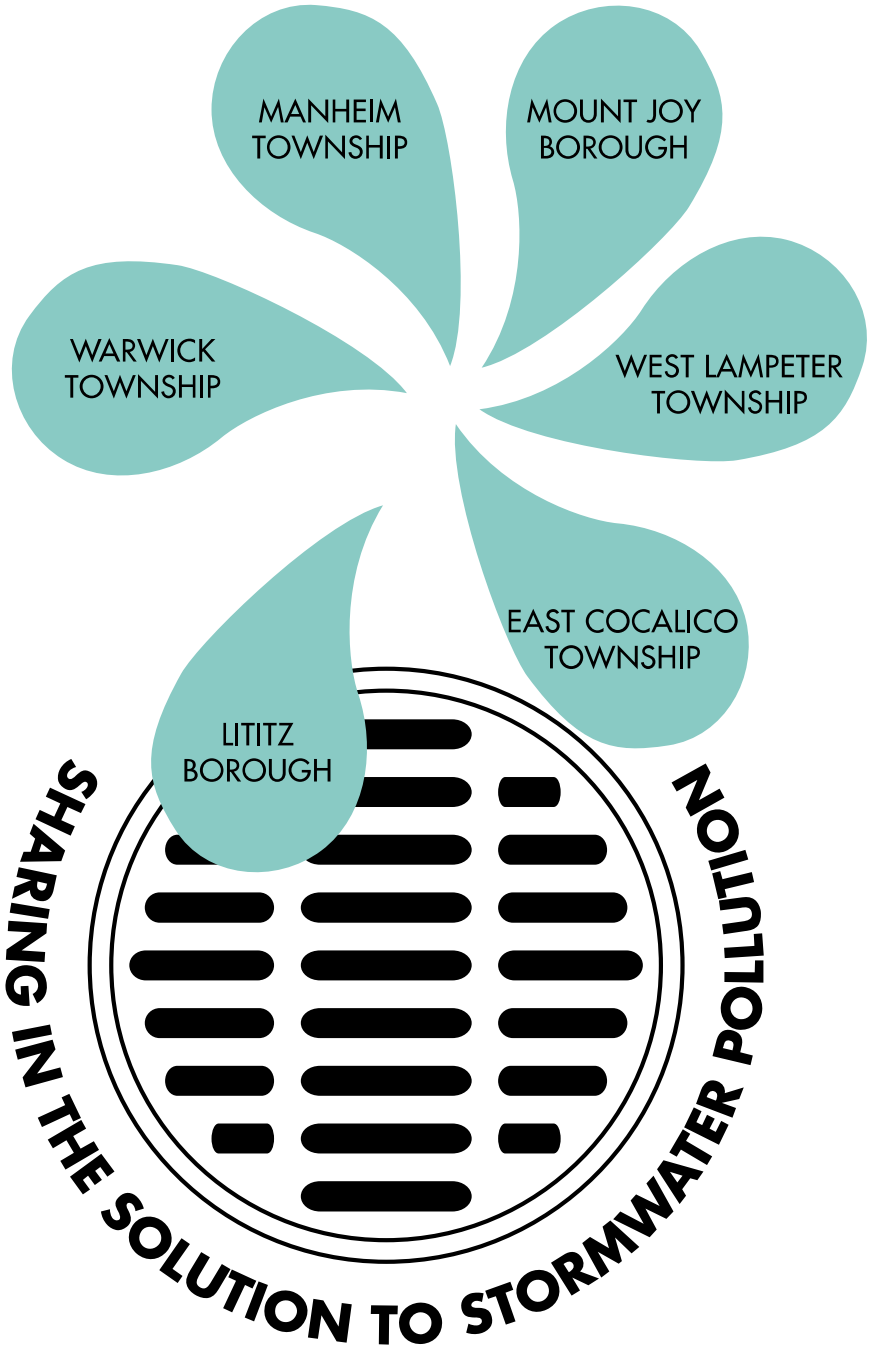
Original Lancaster City Stormwater Logo

SAVE IT!

YOUR WATER.
YOUR MONEY.
YOUR CITY.

saveitlancaster.org

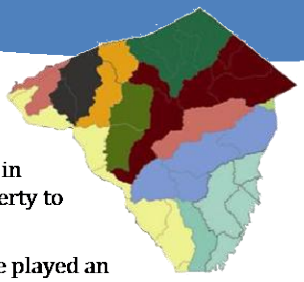
Project logo developed from Lancaster City's "Save It" stormwater campaign



Appendix C: Fact Sheets

General Stormwater Factsheet

STORMWATER MANAGEMENT IN LANCASTER COUNTY



Why is stormwater management important in Lancaster County?

- Heavy rains have in the past, and will continue in the future to endanger livelihoods – from property to crops to lives.
- The Susquehanna River and its tributaries have played an important part in Lancaster County's economy and culture; badly managed stormwater runoff pollutes the water and threatens the communities utilizing these waterways.

What can WE do to minimize stormwater?

- Limit the amount of solid surfaces or use permeable materials.
- Allow buffers of vegetation alongside waterways to filter and slow runoff, and plant native trees, shrubs and groundcover to absorb rainwater.
- Consider a rain garden or rain barrel to manage runoff on your property.
- Find ways to reduce the amount of litter, sediment, and other debris entering waterways.
- Use natural alternatives to chemical fertilizers and pesticides.

What are the efforts of the Lancaster County Municipal Stormwater Financing Initiative?

- The National Fish & Wildlife Foundation (NFWF) provides resources to communities engaged in developing and enhancing their sustainable stormwater management program. Through NFWF, the Lancaster County Clean Water Consortium (LCCWC) is sponsoring six municipalities in Lancaster County – **Lititz and Mount Joy Boroughs and East Cocalico, Manheim, Warwick, and West Lampeter Townships** – to work with the Environmental Finance Center (EFC) at the University of Maryland to find long-term solutions to managing stormwater.
- The EFC is working with municipal staff to ensure each municipality has a stormwater program that addresses local infrastructure and regulatory needs in a long-term and sustainable manner.
- The EFC will provide financing recommendations designed to support stormwater program needs in a way that reflects the nature and characteristics of each municipality.

Want to learn more or share your thoughts on the Lancaster County Municipal Stormwater Financing Initiative?

CONTACT: Monica Billig
Environmental Finance Center, Pennsylvania Satellite Office
mbillig@umd.edu; 240-786-8664

Detailed Residential Handout

Example shown below is for Manheim Township. Each municipality received an individualized handout

HOMEOWNER HANDOUT: RESIDENTIAL STORMWATER BEST MANAGEMENT PRACTICES

Manheim Township
Lancaster ·1729· County
A Healthy Community

SHARING IN THE SOLUTION TO STORMWATER POLLUTION

How do residential areas contribute to stormwater?

- Residential areas are composed of impervious areas—from roofs to driveways—that prevent stormwater from infiltrating the soil
- Many lawn care practices such as fertilizing and bagging clippings add to the pollution found in stormwater

What can homeowners in Manheim Township do to help?

Install a Rain Barrel

In a typical rain event (1 inch in 24 hours), over 700 gallons of water can run off the roof of an average home. Rain barrels help intercept and store rain water from roofs. The captured rainwater may then be used to water your lawn.

Rain barrels are easy to install and are an inexpensive way to help manage stormwater in your community. Residents simply connect their rooftop downspout to a barrel and can install a garden hose for irrigation. Rain barrel costs generally range between $100-$200. Barrel costs can be greatly offset by purchasing recycled barrels.

Take care of your lawn

When rain runs off of lawns and into the storm sewer, it is also taking pesticides, fertilizers and sediment along with it. These harmful substances then flow directly into local waterways and diminish water quality. Some simple practices for homeowners that decreases the amount of lawn-related contaminates in stormwater include:

- Do not apply fertilizer or pesticides to dormant lawns, frozen ground, or before heavy rain
- Test your soil to see what nutrients are needed and how much
- Use slow-release organic fertilizers that are less likely to enter stormwater
- Mulch your grass clippings in order to reduce the need for additional fertilizer

For more information, visit stormwaterpa.org or contact your local municipal office

EFC

Want to learn more about the Lancaster County Municipal Stormwater Financing Initiative?

Contact Monica Billig at 240-786-8664 or mbillig@umd.edu *or* contact your local municipal office at 717-569-6408 or visit www.manheimtownship.org/

Project partners include:

Environmental Finance Center
Lancaster County Clean Water Consortium
National Fish & Wildlife Foundation
West Lampeter Township
Mount Joy Borough
East Cocalico Township
Warwick Township
Lititz Borough
Manheim Township

Detailed Soil and Lawn care Handout

Document was created at the request of Manheim Township's Commissioners.

HOMEOWNER HANDOUT: LAWNCARE BEST MANAGEMENT PRACTICES

Manheim Township
Lancaster -1729- County
A Healthy Community

Having a lawn that is green in terms of aesthetics and environmental stewardship is possible by implementing certain best management practices for lawn care.

MANHEIM TOWNSHIP
MOUNT JOY BOROUGH
WARWICK TOWNSHIP
WEST LAMPETER TOWNSHIP
EAST COCALICO TOWNSHIP
LITITZ BOROUGH
SHARING IN THE SOLUTION TO STORMWATER POLLUTION

Test your soil

In order to know what nutrient is needed for your lawn and to avoid the addition of excess nutrients, it is important to have your soil tested. Soil testing is available through the Pennsylvania State University Agricultural Analytical Services Laboratory (http://www.aasl.psu.edu/) and other private labs. A mail-in soil testing kit may be picked up at the Lancaster County Cooperative Extension office located at 1383 Arcadia Rd, Room 140, Lancaster, PA 17601 for $9 per test.

Understanding the numbers

Once you understand what your soil needs, it is important to choose a fertilizer with the correct amount of nutrients. Fertilizers come in different ratios of nitrogen, phosphorus, and potassium indicated on the label as N-P-K. For example, if your soil tests indicate high phosphorus, look for a fertilizer that has no or low phosphorus such as a 1-0-1.

Choose the right fertilizer

There are two main types of fertilizers that homeowners may choose from: water soluble and water insoluble. Solubility corresponds to the form of nitrogen and how it is released.

Water soluble fertilizer or *fast-release* fertilizer readily dissolves in water and is taken up immediately by grass. Fast-release fertilizer is completely released within 2 weeks and requires subsequent reapplication of fertilizer.

Water insoluble fertilizer or *slow-release* fertilizer does not dissolve in water and releases nitrogen slowly over an 8 to 10 week period. While slow-release fertilizer is more expensive, it saves time in terms of reapplication over the growing season. In addition, slow-release fertilizer is less likely to be washed away from a lawn during a storm event and end up in a local waterway. Common fertilizer brands such as Scotts, Osmocote, Schultz, Miracle-Gro and Vigoro all offer slow-release versions and may be found in your local home gardening retailer.

All about timing

For cooler climates, the best time to apply is in the spring and fall and approximately 1-2 lbs of nitrogen per 1000 square feet for slow-release fertilizer. Focus on the fall fertilization to encourage strong root growth and spring feedings may not be needed. A strong, healthy lawn will discourage the growth of weeds, minimizing the need for pesticides and herbicides.

For more information, visit stormwaterpa.org or contact your local municipal office

EFC

Want to learn more about the Lancaster County Municipal Stormwater Financing Initiative?

Contact Monica Billig at 240-786-8664 or mbillig@umd.edu *or* contact your local municipal office at 717-569-6408 or visit www.manheimtownship.org/

Project partners include:

Environmental Finance Center
Lancaster County Clean Water Consortium
National Fish & Wildlife Foundation
West Lampeter Township
Mount Joy Borough
East Cocalico Township
Warwick Township
Lititz Borough
Manheim Township

Appendix D: Public Works Department Script

Stormwater Talking Points for PWD Employees

Developed by the Environmental Finance Center (EFC) at the University of Maryland

December 5, 2012

What does the decal represent?

This logo represents the six different municipalities in Lancaster County – East Cocalico Township, Lititz Borough, Manheim Township, Mount Joy Borough, Warwick Township, and West Lampeter Township – who are working collaboratively on a stormwater feasibility study. This study is being conducted by the Environmental Finance Center, and will result in recommendations to each municipality on ways to more effectively manage and finance stormwater.

What is stormwater?

Stormwater (commonly known as runoff) is precipitation caused from storm or snowmelt events that flows over impervious surfaces (i.e. pavement, sidewalks, tennis courts, etc.), picks up pollutants, and is not allowed to penetrate into the ground.

Why should we care?

Untreated stormwater carries pollutants into waterways, such as the Susquehanna River, and can also cause flooding issues. By effectively managing stormwater we can help protect properties and water quality.

How can you get more involved?

Talk to your councilperson or local municipal staff, consider installing a rain barrel or rain garden on your property, and check out the local resources within your community that address stormwater.

If you are interested in learning more about the specific study being undertaken in your community, contact Monica Billig at the Environmental Finance Center. Ms. Billig's contact information is: 240-786-8664 (phone); mbillig@umd.edu (email).

Appendix E: Outreach Event Pictures

Warwick Township Watershed Day

May 14th, 2013

Students learning about stream health from a LCCD representative

Students engaging in discussion with an environmentalist

Students planting trees

Lititz Borough 2nd Friday

June 14th, 2013

PWD truck with project logo and banner

Children playing fishing game

PWD staff explaining their new truck to the public

Chiques Creek Watershed Expo

June 19th, 2013

EFC's booth at the event

The LCCD conducting outreach, and receiving some local media attention

A Liederkranz representative sharing information with attendees about the site's improvement project

Mount Joy Borough Rain Garden Volunteer Planting Day

August 10th, 2013

Appendix F: Manheim Township Budget Documents

Manheim Township Stormwater Budget, Years 1-5

Total Expenditures	Year 1	Year 2	Year 3	Year 4	Year 5
Total Operating Expenditures	$872,695	$894,482	$916,814	$939,705	$963,167
Total Capital Expenditures	$1,168,250	$770,250	$1,160,250	$754,750	$1,644,873
Total Expenditures	**$2,040,945**	**$1,664,732**	**$2,077,064**	**$1,694,455**	**$2,608,040**

Operating Expenditures							
G/L Acct No.	**Account Description**	**Notes**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Salaries:							
01-431-103.00	Director (25%)	Existing position	$22,294	$22,851	$23,422	$24,008	$24,608
01-431-105.00	Clerical (25%)	Existing position	$10,763	$11,032	$11,307	$11,590	$11,880
01-431-115.00	Superintendent	New position	$68,000	$69,700	$71,443	$73,229	$75,059
01-431-116.00	Engineer (25%)	Existing position	$24,344	$24,952	$25,576	$26,216	$26,871
01-431-117.00	Maintenance	New position -- includes 4 maintenance + crew leader	$225,000	$230,625	$236,391	$242,300	$248,358
01-431-120.00	Overtime		$5,125	$5,253	$5,384	$5,519	$5,657
		Sub-Total	$355,525	$364,413	$373,523	$382,862	$392,433
Benefits:							
01-431-201.00	FICA/Medicare		$28,000	$28,700	$29,418	$30,153	$30,907
01-431-202.00	Workers Compensation		$8,800	$9,020	$9,246	$9,477	$9,714
01-431-203.00	Unemployment		$1,400	$1,435	$1,471	$1,508	$1,545
01-431-204.00	Health Insurance		$91,100	$93,378	$95,712	$98,105	$100,557
01-431-204.20	Disability Insurance		$2,650	$2,716	$2,784	$2,854	$2,925
01-431-205.00	Life Insurance		$530	$543	$557	$571	$585
01-431-206.00	Retirement		$59,000	$60,475	$61,987	$63,537	$65,125
01-431-207.00	Uniform Allowance		$1,200	$1,200	$1,200	$1,200	$1,200
01-431-209.00	Education		$1,000	$1,025	$1,051	$1,077	$1,104
		Sub-Total	$193,680	$198,492	$203,424	$208,480	$213,662
Materials & Supplies:							

Operating Expenditures							
G/L Acct No.	Account Description	Notes	Year 1	Year 2	Year 3	Year 4	Year 5
01-431-301.00	Postage		$256	$263	$269	$276	$283
01-431-302.00	Office Supplies		$513	$525	$538	$552	$566
01-431-303.00	Computer Supplies		$461	$473	$485	$497	$509
01-431-304.00	Photographic Supplies		$205	$210	$215	$221	$226
01-431-305.00	Subscriptions & Publications		$513	$525	$538	$552	$566
01-431-307.00	Storm Drain Repair Material		$15,375	$15,759	$16,153	$16,557	$16,971
01-431-308.00	Tools & Safety Equipment		$7,688	$7,880	$8,077	$8,279	$8,486
01-431-319.00	Uniforms		$820	$841	$862	$883	$905
01-431-320.00	Minor Equipment Purchases		$10,250	$10,506	$10,769	$11,038	$11,314
		Sub-Total	$36,080	$36,982	$37,907	$38,854	$39,826
Contracted Services:							
01-431-406.00	Engineering Fees	CS Davidson contract	$61,500	$63,038	$64,613	$66,229	$67,884
01-431-409.00	Printing	Educational materials	$1,538	$1,576	$1,615	$1,656	$1,697
01-431-410.00	Contracted Services	Sink hole repairs based on historical average	$51,250	$52,531	$53,845	$55,191	$56,570
01-431-413.00	One Call Systems Fees		$4,613	$4,728	$4,846	$4,967	$5,091
01-431-414.00	Street Sweeping	Twice per year	$51,250	$52,531	$53,845	$55,191	$56,570
		Sub-Total	$170,150	$174,404	$178,764	$183,233	$187,814
General Expenses:							
01-431-501.00	Advertising		$2,563	$2,627	$2,692	$2,760	$2,829
01-431-502.00	Dues, Conference, Train & Cert		$1,538	$1,576	$1,615	$1,656	$1,697
01-431-510.00	Telephone		$2,050	$2,101	$2,154	$2,208	$2,263
01-431-518.00	Equipment Rental		$2,563	$2,627	$2,692	$2,760	$2,829
01-431-520.00	Miscellaneous		$2,563	$2,627	$2,692	$2,760	$2,829
		Sub-Total	$11,275	$11,557	$11,846	$12,142	$12,445
Vehicle Operations:							
01-431-601.01	Gas & Oil		$25,625	$26,266	$26,922	$27,595	$28,285

Operating Expenditures							
G/L Acct No.	**Account Description**	**Notes**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
01-431-601.02	Tires & Tubes		$10,250	$10,506	$10,769	$11,038	$11,314
01-431-601.03	Vehicle Maintenance		$30,750	$31,519	$32,307	$33,114	$33,942
01-431-605.00	Minor Parts		$7,688	$7,880	$8,077	$8,279	$8,486
01-431-608.00	Attachment Repairs		$2,563	$2,627	$2,692	$2,760	$2,829
		Sub-Total	$76,875	$78,797	$80,767	$82,786	$84,856
Facilities Maintenance:							
01-431-701.00	Electric		$2,563	$2,627	$2,692	$2,760	$2,829
01-431-702.00	Heating		$8,713	$8,930	$9,154	$9,382	$9,617
01-431-703.00	Water/Sewer		$1,230	$1,261	$1,292	$1,325	$1,358
01-431-704.00	Trash Removal		$1,538	$1,576	$1,615	$1,656	$1,697
01-431-706.00	Building Maintenance		$3,588	$3,677	$3,769	$3,863	$3,960
01-431-707.00	Grounds Maintenance		$2,563	$2,627	$2,692	$2,760	$2,829
		Sub-Total	$20,193	$20,697	$21,215	$21,745	$22,289
Equipment Maintenance:							
01-431-801.00	Radio Maintenance		$513	$525	$538	$552	$566
01-431-802.00	Computer Operations/Maintenance		$1,025	$1,051	$1,077	$1,104	$1,131
01-431-806.00	Shop Equipment & Tool Repairs		$3,588	$3,677	$3,769	$3,863	$3,960
01-431-807.00	Barriers & Rails		$1,230	$1,261	$1,292	$1,325	$1,358
01-431-812.00	Minor Equipment		$2,563	$2,627	$2,692	$2,760	$2,829
		Sub-Total	$8,918	$9,140	$9,369	$9,603	$9,843
		Total Operating Expenditures	**$872,695**	**$894,482**	**$916,814**	**$939,705**	**$963,167**

Capital Expenditures						
Account Description	**Notes**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Equipment Start-up Costs:						
Superintendent Vehicle		$28,000	-	-	-	-
Pickup Truck		$22,000	-	-	-	-
Utility Truck		$60,000	-	-	-	-
Vactor Truck	in CIP	-	-	$275,000	-	-
Television Truck	Could set up contractual, pay-as-you-go to share with neighboring municipalities	$135,000	-	-	-	-
Street Sweeper	in CIP	-	-	-	$165,000	-
Utility building	$7 million for new building; estimate $650,000 to convert building 2 in interim	$650,000	-	-	-	-
Computers	Assume purchase every 5th year	$5,000	-	-	-	$5,519
Cameras	Assume purchase every 5th year	$1,000	-	-	-	$1,104
	Sub-Total	$901,000	$0	$275,000	$165,000	$6,623
Capital Improvement Plan (CIP) Projects:						
Community Park	Tree Planting	-	-	-	$10,000	-
Landis Woods	Tree Planting	$10,000	-	-	-	-
Destination Playground	Tree Planting	-	$15,000	-	-	-
Overlook Community Campus	Tree Planting	-	-	$10,000	-	-
Habitat improvements at Landis Woods		-	$58,000	-	-	-
Annual inlet repairs	Annual cost	$55,250	$55,250	$55,250	$55,250	$55,250
Annual BMP inspection	Annual cost	$30,000	$30,000	$30,000	$30,000	$30,000
Annual MS4 reporting	Annual cost	$50,000	$50,000	$50,000	$50,000	$50,000
Habitat MT collaboration	Educational materials	$5,000	$5,000	$5,000	$5,000	$5,000
Eden Road swale restoration		-	-	$98,000	-	-
Grandview Heights South - SW improvements	Pending CSO jurisdiction; future year costs: $1,336,000	-	-	-	$177,500	$1,336,000
Grandview Heights South - study	Pushed to future, pending CSO	-	-	$50,000	-	-

Capital Expenditures						
Account Description	**Notes**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Hampton Lane/Echo Velley Road swale improvements		-	-	-	-	$50,000
Lititz Run TMDL implementation		$50,000	$50,000	$150,000	$150,000	-
SW TMDL Plan implementation	Will come out of TMDL study; future year costs: $1,000,000; includes CBPRP preparation	$50,000	$100,000	$100,000	$50,000	$50,000
Rain garden creation/wetland restoration		$15,000	$12,000	$12,000	$12,000	$12,000
EFC program evaluation	Current	$2,000	-	-	-	-
Implementing SW grant program - study	Current & will be annual cost	-	$50,000	$50,000	$50,000	$50,000
Land acquisition - shed relocation	Depends on EPA; future year costs: $972,500	-	-	-	-	-
Shed		-	-	$275,000	-	-
Construct new shed	Future year costs: $6,190,000	-	-	-	-	-
Salt shed replacement	Pushed to future	-	$345,000	-	-	-
	Sub-Total	$267,250	$770,250	$885,250	$589,750	$1,638,250
	Total Capital Expenditures	**$1,168,250**	**$770,250**	**$1,160,250**	**$754,750**	**$1,644,873**

Appendix G: Warwick Township Analysis Documents

Warwick Township Stormwater Budget, Years 1-5

Total Costs	Year 1	Year 2	Year 3	Year 4	Year 5
Storm Sewer Replacement Program	$71,651	$73,442	$75,278	$77,160	$79,089
BMP Replacement	$95,425	$38,899	$74,400	$10,661	$10,928
BMP Required Maintenance	$4,510	$9,738	$6,178	$6,757	$5,153
Total Costs	**$171,586**	**$122,079**	**$155,856**	**$94,578**	**$95,170**

Storm Sewer System Replacement Program -- Total Cost (30 year) = $1,954,100; Annual Cost = $65,137 (w/o inflation)						
Item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Notes**
Pipe replacement	$65,137	$66,765	$68,435	$70,145	$71,899	Since the average useful life of the pipes in the Township is 30 years, the total budget was divided by 30. This figure represents the straight line reserves the Township should generate each year. This assumes that 1/30 of the pipes will be replaced each year.
10% contingency	$6,514	$6,677	$6,843	$7,015	$7,190	
Total Storm Sewer Pipe Costs	**$71,651**	**$73,442**	**$75,278**	**$77,160**	**$79,089**	

BMP Replacement and Required Maintenance Costs -- Renovations are completed every 20 years; Maintenance is completed every 5 years						
Item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Notes**
Renovation Costs (20-year)						
Linear Park Basin Renovation	$55,000	$2,819	$2,889	$2,961	$3,035	Annual reserves should be $2,750 plus inflation after renovation; assume renovation taking place in year 1
Municipal Campus Basin Renovation	$1,750	$1,794	$33,228	$1,885	$1,932	Annual reserves should be $1,750 plus inflation after renovation; assume renovation taking place in year 3

BMP Replacement and Required Maintenance Costs -- Renovations are completed every 20 years; Maintenance is completed every 5 years						
Item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Notes**
6 Bio-Basin Renovations	$30,000	$30,750	$31,519	$4,846	$4,967	Annual reserves should be $4,500 (for all 6) plus inflation after renovation; assume 2 renovations taking place in each year from years 1-3
10% contingency	$8,675	$3,536	$6,764	$969	$993	
Total BMP Renovation Costs	$95,425	$38,899	$74,400	$10,661	$10,928	
Maintenance Costs (5-year)						
Linear Park Basin Dredging & Cleaning	$1,500	$6,188	$1,576	$1,615	$1,656	Annual reserves should be $1,500 plus inflation; assume maintenance taking place in year 2
Municipal Campus Basin Dredging & Cleaning	$800	$820	$841	$1,848	$883	Annual reserves should be $800 plus inflation; assume maintenance taking place in year 4
Bio-Basin 1 Dredging & Cleaning	$300	$308	$969	$324	$332	Annual reserves should be $300 plus inflation; assume maintenance in year 3
Bio-Basin 2 Dredging & Cleaning	$300	$308	$969	$324	$332	Annual reserves should be $300 plus inflation; assume maintenance in year 3
Bio-Basin 3 Dredging & Cleaning	$300	$308	$316	$692	$332	Annual reserves should be $300 plus inflation; assume maintenance in year 4
Bio-Basin 4 Dredging & Cleaning	$300	$308	$316	$692	$332	Annual reserves should be $300 plus inflation; assume maintenance in year 4
Bio-Basin 5 Dredging & Cleaning	$300	$308	$316	$324	$409	Annual reserves should be $300 plus inflation; assume maintenance in year 5
Bio-Basin 6 Dredging & Cleaning	$300	$308	$316	$324	$409	Annual reserves should be $300 plus inflation; assume maintenance in year 5
10% contingency	$410	$885	$562	$614	$468	
Total BMP Maintenance Costs	$4,510	$9,738	$6,178	$6,757	$5,153	
Total BMP Costs	**$99,935**	**$48,637**	**$80,578**	**$17,418**	**$16,081**	

*Inflation is taken into account for all expenditures (2.5%)

Warwick Township Stormwater BMP Renovation & Maintenance Schedule and Annual Reserve Fund, Years 1-5

Item	Quantity	Unit	Unit Cost	Total Cost	Reserve per year*	Year Project Complete	Year 1	Year 2	Year 3	Year 4	Year 5
20 YEAR RENOVATION COSTS											
Linear Park Basin	1	EA	$55,000	$55,000	$2,750	1	$55,000	$2,819	$2,889	$2,961	$3,035
Municipal Campus Basin	1	EA	$35,000	$35,000	$1,750	3	$1,750	$1,794	$33,228	$1,885	$1,932
Bio-Basins (6)	6	EA	$15,000	$90,000	$4,500	2 in year 1; 2 in year 2; 2 in year 3	$30,000	$30,750	$31,519	$4,846	$4,967
						Total Renovation Costs	$86,750	$35,363	$67,636	$9,692	$9,934
5 YEAR MAINTENANCE COSTS (Dredging and Cleaning)											
Linear Park Basin	1	EA	$7,500	$7,500	$1,500	2	$1,500	$6,188	$1,576	$1,615	$1,656
Municipal Campus Basin	1	EA	$4,000	$4,000	$800	4	$800	$820	$841	$1,848	$883
Bio-Basins (6)	6	EA	$9,000	$9,000	$1,800	2 in year 2; 2 in year 3; 2 in year 4	$1,800	$1,845	$3,200	$2,680	$2,146
						Total Maintenance Costs	$4,100	$8,853	$5,616	$6,143	$4,685
						Total BMP Replacement & Required Maintenance Costs	**$90,850**	**$44,216**	**$73,253**	**$15,835**	**$14,619**