

Report

Town of
Middletown
Rhode Island



Phase II
Stormwater
Management Plan

December 2003
Updated May 2008
Revised April 2009

The Louis Berger Group Inc.



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1.0 INTRODUCTION

1.1 PROJECT PURPOSE

The Rhode Island Pollutant Discharge Elimination System (RIPDES) Program enacted Phase II Storm Water regulations that require operators of municipal separate storm sewer systems (MS4s) to implement programs and practices to minimize pollution from storm water runoff. The regulations require MS4s within urbanized or densely populated areas, such as the Town of Middletown, to develop storm water management programs and to obtain RIPDES Phase II storm water permits.

The Town of Middletown initiated development of their storm water management program by retaining the Louis Berger Group, Inc. (Berger) to develop a Storm Water Management Program Plan (SWMPP) for the Town in 2003. Funding for the initial development of the SWMPP was provided in part by a grant from RIDEM's non-point source pollution grants program. The goal of the SWMPP is to reduce the adverse impacts to water quality, aquatic habitat and human health by instituting the use of controls on the unregulated sources of storm water discharges that have the greatest likelihood of causing continued environmental degradation.

The SWPPP was revised Berger in 2005 in accordance with comments received from RIDEM. In 2008, the SWPPP was revised again to address applicable provisions of the *Total Maximum Daily Loads for Phosphorus To Address 9 Eutrophic Ponds in Rhode Island* (Eutrophic Pond TMDL), which was finalized by RIDEM in September 2007. During this revision, the entire document was updated to reflect the current status of Middletown's stormwater management program.

1.2 BACKGROUND

The RIPDES Storm Water Phase II regulations are the next step in the U.S. Environmental Protection Agency's (EPA's) and Rhode Island Department of Environmental Management's (RIDEM's) effort to preserve, protect and improve the State's waters from polluted storm water runoff. Operators of MS4s within urbanized or densely populated areas are subject to these new regulations.

Urbanized areas are comprised of one or more places and the adjacent densely settled surrounding area ("urban fringe") that together have population of at least 50,000 people. Densely populated areas are census designated places that are located outside the urbanized area and meet the following criteria: 1- the population density is equal to or greater than 1,000 people per square mile; and 2 - it is part of a block of contiguous census designated places with a total population of at least 10,000 people.

The Town of Middletown, Rhode Island, encompasses an area of approximately 13 square miles. The Town is located on Aquidneck Island between the communities of Portsmouth and Newport. It is bounded by water on three sides and contains approximately two square miles of water area (rivers, ponds and streams) within its boundaries.

The Town of Middletown, with a population density of 1,335 persons per square mile, is one of the twenty-five municipalities in Rhode Island that meets the urbanized area criteria and is required to file for a Phase II storm water permit in 2004. A figure depicting the population density of the Town of Middletown is shown in Figure 1-1.

EPA and RIDEM are targeting urbanized areas because numerous studies have shown that the type and density of land use has a direct impact on the volume, rate of runoff and the amount of contaminants present in that runoff. EPA has established six minimum control measures designed to improve water quality by reducing the quantity of pollutants that enter urban drainage systems during storm events.

Under the Phase II Program, Middletown is required to develop and submit a SWMPP that addresses how the town will comply with the EPA established six minimum control measures. The control measures include:

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Controls
- Post-Construction Site Runoff Controls
- Pollution Prevention/Good Housekeeping

This SWMPP, incorporated herein, was developed with invaluable input from the public, town staff and a steering committee developed specifically for this project. Town staff included: Ron Wolanski, Town Planner; Warren Hall, Town Engineer; Tom O’Loughlin, Director of Public Works and Recreation; and Raymond Silvia, Deputy Director of Public Works and Recreation. The steering committee was comprised of the aforementioned town staff plus Jim Crockett, Town Council; John Mello, Town Council; David Lawrence, Planning Board; Gary Paquette, Conservation Commission; and Bill Burns, Conservation Commission.

The following sections each describe a particular minimum control measure, the regulatory requirements for that control measure, a description of the town’s current and/or planned actions, and specific measurable goals with associated target completion years. As also required, each measurable goal identifies a department within the town that is anticipated to be responsible for ensuring that measurable goal is achieved. Listed below are the town officials responsible for each department referenced within the report:

Planning

Ron Wolanski – Town Planner
phone 401-849-4027
fax 401-845-0400

Middletown Town Hall
350 East Main Road
Middletown, RI 02842

Engineering

Warren Hall, P.E., P.L.S. – Town Engineer
phone 401-846-2119
fax 401-845-0404

Public Works

Tom O’Loughlin – Director of Public Works and Recreation
phone 401-846-2119
fax 401-845-0404



STORMWATER MANAGEMENT PLAN, MIDDLETOWN, RHODE ISLAND

Figure: 1-1
Population Density

	The Louis Berger Group, Inc.	Source: RIGIS	File: 1842/GIS/Population	TOWN OF MIDDLETOWN, RI
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2.0 TOWN WATER RESOURCES

2.1 DESCRIPTION OF TOWN WATER RESOURCES

Middletown is bounded by three bodies of water: Narragansett Bay on the west, the Sakonnet River on the east, and the Rhode Island Sound on the south. The town is divided into three watersheds or sub-basins that drain to each of these water bodies. The significant water resources located within the town are listed in Table 2-1.

Table 2-1: Significant Town Water Resources

<ul style="list-style-type: none">▪ Narragansett Bay▪ Sakonnet River▪ Rhode Island Sound▪ North Easton Pond (Green End Pond)▪ Bailey Brook▪ Maidford River▪ Little Creek▪ Paradise Brook▪ Gardiner Pond▪ Nelson Pond

RIDEM has categorized most surface waters of the state according to a water use classification system based on considerations of public health, recreation, propagation and protection of fish and wildlife, and social and economic benefit. Each water body has been designated for specific uses, and the assigned classification is intended to protect the most sensitive uses of that water body.

These water quality classifications (AA, B, SA, SB, etc.) denote the water quality goals for the waterbody, not the present conditions. Within Middletown, waters have been classified as Class SA, SB and AA. (The classifications containing an “S” denote seawaters, the others denote freshwaters.) Following are descriptions of the applicable water classifications from RIDEM’s Water Quality Regulations, July, 2006.

- **AA: Bailey Brook Maidford River, Paradise Brook, North Easton Pond, Gardiner Pond, and Nelson Pond** - This classification is for waters designated as a source of public drinking water supply (PDWS) or as tributary waters within a public drinking water supply watershed, for primary and secondary contact recreational activities and for fish and wildlife habitat. These waters shall have excellent aesthetic value.
- **SA: East Passage of Narragansett Bay (waters in the vicinity of McAllister’s Point)** - These waters are designated for shellfish harvesting for direct human consumption, primary and secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for

aquacultural uses, navigation and industrial cooling. These waters shall have good aesthetic value.

- **SB: Newport Harbor/Coddington Cove** - These waters are designated for primary and secondary contact recreational activities; shellfish harvesting for controlled relay and depuration; and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value.

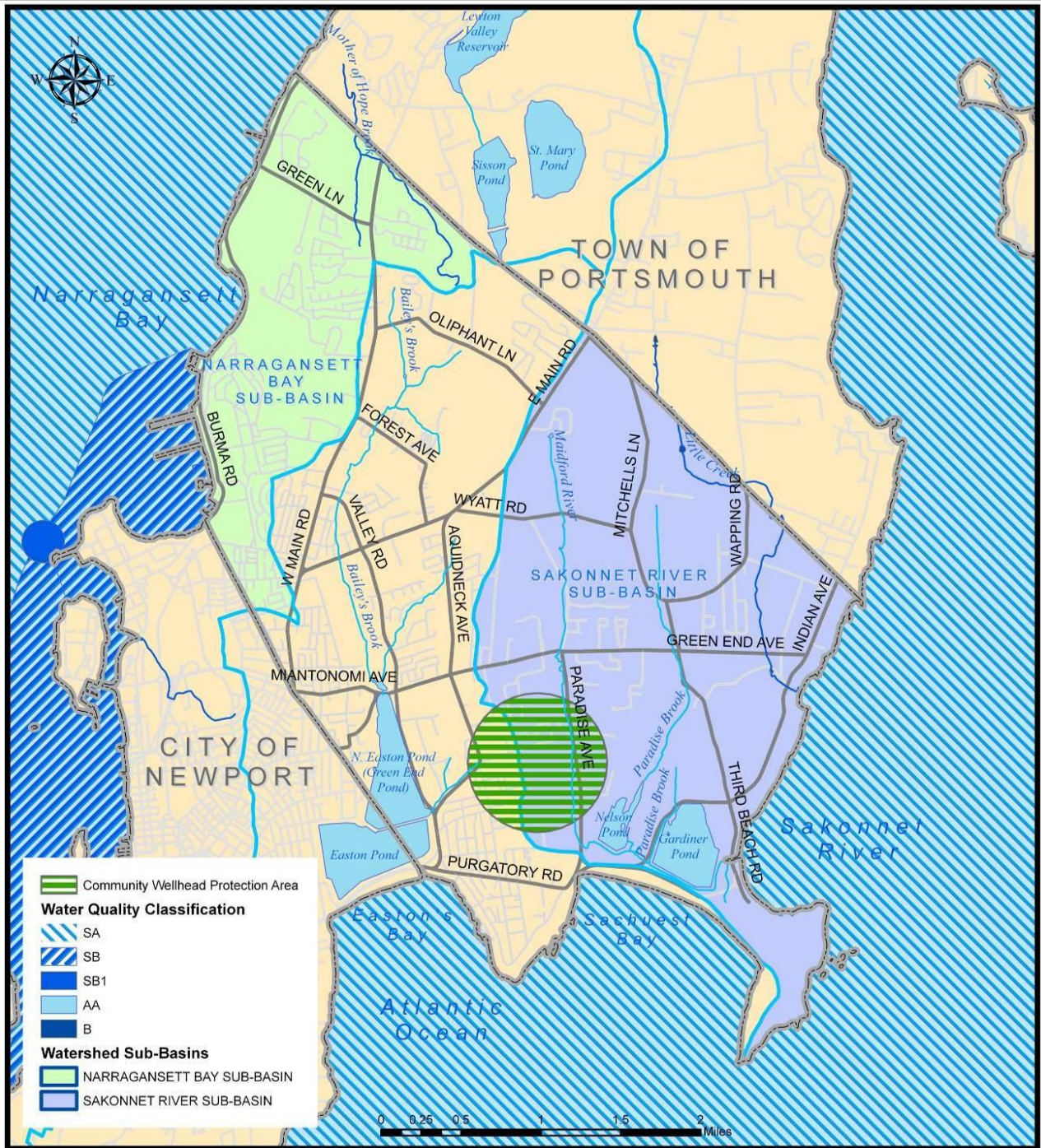
RIDEM has further identified several water bodies in Middletown as Special Resource Protection Waters. These waters have been identified by RIDEM as having significant ecological or recreational uses, such as public drinking water supplies, or tributaries thereto, waterbodies containing critical habitat or special wetland features. The water bodies in Middletown that have been designated as Special Resource Protection Waters include: Bailey Brook, Gardiner Pond, Maidford River, Nelson Pond, North Easton Pond and Paradise Brook.

Middletown watersheds (sub-basins) and significant water resources and their associated water quality classifications are shown on Figure 2-1.

2.2 CURRENT WATER QUALITY CONDITIONS

RIDEM periodically assesses the condition of certain waterbodies in the state utilizing water quality information from a variety of sources including: data collected by state, federal and local agencies; universities; and volunteer monitoring organizations. RIDEM utilizes this information to produce a list of impaired waters called the State 303(d) List, which identifies waterbodies which may not currently meet Rhode Island Water Quality Standards. Total Maximum Daily Loads (TMDLs) are planned to be developed for some of these water bodies. The purpose of a TMDL is to identify the capacity of a water body to assimilate pollutants without impacting its designated uses. The goal of a TMDL is to develop and implement a plan aimed at restoring the impaired water body to an acceptable condition that meets Water Quality Standards and supports its designated uses. The TMDL analysis examines point sources such as industrial discharges as well as nonpoint sources such as storm water runoff.

The list of impaired waterbodies also identifies the scheduled time frame for development of a TMDL. RIDEM has indicated that the ranking is not representative of the severity of water quality impacts, but rather reflects the priority given for TMDL development with consideration to shellfishing waters, drinking water supplies and other areas identified by the public as high priority areas.



STORMWATER MANAGEMENT PLAN, MIDDLETOWN, RHODE ISLAND

Figure: 2-1
Water Resources



The Louis Berger Group, Inc.

Source: RIGIS

File: 1842/GIS/Water Res

TOWN OF MIDDLETOWN, RI



The following five categories are utilized in the draft 2008 303(d) list to describe the appropriate place in the TMDL process for each waterbody:

- Category 1 - Attaining all designated uses.
- Category 2 - Attaining some of the designated uses; and insufficient or no data and information is available to determine if the remaining uses are attained.
- Category 3 - Insufficient or no data and information are available to determine if any designated use is attained or impaired.
- Category 4 - Impaired or threatened for one or more designated uses but does not require development of a TMDL. (Three subcategories):
 - A. TMDL has been completed.
 - B. Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near
 - C. Impairment is not caused by a pollutant.
- Category 5 - Impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

The Middletown waterbodies that are on the State 303(d) list are shown in Table 2-2 along with a summary of the impairments to that waterbody, and their TMDL category. All of the Middletown waterbodies on the 303(d) list are scheduled for development of a TMDL in 2012 with the exception of North Easton Pond, which had a TMDL completed in 2007 (see Section 2.4)

Table 2-2: Impaired Water Bodies

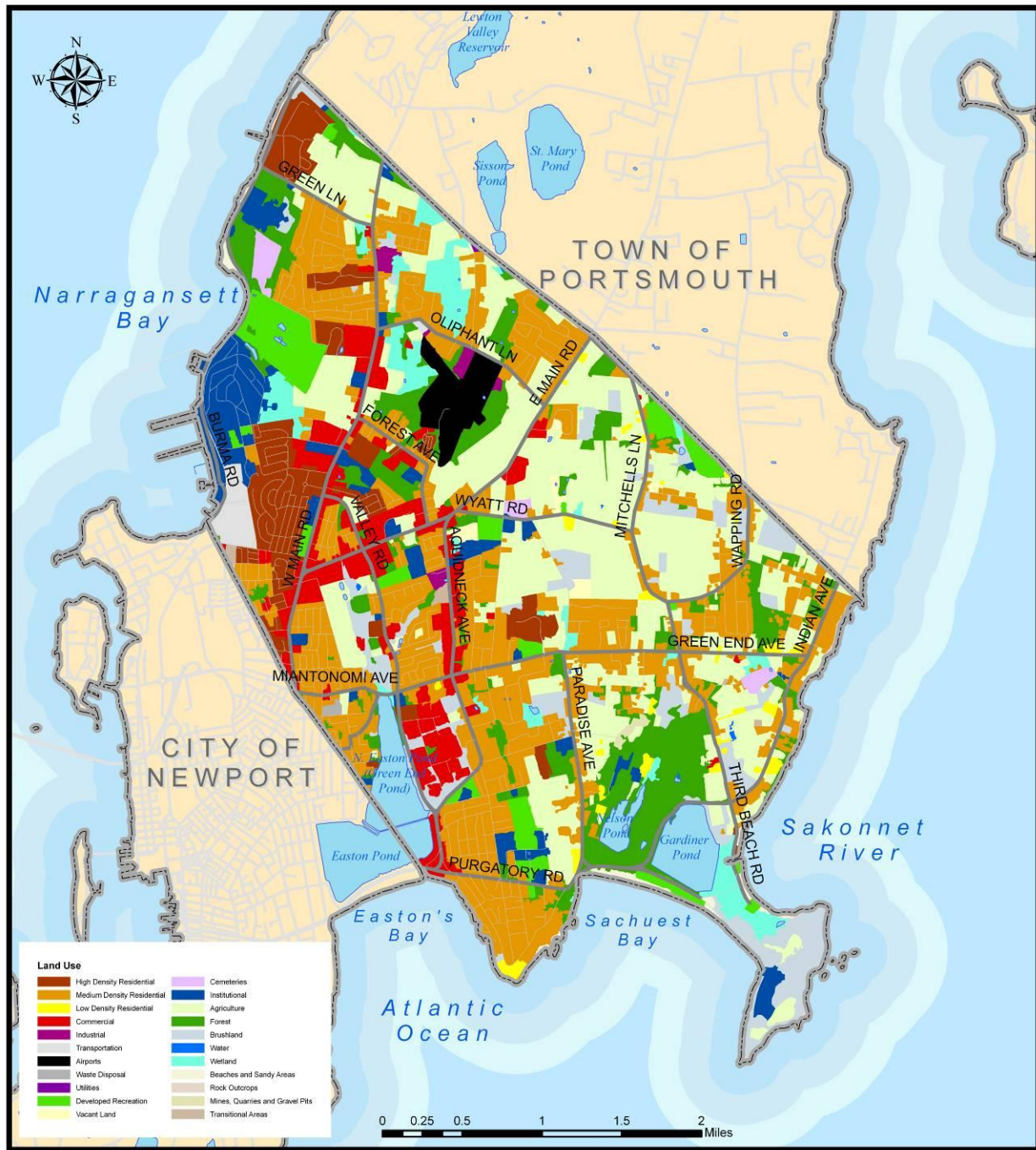
Waterbody	Non-Supporting Uses	Cause/Impairment	Category (TMDL Schedule)
North Easton Pond		Excess algal growth/Chl-A, phosphorus, biodiversity impacts	Cat. 4A (Complete)
East Passage (vicinity of McAllister's Point)	Fish and Wildlife Habitat, primary and secondary contact recreation, shellfish consumption	Sediment Bioassays for Estuarine and Marine Water	Cat. 5 (2012)
Newport Harbor/Coddington Cove	Fish and wildlife habitat	Sediment bioassays for estuarine and marine water	Cat 5. (2012)
Bailey's Brook and Tribs	Fish and wildlife habitat, primary and secondary contact recreation	Benthic-macroinvertebrate bioassessments, lead, enterococcus,	Cat 5. (2012)
Maidford River	Fish and wildlife habitat, primary and secondary contact recreation	Benthic-macroinvertebrate bioassessments, lead, fecal coliform	Cat 5. (2012)
Paradise Brook	Primary and secondary contact recreation	Fecal coliform	Cat 5. (2012)

2.3 LAND USE/SOILS DATA

As described in the Middletown Comprehensive Community Plan - Section IX Land Use (dated 2006), Middletown shows great contrast in its development pattern. The western portion of the town is urbanized and densely populated, while the eastern portion tends to be largely agricultural and undeveloped. Within the town are two principal through highways, East Main Road (Route 138) and West Main Road (Route 114), which have spawned highway oriented commercial development along their frontages as well as significant residential developments set back from the road.

The predominant patterns of urbanization correspond with the natural land forms oriented along three major north south drainage basins. These basins/valleys contribute directly to public drinking water reservoirs. The town's soils and natural ground cover contribute to problems of high water table, soil erosion, poor drainage and periodic flooding.

Current land use in Middletown, as depicted utilizing Rhode Island Geographic Information Systems (RIGIS) data from 2003-2004, is shown in Figure 2-2. Given the highly developed nature of specific sections of Middletown and the continued building on former agricultural lands and undeveloped areas, it is apparent that there is significant potential for storm water quality impacts due to land use.



STORMWATER MANAGEMENT PLAN, MIDDLETOWN, RHODE ISLAND

**Figure: 2-2
LAND USE**



The Louis Berger Group, Inc.

Source: RIGIS

File: 1842/GIS/Land Use

TOWN OF MIDDLETOWN, RI



2.4 NORTH EASTON POND TMDL

In 2007 DEM released the “Total Maximum Daily Loads for Phosphorus to Address 9 Eutrophic Ponds in Rhode Island (“Eutrophic Pond TMDL”). Middletown’s North Easton Pond was one of the nine ponds identified in this TMDL as being impaired by excess phosphorus. The TMDL identified the following major sources of phosphorus to North Easton Pond:

- Bailey’s Brook,
- an unnamed tributary,
- stormwater,
- waterfowl,
- wastewater,
- erosion/sedimentation,
- internal cycling, and
- Rhode island Nursery properties¹.

The Eutrophic Pond TMDL included a shoreline survey of each of the eutrophic ponds and the location of all stormwater outfalls discharging to the ponds and their tributaries – with the exception of North Easton Pond. However, as part of Middletown’s Phase II SWMPP efforts, stormwater outfall discharges in the North Easton Pond watershed were identified; the following table summarizes those discharges.

Table 2-3: North Easton Pond Outfalls

Outfall ID	Coordinates	Size (inches)	Type	Dry Weather Flow
BB01	41.5391°N -71.2899°W	24	RC	Not present
BB02	41.5297°N -71.2917°W	UN	UN	UN
BB02A	41.5297°N -71.2917°W	24	CM	Not present
BB03	41.5241°N -71.2954°W	12	RC	Not present
BB04	41.5240°N -71.2956°W	12	VC	Not present
BB05	41.5203°N -71.2965°W	12	RC	Not present
BB06A	41.5182°N -71.2962°W	8	HDPE	Not present
BB06B	41.5182°N -71.29629°W	12	RC	Not present
BB07A	41.5180°N -71.2960°W	36	CB	Not present
BB07B	41.5180°N -71.2960°W	24	RC	Not present
BB08	41.5083°N -71.2927°W	UN	UN	UN
BBT401	41.5098°N -71.2900°W	UN	UN	UN
GR01	41.5099°N -71.2894°W	48	RC	Not present
NEPT01	41.4965°N -71.2839°W	12	CM	Present
WIL01	41.5300°N -71.2920°W	18	RC	Not Present

NOTES

UN – Unknown; outfall not accessible or could not be located.

CB - CM- Corrugated Metal HDPE – High-Density Polyethylene RC- Reinforced Concrete VC – Vitrified Clay

¹ Potential source.

2.4.1 Water Quality Data

RIDEM has set a Phosphorus standard of 0.25 micrograms per liter ($\mu\text{g/L}$) for shallow ponds. Although water quality data for North Easton Pond and its tributaries is fairly scarce, the available data indicate that water quality within the pond does not meet the RIDEM target.

North Easton Pond

Limited water quality data is available for North Easton Pond; the only data is based on sampling conducted by RIDEM in 2002. For three days of sampling, the average phosphorus concentration was 110 $\mu\text{g/L}$, well above the numeric target set by RIDEM. Sampling results are summarized in the following table.

Table 2-4: Sampling Results for North Easton Pond

Date	TP surface ($\mu\text{g/L}$)	TP bottom ($\mu\text{g/L}$)	DP surface ($\mu\text{g/L}$)	DP bottom ($\mu\text{g/L}$)	Chlor-a surface ($\mu\text{g/L}$)	Chlor-a bottom ($\mu\text{g/L}$)	DO surface ($\mu\text{g/L}$)	DO bottom ($\mu\text{g/L}$)
6/21/2002	97	42			17		9.1	
8/15/2002	112	143	13	20	3		7.0	6.8
10/29/2002	144		34	30	15	21	11.0	9.0

Source: Adapted from RIDEM, 2007

NOTES

$\mu\text{g/L}$ – micrograms/liter TP – Total Phosphorus DP – Dissolved Phosphorus Chlor-a – Chlorophyll DO – Dissolved Oxygen

Tributaries

Bailey Brook, the major tributary to North Easton Pond, was sampled 31 times between 1991 and 2003. Samples were collected at a station located at Kempenaar's Clambake Club, approximately one third of a mile north of North Easton Pond. Phosphorus concentration generally ranged from 15 to 150 $\mu\text{g/L}$, with one outlier sample of 2,730 $\mu\text{g/L}$. The average phosphorus concentration, excluding the outlier, was 42 $\mu\text{g/L}$; almost twice RIDEM's target. No data is available for the unnamed tributary; however, the Eutrophic Pond TMDL surmised it may potentially be a significant contributor of phosphorus to the pond.

Outfalls

During a dry weather survey conducted in fall 2007, flow was only present at a single outfall, NEPT01, located on John Clark Road. A sample from this outfall was analyzed for bacteria; results indicated that the concentration of fecal coliform was well below the established water quality criteria for Class A waters.

In addition to determining of the presence or absence of dry weather flow the area surrounding each outfall was observed for the presence or absence of potential indicators of illicit discharges (odors, sheen, stressed vegetation, coloration and staining, algae growth, sedimentation, scouring, and erosion). No visual indicators of illicit discharges were observed at any of the outfalls.

2.4.2 Phosphorus Loading

The Eutrophic Pond TMDL determined the current annual mean phosphorus load to North Easton Pond using the Reckhow model (1979), which is based on the average concentration of Total Phosphorus and areal water loading. Based on this model, the average load of phosphorus to the pond is 1470 kilograms per year (kg/yr). The TMDL also back-calculated allowable phosphorus loading to the pond based on the

25 µg/L RIDEM target, with a ten percent margin of safety. Based on this calculation, the TMDL of phosphorus for the pond is 301 kg/yr; which can be achieved by an 80% reduction below current levels.

2.4.3 Best Management Practices (BMPs)

In the Eutrophic Pond TMDL, RIDEM determined that various structural and non-structural BMPs are necessary to reduce phosphorus loading to North Easton Pond. While the majority of these BMPs are the responsibility of Middletown, others must be implemented by other entities including RIDOT and the City of Newport. The BMPs that Middletown must implement to achieve the goals of the TMDL are incorporated throughout this document; the following table summarizes BMPs for reducing phosphorus loading in accordance with the Eutrophic Pond TMDL.

Table 2-5: Eutrophic Pond TMDL BMPs

BMP ID	BMP Description	Middletown	RIDOT	Newport	Private	Other
Public Education						
3.1	Stormwater Outreach Materials	•				
3.3	Stormwater Webpage	•				
3.4	Target Audiences	•				
3.5	Target Pollutants	•				
Public Participation						
4.2	Volunteer Opportunities	•				
Illicit Discharge Detection and Elimination						
5.3	IDDE Standard Operating Procedures	•	•			
Post Construction Runoff Control						
7.8	Structural BMPs	•				
7.9	Stormwater Management Ordinance	•				
Pollution Prevention and Good Housekeeping						
8.2	BMP Inspection, Cleaning, and Repair	•	•			
Additional Controls						
NA	Waterfowl Control*			•		
NA	Eliminate erosion of stockpiled earth materials to tributaries				•	• ¹
NA	Develop pond sediment management strategy			•		
NA	Investigate potential contribution of RI Nursery Operations				•	• ²

NOTE

NA – Not Applicable

* - Although the TMDL indicates Middletown is a responsible party for this activity, the Town does not own, operate, or have any jurisdiction over North Easton Pond.

1 – RIDEM Office of Compliance and Inspection (OCI)

2 – Natural Resource Conservation Service (NRCS)

3.0 PUBLIC EDUCATION & OUTREACH

3.1 REGULATORY REQUIREMENTS

The success of a SWMPP relies heavily on the input of an informed and knowledgeable community. Public education will improve the town's ability to gain support for the program as more residents will comprehend why it is necessary and important. Additionally, there will be greater compliance with the program as the public understands what personal responsibilities are expected of them. To satisfy the requirements of this minimum control measure, the town must:

- Implement a public education program to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of storm water discharges on local waterbodies and the steps that can be taken to reduce storm water pollution; and
- Determine the appropriate BMPs and measurable goals for this minimum control measure.

3.2 PARTNERSHIPS

Operators of MS4s are encouraged to enter into partnerships with other organizations to reap the benefits of outreach services and support. Several organizations exist that currently provide public education resources on storm water quality issues.

The organizations that have the best potential to enter into a partnership with the Town of Middletown and provide education and outreach materials are the following:

Southern Rhode Island Conservation District (SRICD)

The SRICD provides a variety of environmental services to southern RI communities. Of particular interest is the Active Watershed Education (AWESome!) curriculum. The program offers a watershed education curriculum to teachers and is discussed in detail in Section 4.2. The SRICD can be reached at (401) 822-8832 or <http://www.sricd.org>, and is located at 60 Quaker Lane, Suite 46, Warwick, RI 02886-0114. The SRICD is assisted by its cooperating sister agency, the Northern Rhode Island Conservation District (NRICD).

University of Rhode Island (URI)

- The University of Rhode Island offers several outreach and educational programs through the URI Cooperative Extension Service. Many of these programs may be beneficial to the Town of Middletown in its effort to provide storm water education and outreach. URI Nonpoint Education for Municipal Officials (NEMO): NEMO offers training in the science, management, and regulation of water and water resources. This program is geared toward community leaders and volunteer board members. Its goal is to provide decision makers with the skills and resources to identify local water quality problems and to adopt effective pollution controls. Educational programs range from evening or one-day workshops to intensive small group training tailored to meet the participants' needs and interests. For more information, interested parties should contact Lorraine Joubert, Program Director, at (401) 874-2138 or ljoubert@uri.edu. The URI NEMO

program has recently joined the National NEMO Network which is located at Middlesex County Extension Center, 1066 Saybrook Road, Box 70, Haddam, CT, 06438 or (860) 345-4511.

- Rhode Island Source Water Assessment Program (SWAP): Rhode Island's EPA-approved Source Water Assessment Program is administered by the RI Health, Office of Drinking Water Quality. There are four basic requirements for this program:
 - Delineate the source water protection areas
 - Inventory all potential sources of contamination to the water supply
 - Assess the overall susceptibility of the water supply to contamination; and
 - Make the results of the assessments know to the water suppliers and consumers.

Additional information on this program can be reviewed online at <http://www.uir.edu/ce/wq/program/html/SWAP.html>. Volunteer opportunities and training for interested participants and volunteers are also available.

Cooperative State Research, Education, and Extension Service (CSREES) Water Quality Program

The CSREES Water Quality Program was authorized under Section 406 of the Agricultural Research, Extension, and Education Reform Act of 1998 for an Integrated Research, Education, and Extension Competitive Grants Program. This program provides the necessary flexibility for CSREES to bring the resources of researchers, instructors, and extension educators to national initiatives and programmatic partnerships that target evolving water quality needs.

The New England Extension Water Quality Program focuses on the following areas:

- Volunteer Water Quality Monitoring
- Community-Based Watershed Protection
- Agricultural Best Management Practices
- Residential Pollution Prevention

The community-based watershed management approach may be of most interest to the Town of Middletown. This approach addresses the need for watershed-scale research, technical tool development, and education, while also recognizing that the land use decisions that determine watershed health are largely made at the local level. For more information, contact Art Gold of the Department of Natural Resources Science at URI at (401) 874-2903 or agold@uri.edu.

3.3 EDUCATIONAL STRATEGIES

3.3.1 Existing School Programs

The following is a list of schools in the Middletown Public School System:

- John F. Kennedy Elementary School
- Forest Avenue Elementary School
- Aquidneck Elementary School
- Joseph H. Gaudet Middle School
- Middletown High School

Environmental programs/projects within the Middletown public schools system, like most other school systems, are conducted at the discretion of the individual teachers. In Middletown, some teachers offer

environmental field trips, participate in litter cleanups and incorporate environmental themes into classroom activities. Currently there is no system-wide curriculum for storm water pollution prevention or other environmental issues.

Middletown High School currently offers several classes to strengthen student environmental awareness. An *Environmental Science* course is offered, as well as a *Geology* course. The *Environmental Science* program emphasizes the need for action on problems of overpopulation, resource depletion, and pollution.

3.3.2 Available Educational Resources

A variety of educational resources focusing on environmental issues are available for Middletown School District teachers to utilize. These resources include:

Southern Rhode Island Conservation District: “AWEsome Curriculum”

The Active Watershed Education (AWEsome!) curriculum was developed by the Southern Rhode Island Conservation District (SRICD) and the University of Rhode Island. The AWEsome! curriculum is nationally recognized, and it assists teachers and their students with studying a watershed, participating in hands-on science, and investigating local environmental issues.

The curriculum connects classroom learning with the outside world and encourages active learning. Activities include water quality tests, sampling streams and ponds for aquatic insects, writing and performing watershed plays, creating watershed models, holding mock town meetings, conducting stream clean-ups, and investigating local environmental issues. These activities were developed in an effort to educate children and adults about their watersheds and the critical importance of protecting the water supply.

The AWEsome! Curriculum is comprised of twelve study units:

1. What is a Watershed?
2. Wetland Ecology
3. Wetland Exploration: a Field Trip
4. Water Resources
5. Soil Resources
6. Effects of Land Use on a Watershed
7. Cultural Resource in the Watershed
8. Introduction to Water Quality Issues
9. Point Sources of Pollution: a Field Trip
10. Non-Point Sources of Pollution
11. Non-Point Sources of Pollution: a Field Trip
12. Public Hearing and Citizens Action: a Final Look

The program is geared toward grades K-8, and while the curriculum guide is most readily adaptable for middle-school aged students, all grades from first through eighth are welcome to participate. More information on the AWEsome! Curriculum can be obtained from the Southern Rhode Island Conservation District office at (401) 822-8832, or <http://www.sricd.org>.

U.S. Environmental Protection Agency’s Environmental Education Center (EEC)

The Environmental Education Center, an extensive on-line resource, provides teachers with information from across the agency on areas such as curriculum resources and activities, community service projects, and other subjects. (The EEC can be found at www.epa.gov/teachers/) The resource is useful in

providing educators with curricula for students in grades K-12. More information on educational resources may be obtained from the USEPA Region 1 (New England) office located at 1 Congress Street, Suite 1100, Boston, MA 02114-2023.

Specific curriculum tools pertaining to storm water management and non-point source pollution can be found at:

- www.epa.gov/teachers/background_water.htm and
- www.epa.gov/teachers/curriculumwater.htm

U.S. Geological Survey' s (USGS) Water Science for Schools

The USGS Water Science for Schools web site is found at <http://ga.water.usgs.gov/edu/index.html>. The program offers information on many aspects of water, along with pictures, data, maps, and an interactive opinion and testing center.

U.S. Geological Survey' s (USGS) Water Resources Education Initiative

The USGS Water Resources Education Initiative developed through a cooperative effort between public and private education interests. Program partners include the Bureau of Reclamation, the U.S. Fish and Wildlife Service of the U.S. Department of the Interior, the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the Nebraska Groundwater Foundation, and the National Science Teachers Association.

Poster titles include: “Watersheds: Where We Live”, “Oceans-Coastal Hazards: Hurricanes, Tsunamis, Coastal Erosion”, “Hazardous Waste: Cleanup and Prevention”, “Wetlands: Water, Wildlife, Plants, & People!”, “Water: The Resource That Gets Used & Used & Used for Everything!”, “How Do We Treat Our Wastewater?”, “Navigation: Traveling the Water Highways!”, “Ground Water: The Hidden Resource!”, and “Water Quality...Potential Sources of Pollution”. The posters in the series are designed to be joined to create a large wall mural.

A series of water-resources education posters were developed through the Initiative. All posters are available in color. The reverse sides of the posters contain educational activities for children in either grades 3-5 or 6-8. Copies of the posters in the series can be obtained at no cost from the USGS (specify the poster title and grade levels desired) at:

U.S. Geological Survey
Branch of Information Services
Box 25286 - Denver Federal Center
Denver, CO 80225
Telephone: 1-888-ASK-USGS

Rhode Island Department of Environmental Management (RIDEM): Resources for Students and Teachers

RIDEM offers a variety of student and teacher educational resources on its web site at <http://www.state.ri.us/dem/topics/learning.htm>. The resources are organized by topic and by educational level, ranging from teacher-training opportunities and short courses for environmental professionals to the Adopt-A-Watershed K-12 learning experience. Adopt-A-Watershed uses a local watershed as a living laboratory in which students engage in hands-on activities. The entire inventory of educational resources can be reviewed at the RIDEM web site.

Department of Transportation (DOT)/University of Rhode Island (URI)

As part of the Phase II Storm Water Program DOT is required to develop a Storm Water Management Plan that addresses how pollutants in storm water runoff from state owned/DOT maintained roads can be reduced. As part of their SWMPP, DOT has enlisted the services of URI to develop a public outreach program to inform and educate Rhode Island residents about storm water pollution prevention. Once this program has been developed, DOT plans to make this information available to local towns. Middletown plans to review the public outreach materials that are developed by DOT and URI and utilize those that are appropriate to the town.

3.4 REACHING DIVERSE AUDIENCES

According to the data compiled by the 2000 U.S. Census of the Town of Middletown, RI, for persons aged over 5 years, approximately 9.0% of Middletown residents speak a language other than English, and 2.2% of Middletown residents indicated that they speak English less than “very well.” Spanish is spoken by 2.0% of Middletown residents, Asian and Pacific Island languages are spoken by 1.8% of Middletown residents, and other Indo-European languages are spoken by 5.2% of Middletown residents. English literacy rates for the town are not reported within the 2000 U.S. Census data.

The given Census data indicates that it may not be necessary to conduct a public education and outreach program in a language other than English, given that approximately 98% of the town’s population reports speaking English “very well”. Middletown’s public education program will reach a diverse audience by targeting children as well as adults, and given that Middletown is surrounded by water on three sides it will also reach out to boaters.

3.5 BEST MANAGEMENT PRACTICES

BMP 3.1: Storm Water Outreach Materials

A town-specific water quality educational brochure has been developed based on the RIDEM “10 Simple Things You Can Do to Help Clean Rhode Island Waters” brochure. This brochure provides information on Middletown’s watersheds, and ways residents can improve them including: avoidance of feeding waterfowl, proper pet waste disposal, septic system inspection/maintenance, proper use of fertilizers, hazardous waste reduction, water conservation, volunteering and proper disposal of boat waste. This brochure also contains valuable web addresses and phone numbers where residents can obtain more information on reducing storm water runoff pollution and improving water quality. The town printed and distributed this brochure in 2005, and will conduct a second mailing in 2009. In order to reduce costs, the town will include the brochure with tax documents rather than as a separate mailing. A copy of the brochure is included in Appendix A.

In addition to distributing this brochure with tax documents, the town has made it available at town hall and the public library. Additional materials that have been or will be made available at these locations include RIDEM and EPA published storm water outreach materials such as: “What Do You Know About Nonpoint Source Pollution?” brochure, “Please Do Not Feed Waterfowl” brochure, “Healthy Lawn, Healthy Environment, Caring for Your Lawn in an Environmentally Friendly Way” workbook, and “Septic System Checkup: The Rhode Island Handbook for Inspection”. Additional information on illicit discharge detection and elimination and illegal dumping will also be available at these locations. These materials are currently available from RIDEM and EPA, therefore no additional printing costs are anticipated to make these materials available at the aforementioned locations.

Based on the requirements of the Eutrophic Ponds TMDL, Middletown will incorporate public outreach materials specific to phosphorus into its program. A variety of phosphorus related outreach materials have been developed by other entities; Middletown will customize some of these materials and distribute them to citizens via mass mailing and by providing the materials at public locations such as the Town Hall and Library. Sample phosphorus outreach materials are available at the following locations:

- <http://www.lawntolake.org/P-web.pdf>
- <http://www.cleanwatermn.org/pdfs/BrochureNation.pdf>
- http://www.semcog.org/MunicipalTraining_Landscaping.aspx

The town plans to review the storm water pollution prevention public outreach materials developed by DOT/URI as part of the Phase II program. These materials will be region specific and may provide better detailed information than materials developed by EPA and other national organizations. Middletown will utilize the materials that they deem appropriate for the town.

BMP 3.2: Storm Water Web Page

The town maintains a storm water web page, <http://www.middletownri.com/departments/stormwater.php>. The web page contains information on how residents and businesses can reduce storm water pollution and improve water quality, as well as the town ordinance relating to stormwater. Information included on the web site includes: illicit discharge detection and elimination, hazards of illegal dumping, proper disposal of automotive liquids, avoidance of feeding waterfowl, proper pet waste disposal, septic system inspection/maintenance, proper use of fertilizers and pesticides, hazardous waste reduction, water conservation, volunteering and proper disposal of boat waste.

The web page contains links to EPA's storm water web page, Save the Bay web page and various other water quality resource sites. Most resources that are utilized on the web page have been developed by EPA and other organizations or were developed by Berger as part of this SWMPP contract.

As Middletown maintained a fully-functional web site prior to development of the stormwater webpage, the cost to implement the web page was limited to incorporating existing information and resources on a page within the town's existing site. This took approximately 8 to 10 hours of the Planning Department and town web administrator's time.

Additional information that could be added to improve the webpage includes:

- Additional electronic copies of educational brochures,
- Power Point slides on storm water pollution reduction,
- Map(s) of Middletown with the significant water resources noted and the watershed boundaries delineated
- Installation of a hit counter to track the number of people accessing the page
- Phosphorus specific information.

BMP 3.3: School Curricula

The town will review available storm water and water quality curricula developed by EPA, USGS and other agencies as identified in Section 3.3.2 Available Educational Resources. The town will identify those curricula that provide the best educational tools for improving storm water quality. Information on the top curricula will be provided to the school board and to each public school in Middletown. The cost of reviewing and evaluating available educational materials is expected to be limited to staff time, plus some additional minor costs for copying and sending out the educational materials. Copying and postage costs are estimated at under \$100. It is noted that the town does not have control over the curricula taught

within the public school system, this control is reserved by the teachers and school board. Therefore this information will be provided to the school system to use at their discretion.

BMP 3.4: Target Audience

Given that Middletown is bounded by three bodies of water, Narragansett Bay on the west, the Sakonnet River on the east, and the Rhode Island Sound on the south, it is appropriate that a target audience include boaters. Although there are no marinas in town, the town does own and operate a mooring field. The town plans on distributing educational materials to each of the mooring leasers at the time they renew their lease. The town plans on distributing RIDEM published information regarding the use of pump outs and how to reduce pollution from boat engines. The town will likely include other non-point source educational materials as well. The cost to implement this best management practice is anticipated to be limited to printing costs of approximately \$100, plus staff time to coordinate copying and distribution of materials. The materials are expected to be included with lease renewal information, so no additional postage costs should be incurred.

Due to the requirements of the Eutrophic Pond TMDL, anyone whose activities may lead to phosphorus loading to North Easton Pond is part of an important target audience. This target audience consists primarily of residents of the North Easton Pond Watershed and businesses located in the watershed. Middletown's GIS system can be used to identify residences and businesses located within the watershed; they will be targeted for education about minimizing the adverse effects of lawn fertilizers, discouraging waterfowl, and proper waste disposal. Landscapers, lawn care companies and land developers doing business in Middletown are another part of this target audience. These groups should be educated about low impact development techniques to minimize runoff and promote infiltration, as well as landscape maintenance techniques to reduce the use of phosphorus.

BMP 3.5: Target Pollutants

The pollutants that will be targeted by the public education and outreach program include those that could cause the impairments in the water bodies listed on DEM's 303D List. The impairments to Middletown waterbodies, as described in Section 2.2, include biodiversity impacts, excess algal growth, and pathogens. Therefore the target pollutants will include pathogens and fecal coliform from human and animal sources, and nutrients from fertilizers, ISDS systems and other sources. Within the North Easton Pond watershed, phosphorus will be specifically targeted. If more information becomes available as to the specific pollutant(s) causing the biodiversity impacts, these pollutants will be added as target pollutants.

3.6 MEASURABLE GOALS

The following measurable goals, target dates and responsibility have been established to ensure proper implementation of this minimum control measure:

Table 3-1: Public Education Measurable Goals

BMP ID	Minimum Control Measure Illicit Discharge Detection and Elimination	Responsible Party	Measurable Goal*	Implementation Date
	BMP Description			
NA		Planning/ Steering Committee	Strategies on how to inform the community on how to become involved in the storm water program and how operators will utilize partnerships with governmental and non-governmental entities. (Part IV.B.1.b.2)	Start: 4/04 Finish: 3/05
3.1	Storm Water Outreach Materials	Planning	Town-specific storm water brochure developed which addresses: pet waste, fertilizers, ISDS maintenance, waterfowl pollution and boat pump out information.	Start: 4/04 Finish: 12/04
			Customized materials targeting phosphorus developed.	Start: 4/08 Finish: 9/08
3.2	Storm Water Webpage	Planning/IT	Storm water web page and hit counter added to town web site. Web page to include information on watersheds, impaired water bodies in Middletown, illicit discharge detection, pet waste removal, illegal dumping, proper pesticide and fertilizer use and ISDS maintenance.	Start: 3/05 Finish: 3/06
3.3	School Curricula	Planning/ School Dept.	School curricula developed utilizing EPA and other existing information	Start: 3/06 Finish: 3/07
3.4	Target Audience	Planning	Storm water brochures distributed to residents	Start: 12/04 Finish: 3/05
			Information on storm water posted at transfer station, town hall and library and total number of brochures taken tracked.	Start: 3/05 Finish: 3/06
			Information distributed to town mooring lessees regarding pump out locations and prevention of boat engine pollution.	Start: 3/07 Finish: 3/08
			Information on phosphorus disseminated to residents/business in the North Easton Pond Watershed	Start: 5/08 Finish: Ongoing
3.5	Target Pollutants	Planning	Strategies to list target pollutant sources the public education program is designed to address (Part IV.B.1.b.4)	Start: 4/04 Finish: 3/05
			Phosphorus in the North Easton Pond Watershed targeted.	Start: 5/08 Finish: Ongoing

* Measurable Goals in bold required by the General Permit.

4.0 PUBLIC PARTICIPATION

4.1 REGULATORY REQUIREMENTS

The success of any SWMPP relies heavily on the interaction with and comments of an informed community. The public can provide valuable input and assistance to the development of a regulated SWMPP. The anticipated benefits of public involvement are; broader public support, shorter implementation schedules, a broader base of expertise and economic benefits, and a conduit to other programs as citizens involved in the SWMPP provide valuable relationships with other community and government programs. To satisfy the requirements of this minimum control measure, the town must:

- Comply with applicable State and local public notice requirements; and
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

4.2 VOLUNTEER EFFORTS AND CITIZEN GROUPS

Save the Bay (STB)

Volunteers are involved in virtually every facet of Save the Bay's work. These opportunities are listed at www.savebay.org/volunteer/index.htm. For more information about any of the volunteer opportunities, interested individuals should contact Stan Dimock, volunteer coordinator at sdimock@savebay.org or (401) 272-3540, ext. 130. The volunteer opportunities include:

- BayWatchers: The BayWatcher Program is STB's citizen monitoring program. It encourages volunteers to become involved with the restoration and protection of Narragansett Bay, discovering it first hand. Volunteers are involved in shoreline surveys, area cleanup projects, sea mammal monitoring (seasonal), and salt marsh cleanups and restoration.
- Legislative Volunteers: Legislative volunteers assist STB by writing letters to local newspapers about key Bay issues, attending and testifying at public and legislative hearings, and organizing group meetings with city/town, state, or federal officials about local or state environmental issues.
- In-Office Support at Save the Bay: Volunteers assist with running the reception area, helping with mailings, and answering the phone lines. Opportunities include data entry, becoming a member of the mailing team, and clipping newspaper articles.
- Fundraising and Special Events: STB hosts several fundraisers per year. Volunteers can often assist with decorating, registration, bartending, parking and many other tasks.
- Fairs and Festival Team: STB attends approximately fifteen fairs and festivals each season throughout Rhode Island. Volunteers are recruited to assist in selling STB merchandise,

encouraging people to join the STB cause, and educating the public regarding current issues facing the bay and the marine life environment.

- STB also offers internships which allow college students to earn credits through various assignments including web content development, habitat restoration, program planning and development, communications, and environmental law.

University of Rhode Island (URI) Watershed Watch

The URI Watershed Watch Program was developed as a cooperative effort among local governments, watersheds, and other organizations to assess water quality by recruiting and training volunteers to become “citizen scientists.” The Watershed Watch Program research is focused on long-term ecological monitoring of Rhode Island’s fresh and salt water resources, including lakes, ponds, rivers, streams, and coastal waters. Volunteers are provided with training, equipment, supplies, and analytical services for recording weekly measurements. The program is intended to encourage communities and shoreline residents to understand the need to manage and improve the water quality of all water bodies within a given watershed. The goals of the URI Watershed Watch Program are:

- To promote active citizen participation in water quality protection.
- To educate the public about water quality issues.
- To obtain multi-year surface water quality information in order to ascertain current conditions and to detect trends.
- To encourage sound management programs based upon water quality information.

Water quality monitoring requires a time commitment of one to two midday hours per week. Volunteers can choose the day of the week that is most convenient for them. The monitoring season extends from late April to early November, and generally can not be started mid-season. No water quality monitoring experience is necessary. Volunteers must provide the means to get to their monitoring locations (i.e. canoe, kayak, or boat), which are typically the deepest part of the lake, or mid-stream for rivers. Results of the monitoring are published in a biennial report. Interested parties can contact Elizabeth Herron, Program Coordinator at emh@ri.edu or (401) 874-4552.

River Network’ s “River Watch Program”

Through the River Network, over 550,000 people across America are involved in community-based watershed monitoring and assessments. Community-based monitoring programs are carried out by schools, nonprofit organizations, government agencies, and Native American Tribes. River Network’s River Watch Program provides guidance and support by helping these groups design and implement their programs. River Watch staff have trained thousands of people in designing watershed monitoring programs, benthic macroinvertebrate and habitat monitoring, water quality monitoring, and data reduction and analysis. More information about program details can be found at <http://www.rivernetwork.org>.

4.3 BEST MANAGEMENT PRACTICES

BMP 4.1: Public Meetings

The town has gathered information regarding storm water issues via its storm water steering committee comprised of representatives from the town conservation commission, planning board and town council. The town held a public meeting on January 22, 2003 to educate residents on the causes and effects of storm water pollution. This meeting also provided the residents an opportunity to review the draft SWMPP and provide input on the contents. Residents were asked for their comments during the meeting and were informed that additional comments or questions could be provided to the Town Planner via phone, fax, email or standard mail. The town held a second public meeting/public hearing on February 3, 2003 at which the final draft SWMPP was presented to the town council and to the public. After a presentation by Berger on the contents of the plan, the public was invited to voice comments before the Town Council. The Town Council held the public hearing open until January 2004. The draft SMWP was revised to address the comments received by the town, the Town Council, the public, and RIDEM NonPoint Source Program. It was also revised to comply with the Phase II Draft Permit which was not available in its final form until November 2003. A summary of the response to comments is provided in Section 12 of this report.

The SWMPP Annual Reports are made available to the public for their review and comment each year. A public notice indicating the availability of the annual report is advertised in accordance with DEM requirements and town procedures.

BMP 4.2: Volunteer Opportunities

Middletown's stormwater webpage (BMP 3.3) contains links to volunteer opportunities available to residents. These include opportunities to participate in the town's identification and inspection of storm water outfalls, and opportunities with Save the Bay and URI's watershed monitoring program, among others. Middletown should consider becoming more proactive in encouraging volunteer monitoring, especially in the North Easton Pond Watershed. The pond is the only one of the nine ponds addressed by the Eutrophic Pond TMDL that is not monitored by a URI Watershed Watch group; neither of the ponds two tributaries is monitored either. As the City of Newport owns and controls access to North Easton Pond, the city would have to approve any monitoring of the pond itself.

BMP 4.3: Storm Water Outfall Identification

In accordance with the Phase II Storm Water requirements, the town must identify all storm water outfalls and receiving waters in the first year of the RIPDES permit. To accomplish this, the town planned on utilizing volunteer help in addition to its public works staff to identify discharge points from the town's storm drainage system, and to utilize capable volunteers to conduct dry weather observations of the outfalls once they have been identified. However, the town instead contracted with Weston and Sampson to locate and survey outfalls in winter 2007 – spring 2008.

BMP 4.4: Storm Drain Marking

A storm drain marking program is planned for catch basins that discharge to priority water bodies. The drains could be stenciled with a picture of a fish and an inscription that indicates that the contents discharge directly to the bay or river, whichever the case may be. The storm drain marking program is designed to inform (remind) residents that the drains do not go to the sanitary sewer system, but are discharged directly into a local water body. The intent of the program is to discourage any type of dumping into the storm drainage system.

An alternate storm drain marking method, now recommended by Save the Bay, is utilizing epoxy markers in lieu of stenciling. The epoxy markers are expected to last 5 to 7 years compared to the one year life of a

painted stencil. These markers are approximately 4 inches in diameter and can be easily installed using volunteer assistance. The markers can be specially designed to the town's specifications or the town can choose among existing designs. Save the Bay indicated that the cost of the markers is approximately \$1.25/marker when ordering 500 or more. The adhesive costs approximately \$9.00/tube and each tube covers approximately 25 markers. Therefore the materials to mark 500 storm drains would cost approximately \$800.00. The Rhode Island Surfrider Foundation currently has a grant to assist organizations on Aquidneck Island mark storm drains. This grant covers the markers, epoxy and training on their application. Dave Prescott, Executive Board Member of Surfrider, indicated that Surfrider could provide the town with hundreds of markers and the required adhesive under this grant. A photocopy of the Surfrider storm drain marker is included in Appendix B along with copies of markers used by Save the Bay.

BMP 4.5: Town Co-Sponsored Cleanups

The town will continue to co-sponsor litter cleanups at the beach and other area locations. These cleanups provide opportunities for residents to assist in the removal of unsightly litter and prevent its transport into the town's storm drainage system and ultimately local waterbodies. The town will also continue to provide for proper disposal of all waste collected at such events. The town will assist environmental groups in recruiting volunteers by notifying the Middletown First organization of such events, and by advertising the cleanups on its web page and at town hall.

4.4 MEASURABLE GOALS

The following measurable goals, target dates and responsibilities have been established to ensure proper implementation of this minimum control measure:

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Table 4-1: Public Participation Measurable Goals

BMP ID	BMP Description	Responsible Party	Measurable Goal	Implementation Date
NA	Strategies	Planning	Strategies to identify the target audiences of the public involvement program and description of the groups engaged. (Part IV.B.2.b.2.1)	Start: 4/04 Finish: 3/04
			Strategies to describe types of public involvement activities in the program (Part IV.B.2.b.2.ii)	Start: 4/04 Finish: 3/05
4.1	Public Meeting	Planning	Public meetings and steering committee meetings regarding storm water pollution prevention and development of SWMPP advertised and held.	Start: 1/03 Finish: 12/03
			Volunteers recruited for SWMPP steering committee	Start: 4/03 Finish: 3/04
			Public hearing advertised and held on draft SWMPP.	Start: 1/04 Finish: 1/04
			Provide public notice of the draft annual report and provide the opportunity for public comment (Part IV.B. 2.b.2.iii)	Annually Start:3/05 Finish: 3/08
4.2	Volunteer Opportunities	Planning/IT	Volunteer opportunities with local environmental organizations advertised on town web page.	Start: 3/06 Finish: 3/07
			Encourage volunteer monitoring in North Easton Pond Watershed	Start:5/08 Finish: N/A
4.3	Storm Water Outfall Identification	Planning	Volunteers organized to locate storm water outfalls (Boy/Girl Scouts and/or local schools)	Start: 3/04 Finish: 3/05
4.4	Storm Drain Marking	Public Works & Planning	Volunteers stencil or mark storm drains	Start: 3/05 Finish: 3/06
4.5	Town Co-Sponsored Cleanups	Planning	Community clean-up sponsored by environmental group. One to be held in year 3 and one in year 4.	Start: 3/06 Finish: 3/08
			Increase in residents participating in clean-ups and volunteering with other local environmental organizations.	Start: 3/07 Finish: 3/08

* Measurable Goals in bold required by the General Permit.

5.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION

5.1 REGULATORY REQUIREMENTS

Illicit discharges are illegal and/or improper connections to storm water drainage systems and receiving waters. Sources of illicit discharge can include sanitary wastewater, effluent from septic tanks, floor drains, car wash wastewater, improper oil disposal, radiator flushing disposal, laundry wastewater, spills from roadway accidents, and improper disposal of auto and household toxics. Commonly, elevated levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria are introduced into waterbodies through these illicit discharges.

These discharges are considered “illicit” because MS4s are not designed to accept, process, or discharge such non-storm water wastes. Because of their negative impacts, these discharges must be removed and/or permitted and connected to the Town’s sanitary sewer system for proper treatment.

RIPDES defines “illicit discharges” in the Phase II Storm Water Regulations as “any discharge to an MS4 that is not composed entirely of storm water with some exceptions.” These exceptions include discharges from RIPDES-permitted industrial sources and discharges from fire-fighting activities. The exceptions also include the following list of allowable non-storm water discharges, provided that these discharges are not identified as significant contributors of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Uncontaminated ground water infiltration
- Uncontaminated pumped ground water (i.e. water from basement sump)
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- Flows from riparian habitats and wetlands
- Dechlorinated swimming pool discharges
- Street wash water

Program requirements consist of the following:

- A storm sewer system map, showing the location of all outfalls and the names and locations of all receiving waters;
- Through an ordinance, or other regulatory mechanism, a prohibition (to the extent allowable) under State, or local law on non-storm water discharges into the MS4, and appropriate enforcement procedures and actions;
- A plan to detect and address non-storm water discharges, including illegal dumping, into the MS4;

- The education of public employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste; and
- The determination of appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

5.2 POTENTIAL SOURCES OF ILLICIT DISCHARGES

The two major potential sources of illicit discharges to the stormwater system have been identified as Middletown's sanitary sewer and Individual Sewage Disposal Systems (ISDS).

Sanitary Sewer

The town owns and operates a sanitary sewer collection system that serves all but the eastern, unsewered section of town. Wastewater is collected and pumped to Newport's wastewater facility for treatment and disposal. Middletown's sanitary sewer system has two main interceptors, one that runs parallel to Bailey's Brook and the other runs parallel to Paradise Brook. Substantial leaks in either of these lines could cause an illicit discharge of sanitary wastewater into the brooks. The town of Middletown performed a sanitary sewer evaluation study to identify any such leaks from lines, connections and/or pump stations throughout the system. The town has taken corrective action as necessary, including a significant upgrade to the Bailey Brook Interceptor, which was identified in the Eutrophic Pond TMDL as a potential source of phosphorus loading to North Easton Pond.

Individual Sewage Disposal Systems

The eastern side of the town is presently unsewered. The unsewered areas correspond to the Paradise Brook, Gardiner Pond, and Little Creek sub-watersheds. According to Middletown's 1999 Wastewater Facility Plan, approximately 866 housing units are served by septic systems. The Plan indicated that the number of failing systems was found to be negligible, but there were a considerable number of systems that could be considered marginal. It was further noted that dense development has generally not occurred in the areas with extremely limiting soil conditions; hence widespread problems with failing systems due to poor site conditions has been avoided.

The two sub-watersheds within the unsewered sections of town (Paradise Brook and Gardiner Pond) are listed as impaired water bodies by RIDEM; the third sub-watershed, Little Creek, is not known to have any impairments. Paradise Brook and Gardiner Pond are classified as having biodiversity impacts. RIDEM has not observed impacts related to failed septic systems such as: excess nutrient levels and algae growth, elevated levels of pathogens or the presence of hypoxic conditions in any of these waterbodies. Since local water bodies are not showing measurable signs of impact from failed septic systems, it is likely that illicit discharges from failing septic systems is not a widespread problem in Middletown.

Although the RIDEM-approved Wastewater Facilities Plan did not require establishment of a Wastewater Management District, the town is now considering developing an ISDS Wastewater Management Plan and potentially a Wastewater Management District to regulate timely maintenance and repair of systems. Development of the ISDS Plan and related Wastewater Management District will be dependent on funding availability.

5.3 BEST MANAGEMENT PRACTICES

BMP 5.1: Outfall Mapping

Identification and Location of Outfalls

In accordance with Phase II requirements, Middletown developed an outfall map which shows the location of all outfalls within the MS4 as well as the names of all waterbodies that receive discharges from those outfalls; this map is shown as Figure 5-1.

The outfall map was developed by collecting known data on stormwater outfalls, GPS locating outfalls without accurate spatial information, and then creating a final GIS stormwater data layer. Planning Department Staff first created a draft GIS data layer based on information from the *Bailey Brook Watershed Preliminary Investigation* (Geosyntec, 2005) the *Water Quality – Maidford River: Bacteria Water Quality Summary Report* (Berger 2005). This data was added to a large scale aerial base map and provided to DPW staff, who penciled in the approximate locations of all other known outfalls. This information was incorporated into the draft GIS layer, and provided to Weston and Sampson, who were hired by the town to conduct the Towns Phase III GIS project (Sewer and Storm Sewer mapping). Weston and Sampson used the draft map to locate outfalls in the field. The firm obtained GPS coordinates for each outfall, collected attribute data, and developed a final GIS data layer.

The storm water base mapping (which contains the outfall and receiving water locations) will be updated on an on-going basis for new MS4 construction projects or when any changes are made to the system. Updates will be based upon as-built drawings as available.

Outfall Tagging

Middletown elected not to tag outfall pipes as outfalls have been GPS-located.

Additional Elements

Mapping of additional elements of the MS4 system, including catch basins, manholes, and pipes is required for portions of the system that are associated with the investigation of illicit discharges, municipal construction projects, and catch basin inspections. The town currently has fairly complete information on the location of catch basins. The DPW maintains a list of all catch basins within the system, this list indicates all the streets within the town and the number of catch basins located on each street. The list was developed for catch basin cleaning and mosquito abatement activities. The Town's Phase I GIS project included planimetric mapping of catch basins and detention ponds (based on 2005 aerial photography). Catchbasins are shown on Figure 5-1, and a copy of the DPW list, which identifies 1,420 catch basins within the town, is included in Appendix C. Manholes were also identified during the Phase I GIS project, however, the GIS layer does not distinguish between storm sewer and other types of manholes.

If the town wishes to pursue full-scale meaningful GIS mapping of the entire drainage system, then a field data collection survey of all storm water structures within the town must be completed. Data collection would include structure location information obtained using a Global Positioning System (GPS) receiver, with an accuracy of approximately one to two feet, for any storm system elements not already contained in the town's GIS database. Each structure must also be opened and the following information recorded: invert elevations, pipe size, pipe material, street where structure is located, grate type, maintenance problems, sump information, number of pipes serving the structure, and condition of the structure. The specific structure information would be manually entered into a database and the GPS location data would be downloaded directly from the GPS unit into a database then imported into the Town's GIS

geodatabase. The data sets and additional storm water pipe location information would be used to develop a functional database pipe system with line and node topology. Since very little information is currently available on the storm water pipe networks, additional time would be allowed to field confirm flow directions and develop a connectivity topology layer. The connectivity topology layer would allow the Town to integrate future modeling applications, and it could also be used for tracking and asset management.

The approximate cost to develop a full scale GIS storm water map as described above is estimated to cost on the order of \$200,000. The cost of mapping could be significantly reduced if the town were to collect, verify and input its own field data. The cost for the field data collection, input and verification is estimated at \$70,000 to \$90,000. Therefore if the town were to do this portion of the work in house, the balance of the cost is estimated to be between \$110,000 and \$130,000.

If a GIS storm water mapping system is not established then the recording of additional elements for those portions of the system investigated (e.g., catch basins, manholes and pipes within the system, and location of identified physical interconnections with other MS4s) will be sketched on the storm water base mapping and appropriate notes will be kept in the illicit discharge tracking file. Required information will be submitted to DEM with the annual report (see Section 9 for annual reporting requirements).

BMP 5.2: IDDE Ordinance

Middletown adopted an IDDE Ordinance on February 21, 2006; it is based on the model ordinance developed by the Center for Watershed Protection. The ordinance effectively prohibits illicit discharges to the MS4, and provides an enforcement mechanism. A copy of the ordinance is included in Appendix D.

BMP 5.3: IDDE Standard Operating Procedures

The following Standard Operating Procedures (SOPs) are followed during the course of illicit discharge investigations.

Locating Priority Areas

Prior to initiating field investigations of illicit discharges, Middletown planned on prioritizing its efforts in identifying and eliminating illicit discharges by first observing the outfalls that discharge to waterbodies RIDEM has identified as impaired. These included any outfalls that discharge to the Maidford River, which has been identified as having pathogen and biodiversity impacts, and outfalls that discharge to North Easton Pond, which has been identified as having excess algae growth and biodiversity impacts. Other high priority outfalls included those that discharge to Bailey Brook, Nelson Paradise Pond, and Gardner Pond, which have all been identified as having biodiversity impacts. However, after the first dry weather survey was completed, it was apparent that there was very little evidence of illicit discharges: only two outfalls had dry weather flows. Therefore, Middletown has prioritized the two outfalls with dry weather flows for IDDE: outfall NEPT01, which discharges to Easton's Bay, and outfall MR10, which discharges to the Maidford River.

Middletown must prioritize outfalls in the North Easton's Pond watershed, as required by the Eutrophic Pond TMDL. Outfalls will be prioritized in accordance with the Eutrophic Pond TMDL, which prioritized outfalls in other watersheds by pipe diameter, appropriate culvert sizing based on the catchment area, and the percentage of impervious surface within the outfall catchment area. More detail on outfall prioritization is included in Section 10.

Receipt and Consideration of Complaints

Complaints and data required for program evaluation and assessment including documenting results and evaluating impact on sewer system subsequent to the removal of an illicit discharge will be recorded and tracked in a database.

Tracing the Source of Illicit Discharges

For those outfalls where an illicit discharge is suspected, based on field observations or citizen complaints, the investigation procedures below will be utilized to investigate the potential sources. All complaints received regarding potential illicit discharges will be forwarded to the DPW Director, logged, tracked and investigated as described below. A sample complaint tracking sheet that will be utilized by the Town is included in Appendix E.

For those outfalls where an illicit discharge is suspected, the following procedures will be utilized to investigate the potential sources:

1. *Characterize the discharge and investigate any obvious sources.*
Analyze the information collected during the initial screening of outfalls. Classify type of flow, i.e. sanitary waste, food waste, wash waters. Investigate any obvious sources (i.e. wash waters found in outfall adjacent to car wash).
2. *Inspect the upland drainage system.*
Open manholes and inspect structures upstream from the outfall to determine the extent of the system where a dry weather flow component exists. This will determine the extent of the investigation. When inspecting structures, attention shall be paid to any small diameter pipes or other potential indicators of illicit connections. The storm pipes and associated structures where the dry weather flow is observed should be mapped. These pipes and structures can be identified on the base mapping developed for the identification of outfalls and receiving waters or on the Town of Middletown's GIS generated sanitary sewer map.
3. *Identify the drainage area.*
If the source of the discharge is still not obvious, then the drainage area to that outfall should be delineated. This can be achieved by approximating the drainage divides of the contributing sub-basin utilizing a topographic map or by visually inspecting the upland area surrounding the outfall. The catchment area for all prioritized outfalls in the North Easton Pond watershed will be delineated, in accordance with the Eutrophic Pond TMDL.
4. *Inventory the drainage area.*
Review land use information, street maps, business directories and other available data to identify what potential sources exist within the drainage area. On-site inventories can also be performed by walking or driving throughout the drainage area and observing any potential sources. When conducting the on-site inventories, valuable information could also be gained by interviewing available property owners in the vicinity of the outfall.
5. *Inspect connections in question.*
Conduct site investigations to further evaluate suspect connections. Investigations can be performed utilizing smoke testing, dye testing and/or television inspection as described below. The specific method used to help determine the source of the illicit discharge will depend upon the nature of the suspected discharge and the surrounding land use.
 - Smoke testing – Smoke testing is performed by blowing non-toxic smoke into isolated sections of the storm drainage system. Smoke testing is intended to detect inflow sources such as sanitary sewer cross-connections; floor drain, laundry or wash water connections; or other point source connections of non-storm water. Smoke testing is typically conducted between July 1 and November 15, during the periods of low groundwater and with sufficient time having elapsed from a previous rain event. No testing can be conducted unless groundwater is below the pipe and the ground is not frozen. Prior to

initiating smoke testing, police and fire officials will be notified. Home/business owner notification will be conducted at least 24 hours prior to initiating smoke testing. Smoke testing costs range from approximately \$0.50 to \$0.70 per linear foot plus initial mobilizations costs of approximately \$600 to \$1,000. These costs include the necessary labor, materials and equipment to perform the smoke test. A town staff member or agent of the town must be present to oversee the testing. The extent to which smoke testing could be required is completely dependent on the number and complexity of potential discharges detected.

- **Dye Testing** – Dye testing is performed by flushing fluorometric dye into the fixture(s) of suspected sources and observing the outfall for traces of the dye. This method requires access to suspected buildings and structures. Since permission is required to gain entry into each of the potential source locations, this method is typically used to confirm the existence of a suspected illicit discharge as opposed to general investigation of numerous potential sources. The cost for dye testing is essentially labor; dye costs are negligible in comparison (200 fluorometric dye tablets cost approximately \$50). Public Works or Engineering staff would perform the dye tests, or the town could hire an outside firm to investigate via dye testing, which is estimated to cost approximately \$140/hour for a two-person team of investigators. The duration of work required is completely dependent upon the number of potential illicit discharges and the complexity of the pipe network in the vicinity of the discharges.
- **Television Inspection** – Areas identified as having the potential for illicit connections could be inspected with television cameras. Closed-circuit television inspection is a method of evaluating and creating a video record of underground pipe conditions. Video inspection will identify the general condition of the line segments in question, and will also pinpoint locations of pipe connections, areas of collapse, settling and excessive line deterioration. Inspection of the storm sewer would be conducted by passing a closed circuit color television camera through the lines at a slow, steady rate. Television inspection costs range from approximately \$2.00 to \$3.00 per linear foot plus initial mobilizations costs of approximately \$1,000 to \$1,500. These costs include the necessary labor, materials and equipment to perform the television inspection. This cost does not include major cleaning of the lines, root removal or disposal of any waste encountered in the lines. A town staff member or agent of the town must be present to oversee the investigation.

Illicit Discharge Removal

Middletown's Illicit Discharge Detection and Elimination Ordinance establishes appropriate enforcement procedures and actions for the removal of illicit discharge. A copy of the ordinance is included in Appendix D.

Program Evaluation and Assessment

The IDDE program will be evaluated on an annual basis to assess the success of the program. All standard operating procedures and BMPs will be evaluated to determine whether any changes are necessary, or if they are working as anticipated.

Catch Basin and Manhole Inspections

Catch basin inspections include the investigation of accumulated sediments as well as structural integrity. Sediment is cleaned on an as-needed basis, and structural repairs are prioritized based on severity. Manholes are inspected in order to evaluate the condition of the manhole structure and its component parts: cover, frame, corbel, walls, base, and connecting conduits. Inspections focus on deterioration and

evidence of structural cracks or openings. Inspection should include manhole cover type, type of frame, manhole depth, type of construction used for manhole walls, and an assessment of problems and repairs needed.

Dry Weather Surveys

Middletown contracted with Weston and Sampson to inspect and record information about each of the storm water outfalls. These inspections were made with at least 72 hours of antecedent dry weather. One survey was conducted between July 1st and October 31st in 2007, the second was conducted between January 1st and April 30th in 2008. Surveys were conducted by the following procedure.

Outfalls were inspected for pipe and flow related attributes. This information was collected to aid in the location of illicit discharges. All observations were recorded in the field. The information collected included:

Pipe attributes:

- Location of pipe;
- Approximate height of pipe above water body;
- Diameter of pipe;
- Pipe material; and
- Condition of pipe.

Flow related attributes:

- Presence of dry-weather flow;
- Clarity of water;
- Presence of sediment or other solids;
- Presence of odors;
- Presence of soap suds, oily sheens or other visible pollutants;
- Presence of excess algae growth in or beneath the pipe;
- Presence of stressed vegetation;
- Presence of coloration/staining; and
- Evidence of erosion or scour.

For each outfall this information was summarized on an outfall inspection form, a sample form is shown in Figure 5-1. This form was used by Weston and Sampson during the field inspection to assist in determining if any potential illicit discharges are present.

Sampling and analysis of any dry-weather flows observed during inspection is required by RIDEM. Dry weather flows were analyzed for:

- Temperature;
- pH;
- Conductivity; and
- Bacteria (*Fecal Coliform* and *E. Coli*).

All data collected was reviewed and organized by the DPW department. All outfalls have been assigned a unique identification number; these identification numbers are utilized on the storm water system base mapping and will also be used on any future reports that may require identification of specific outfalls.

DPW staff reviewed each of the outfall inspection forms to determine if there was any indication of the presence of an illicit discharge. For those outfalls where a dry weather discharge was observed or an illicit discharge was otherwise suspected, additional investigation is required.

The town keeps a file of all the dry weather sampling forms, field notes, and sample results regarding potential illicit discharges. A database of information will be kept to track any investigations that ensue. Illicit discharge elimination information will also be incorporated into the GIS geodatabase, as feasible.

Figure 5-2: Dry Weather Outfall Inspection Form

MIDDLETOWN, RI
WESTON AND SAMPSON OUTFALL INSPECTION AND SAMPLING
SAMPLING EVENT 1

<u>Inspection Details</u>	
Structure ID	RB01
Date of Inspection	10/30/07
Last Precipitation	10/27/2007 @3:53AM
Sampling Type	Dry
Presence of Flow	Absent
Flow Volume	0
<u>Outfall Details</u>	
Material	RC
Diameter	24
Outfall Type	Loose Stone Wall
Condition	Satisfactory
Tidal Influence	No
Receiving Body Check	Bayley Brook
Connection Upstream	DMH
Photograph Number	24
Comments	No flow in culvert or outfall.

<u>Visual Observations</u> (present or absent)	
Odors	Absent
Sheen	Absent
Stressed Vegetation	Absent
Coloration and Staining	Absent
Algae Growth	Absent
Sedimentation	Present
Scouring	Absent
Erosion	Absent

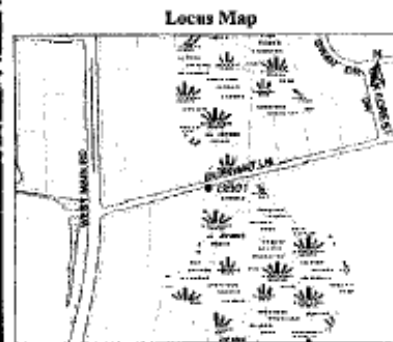
<u>Sample Analysis (If applicable)</u>	
Date of Sampling	N.A.
Time of Sampling	N.A.
Person	N.A.
Temperature	N.A.
Conductivity	N.A.
pH	N.A.
Fecal Coliform*	N.A.
E-Coli*	N.A.

*Note: Holding time for lab tests not more than 15 minutes before preserved at <10 degrees Celsius.

Photograph



X Coordinate	-71.2899410239999
Y Coordinate	41.5391521640001



Location Description	Oliphant Ln
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BMP 5.4: Coordination with Physically Interconnected MS4s

The DPW has developed procedures for coordinating with physically interconnected MS4s, including state and federally owned or operated MS4s, when illicit discharges are detected or reported. When illicit discharges are identified at interconnected MS4s, DPW officials will contact officials at the appropriate state or federal agency (e.g. RIDOT, City of Newport, Town of Portsmouth) and discuss how to ensure elimination of the discharge. A log of the initial telephone call and a description of follow-up actions will be kept in DPW files. Actions taken will also be noted in the annual report. Any identified physical interconnections with other MS4s will be noted on the stormwater base map.

BMP 5.5: Referral to RIDEM

Any significant non-storm water discharges not authorized by this permit or a preexisting permit, and that cannot be eliminated via the procedures outlined in this section will be referred to RIDEM. These discharges will be referred to DEM via a telephone call to the RIPDES Program at 401-222-4700. A log of the initial telephone call and a description of follow-up actions will be kept in DPW files.

BMP 5.6: Public Education

Illicit discharge detection and elimination activities will be conducted in accordance with the Public Education Measures described in Section 3 and the Pollution Prevention/Good Housekeeping Measures described in Section 8. The public will be notified of procedures on how to identify and report illicit discharges. Public education materials, as described in Section 3, will target local residents and businesses and include information on the hazards of illegal discharges and improper disposal of waste. DPW employees will be trained in detecting illicit discharges during storm water system maintenance activities and reporting and/or eliminating such discharges.

The town plans on having copies of RIDEM's RI Septic System Checkup available at town hall for residents with septic systems. This handbook provides valuable information on the proper operation, inspection and maintenance of systems. The town's storm water web page will also contain information regarding proper care for septic systems and will inform residents of the availability of the Septic System Handbook at town hall and from RIDEM.

BMP 5.7: IDDE Tracking

The Middletown Department of Public Works tracks all illicit discharge removals and procedures.

BMP 5.8: Program Responsibility

The Middletown Department of Public Works is responsible for the IDDE program.

BMP 5.9: Program Evaluation

The Town will develop procedures for the evaluation of the efficacy of the IDDE program.

5.4 MEASURABLE GOALS

The following measurable goals, target dates and responsibility have been established to ensure proper implementation of this minimum control measure:

Table 5-1: Illicit Discharge Elimination Measurable Goals

BMP ID	BMP	Responsible Party	Measurable Goal	Implementation Date
5.1	Stormwater Mapping	Public Works, Planning	Develop procedures for identification of the location of outfalls (Part IV.B.3.1)	Start: 4/04 Finish: 3/05
			Develop procedures for GPS locating outfall pipes (Part IV.B.3.2)	Start: 4/04 Finish: 3/05
			Develop procedures for recording of additional elements (Part IV.B.3.3)	Start: 4/04 Finish: 3/05
			Incorporate 100% of outfall location/receiving waterbody information onto map	Start: 6/04 Finish: 3/07
			GPS locate 50% of outfall pipes (Part IV.B.3.2)	Start: 3/05 Finish: 3/06
			GPS locate remaining 50% of outfall pipes (Part IV.B.3.2)	Start: 3/06 Finish: 3/07
			Record all additional elements on municipal plat maps or GIS (Part IV.B.3.2)	Start: 6/04 Finish: 3/08
5.2	IDDE Ordinance	Planning, Engineering, Public Works	Develop and introduce draft ordinance by first year (Part IV.b.3.4)	Start: 3/04 Finish: 3/05
			Adopt ordinance by second year (Part IV.b.3.4)	Start: 3/05 Finish: 3/06
5.3	IDDE Standard Operating Procedures	Public Works	Develop Standard Operating Procedure (SOP) to detect and address the illicit discharges to the system including discharges from illegal dumping, spills and individual sewage disposal systems (ISDS) when applicable, catch basin and manhole inspections, investigation of complaints, and dry weather field screening for non-storm water flows and field tests of selected parameters (Part IV.B.3.5)	Start: 4/04 Finish: 3/05
			Catch basin and manhole inspections once by fourth year (Part IV.B.3.5.vi) - Inspect 100% of catch basins and manholes / coordinate with cleaning schedule under Good Housekeeping	Start: 4/04 Finish: 3/07
			Dry Weather Survey (conduct between July 1st- October 31st by fourth year) (Part IV.B.3.5.vii) - Sample 100% of dry weather flows	Start: 3/04 Finish: 3/08
			Dry Weather Survey (conduct between January 1st-April 30th by fourth year) (Part IV.B.3.5.vii) - Sample 100% of dry weather flows	Start: 3/04 Finish: 3/08
		Public Works	Strategies for locating priority areas	Start: 4/04 Finish: 3/05

BMP ID	BMP	Responsible Party	Measurable Goal	Implementation Date
	IDDE Standard Operating Procedures (Con't)		Investigate 100% of annual prioritized IDDE investigations	Updated Annually Start: 12/04 Finish: 3/08
			Enforcement action taken on 100% of illicit discharges found or referred to other entity such as police, Health Department, RIDEM or USEPA.	Start: 12/04 Finish: 3/08
			Prioritize outfalls in the North Easton Pond Watershed	Start: 5/08 Finish: 8/08
			Delineate catchment areas for North Easton Pond priority outfalls:	Start: 8/08 Finish: 8/09
5.4	Physically Interconnected MS4s	Public Works	Procedures for coordinating with other physically interconnected MS4s (Part IV.B.3.7)	Start: 4/04 Finish: 3/05
5.5	Referral to RIDEM	Public Works	Procedures for referral to RIDEM of non-storm water discharges not authorized in accordance to Part I.B.3. (Part IV.B.3.8)	Start: 4/04 Finish: 3/05
5.6	Public Education	Public Works	Make RIDEM's RI Septic System Checkup available at Town Hall	Start: 4/04 Finish: 3/05
5.7	IDDE Tracking	Public Works	Procedures to record and track all actions taken to detect and address illicit discharges. (Part IV.B.3.10)	Start: 4/04 Finish: 3/05
5.8	Program Responsibility	Engineering, Public Works	Assign individual(s) responsible for overall management and implementation of the IDDE minimum measure. (Part IV.B.3.11)	Start: 3/04 Finish: 4/04
5.9	Program Evaluation	Engineering, Public Works	Develop procedures to evaluate the success of IDDE minimum measure (Part IV.B.3.12)	Start: 4/04 Finish: 3/05

Note: Measurable Goals in bold required by the General Permit.

6.0 CONSTRUCTION SITE RUNOFF CONTROL

6.1 REGULATORY REQUIREMENTS

Construction site runoff controls mitigate sediment runoff to water bodies from construction sites. These controls are also used to eliminate the discharge of other construction-generated pollutants such as fertilizers, pesticides, oil and grease, construction chemicals and construction debris to water bodies from construction sites.

The Phase II Storm Water Program requires the town to implement and enforce a program to reduce pollutants in storm water runoff from construction activities that result in a land disturbance of greater than or equal to one acre. Specifically the MS4 is required to:

- Have an ordinance or other regulatory mechanism in place that requires the implementation of proper sediment and erosion controls, and controls for other construction site waste;
- Have procedures for site plan review of construction plans that consider potential water quality impacts;
- Have procedures for site inspection and enforcement;
- Establish procedures to accept information submitted by the public; and
- Determine the appropriate BMPs and measurable goals for this minimum control measure.

6.2 BEST MANAGEMENT PRACTICES

BMP 6.1: Town Ordinance/Regulations

Construction site runoff controls are required in Middletown by both the Rules and Regulations Regarding the Subdivision and Development of Land (“Regulations”) and the Construction Site Runoff Control ordinance (“ordinance”). The Subdivision Regulations, which apply only to commercial development and sites involving the division of land, require compliance with the ordinance. The ordinance addresses site disturbances other than those related to the development of subdivisions.

Middletown’s former Erosion and Sediment Control Ordinance was amended and renamed the Construction Site Runoff Control Ordinance in 2006 to address the requirements of the RIPDES Phase II Storm Water Program. At the same time, the Zoning Ordinance and Regulations were amended to be consistent with the revised Ordinance. The amended ordinance requires the development of a Stormwater Pollution Prevention Plan (“SWPPP”) which includes erosion and sediment controls as well as provisions for waste disposal, good housekeeping, and spill prevention. The ordinance also includes procedures for inspection and enforcement of control measures at construction sites. The ordinance is included in Appendix F.

The ordinance applies to “any situation involving any disturbance to the terrain and topsoil or vegetative ground cover ...within the town.” The Building Official or the Planning Board (subdivisions and land development) determines the applicability of the ordinance. Since the ordinance applies to any situation, it does meet the requirements of the Phase II regulations that require controls for construction activities disturbing greater than one acre.

BMP 6.2: Construction Plan Review

Specific requirements for the contents of a soil erosion and sediment control plan are outlined in the Ordinance. The plan must address grading, site drainage, temporary and permanent erosion controls, monitoring and maintenance. The inspection and enforcement procedures are identified.

Water quality impacts must be considered during review of the application. The subdivision regulations require the storm water system to regulate discharges without increasing “runoff related problems to public or private land, facilities, or water resources.” The Ordinance requires the Building Official to consider impacts to “the quality of any coastal feature, flood plain, or watercourse.”

BMP 6.3: Public Participation

There is limited opportunity for public input into the review of site runoff controls. Public meetings and public hearings are mandated by the subdivision regulations for certain minor and major subdivisions. These hearings provide an opportunity for the public to comment on all aspects of a project including construction site runoff controls. The current ordinance does not include a procedure for consideration of public input. Applications under the jurisdiction of this ordinance do not require any public notification.

BMP 6.4: Inspection and Enforcement

Inspection of the proper installation and maintenance of construction site BMPs is conducted by the Building Official in conjunction with regularly scheduled construction inspections. The Construction Site Runoff Control ordinance allows the Building Official to require a performance bond or other method of surety; surety is required when any land-disturbing activity takes place within 200 feet of watercourses or coastal features, in flood plains, or on steep slopes.

6.3 MEASURABLE GOALS

The following measurable goals, target dates and responsibility have been established to ensure proper implementation of this minimum control measure:

Table 6-1: Construction Site Runoff Control Measurable Goals

BMP ID	Minimum Control Measure Illicit Discharge Detection and Elimination	Responsible Party	Measurable Goal	Implementation Date
	BMP Description			
6.1	Construction Site Runoff Ordinance	Planning, Engineering	Development and introduction of a mechanism to require erosion and sediment control, control of other wastes, and sanctions to ensure compliance. (Part IV.B.4.b.1)	Start: 3/04 Finish: 3/05
			Mechanism Adoption (Part IV.B.4.b.1)	Start: 3/05 Finish: 3/06
			Procedures for issuing permits and implementing policies and procedures for all construction projects disturbing greater than 1 acre (Part IV.B.4.b.2)	Start: 3/04 Finish: 3/06
			Implementation of procedures (Part IV.B.4.b.2)	
6.2	Construction Plan Review	Engineering	Implementation of program to review 100% of plans and SWPPPs for construction projects greater than one acre not reviewed by other state programs (Part IV.B.4.b.4)	Start: 3/04 Finish: 3/06
			Procedures for coordination of site plan and SWPPP review when relying on State program reviews of construction activity (Part IV.B.4.b.5)	
			Implementation of procedures (Part IV.B.4.b.5)	
6.3	Public Participation	DPW	Procedures for consideration of information from public in place.	Start: 4/04 Finish: 3/05
			Pre-application meetings with potential developers continue to be offered.	ongoing
6.4	Inspection and Enforcement	DPW/Building Dept.	Inspect 100% of all construction projects within the regulated area that discharge or have the potential to discharge to the MS4 (Part IV.B.4.b.7)	Start: 3/05 Finish: 3/06
			Procedures for referral to the State of non-compliant construction site operators (Part IV.B.4.b.8)	

Note: Measurable Goals in bold required by the General Permit.

7.0 POST CONSTRUCTION SITE RUNOFF CONTROL

7.1 REGULATORY REQUIREMENTS

Post construction runoff controls mitigate both the quantity and quality of storm water runoff from a developed site. These controls protect the water quality of receiving water bodies and prevent flooding of downstream properties.

The Phase II Storm Water Program requires towns to develop, implement, and enforce a program to reduce pollutants in post-construction runoff from new development and redevelopment projects that result in land disturbance of greater than one acre. Specifically the MS4 is required to:

- Develop and implement strategies which include a combination of structural and/or non-structural BMPs;
- Have an ordinance or other regulatory mechanism in place that requires the implementation of post-construction runoff controls to the extent allowable under state and local law;
- Ensure adequate long-term operation and maintenance of controls; and
- Determine appropriate BMPs and measurable goals for this minimum control measure.

7.2 BEST MANAGEMENT PRACTICES

Middletown's Rules and Regulations Regarding the Subdivision and Development of Land ("Regulations) and Stormwater Management Ordinance ("Ordinance") regulate post construction runoff controls. The Regulations, which apply only to commercial development and sites involving the division of land, require compliance with the Ordinance. The Ordinance addresses site disturbances other than those related to the development of subdivisions. The combined use of the Regulations and Ordinance provides the structure for the implementation of post construction runoff controls at construction sites with greater than one acre of disturbance.

The Ordinance promotes the use of a combination of structural and non-structural BMP's. The Regulations encourage the development of measures or construction techniques to control peak discharges through planned runoff delay and infiltration into the ground. Further, the Regulations recognize that a variety of methods can be used to control peak flows and that each method will be evaluated for its effectiveness. The Ordinance also encourages that storm water runoff be retained and recharged as close as feasible to its place of origin.

BMP 7.1: Stormwater Runoff

Stormwater runoff from new development and redevelopment projects is addressed through Middletown's Stormwater Management Ordinance (see BMP 7.9).

BMP 7.2: Consistency

The Stormwater Management Ordinance requires stormwater management controls that are consistent with the *State of Rhode Island Stormwater Design and Installation Manual (as amended)*. The Ordinance minimized water quality impacts, and requires that post-development peak discharge rates must be maintained at or below pre-development rates.

BMP 7.3: Pre-Application Meetings

Middletown requires pre-application meetings for major projects, and offers them for smaller projects.

BMP 7.4: Plan Review

All site plans are reviewed by Town staff, in accordance with Chapter 153 of the Town Code. The Building Official, Town Engineer, and Director of Public Works meet weekly to review development plans, and no building permit is issued until plans have been approved.

BMP 7.5: Coordination of Local and State Programs

Middletown coordinates with existing State programs requiring post-construction storm water management as required.

BMP 7.6: Referral to RIDEM

Any new discharges of storm water associated with industrial activity will be referred to the State. To date, no such referral has been required.

BMP 7.7: Non-Structural BMPs

Middletown promotes the use of non-structural BMPs in a variety of ways. The Stormwater Management Ordinance requires nonstructural BMPs to minimize the increase in runoff from new development and to reduce runoff in redevelopment projects. Although the ordinance specifically references natural area conservation, disconnection of rooftop runoff, sheet flow to buffers, grass channels, and environmentally sensitive development as appropriate BMPs, other methods are also permissible. The Town recently adopted a Conservation Development Ordinance that incorporates Low Impact Development techniques including the protection of sensitive areas, open space requirements, and reduction of impervious surface. Middletown's regulations for commercial development also specifically reference low-impact development techniques.

BMP 7.8: Structural BMPs

Middletown's Stormwater Management Ordinance lists appropriate structural BMPs for post-construction runoff control as detention, retention and extended detention ponds; infiltration systems, and filtering systems. The ordinance allows for the use of other BMPs as well, and requires that BMPs be selected to accommodate the unique hydrologic conditions of the project site.

According to the Eutrophic Pond TMDL, structural BMPs to reduce phosphorus loading to North Easton Pond are required. Middletown received a RIDEM Non-Point grant in 2007 to design and construct a Bioretention Cell at the Gaudet Middle School, which is in the North Easton Pond watershed; construction of this BMP will assist in reducing phosphorus loading to the pond. In addition, Middletown has developed a draft Scope of Work (SOW) that describes the process and rationale that will be used to select BMPs and includes all the tasks necessary to design and construct BMPs. The draft SOW is included as Appendix G.

Middletown has prioritized the Easton's Point neighborhood for stormwater management retrofitting, due to frequent closures of Atlantic and Easton's Beaches because of high levels of bacteria after storm events. The town was awarded a RIDEM grant in 2007 to conduct a feasibility study for stormwater retrofitting the neighborhood.

BMP 7.9: Stormwater Management Ordinance

The Stormwater Management Ordinance was adopted on February 21, 2006 to address requirements of the RIPDES Phase II Stormwater Program, the Ordinance is included in Appendix H. Due to the adoption of the Eutrophic Ponds TMDL, amendments to the ordinance to address phosphorus in the North Easton Pond watershed are required. The ordinance must be revised to ensure that

- New land development employ stormwater controls to prevent any net increase in phosphorus and;
- Redevelopment projects employ stormwater controls to reduce phosphorus to the maximum extent feasible.

BMP 7.10: Inspection

All BMPs constructed as part of projects over one acre that discharge or may discharge to the MS4, as well as the majority of smaller projects, are inspected by the Building Inspector.

BMP 7.11: Operation and Maintenance

Middletown's Stormwater Management Ordinance requires a maintenance agreement for all new BMPs; the agreement must include a maintenance schedule. BMP owners are required to notify the Town each time scheduled maintenance is completed; if such notice is not received, the Town may take action to ensure the required maintenance is performed. In addition, maintenance agreements must include a specific schedule for on-site inspections of BMPs by the Town Engineer. The combination of these requirements, in addition to the various methods for enforcement outlined in the Ordinance, ensures BMPs will receive necessary maintenance in order to continue to operate effectively. In order to improve tracking of scheduled maintenance, the Town plans on using a combination of is GeoTMS and GIS software.

BMP 7.12: Existing Structural BMPs

The majority of structural BMPs in Middletown are privately owned, and are constructed as part of new development or redevelopment projects; most of these are detention ponds. The only town-owned structural BMP is a detention pond located at the Public Works facility. In addition, the City of Newport owns two wet detention ponds, located adjacent to Bailey Brook.

Structural BMPs (mostly detention/retention ponds) were identified during Phase I of the Town's GIS project (planimetric mapping). Currently, information on ownership/ maintenance responsibility and existing conditions of BMPs is being collected and entered into the GIS database. The Town has also been working with homeowners associations to ensure BMPs are properly maintained. New BMPs are subject to the requirements of the Stormwater Runoff Ordinance, which includes stringent requirements for maintenance of BMPs.

BMP 7.13: Program Responsibility

Middletown's Building Official is responsible for the Construction Site Runoff Control program.

BMP 7.14: Program Evaluation

Middletown will review each of the Post-Construction BMPs on an annual basis to determine the need to maintain, modify or replace each BMP based on its success.

7.3 MEASURABLE GOALS

The following measurable goals, target dates and responsibility have been established to ensure proper implementation of this minimum control measure:

Table 7-1: Post Construction Site Runoff Control Measurable Goals

BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date
7.1	Stormwater Runoff	Planning Department	Description of a method to address storm water runoff from new development and redevelopment projects. (Part IV.B.5.b.1)	Start: 3/04 Finish: 3/05
7.2	Consistency	Planning, Engineering	Description of how the program is consistent with the State of Rhode Island Storm Water Design and Installation Manual and will be tailored for the community/facility, minimize water quality impacts, and maintain pre-development runoff conditions. (Part IV.B.5.b.2)	Start: 3/04 Finish: 3/05
7.3	Pre-Application Meetings	Building/Engineering	Procedures for pre-application meetings (Part IV.B.5.b.3)	Start: 3/05 Finish: 3/06
7.4	Plan Review	Building/Engineering	Implementation of program to review 100% of plans for development projects one or more acres not reviewed by other State Programs (Part IV.B.5.b.4)	Start: 3/05 Finish: 3/06
7.5	Coordination of State and Local Programs	Building Department	Description of how the program will coordinate with existing state programs requiring post-construction storm water management (Part IV.B.5.b.5)	Start: 3/05 Finish: 3/06
7.6	Referral to State	Building	Procedures for referral of new discharges of storm water associated with industrial activity (Part IV.B.5.b.6)	Start: 3/05 Finish: 3/06
7.7	Non-Structural BMPs	Planning Department	Any non-structural BMPs in the program. (Part IV.B.5.b.7)	Start: 3/04 Finish: 3/05
7.8	Structural BMPs	Planning Department	Any structural BMPs in the program. (Part IV.B.5.b.8)	Start: 3/04 Finish: 3/05
			Construct Gaudet Middle School Bioretention Cell	Start: Finish:
			Conduct Easton’s Point BMP Feasibility Study	Start: Finish:
			Develop SOW for BMPs in North Easton Pond Watershed	Start: 4/08 Finish: 7/08
7.9	Stormwater Management Ordinance	Planning Department	Develop and introduce regulatory mechanism to address post-construction runoff (Part IV.B.5.b.9)	Start: 3/04 Finish: 3/05
			Mechanism adoption (Part IV.B.5.b.9)	Start: 3/05 Finish: 3/06
			Amend ordinance to address phosphorus loading in North Easton Pond Watershed.	Start: 5/08 Finish: 11/08
BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date

7.10	Inspection	Building	Procedures for post-construction inspections of BMPs and inspect 100% of all development greater than one acre within the regulated area that discharges to the MS4 (Part IV.B.5.b.10)	Start: 3/05 Finish: 3/06
			Implementation of Procedures (Part IV.B.5.b.12)	Start: 3/05 Finish: 3/06
7.11	Operation and Maintenance	Building/ Public Works	Procedures for post-construction inspection of BMPs, to ensure these are constructed in accordance with the approved plans.	Start: 3/04 Finish: 3/06
7.12	Existing Structural BMPs	Building	Description of how the long-term O&M of the selected BMPs, for new development and re-development, will be ensured.	Start: 3/04 Finish: 3/06
7.13	Program Responsibility	Building	Individual(s) responsible for overall management and implementation of the post-construction storm water management program, as well as each BMP identified for this program.	Start: 3/04 Finish: 3/05
7.14	Program Evaluation	Planning Dept.	Procedures to evaluate the success of this minimum measure, including discussion of how the measurable goals for each of the BMPs were selected.	Start: 3/04 Finish: 3/05

Note: Measurable Goals in bold are required by the General Permit.

8.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING

8.1 REGULATORY REQUIREMENTS

The intent of this control measure is to ensure that existing municipal operations are performed in ways that will minimize contamination of storm water discharges. To satisfy the requirements of this minimum control measure, the town must:

- Develop and implement an operation and maintenance program with the goal of preventing or minimizing pollutant runoff from municipal operations into the storm sewer system;
- Train employees on incorporating pollution prevention/good housekeeping techniques into municipal operations such as vehicle and building maintenance, park and open space maintenance, and storm system maintenance; and
- Determine the appropriate BMPs and measurable goals for this minimum control measure.

8.2 MUNICIPAL OPERATIONS

This section describes the town's current practices with regard to activities and facilities that have the potential to introduce pollutants into storm water runoff. The activities described include chemical and waste handling and storage; application of pesticides, herbicides, and fertilizers; vehicle fueling, washing, and maintenance; and road sand and salt storage. Specific facilities that the pollution prevention measures apply to include: the DPW garage, the transfer station, and municipal parking lots at public schools, municipal offices, and police stations. Identified potential point sources of storm water pollution on municipal facilities are also described in this section (e.g. road salt storage at the town highway garage) and BMPs are recommended for minimizing or eliminating pollutant runoff.

Information regarding the current practices of the town was gathered by interviewing personnel from the public works, planning and engineering departments. The locations of all the town facilities are shown on Figure 8-1.

8.2.1 Fleet Vehicle Maintenance


The town vehicles are maintained at the public works garage located on Berkeley Avenue adjacent to the fire station. New and used automotive fluids are stored inside the public works garage. Used motor oil from town vehicles is stored onsite and picked up by a local recycler. Public works staff are currently investigating purchase of a specially designed space heater that utilizes motor oil to heat the garage. Public collection of used motor oil, via an Oil Igloo, is available at the transfer station.

The town is in the process of redirecting its floor drain to the sanitary sewer. The town is constructing this modification in cooperation with RIDEM's Underground Injection Control (UIC) program. In conjunction with this project, a portion of the site will be regarded to allow vehicle wash water to flow into a grassed area prior to sheet flowing into an existing drainage basin.




STORMWATER MANAGEMENT PLAN, MIDDLETOWN, RHODE ISLAND

Figure: 8-1 Town Facilities and Pollutant Sources



The Louis Berger Group, Inc. Source: RIGIS File: 1842/GIS/Water Res



It is recommended that the town conduct an audit of its vehicle maintenance activities to ensure that all materials and wastes at the facility are being managed properly. The town should also ensure that adequate spill prevention and control measures are in place.

8.2.2 Sand/Salt Storage and Use

The sand and salt reserves for the town are stored within a salt storage shed. The salt storage area is surrounded by a berm. DPW staff indicated that the berm has one outlet that drains to a detention pond. The town applies a 50/50 mix of sand and salt to roads during winter storms which utilized approximately 2000 tons of sand/salt in an average year. The town is experimenting with applying calcium chloride in some locations instead of salt. The Town's Comprehensive Plan calls for a 5/1 sand to salt mix to be used in water supply areas.

The town should also consider ways to reduce the amount of sand and salt applied to roads such as ensuring proper calibration of spreading equipment and by continuing to investigate alternate methods of de-icing roads.

8.2.3 Building and Landscaped Area Maintenance

The town rakes its beaches, removing any litter, daily during the summer season. The town does not regularly apply pesticides, herbicides or fertilizers to town-owned land. DPW staff indicated that occasionally the weed-killer Round-up is used on isolated problem areas.

Signage regarding the mandatory disposal of pet waste is posted at Paradise Park and the town beaches. Plastic gloves are provided beneath the sign for the convenience of pet owners.

Middletown should use landscaping BMPs in the North Easton Pond watershed to reduce phosphorus loading to the pond. If fertilizers are applied within the watershed they should be low-phosphorus formulations.

8.2.4 Solid Waste Collection and Disposal

In 2007 Middletown institutes a Pay as You Throw (PAYT) curbside collection program. This program is available to all properties with four or fewer households, as well as some larger complexes. Under the program, residents purchase special trash bags from local stores for solid waste disposal; recycling is collected at no cost. Prior to the PAYT program, Middletown did not provide regular municipal curbside collection of solid waste and recyclables. Residents brought their own trash and recyclables to the town transfer station, or hired a private contractor to do it for them. Since the PAYT program was initiated, recycling has increased dramatically. Waste collected through the PAYT program is disposed of at the Central Landfill in Johnston.

DPW staff indicated that there is one location in town, Hanging Rock Road that has a propensity to collect trash and other discarded items. The town has posted signage at this site prohibiting illegal dumping, warning potential polluters of fines, and providing a telephone number for witnesses to report incidents.

The town already has best management practices in place to promote recycling and it actively participates in earth day and beach cleanup efforts with local environmental organizations. In the past, the town has offered its residents the opportunity to recycle computers, hence keeping these items out of the landfill. The town plans to host other computer recycling events in the future.

The town should continue to promote recycling and when purchasing town supplies consider buying recycled materials over virgin materials. The town should continue to encourage participation in local cleanup efforts and maintain “no dumping” signage at Hanging Rock Road. Cleanup events and litter prevention information could be posted on the town’s website and distributed at the transfer station.

8.2.5 Hazardous Materials Handling and Storage

Household hazardous waste collection is generally offered one day a year at an Aquidneck Island location. The collection event is sponsored by RI Resource Recovery and is open to all Aquidneck Island residents; Middletown advertises the collection date on the Town website. The residents who wish to properly dispose of hazardous waste at any other time, must make an appointment to drop it off at the Eco Depot located at the RI Resource Recovery’s facility in Johnston.

Middletown plans to work with RI Resource Recovery to investigate increasing the number of collections provided on Aquidneck Island. It is recommended that the town conduct a hazardous materials audit of all its facilities to ensure that hazardous materials and wastes are being properly handled, stored and disposed of. This audit may also provide the town with recommendations for less hazardous alternatives to the hazardous materials it is currently using.

8.3 INDUSTRIAL FACILITIES

The only industrial facility owned or operated by the town that has storm water discharges that discharge to a MS4 or to waters of the State is the Highway Garage. In 2004, the town prepared an additional SWPPP for its DPW Highway Garage located at the southwest corner of the intersection of Wyatt Road and Berkeley Avenue in Middletown. The facility covers approximately 8.1 acres, and has three main buildings: a six-bay garage with an office, a five-bay garage, and a police and fire station building. Other site structures include a communications tower facility, a fire-training tower, and storage shed. This SWPPP covers the DPW buildings and operations on the site parcel. The SWPPP addresses good housekeeping measures instituted at the town’s facilities, an assessment of potential pollutants, chemical and material storage practices, spill and leak prevention, and vehicle maintenance, fueling and washing procedures and recommendations.

No SWPPPs have been completed for other municipal properties; however, the general good housekeeping procedures described in this section will be applied at all municipal facilities.

8.4 BEST MANAGEMENT PRACTICES

The town is proposing strategies and procedures to reduce or eliminate the discharge of pollutants and reduce runoff volumes through the use of good housekeeping measures and BMPs, with the goal of implementing all BMPs by the fourth year of the Phase II SWMPP. The town will further evaluate the existing conditions of their municipal systems and properties and identify proposed strategies and procedures to reduce or eliminate the discharge of pollutants and reduce runoff volumes. The town plans to implement any recommended BMPs by the fourth year of the permit.

BMP 8.1: Identification of Structural BMPs

The town has begun the process of identifying, locating, and describing all municipally owned structural BMPs. Information on structural BMPs will be logged and updated annually in the annual report.

There are numerous detention basins located throughout Middletown. Most of the basins are privately owned and maintained, although the town is also responsible for the maintenance of the detention basin serving the public works complex on Berkeley Avenue. As discussed in section 5.3, the town maintains over 1400 catch basins. The majority of detention ponds and catch basins were mapped as part of the Town's Phase I GIS project; however, minimal attribute data has been collected to date.

BMP 8.2: BMP Inspection, Cleaning, and Repair

The town's storm drainage system inspection and maintenance program consists of annually inspecting and cleaning catch basins throughout the town. Catch basins are treated for mosquitoes monthly in the summer and are cleaned once in the fall. Catch basins are cleaned using a dump truck equipped with a clam shell attachment. No written maintenance records were historically kept regarding catch basin cleaning, nor was written schedule established to ensure all catch basins in the town receive proper maintenance. The DPW is developing a logging system for retaining maintenance records and is developing a schedule for annual cleaning and maintenance of catch basins. The maintenance and inspection program for the town's storm drainage system will be coordinated with the illicit discharge detection and elimination efforts described in Section 5 of this plan by using mapping, logging, and scheduling. More frequent BMP inspection and cleaning is required in the North Easton Pond Watershed.

Middletown must establish a written schedule for inspection and maintenance of the storm drainage system to ensure all catch basins, detention basins and drain pipes receive proper attention. The written schedule can be based on the spreadsheet developed for the mosquito abatement program which lists all the streets in town and the number of catch basins located on each street and on the town's GIS mapping. A record will be kept of when each catch basin is cleaned and approximately how much sediment and trash is removed. This information will be used to prioritize which catch basins that may require more frequent cleaning in the future. Catch basins that collect unusually large amounts of sediment or trash will be further investigated to determine the source of pollutants.

BMP 8.3: Erosion Minimization

The DPW is identifying measures to minimize erosion of road side shoulders and ditches, including stabilization measures such as planting vegetation and engineering controls such as the placement of gravel or rip rap to reduce the velocity of storm water runoff. The DPW will develop a log of erosion control measures and continue to identify and mitigate problem areas on an ongoing basis.

BMP 8.4: Scouring and Sedimentation at Outfalls

Known discharges causing scouring or excessive sedimentation at outfall pipes or outfalls with excessive sedimentation will be identified during inspections of the outfalls as described in Section 5 and reported. Once reported and logged appropriate actions will be taken to eliminate or correct the source of scour and/or sedimentation. Corrective measures for erosion may include establishing vegetation, retrofit of outfall structures, placement of rip rap, or other structural means of protecting outfall areas.

BMP 8.5: Street Sweeping

All streets in town are swept annually, some are swept more often. Street sweeping typically occurs from April through July. Streets are cleaned during the day and no parking restrictions are in effect when sweeping takes place. Town staff has indicated that it is not always possible to predict in advance the exact day when a particular street will be swept, therefore it is difficult to notify residents in advance to avoid parking on the street. Staff indicated that they try to go back and clean areas where cars were parked when possible. Streets are cleaned using the town-owned street sweeper which is a 1988 mechanical brush and hopper type sweeper. DPW staff noted that the equipment is nearing the end of its useful life. Sand and grit collected by the street sweeper is either stock piled or recycled at an asphalt and concrete plant; trash is disposed of at the Central Landfill.

Staff indicated that the town's sweeper is nearing the end of its useful life. The town is considering replacing this sweeper with a vacuum assisted dry sweeper which is expected to remove finer sediments than typical mechanical brush type sweepers. This is especially important in the North Easton Pond Watershed. Vacuum assisted sweepers are more expensive than standard broom-style sweepers therefore a cost/benefit analysis should be performed before purchasing a new sweeper. Middletown will apply for a RIDEM grant to help defray the expense of a new street sweeper.

Street sweeping frequency will be increased in the Bailey Brook/North Easton Pond watershed in order to decrease sediment load to the pond. Middletown is currently prioritizing outfalls in the Bailey Brook Watershed for construction of structural BMPs in accordance with the requirements of the Eutrophic Pond TMDL. Once outfall prioritization is finalized, and catchments to priority outfalls have been mapped, streets located within priority catchment areas will be swept a minimum of three times per year until structural BMPs are installed.

BMP 8.6: Floatable Reduction

In order to reduce the amount of solid debris or "floatables" in the MS4, the town is identifying maintenance activities and inspection procedures for control of floatables. The town first plans to fully implement its procedures for annual street sweeping and catch basin cleaning then if floatables are still identified as a problem the town will investigate additional means of reducing floatables in problem areas. These procedures may include retrofit of storm sewer grates, installation of trash netting, and/or other equivalent technologies. Areas of high pedestrian traffic will be identified during annual catch basin inspections and these areas will be prioritized for control of floatables.

BMP 8.7: Waste Disposal

The trash and debris removed from the catch basins is sent to the Central Landfill in Johnston, RI. Sediment removed from catch basins is stockpiled or sent to a concrete/asphalt plant for recycling.

BMP 8.8: Employee Training

The town is implementing a training program for municipal employees that covers the pollution prevention and good housekeeping measures described in this section as well as other pertinent areas of the SWMPP, including illicit discharge detection and elimination. Appropriate municipal employees will be trained to identify signs of illicit discharge including illegal dumping, hazardous waste/material spills and surface evidence of ISDS failure. In addition to training on hazardous materials handling, the town also routinely trains its employees on matters of safety and spill prevention. Additional training is planned for municipal employees involved in park and open space maintenance, fleet and building maintenance, and storm water system maintenance. Training is also being planned for employees involved in permitting and inspecting new construction and land disturbance. Municipal employee training programs will be coordinated, when possible, with the outreach programs developed for the public information measures described in Section 3 and with the illicit discharge detection and elimination measures in Section 5. The training will be coordinated by ensuring that appropriate employees receive copies of all storm water outreach materials being distributed by the town and be informed of the ongoing public outreach and illicit discharge implementation schedule. Training materials to be utilized include: EPA training materials, materials from the Center for Watershed Protection, and other town specific information and materials.

BMP 8.9: Flow Management

Any new flow management projects for construction of new elements of the MS4, controlling flooding and overland flow will be assessed for incorporation of water quality protection devices or practices in accordance with the *Rhode Island Storm Water Design and Installation Manual*. Design and construction of new elements of the MS4 and repairs of existing elements of the MS4 will be assessed for potential

water quality impacts and incorporation of additional water quality protection devices or practices will be investigated.

BMP 8.10: Municipal Construction Projects

The town will implement proper erosion and sediment and water quality controls for all construction projects undertaken by the town including roadway re-paving and flood control projects. The only major capital improvement planned by the town is the construction of a new police station on Valley Road. For this and any other municipal construction project, the town will follow procedures for construction site runoff controls described in Section 6. The town will also incorporate strategies to reduce runoff volumes such as reducing impervious surfaces and infiltration of storm water into new construction projects where feasible.

8.5 MEASURABLE GOALS

The following measurable goals, target dates and responsibility have been established to ensure proper implementation of this minimum control measure:

Table 8-1: Pollution Prevention/Good Housekeeping Measurable Goals

BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date
NA	Reporting	Public Works	Operator must report and describe all operations under legal control that may have the potential to introduce pollutants into storm water runoff (Part IV.B.6.b.2)	ongoing
NA	O&M and Good Housekeeping	Public Works	Procedures for the development of a O&M and good housekeeping program for non-industrial facilities with the potential to introduce pollutants to their storm water discharges with the goal of minimizing or eliminating pollutant runoff (Part IV.B.6.b.4)	Start: 4/04 Finish: 3/05
8.1	Identification of Structural BMPS	Public Works, Engineering	Procedures for identifying, locating, and describing all municipally owned structural BMPs (Part IV.B.6.b.1.i)	Start: 4/04 Finish: 3/05
8.2	BMP Inspection, Cleaning, and Repair	Public Works, Engineering	Procedures for Inspecting and cleaning BMPs (Part IV.B.6.b.1.ii)	Start: 4/04 Finish: 3/05
			Procedures for an annual catch basin inspection and cleaning program (Part IV.B.6.b.1.iii)	Start: 4/04 Finish: 3/05
			Implementation of program (Part IV.B.6.b.1.iii)	Start: 4/04 Finish: 3/07
			Increase frequency in North Easton Pond Watershed	Start: 5/08 Finish: ongoing
8.3	Erosion Minimization	Public Works	Procedures to minimize erosion of road side shoulders and ditches (Part IV.B.6.b.1.iv)	Start: 4/04 Finish: 3/05
8.4	Scouring and Sedimentation at Outfalls	Public Works	Procedures to identify and report annually the known discharges causing scouring at outfall pipes or outfalls with excessive sedimentation (Part IV.B.6.b.1.v)	Start: 4/04 Finish: 3/05
8.5	Street Sweeping	Public Works	Procedures for a road sweeping program that includes sweeping all streets and roads within the regulated area annually (Part IV.B.6.b.1.vi)	Start: 4/04 Finish: 3/05
			Implementing the program to occur annually (Part IV.B.6.b.1.vi)	Start: 4/04 Finish: 3/05
			Consider more frequent street sweeping in the North Easton Pond Watershed.	Start: 8/08 Finish: 12/08

			Apply for RIDEM grant funding to purchase vacuum sweeper.	Start: TBD Finish: TBD
8.6	Floatable Reduction	Public Works	Description of maintenance activities, schedules, and long-term inspection procedures for controls to reduce floatables (Part IV.B.6.b.1.vii)	Start: 4/04 Finish: 3/05
8.7	Solid Waste Collection and Disposal	Public Works	Procedures for the proper disposal of removed waste from the MS4 (Part IV.B.6.b.1.viii)	Start: 4/04 Finish: 3/05
8.8	Employee Training	Planning, Public Works	Employee pollution prevention training materials gathered	Start: 4/04 Finish: 3/05
			Train 100% of staff that will be involved with municipal operations.	Annually (March) 3/05..3/08
8.9	Flow Management	Public Works	Procedures for assessment of flow management projects (Part IV.b.6.b.7)	Start: 4/04 Finish: 3/05
8.10	Municipal Construction Projects	Public Works	Procedures for implementing proper erosion and sediment and water quality control for construction projects (Part IV.b.6.b.8)	Start: 4/04 Finish: 3/05

NOTE: Measurable Goals in bold are required by the General Permit

9.0 EVALUATION AND ASSESSMENT REPORTING

9.1 REPORTING REQUIREMENTS

The town is required to comply with specific evaluation/assessment reporting requirements under the Phase II Storm Water Permit. These requirements include:

Assessment of Program

- The status of compliance with permit conditions;
- An assessment of the appropriateness of selected BMPs;
- Progress toward achieving the measurable goals for each minimum control measure;
- Progress towards meeting the requirements for the control of storm water identified in an approved TMDL;

Data Collection

- Results of any information collected and analyzed;
- Newly identified physical interconnections with other small MS4s;

Public Comment

- Date of annual notice and copy of public notice for review of plan;
- Summary of public comments received in the public comment period of the draft annual report and planned responses or changes to the program;

Completed Activities

- Summary of the extent of the MS4 system mapped, actions taken to detect and address illicit discharges including: the number of illicit discharges detected, illicit discharge violations issued, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM;
- Summary of the number of site inspection conducted for erosion and sediment controls, inspections that have resulted in an enforcement action and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM;

Proposed Activities

- A summary of activities planned for the next reporting cycle; and
- A change in any identified best management practices or measurable goals for any minimum control measure.

9.2 ANNUAL REPORTING

RIDEM's RIPDES Storm Water Program provides a report format each year to be utilized by all regulated MS4s. The town of Middletown will utilize the RIDEM report format as requested and will evaluate their program and submit a report by the RIDEM deadline each year. The annual report form addresses all the required elements listed above in Section 9.1.

10.0 STORM WATER ABATEMENT OPPORTUNITIES

The following is a description of storm water abatement opportunities the town is planning or considering implementing. See Figure 10-1 for a map and tabular summary of the approximate locations of these projects (where applicable).

10.1 TOWN-WIDE

Storm Water Source Reduction and Advanced Management – In addition to the projects and practices outlined below and in previous sections of this report, the town has implemented several measures that address source reduction via appropriate land-use and other environmental management tools. For instance, the town's Zoning Ordinance establishes Watershed Protection Districts with specific use restrictions on these areas. The purpose of the Watershed Protection District is to protect, preserve and maintain the quality and supply of groundwater and surface water upon which the residents of the Town of Middletown and others depend, by regulating the use and development of land adjoining water courses or primary water recharge areas and to prevent uses of land detrimental thereto. An excerpt from the Town of Middletown Zoning Ordinance – Article 11 – Watershed Protection District is included in Appendix I. Other source reduction measures include the continual investment in the maintenance and upgrade of the sanitary sewer collection system. The town conducted an Inflow and Infiltration Study on their sewer system beginning in March 2003. Since then, the town has continually worked to improve and upgrade the system.

Open Space Preservation – Middletown has an aggressive open space preservation program, primarily funded through grants and open space and recreation bonds. By purchasing developable properties and preserving them, especially through conservation easements, the increase in quantity and decrease in quality of runoff associated with development is avoided. Preservation of open space adjacent to water resources is especially important, as it provides a buffer that reduces the velocity and improves the quality of stormwater runoff.

Conservation Zoning – The town has recently adopted amendments to its current zoning ordinance to promote conservation of land. The purposes of the Conservation Subdivision Design include: encouraging the preservation of open space for its scenic beauty and the appropriate use thereof, to protect the natural environment and to promote more sensitive siting of buildings and roads, and better overall site planning, and to perpetuate the appearance of Middletown's traditional rural/agricultural landscape.

10.2 NORTH EASTON POND/BAILEY BROOK WATERSHED

Gaudet Middle School Bioretention Cell – The *Bailey Brook Watershed Preliminary Report (Geosyntec, 2005)* recommended construction of a bioretention cell for stormwater management on Middletown's Gaudet Middle School property. Middletown applied for, and received, a \$41,811 grant from RIDEM that will be used for design and construction of the BMP. Once constructed, the BMP will not only improve water quality discharging to a wetland, but will also serve as a valuable educational opportunity for Middletown's students.

Structural Best Management Practices – RIDEM’s Eutrophic Pond TMDL requires the construction of BMPs in the Bailey Brook Watershed to reduce phosphorus loading to North Easton’s Pond. In accordance with the requirements of the TMDL, Middletown has prioritized outfalls in the Bailey Brook Watershed for construction of BMPs based on the diameter of the outfall and presence or absence of dry weather flow. Priority levels of outfalls are subject to change based on improved information.

Table 10-1: Bailey Brook Outfall Prioritization (Preliminary)

Outfall ID	Pipe Diameter (inches)	GPS Coordinates	Location	Dry Weather Flow Present	Priority
BB01	24	41.539152 -71.28994	Oliphant Ln.	No	Medium
BB02	24	41.529689 -71.291662	Forest Ave. - Southeast	Yes	High
BB02A	24	41.524142 -71.291680	Forest Ave. - Northwest	Yes	High
BB03	12	41.524018 -71.295445	Woolsey Ave. – North	No	Low
BB04	12	41.520341 -71.295516	Woolsey Ave. - South	No	Low
BB05	12	41.518226 -71.296457	Maplewood Rd.	Yes	Medium
BB06A	8	41.518170 -71.296176	East Main Rd. - North	No	Low
BB06B	12	41.517942 -71.296156	East Main Rd. - North	No	Low
BB07A	36	41.517962 -71.295960	East Main Rd. - South	Yes	High
BB07B	24	41.508330 -71.296064	East Main Rd. - South	Yes	High
BB08	24	41.508330 -71.292697	Adelaide Ave.	No	Medium
GR01	48	41.509912 -71.289371	Goldenrod Detention Pond - North	Yes (from detention pond)	Low
WIL01	18	41.530028 -71.291972	Wilson Rd. & Forest Ave.	No	Low

Notes

High Priority - >24" diameter and Dry Weather Flow present

Medium Priority - >24" diameter with no flow or < 24" diameter and flow present

Low Priority - <24" diameter with no flow present or connected to stormwater BMP

Middletown will fund a feasibility study for construction of appropriate BMPs, which may include sand filters, bioretention, sidewalk storage, permeable pavers, vegetated swales, impervious surface reduction and disconnection, and infiltration systems. The study will include mapping of drainage areas, a survey and feasibility analysis of existing drainage areas, determination of groundwater recharge goals, a source reduction survey, conceptual design of BMPs, and a stormwater attenuation and source reduction strategy. A draft Scope of Work for this study is included in Appendix G. Upon completion of the study, Middletown will select BMPs for final design and construction; construction will be funded though

inclusion in the towns Capital Improvement Program (CIP) and through grants. It is anticipated that funding acquisition and construction of selected BMPs will take a minimum of three years.

Table 10-2: Schedule for BMP Construction in North Easton's Pond Watershed

Task	Estimated Cost/ Funding Source	Start Date	Duration	Responsible Party
Task 1: Prioritize Outfalls	NA/ Complete	Spring 2009	N/A – Complete	Town of Middletown
Task 2: Feasibility Study	\$50,000	Fall 2009	6 months	Consultant
Task 3: Select BMPs for Design & Construction	NA/ Staff Time	Upon Completion of Task 2	2 months	Town of Middletown DPW/Engineering
Task 4: Acquire Funding	NA/ Staff Time	Upon Completion of Task 3	1 year/ongoing	Town of Middletown Planning Department
Task 5: BMP Design	\$50,000	Upon Completion of Task 4	6 months	Consultant
Task 6: BMP Construction	Varies*/ Grants, CIP	Upon Completion of Task 5	3 years	Contractor(s)

*Cost of BMP construction based on size and type of BMP

Bailey Brook and Maidford River Project – The town is currently having engineering work conducted on specific sections of Bailey Brook and Maidford River that experience periodic flooding problems and intermittent discharges of sanitary sewer overflow. The town is investigating means of reducing the velocity of storm water runoff to these waterbodies via detention basins to allow peak storm water to flow through the river/stream systems without causing flooding problems. The cost of this project is estimated at \$125,000. The town has also planned numerous upgrades to the sanitary sewer system including adding grinders to several pump stations, re-lining sections of the sewer trunk line, and installing a SCADA system. These improvements are expected to eliminate the intermittent sanitary sewer overflow problems.

Bailey Brook Invasive Species Control – Middletown received a \$20,000 RIDEM Riparian Buffer Restoration Grant, which will be used along with \$20,000 of town funds, to control invasive plant species located on town-owned properties adjacent to Bailey Brook. Removal of invasive species, and replacement with a naturally vegetated buffer, will improve the quality of stormwater runoff entering Bailey Brook.

Town Center in the Valley - The town purchased a 60-plus acre parcel of land located behind the Aquidneck Center shopping plaza offered for sale by a local farming family. This land is adjacent to Bailey Brook, a tributary of Easton's Pond Reservoir. The land was advertised on the open market and received nation-wide attention. Two large-scale projects were proposed for the site one being a 290 unit apartment complex the other a 60-lot residential subdivision. The town negotiated a deal with the owners and plans to buy it for \$3 million dollars and maintain it as open space. A portion of the funds, approximately \$400,000, was provided by a state open space land grant. By maintaining this land as open space, Bailey Brook will not be impacted by a net increase in storm water runoff or related pollutants associated with development of the site.

10.3 EASTON'S BAY WATERSHED

Newport Avenue Bioretention Stormwater Retrofit

Middletown applied for, and received, a \$42,696 Nonpoint Source Pollution Abatement Grant from RIDEM. Grant funds along with a town match will be used for the design and construction of bioretention structures to treat stormwater runoff that currently flows untreated from the Newport Avenue outfall into Easton's Bay. Stormwater from this outfall contributes to the elevated bacteria levels in the Bay that has resulted in multiple beach closures in recent years.

Easton's Point Stormwater Feasibility Study - Middletown received a Non-Point Source Pollution Prevention Grant in 2007 from RIDEM. The \$10,000 grant is being used to develop a feasibility study of stormwater BMPs in the Town's Easton's Point neighborhood. Currently, the neighborhood is served by a catch basin and pipe system that drains to two large outfalls that discharge at Atlantic Beach. These outfalls have been determined to be a contributing factor to high bacteria concentrations at the beach, which regularly leads to beach closures during wet weather.

10.4 SAKONNET RIVER WATERSHED

Sachuest Point Dump Closure – The town is working with the state and the federal government to cap the Sachuest Point Dump which is identified by EPA as a CERCLIS Hazardous Waste Site. The former dump is located on Sachuest Point adjacent to a national wildlife refuge. Properly capping the landfill will prevent rain water and associated runoff from transporting pollutants from the landfill into Rhode Island Sound. This project is estimated to cost on the order of \$1,500,000.

Purchase of land adjacent to Norman Bird Sanctuary – The Norman Bird Sanctuary constitutes the largest area of preserved open space in Newport County. It is a wildlife refuge encompassing over 450 acres and 7 miles of trails that wind through a diversity of habitats. Nearly 30 acres are maintained as hay fields. Woodlands are the most prominent plant community and four ridges provide spectacular views of the surrounding ocean and ponds. Recently 23 acres of Sakonnet River frontage and beach adjacent of the Sanctuary was slated to be sold to a Massachusetts developer. The Sanctuary exercised its option to match the \$3,687,500 offer of the developer. The town is assisting the Sanctuary negotiate the sale and raise the funds necessary to make the purchase. If successful in raising adequate funds, this purchase will ensure that the 23 acres of Sakonnet River frontage remain a wildlife preserve. By leaving this parcel undeveloped this area will see no net increase in storm water runoff or related pollutants.

Bailey Brook and Maidford River Project – See Section 10.2.

Maidford River Stabilization Project – Middletown received a RIDEM grant to use biostabilization methods to stabilize the eroding banks of the stream in the vicinity of the town-owned Paradise Valley Park. Stabilization of the banks will dramatically reduce erosion of sediment into the stream, thereby improving water quality. This project will cost \$34,197.

Table 10-3: Summary of Storm Water Abatement Opportunities

Abatement Opportunity	Approx Cost/ Funding Source	Affected Waterbody	Anticipated Improvements	Start Date	Status
Bailey Brook and Maidford River Project	\$125,000/ Town	Bailey Brook and Maidford River	Elimination of intermittent discharges of sanitary sewer overflow.	2003	Complete
Sanitary Sewer Improvements	Varies/ Town, SRF	Sachuest Bay, Bailey Brook, Maidford River	Reduction of leaks and overflows of sanitary sewer.	On-going	On-going
Sachuest Point Dump Closure	\$1.5 mil/ Town, grant	Sachuest Bay	Reduce/eliminate potential contaminated runoff from site.	2004	Complete
Land Purchase near Norman Bird Sanctuary	\$3.5 mil/ Land Trust, Private Donations, Town	Sakonnet River Sachuest Bay	Protection of barrier beach, maintaining pervious areas	2003	Complete
Town Center in the Valley	\$3 mil/ Land Trust, Private Donations, grants, Open Space Bond	Bailey Brook	Reduced volume of runoff, improved quality of runoff	2003	Complete
Open Space Preservation	Varies/ Land Trust, Private Donations, grants, Open Space Bond	Town wide	Reduced volume of runoff, improved quality of runoff	On going	Ongoing
SW Reduction Advanced Mgmt.	Varies/ Operating Budget	Town wide	Reduced volume of runoff, improved quality of runoff	On going	Ongoing
Bailey Brook Invasive Species Control	\$20,000/ RIDEM Grant/Town	Bailey Brook	Improved quality of Runoff	2007	Funding acquired
Easton's Point Feasibility Study	\$10,000/ RIDEM grant	Easton's Bay	Reduced volume of runoff, improved quality of runoff	2008	Underway
Gaudet Middle School Bioretention	\$41,811/ RIDEM Grant, Town	Bailey Brook	Reduced volume of runoff, improved quality of runoff	2008	Funding acquired
Maidford River Streambank Stabilization	\$34,197/ RIDEM Grant/Town	Bailey Brook	Reduced volume of runoff, improved quality of runoff	2008	Funding acquired
Newport Ave. Bioretention Retrofit	\$71,265 RIDEM grant/Town	Easton's Bay	Reduced volume of runoff, improved quality of runoff	2009	Funding acquired
Bailey Brook Structural BMPs	Varies/ RIDEM Grants, CIP	Bailey Brook/ North Easton's Pond	Reduced volume of runoff, improved quality of runoff, Reduced Phosphorus	2009	Ongoing



STORMWATER MANAGEMENT PLAN, MIDDLETOWN, RHODE ISLAND

Figure: 10-1
Stormwater Abatement Opportunities



The Louis Berger Group, Inc.

Source: RIGIS

File: 1842/GIS/Abatement

TOWN OF MIDDLETOWN, RI



11.0 POTENTIAL FUNDING SOURCES

The following are descriptions of traditional funding sources that are available to finance storm water pollution prevention projects in Rhode Island. Additional non-traditional funding sources may also be available or become available throughout the duration of the permit. In the past, these sources have included state and open space land grants, and other private foundation grants.

Non Point Source Pollution Abatement Grants (NPS) – Periodically DEM’s Non-Point Source Program makes funding available for projects that reduce non-point source pollutant loadings entering water resources so that beneficial uses of the water resources are maintained or restored. Funding is provided by the Rhode Island Clean Water Trust Fund and EPA Clean Water Act Section 319 monies. These grants typically range from \$25,000 to \$200,000.

Narragansett Bay and Watershed Restoration Fund (BWRF) – Periodically DEM’s Non-Point Source Program makes funding available for projects that reduce pollutant loadings entering Narragansett Bay and state watershed by addressing NPS and stormwater management including illicit connections to the stormwater collection systems. Funding can be used for construction of projects, including stormwater management structures that mitigate, control or eliminate the effects of nonpoint source pollution to the waters of the state (feasibility and design or implementation); capital expenditures for additional or upgraded equipment to enhance implementation of best management practices identified in RIDEM approved local stormwater management program plans; and identification, mitigation, control or elimination of illicit point source connections to stormwater collection systems. Funding is provided by the Rhode Island Open Space, Recreation, Bay and Watershed Protection Bond

State Revolving Fund – The State Revolving Fund (SRF) co-managed by the RI Clean Water Finance Agency and DEM Office of Water Resources, provides below market rate loans (1/3 off prime) for the construction and upgrade of wastewater collection systems and treatment facilities and other water pollution abatement projects which contribute to the removal, curtailment or mitigation of pollution of the waters of the state. In order to receive SRF funding for a project, the town must submit information on that project to DEM and have the project placed on the Project Priority List. For more information contact Jay Manning at DEM’s Office of Water Resources (401) 222-4700 or jmanning@dem.state.ri.us.

Aqua Fund – The Rhode Island Aqua Fund was established in 1988 to fund projects aimed at protecting and improving the water quality of Narragansett Bay and its tributaries. A 20-member Aqua Fund Council, comprised of scientists, state officials, EPA, the League of Cities and Towns, commercial fishermen, local industry representatives and the general public, advises the Director of DEM in granting funds. The fund categories include: planning, project implementation, wastewater treatment, and non-point source pollution prevention. For more information contact Lisa McGreavy at DEM’s Office of Water Resources (401) 222-4700 or lmcgeav@dem.state.ri.us.

12.0 PUBLIC PARTICIPATION

12.1 PUBLIC WORKSHOPS/PUBLIC HEARING

The town held a public meeting on January 22, 2003 to educate residents on the causes and effects of storm water pollution. This meeting also provided the residents with an opportunity to review the draft SWMPP and provide input on the contents. The public meeting was advertised twice in early January in the Newport Daily News. Notice of the meeting was also posted at town hall. Residents were asked for their comments during the meeting and were informed that additional comments or questions could be provided to the Town Planner via phone, fax, email or standard mail. The town held a second public meeting/public hearing on February 3, 2003 where the final draft SWMPP was presented to the town council and to the public. The public hearing was advertised in the Newport Daily News on January 17, 2003 and January 24, 2003. After a presentation by Berger on the contents of the plan, the public was invited to voice comments before the Town Council. The Town Council held the public hearing open until January 2004. The draft SMWP was revised to address the comments received by the town, the Town Council, the public, and RIDEM NonPoint Source Program. It was also revised to comply with the Phase II Draft Permit which was not available until November 2003. A summary of the response to comments is provided below. Copies of the advertisements for the public workshop and hearing are included in Appendix J.

12.2 PUBLIC COMMENTS

Public comments were solicited during the January 22, 2003 and February 3, 2003 public meetings. Two residents were concerned about a specific construction site that they felt did not have adequate soil erosion control measures in place. The DPW director indicated that he would have an inspector at the site the next day. The new SWMPP requires inspection of all construction sites greater than one acre so this will be prevented in the future. A few residents expressed general concern about protecting the quality and quantity of ground water within the town in addition to storm water.

12.3 AGENCY COMMENTS

Comments from RIDEM's Nonpoint Source program were received on January 30, 2003. The changes and additions requested in these comments have been incorporated into the SWMPP. Additional comments from RIDEM were received in February 2005 the changes and additions requested in these comments have also been incorporated into the SWMPP.

12.4 RESPONSIVENESS SUMMARY

This report addresses the comments that have been received to date from RIDEMs Nonpoint Source Program. No substantive comments were received from the public or Town Council aside from those supporting the plan.

13.0 IMPLEMENTATION SCHEDULE

Public Education and Outreach Measurable Goals

BMP ID	Minimum Control Measure Illicit Discharge Detection and Elimination	Responsible Party	Measurable Goal*	Implementation Date
	BMP Description			
NA		Planning/ Steering Committee	Strategies on how to inform the community on how to become involved in the storm water program and how operators will utilize partnerships with governmental and non-governmental entities. (Part IV.B.1.b.2)	Start: 4/04 Finish: 3/05
3.1	Storm Water Outreach Materials	Planning	Town-specific storm water brochure developed which addresses: pet waste, fertilizers, ISDS maintenance, waterfowl pollution and boat pump out information.	Start: 4/04 Finish: 12/04
			Customized materials targeting phosphorus developed.	Start: 4/08 Finish: 9/08
3.2	Storm Water Webpage	Planning/IT	Storm water web page and hit counter added to town web site. Web page to include information on watersheds, impaired water bodies in Middletown, illicit discharge detection, pet waste removal, illegal dumping, proper pesticide and fertilizer use and ISDS maintenance.	Start: 3/05 Finish: 3/06
3.3	School Curricula	Planning/ School Dept.	School curricula developed utilizing EPA and other existing information	Start: 3/06 Finish: 3/07
3.4	Target Audience	Planning	Storm water brochures distributed to residents	Start: 12/04 Finish: 3/05
			Information on storm water posted at transfer station, town hall and library and total number of brochures taken tracked.	Start: 3/05 Finish: 3/06
			Information distributed to town mooring lessees regarding pump out locations and prevention of boat engine pollution.	Start: 3/07 Finish: 3/08
			Information on phosphorus disseminated to residents/business in the North Easton Pond Watershed	Start: 5/08 Finish: Ongoing
3.5	Target Pollutants	Planning	Strategies to list target pollutant sources the public education program is designed to address (Part IV.B.1.b.4)	Start: 4/04 Finish: 3/05
			Phosphorus in the North Easton Pond Watershed targeted.	Start: 5/08 Finish: Ongoing

* Measurable Goals in bold required by the General Permit.

Public Participation Measurable Goals

BMP ID	BMP Description	Responsible Party	Measurable Goal	Implementation Date
NA	Strategies	Planning	Strategies to identify the target audiences of the public involvement program and description of the groups engaged. (Part IV.B.2.b.2.1)	Start: 4/04 Finish: 3/04
			Strategies to describe types of public involvement activities in the program (Part IV.B.2.b.2.ii)	Start: 4/04 Finish: 3/05
4.1	Public Meeting	Planning	Public meetings and steering committee meetings regarding storm water pollution prevention and development of SWMPP advertised and held.	Start: 1/03 Finish: 12/03
			Volunteers recruited for SWMPP steering committee	Start: 4/03 Finish: 3/04
			Public hearing advertised and held on draft SWMPP.	Start: 1/04 Finish: 1/04
			Provide public notice of the draft annual report and provide the opportunity for public comment (Part IV.B. 2.b.2.iii)	Annually Start:3/05 Finish: 3/08
4.2	Volunteer Opportunities	Planning/IT	Volunteer opportunities with local environmental organizations advertised on town web page.	Start: 3/06 Finish: 3/07
			Encourage volunteer monitoring in North Easton Pond Watershed	Start:5/08 Finish: N/A
4.3	Storm Water Outfall Identification	Planning	Volunteers organized to locate storm water outfalls (Boy/Girl Scouts and/or local schools)	Start: 3/04 Finish: 3/05
4.4	Storm Drain Marking	Public Works & Planning	Volunteers stencil or mark storm drains	Start: 3/05 Finish: 3/06
4.5	Town Co-Sponsored Cleanups	Planning	Community clean-up sponsored by environmental group. One to be held in year 3 and one in year 4.	Start: 3/06 Finish: 3/08
			Increase in residents participating in clean-ups and volunteering with other local environmental organizations.	Start: 3/07 Finish: 3/08

* Measurable Goals in bold required by the General Permit.

Illicit Discharge Detection and Elimination Measurable Goals

BMP ID	BMP	Responsible Party	Measurable Goal	Implementation Date
5.1	Stormwater Mapping	Public Works, Planning	Develop procedures for identification of the location of outfalls (Part IV.B.3.1)	Start: 4/04 Finish: 3/05
			Develop procedures for GPS locating outfall pipes (Part IV.B.3.2)	Start: 4/04 Finish: 3/05
			Develop procedures for recording of additional elements (Part IV.B.3.3)	Start: 4/04 Finish: 3/05
			Incorporate 100% of outfall location/receiving waterbody information onto map	Start: 6/04 Finish: 3/07
			GPS locate 50% of outfall pipes (Part IV.B.3.2)	Start: 3/05 Finish: 3/06
			GPS locate remaining 50% of outfall pipes (Part IV.B.3.2)	Start: 3/06 Finish: 3/07
			Record all additional elements on municipal plat maps or GIS (Part IV.B.3.2)	Start: 6/04 Finish: 3/08
5.2	IDDE Ordinance	Planning, Engineering, Public Works	Develop and introduce draft ordinance by first year (Part IV.b.3.4)	Start: 3/04 Finish: 3/05
			Adopt ordinance by second year (Part IV.b.3.4)	Start: 3/05 Finish: 3/06
5.3	IDDE Standard Operating Procedures	Public Works	Develop Standard Operating Procedure (SOP) to detect and address the illicit discharges to the system including discharges from illegal dumping, spills and individual sewage disposal systems (ISDS) when applicable, catch basin and manhole inspections, investigation of complaints, and dry weather field screening for non-storm water flows and field tests of selected parameters (Part IV.B.3.5)	Start: 4/04 Finish: 3/05
			Catch basin and manhole inspections once by fourth year (Part IV.B.3.5.vi) - Inspect 100% of catch basins and manholes / coordinate with cleaning schedule under Good Housekeeping	Start: 4/04 Finish: 3/07
			Dry Weather Survey (conduct between July 1st- October 31st by fourth year) (Part IV.B.3.5.vii) - Sample 100% of dry weather flows	Start: 3/04 Finish: 3/08
			Dry Weather Survey (conduct between January 1st-April 30th by fourth year) (Part IV.B.3.5.vii) - Sample 100% of dry weather flows	Start: 3/04 Finish: 3/08
		Public Works	Strategies for locating priority areas	Start: 4/04 Finish: 3/05

BMP ID	BMP	Responsible Party	Measurable Goal	Implementation Date
	IDDE Standard Operating Procedures (Con't)		Investigate 100% of annual prioritized IDDE investigations	Updated Annually Start: 12/04 Finish: 3/08
			Enforcement action taken on 100% of illicit discharges found or referred to other entity such as police, Health Department, RIDEM or USEPA.	Start: 12/04 Finish: 3/08
			Prioritize outfalls in the North Easton Pond Watershed	Start: 5/08 Finish: 8/08
			Delineate catchment areas for North Easton Pond priority outfalls:	Start: 8/08 Finish: 8/09
5.4	Physically Interconnected MS4s	Public Works	Procedures for coordinating with other physically interconnected MS4s (Part IV.B.3.7)	Start: 4/04 Finish: 3/05
5.5	Referral to RIDEM	Public Works	Procedures for referral to RIDEM of non-storm water discharges not authorized in accordance to Part I.B.3. (Part IV.B.3.8)	Start: 4/04 Finish: 3/05
5.6	Public Education	Public Works	Make RIDEM's RI Septic System Checkup available at Town Hall	Start: 4/04 Finish: 3/05
5.7	IDDE Tracking	Public Works	Procedures to record and track all actions taken to detect and address illicit discharges. (Part IV.B.3.10)	Start: 4/04 Finish: 3/05
5.8	Program Responsibility	Engineering, Public Works	Assign individual(s) responsible for overall management and implementation of the IDDE minimum measure. (Part IV.B.3.11)	Start: 3/04 Finish: 4/04
5.9	Program Evaluation	Engineering, Public Works	Develop procedures to evaluate the success of IDDE minimum measure (Part IV.B.3.12)	Start: 4/04 Finish: 3/05

Note: Measurable Goals in bold required by the General Permit.

Construction Site Runoff Control Measurable Goals

BMP ID	Minimum Control Measure Illicit Discharge Detection and Elimination	Responsible Party	Measurable Goal	Implementation Date
	BMP Description			
6.1	Construction Site Runoff Ordinance	Planning, Engineering	Development and introduction of a mechanism to require erosion and sediment control, control of other wastes, and sanctions to ensure compliance. (Part IV.B.4.b.1)	Start: 3/04 Finish: 3/05
			Mechanism Adoption (Part IV.B.4.b.1)	Start: 3/05 Finish: 3/06
			Procedures for issuing permits and implementing policies and procedures for all construction projects disturbing greater than 1 acre (Part IV.B.4.b.2)	Start: 3/04 Finish: 3/06
			Implementation of procedures (Part IV.B.4.b.2)	
6.2	Construction Plan Review	Engineering	Implementation of program to review 100% of plans and SWPPPs for construction projects greater than one acre not reviewed by other state programs (Part IV.B.4.b.4)	Start: 3/04 Finish: 3/06
			Procedures for coordination of site plan and SWPPP review when relying on State program reviews of construction activity (Part IV.B.4.b.5)	
			Implementation of procedures (Part IV.B.4.b.5)	
6.3	Public Participation	DPW	Procedures for consideration of information from public in place.	Start: 4/04 Finish: 3/05
			Pre-application meetings with potential developers continue to be offered.	ongoing
6.4	Inspection and Enforcement	DPW/Building Dept.	Inspect 100% of all construction projects within the regulated area that discharge or have the potential to discharge to the MS4 (Part IV.B.4.b.7)	Start: 3/05 Finish: 3/06
			Procedures for referral to the State of non-compliant construction site operators (Part IV.B.4.b.8)	

Note: Measurable Goals in bold required by the General Permit.

Post-Construction Site Runoff Control Measurable Goals

BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date
7.1	Stormwater Runoff	Planning Department	Description of a method to address storm water runoff from new development and redevelopment projects. (Part IV.B.5.b.1)	Start: 3/04 Finish: 3/05
7.2	Consistency	Planning, Engineering	Description of how the program is consistent with the State of Rhode Island Storm Water Design and Installation Manual and will be tailored for the community/facility, minimize water quality impacts, and maintain pre-development runoff conditions. (Part IV.B.5.b.2)	Start: 3/04 Finish: 3/05
7.3	Pre-Application Meetings	Building/ Engineering	Procedures for pre-application meetings (Part IV.B.5.b.3)	Start: 3/05 Finish: 3/06
7.4	Plan Review	Building/ Engineering	Implementation of program to review 100% of plans for development projects one or more acres not reviewed by other State Programs (Part IV.B.5.b.4)	Start: 3/05 Finish: 3/06
7.5	Coordination of State and Local Programs	Building Department	Description of how the program will coordinate with existing state programs requiring post-construction storm water management (Part IV.B.5.b.5)	Start: 3/05 Finish: 3/06
7.6	Referral to State	Building	Procedures for referral of new discharges of storm water associated with industrial activity (Part IV.B.5.b.6)	Start: 3/05 Finish: 3/06
7.7	Non-Structural BMPs	Planning Department	Any non-structural BMPs in the program. (Part IV.B.5.b.7)	Start: 3/04 Finish: 3/05
7.8	Structural BMPs	Planning Department	Any structural BMPs in the program. (Part IV.B.5.b.8)	Start: 3/04 Finish: 3/05
			Construct Gaudet Middle School Bioretention Cell	Start: Finish:
			Conduct Easton’s Point BMP Feasibility Study	Start: Finish:
			Develop SOW for BMPs in North Easton Pond Watershed	Start: 4/08 Finish: 7/08
7.9	Stormwater Management Ordinance	Planning Department	Develop and introduce regulatory mechanism to address post-construction runoff (Part IV.B.5.b.9)	Start: 3/04 Finish: 3/05
			Mechanism adoption (Part IV.B.5.b.9)	Start: 3/05 Finish: 3/06
			Amend ordinance to address phosphorus loading in North Easton Pond Watershed.	Start: 5/08 Finish: 11/08

BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date
7.10	Inspection	Building	Procedures for post-construction inspections of BMPs and inspect 100% of all development greater than one acre within the regulated area that discharges to the MS4 (Part IV.B.5.b.10)	Start: 3/05 Finish: 3/06
			Implementation of Procedures (Part IV.B.5.b.12)	Start: 3/05 Finish: 3/06
7.11	Operation and Maintenance	Building/ Public Works	Procedures for post-construction inspection of BMPs, to ensure these are constructed in accordance with the approved plans.	Start: 3/04 Finish: 3/06
7.12	Existing Structural BMPs	Building	Description of how the long-term O&M of the selected BMPs, for new development and re-development, will be ensured.	Start: 3/04 Finish: 3/06
7.13	Program Responsibility	Building	Individual(s) responsible for overall management and implementation of the post-construction storm water management program, as well as each BMP identified for this program.	Start: 3/04 Finish: 3/05
7.14	Program Evaluation	Planning Dept.	Procedures to evaluate the success of this minimum measure, including discussion of how the measurable goals for each of the BMPs were selected.	Start: 3/04 Finish: 3/05

Note: Measurable Goals in bold are required by the General Permit.

Pollution Prevention/Good Housekeeping Measurable Goals

BMP ID	Best Management Practice	Responsible Party	Measurable Goal	Implementation Date
NA	Reporting	Public Works	Operator must report and describe all operations under legal control that may have the potential to introduce pollutants into storm water runoff (Part IV.B.6.b.2)	ongoing
NA	O&M and Good Housekeeping	Public Works	Procedures for the development of a O&M and good housekeeping program for non-industrial facilities with the potential to introduce pollutants to their storm water discharges with the goal of minimizing or eliminating pollutant runoff (Part IV.B.6.b.4)	Start: 4/04 Finish: 3/05
8.1	Identification of Structural BMPS	Public Works, Engineering	Procedures for identifying, locating, and describing all municipally owned structural BMPs (Part IV.B.6.b.1.i)	Start: 4/04 Finish: 3/05
8.2	BMP Inspection, Cleaning, and Repair	Public Works, Engineering	Procedures for Inspecting and cleaning BMPs (Part IV.B.6.b.1.ii)	Start: 4/04 Finish: 3/05
			Procedures for an annual catch basin inspection and cleaning program (Part IV.B.6.b.1.iii)	Start: 4/04 Finish: 3/05
			Implementation of program (Part IV.B.6.b.1.iii)	Start: 4/04 Finish: 3/07
			Increase frequency in North Easton Pond Watershed	Start: 5/08 Finish: ongoing
8.3	Erosion Minimization	Public Works	Procedures to minimize erosion of road side shoulders and ditches (Part IV.B.6.b.1.iv)	Start: 4/04 Finish: 3/05
8.4	Scouring and Sedimentation at Outfalls	Public Works	Procedures to identify and report annually the known discharges causing scouring at outfall pipes or outfalls with excessive sedimentation (Part IV.B.6.b.1.v)	Start: 4/04 Finish: 3/05
8.5	Street Sweeping	Public Works	Procedures for a road sweeping program that includes sweeping all streets and roads within the regulated area annually (Part IV.B.6.b.1.vi)	Start: 4/04 Finish: 3/05
			Implementing the program to occur annually (Part IV.B.6.b.1.vi)	Start: 4/04 Finish: 3/05

			Consider more frequent street sweeping in the North Easton Pond Watershed.	Start: 8/08 Finish: 12/08
			Apply for RIDEM grant funding to purchase vacuum sweeper.	Start: TBD Finish: TBD
8.6	Floatable Reduction	Public Works	Description of maintenance activities, schedules, and long-term inspection procedures for controls to reduce floatables (Part IV.B.6.b.1.vii)	Start: 4/04 Finish: 3/05
8.7	Solid Waste Collection and Disposal	Public Works	Procedures for the proper disposal of removed waste from the MS4 (Part IV.B.6.b.1.viii)	Start: 4/04 Finish: 3/05
8.8	Employee Training	Planning, Public Works	Employee pollution prevention training materials gathered	Start: 4/04 Finish: 3/05
			Train 100% of staff that will be involved with municipal operations.	Annually (March) 3/05..3/08
8.9	Flow Management	Public Works	Procedures for assessment of flow management projects (Part IV.b.6.b.7)	Start: 4/04 Finish: 3/05
8.10	Municipal Construction Projects	Public Works	Procedures for implementing proper erosion and sediment and water quality control for construction projects (Part IV.b.6.b.8)	Start: 4/04 Finish: 3/05

NOTE: Measurable Goals in bold are required by the General Permit