2012

Financing Feasibility Study for Stormwater Management in Berlin, Maryland

Prepared for the Town of Berlin, MD

Prepared by the Environmental Finance Center (EFC) for the Town Creek Foundation

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This report was prepared by the Environmental Finance Center's Stormwater Financing & Outreach Unit for the Maryland Department of Natural Resources and the Town Creek Foundation.

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Executive Summary

Background – Berlin is a small community nestled in the Eastern Shore of Maryland with close ties to its natural environment and its long history. Like many communities across the state, its rich history comes with aging infrastructure. With one staff person dedicating 20% of her time to stormwater and a budget of only $20,000 (of a total operating budget of $10 million), effectively managing stormwater in the town is beyond challenging.

Both town officials and the community alike have shown strong support for participatory resource protection efforts like "Grow Berlin Green," which was created to highlight the town of Berlin as a model community for environmental protection and conservation. Managed by a coalition of organizations including the Assateague Coastal Trust (ACT), Lower Shore Land Trust, and Maryland Coastal Bays Program, it was anticipated at the start of this study that the organizational capacity already in place due to GBG would help generate effective education and outreach on the need for dedicated financing of a stormwater program.

Prior to the start of this study, the Environmental Finance Center (EFC) at the University of Maryland received a letter of support from the Town Administrator and the Mayor that reinforced their commitment to becoming one of the first communities to receive assistance from the newly launched Stormwater Financing and Outreach Unit (Stormwater Unit), expressing the need for this work to be done for Berlin. The various stakeholders working together to support a sustainable Berlin proved instrumental in raising the profile of local stormwater management needs and exploring ways to pay for implementation as a logical step in the town's environmental efforts.

In September 2011, the EFC was contracted by the town of Berlin to conduct a stormwater financing feasibility study as part of the Stormwater Unit, an effort made possible through the support of the Chesapeake and Coastal Service of Maryland's Department of Natural Resources (DNR). Additional funds from the Town Creek Foundation were provided for the Project Team to conduct outreach and education activities to support these efforts.

The immediate goal of EFC's stormwater efforts in Berlin was to recommend a long-term dedicated funding stream that is equitable and effective in generating sufficient revenue for the town to maintain a comprehensive stormwater program. Other outputs of the study included outreach and educational activities targeted to the various stakeholders throughout the community to inform the public of the significance of addressing local stormwater management needs and enable for their input in the development of recommendations to the town. The goal of this effort was to provide the town guidance for implementing a self-sustaining stormwater management program.

Process and Analysis – This year-long study incorporated information from various sources including town staff and officials, a study conducted by the town engineer, business leaders, residents, GBG, a 3-phase study done by the Army Corps of Engineers, and the Berlin Stormwater Stakeholder Committee. Information was collected on the town's stormwater management needs and current stormwater activities, other taxes and fees charged to town businesses and residents, budget allocations, and the monetary costs of improving the stormwater program. Throughout the project period, the Project Team also engaged citizens through a series of public meetings, presentations to key stakeholders, and a stormwater photo contest to highlight the flooding issues created by heavy rain fall in the town. Promotional materials were developed and distributed including flyers and a fact sheet.

As part of the study, the Project Team evaluated a series of funding options in terms of what would best fit Berlin's needs for a fair, equitable, dedicated, and sustainable revenue source to support a comprehensive stormwater management program. Based on the unique characteristics of Berlin, the

Project Team narrowed the field of potential financing mechanisms; the two options that were considered above all were the general fund allocation and a stormwater utility. At the end of this evaluation, the Project Team found a stormwater utility to be the most appropriate approach for the town of Berlin.

Based on the needs assessed by the Project Team in this study, the town of Berlin will need to spend approximately $8.3 million over the next 10 years for repairs and improvements to the stormwater system, utilizing a stormwater utility *and* bond financing to generate ample revenue.

Recommendations – This report recommends distributing the costs of paying for repairs and improvements in proportion to the types of land uses that are contributing to the problem. Just as a building owner or tenant is responsible for paying its share to process the wastewater and potable water it uses, or to provide the electricity it consumes, the Project Team recommends that building owners and tenants recognize and be accountable for the stormwater that is created from their portion of the built environment.

A stormwater utility fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem on a per property basis. Creating a stormwater utility will allow Berlin to:

- Allocate the costs of stormwater management in a manner that is fair and equitable;
- Assist in the reduction of stormwater runoff to address flooding and water quality issues;
- Generate adequate revenues for stormwater management activities;
- Have stronger accountability for stormwater management spending; and
- Address and reduce water quality stressors.

The Project Team recommends the use of a rate structure based upon Equivalent Residential Unit (ERU) (also known as an Equivalent Runoff Unit) where 1 ERU equals 2,100ft^2. It is further recommended based on the Project Team's communication with town staff that each ERU on a property be assessed $45 per ERU per year for non-residential properties and $50 per year for residential properties. The Project Team calculated revenue based on a flat rate fee for residential properties and a fee structure for non-residential units based on impervious surface.

Residential -- The residential fee is based on the assumption that an average property has about 2,100ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The average impervious surface for residential properties was determined using the data provided by town staff. ***Thus, it is recommended that all residents will be charged $50 per year regardless of property size or amount of impervious surface.*** Revenue from residential properties will yield a total of $70,000 per year based on $50 multiplied by 1,400 properties.

Non-residential -- The non-residential fee is based on the amount of impervious surface on each individual property. Thus, if a commercial property is estimated to be 25,000ft^2 with an impervious surface of 10,000ft^2 and each ERU is equal to 2,100ft^2, the property will be billed for 5 ERUs. If each ERU is worth $45 a year, the total bill per year for this business is $225. All commercial properties, regardless of status (governmental, non-profit, etc.) should be assessed a stormwater utility fee based on its contribution to the problem. Revenue from all non-residential properties will yield an estimated total of $391,846 per year, based on 290 non-residential properties each paying $45 per ERU per year.

Conclusions –The Project Team strongly urges the town of Berlin to invest in its stormwater program now to prevent catastrophic failure in the future. If recommendations within this report are implemented, Berlin could become one of the first communities on Maryland's Eastern Shore to have a sustainable stormwater program with a dedicated revenue stream, thus making Berlin a leader in managing stormwater effectively in this part of the state.

Chapter 1: Introduction

Project Goals and Objectives

The Mayor and Council of the town of Berlin recognize the potential impact that stormwater has on the environment and acknowledge the paramount importance of providing residents and businesses adequate drainage. Not only do they acknowledge this importance, but also the town is committed to reducing pollutants, decreasing sedimentation, improving surface water quality, enhancing surface water drainage, and promoting compatible wildlife habitat. By considering all of these challenges together, the town can effectively address both water quantity - the volume of stormwater - and water quality - the amount of pollutants entering its waterways.

Thus, the town of Berlin seeks to establish a self-sustained stormwater management program with the following goals:

- Allocate the costs of stormwater management in a manner that is fair and equitable;
- Assist in the reduction of stormwater runoff to address flooding and water quality issues;
- Generate adequate revenues for stormwater management activities such as:
    - High priority areas,
    - Maintenance,
    - Education and outreach programs,
    - Emergency projects, and
    - Green infrastructure projects; and
- Create a self-sustaining municipal stormwater management program.

Anticipated Outputs & Outcomes

The EFC has developed a set of financing recommendations designed to assess the current stormwater management needs of the town and to propose strategies for meeting these needs. The EFC also implemented public outreach and educational activities to the public, community leaders, and elected officials. As a result of the assistance of the EFC, the Maryland Department of Natural Resources (DNR), and the Coastal Bays Program, we anticipate that the town of Berlin will be able to act upon one or more financing recommendations in order to implement a self-sustaining stormwater management program. Such action will achieve community and watershed protection priorities in an efficient and effective manner and will take full advantage of the dollars invested.

Information Gathering Process

Information was gathered for this feasibility study through a series of meetings and interviews conducted in person and/or over the phone with town staff. In addition, information was gathered through a series of public meetings, a facilitated meeting with residents in the Flower Street neighborhood, and a homeowner's association meeting. Finally, the Project Team gleaned information, particularly about our outreach strategy, from the Stormwater Stakeholder Committee. This group consisted of representatives from the hospital, the Chamber of Commerce, business owners, and town staff. See the public outreach section for more details regarding the stakeholder committee.

In addition, the Project Team's work in Berlin was informed by information gathered over the past two years from communities in Virginia, Maryland, North Carolina, and Delaware, as well as the District of Columbia, who have considered creating a stormwater utility or who have actually implemented a stormwater utility. See Appendix A for a timeline of major events, presentations, and meetings throughout the project.

Project Funding

The Stormwater Unit's work in the town of Berlin was made possible through the support of the DNR. Additional funds from the Town Creek Foundation have enabled the Project Team to conduct outreach and education designed to support these efforts. The EFC intends to use the experiences of working in Berlin as a model for other interested small communities in Maryland and eventually throughout the Mid-Atlantic region. In addition, the town of Berlin contributed significant in-kind support for this project.

The DNR supports communities in addressing nonpoint source pollution, including stormwater. The DNR and the EFC selected Berlin because we identified the town as a good candidate for the implementation of a project/program that is locally based, innovative, and sustainable and that will help to improve and restore water quality.

Chapter 2: Stormwater in Berlin

What is Stormwater?

Stormwater runoff is defined by the Environmental Protection Agency (EPA) as,

> "…Precipitation from rain and snowmelt events that flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated."[1]

Stormwater, unlike the wastewater that enters the sewer system via sinks, toilets, etc. generally does not go to a wastewater treatment plant. Instead, it flows underground and then is discharged into the nearest body of water.

Urban and suburban development has magnified the impact of stormwater runoff. The increase in acreage covered by impervious surfaces including roads, parking lots, houses, swimming pools, buildings, compacted soil (including many lawns) and sidewalks has changed the land's ability to naturally absorb stormwater. Until recent stormwater legislation was passed requiring best management practices (BMPs) in the management of stormwater, developers built simple stormwater management systems, generally underground, to drain rooftops, parking lots, driveways, etc. in order to protect property and public safety. The stormwater eventually dumped from an exit pipe into a river, stream, bay, or ocean taking with it any pollutant it had picked up along the way. Storm sewer systems concentrate stormwater into straight channels, increasing the rate of flow as it travels underground. Besides concerns about pollutant loads, the excessive volume leads to streamside erosion, sedimentation, and often, warmer-than-usual water temperatures, all of which impact natural systems.[2]

Why Stormwater is a Concern in Berlin

Growth and development

The town of Berlin was incorporated in 1868 and boasts over 40 structures in the National Register of Historic Places. The town is located in Worcester County, just south of the interchange of U.S. Route 50 and U.S. Route 113, 23 miles east of Salisbury and nine miles west of Ocean City. Berlin's proximity to coastal destinations (e.g., Ocean City and Assateague Island), in combination with its strong historic heritage, emphasize the importance of effective stormwater management to protect coastal water quality and reduce flood risk.

Berlin encompasses approximately 3.19 square miles, most of which lies in the Trappe Creek watershed.[3] The town contains three primary tributaries for Trappe Creek – Bottle Branch, Hudson Branch, and Kitts Branch (the largest sub-watershed). All three watersheds contain a mix of agricultural, forest, and developed land uses, though the Hudson Branch and Bottle Branch watersheds contain far more developed land than Kitts Branch.[4] Trappe Creek itself is a sub-watershed of the Newport Bay

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[1] National Pollutant Discharge Elimination System (NPDES), Stormwater Program, http://cfpub.epa.gov/npdes/home.cfm?program_id=6.

[2] Protecting Water Quality from Urban Runoff, EPA 841-F-03-003, February 2003, http://www.epa.gov/npdes/pubs/nps_urban-facts_final.pdf.

[3] Army Corps of Engineers (2007). *Stormwater System Improvement Study: Town of Berlin, Worcester County, Maryland*, p.1-3.

[4] Ibid, p.1-3.

watershed. The Newport Bay watershed is one of five coastal bays. The Coastal Bays watershed encompasses the towns of Berlin and Ocean City, parts of Snow Hill and Pocomoke, and the Assawoman, Isle of Wight, Sinepuxent, Newport, and Chincoteague Bays. Overall, the Coastal Bays watershed has an estimated population of 45,000.[5]

In 2009, the population of Berlin was estimated at 4,053[6], a 16% increase from its 2000 Census population. This continues previous upward population trends. Berlin's population increased by 74% from 1950 to 2000, with the largest increase (33.4%) between the 1990 Census and 2000 Census.[7] Development and construction activities accompany population growth. From 2000 to 2008, the town of Berlin approved approximately 479 building permits.[8] Based on the number of residential building permits, Berlin estimates its own 2010 population at around 4,500 residents.[9] Thus, while the Maryland Department of Planning (MDP) estimates the town's population at 4,857 in 2030, trends indicate that the population could be as high as 5,522 residents by then.[10] According to statistics provided by town staff, the number of utility customers grew annually at an average rate of 4.5% from 2003 to 2011, whereas the number of taxpayers grew at an average annual rate of 3.25%.[11]

As of 2008, most of Berlin's area was used for residential purposes (30.7% for single-family and 7.3% for multi-family). About one-fifth is undeveloped or used for agriculture, while approximately 10% is developed for commercial use, as shown in the table below.

Existing Land Use Acreages and Proportions of Total Land Uses[12]

Land Use	Area (in acres)	Percentage (%)
Single-family residential	616.0	30.7
Agricultural/undeveloped	412.3	20.5
Commercial	203.2	10.1
Roads and rights-of-way	161.7	9.0
Multi-family residential	147.1	7.3
Institutional	142.9	7.1
Parks and recreation	101.3	5.0
Light industrial	63.4	3.2
Municipal	56.4	2.8
Vacant	49.8	2.5
Open space	34.0	1.7
Total	2008.1	100.00

[5] Personal communication, Carol Cain, Maryland Coastal Bays Program, July 22, 2011.
[6] U.S. Census Bureau, Worcester County, Maryland QuickLinks, spreadsheet titled "Places in Maryland listed alphabetically," http://quickfacts.census.gov/qfd/states/24/24047lk.html.
[7] Town of Berlin, 2010 Comprehensive Plan, p.11.
[8] Ibid, p.31.
[9] Ibid, p.31.
[10] Ibid, p.31-32.
[11] Growth statistics provided to EFC via email on February 9, 2012, by Anthony Carson, Town of Berlin Administrator; compiled by Sharon Timmons, Town of Berlin Administrative Assistant.
[12] 2010 Comprehensive Plan, p.27.

Water quality

In 2010, the Maryland Coastal Bays Program gave Coastal Bays a C rating in terms of water quality. Part of the National Estuary Program, the Coastal Bays Program is a partnership among the towns of Ocean City and Berlin, the National Park Service, Worcester County, EPA, and the Maryland Departments of Natural Resources, Agriculture, Environment, and Planning. Indicators for the C rating include total nitrogen, total phosphorous, chlorophyll a, and dissolved oxygen. Biotic indicators, including seagrasses and hard clams, are also measured.[13] The Newport Bay Tributary System has Total Maximum Daily Load (TMDL) limitations for nitrogen under the federal Clean Water Act. Under the town's National Pollutant Discharge Elimination System (NPDES) permit, there will be no nitrogen or phosphorous discharges into local waterways from Berlin's wastewater treatment plant by the end of 2012.[14] With the elimination of point source nutrient loads, any additional reductions or controls must come through stormwater or other nonpoint sources.

Flooding

The town of Berlin has experienced flooding in the Bottle Branch, Hudson Branch, and Kitts Branch watersheds for years.[15] Flooded streets and neighborhoods are relatively common, even during smaller rain events.[16]

The Army Corps of Engineers analyzed the town's stormwater system and identified 15 areas that experience moderate or significant stormwater system deficiencies in its 3-phase study. Through its analysis and based on input from local officials, the Army Corps determined that seven problem areas were "high priority," where the entire stormwater system is flooded and the flooding directly impacts structures and roadways. The study also identified eight "medium priority" areas with moderate deficiencies. In addition, the Decatur Farms Home Owners Association has voiced concerns regarding localized flooding in their community.[17]

High Priority areas (ACE, 2007)	
West Street near Abbey Lane	Cedar, Pine, Maple, Franklin, Grice, and Nelson
Williams Street near Electrical Plant	Bottle Branch at Gull Creek Subdivision
Henry's Green/Henry's Mill	Hudson Branch at Flower and Showell
Harrison Avenue	
Medium priority areas (ACE, 2007)	
West Street at Broad	Main Street near Library
U.S. Route 113 at Bottle Branch	Main Street at Bottle Branch
U.S. Route 113 near Uncle Willie's	Ditch at Union Station
Williams Street at Old Ocean City	Kitts Branch at Old Ocean City
Other priority areas	
Decatur Farms community	

[13] 2009 Coastal Bays Report Card, http://www.mdcoastalbays.org/content/docs/Report%20Card.pdf.
[14] 2010 Comprehensive Plan, p.46.
[15] Army Corps of Engineers (2007), 1-1.
[16] Ibid, 1-1.
[17] See the EA study (p.3), included as Appendix B of this report.

Inadequate system maintenance and funding

According to phase 1 of the Army Corps of Engineers' study, Berlin's stormwater conveyance system contains about 69,438 linear feet (13.2 miles) of piping within the town's 3.19 square mile area. A plurality (37%) of the pipes are corrugated plastic, 26% concrete, 23% corrugated metal, and 10% cast iron.[18] At the time of the study there were 96 outfalls and 1,034 stormwater structures such as inlets, outlets, manholes, weirs, and ponds. This extensive stormwater system, like all infrastructure, requires regular maintenance and upkeep. However, the officials have not incorporated this maintenance into the regular budget, opting to pay for the expense when an immediate need or emergency arises. Without a dedicated source of revenue it is difficult to fund stormwater maintenance on a continual basis, since it competes for funding against other local government services and programs. The Army Corps indicated in phase 1 that the overall stormwater system was in fair to poor condition.[19] In the absence of regular maintenance, the overall condition of the stormwater system is likely to worsen over time.

Current Stormwater Activities in Berlin

The community of Berlin is very close knit and active on many fronts to promote and sustain the beauty and unique nature of the town. In terms of stormwater activities, there is a coalition of several nonprofit organizations who came together in 2008 to launch a Grow Berlin Green (GBG) initiative. The GBG initiative was created to highlight the town of Berlin as a model community for environmental protection and conservation. The local government is also proactive with several commissions (Parks, Historic Downtown, Planning and Zoning) that include environmental initiatives. The town of Berlin was the first to become certified in the Sustainable Maryland Certified (SMC) Program in the state. In part this was due to some of the efforts of the town to make Berlin a leader in sustainability that includes effectively managing their water resources with a newly formed department responsible for oversight of all water related activities to ensure proper communication and collaboration between all departments.

Berlin's Water Resources Department has four divisions that oversee the town's water infrastructure and resource management – Water, Wastewater, Spray Irrigation, and Stormwater Management. The Stormwater Management Division is responsible for enforcement of the town's Stormwater Management Code.[20] The Stormwater Management Code (Chapter 93) in its current form covers development and redevelopment stormwater management standards to ensure that such activities have minimal impacts on local land and runoff. It asserts that all activities must adhere to applicable state standards and defines the 2000 Maryland Stormwater Design Manual, Volumes I and II, as the official guide for local stormwater management principles, methods, and practices. The chapter also identifies acceptable structural and nonstructural stormwater management practices and defines the scope of enforcement and compliance. Berlin does an excellent job of following the codes and standards regarding stormwater principles, methods, and practices.

Water-related Taxes and Fees in Berlin

Water and wastewater utility fees

The town of Berlin operates substantial drinking water and wastewater systems. Berlin's 51-mile water distribution system of cast iron, ductile iron, and PVC pipes includes three wells, two water towers, over

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[18] Army Corps of Engineers (2005), *Stormwater System Assessment and Mapping for the Town of Berlin, Worcester County, Maryland*.
[19] Ibid.
[20] Berlin Code of Ordinances, Chapter 93.

200 fire hydrants and over 1,800 metered services.[21] From 2001 to 2004 the water system delivered an average daily flow of 405,000 gallons per day (GPD), rising to an estimated 471,500 GPD by 2010 due to development.[22] The town is reserving an additional 203,000 GPD of capacity to account for growth through 2030.[23]

The town's sewer system has over 60 miles of pipes and sewer mains, with over 475 manholes and 11 pumping stations. Additionally, the town operates a wastewater treatment plant with a treatment capacity of 0.75 million gallons per day (MGD) and designed to allow an additional 0.25 MGD with minor retrofits.[24] This newly constructed treatment facility has Enhanced Nutrient Removal (ENR) technology, which offers the best available protection to local and regional watersheds from excess nitrogen and phosphorous. Berlin also has plans for the largest spray irrigation system of effluent in the state of Maryland.[25]

To fund the operation, maintenance, and capital expenses of its water and sewer systems, Berlin residents pay utility fees at the rates summarized in the tables below.

Water Utility Billing Rates				
	Billing effective January 1	Billing effective January 1	Billing effective January 1	Billing effective January 1
# of gallons	**2010**	**2011**	**2012**	**2013**
0 – 2000	$14.00	$14.98	$15.28	$15.59
3000-5000	$15.12	$16.18	$16.50	$16.83
6000-8000	$16.80	$17.98	$18.34	$18.70
Any water consumption over 8,000 gallons per month will be billed at rate per 1,000 gallons:				
	2010	**2011**	**2012**	**2013**
	$3.81	$4.08	$4.16	$4.24
For metered customers outside town limits, the above rates are doubled.				

Sewer Utility Billing Rates							
	Billing effective January 1	Billing effective January 1	Billing effective January 1	Billing effective January 1	Billing effective July 1	Billing effective January 1	Billing effective July 1
# of gallons	**2010**	**2011**	**2012**	**2013**	**2013**	**2014**	**2014**
0 – 2000	$38.34	$40.26	$42.27	$44.38	$46.60	$47.05	$48.93
3000-5000	$41.54	$43.62	$45.80	$48.09	$50.49	$50.97	$53.01
6000-8000	$45.80	$48.09	$50.49	$53.02	$55.67	$56.20	$58.45

[21] 2010 Comprehensive Plan, p. 20. Personal communication with Berlin officials indicates that water meters now exceed 1,800 meters (1,897 in 2011).
[22] Ibid, p.20.
[23] Ibid, p.44.
[24] Ibid, p.21.
[25] Ibid, p.21 .

Sewer Utility Billing Rates							
	Billing effective January 1	Billing effective January 1	Billing effective January 1	Billing effective January 1	Billing effective July 1	Billing effective January 1	Billing effective July 1
Any wastewater usage over 8,000 gallons per month will be billed at rate per 1,000 gallons:							
	2010	**2011**	**2012**	**2013**	**2013**	**2014**	**2014**
	$5.33	$5.60	$5.88	$6.17	$6.48	$6.54	$6.80
For metered customers outside town limits, the above rates are doubled.							

There are currently no available exemptions (e.g., for elderly or low-income customers) for the water and sewer utility fees in Berlin, and the rates below are current through early 2012.[26]

A 2009-2010 Black & Veatch survey of water and wastewater rates in the 50 largest U.S. cities found that the average monthly residential charge for 7,500 gallons of consumption was $25.66 for water and $33.80 for sewer ($59.46 combined). The median rates were slightly lower ($24.91 and $29.80, respectively). The average monthly residential rates for 3,500 gallons were $15.35 for water and $20.03 for sewer; median rates were lower at $15.14 and $18.65, respectively.[27] Thus, as the above tables indicate, Berlin residents pay close to the national average for their drinking water and slightly above average for sewer. The National Association of Clean Water Agencies (NACWA) annually surveys the rates charged by its membership of wastewater utilities. Of the 178 sewer utilities surveyed nationwide in 2011, the average monthly bill for a single-family residence was about $32.46, an increase of 5.8% over 2010 and an increase of 34.3% overall from 2006 to 2011.[28] NACWA's data demonstrates a national trend of increasing sewer bills, consistent with the increasing water and sewer rates reported by Black & Veatch (2010). Black & Veatch (2010) reported that the average residential water and sewer bills increased at annual rates of 5.3% and 5.5% from 2001 to 2009, far above the Consumer Price Index (CPI) rate of change (2.4%) over the same period.[29] Not only are water and sewer rates on the rise, but they tend to be slightly higher in the Mid-Atlantic region. Out of 18 NACWA members in EPA Region 3, the average monthly rate was $36.17 compared to the national average of $32.46.[30]

Bay restoration fee

Every Maryland homeowner served by a wastewater treatment plant pays $2.50 per month to support the Bay Restoration Fund, passed in 2004 and managed by the Maryland Department of the Environment (MDE). The monthly payment increased to $5 beginning July 1, 2012 under legislation passed during by the 2012 General Assembly.[31] This fee is also known as the "Maryland Flush Tax". Fifty percent of the Flush Tax goes to cover crop programs throughout Maryland. The rest of this tax goes to septic tank upgrades and the upgrade of waste water treatment plants to meet ENR standards for plants in Maryland that discharge into the Chesapeake Bay.

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[26] Given rates reflect enacted charges based on Resolution 2011-02 and Resolution 2012-01, passed by the Mayor and Council of the town of Berlin. Resolution documents were provided to EFC by town staff.
[27] Black & Veatch (2010). *2009/2010 50 Largest Cities Water/Wastewater Rate Survey.*
[28] National Association of Clean Water Agencies. (2012). *2011 Service Charge Index.* Data and survey results are available at http://www.nacwa.org/utilitymanagement.
[29] Black & Veatch (2010).
[30] NACWA reports annual rates, so the given rates were derived by dividing by 12.
[31] Bay Restoration Fund, Maryland Department of the Environment, http://www.mde.state.md.us/programs/Water/BayRestorationFund/Pages/index.aspx.

Chapter 3: Public Outreach

Based on the experience of the Project Team in other communities, one of the most important ways to achieve a high degree of accuracy in our recommendations is to engage local businesses and residents throughout the process. This is generally accomplished by having a well thought out plan to collect feedback, educate the public, and incorporate their ideas into the final recommendations. Often times, community members are not aware of the impact that stormwater has on their daily lives and this process opens the dialogue. This process also allows a town to develop a comprehensive long-term stormwater management plan that is in the best interest of a knowledgeable citizenry. The public education and outreach component is so important, in fact, that it is one of six minimum control measures listed in NPDES Phase II Municipal Separate Storm Sewer System (MS4) permits. Typically, a feasibility study that does not take into account significant input from the community will have little chance of success in gaining support from the city council. Berlin, of course, is not subject to NPDES Phase II permitting, but we find that effective outreach, nevertheless, is a "best practice" for any stormwater financing feasibility study.

Knowing the importance of engaging the community made public outreach a significant component of this feasibility study, both for the purposes of information-gathering and for the purposes of keeping the public informed about the progress of the study. In the case of Berlin, many residents were unaware that water quantity concerns were occurring in other neighborhoods and believed that it was only their neighborhood enduring such problems. Thus, the outreach effort attempted to focus the community around the idea that appropriate stormwater management in Berlin was a community-wide problem that needed a community-wide solution. In order to inform the community periodically and keep residents abreast of our outreach activities and progress, local press coverage was essential. See Appendix C for a list of the local press coverage throughout the study.

The goal of outreach was to communicate accurate information to Berlin stakeholders about stormwater infrastructure problems, financing shortfalls, and solutions for long-term funding as well as to collect community feedback that would be reflected in the results of the study. Thus, public outreach was accomplished first by establishing a stakeholder committee and second by creating and implementing an outreach strategy.

Berlin's Stormwater Stakeholder Committee, launched in October 2011, was a guiding force in the outcome of this study. Prior to launch, the Project Team assembled a list of names, businesses, and organizations who might be important to include in the work group. Phone interviews were conducted with as many candidates as possible, and a final group was selected to participate.

The Berlin Stormwater Stakeholder Committee was comprised of 16 members representing a diverse set of backgrounds in the community, including residents, business owners, town officials, and community organizations. Over the course of the project, the work group met three times at the Berlin Town Hall (October 4, 2011, November 15, 2011, and June 14, 2012). Many of the members were also residents of the town.

The Stormwater Stakeholder Committee served several important purposes. First, as a cross section of both business and residential stakeholders, the work group was an important advocate for how to communicate information to the community at large and the proper tone, language, and method of this communication. Second, work group members were exceedingly well-connected and generously shared their professional networks for purposes of outreach or when the Project Team needed a contact with a certain expertise. This was essential, for instance, as we planned the Stormwater Photo Contest. Both the town of Berlin and GBG were very helpful in publicizing the event and the Chamber of Commerce

was generous in allowing us to use their lobby for display space. Third, members of the work group supported our efforts at the four public meetings by attending and providing introductions to key players. Finally, the work group was an unprecedented opportunity for municipal officials and members of the community (business leaders, citizen leaders) to share input on the stormwater challenges in Berlin and begin to discuss solutions. See Appendix D for the outreach and marketing strategy utilized by the Project Team and Stormwater Stakeholder Committee.

Public Meetings

At the town's request, four public meetings were held throughout October and November 2011. Each meeting coincided with one of the town's voting districts – Districts 1, 2, 3, and 4. The meetings were designed to communicate the basics of stormwater management, describe the purpose of the feasibility study, and facilitate comments and concerns from district residents and business owners.

The meetings for Districts 1, 2, and 3 were held at Berlin Town Hall. The meeting for District 4 was held at the Multipurpose Building located on Flower Street. Approximately 25 residents and community leaders attended the District 1 meeting, 40 attended the District 2 meeting, 25 attended the District 3 meeting, and 40 attended the District 4 meeting. These public meetings gave the community a chance to ask questions and make comments about the town's stormwater needs. Discussion at these meetings highlighted many public concerns including property loss, safety concerns, inadequate maintenance of the existing stormwater infrastructure, and frustration with the unmitigated flooding problems, despite years of complaints and the study from the Army Corps of Engineers. District 4 residents, in particular, expressed concerns about a proposed restoration project along Hudson Branch.

Informational handouts, including contact information for EFC staff, were available at the meetings. The town of Berlin did an excellent job advertising the public meetings. In addition to distributing press releases prior to each meeting, town staff also hand-delivered a notice to every address within the district, inviting their participation in their district's meeting.

Stormwater Photo Contest

From September 18th to October 7th, residents and non-residents were invited to submit photos of Berlin flooding or the impacts of flooding for the Berlin Stormwater Photo Contest. The EFC developed a contest flyer and registration form (including a photo authorization release). Please see Appendix E for all photo contest materials.

The contest was publicized by several community partners including local newspapers (via press release from the town of Berlin to the Daily Times, OC Today, Dispatch, Bayside Gazette, Worcester County Times, WBOC, WMDT, and Shore Progress), GBG (distributed via email blasts), and the Chamber of Commerce (also distributed via email blasts, the October 12, 2011 Newsletter, the Chamber Facebook page, and flyers sent to the Board).

Town staff collected in-person photos and registration forms. EFC staff collected any submissions sent electronically. Overall, 22 photo entries were received from 13 individuals. Two EFC staff members attended the event, which took place at Berlin's Chamber of Commerce on October 14 and 15, 2011. This event took place alongside Berlin's 2nd Friday Art Stroll and Oktoberfest. Cookies in the shape of raindrops were supplied from a local business called Baked Desserts. See Appendix F for pictures from the event.

During the two-day event, 126 residents and non-residents stopped by the Chamber of Commerce to vote on their favorite photo. The top three photos were chosen, and the winners received a Chamber of Commerce gift card. See Appendix G for the top three photos from the event. Following the event, the

town of Berlin announced the winners via press release to the eight local media sources who publicized the event.

Presentations

At the very beginning of the stormwater feasibility study, it became clear that an important first step would be to engage selected engineers and developers who regularly work in Berlin and begin the feasibility study with everyone having a better understanding about new environmental site design (ESD) rules and regulations that would apply to any future infrastructure work in Berlin. To that end, EA Engineering, the EFC, and the Town of Berlin sponsored and presented a lunchtime session to discuss ESD for special guests involved in any infrastructure development. This was seen as a great way to begin the education and information sharing process by starting with engineers and developers directly involved with handling stormwater for Berlin.

On December 7, 2011, the EFC facilitated a meeting with residents in District 4 and Maryland Coastal Bays at St. Paul United Methodist on Flower Street. The purpose of the meeting was to ensure that Maryland Coastal Bays was incorporating the needs of the local residents in designing the Hudson Branch restoration project. Prior to the start of the meeting, the EFC and several town officials went on a walking tour around the neighborhood to get a better understanding of stormwater "hotspot" locations and the impact it was having on the community. Following the walking tour, St. Paul's church hosted a dinner for area residents, which was also attended by the Mayor of Berlin, town officials, at least two council members, members of GBG, and approximately 20 residents from District 4. During the dinner, a facilitated discussion took place about the impact of stormwater to residents and the concerns over a pending restoration project designed to alleviate some of the stormwater issues in this section of town. As a result of this meeting, changes to the proposed Hudson Branch restoration project were made that incorporated community feedback. On March 7, 2012, the EFC presented preliminary findings to the town of Berlin Historic District Commission. The commission expressed support for the study and gave some brief feedback on stormwater challenges in Berlin. That evening, the EFC also made a presentation to the Decatur Farms Homeowner's Association. About 15 members of the association were present at the meeting and asked questions about how the study results may ameliorate the flooding problems in their neighborhood

In addition, in the spring 2012 Berlin Community News, the EFC offered presentations to any other interested community groups.

Festivals and Events

On August 14, 2011, GBG distributed postcards with information about the stormwater study and displayed a poster on behalf of the EFC and town of Berlin. This was the first local event where information was provided to the community to inform and engage them on Berlin's stormwater issues.

On September 17, 2011, the EFC attended Berlin's Third Annual Tindley Festival, a gospel event honoring Reverend Tindley. This event was located at the community center on Flower Avenue. The EFC set up an informational table to inform and engage the community on Berlin's stormwater issues. See Appendix H for pictures from the event.

Simultaneously on September 17, 2011, GBG attended Coast Day and Coastal Clean Up hosted by the Maryland Coastal Bays Program. During the event, located at Assateague State Park, GBG distributed materials pertaining to the study and the photo contest.

Promotional outreach materials – postcards, flyers, and a large banner - were produced by the EFC to use at the festivals and events. The theme of the materials was "Stormwater: How much is too much? It's up to you, Berlin!" Please see Appendix I for examples of the promotional materials.

Chapter 4: Funding Options

There are several appropriate funding mechanisms available to help fund the necessary stormwater improvements. Some can be used to fund either one-time capital expenses or ongoing operations and maintenance costs. Only a couple of funding options will cover all of the costs as highlighted in the table below:

Funding Source	Capital	Operations & Maintenance
Grants	Yes	No
Maryland Loan Programs	Yes	No
Bond Financing	Yes	Yes
General Fund	Yes	Yes
Permit Review Fees	No	Yes
Inspection Fees	No	Yes
Utility Rates	Yes	Yes

Based on this table, only four of the options can be considered to help Berlin cover the costs of their stormwater needs as detailed in Chapter 5. These options, discussed below, include: grant funding, bond financing, General Fund appropriations, and utility rates.

Grants

Contrary to popular belief, grants are not a steady revenue source. It is neither stable nor a long-term solution. Due to the competitiveness and instability of grant financing, grants should not be considered a sustainable financing solution. However, grants may be used for short-term capital and pilot projects. It will not, however, cover the cost of operations and maintenance.

Berlin has done a very successful job to date of pursuing various stormwater related grants as a means of supplementing their stormwater program. Specifically, grants enabled Berlin to secure project funding from the DNR for a large stormwater retrofit project in the area known as Hudson Branch located near Flower Street; a grant to the Assateague Coastal Trust allowed for a stormwater management BMP to be implemented near West Street and Graham Avenue; and grant funding helped to launch the local non-profit advocacy group GBG who used their funds to implement several effective outreach activities within the town related to environmental protection and conservation.

One way that Berlin can help offset the cost of some proposed capital improvement projects in the first few years without taking on considerable debt is to look at a program currently being offered by the DNR. Through the Chesapeake & Atlantic Coastal Bays Trust Fund (Trust Fund), Maryland municipalities and non-governmental organizations are eligible for stormwater capital improvement funding on "shovel ready" projects if they are located within the Chesapeake and Costal Bay watershed. The available funding for capital improvements on stormwater projects vary from year to year but Berlin is in a strong position to be considered eligible since larger scale projects such as those listed in this report are being prioritized. Since a list of projects is currently being generated for future capital improvement funding, Berlin is strongly encouraged to contact DNR immediately to discuss their needs.

Additionally, Berlin should seek grant funding from the state of Maryland's Emergency Management Agency (EMA) to offset some of the proposed capital improvement projects. Although there are stipulations for receiving these grants, the town of Berlin would be a good candidate to receive funding for stormwater from EMA.

Examples of stormwater related grants secured by the town of Berlin should continue in the future as a supplement to whatever funding mechanism is ultimately adopted by the town. Grants can be used to enhance current activities related to stormwater but should only be considered as a piece of a much larger financing program.

Maryland Loan Programs

The state of Maryland does provide opportunities to acquire loans at low interest rates to municipalities. The state revolving loan program through the Maryland Department of the Environment (MDE) is an option but is competitive and not always the best option for smaller municipalities who compete with larger cities and counties for limited funds. Even if successful, the state loan program will also only cover capital improvements leaving a need to find another revenue source for operations and maintenance costs.

In addition, the United States Department of Agriculture (USDA) Rural Development offers the Water and Environmental Programs (WEP), which offers some loans, grants, and loan guarantees for qualifying storm drainage facilities located in rural areas like Berlin. The funds may be used for construction, legal fees, engineering fees, capitalized interested, equipment, maintenance costs, or anything else Rural Development deems necessary.

Another option for Berlin to consider is the Local Government Infrastructure Finance Program offered by the Maryland Department of Housing and Community Development (DHCD) through the Community Development Administration (CDA). It is available for stormwater capital improvements and has agreeable lending terms to municipalities such as Berlin. Although approval is based on Berlin's credit worthiness and their ability to incur the debt obligation, it is still another funding mechanism worthy of consideration.

It should be noted, however, that loans are still just that, money borrowed that needs to be repaid with interest. Without a steady revenue source to pay back these loans, it is not an ideal way to fund all of Berlin's future stormwater needs.

Bond Financing

Bonds, although not a revenue source, can be used to finance both the operations and maintenance of stormwater management programs. Local governments can use this financing mechanism when they cannot meet the demand through general funds. Additionally, bond financing is used for large capital improvements that will not recur on an annual basis.

However, since bond financing relies on borrowed funds, the debt must be repaid. In the case of many local governments, bond debt is often paid off through the general fund. This leads to the underfunding of other government programs in the future. Therefore, though bond financing may make short term stormwater management projects possible, it is not a sustainable long term financing solution.

General Fund

The current method for funding stormwater in Berlin is now being supported almost entirely by the General Fund beyond getting some grants to offset the current program. The General Fund comes from property taxes and cannot be relied on from year to year as a steady source of revenue to pay for all of Berlin's anticipated stormwater expenses. Other town expenses have always competed for General Fund monies, including schools, transportation, and public safety. Stormwater expenses, although recognized as important to the town of Berlin, cannot be viewed as being as high a priority when measured against the safety of its citizens. Clearly, if all of the proposed improvements are to be undertaken by Berlin over the next five to ten years, another revenue source must be considered.

Permit Review Fees and Inspection Fees

A source of small revenue can be gained by dedicating the permit review fees and inspection fees toward paying for some part of the operations and maintenance program for Berlin. The problem with relying on these fees is that they are unstable as they will vary from year to year depending on the number of permits reviewed and inspections completed. This will not cover any of the capital improvement expenses which make up the bulk of Berlin's stormwater program over the next several years. These fees are also minimal and frequently do not cover the true cost of the service being provided by a local government. Therefore, it would not be feasible for Berlin to consider this as generating a sufficient revenue source to fund the entire stormwater program.

Stormwater Utility

A utility is an entity that may collect fees for a specific purpose, in this case, to fund a stormwater management program. A stormwater utility is considered a dedicated method because funding does not greatly fluctuate year to year and cannot be re-allocated to serve a purpose other than the stormwater program. Projects that may be supported by a stormwater utility include infrastructure retrofits and replacement, public outreach, operations and maintenance programs, and a variety of other items including staff positions (Planner, Stormwater Manager, etc.), if warranted.

In 1994, the EPA reported the existence of approximately 100 utilities around the country. In the Western Kentucky University Stormwater Utility Survey of 2011, the authors were able to document 1,175 stormwater utilities (SWUs) located in 39 states and the District of Columbia. They estimate, however, that there are actually between 1,200 and 1,500 SWUs in the U.S. They also state that the average population of a U.S. community with a stormwater utility is approximately 79,000 and the median population is 20,000.[32]

Following a model similar to what is used by a water and wastewater utility, stormwater utilities charge a recurring (usually monthly or quarterly) user fee based on the amount of stormwater "produced" on a landowner's property. These user fees are typically calculated based on the amount of impervious surface (land that does not permit the absorption of rainwater) on the property. Thus, a property owner would be assessed a fee in proportion to the amount of driveway, rooftop, patio, parking lot, and other paved area on the property.

Many communities choose to set up a rate system based on a factor called an Equivalent Residential Unit (ERU) (also known as an Equivalent Runoff Unit). Once an average amount of impervious surface for a single family residential parcel is determined, an ERU (the square footage on a property that is expected to be impervious) is established. The ERU is then used to determine the amount a parcel is charged, sometimes as a flat fee and sometimes as a tiered system. Fees for non-residential properties are typically assessed by multiplying the ERU times the non-residential parcel size. Reportedly, the mean ERU of the utilities assessed in the Western Kentucky University Study was 2,957ft^2 of impervious area with a standard deviation of 1,559ft^2.[33] The mean ERU (based on impervious area) reported in the 2010 Black & Veatch Stormwater Utility Survey was 2,453ft^2.[34]

The advantages of establishing a stormwater utility are numerous. In general, these advantages include:

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[32] Western Kentucky University Stormwater Utility Survey (2011), http://wku.edu/engineering/documents/swusurveys/wku-swusurvey-2011.pdf.
[33] Ibid.
[34] 2010 Black & Veatch Stormwater Utility Survey, http://www.bv.com/Markets/management_consulting/Stormwater_Survey.aspx.

- Stormwater fee revenue is much more reliable and consistent than property tax revenue. (And basing a budget on tax revenue means that a stormwater program has to compete, year-to-year, with other programs funded on tax revenues.)
- Creating a utility means that the stormwater system is treated as infrastructure (as it should be) and not an optional community program.
- A stormwater utility creates a dedicated funding mechanism. Although the local government can change the stormwater utility fee rates as needed, stormwater utility revenues can only be used for stormwater projects.
- A stormwater fee structure can be designed to take into account a community's unique characteristics (housing type, lot size, proportion of industry to residential to government owned properties).
- Stormwater fees are more equitable than taxes because the fee is based on a property's impervious surface and reflects the property's contribution to stormwater runoff.
- Stormwater fees can be a powerful tool for education. Since the fee is directly linked to impervious surface on a property, property owners have an economic incentive to minimize impervious surface if a credit system is put in place.
- Stormwater fees can be charged to tax-exempt properties. This is especially important in cities that have large amounts of government buildings, places of worship, and schools. Since many of these properties are typically large, they can account for a large proportion of a city's stormwater runoff.

Challenges to setting up a stormwater utility should also be taken into account before a community is ready to commit. In general, these challenges include:

- Administrative hurdles at project onset will require startup funding. In particular, costs associated with setting up a new billing system and answering public inquiries will be significant for some communities. In many cases, however, these costs decrease dramatically once the utility has been in place for several months.
- Public education for citizens, municipal officials and elected officials is essential to the success of a stormwater utility. This will require direct funding or in-kind funding at the local level, possibly through grants or partnerships. The 2010 Black and Veatch Stormwater Utility Survey maintains that 70% of the communities surveyed believed that "organized ongoing public information/education were essential to a stormwater utility fee." [35]
- Lastly, since the stormwater utility fee is based on impervious surface, the impervious surface of each property must be calculated (or a community may choose to assess the impervious surface of a set of representative properties). This typically requires the use of geographical information systems (GIS) as well as an employee to interpret it. Once again, this will cost the government both time and money.

Stormwater fees vary from community to community. The 2011 study from Western Kentucky University reports that the average monthly single family residential fee in the surveyed communities was $4.19, the standard deviation was $2.55, and the median fee was $3.65.[36]

In 2010, Black & Veatch reported 2009 fees ranging from $0.75/month (Auburndale, Florida) to $19.80/month (Portland, Oregon).[37] The range of fee amounts likely reflects political climate, level of state and federal regulation, and community needs.

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[35] Ibid.
[36] Western Kentucky University Stormwater Utility Survey (2011).

Recommended Funding Option

Of all the funding options listed above which are available to Berlin to provide sufficient revenue, only a stormwater utility will provide Berlin with the most stable, reliable funding to meet all of their needs. Since stormwater utility rates are based primarily on the use of the town's stormwater system, these rates will represent the most equitable and logical means of assessing a user fee.

[37] 2010 Black & Veatch Stormwater Utility Survey.

Chapter 5: Berlin Stormwater Management Program

Program Funding Needs

To identify the necessary components of an enhanced stormwater program for Berlin, the Project Team worked with town staff to conduct a comprehensive review of all aspects of current spending on stormwater management. The Project Team found that the current level of funding dedicated to stormwater management in Berlin was drastically under budgeted compared to the demonstrated need.

The Project Team found that a 10-year revenue stream totaling approximately $8.3 million, when adjusted for inflation at a rate of 2.5% per year, will be needed to fully support a comprehensive stormwater program.[38] The total cost of implementing a comprehensive program has been broken down into the following categories: personnel costs, capital improvement costs, and operations and maintenance costs. See Appendix J for an itemized list of the proposed year 1 program budget. See Appendix K for a breakdown of costs by category projected over a ten-year period. The following section describes the expenditures associated with each category.

Level of Service Expenditures

Personnel Costs

Total personnel costs include expenditures for any additional technical or administrative positions not currently filled that are needed to run and sustain a comprehensive stormwater management program. The salary and benefits for the additional positions were estimated by town staff. It is assumed that salaries and wages will increase each year with inflation.

It was found throughout our analysis that many of the positions needed to run a comprehensive stormwater management program are already filled by current town staff, and therefore only two new positions will be anticipated – two full time utility technicians for cleaning ditches, inlets, and drains at a total of $90,000 per year including benefits. The total projected personnel costs for a 10-year period are listed below:

- Year 1: $90,000
- Year 2: $92,250
- Year 3: $94,556
- Year 4: $96,920
- Year 5: $99,343
- Year 6: $101,827
- Year 7: $104,372
- Year 8: $106,982
- Year 9: $109,656
- Year 10: $112,398

Capital Improvements

Capital improvements consist of expenditures on equipment, project installation, and inspection of stormwater infrastructure. A study conducted by the town's engineer prioritized stormwater capital improvement projects, and was utilized to project the capital improvement expenditures. The study outlined the stormwater infrastructure improvements that the town is hoping to implement in years 1-3 of this study. The study determined priority areas within the town to be addressed by comparing the

[38] Inflation was taken into account for all expenditures in years 2-10; Inflation = 2.5% based on 10 year percent change in consumer price index (CPI). The % change in annual CPI since 1999, from December-December = 2.45%. The percent change in the annual average CPI since 1999 = 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

Project Team's tabulated results from the participants in public outreach meetings against the 3-phase study conducted by the Army Corps of Engineers.[39] Once the highest priority areas were determined, the town engineer prepared cost estimates for implementing priority area upgrades, utilized in the Project Team's capital improvement expenditures. Such estimates are based on concept level evaluations only and will require refinement upon development of the detailed design for the project.

The following lists the capital improvement costs for the 10-year period that are a result of the engineer's study, and it should be noted that all major infrastructure projects were included in years 1-3 of the 10-year budget projection:

Year 1 Capital Improvement Expenditures

- Upgrades to priority areas 2 (Cedar, Pine, Maple, Franklin, etc.) & 3 (Williams Street near Electrical Plant) identified in study @ $1,414,199
- Funds set aside to purchase a waste water treatment plant (WWTP) truck @ $30,000[40] per year

Year 2 Capital Improvement Expenditures

- Upgrades to priority areas 5 (Henry's Mill/Henry's Green) & 1 (West Street near Abbey Lane) identified in study @ $3,028,107
- Funds set aside to purchase a WWTP truck @ $30,750 per year

Year 3 Capital Improvement Expenditures

- Upgrades to priority areas 6 (Hudson Branch at Flower/Showell) & 16 (Decatur Farms) identified in study @ $682,500
- Funds set aside to purchase a WWTP truck @ $31,519 per year

The total projected capital improvement costs for a 10-year period are listed below:

- Year 1: $1,444,199
- Year 2: $3,058,857
- Year 3: $714,019
- Year 4: $32,307
- Year 5: $33,114
- Year 6: $33,942
- Year 7: $34,791
- Year 8: $35,661
- Year 9: $36,552
- Year 10: $37,466

[39] Kolar, Darl (June 6, 2012), *Stormwater Management Financial Study – Budgetary Cost Estimates for High Priority Areas with the Town of Berlin*, EA Engineering, Science, and Technology, Inc.
[40] Inflation was taken into account for the $30,000 in annual savings set aside to purchase a new truck.

Capital Improvement Priority Areas for the Town of Berlin

The following information is from the *Stormwater Management Financial Study – Budgetary Cost Estimates for High Priority Areas within the Town of Berlin* prepared by Darl Kolar, EA Engineering, Science, and Technology, Inc. and the Town of Berlin engineer. This study provides a detailed list of the highest priority stormwater management projects from an analysis of the *Draft Stormwater System Improvement Study* prepared by the Army Corps of Engineers (USACE) and public outreach feedback from the *Berlin Stormwater Feasibility Study* prepared by the Environmental Finance Center (EFC) at the University of Maryland.

The budgetary costs identified for the stormwater improvements and retrofits by EA Engineering are based on concept level evaluations only and each estimate will require refinement upon development of the detailed design for the project. At this preliminary planning stage it is difficult to determine with a high level of accuracy the actual cost of the project. Many unknowns such as permitting, property acquisition and environmental impacts must be evaluated during the design phase. In addition to the costs, there are uncertainties with respect to the overall schedule for construction completion. It is best to start with a concept level budgetary planning estimate and refine the estimate as the design is prepared.

Priority	Project	Estimated Design and Permitting Time (months)	Estimated Construction Time (months)
1	Area 2 – Cedar, Pine, Maple, Franklin, Grice, and Nelson	12	3
2	Area 3 – Williams Street near Electrical Plant	18	3
3	Area 5 – Henry's Green/Henry's Mill	12	3
4	Area 1 – West Street near Abbey Lane	12	3
5	Area 6 – Hudson Branch at Flower and Showell	6	2
6	Area 16 – Decatur Farms Development	3	3

Year 1 Capital Improvements

A**rea 2 – Cedar, Pine, Maple, Franklin, Grice, and Nelson**

Total cost: $1,018,582; Location: District 1

Background: Long history of expressed concern over flooding (frequency and water quantity)

Recommendation: Mitigate flooding concerns using USACE option 2E; Improvements include: regional stormwater management system consisting of a wet pond/constructed wetland, associated conveyance piping, bypass piping, and major street repairs.

Note: Property to the west of Nelson Avenue and north of the Perdue Plant is in the planning stages for improvements related to the development of an activity center. This component will be required to meet the current stormwater management regulations and may provide a slight improvement to flooding in this area.

Area 3 – Williams Street near Electrical Plant

Total cost: $395,617; Location: District 2

Background: Flooding concerns

Capital Improvement Priority Areas for the Town of Berlin (continued)

Year 2 Capital Improvements

Area 5 – Henry's Green/Henry's Mill

Total cost: $1,114,293; Location: District 2

Background: Flooding concerns associated with development of Henry's Green and Henry's Mill

Recommendation: Mitigate flooding concerns using USACE option 5H2; Improvements include: regional stormwater management system consisting of a wet pond/constructed wetland and associated conveyance piping.

Note: Area 5 is adjacent to Area 1, and thus the improvements will impact and reduce flooding in Area 5 *and* Area 1.

Area 1 – West Street near Abbey Lane

Total cost: $1,913,814; Location: District 2

Background: Flooding concerns

Recommendation: Mitigate flooding concerns using USACE option 1-5A; Improvements include: regional stormwater management system consisting of a wet pond/constructed wetland and associated conveyance piping.

Note: Area 1 is adjacent to Area 5, and thus the improvements will impact and reduce flooding in Area 1 *and* Area 5.

Year 3 Capital Improvements

Area 6 – Hudson Branch at Flower Street and Showell Street

Total cost: $570,000; Location: Districts 3 and 4

Background: Flooding concerns

Recommendation: Mitigate flooding concerns using USACE option 6B and 6C; Improvements include: increasing the size of the culvert system associated with Hudson Branch traveling under Flower Street and possible flood proofing of adjacent residential and business dwellings.

Note: This area of Hudson Branch is in the planning and designing phase of improvements consisting of a regenerative stormwater conveyance system. The implementation of improvements may have significant impact on flooding in Area 6.

Area 16 – Decatur Farms Development

Total cost: $112,500; Location: District 4

Background: Flooding concerns expressed by the Decatur Farms Home Owner's Association (HOA) (from the original construction of community)

Recommendation: Apparent issue with construction of swales transporting stormwater; Improvements include: significant regrading to the existing swales throughout the community; also possible that capacity of the existing stormwater management ponds may need to be increased based on the regrading activities.

Note: The implementation of improvements may have significant impact on flooding in Area 16.

Operations and Maintenance

The Project Team and town staff identified the operations and maintenance costs that will consist of expenditures for vehicle maintenance, insurance, and gas; promotional materials for waste collection; BMP erosion control measures; equipment and analysis for illicit discharge detection and elimination (IDD&E); $10,000 set aside from the general fund to support public outreach and education; and redevelopment projects. It is assumed that all operations and maintenance costs will increase each year with inflation. The following lists the estimated operations and maintenance costs in year 1:

- Vehicle maintenance (gas, insurance, routine maintenance) for existing WWTP truck @ $5,000 per year
- Promotional materials for waste collection @ $500 per year
- BMP erosion control measures from the Green Infrastructure Plan @ $100,000 per year
- IDD&E equipment and analyses @ $3,000 per year
- Public outreach and education (General Fund) @ $10,000 per year
- Redevelopment projects @ $45,000 per year

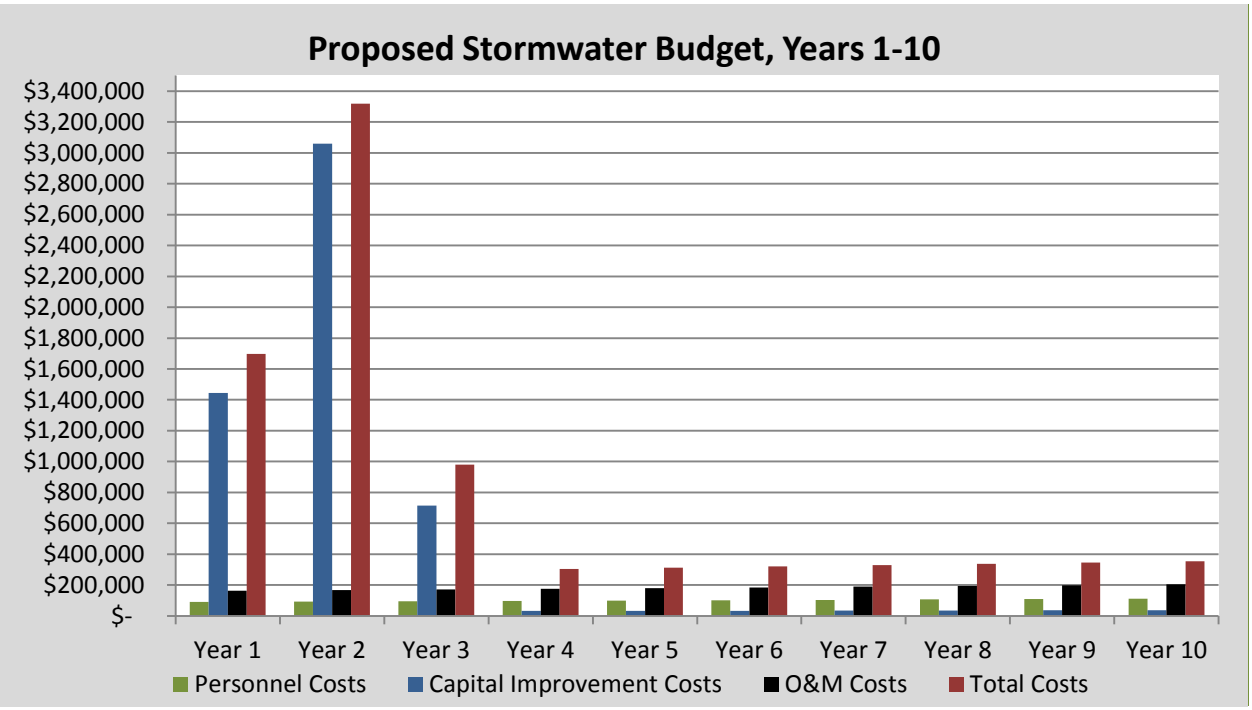
The total projected operations and maintenance costs for a 10-year period are listed below:

- Year 1: $163,500
- Year 2: $167,588
- Year 3: $171,777
- Year 4: $176,072
- Year 5: $180,473
- Year 6: $184,985
- Year 7: $189,610
- Year 8: $194,350
- Year 9: $199,209
- Year 10: $204,189

Total Expenditures

The total expenditures for the entire 10-year period, including personnel costs, capital improvement costs, and operations & maintenance costs are as follows:

- Year 1: $1,697,699
- Year 2: $3,318,695
- Year 3: $980,352
- Year 4: $395,298
- Year 5: $312,931
- Year 6: $320,754
- Year 7: $328,773
- Year 8: $336,992
- Year 9: $345,417
- Year 10: $354,053



The chart above shows the breakdown of costs by the three categories over 10 years. The first three years represent the largest costs to the town's program in order to implement the necessary stormwater infrastructure changes driven by the current widespread flooding issues, identified by the town engineer. Based on the total expenditures for 10 years, a discussion of the necessary revenue to maintain a sustainable stormwater management program follows.

Utility Revenues: Rate Structure Analysis

Why This Study is Recommending a Stormwater Utility for Berlin

Based on the needs identified by the Project Team, the town of Berlin will incur $8.3 million in stormwater expenses over the next 10 years. Our key recommendation is to create a stormwater utility 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 town 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 growing stormwater costs and address specific issues such as flooding, 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 for the town.

A stormwater utility fee allows for the assessment of the amount of impervious surface contributing to the stormwater problem. Since a large and growing percentage of the town is covered in impervious surface, it is appropriate to charge properties that contribute significant runoff more and properties that contribute insignificant runoff less. It is essential that the utility fee must be structured with respect to Berlin's unique characteristics.

Berlin Stormwater Utility Goals

In the early stages of this study, the Project Team was able to assess that there were large expenditures associated with addressing the continued growth and development, flooding, water quality, and inadequate maintenance issues brought to light by all stakeholders in the community. It became abundantly clear that a utility was potentially going to be the best option for consideration as a way to secure dedicated funding for the stormwater program. The immediate goal of this study was to recommend a long-term dedicated funding stream that is equitable and effective in generating ample revenue for the town to maintain a comprehensive stormwater program. The long-term goal of the EFC's stormwater efforts in Berlin is to enhance the existing program, raising the level of service in a way that helps the town address flooding issues and current inadequate infrastructure, address community water quality priorities, and prepare for future nutrient reduction expectations. This requires the support of a more robust and reliable funding stream than current practices provide.

Billing Recommendations

There are two common billing considerations for stormwater utilities seen in communities across the U.S. The first is to put it as a separate line on the tax bill and the second is to include it on the water and sewer bill. Each option has advantages and disadvantages. If stormwater is listed as a line item on the property tax bill, it is less likely to be contested since the amount would be very small compared to the larger assessment of the total tax bill. The drawback, however, is that Berlin taxes are paid to Worcester County and so the revenue would have an extra step of processing before it was returned to the town. In contrast, if billing occurs as a separate line on the water and sewer bill, it is easier for Berlin to collect since it would not be a considerable additional administrative burden. Additionally, since the Water Resources Department already combines water, wastewater, spray irrigation, and stormwater management, and this department has the infrastructure in place to collect the water and sewer bill, it is recommended that the town apply the stormwater utility fee billing to the water and sewer bill as a separate line on the bill that would indicate exactly how much is being applied towards stormwater.

Berlin should also prepare to enforce stormwater non-payment. The Project Team recommends adopting a policy to ensure that non-payment be addressed for stormwater in addition to water and sewer. Leniency on payments should be avoided from the inception of the utility. Based on the experience of other communities, when a community becomes known for not enforcing their fee collection, word spreads very quickly and expected revenue is lost. A stated action policy for non-payment should be set up in advance with strict penalties put into place, similar to the penalties faced for non-payment of the water and sewer bill.

For example, interviews with program staff in Takoma Park, Maryland revealed that the city had a high rate of non-payment in the initial years of implementing their utility. Because no penalty was assessed to non-payers, loss of anticipated revenue began to affect the program. Program staff finally created a policy that stated after three late notices a lien would be placed on the property. They also instituted penalties, including accrued interest, for non-payment. The city was thus able to remedy the non-payment situation very quickly. Berlin should avoid this mistake by making sure to enforce its program and create a policy for non-payment that results in official action by town officials.

Finally, based on the experience of other communities, it is also recommended that Berlin set up a strong administrative structure to deal with public questions and concerns, particularly when the utility 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 town staff members should be made available to quickly address customer concerns.

Rate Structure Analysis

In determining an equitable funding strategy for collecting approximately $8.3 million in revenue over the next 10 years to pay for stormwater related expenditures, the Project Team reviewed available data on all parcels located in the town provided by town staff. The Project Team calculated potential revenue using a flat rate fee for some residential parcels and an ERU-based fee structure for multi-family and non-residential properties.

Summary of recommended rate structure for residential properties

The decision to recommend a flat rate fee for residential properties was not made lightly. After reviewing the number of residential units and the many different types of residential properties located within the town, the Project Team became concerned that a parcel-specific fee structure would require additional capacity on the part of the town 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 1,400 single family and townhome parcels worthwhile.[41] Multi-family units are suggested to be handled as non-residential, however, meaning that the 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.

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. [42]

Calculating the impervious surface for non-residential properties is a feasible, practical, and appropriate task given specific software and training. Berlin currently does not have adequate GIS in place to estimate the impervious surface for each commercial building, thus it is essential for the town to invest in GIS software and training, which should be paid for using the $45,000 redevelopment projects and operating expenses budgeted into the level of service expenditures. The Project Team recommends investing in GIS software and training prior to issuing its first utility bill. Although the size of many properties may be significant, the total number of properties being assessed would not prove difficult for town staff compared to that of assessing residential properties.

For all 290 non-residential parcels,[43] it is recommended that a utility fee be assessed based on each property's total impervious surface. For example, if a commercial property is estimated to have an

[41] The total number of properties was determined using parcel data provided by town staff.
[42] Non-residential units include multi-family, commercial, and industrial parcels.
[43] The total number of properties was determined using parcel data provided by town staff.

impervious surface of 10,000$ft^2$and each ERU is equal to 2,100ft^2, the property will be billed for 5 ERUs. If each ERU is worth $45 a year, the total bill per year for this business is $225. All non-residential properties, regardless of status (governmental, non-profit, etc.) should be assessed a stormwater utility fee based on its contribution to stormwater runoff.

After conducting a sensitivity analysis[44] using various fee structures, the Project Team found that **$45** a year per ERU of impervious surface for non-residential properties was the lowest rate found to yield revenue sufficient to maintain a sustainable and comprehensive stormwater management program. It is recommended that the utility be reviewed and adjusted as needed pending additional projects and efforts. Another variable to be considered in terms of rate adjustment is the impact of a credit system, if the town decides it should implement a credit system in later years.

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 yield a total of $70,000 per year based on a fixed yearly rate of $50 for a total of 1,400 residential properties. (The residential fee is based on the average impervious surface of a single family home, which is 2,100ft^2[45]and therefore all properties are billed for 1 ERU per year.)

Non-Residential – The non-residential properties yield a total of $391,846 per year based on a $45 per ERU per year rate for a total of 290 non-residential properties. For each property type, the average impervious surface was divided by 2,100ft^2 (1 ERU), which yields an average ERU for each property type, as follows:

- Multi-family = 25.58 ERU
- Commercial = 30.95 ERU
- Industrial = 30.95 ERU

Each average ERU by property type was then multiplied by $45, and then again by the total number of properties, thus determining the average each property type will pay by year:

- Multi-family = 25.58 ERU x $45 x 50 = $57,560
- Commercial = 30.95 ERU x $45 x 200 = $278,571
- Industrial = 30.95 ERU x $45 x 40 = $55,714

The total revenue for each property type was then added to determine the total revenue for all non-residential properties for year 1 ($391,846). Thus, the total revenue per year using the recommended rate structures for residential and non-residential properties is **$461,846**. When adding the anticipated revenue totals over the next ten years from residential and non-residential properties, a deficit of approximately $3.7 million remains. However, in order to fully maintain a sustainable stormwater

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[44] 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.

[45] The average impervious surface for a single-family home was determined by data from town staff. A single-family home is estimated to be 15,000 ft^2 with an average impervious footprint of 2,100ft^2.

management program with no deficit over 10 years, utility rates would need to be greatly increased *or* the level of service anticipated could not be sustained. The up-front necessary capital improvements in the first years of the program require Berlin to implement another funding mechanism in order to manage its 10-year program deficit.

The Project Team recommends that the town of Berlin incorporate borrowing to make up for the deficit. In communicating with town staff, the Project Team learned that the town is eligible for bond financing and is in good standing to accrue debt in order to fund the necessary capital improvements in years 1-3. Since the town staff want to keep a steady stormwater utility rate, bond financing will be a necessary tool, and one that the Project Team recommends considering the town's good financial standings.

The following table shows the total revenues that will be generated in the first 10 years from the stormwater utility fee if no credits and exemptions are put in place:

Total Revenues, 10 Year Projection					
	Residential	**Commercial**		**Residential**	**Commercial**
Year 1	$70,000	$391,846	Year 6	$70,000	$391,846
Year 2	$70,000	$391,846	Year 7	$70,000	$391,846
Year 3	$70,000	$391,846	Year 8	$70,000	$391,846
Year 4	$70,000	$391,846	Year 9	$70,000	$391,846
Year 5	$70,000	$391,846	Year 10	$70,000	$391,846

Impact of a credit system and exemptions on the ability to generate adequate revenue

It is difficult to estimate the effect of a credit system being imposed on the program. However, revenues will likely 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 utility 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.

The Project Team recommends that there are **no** exemptions or credits incorporated into the stormwater program until further evaluation is conducted. It is recommended that the town of Berlin reevaluate the program on an annual basis, and if in no less than 5 years the town decides to implement a credit system, the EFC will welcome the opportunity to be involved with helping to structure a system that is equitable, fair, efficient, and does not hinder the ability to sustain the dedicated funding imposed by a stormwater utility fee.

In determining whether exemptions should be incorporated into the stormwater program, the Project Team evaluated the stormwater utility fee using a sample of actual properties located in the town of Berlin (see Appendix L). The impact of a stormwater utility on large non-residential properties, although substantial, should not be a reason to exempt those properties. As stated earlier, all properties (tax-exempt or otherwise) should be included in the stormwater utility, since the property's impervious surface directly affects flooding, poor infrastructure, etc. However, although exact information on the largest buildings in the town is uncertain, if there are a specific number of properties that are unable to pay their stormwater fees due because of the extreme cost (based on their impervious foot print), then a impervious surface *cap* should be considered by town staff. There is precedence in other communities in the region to cap the number of ERUs that a non-residential property is charged. Capping the number of ERUs for non-residential properties should be considered only during the program reevaluation conducted annually.

More on how the ERU was calculated for Berlin – As stated earlier in this report, an Equivalent Runoff Unit (ERU) is the amount of impervious surface, usually measured in square feet, of a typical property. An ERU is often calculated by collecting the impervious square footage of a random sample of properties across an area of a municipality. The resulting numbers are then analyzed and an average or median impervious surface value for the data set is used to determine the value of an ERU.

Currently, the town of Berlin does not have adequate software or capacity in place to calculate an exact ERU for all of the properties located within town limits. In order to calculate a fair and equitable ERU rate for the town, the Project Team began by collecting information about the total number of residents and businesses in the town. With data (see table below) provided by town staff, the Project Team was able to determine an appropriate ERU to set for Berlin. Based on this data collection, it was determined that one ERU should be equal to 2,100ft^2 of impervious surface.

Average Impervious Surface by Dwelling Type	
Dwelling Type	**Average Impervious Surface (ft^2)**
Residential classification:	
Single family	2,100
Townhome	359
Non-residential classification:	
Multifamily	53,723
Commercial	76,125
Industrial	60,000
Average total impervious surface (residential & non-residential):	27,748
Average total impervious surface (non-residential classification only):	63,283
Average total impervious surface (residential classification only):	1,229

The justification for an ERU being set at 2,100ft^2 is that this is the average impervious surface for single family properties, and therefore ties the level of payment to the extent to which a typical property contributes to runoff. Since residential properties are similar in size compared to non-residential properties, and since calculating impervious surface for all properties proves a large administrative task, it is recommended that all residential properties be billed at one ERU. In addition, after conducting a sensitivity analysis that used different ERU calculations to compare the average impervious surface for all property types, 2,100 stood out as an equitable number that is fair for all dwelling types.

Finally the Project Team recommends that, when explaining the fee structure to property owners with smaller properties (who may not literally have 2,100ft^2 of property, much less 2,100ft^2 of impervious surface), that the structure was set up based on average contribution to stormwater runoff. It also should be noted that additional structures beyond the units themselves, such as swimming pools, paved parking lots or cement landings, sheds, patios, courtyards, tennis courts, recreational and/or workout rooms, and other such structures are part of calculated total impervious surface. Regardless of individual ownership, some of these amenities and storage spaces must be shared by all owners of the buildings.

Chapter 6: Summary of Recommendations

In summary, the Project Team strongly urges the town of Berlin to invest in their stormwater program now to prevent catastrophic failure in the future. The stormwater system, like the town's water and wastewater systems, must be treated as critical infrastructure with dedicated funding for repair and maintenance. After exploring a suite of financing options, the Project Team recommends the creation of a stormwater utility.

As stated in Chapter 5, the Project Team recommends the use of a rate structure based upon Equivalent Residential Unit (ERU) (also known as an Equivalent Runoff Unit) where 1 ERU equals 2,100ft^2. It is further recommended that each ERU on a property be assessed $45 per year for non-residential properties and $50 per year for residential properties.

The Project Team calculated revenue based on an ERU-based flat rate fee for residential properties and a fee structure for non-residential units based on impervious surface.

Residential -- The residential fee is based on the assumption that an average property has about 2,100ft^2 of impervious surface and, therefore, all properties are billed for 1 ERU per year. The average impervious surface for residential properties was determined using the data provided by town staff. Thus, it is recommended that all residents will be charged $50 per year regardless of property size or amount of impervious surface. Revenue from residential properties will yield a total of $70,000 per year based on $50 multiplied by 1,400 properties.

Non-residential -- The non-residential fee is based on the amount of impervious surface on each individual property. Thus, if a commercial property is estimated to be 25,000ft^2 with an impervious surface of 10,000ft^2 and each ERU is equal to 2,100ft^2, the property will be billed for 5 ERUs. If each ERU is worth $45 a year, the total bill per year for this business is $225. All commercial properties, regardless of status (governmental, non-profit, etc.) should be assessed a stormwater utility fee based on its contribution to the problem. Revenue from all non-residential properties will yield an estimated total of $391,846 per year, based on 290 non-residential properties each paying $45 per ERU per year.

The report concludes that by utilizing a residential flat fee and a non-residential ERU-based fee structure, in tandem with conservative bond financing to make up for the deficit after 10 years, the utility will be able to collect the necessary $8.3 million in order to properly maintain Berlin's stormwater system. If the Project Team's recommendations are implemented, Berlin could become one of the first communities on Maryland's Eastern Shore to have a sustainable stormwater program with a dedicated revenue stream, thus making Berlin a leader in managing stormwater effectively in this part of the state.

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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Megan Hughes has been with the EFC since early 2008. From 2003 to 2007 she served as an Instructor and Internship Coordinator for the Center for Environmental Programs at Bowling Green State University in Bowling Green, OH. She also worked for two years with the Chapel Hill, NC, firm Environmental Consultants and Research (EC/R, Inc.) as a contractor to the Environmental Protection Agency Office of Air Quality Planning and Standards (OAQPS). Ms. Hughes received her Master of Environmental Management degree from Duke University's Nicholas School of the Environment and Earth Sciences and a Bachelor of Arts Degree in Environmental Studies from the University of North Carolina at Wilmington. Her Master's Project, entitled "Creating the Urban Toolshed: A case study of Durham children's perceptions of nature and neighborhood," was authored during her time as an environmental education consultant for Durham Parks and Recreation in Durham, NC. During graduate studies, she also held a series of positions in the Triangle region of NC with the North Carolina Solar Center, the Center for Environmental Education, and Triangle J Council of Governments.

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Monica Billig joined the EFC in September 2010 at the start of her graduate student experience at UMD. She currently heads the EFC Pennsylvania Satellite office, where she primarily works with communities in Pennsylvania to plan and implement environmental conservation and protection efforts. She attended UMD's School of Public Policy, concentrating in social policy and received her Master in Public Policy (MPP) in May 2012. Prior to attending UMD, Ms. Billig worked for two years 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.

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