WILLINGBORO TOWNSHIP COUNCIL
MEETING
September 1, 2020

To Join Zoom Meeting.
1. Type in address bar: https://zoom.us
2. Click " Join Meeting" on the top menus bar
3. Meeting ID: 953 6953 7139
4. Password: 531748

Telephone Users May Dial In:
1-646-558-8656
Password: 531748

6:00 PM
Call to Order
Flag Salute
Statement
Roll Call

MANAGER

INTRODUCTION OF MR. RICH BREVOGEL TO DISCUSS THE "STORM WATER POLLUTION PREVENTION PLAN"

Public Comment
Council Comment

Res. 2020—121 EXECUTIVE SESSION (IF NEEDED)

ADJOURNMENT

ALL BUSINESS ITEMS ARE TENTATIVE PENDING THE REVIEW AND APPROVAL OF THE LAW DEPARTMENT

RESOLUTION NO. 2020--121
AUTHORIZING
AN EXECUTIVE SESSION OF THE TOWNSHIP COUNCIL

WHEREAS, the New Jersey Open Public Meetings Act, N.J.S.A. 10:4-6 et seq., permits a public body to exclude the public from portions of a meeting at which specific matters set forth in N.J.S.A. 10:4-12b are discussed; and

WHEREAS, a request has been made of the Township Council assembled in public session on this 1st day of September, 2020 to convene a closed Executive session consistent with the provisions of N.J.S.A. 10:4-12b; and

NOW, THEREFORE, upon motion duly made and seconded and passed by a vote of in favor and opposed, **BE IT RESOLVED** by the Township Council of the Township of Willingboro, County of Burlington, State of New Jersey that an Executive Session of the Township Council meeting shall be convened to discuss one or more of the following categories as noted:

_____ 1. Any matter which, by express provision of federal law, state statute or rule of court is rendered confidential or excluded from the public portion of the meeting.

_____ 2. Any matter in which the release of information would impair the right to receive funds from the United States Government.

_____ 3. Any material the disclosure of which constitutes and unwarranted invasion of privacy as set forth in N.J.S.A. 10:4-12b(3).

_____4. Any Collective Bargaining Agreement or the terms and conditions which are proposed for inclusion in any Collective Bargaining Agreement, including the negotiation of the terms and conditions thereof with employees or representatives of employees.

_____ 5. Any matter involving the purchase, lease or acquisition of real estate with public funds, the setting of banking rates or investment of public funds where it could adversely affect the public interest if discussions of such matters were disclosed.

_____ 6. Any tactics and techniques utilized in protecting the safety and property of the public and any investigations of violations or possible violations of law.

_____ 7. Any pending or anticipated litigation or contract negotiations in which Township Council is or may become a party.

_____ 8. Any matters falling within the attorney/client privilege to the extent that confidentiality is required for the attorney to exercise his/her ethical duties as a lawyer.

_____9. Any matter involving the employment, appointment, termination of employment, terms and conditions of employment and other categories set forth in N.J.S.A. 10:4-12b(8).

_____ 10. Any deliberations occurring after a public hearing that may result in the imposition of specific civil penalty or the suspension of loss of a license or permit as set forth in N.J.S.A. 10:9-12b(9).

BE IT FURTHER RESOLVED that the general nature of the subject to be discussed relates to:

BE IT FURTHER RESOLVED that the time when and the circumstances under which the discussion conducted in closed session will be disclosed to the public, in accordance with N.J.S.A. 10:4-14, and to the extent that it is not inconsistent with N.J.S.A. 10:4-12.

Sarah Wooding, RMC
Township Clerk

Dr. Tiffani Worthy, Mayor

Recorded Vote	**Motion**	**2nd.**	**Yes**	**No**	**Abstain**	**Absent**
Councilman Anderson						
Councilwoman Perrone						
Councilwoman Whitfield						
Deputy Mayor McIntosh						
Mayor Worthy						

Willingboro Township Stormwater Program

Presented by:
Richard Brevogel
Director of Public Works
Storm Water Coordinator

Willingboro Township Council Meeting
September 1 2020

MS4 Permit Requirements

- **HISTORY**
  - In 1999 EPA enacted Phase II rules addressing Non-point pollution control from small and medium MS4's
  - Outlined in 6 minimum measures
  - NJ issued initial MS4 permits in February 2004
  - Renewed in 2009
    - Willingboro was asked to participate in 2009 permit review due to compliance and implementation of initial permit
    - Participated as one of 2 municipalities
  - Latest Renewal Date Jan 1st 2018

The MS4 Permit Renewal has been designed to comply with the National Pollutant Discharge elimination System (NPDES) Municipal Separate Sewer System General Permit Remand Rule, adopted December 2016

Why do it?

Stormwater/non point pollution can often be linked to our daily lives. Community planning impacts water quality. Examples include, use of fertilizers, pet waste on the ground, and washing cars at home. Often there is a lack of public knowledge and people are unaware that storm water discharges directly into state waterways. Individual acts may seem insignificant but collectively they have an impact. MS4 is designed to minimize that impact.

Willingboro MS4 Permit

The USEPA and the State of NJ understand the critical importance of reducing stormwater/nonpoint pollution entering the waters of the state. The Municipal Stormwater Regulation Program is designed to do so by implementing Statewide Basic Requirements (SBR's) and best management practices (BMP's) contained in the state permit.

- **Willingboro is a Tier A Municipality Under the MS4 NJPDES Permit**
  - Tier A Municipalities are located within the more urbanized regions of the state or along or near the Atlantic coast, while Tier B Municipalities tend to be located in more rural and non-coastal areas. All municipalities in New Jersey are considered either Tier A or Tier B. Currently there are 461 assigned to Tier A and 104 municipalities assigned to Tier B. Renewal of NJPDES master general permit NJ0141852 applies to Tier A Municipalities only. Renewal of the NJPDES master general permit for Tier B Municipalities will be completed in a separate permit action. For a more detailed description of the regulatory basis for assignment to Tier A or Tier B, and for a list of Tier A and Tier B municipality designations, please refer to N.J.A.C. 7:14A-25.3 (see www.nj.gov/dep/dwq/714a.htm). In addition, a list of all New Jersey municipalities and their Tier designation, as well as a map depicting municipal tier assignments can be found at www.nj.gov/dep/dwq/msrp_home.htm.
- Municipal Stormwater Pollution Prevention Plan (SPPP)
  - The Plan is available for the Public to review on the township website
  - The SPPP is a dynamic document that is never completed. It is annually reviewed and updated (if required) prior to the filing of the annual storm water certification report due May 1st of each year.
  - The last update was in April 2019
  - The SPPP describes and documents how the municipality is meeting the minimum standard

Willingboro MS4 Permit

The following forms are in the body of the SPPP which is located on the township Website at:

www.willingboronj.gov/docman-files/public-works/920-stormwater-pollution-prevention-plan-april-2019:

- SPPP Team Members
  - Stormwater Coordinator SPPP sign off : R. Brevogel
  - Team Member and function listing
- Revision History
  - Documents updates and revisions to the plan
- Public Involvement and Participation
  - Describes how the public can access
    - SPPP
    - MSWMP
    - Ordinances
- Public Outreach and Education
  - Describes how the municipality advertises public education and outreach events
    - There are 5 categories with associated lists of activities and online resources
      - » General Public Outreach
      - » Targeted Audiences Outreach
      - » School/Youth Education
      - » Wastershed / Regional Collaboration
      - » Community Involvement
    - Must choose 3 of 5 categories and achieve 12 points (revised from 10)
- Post Construction Stormwater Management
  - Ensure Residential Site Improvement Standards (RSIS)
    - Planning / Zoning Board Input and Engineering

Willingboro MS4 Permit

- **Ordinances**
  - Pet Waste
  - Wildlife Feeding
  - Litter Control
  - Improper Disposal of Waste
  - Containerized Yard Waste/Yard Waste Collection Program
  - Private Storm Drain Inlet Retrofitting
  - Stormwater Control Ordinance
  - Illicit Connection Ordinance
- **Street Sweeping**
  - Written Description or map illustrating the areas swept
  - Records of Sweeping
    - Date, Miles, Collected materials
- **Catch Basins and Storm Drain Inlets**
  - Describes plan for catch basin inspection and maintenance
    - GIS
  - Identification of locations with reoccurring problems
    - Flooding, Debris accumulation
  - What measures are taken to address those issues and how remediation projects are identified

Willingboro MS4 Permit

- **Storm Drain Inlet Retrofitting**
  - Describes how township ensures that all storm drain inlets (municipal and private) are retrofitted to meet permit requirements
    - Annual Inspection and Cleaning if required
    - Retrofits associated with Road work (Capital)
- **Municipal Maintenance Yards and Other Ancillary Operations**
  - Describes Best Management Practices (BMP's) or SOP's for each location
    - Fueling Operations
    - Vehicle Maintenance
    - Vehicle Washing
    - Salt and De-icing material storage
    - Street Sweeping storage
    - Catch Basin and Other Material Storage
    - Debris Management Sites (DPW Yard)
- **Employee training**
  - Document Training for:
    - Employees
    - Municipal boards and governing body members
    - Stormwater management Design Reviewers

Willingboro MS4 Permit

- **Outfall Pipes**
  - Documents 4 areas related to Municipal owned and operated outfalls
    - Mapping of outfalls
      - » Map to be submitted to DEP by Dec 2020
        - This is complete (GIS)
    - Inspections of Outfalls (202)
      - » Describes Inspection Schedule and indicates where records are kept
    - Stream Scouring
      - » Describes the program to detect, investigate and control localized scouring from outfalls
    - Illicit Connections
      - » Describes program to conduct visual dry weather inspections of outfalls maps for flow
- **Stormwater Facilities Maintenance**
  - Describes program for ensuring long term cleaning, operation and maintenance of stormwater facilities owned by the municipality. It also describes the process for facilities "not" owned by the municipality
    - Storm Water Management Areas
      - » Township owned 12
      - » Privately owned 11
    - Catch Basins
      - » Township owned 1286
      - » Privately owned Unknown
    - Manufactured Treatment Devices
      - » Township Owned 3
        - DPW Yard 2
        - Firehouse 1

Willingboro MS4 Permit

- **Total Maximum Daily Load Information**
  - **Documents the results of the TMDL report that are specific to Willingboro using the DEP tool**
    - List adopted TMDL's
    - Parameters addressed and names of affected water bodies
    - PCB's
      - » No required implementation plan

- **Optional Measures**

The DPW has been working with the municipal engineer creating a GIS database that is compatible for submission to the State of NJ for compliance with the permit. We are working towards a comprehensive mapping system that will contain the following information:

- Outfall Maps — Complete
- MS4 system mapping — Complete
  - Includes directional flow
- Storm Water Management Areas — Complete
- Roadway and MS4 repair/replacement — In-Progress
  - Majority is complete. Inputting Inspection sheets tied to specific stormwater facilities

- The Stormwater Control Ordinance by must revised by March 3 2021 to incorporate the following:
  - Clarifying and modifying the definition of a major development
  - Incorporating Green Infrastructure BMP's as a way to modify storm water volume created by traditional methods
  - Moving from MTD's (although not restricted) to the use of Green Infrastructure

New Permit vs. 2009 Tier A Permit

Stormwater Facility Inventory & Mapping

- Stormwater Basins, Subsurface Retention/Detention Systems, MTDs, GI, and Outfalls
- GIS Coordinates
- Supports Effective Maintenance

Maintenance Requirements

- Clarified Conditions Related to Municipal Oversight of Certain Private Stormwater Facilities
- Planning with Awareness of Known Impairments and other Impacts
- Clarified Municipal Maintenance Yard Module

Post-Construction Stormwater Review

- Checklists for newly proposed stormwater management measures
- Clarified that Post-Construction Stormwater Rules Apply in All Areas
- Required Training for Board Members and Those Involved in Review of Stormwater Design

New Permit vs. 2009 Tier A Permit

"Map As You Inspect"

- Inspection and Maintenance of Stormwater Facilities
- Maintain a Log
  - Locational information
  - Inspector
  - Date
  - Findings
  - Maintenance Performed

Maintenance Requirements

- Clarified Conditions Related to Municipal Oversight of Certain Private Stormwater Facilities
- Planning with Awareness of Known Impairments and other Impacts
- Clarified Municipal Maintenance Yard Module

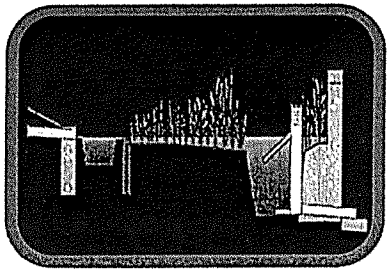
Post-Construction Stormwater Review

- Checklists for newly proposed stormwater management measures
- Clarified that Post-Construction Stormwater Rules Apply in All Areas
- Required Training for Board Members and Those Involved in Review of Stormwater Design

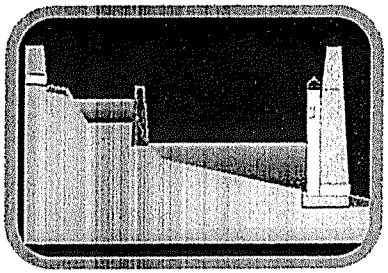
MJ1

New / Updated BMP Chapters

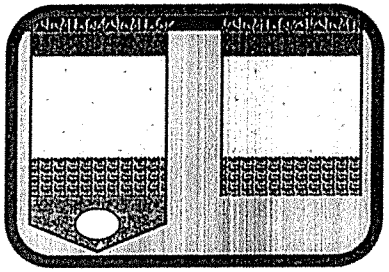
Best Management Practice Manuals



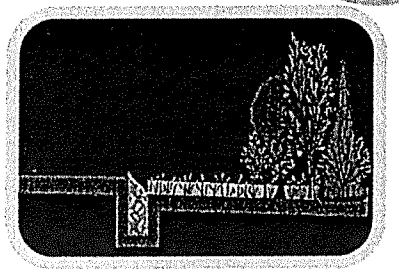
Standard Constructed Wetlands



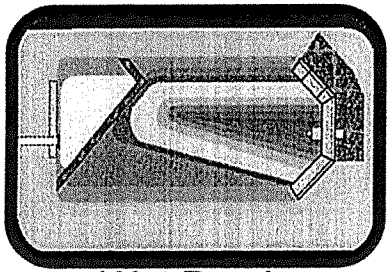
Extended Detention Basins



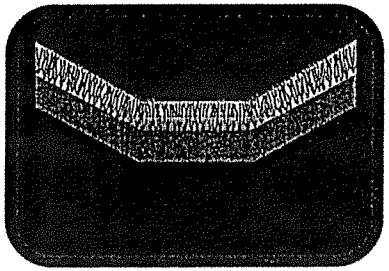
Sand Filters



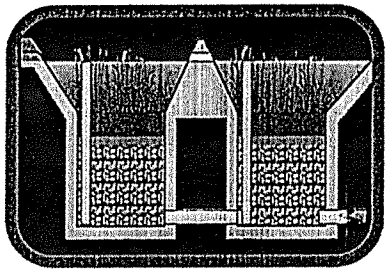
Vegetative Filter Strips



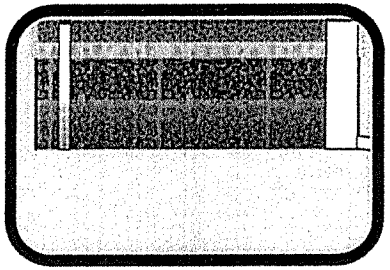
Wet Ponds



Grass Swales



Subsurface Gravel Wetlands



Pervious Paving

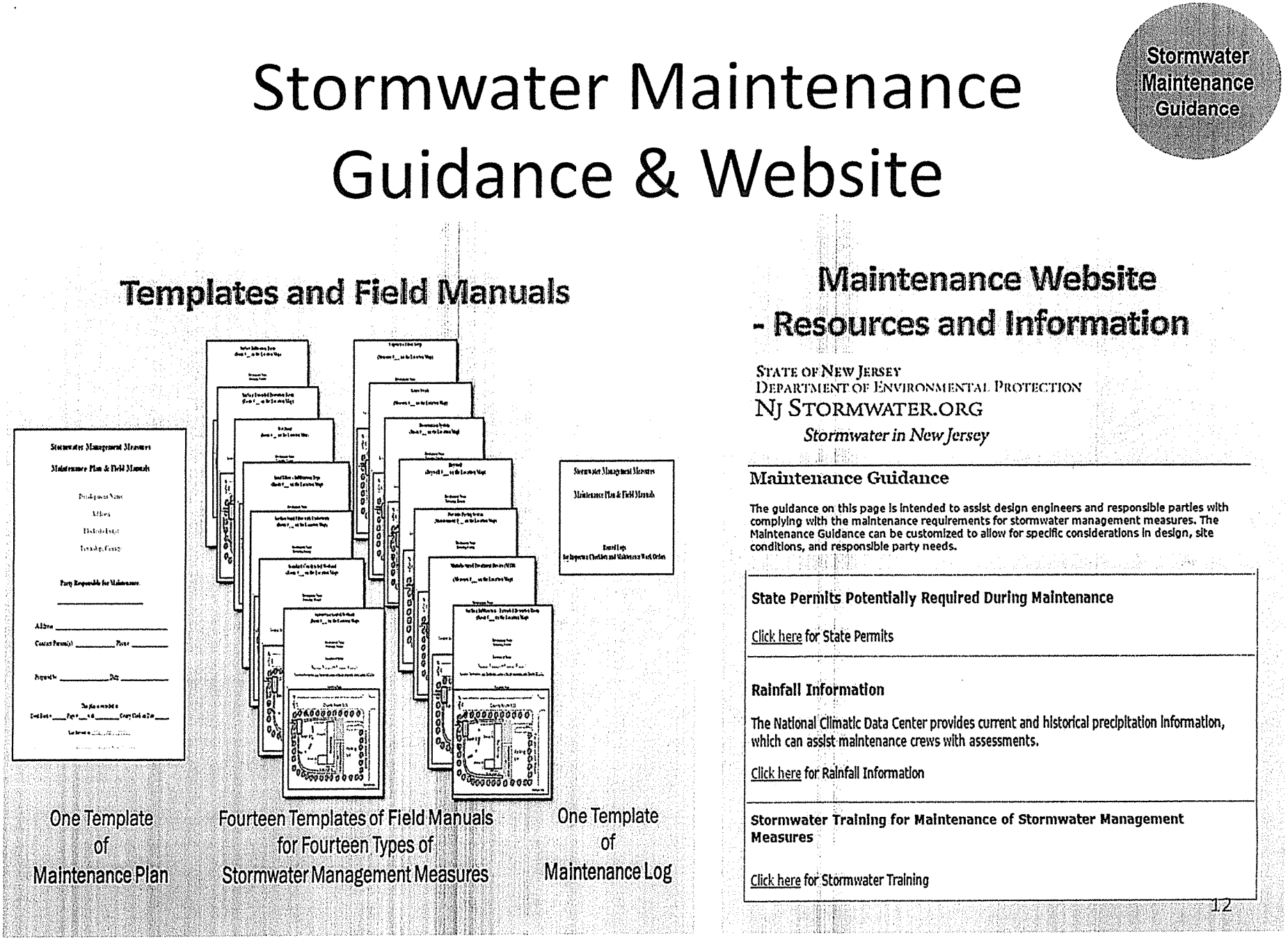
In Progress ...

Biore-tention System | MTDs | Dry Well | Infil-tration Basin | Blue Roof | Rain Garden | Cistern | Green Roofs

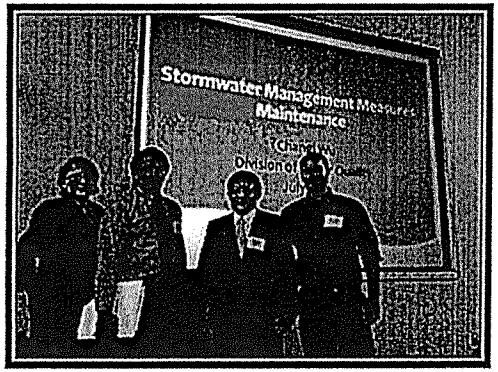
Slide 11

MJ1 Murphy, James, 2/6/2017

Stormwater Maintenance Guidance & Website



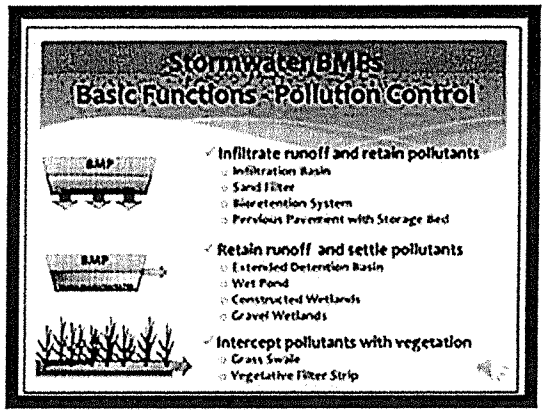
Stormwater Training

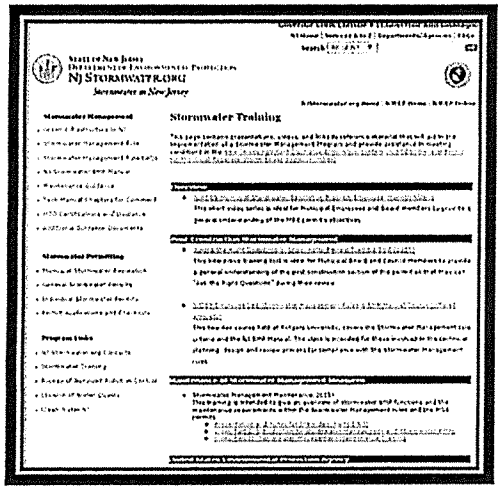


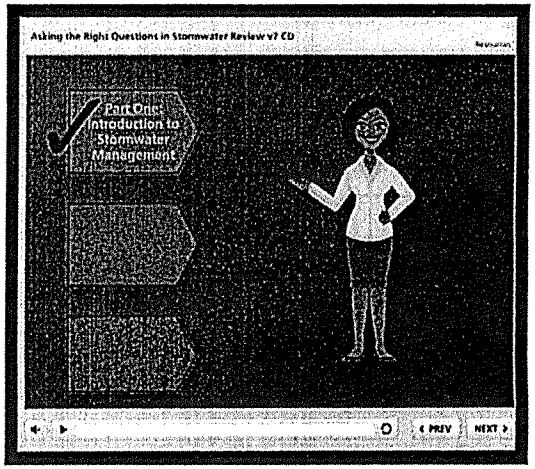
Training for NJDOT

New Training Page at DEP Website

Videos & Interactive Tools







www.njstormwater.org/training.htm

Manufactured Treatment Devices (MTD) Certification Process

MTD Certification Process

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NJ STORMWATER.ORG

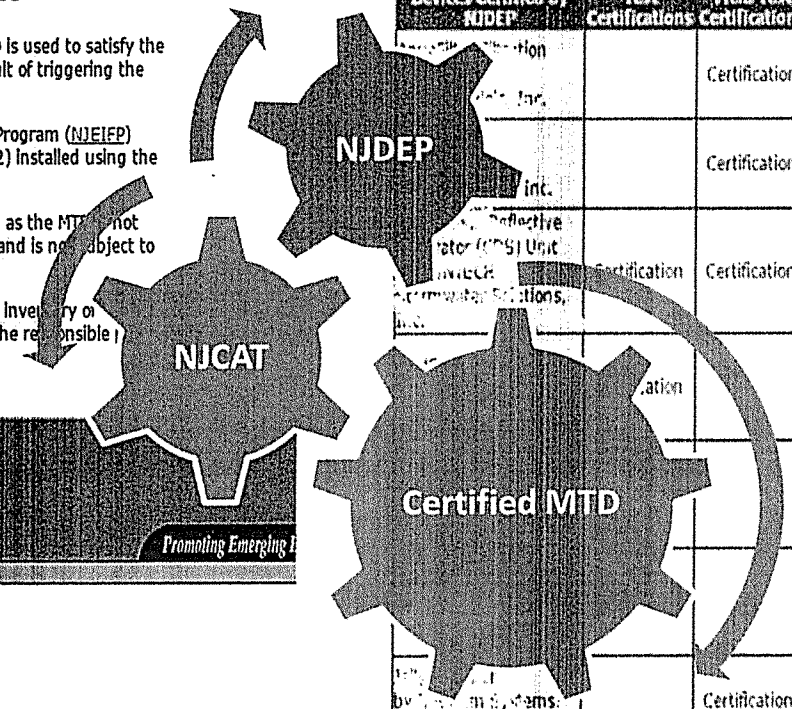
Stormwater Manufactured Treatment Devices

An MTD is required to be NJCAT verified and NJDEP certified when the MTD is used to satisfy the requirements of the Stormwater Management rule (N.J.A.C. 7:8), as a result of triggering the requirements for major development.

For projects receiving New Jersey Environmental Infrastructure Financing Program (NJEIFP) funding, an MTD must be either: 1) NJCAT verified and NJDEP certified or 2) installed using the NJEIFP MTD Funding Policy.

An MTD which is not NJCAT verified or NJDEP certified may be used as long as the MTD is not intended to satisfy the requirements of the Stormwater Management rule and is not subject to NJEIFP MTD Funding Policy.

Please note that any MTD installed should be listed on the MS4 permittee's inventory of stormwater management measures and must be properly maintained by the responsible party. Other state, federal and local requirements may apply.



Stormwater Management Manufactured Treatment Devices Certified by NJDEP	MTD Laboratory Test Certifications	Field Test Certifications	Superseded Certifications	Certified TSS Removal Rate	Maintenance Plan
[illegible]		Certification	Superseded	80%	Plan
[illegible]		Certification	Superseded	50%	Plan
[illegible]	Certification	Certification	Superseded	50%	Plan
[illegible]			Superseded	50%	Plan
[illegible]				50%	Plan
[illegible]			Superseded	80%	Plan
[illegible]		Certification	Superseded	80%	Plan
[illegible]		Certification	Superseded	80%	Appendix A

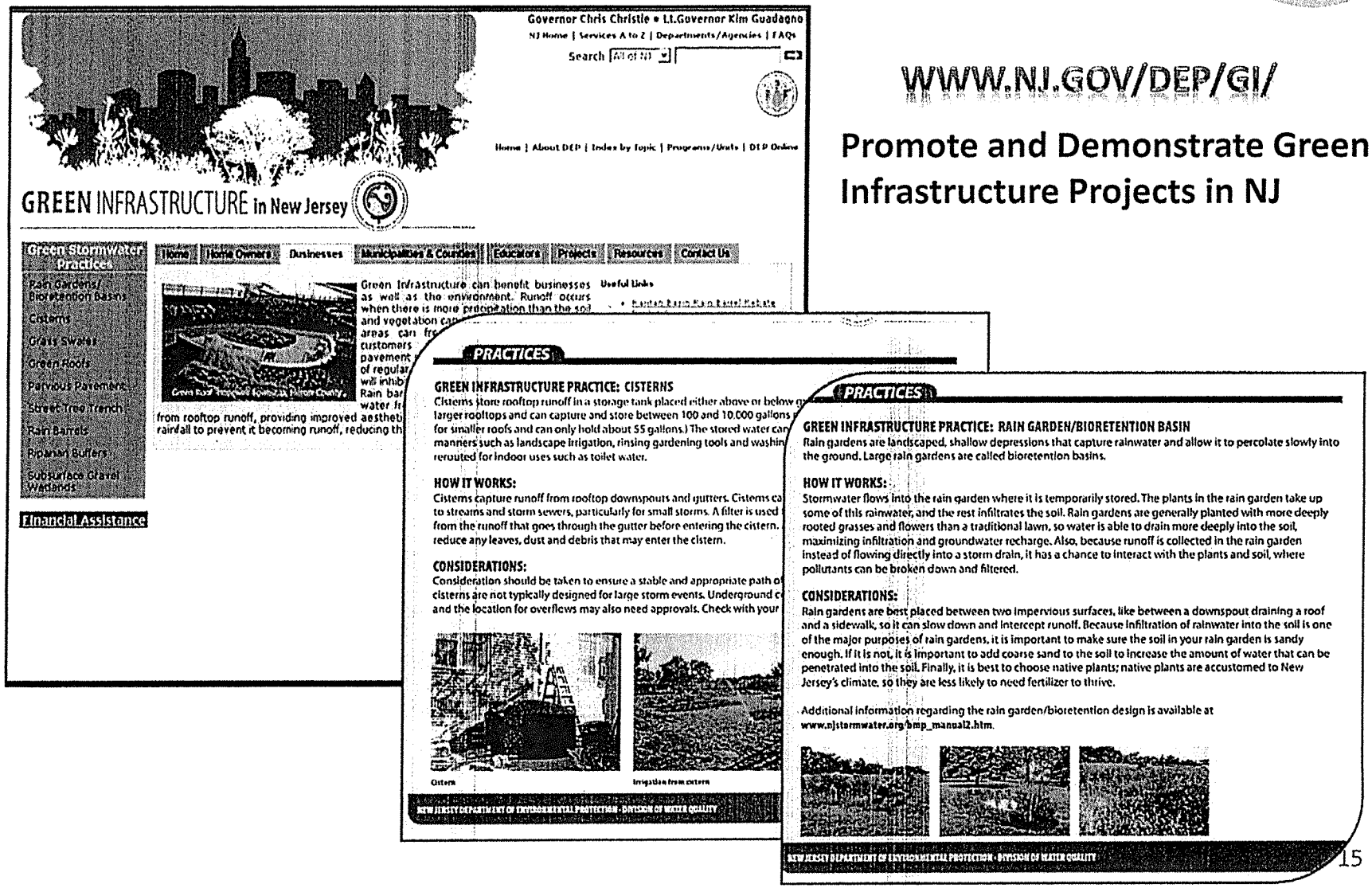
NJCAT
New Jersey Corporation for Advanced Technology
Promoting Emerging

- About Us
- Verification Process

Verification Process

The Technology Verification Program specifically encourages collaboration between vendors and users of technology. Through this program, teams of academic and business professionals form to implement a comprehensive evaluation of vendor specific performance claims. The result of successfully completing this program is documentation of independent third party confirmation of claims that provides valuable information to business and governmental decision-makers.

Green Infrastructure



Green Infra-structure

WWW.NJ.GOV/DEP/GI/

Promote and Demonstrate Green Infrastructure Projects in NJ

TMDL Look-Up Tool

Bureau of Nonpoint Pollution Control

Find Forms | Contact Us

Total Maximum Daily Load (TMDL) Look-Up Tool

The tool was developed to assist New Jersey's municipal stormwater coordinators with the development of plans and strategies to reduce stormwater discharges from Municipal Separate Storm Sewer Systems. It should also prove useful to others with an interest in water quality issues that affect our state.

To use the TMDL Look-Up Tool, go to the dropdown feature below and locate your municipality. The tool will display a list of watersheds and established, approved or adopted TMDL information associated with the selected municipality. To view the TMDL document and find implementation strategies, click on the associated link: View the TMDL Document. Once you have opened the TMDL document you can locate the implementation section using the table of contents.

Amendment to the Atlantic, Cape May, Lower Delaware, Lower Raritan-Middlesex, Mercer, Monmouth, Northeast, Ocean, Sussex, Tri-County, Upper Delaware and Upper Raritan Water Quality Management Plans

Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide

County: Mercer **Municipality:** Select Go Reset

Please click Reset for a new search.

A Guide to Abbreviations used in the TMDL
Hg = Mercury
TP = Total Phosphorus
DO = Dissolved Oxygen
TSS = Total Suspended Solids

- East Windsor Township
- Ewing Township
- Hamilton Township
- Hightstown Borough
- Hopewell Borough
- Hopewell Township
- Lawrence Township
- Pennington Borough
- Trenton City
- Robbinsville Township
- West Windsor Township
- Princeton

Total Maximum Daily Load(TMDL) Information for Selected Municipality:

Applicable Stream TMDL(s)

- Total Maximum Daily Loads for Fecal Coliform to Address 28 Streams in the Northwest Water Region

  Fecal Coliform - 2003 : Assunpink Creek, Shabakunk Creek, Little Shabakunk : View the TMDL Document
- Total Maximum Daily Loads for Fecal Coliform to Address 48 Streams in the Raritan Water Region

  Fecal Coliform - 2003 : Duck Pond Run : View the TMDL Document
- Total Maximum Daily Loads for Fecal Coliform to Address 48 Streams in the Raritan Water Region

  Fecal Coliform - 2003 : Stony Brook : View the TMDL Document
- Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewid

  Mercury - 2010 : Stony Bk(Province Line Rd to 74d46m dam) : View the TMDL Document

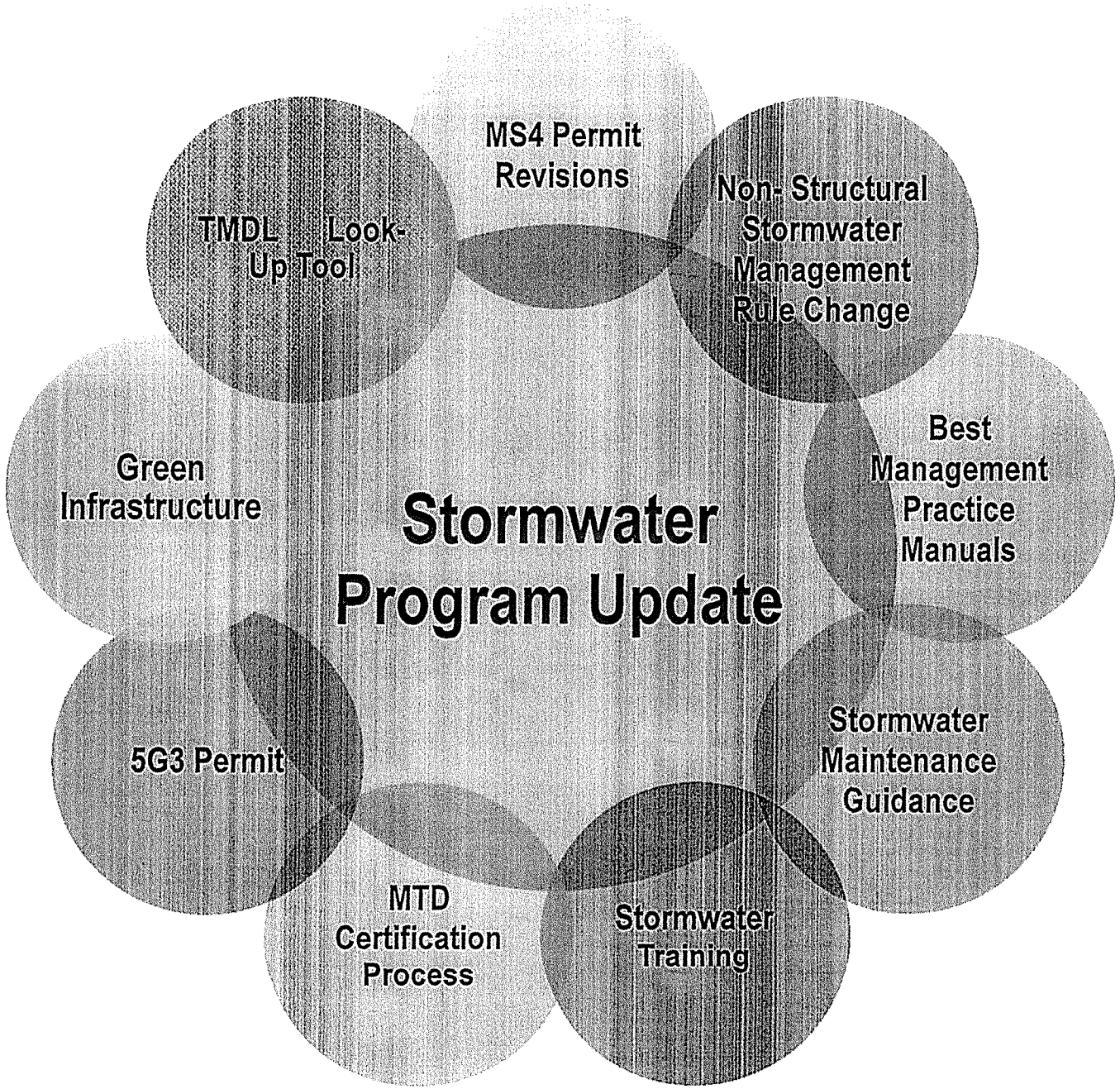
Applicable Lake TMDL(s)

None

Applicable Shellfish TMDL(s)

None

Posted at
www.nj.gov/dep/dwq/msrp_home.htm


Stormwater Program Update
MS4 Permit Revisions
Non- Structural Stormwater Management Rule Change
Best Management Practice Manuals
Stormwater Maintenance Guidance
Stormwater Training
MTD Certification Process
5G3 Permit
Green Infrastructure
TMDL Look-Up Tool

Questions?

Stormwater Utilities

A Funding Solution for New Jersey's Stormwater Problems

Prepared by MicKenzie Roberts-Lahti
For
New Jersey Future

September 2014

Acknowledgments

I would like to thank the following organizations and individuals for graciously contributing their time, resources, and expertise to make this report possible:

- Chris Sturm, Senior Director of State Policy, New Jersey Future
- Kevin Burkman, Intern, New Jersey Future
- Bill Cesanek, AICP, Vice President, CDM Smith
- Maureen Krudner, Region II Green Infrastructure Coordinator, US Environmental Protection Agency
- Division of Water Quality, NJ Department of Environmental Protection
- Brian Friedlich, P.E., Project Manager II, Kleinfelder
- Roman Zabihach, Former Morris County Planning Director

Statement of Purpose

This report seeks to provide an introduction to and description of stormwater utilities as a tool to manage stormwater in New Jersey more effectively. Stormwater utilities provide a mechanism for raising funds dedicated to stormwater management and create the opportunity for a number of implementation activities, including the construction, operation, and maintenance of stormwater infrastructure, and the development of related water quality programs and public education. This paper provides examples of prevalent stormwater management practices, operations, and finance systems, based on reviews of stormwater management from around the country. The role of the state government to authorize the local creation of stormwater utilities is also discussed.

About the Author

MicKenzie Roberts-Lahti worked as a 2014 summer intern at New Jersey Future. From Indianapolis, she is a member of the Princeton University class of 2015 earning a degree in public and international affairs from the Woodrow Wilson School with a certificate in humanistic studies. MicKenzie can be reached at mrrobert@princeton.edu.

Table of Contents

The Impacts of Ignoring Stormwater

New Jersey faces an extensive and expensive set of problems because of inadequate stormwater management. When storms occur, rainwater can either soak back into the ground or run off of **impervious surfaces**, like roads, roofs, and parking lots, into stormwater sewer systems and ditches or directly into waterways. When water runs off of streets, buildings, or yards, it can carry with it dirt, debris, bacteria, and chemicals like pesticides, fertilizers, and gasoline that can pollute lakes, streams, wetlands or the ocean. Runoff in large volume and force, when there is no open space or constructed stormwater management infrastructure to help absorb and capture the water, can result in major flooding and property damage.

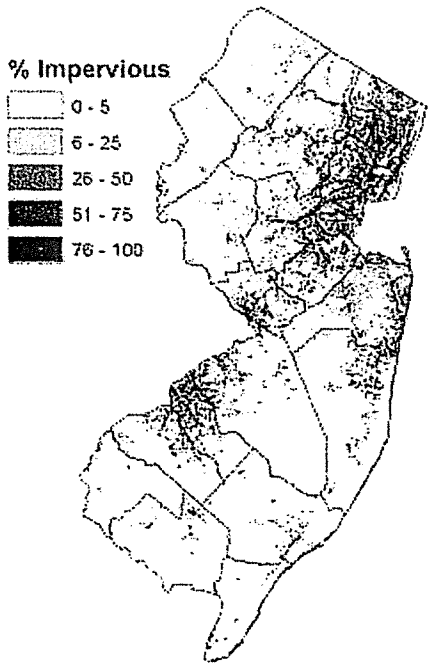


Figure 1. Impervious surface covered 10 percent of New Jersey's land area in 2002. *(Source: "Integrating Impervious Surface Management and Smart Growth Development in New Jersey.")*

With such a large percentage of impervious surface, New Jersey in particular faces serious water pollution and flooding issues. According to a Rowan University report, as of 2002 New Jersey's impervious surface made up 490,000 acres or 10 percent of the state's land area.[1]

While **gray infrastructure**, or the traditional engineered solutions such as storm drains, pipes, and outfalls, is designed to collect and transfer runoff, sometimes that infrastructure fails. Unlike wastewater and drinking water infrastructure, which are paid for by water rates, stormwater conveyances systems in New Jersey lack a dedicated funding source and receive few upgrades and little maintenance once built.[2] Since this infrastructure is durable, the systems often go unmonitored and unattended until they break down due to age or erosion. In some cases, the infrastructure is simply inadequate to manage stormwater, especially as increased development and large storm events generate more runoff.

New Jerseyans experience the negative effects of stormwater runoff firsthand when aging stormwater infrastructure breaks, resulting in major flooding. Other impacts of inadequate stormwater management may include an increase in contaminated drinking water, sinkholes,

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[1] Hasse and Dornisch, *Integrating Impervious Surface Management and Smart Growth Development in New Jersey*, 11. This report assesses that impacts on chemical balances (including pH, chloride, sulfate, and nitrogen) and vegetation and animal health become measurable at impervious cover proportions as low at 10%.

[2] Van Abs, *Water Resources Baseline Assessment Report*, 17.

closed businesses, property damage, sewage overflows, and a resulting decline in living conditions. Especially concerning for New Jersey's vast urban population is the Federal Emergency Management Agency's (FEMA) estimate that nationwide up to 25 percent of economic losses from flooding result from urban drainage. These problems can affect the ecological, health, and economic aspects of citizens' daily lives.

New Jersey's 21 cities that have combined sewer systems (CSSs) experience greater difficulty in handling their stormwater. Combined sewer systems have underground conveyance that carries both sewage and stormwater in the same pipe to treatment facilities. When there is too much sewage and stormwater to process, untreated pollutants overflow into waterways causing combined system overflows (CSOs). Sewage may also backup into streets, near homes, and in waterways that supply drinking water, creating a health threat for the community. Many CSSs have underground water infrastructure well past their useful lives, some over 100 years old.[3] The U.S. Environmental Protection Agency (USEPA) estimates that fixing CSOs could cost New Jersey $9.3 billion.[4]

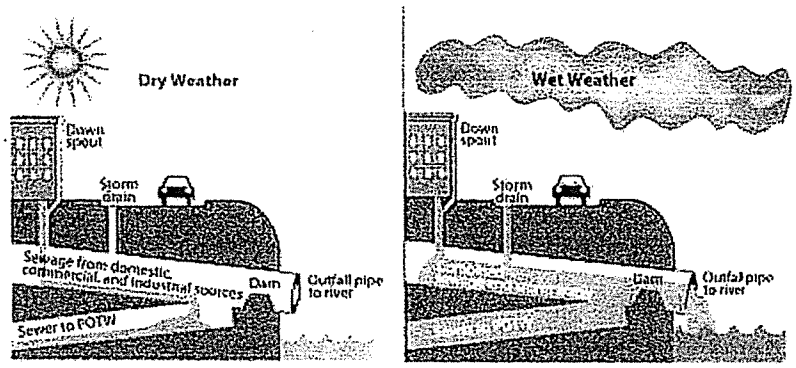

Figure 2. 21 New Jersey cities have combined sewer overflows where rainwater mixes with sewage and flows into waterways. *(Source: USEPA.)*

Stormwater management problems span urban, suburban, and rural municipalities, above and below ground. In 2008, the USEPA ranked stormwater management as New Jersey's most expensive water-related funding need.[5] To meet stormwater management compliance requirements under the Clean Water Act, the USEPA estimates that New Jersey will need to spend $15.6 billion.[6] While the USEPA's Clean Water Act and New Jersey Department of Environmental Protection (NJDEP) have adopted regulations requiring municipalities to manage stormwater, many towns lack resources and often choose to divert money and staff power to more urgent concerns.[7]

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[3] Van Abs, *Water Infrastructure in New Jersey's CSO Cities*, 1.
[4] *Facing Our Future: Infrastructure Investments Necessary for Economic Success*, 34.
[5] *Clean Watersheds Needs Survey 2008 Report to Congress*, 2–18.
[6] Ibid., vii.
[7] Peifer, "Is It Time for Stormwater Utilities?," 23.

Under the Clean Water Act and related state statutes and regulations, municipalities are mandated to install controls to prevent pollutants in stormwater runoff from entering local waterways. Stormwater management seeks to reduce, control, and prevent rainwater runoff through a variety of strategies intended to induce or control infiltration of water and associated pollutants into the soil. If rainwater cannot infiltrate into the soil fast enough or there is a lot of impervious surface, runoff is produced that can lead to flooding. NJDEP regulations also require municipalities to create and carry out a stormwater management plan that reduces flooding damage, minimizes runoff, and decreases pollutants in rainwater runoff, among other things.[8] Municipalities must review the stormwater management components of new development and redevelopment projects.

The practice of stormwater management in New Jersey has evolved progressively over the years. Originally, stormwater management took on the simple task of moving water away from developed areas to prevent flooding. This approach relied on stormwater sewer conveyance systems, typically ditches and underground pipes, to relocate the rainwater to waterways. In the 1980s, as more development occurred (with a corresponding increase in impervious surfaces), and as New Jersey adopted its Stormwater Management Rules (1983, N.J.A.C. 7:8), stormwater management in new developments in the state began to rely upon detention basins.[9] Detention basins are designed to hold stormwater during a rain event and then release it slowly through a concrete low-flow channel and outlet structure, often into an adjacent water body.[10]

Stormwater Management seeks to reduce, control, and prevent rainwater runoff through a variety of strategies intended to induce or control infiltration of water into the soil and associated pollutants.

In 2004, the NJDEP adopted updated stormwater management regulations that established more stringent controls on stormwater quality and quantity generated by new development and redevelopment. The rules included four new requirements: 1) control of water quantity either by reducing by specified percentages the peak runoff flow rates leaving a site after development, or by matching the pre-development volume of water runoff; 2) groundwater recharge[11] to mitigate deficits caused by development; 3) protection of water quality by requiring a certain percent of pollutant removal and filtering before stormwater flows downstream or into groundwater;[12] and 4) use of nonstructural strategies for site design relying on Best Management Practices (BMPs) that can reduce downstream impacts on stormwater quality and quantity.

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[8] *Municipal Stormwater Regulation Program*, 1.
[9] Friedlich, Stormwater Management in New Jersey Interview.
[10] *New Jersey Stormwater Best Management Practices Manual, 1-2.*
[11] Ibid.
[12] Friedlich, Stormwater Management in New Jersey.

Stormwater management practices in New Jersey have responded to the 2004 regulatory requirements. Many new development and redevelopment projects are beginning to utilize Low Impact Development (LID) practices to design sites to handle stormwater similar to the way they did before development.[13] LID typically involves careful site planning and decentralization of stormwater management techniques throughout the site. [14] For example, instead of a installing a central stormwater detention basin, the developer may minimize site disturbance through preserving important natural features such as native vegetation; reducing impervious cover; and minimizing turf grass lawns where water does not infiltrate as deeply.[15] Decentralized stormwater BMPs, such as porous pavement that allows water to soak through and bioretention basins where stormwater collects in a treatment area that naturally filters out contaminants and sedimentation, are more common in LID designs. Once stormwater infrastructure is installed, homeowners' associations typically have responsibility over managing it; less frequently they may transfer that responsibility to the local government.

Stormwater management is an ever-expanding subject with new practices, technologies, processes, programs, and methods to handle runoff. There is a growing shift towards strategies that use natural processes. One increasingly popular strategy for both new and existing development is the use of **green infrastructure**. Green infrastructure uses vegetation, soils, and natural processes in areas with impervious surfaces to allow for more stormwater to be absorbed into the ground instead of being piped into streams through gray infrastructure.[16] Many of the best management practices for stormwater now focus on finding new ways to utilize green technology, such as vegetated roofs and walls, rain gardens and pervious pavements, and promoting groundwater recharge.

Outside of developments where homeowners' associations or property owners hold responsibility for stormwater management, municipalities are generally responsible for managing stormwater. Operationally, local governments – typically the local public works or sewer department staff – are responsible for operating and maintaining such publicly-owned stormwater infrastructure as drainage systems for local roadways, stormwater basins, underground conveyance systems and stormwater inlets and outlets. State and local government transportation agencies also install and maintain stormwater infrastructure that serves roads and bridges under their jurisdiction.[17] Municipalities also typically conduct street sweeping and sometimes run anti-pollution awareness campaigns to help improve the quality of runoff before it enters the storm sewer system.[18]

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[13] *New Jersey Stormwater Best Management Practices Manual.*
[14] Friedlich, Stormwater Management in New Jersey Interview.
[15] Ibid, 2-1.
[16] *The Economic Benefits of Green Infrastructure.*
[17] Cesanek, Current State of Stormwater Management in New Jersey.
[18] Friedlich, Stormwater Management in New Jersey.

But unlike sewer and drinking water systems, where repairs and treatment are funded directly by user fees, stormwater management systems in New Jersey lacks a consistent, dedicated funding source. Despite a complex network of stormwater management systems, local governments often do not maintain records of the location and condition of stormwater infrastructure. Within the local public works or sewer department, ongoing stormwater maintenance and operations compete for funds and staff power with other priorities. Inconsistent funding makes it hard to plan for long-term stormwater infrastructure repairs and improvements.[19] The generally durable nature of stormwater infrastructure often means maintenance and repairs are deferred year after year.[20] When faced with a largely unseen and expensive maintenance project that will require large quantities of taxpayer money, local officials often choose to put it off.[21]

Stormwater Utilities

In over 1,400 municipalities nationwide, local governments have begun to use **stormwater utilities** as a way to assign responsibility for repairs, develop asset management plans, and set up a stable financial support system.[22] A stormwater utility, like a water and sewer utility, is an assessment district established to collect funds specifically for stormwater management.[23] A customer's rate is usually determined based on the customer's contributions of stormwater runoff into the infrastructure system, and may go directly towards a stormwater utility's infrastructure maintenance and upgrades, plan development and control measures, and water-quality programs.[24]

Although defined as a "stormwater utility," the entity that uses the stormwater management fee does not have to run as a separate utility and is frequently given to a city's public works or water department to manage. From Oregon to Ohio to Florida, 41 states allow their municipalities and counties to decide if a stormwater utility fits their needs.[25] Within those governing bodies, 82 percent of the utilities reported jurisdiction over only one city, with 9 percent supporting a county and 3 percent having regional authority.[26] Municipalities with stormwater utilities vary in size and location. Interestingly, the states with the highest number of stormwater utilities are those with younger development, such as Washington, Texas, Florida, Wisconsin, Ohio, and

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[19] Peifer, "Is It Time for Stormwater Utilities?," 23.
[20] Peifer, "Is It Time for Stormwater Utilities?", 23.
[21] Cesanek, Current State of Stormwater Management in New Jersey.
[22] Kaspersen, "The Stormwater Utility: Will It Work in Your Community?".
[23] Ibid.
[24] Ibid.
[25] *2012 Stormwater Utility Survey*, 3.
[26] *Ibid., 7.*

Minnesota.[27] Stormwater utilities can provide municipalities with the resources necessary to responsibly maintain and manage existing systems.

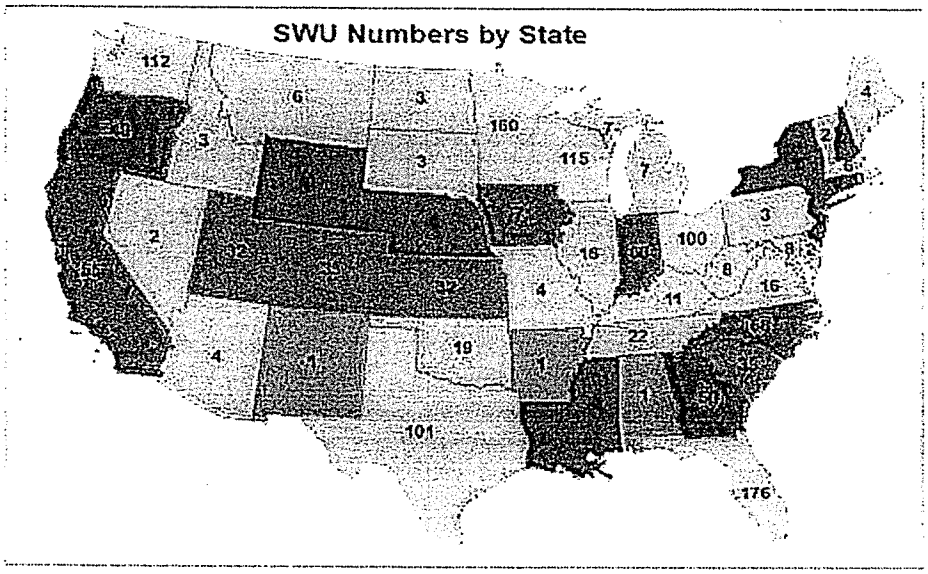

Figure 2 Number of stormwater utilities by state. Blue designates those states with more than 100 and red designates those with no stormwater utilities. Despite have younger development than New Jersey, Minnesota, Florida, and Wisconsin are the leaders in implementing stormwater utilities. *(Source: "Stormwater Utility Survey 2011." Western Kentucky University.)*

New Jersey law does not explicitly authorize local governments or utilities to create stormwater utilities. Some New Jersey CSO cities are exploring ways in which they may be able to establish stormwater fees legally. Their position centers on the argument that municipalities and utilities should be able to charge for the control or treatment of stormwater because technically it becomes sewage once it enters a combined system. While existing statutes on sewer rates apparently allow CSO municipalities to charge for stormwater contributions to combined sewers, other municipalities lack clear authorization to charge for stormwater management. Historically, New Jersey's attempts to enable stormwater utilities have been thwarted due to concerns about the creation of a new fee on residents and businesses. In 2010, Governor Chris Christie vetoed a bill that would have set up a stormwater management utility pilot project to protect Barnegat Bay and require the NJDEP to create a stormwater utility guidance manual.[28] In 2012, a bill to grant municipalities, counties, and county utility authorities the power to establish stormwater utilities for areas served by combined sewer systems passed the Assembly, but was stalled in the Senate

[27] Campbell, *Stormwater Utility Survey 2013*, 3.

[28] The struggle to pass these bills authorizing a stormwater utility likely comes from concerns that the new fee may become an added tax burden. Peifer, "Is It Time for Stormwater Utilities?".

Budget and Appropriations Committee.[29] These legislative attempts have continued, albeit unsuccessfully.[30]

[29] "Bills 2012-2013: A2641."
[30] Bates, "NJ Has No Stormwater Utilities Post-Sandy."

Characteristics and Choices for Stormwater Utilities

This section surveys the common characteristics of stormwater utilities in place around the country, based primarily on two comprehensive national surveys: the Black and Veatch Consulting *2012 Stormwater Utility Survey* and Western Kentucky University's *Stormwater Utility Survey 2013*.

Stormwater utilities have various options for who administers the stormwater utility program. According to Black and Veatch, 46 percent of the surveyed municipalities have a stand-alone stormwater utility; 21 percent added stormwater management to the applicable water and wastewater utility; and 28 percent combined the utility with the local department of public works.[31] After responsibility is assigned, there are many options for which operations to conduct, which technologies to use, what plans to develop, and how to oversee existing systems.

USEPA Stormwater Utility Resources

The USEPA provides a wide variety of resources to help assist municipalities in establishing and managing a stormwater utility:

- *National Menu of Stormwater Best Management Practices* – online database of all tools related to Public Education, Public Involvement, Illicit Discharge, Construction, Post-Construction, and Good Housekeeping.
- *Integrated Planning Technical Assistance* – technical support offered to communities looking to develop and implement an integrated approach to meeting Clean Water Act requirements.
- *Resource Guide to Effective Utility Management and Lean: Improving Performance and Addressing Key Management Priorities at Water-Sector Utilities* – report available online for water-sector utilities looking to implement better management and risk assessment practices.
- Stormwater Utility Case Studies – online reports that assess the application of stormwater utilities in such communities as Philadelphia, PA; Lancaster, PA and Hillsboro, OR.

System Evaluations. The structure and character of a stormwater utility depend upon the different needs of each community, which include the state of the existing stormwater system. Understanding the location, age and type of stormwater infrastructure is essential to the effective ongoing operation and maintenance of the comprehensive system.

Master Plans. Around the country, 84 percent of stormwater utilities surveyed reported having developed stormwater master plans, and 19 percent reported having long-term control plans.[32] Other plans developed by stormwater utilities include integrated wet weather management plans to meet state and federal regulations for stormwater management, and integrated water resource plans. With its system evaluation made, a utility can develop plans that ensure proper design for stormwater collection and treatment within new development projects.[33]

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[31] *2012 Stormwater Utility Survey*, 7.
[32] *2012 Stormwater Utility Survey.*
[33] "STORMWATER 101."

Above-Ground Equipment Maintenance. A stormwater utility can finance the more visible aspects of stormwater management. The utility would take over responsibility for such maintenance as cleaning stormwater inlets, outlets, ponds, and retention basins used to collect water runoff.[34] Black and Veatch report that 91 percent of CSSs and 98 percent of separate storm sewer system utilities budget for inlet and outlet maintenance.[35]

Above-Ground Pollution Prevention. Fifty-five percent of CSSs and 82 percent of separate storm sewer system utilities finance street sweeping that helps prevent pollutants from entering the system when it rains.[36] The utility can oversee the construction of stormwater runoff and collection systems in development projects to help prevent erosion.[37] In cases of emergency chemical spills or flooding, the stormwater utility can finance and create an emergency response team to prevent pollution of area waterways.[38] Public alerts keep citizens informed on the direct impact of their actions. Other pollution prevention activities engaged in by utilities include illegal-discharge detection to stop hazardous spills and dumping; construction of detention and retention basins, which collect water and release it slowly, and of constructed wetlands to restore the native habitat and create a biofilter to remove pollutants; and control of lawn herbicides and pesticides as a way to limit the chemicals in stormwater runoff.[39] A stormwater utility can also take responsibility for water sampling of creeks and pollution surveys to identify and address sources of pollution.[40] Financing pollution prevention can help to decrease the costs of treatment once the water has entered the stormwater system.

Public Pollution Alerts. Stormwater utilities can communicate with the public on the current status for pollutants entering the local waterways, which helps to prevent further pollution. Philadelphia uses its stormwater revenues to produce the Philly RiverCast, a daily forecast of the Schuylkill River water quality for recreational activities,[41] and CSOCast that alerts the public to combined sewer overflows.[42]

Green Infrastructure. Maintaining and monitoring current assets also presents the opportunity to promote innovations in stormwater management. Green infrastructure uses vegetation, soils, and natural processes to capture stormwater where it falls, before it can enter the gray-infrastructure pipe system.[43] Since green infrastructure increases vegetation and allows for more

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[34] Ibid.
[35] Inlets and outlets are the gray infrastructure drains in which the stormwater enters and exits. *2012 Stormwater Utility Survey*, 13.
[36] Ibid.
[37] "STORMWATER 101."
[38] Ibid.
[39] *2012 Stormwater Utility Survey*, 9.
[40] "STORMWATER 101."
[41] "Philadelphia Water Department Philly RiverCast."
[42] "Philadelphia Water Department CSOcast."
[43] *The Economic Benefits of Green Infrastructure.*

Green Infrastructure Incentives

According to Black and Veatch, 37.3 percent of utilities surveyed have a credit program for those properties that either reduce demand on the stormwater system and/or reduce the utility's cost of service through green infrastructure. As a way to promote on-site stormwater management, many stormwater utilties give a rebate for the instillation of certain green infrastructure techniques that help reduce impervious surface and absorb or store water on-site. Seventy-two percent of those programs that offer credits place a cap on the total amount that can be offered.

Green infrastructure techniques that receive fee credits or rebates include:

- Rain barrels
- Green roofs
- Rain gardens
- Porous pavers.

planted areas, greater flood protection, cleaner air and cleaner water, it is especially useful in an urban setting with large quantities of impervious pavement.[44] Green infrastructure can be created directly by stormwater utilities or by private property owners. Many cities offer property owners reductions in stormwater utility fees in return for the instillation of green infrastructure.[45]

Meeting Permit Requirements. Some municipalities, such as Lancaster, Pa., are establishing new approaches to the USEPA mandated permit requirements system by using integrated strategic plans.[46] Most municipalities, instead of creating a comprehensive plan that addresses multiple permit requirements, choose to act only on individual requirements.[47] This has proven to be inefficient since permits have overlapping requirements that can be addressed more efficiently together.[48]

Developing an integrated and tactical planning approach can serve as a holistic way to help bring states up to date and in compliance with existing nationwide standards. A stormwater utility can help provide the funding and management needed to fulfill the purpose of the permit system through holistically improving the community's treatment and use of stormwater.

Asset Management, Financing, and Billing

Asset Management. The implementation of a stormwater utility encourages asset management, which uses strategies to preserve and extend the service life of long-term gray and green infrastructure. Implementing asset management involves conducting a comprehensive assessment to map the physical location and condition of all assets in a system, and to identify the most critical assets, which then facilitates more effective planning and prioritizing of capital renewal and investments. The USEPA has defined a framework for stormwater asset management through its Best Management Practices (BMP), which outline technologies, and its

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[44] Ibid.
[45] "EPA Funding Stormwater."
[46] *2012 Stormwater Utility Survey,* 8.
[47] *Ibid.*
[48] Ibid.

Effective Utility Management (EUM) guide, which describes strategies to monitor and maintain assets.[49] The stormwater BMP are a list of techniques promoted by the USEPA to design, implement, and evaluate stormwater management efforts.[50] Municipal utilities like Hillsboro, Oregon, use both the BMP and EUM guide for their stormwater utility.[51] Although the EUM guide was designed for water and wastewater systems, it promotes Total Water Management that easily can include stormwater management.[52]

Fee Systems. Ninety-one percent of surveyed stormwater utilities reported that over 75 percent of their revenues come from stormwater user fees, with the rest of the financing from bonds or taxes.[53] Fee systems come with a variety of options. A few utilities base charges on a property's water usage according to the water meter.[54] This system is best for those utilities that use the fee primarily to support water quality improvement.[55] Other stormwater utilities, however, choose either to charge a flat rate for residents or base the fee on property specifics.[56] There are three main rate structures for single-family residential parcels:

- **Uniform flat fee.** Used by about 55 percent of surveyed stormwater utilities, this system is a simple way to offer the same rate to all homes despite the quantity of impervious surface on the property.[57]
- **Individually calculated.** Calculated using the *Residential Equivalent Factor (REF)* technique, this system represents 18 percent of utilities surveyed.[58] A REF measures the amount of runoff from different land uses.[59] Although a fair system, the calculations can be complicated because charges are based on the average runoff from similar parcels of a given size.[60]
- **Tiered rates.** This fee structure uses various pricing ranges, or tiers, based on the extent of impervious coverage present.[61] Thirty percent of surveyed utilities use this fee system.[62]

Ultimately, it is up to the utility to decide which system matches the needs of the municipality.

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[49] "Effective and Sustainable Water Utility Management."
[50] "Stormwater Management Best Practices."
[51] Taniguchi-Dennis, Diane, "Leveraging Utility Performance with Effective Utility Management and Lean/Six Sigma, Presentation by Clean Water Services."
[52] Ibid.
[53] *2012 Stormwater Utility Survey*, 11.
[54] Cesanek, Current State of Stormwater Management in New Jersey.
[55] Campbell, *Stormwater Utility Survey 2013*, 9.
[56] Ibid.
[57] *2012 Stormwater Utility Survey*, 13.
[58] *Ibid.*
[59] Ibid., 5.
[60] Ibid.
[61] Ibid.
[62] *Ibid.*

Billing. There is a variety of options for how to collect a stormwater utility fee. Nationwide, the average monthly single-family residential fee in 2013 was $4.57.[63] Who is billed also varies across stormwater utilities. Sixteen percent of utilities charge each resident, while 73 percent charge the property owner or landlord. [64] The fee can be included with tax bills, included with water and sewer bills, or billed via a separate stormwater bill.[65] About 61 percent of stormwater utilities bill on a monthly basis; others bill annually, quarterly, bimonthly, or semiannually.[66] The fee may come with discount options for low-income, elderly, disabled residents, or if the property is an educational institution, although 76 percent do not offer discounts.[67] Many cities, including Philadelphia, offer a credit or reduced fee for properties that install green infrastructure.[68] This incentivizes property owners to manage stormwater on-site by installing rain barrels, planters, rain gardens, green roofs, and various other infiltration techniques.[69]

Advancing Stormwater Utilities in New Jersey

State Authorization. With the possible exception of New Jersey's CSO municipalities,[70] legislative authorization by the state would provide municipalities with the ability to create a stormwater utility. Current legislation, such as The Stormwater Management Act, should be clarified and extended in order to grant municipalities, groups of municipalities, counties, or regional government agencies the authority to develop and implement a stormwater utility if they so choose.[71] General government and utility authority powers should provide provisions for stormwater utility functions under existing water, wastewater, and flood control laws. [72] Once powers are clarified legislatively, state agencies such as the NJDEP, should look to provide guidance for successful implementation of stormwater utilities at the local level.[73] Already, the USEPA provides best-practice methods that can be analyzed further to determine which will work best for New Jersey.[74] Without this step at the state government level, local governments may not have the option of providing proper stormwater management to their local communities.

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[63] Ibid., 2.
[64] *2012 Stormwater Utility Survey*, 16.
[65] Ibid., 15.
[66] Ibid.
[67] Ibid.
[68] *Promoting Green Infrastructure*, 2.
[69] *Homeowners Guide Stormwater Management.*
[70] As mentioned previously on page 8, while New Jersey law does not explicitly authorize local governments or utilities to create stormwater utilities, some CSO cities are exploring whether or not existing regulations would permit them to legally establish stormwater fees.
[71] Cesanek, *Recommendations for Stormwater Utility Implementation in New Jersey*, 1, 5, 6.
[72] Ibid.
[73] Ibid.
[74] "Stormwater Management Best Practices."

With legislation passed, the municipalities and regional entities will have the option whether to create, oversee, and regulate the stormwater utility. If a watershed spans multiple municipalities seeking to implement a new utility, creating a regional utility, or creating a special assessment district that charges only those who affect the watershed, may work best.[75] It may be simplest in many areas for the pre-existing water and sewer utilities to expand to include stormwater management.

Building Support through Education at the Local Level. Educating the public remains one of the most important tasks in gaining community support for a new stormwater utility. Public education on the needs and benefits of stormwater management is also considered one of the greatest challenges current stormwater utilities face.[76] By developing a holistic education campaign, stormwater utilities can help citizens understand better and support the proposed uses for the new utility fee.[77] An education campaign will also encourage community members to implement green infrastructure practices that can help lower the utility fee for individual properties and for the whole community. Forty-eight percent of utilities found that ongoing public information and education campaigns are essential to the continued success of user fee-funded stormwater utilities, with another 43 percent finding it helpful.[78] In order for New Jersey municipalities to implement a stormwater utility successfully, citizens must recognize their role as key stakeholders in helping prevent infrastructure failures, flooding, property damage, and poor water quality.

[75] "EPA Funding Stormwater," 2.
[76] Ibid., 19.
[77] Ibid.
[78] Ibid.

Conclusion

Problem. New Jersey residents, businesses and its environment suffer from the effects of inadequate stormwater management, including flooding and water pollution, and these effects are likely to worsen as stormwater infrastructure continues to age. Outside of municipalities with combined sewer systems, New Jersey local governments and utilities lack the specific authority to raise dedicated funds to address these issues.

Solution. Stormwater utilities have been created across the country by local and regional governments to raise funds and assign responsibility for evaluating and managing stormwater assets. These utilities enable local governments to reinvest in infrastructure and plan for future improvements before emergency repairs are needed. Although a stormwater utility comes with added service fees, communities have the option to decide if they would rather pay a little now to maintain and prevent, or a lot more in the future to repair and replace.

Action. Legislation would clarify local governments' and utilities' authority to use stormwater utilities as a way to finance stormwater management. Such legislation is permissive; it would not require local governments to implement the utility and fee, but will provide them with the option to do so. Then, municipal and utility leaders can begin to evaluate the many options and opportunities a stormwater utility provides.

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