STORMWATER MANAGEMENT PLAN

TOWN OF SOUTHBOROUGH, MASSACHUSETTS

AUGUST 2003

Prepared for:

The Town of Southborough

STORMWATER MANAGEMENT PLAN
TOWN OF SOUTHBOROUGH
SOUTHBOROUGH, MASSACHUSETTS

TABLE OF CONTENTS

STORMWATER MANAGEMENT PLAN
TOWN OF SOUTHBOROUGH
SOUTHBOROUGH, MASSACHUSETTS

TABLE OF CONTENTS (continued)

STORMWATER MANAGEMENT PLAN
TOWN OF SOUTHBOROUGH
SOUTHBOROUGH, MASSACHUSETTS

TABLE OF CONTENTS (continued)

STORMWATER MANAGEMENT PLAN
TOWN OF SOUTHBOROUGH
SOUTHBOROUGH, MASSACHUSETTS

TABLE OF CONTENTS (continued)

TABLES **PAGE**

APPENDICIES **END OF REPORT**

MAPS **END OF REPORT**

1.0 INTRODUCTION

On December 8, 1999, the U.S. Environmental Protection Agency (EPA) promulgated Phase II of its National Pollution Discharge Elimination System (NPDES) storm water regulations. Phase I of the EPA storm water program established regulations for storm water discharges from municipal separate storm sewer systems (MS4s) in municipalities with populations of 100,000 or greater, construction activities disturbing five or more acres of land, and ten categories of industrial facilities. The Phase II Final Rule expands the Phase I program by requiring smaller communities with MS4s in urbanized areas to implement programs and practices to control polluted storm water runoff and protect water quality. EPA chose to regulate municipalities within urbanized areas because urban runoff is a major source of water quality impacts.

The Town of Southborough is one of 251 municipalities in Massachusetts that are located either completely or partially within an urbanized area. Urbanized Areas (UAs) means those areas that are comprised of one or more places ("central places") and the adjacent densely settled surrounding territory ("urban fringe") that together have a minimum of 50,000 persons. The urban fringe generally consists of contiguous territory having a density of at least 1,000 persons per square mile. These communities must seek permit coverage by March 10, 2003 under EPA's Phase II Storm Water Program.

As part of the permitting process, these regulated municipalities are required to prepare and submit Storm Water Management Plans that address how the regulated MS4 will comply with six minimum control measures. These six minimum measures include:

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

The Town has retained Fuss & O'Neill, Inc. to prepare a storm water management plan for their MS4 to develop recommendations and a strategy to comply with the Phase II requirements. Our goal during the plan development was to build on existing resources and practices in order to minimize future investments to comply with the Phase II program as well as to identify measures which could focus on specific water resources in the Town of Southborough. By focusing this effort on specific water resources we can target controls where they will bring the greatest water quality benefits to the Town.

Our goal during plan development was to build on existing resources and practices in order to minimize future investments to comply with the Phase II program. Our study began with reviewing existing conditions in Southborough that included site visits and data collection. This was followed up with interviews of selected municipal staff and reviews of existing regulations and ordinances. Once this data was collected, we then developed technical memoranda addressing each of the six minimum control measures. We then conducted a

series of workshops to validate the information we collected, and developed implementation alternatives. We identified implementation alternatives to complete the plan based on expected Phase II requirements.

This report details the findings of our evaluation as well as summarizes our recommendations addressing both project objectives.

2.0 WATER RESOURCES INVENTORY

The Town of Southborough is located entirely in the Concord River Basin. Several watercourses drain through Southborough. While significant portions of Southborough have been developed, a number of significant water resources exist that should be the focus of future storm water management activities in Southborough. These significant resources are primarily the Sudbury Reservoir and the Sudbury River.

2.1 Outstanding Resource Waters

The Sudbury Reservoir is an Outstanding Resource Water as defined in the State of Massachusetts 1995 Surface Water Quality Standards and is afforded special protections under the Massachusetts Water Quality Standards (314 CMR 4.04) The reservoir is an emergency back-up water supply source for over two million residents of Eastern Massachusetts and is located in Southborough and Marlborough.

The Massachusetts Water Resources Authority (MWRA) is responsible for the quantity and quality of the reservoir while the Metropolitan District Commission (MDC) is responsible for the land surrounding the reservoir. The MDC Division of Watershed Management (DWM) was established by the Massachusetts legislature in 1985 to "construct, maintain and operate a system of watersheds, reservoirs, water rights and rights in sources of supply in order to provide sufficient supply of pure water to the Massachusetts Water Resources Authority." The DWM must also conserve and protect these resources in order to ensure the purity of its drinking water supply for future operation.

The reservoir not only serves as an emergency back-up water supply, but also provides habitat for fish and wildlife as well as recreational opportunities and improves the quality of life and property values in the community. There are many groups and agencies working together to protect the watershed. The Metropolitan District Commission (MDC), Massachusetts Water Resources Authority (MWRA), Department of Environmental Protection (DEP), Sudbury Valley Trustees, and the Framingham Advocates for the Sudbury River, as well as community Boards of Health, Conservation Commissions and Planning Boards are taking responsibility to address specific areas of concern.

The **Su**dbury-**As**sabet-**Co**ncord Watershed, located in the metro-west area of the state, encompasses a large network of tributaries, which ultimately contribute to the Merrimack River Watershed in the northeastern part of the state. The Watershed is referred to as the SuAsCo not only in recognition of its distinct grassroots organizations, but for the unique

physical characteristics of its three individual river sub basins. The Assabet River flows north about 30 miles from its headwaters in Westborough, through the now densely developed urban centers of Northborough, Hudson and Maynard, to its confluence with the Sudbury River at historic Egg Rock in Concord, where the Concord River begins. The Sudbury River also has its beginnings in Westborough, flowing eastward from Great Cedar Swamp toward Framingham, then north through the towns of Sudbury, Wayland, and Lincoln and into the town of Concord.

A Stream Team was developed for the Sudbury River in Southborough. This team will help maintain a grassroots presence in the watershed. The results of their surveys will help lay the groundwork for non-point source pollution remediation and future grant targeting.

2.2 Impaired Waters

The Office of Watershed Management of the Massachusetts Department of Environmental Protection (MADEP) has prepared a list of impaired waters in Massachusetts in compliance with section 303(d) of the federal Clean Water Act (CWA). These impaired waters are defined as those that do not meet State of Massachusetts Quality standards. Total maximum daily loads (TMDLs) are planned to be developed for each of these waters. The purpose of the TMDLs is to identify the capacity of a surface water to assimilate pollutants without impacting its designated uses (e.g. fishable, swimmable) as well as meet the State Water Quality Standards. While many of the TMDLs are anticipated to focus on point sources of pollution, future TMDLs may require more intensive storm water controls to more aggressively reduce sources of storm water pollution from what was intended for the Phase II program.

The Sudbury River in Southborough is identified on the state's 303(d) list for metals. However, MADEP has identified additional monitoring is necessary to assess this segment, and this segment may be removed from the list. MA DEP is presently reformatting the list for publication this year.

2.3 Fish Advisories

The Massachusetts Department of Public Health has issued a fish advisory for the Sudbury Reservoir. Children younger than 12 years, pregnant women, and nursing mothers should not eat any fish from this water body. The general public should not consume any bass from this water body. These advisories are the result of mercury contamination.
Mercury is a natural element and can be found at low levels almost everywhere. However, human activities such as coal burning and trash disposal have significantly increased mercury levels in the environment. Many common products contain mercury and can pollute the environment when they are incinerated, land filled, broken or disposed of down drains.

In lakes, ponds and the ocean, mercury can be transformed by natural processes into a more toxic form called methylmercury. Methylmercury is absorbed by small organisms that are then eaten by fish. The mercury becomes concentrated in the fish. In fact, the level of methylmercury in fish can be up to a million times higher than in the water the fish lives in. Thus, the fish may be unsafe to eat even though the water is safe to swim in or even drink.

Once released into the environment, mercury persists for long periods of time and does not degrade into harmless chemicals.

2.4 Land Use

Land use directly affects the potential for storm water pollution and the types of pollutants found in storm water. Different land uses expose different pollutants to storm water. For example, residential land uses often result in higher nutrient (nitrogen and phosphorous) concentrations in runoff due to the use of fertilizers while metals concentrations are often higher in runoff from commercial areas due to traffic.

Based on MASSGIS mapping, much of Southborough consists of low to medium density residential land uses. The Sudbury Reservoir occupies close to 25% of the Town. Limited commercial and industrial developments also exist, primarily along the Route 9 corridor and the northeast and southwest portions of the Town. Given the nature of Southborough and the fact that many developments exist to the banks of the rivers and streams in Southborough, there is significant potential for storm water quality impacts.

The following table identifies the land uses in Southborough based on data available from MASSGIS :

TABLE 2.1
LAND USE
TOWN OF SOUTHBOROUGH

Land Use	Acreage	Percent of Total Land
Commercial	192.14	1.93 %
Cropland	508.04	5.10 %
Forest	4,109.40	41.25 %
Industrial	195.28	1.96 %
Open Land	177.14	1.78 %
Open Land - Powerlines	9.08	0.09 %
Participation Recreation	69.38	0.70 %
Participation Recreation-Golf	91.47	0.92 %
Pasture	69.45	0.70 %
R0 Residential	11.14	0.11 %
R1 Residential	6.32	0.06 %
R2 Residential	1,385.79	13.91 %
R3 Residential	1,516.02	15.22 %
Spectator Recreation	14.53	0.15 %
Transportation	234.01	2.35 %
Transportation - Facilities	17.97	0.18 %
Urban Open	46.48	0.47 %
Urban Open - Cemeteries	22.61	0.23 %
Urban Open - Public	122.55	1.23 %
Waste Disposal	9.55	0.10 %
Water	953.10	9.57 %
Water Based Recreation	7.96	0.08 %
Wetland	116.80	1.17 %
Woody Perennial - Orchard	73.02	0.73 %
Woody Perennial - Nursery	2.15	0.02 %
TOTAL	**9,961.38**	**100 %**

For Storm Water Management Planning we have identified the following priority land uses. High-risk land uses (Category A) are those that have a higher potential risk or actual presence of pollutants such as sediment, metals, nutrients, and pathogens. The highest risk areas are those that contain a high percentage of impervious area, activities using dangerous chemicals, and high human activity thus creating a higher degree of human impacts (including automotive impacts). These areas would have industrial, commercial, commercial/industrial, high density residential, transportation, quarries, and waste disposal land use designations. Industrial and commercial land uses can contribute solids, and oils and grease from high volume parking areas. They may also contribute toxics and metals dependent upon the activities conducted at the site from areas associated with manufacturing and waste disposal. Transportation related land uses have the potential to degrade water

quality from vehicular spills (oils, grease, antifreeze), salting and sanding, and particulate deposition. Higher concentration of metals can also be found due to tire wear, brake pads, and body wear. These areas are particularly dangerous when located on highly permeable soils, as the pollutants are easily accepted into the groundwater.

Medium risk areas (Category B) are those that contain a considerable amount of impervious area and human impacts (including pet waste impacts). These areas consist of medium density, low density and developed recreation (beach walks and facilities) land use designations. Residential land uses can be significant sources of nutrients and pathogens. Improper lawn care can contribute excess nutrients to the storm drainage system. Sanitary systems that are not properly designed, constructed, or maintained can be significant sources of nutrients, pathogens, and organic contaminants. Residential land uses may be a source of toxic contaminants due to improper disposal of household hazardous wastes.

The agricultural lands (Category C) are associated with fertilizer and pesticide runoff pollution. We have included in this group cemetery, orchards, pasture, and idle agriculture land uses.

TABLE 2.2
PRIORITY LAND USE
TOWN OF SOUTHBOROUGH

Land Use	Acreage	Percent of Total Land
Category A		
Commercial	192.14	1.93 %
Industrial	195.28	1.96 %
Transportation	234.01	2.35 %
Transportation – Facilities	17.97	0.18 %
Waste Disposal	9.55	0.10 %
Category B		
R0 Residential	11.14	0.11 %
R1 Residential	6.32	0.06 %
R2 Residential	1,385.79	13.91 %
R3 Residential	1,516.02	15.22 %
Category C		
Cropland	508.04	5.10 %
TOTAL	**4,076.26**	**40.92 %**

Category A represents approximately 6% of the land uses in Southborough. The pollutants of concern from these land uses are sediments and metals primarily washed off impervious surfaces.

Category B represents approximately 30% of the land uses in Southborough. The pollutants of concern from these land uses are nutrients and pathogens, primarily from lawns and sanitary systems.

Category C represents approximately 5% of the land uses in Southborough. The pollutants of concern from these land uses are nutrients and pathogens from fertilizers.

2.5 Vernal Pools

Sixty-four sites have been identified as potential vernal pools. Based on available information, only one vernal pool has been certified. Vernal pools are temporary bodies of fresh water that provide critical habitat for many vertebrate and invertebrate wildlife species. "Vernal" means spring, and indeed, many vernal pools are filled by spring rains and snowmelt, only to dry up during the hot, dry months of summer. However, many vernal pools are filled by the rains of autumn and may persist throughout the winter. Vernal pools are quite often very small and shallow; vernal pools that support rich communities of vertebrate and invertebrate animals may measure only a few yards across. However, vernal pools of several acres occur throughout Massachusetts. Vernal pools constitute a unique and increasingly vulnerable type of wetland. Vernal pools are inhabited by many species of wildlife, some of which are totally dependent on vernal pools for their survival. Vernal pools do not support fish because they dry out annually or at least periodically. Some may contain water year round, but are free of fish as a result of significant draw-downs that result in extremely low dissolved oxygen levels.

Certified vernal pools are provided special protections under the Massachusetts Wetlands Protection Act by preventing alteration up to 100 feet beyond the boundary of the pool. Vernal pools that are not certified can be protected by the local Conservation Commission by preventing alteration within 100 feet of the "vernal pool habitat", provided they occur within a regulated wetland.

2.6 Priority Habitats for State-Protected Rare Species

Two areas in Southborough are identified as Priority Habitats for State-Protected Rare Species. One area is in the southern part of Southborough, south of the Massachusetts Turnpike (Rte 90) that borders a large wetlands complex. The other is a small area in the western part of Southborough bounded by Routes 9 and 495. Available data on why these areas are priority habitats are not publicized; however, we are currently following up with the Commonwealth officials on additional data for these areas.

2.7 Wetland Areas

Approximately 850 acres of the Town is classified as wetland areas outside of the Sudbury Reservoir. These wetlands cover approximately 8.5% of the Town's land area. Much of these wetland areas are classified as "wooded swamp deciduous." Other wetland types in Southborough include "shallow marsh meadows" and "shrub swamps."

These wetland areas are scattered throughout Southborough. The largest wetland areas appear to exist to the north of I-90 where several large systems have been identified based on existing databases.

2.8 Water Supply

The MWRA provides water for the Town of Southborough. Water is transported from the Quabbin system to the Town. Although the Sudbury Reservoir is an emergency back up water supply, there are no primary surface or ground water supplies in the Town. Private wells exist, but are not regulated by the Town.

2.9 Pollutants of Concern

Given the land uses in the Town, the priority habitats, and the fact the Sudbury Reservoir is an emergency backup water supply, the pollutants of concern Town-wide are:

- Pathogens: Disease causing bacteria and other organisms that may require special treatment or a boil water order.
- Sediments: Particulate matter (e.g. silt and sand) transport pollutants such as pathogens and heavy metals, and decrease water clarity that adversely impacts aquatic life and habitat.
- Nutrients: High levels of nutrients (such as phosphorous and nitrogen) cause increased algal growth that limits aquatic life and the use of the reservoir for drinking water.

3.0 PUBLIC EDUCATION AND OUTREACH

3.1 State and Federal Regulatory Requirements

The success of any storm water management program hinges on educating the public about the impacts of certain behaviors and practices on surface water quality in their watershed. In addition, public education will improve the Town's ability to gain support to implement this program as well as secure required funding. For this reason, USEPA has included public education and outreach as a minimum control measure of the Phase II regulations. The requirements to satisfy this minimum control measure are:

1. Implement a public education and outreach program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution; and

2. Determine the appropriate BMPs and measurable goals for this minimum control measure.

3.2 Available Resources

There are a number of resources and public education currently available or in-place to assist Southborough to achieve the requirements of this minimum control measure. Descriptions and examples of education and outreach materials are provided throughout the following sections. Appendix A contains additional information specific to SuAsCo Storm Water Community Assistance Program. The following is a list of the groups or programs that represent opportunities for education and outreach to the public.

3.2.1 School Programs

The following summarizes existing environmental education or non-point source pollution education programs that are taught in Southborough public schools.

Mary Finn School

Mary Finn School is an elementary school for kindergarten through second grade. The school follows the state curriculum, which includes weather as a topic in earth science and "living things and their environment" as a topic in life science for each of these grades. Additionally, first graders learn about the water cycle. Students here will learn to distinguish between different states of water, to identify non-living aspects of the environment, and how to define and measure precipitation.

Margaret Neary School

An elementary school for grades three through five, the Margaret Neary School follows the state sequence for science education. Each grade has topics that can be related to storm water and the environment. In third grade, part of the year is spent learning about environmental responsibility, how human actions have altered ecosystems over time, and relating non-living aspects of the environment to the ability of organisms to survive. Forth grade focuses heavily on life science including topics like earth layers, erosion, habitats, and adaptations. Fifth graders begin to learn about chemistry and experimentation. Neary School has a strong hands-on approach that incorporates the Full Option Science System (FOSS), Elementary Science Study (ESS) kits, Science Through Experiments Program (STEP), and the Activities Integrating Math and Science (AIMS) curriculum. AIMS engages students in grades three and four in lessons incorporating mathematics and science with real world experiences, oral and written communication, critical thinking and pictorial/graphic presentations. STEP, geared towards fifth graders, integrates math, science and writing to encourage students to act like scientists. Topics include friction, levers, volume, electricity and quantitative analysis. A number of grants are funded by the Southborough Education Foundation and available for additional programs this academic year. In the past, students have created posters about the Rainforest as part of the environmental curriculum.

P. Brent Trottier Middle School

This school is for grades six through eight. The sixth grade begins the year with a two to three month unit on ecology. Covered topics include animal habitats, niches, ecosystems, and biomes. The affect of pollution on organisms and other aspects of environmental awareness are discussed in relation to these topics. Trottier Middle School has recently purchased Vernier Probes for water testing and plan to implement their instruction and use into the 2003 curriculum. The sixth grade class also takes a three to five day field trip Stone Environmental Camp in Madison, New Hampshire. Here naturalists and biologists at the camp introduce students to many environmental themes. The seventh and eight grade earth science topics include weather, the water cycle, and soil. The seventh grade also discusses "living things are their environment" and "changes to an ecosystem over time" as part of the life science curriculum. Trottier also offers an environmental club to its students. SWaMP has visited with students in this club to show them sampling equipment and a slide show about water quality monitoring.

Algonquin Regional High School

The High School offers several science courses to its students including physiology, biology, chemistry, physics, and Principles of Technology. Most of these courses are offered at varying degrees of difficulty. Students are not required to take any one science course or certain combinations but must fulfill three years of science to graduate.

Available Teaching Resources

Teachers in the Southborough school system have a number of resources and periodicals available to them that focus on environmental issues including water quality. Some of these resources are:

USEPA Environmental Education Center

The on-line Environmental Education Center (EEC) provides teachers with technical background, curriculum and activities information, and workshops on a variety of environmental topics. This resource is useful in providing educators with the tools to teach students in grades K-12. The EEC web page is www.epa.gov/teachers/. More information on educational resources, including having USEPA employees provide talks and presentations at public events or in schools, may be obtained from the USEPA Region 1 (New England) office located at 1 Congress Street, Suite 1100, Boston, MA 02114-2023, (888) 372-7341.

The Environmental Education Grant Program was developed to provide financial support for projects that "design, demonstrate or disseminate environmental education practices, methods or techniques." Organizations eligible to apply for grant funds are:

- A local or tribal government education agency, college, or university; a state education or environmental agency; a 501(c)(3) not-for-profit organization; or a noncommercial educational broadcasting entity is eligible.

- A teacher's school district, an educator's not-for-profit organization, or a faculty member's college or university may apply, but an individual teacher is not eligible.

- The primary applicant must be based in the U.S.; partner organizations and project activities may be located outside the U.S.

USEPA Student Center

USEPA's Student Center web site provides information and activities for students to learn more about surface water ecosystems, environmental laws, and pollution. The site is located at www.epa.gov/students/. There is also the Explorers' Club web page for younger students with games, activities and documents on the basics of environmental education. The Explorers' Club is found at www.epa.gov/kids/.

President's Environmental Youth Awards

The President's Environmental Youth Awards is a program that recognizes young people across America for projects that demonstrate their commitment to the environment. Winners of regional certificates in the program are evaluated against winners in other USPEPA regions. The national winner receives a plaque issued by the President of the United States at an EPA awards ceremony. Participants of completed projects will receive a certificate signed by the President. Projects can include a variety topics focused on environmental issues and environmental science. Participation in this awards program can be a mechanism to promote student interest in other education or participation programs.

Green Teacher

This magazine is produced by and for educators to enhance environmental and global education at all grade levels. It is produced four times per year and contains approximately fifty pages of ideas, activities, perspective articles, reports of what successful teachers, parents, and schools are doing, activities for various grade levels, evaluations of new books, kits, games and other resources. Green Teacher may be contacted at P.O. Box 452, Niagara Falls, NY 14304-0452, e-mail: greentea@web.net, (416) 960-1244.

EARTHWATCH

This magazine is produced bimonthly by the organization of the same name to link business, science, and the community in search of environmental solutions. Contact information: 680 Mt. Auburn Street, P.O. Box 403, Watertown, MA 02272, (800) 776-0188.

Earth Preservers

Earth Preservers is an "environmental newspaper" for kids in grades 3-9 published monthly during the academic season. Contact information: P.O. Box 6, Westfield, NJ 07090.

EE-Link

EE-Link is an on-line environmental education resource guide that can assist educators in locating materials and information for class study guides, activities, and programs (http://www.eelink.net).

Project WET

Project WET (Water Education for Teachers) is a national nonprofit water education program for educators and young people located on the campus of Montana State University. The goal of Project WET is to facilitate and promote the awareness, appreciation, knowledge and stewardship of water resources through the development and distribution of classroom ready teaching aids and through the establishment of Project WET programs. It is active in all 50 states, the District of Columbia, the U.S. islands and select provinces of Canada. In Massachusetts, the Metropolitan District Commission's Division of Watershed Management sponsors Project WET.

Certified Project WET facilitators conduct workshops where educators, community leaders and natural resource managers receive instruction in the use of Project WET materials. A workshop lasts six hours and participants receive the highly acclaimed Project WET Curriculum and Activity Guide. Workshop participants are then encouraged to integrate activities from the Guide into the existing school curriculum or other appropriate forums. This guide is a 500-page publication filled with over 90 innovative, interdisciplinary activities for grades K - 12 most of which are hands-on. Designed to coincide with state and national standards, the Guide addresses the following content areas:

- Water has unique physical and chemical characteristics.
- Water is essential for all life to exist.
- Water connects all Earth systems.
- Water is a natural resource.
- Water resources are managed.
- Water resources exist within social contexts.
- Water resources exist within cultural contexts.

Jim Lafley of the Metropolitan District Commission can be contacted at (508) 792-7423 x231 or jim.lafley@state.ma.us for more information about this program.

Healthy Water, Healthy People

Healthy Water, Healthy People is an innovative water quality education program sponsored by Project WET and the Hach Scientific Foundation, which offers hands-on activity guides, testing kits, and training. Healthy Water, Healthy People is for anyone interested in learning and teaching about contemporary water quality education topics. The goal of the program is to raise the awareness and understanding of water quality topics and issues and their relationship to personal, public, and environmental health. The program attempts to provide a clear understanding of these relationships, the connection between water quality and land uses, and the process of analyzing and interpreting data. Healthy Water, Healthy People will help educators address science standards through interactive activities that interpret water quality concepts and promote diverse learning styles, with foundations in the scientific method.

The program comes with educator guides for the fourth grade through university level age students as well as testing kits and manuals. The Healthy Water, Healthy People Testing Kits yield in-depth information about eleven water quality parameters. The water quality testing kits include all materials and equipment needed for field and classroom analysis of water samples for chemical, physical, and biological parameters. Healthy Water, Healthy People Testing Kits are available for a variety of parameters, grade levels, skills, and prices.

For more information about the Healthy Water, Healthy People program visit their website at. www.healthywater.org

Catch the Science Bug

Catch the Science Bug, created by Kim Bent, is a traveling science program, bringing hands-on science activities to Boston-area elementary schools. Its mission is to excite and educate students about science and how it affects everyday aspects of life. Their Traveling Programs feature interactive inquiry-based methods of presentation to enable students to take part in the learning process. Students learn by predicting outcomes, observing, comparing, experimenting and drawing conclusions through hands-on activities. Appropriate math concepts are also integrated. All programs are designed in accordance with the National Science Standards, the Massachusetts Science and Technology Curriculum Frameworks, and the Benchmarks on the Way to Environmental Literacy.

Catch The Science Bug offers five programs, which range across a variety of science topics. Environmental Programs include:

- "Clean-Up an Oil Spill" This is a two hour program that challenges students to design the clean up of a hypothetical oil spill.
- "All Eyes on Earth" combines four different programs including catch the recycling bug, where do you get your drinking water from, protecting our land and water resources, and contaminant hydrogeology.

- "Watersheds" addresses several topics directly related to storm water pollution prevention. Students learn how to define a watershed using a topographic map and are given different cards describing everyday activities that take place in a watershed. Participants each model a different everyday business or residential activity, which when acted out together, shows how various land-uses affect water quality.
- "Protecting our Land and Water Resources" includes explanation of non-point source pollution and storm water.
- "Where Do You Get Your Drinking Water" addressed pollution prevention and preserving surface water supplies through the use of a model. The model shows different non-point sources of pollution and shows how these sources affect both the ground water and surface water supplies.

These programs are also available to youth organizations such as scouting troops and church groups.

Catch the Science Bug will soon offer a children's show to be televised over the Web at FreeNetTV. The show will feature a different science expert each week and will allow time for Kim to respond to questions that children send by e-mail while the show is "on the air." More information about available education programs can be found at www.catchthesciencebug.com and by contacting (508) 854-1681 or sciencebug@charter.net.

3.2.2 Citizen's Groups

Several organizations exist that either currently provide public education resources on storm water quality issues or could provide a public outreach avenue in developing storm water awareness and developing partnerships with the public. The organizations that have the best potential to support future storm water education programs in Southborough are the following:

SuAsCo Watershed Community Council

The SuAsCo Watershed Community Council (Council) was formed from the SuAsCo Watershed Coalition (Coalition). The Coalition was formed approximately five years ago when five environmental organizations in the SuAsCo watershed joined together to help acquire funding and to collaborate efforts. There initial efforts included creating the Council which as since taken over and expanded upon the Coalitions efforts. The main goal of the Council is to encourage community-driven assessment and action for the protection of water resources and ecosystems at a watershed scale. The Council works as a collaboration of four main groups (municipalities, consultants, regulators, and environmental advocates) to find solutions to environmental and economic challenges. They provide strategic support to the 36 communities in the watershed to help them address priority issues and achieve long-range watershed protection measures. To achieve their goal the Council focuses on:

1. Citizen involvement in volunteer assessment and monitoring programs. Then integrating monitoring programs into a comprehensive, community-based assessment process.
2. Public participation on issues of identification, prioritization, action planning and decision-making
3. Specific outreach and education on the importance of land use and growth management for protecting water resources and ecosystems
4. Creating a model for strategic education and outreach to achieve specific water quality and conservation goals. This was conceived under the MA Watershed Initiative Program and is a joint effort between watershed associations, municipalities, and regulators.

For the past year, the Council has been working on writing a Regional Public Outreach and Education document for the communities in the SuAsCo watershed. They have worked closely with the Towns, state agencies, and similar groups to create a document all of the towns can use to address Phase II requirements. Once completed they will also provide the towns with the materials needed to implement the education, outreach, and public participation measures outlined in their document for the next five years. At the end of each year the Council will provide each of the communities with written summary they can submit to the DEP. The Council will also be providing the towns with supplemental "bonus" materials that they can use to address other aspects of their Storm Water Management Plans. The Council is based at Suite 500, 2 Clock Tower Place, Maynard, MA 01754. For more information about this document or the Council's work, please contact Nancy Bryant, Executive Director, at (978) 461-0735 (tel.), (978) 461-0322 (fax), or suasco@compuserve.com

Sudbury Watershed Monitoring Program

The Sudbury Watershed Monitoring Program (SWaMP) is the stream team supported by the Office of Environmental Affairs and the Adopt-A-Stream program as a group of citizens concerned for the health and future of the Sudbury River, specifically, the portion between the Fruit Street Bridge and the Chattanooga Mill Site. The group monitors the river, offers biodiversity walks and presentations to local youth, and participates in Southborough's annual Heritage Day celebration. SWaMP members have attended many statewide and local watershed seminars and workshops to educate the group and community to better understand the Sudbury watershed.

SWaMP members have given presentations to boy scouts, girl scouts, school classes and other local groups in the past. The topics of these presentations include watersheds, biodiversity, water sampling, and instructional walks along the river. The river walks include discussion of the importance of not polluting, storm drains, storm water runoff, and watershed habitats. In the past, they have also taught the STEP and REACH after school programs for grades K-8 during which they would bring in sampling equipment and river samples, present slide shows, and review with the students the need to protect their environment with emphasis on the Sudbury River. In the past five years, SWaMP programs have reached over 600 students.

For more information about SWaMP's educational programs contact Ms. Linda Hubley RideNApp@aol.com.

Southborough Open Land Foundation

The Southborough Open Land Foundation, Inc. (SOLF) works to preserve, protect, conserve, and enhance the natural resources in the Town of Southborough. To accomplish these goals, SOLF collaborates with public agencies and with other private organizations like SVT. Their main efforts include providing an awareness of the importance of resource conservation and acquiring land for permanent protection. They are a principal source of information on private voluntary land protection for landowners, local officials, and the general public. For more information please contact Frederica Gillespie at (508) 481-8499.

Organization for the Assabet River

The Organization for the Assabet River (OAR) is a nonprofit group whose mission is to preserve, protect, and enhance the Assabet River, its tributaries, and watershed. The Assabet River, like the Sudbury, is a tributary to the Concord River in the SuAsCo watershed. Established in 1986 by a group of concerned citizens, OAR currently has approximately 740 members, a 15-member board of directors, and a part-time staff of five. Their goals are to:

- Raise awareness of the river's special qualities as well as its problems among the public, watershed towns, and government agencies.
- Collect data and advocate for additional information gathering in order to insure that decisions affecting the river are based on scientific research.
- Work with town, government agencies, and others toward solutions that will improve the Assabet River, and satisfy the state's standard of a "fishable and swimmable" river.

OAR's public outreach, education, and recreation programs include a nutrient awareness program, a River Solstice celebration, a traveling photo exhibit, canoe and kayak trips, educational workshops, volunteer shoreline surveys of the Assabet and its tributaries; and two meetings a year with featured speakers on topics of interest to OAR members. OAR staff and volunteers also discuss the Assabet River as invited speakers at conferences, civic organization's meetings, and schools. OAR publishes a newsletter three times a year. OAR staff and volunteers also work collaboratively with other groups to achieve environmental goals. Therefore, they could provide an educational resource to the Town of Southborough and its local citizen groups.

Charles River Watershed Authority

One of the country's first watershed organizations, Charles River Watershed Association (CRWA) was formed in 1965 in response to public concern about the declining condition of the Charles. CRWA organizes and participates in major clean-up and watershed protection

efforts through working with government officials and citizen groups from 35 Massachusetts watershed towns. Their goals include:

- Develop a sound, science-based understanding of interactions in the watershed;
- Define long-term, cutting-edge solutions to watershed problems;
- Promote sustainable watershed management practices with government agencies and private entities.
- Advocate protection, revitalization, and expansion of public parklands along the Charles.

Over their three decades of operation, the CWRA has developed an extensive education and public outreach program that could benefit Southborough and many of its citizen groups. Since 1996, CRWA has provided technical assistance and laboratory analyses of over 500 samples at no cost to local watershed organizations, community groups, citizens, universities, and high schools. The analyses are conducted at CRWA's own lab, which is in the process of becoming DEP certified. They have assisted organizations in the design of water quality monitoring programs, development of Quality Assurance Project Plans (QAPP), application of GIS and water quality and hydrologic models, and evaluation of proposed projects and advocacy. They have also developed a Strom Drain Stenciling Program that communities can use. CRWA has and can continue to advise sister watershed associations on ways to build their organizations through fundraising and membership. They are located at 2391 Commonwealth Avenue, Newton, MA 02466. For additional information please contact (617) 965-5975 (tel.) or (617) 332-9465 (fax), or view their website at http://www.crwa.org.

3.2.3 Regional, State, and National Resources

There are a number of educational resources available for homeowners and businesses such as storm water guidance documents, programs for children, and educator training workshops. Many of the education and outreach materials developed can, in many cases, eliminate the need for Southborough to develop its own materials. Some of the available resources are listed below.

U.S. Environmental Protection Agency

The Office of Wastewater Management (OWM) provides technical resources to persons responsible for designing and implementing BMPs recommended to achieve the goals of the six minimum control measures. These resources are available electronically at USEPA web sites. While the resources provide some background to the development of the Phase II regulations, they are largely oriented to municipalities and organizations that are developing storm water management plans as opposed to the general public.

The Office of Water has created Adopt Your Watershed, a campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality (www.epa.gov/adopt/). The program provides a resource for communities or groups to network with other groups nationwide. This networking and watershed approach can enable

a community to share, develop or utilize successful strategies from existing programs. The resources available include training courses and publications offered by the Watershed Academy to assist with implementing storm water programs. These educational materials can be used by educators, private groups that adopt a watershed, or by municipal employees responsible for implementing the program. The Watershed Academy also offers Academy 2000, an internet-based learning tool for distance learning (www.epa.gov/owow/watershed/wacademy/).

New England Interstate Water Pollution Control Commission

The New England Interstate Water Pollution Control Commission (NEIWPCC) provides educational programs, promotes participation in water quality restoration programs, and supplies outreach materials. NEIWPCC is involved with many projects in the region that currently includes developing outreach strategies and products for the Narragansett Bay Estuary Program with MADEP. Highlights of the NEIWPCC offerings are the NEIWPCC website, an Environmental Training Center, youth programs, newsletters such as L.U.S.T.LINE and Water Connection, informational brochures, workshops, and technical advice.

American Rivers

American Rivers is a national, non-profit, conservation organization dedicated to protecting and restoring healthy natural rivers and the variety of life they sustain for people, fish, and wildlife.
They provide innovative solutions to improve river health; raise awareness among decision-makers; serve and mobilize the river conservation movement; and are collaborating with their partners to develop a national "river agenda." This will create a unified vision for improving river health across the country. Along with conservation efforts, they promote public awareness about why healthy rivers matter for fish and wildlife, kayakers, canoeists, and anglers, and for our communities as a whole. American Rivers works closely with grassroots river and watershed groups across the country. Staff members also collaborate with other conservation groups, local citizens and businesses, and various federal, state, and tribal agencies to build coalitions and provide technical support. Their website provides educational resources including a Lewis and Clark animation about how the Missouri River has changed, River ABC's for kids and teachers, and a tools and links page. American Rivers has also published a Draft River Threats List and a River Agenda, which is a plan for creating healthy rivers. For more information, please visit http://www.amrivers.org/.

National Watershed Network

The National Watershed Network (NWN) is a coordinated national effort to encourage the formation of local, voluntary watershed partnerships and help assure that these partnerships successfully attain their goals. More than 70 diverse National Partners representing private and public corporations, government agencies, and non-profit organizations sponsor the initiative. Each National Partner agrees to provide financial and/or in-kind support. The Conservation Technology Information Center (CTIC), a non-profit data and technology

information transfer center coordinate the national effort. In addition to maintaining the watershed network, National Watershed Calendar, and many other on-going tools for watershed coordinators, NWN also provides the following:

- Consistent messaging among all National Partners to state and local leaders of organizations, government agencies and companies.
- A connection between National Partners who have useful tools and coordinators of local watershed partnerships.
- A resource to share state activities and successes with state-level stakeholders in other states and regions.
- Encouragement for broad-based state-level partnerships that provide support to local watershed partnerships.
- A way to use and share processes and methods that have been found to work successfully for watershed coordinators.

For more information, please visit http://www.ctic.purdue.edu/KYW/nwn/nwn.html.

National Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is a federal agency that works hand-in-hand with the people of Massachusetts to improve and protect their soil, water and other natural resources. For decades, private landowners have voluntarily worked with NRCS specialists to prevent erosion, improve water quality and promote sustainable agriculture. This includes helping landowners develop conservation plans, create and restore wetlands, restore and manage other natural ecosystems as well as advise on storm water remediation, nutrient and animal waste management, and watershed planning. NCRS is also an active participant in the "Year of Clean Water" Observance. NCRS provides has several educational resources including tip sheets on topics like nutrient management and multi-media information on topics like backyard conservation. Conservation Programs offered and assisted by NCRS include:

- **Environmental Quality Incentives Program (EQIP)** – Provides technical, educational, and financial assistance to farmers to help them comply with environmental laws while encouraging environmental enhancement.
- **Farmland Protection Program (FFP)** – Provides funds to purchase the development rights to farmland, thus preserving quality farmland for agricultural use.
- **Wetlands Reserve Program (WRP)** – Offers an opportunity for landowners to voluntarily protect, restore, and enhance wetlands on their property
- **Wildlife Habitat Incentives Program (WHIP)** – Provides both technical assistance and cost-share assistance for farmers who want to voluntarily improve fish and wildlife habitat and restore and managing natural ecosystems on their property.
- **Watershed and River Basin Planning and Installation (PL566)** – Provides technical and financial assistance in cooperation with local sponsoring organizations, state agencies, and others for watershed-based projects. NCRS cooperates on

projects for watershed protection; flood prevention; water quality improvements; soil erosion reduction; rural, municipal and industrial water supply; irrigation water management; sedimentation control; fish and wildlife habitat enhancement and wetland restorations.

- **Massachusetts Community Assistance Partnership (MassCAP)** – MassCAP is a partnership among state and federal agencies that helps provide technical conservation assistance to communities in the eastern Massachusetts coastal zone. This program helps people prevent and address natural resource problems
- **Resource Conservation and Development (RC&D)** – Provides local people with the means to solve natural resource problems and promote sustainable use of natural resources in rural areas. The program aims to improve the quality of life by providing practical solutions for community development, land conservation, environmental enhancement and water management.
- **National Resources Inventory (NRI)** – This is a compilation of natural resource information on non-federal land throughout the United States. It captures data on land cover and use, soil erosion, prime farmland, wetlands, habitat diversity, selected conservation practices and related resource attributes at more than 800,000 scientifically selected sample sites.
- **Emergency Watershed Protection Program (EWP)** – It is a disaster recovery program made available in emergency situations when neither the state nor the local community is able to repair a damaged watershed.
- **Earth Team Volunteer Program** – Provides volunteers with opportunities to use their talents on behalf of conservation. Earth Team volunteers do not receive a salary from NRCS but they perform services that are essential to the conservation mission of the agency. Anyone 14 years of age and older can join the Earth Team by calling a local NRCS office.

More information about NCRS can be found at http://www.ncrs.usda.gov/, while Massachusetts programs can be found http://www.ma.ncrs.usda.gov/. Ron Thompson at (508) 829-6628 ext. 3 and Bonita Booth at (508) 829-4477 ext. 5 are the contacts for the Worcester Conservation District located at the Medical Arts Center Building, 52 Boyden Road, Room 100 in Holden, MA. While the NCRS has not been active in Southborough recently, they would be very willing to help landowners with any program they are eligible for.

Urban Ecology Institute

The Urban Ecology Institute (UEI), established in 1998, studies the new field of urban ecology to help urban residents and policymakers understand the natural resources in their communities and to take action to protect them. The institute's members include scientists, educators, and lawyers who research urban ecosystems. One of UEI's goals is to inform and empower people to improve their health, economy, and quality of life as well as natural resources. They conduct the first inventory of all the natural resources found in the urban ecosystem and the most critical threats facing those resources. The UEI is also helping urban residents and policymakers develop realistic plans to protect threatened ecosystems and turn polluted and abandoned lands into useable open spaces. One of their missions is to

improve high school science education in urban schools by getting students out of the classroom to learn first-hand about the ecosystems around them and their connections to the environment. These connections made will help the students to realize that they can make a difference in their environment. The UEI currently works with 28 teachers and over 600 students in 20 public schools in the Boston area. They serve as a catalyst for innovation and science education by providing training and ongoing consulting support to public school teachers. The curriculum units are intended to help students measure and understand ecological processes that can be indicators of ecosystem health. Part of this curriculum includes an annual student congress, in which students report on their findings to their peers and community groups. Although this program is current only in the Boston area, other urban areas are in communication with the UEI to acquire their program. The materials drafted for this educational program are applicable to any higher density area and may be available to communities outside of UEI's current scope.

The UEI is located at Boston College, 225 Higgins Hall, Chestnut Hill, MA 02467, (617) 552-0592. Charlie Lord can be contacted for additional information about UEI's educational programs at lordca@bc.edu or by calling (617) 552-0928.

New England Wild Flower Society

The New England Wild Flower Society (NEWFS) is the oldest plant conservation organization in the United States, promoting the conservation of temperate North American plants through key programs: Conservation, Education, Research, Horticulture. They do not focus their efforts on any one watershed or town, but are an available resource for New England towns. They worked with SWaMP and Plant Conservation Volunteers (PCV's) to conduct a shoreline inventory and habitat evaluation of the Sudbury River. Mass Audubon is often another one of their partners. NEWFS's offers many education programs that are informative to both children and adults. There were 2,000 people register for their fall session. A total of four sessions are offered each year. A portion of their education programs cover wetlands and courses include "Wetland Identification and Delineation," "Wetland Species", and "Vernal Pool Ecology." More information about the Society can be found at www.newfs.org

Massachusetts Water Watch Partnership

The Massachusetts Water Watch Partnership (MassWWP) provides training and other technical assistance to citizen organizations that conduct water quality monitoring programs on the lakes, rivers, and estuaries of Massachusetts. Founded in 1990, MassWWP operates under the administration of the Water Resources Research Center of the University of Massachusetts Amherst Environmental Institute. MassWWP focuses on water quality monitoring and is a resource for related educational materials including an extensive library of fact sheets, videos, and publications. They can provide a monitoring group with the following services:

- Development of standardized protocols for measurement of a variety of physical, chemical, and biological water quality parameters

- Lend educational materials on monitoring methods and how to start a monitoring program
- Consultations on study designs for individual watershed monitoring surveys
- A quality control program for field sampling and laboratory methods
- Ongoing workshops to train citizen groups to sample, analyze, interpret data and present findings to diverse audiences
- An annual Conference for monitors to meet, learn, and share experiences
- Loan monitoring equipment

More information can be found at http://www.umass.edu/tei/mwwp/

Massachusetts Audubon Society

Massachusetts Audubon Society is the largest conservation organization in New England, concentrating its efforts on protecting the nature of Massachusetts for people and wildlife. Mass Audubon protects more than 29,000 acres of conservation land, conducts educational programs for 250,000 children and adults annually, and advocates for environmental policies at the local, state, and federal levels. Established in 1896 and supported by 65,000 member households, Mass Audubon maintains 41 wildlife sanctuaries that are open to the public and serve as the base for its conservation, education, and advocacy work across the state.

Mass Audubon offers activity guides, teaching sheets, field guides, and books on an exciting variety of nature topics, many of which are written by their staff experts. The two Wildlife Sanctuary closet to Southborough are Broad Meadow Brook in Worcester and Broadmoor in Natick. A few of the related courses offered at these locations are the following:

- **Project WET: Water Education Workshop (Broad Meadow Brook)**: Project WET is a nationally acclaimed workshop that provides teachers, scout leaders, counselors, and homeschool parents with a 500-page guide of interdisciplinary activities for grades K-12. Through games and experiments the students come to appreciate water's importance to the earth.
- **Life in a Vernal Pool (Broadmoor)**: Students learn about life in this ecosystem by exploring a vernal pool (a seasonal pond) at Broadmoor. The salamanders, frogs, and invertebrates that use these pools for breeding and those that live out their life cycles within vernal pools will be examined, along with the connection of vernal pools to a surrounding upland forest habitat.
- **Habitat Explorations (Broadmoor)**: Students observe signs of animal lives in a field, a forest, and a marsh. They explore habitats-where animals find food, shelter, water and space, and learn about food chains and other interrelationships among plants, animals, and non-living nature within these three natural communities. The diversity of species within and across habitats is emphasized.
- **ALLIES (Achieving Long-term Literacy In Environmental Science) (Broadmoor)**: ALLIES is a program in which a naturalist-in-residence develops and teaches classroom and outdoor lessons based on a particular schools science curriculum. Fall and Spring Science Studies Package: A fall classroom lesson and field trip to the sanctuary introduces students to ecological concepts such as, species,

food chains, and habitats. It gives students an introduction to the curriculum that will be studied during the school year. Then the spring classroom lesson and sanctuary field trip compares two aquatic habitats in depth, which allows the students to make comparisons between animals, plants, and the habitats themselves. This program gives students and teachers concrete experiences from which to base their classroom study.

The Broad Meadow Brook Wildlife Sanctuary also offers public workshops on the following topics:

Better Places and Open Spaces: Alternatives to Traditional Subdivisions: This workshop explores one innovative method to build desirable neighborhoods and maximize the amount of quality open space. The Green Neighborhoods: Open Space Residential Design (OSRD) process attempts to preserve community character, reduce environmental impacts, protect the rights of property owners, and enable the developer, realtors and homeowners to benefit from a high-quality project. The workshop explains the benefits of OSRD, as well as how it works and how interested local officials and citizens can work together to implement it in their communities. It is designed for members of planning boards, conservation commissions, and boards of health, as well as citizens concerned about residential sprawl

Creating Neighborhood Preserves with Conservation Restrictions: This workshop teaches community members how to create neighborhood preserves by placing a conservation restriction on it. Tax reduction through this preservation is also discussed.

The Mass Audubon headquarters are located at 208 South Great Road, Lincoln, MA 01773, www.massaudubon.org. The Broad Meadow Brook is located at 414 Massasoit Road, Worcester, MA 01604, bmbrook@massaudubon.org. The Broadmoor Wildlife Sanctuary is located at 280 Eliot Street, Natick, MA 01760-5513, broadmoor@massaudubon.org.

For more information about the Society's entire educational program contact Adrian Ayson at (781) 259-9500. For more information on programs offered at Broad Meadow Brook, contact Doug Kimball at (508) 753-6087 or for programs at Broadmoor call Dan Farber at (508) 655-2296, extension 7304, dfarber@massaudubon.org.

Metropolitan District Commission- Division of Watershed Management

The Division of Watershed Management (MDC) is an agency of state government, one of five departments in the Executive Office of Environmental Affairs (EOEA). On June 3, 1893, the Metropolitan Park Commission (renamed the Metropolitan District Commission in 1919) was established by the Massachusetts state legislature to oversee and maintain the Metropolitan Park System. The MDC also manages and protects a 120,000-acre watershed and reservoir system, including the Sudbury, which provides the drinking water supply for nearly 2.2 million residents of Massachusetts. Their watershed management staff provides teacher training and classroom instruction in various aspects of water and watershed science. The activities they provide are hands on lessons and primarily geared towards grades K-12,

but can be modified for any age group. A few of their applicable topics and activities are as follows:

- The water cycle – topics include water distribution on Earth and where does water go?
- Building a watershed – includes students learning their watershed address, what a watershed is, watershed health, and what the importance of a watershed is
- Groundwater model – Learning about groundwater, where does it come from and what happens to water in the groundwater table, and how groundwater can be contaminated
- Experience MDC's EnviroScape model
- Careers in watershed management
- Field trips to the reservoir – includes the history of the water system
- Water quality monitoring (testing) workshops

They also conduct teacher workshops in national Project WET and Project Learning Tree (PLT), which are interdisciplinary environmental education curriculums.

For more information about MDC's educational program contact Kelley Freda, Watershed Ranger/Ranger 10 at (978) 365-3800.

Massachusetts Drinking Water Education Partnership

The Massachusetts Drinking Water Education Partnership (MADWEP) is branch of the MWRA that provides year-round educational programs and information to increase public understanding of drinking water issues. The Partnership is dedicated to protecting drinking water supplies and public health through collaborative projects, culminating in Drinking Water Week events each May.

Their educational resources website (http://www.madwep.org/education_teachers.htm) provides links and information about several educational programs offered by USGS, EPA, the MWRA, University of Wisconsin-Extension Environmental Resource Center (UWEX ERC), PBS, and the Discovery Channel. MADWEP's "Kids Stuff" website is an excellent resource of games and tours geared to children. It is located at http://www.madwep.org/education_kids_stuff.htm and features sites provided by QUIA (a general educational resource), EPA, and Lehigh Valley Water Suppliers. The site features the Watershed Game developed by Minnesota IDEALS and featured on Bell Museum's website. The general public can learn about their drinking water supply, federal and state standards, how to protect drinking water sources, and water conservation at http://www.madwep.org/your_drinking_water.htm. Meg Tabacsko is the education chair within the MWRA and can be contacted about MADWEP's programs at (617) 788-4643.

Massachusetts Water Resource Authority

The Massachusetts Water Resource Authority (MWRA) is a Massachusetts public authority established by an act of the Legislature in 1984 to provide wholesale water and sewer

services to 2.5 million people and more than 5,500 large industrial users in 61 metropolitan Boston communities. The MWRA has practiced watershed management and source protection since its establishment, in order to protect and maintain the high quality of source water for the system. This management program is structured to help protect the MWRA's raw water sources before they can be polluted. Part of the MWRA's watershed protection and land management program has been and continues to be public education.

The MWRA works both independently and with various organizations to educate students. At their school programs website http://www.mwra.com/org/html/sti.htm, you can find a list of teacher resources, curriculum guides, student resources, videos, and demonstration projects. This page also provides a list of staff contacts. MWRA also publishes a substantial amount of educational materials including the following:

- "Water…from Source to Sea" An information brochure outlining MWRA's School Education Program. An educator's newsletter with the same title is also published quaterly.
- "Pocket Pal" A guide to MWRA facts, schedules, and terminology geared more towards adults.
- A Water System map with additional information about the MWRA/MDC's General Plan.
- Consumer confidence brochures and newsletters about the quality of drinking water.
- "Dotty the Potty" An informational story and coloring book about what can mistakenly be flushed and how this is harmful.
- "Teenage Mutant Ninja Turtles Outrageous Journey to Boston Harbor" An informational coloring book.
- "Water & Germs" An informational booklet about pathogens that can be adapted as a school program.
- A field-based water quality testing program for Middle and High Schools.
- "Down the Drain" A detailed document explaining the wastewater treatment process. It discusses the Boston Harbor Project and describes the responsibility of individual citizens to revitalize the harbor environment. It includes classroom activities that can be supported with guest speakers and tours of MWRA facilities.
- "Water Watchers Be Astounded" A detailed document outlining classroom activities for Middle School curriculums. Section five focuses on watersheds and water quality.

For more information about MWRA's education and outreach programs please visit http://www.mwra.com/org/html/sti.htm or contact Meg Tabacsko at (617) 788-1139, Meg.Tabacsko@mwra.state.ma.us. The MWRA is located at the Charlestown Navy Yard, 100 First Avenue, Boston MA 02129.

Massachusetts Watershed Coalition

This organization includes CRWA, OAR, SVT, and many more organizations covering the entire state. A way of sharing information between groups, the Massachusetts Watershed

Coalition (MWC) provides links to all of its supporting groups. For more information please visit http://www.commonwaters.org/ or contact (978) 534-0379.

Massachusetts Riverways Program

A branch of the Massachusetts Department of Fisheries, Wildlife, and Environmental Law Enforcement (DFWELE), the Massachusetts Riverways Program (MRP) was established in 1987 to promote the restoration and protection of the ecological integrity of the Massachusett's watersheds, rivers, streams and adjacent lands. They do this through encouraging and supporting local river protection initiatives as a vital complement to state action. With their primary focus to provide technical assistance and outreach to communities and citizen groups, they offer a strong educational library on storm water and watershed protection. Education materials include brochures on "10 Ways to Protect Your Favorite River" and "Clean Rivers Begin at Home, Understanding Non-point Source Pollution." They also offer free video rentals with films covering topics on water quality/land stewardship, wetlands education, land protection/open space/buffers, general watershed/river education, and advocacy/stewardship. In Southborough, the MRP works through the SuAsCo Watershed Council and SWaMP. They are helping SWaMP to prepare a Quality Assurance Project Plan (QuAPP) for water quality sampling that EPA will be able to use. For more information about MRP, please visit their website at http://www.state.ma.us/dfwele/River/riv_toc.htm or contact either:

- Mike Fleming, SuAsCo Watershed Team Leader, at (508) 835 – 4816
- Rachel Calabro, Adopt-A-Stream Coordinator, Riverways Program, 251 Causeway Street, Suite 400, Boston, MA 02114, (617) 626-1549, Rachel.Calabro@state.ma.us

Non-point Education for Municipal Offices

Non-point Education for Municipal Offices (NEMO) is an educational program for local land use officials that addresses the relationship of land use to natural resource protection. They believe that better land use decisions are the key to protecting the natural resources, community character, and long-term economic health of communities. The people making land use decisions are the target audience. This means local officials serving on land use boards at the county and municipal levels. NEMO provides research-based, non-advocacy professional outreach type education to these municipalities given that the local land use decision-making process is complex, political, and widely varying. Their education supplements state and federal regulations that push for better land use policies and practices. For more information, please visit their website at http://nemo.uconn.edu/.

3.3 Educational Targets

While a future education program should be designed to offer a broad discussion of storm water quality issues, there are issues that should be targeted in every municipality as the focus of the program. These targets can include diverse audiences, sub watersheds and sources of pollution. Based on the current conditions and storm water quality issues in

Southborough, several targets have been identified where a future educational program could be focused.

3.3.1 Subwatersheds

Critical subwatersheds in Southborough include those where surface water quality has already been impaired or where current land uses have greater potential for future water quality impacts. The significant subwatersheds in Southborough are the areas that drain to the Sudbury Reservoir and the Sudbury River. These subwatersheds encompass all of Southborough; therefore, outreach activities would be town wide.

3.3.2 Diverse Audiences

Data obtained from the 2000 U.S. Census of Southborough indicates that most of the residents consider themselves from one racial background of which 94.5 is Caucasian. Percentages of ancestries were not provided except that from this 94.5%, 1.5% is Hispanic or Latino. The second most predominant race in Southborough is Asian at 3.5%.. Massachusetts's demographic data did not indicate the percentage of residents that spoke or wrote English as their primary language. However, the ethic breakdown suggests English is predominately spoken in most homes. Also MCAS scores for Southborough schools indicate greater than 95% of students passed the English portion for the last three years.

One way to reach diverse audiences is through advertising at local churches, cultural centers, or contacting religious leaders. This method can help to determine whether education and outreach materials should be printed in languages other than English.

The 2000 U.S. Census reports show that Southborough's population has grown from 6,628 in 1990 to 8,781. During this time there was 26.2% growth in single-family residential land use. However, the amount of open land increased 14.7%, while forestry and agricultural lands uses were the two categories loosing acreage. In Southborough 87.9% of housing units are owned-occupied, while only 12% are rented.

While the demographics in Southborough show steady growth and development, the data presented in the census reports do not allow a clear identification of a specific group to target for multi-lingual education and outreach programs. However, the 2000 census reports that approximately half of the population is families with children and 22.2% of Southborough's residents are school age (between the ages of 5 and 18). Therefore including homeowners, families, and the school system as an outreach targets in the Town's storm water program is recommended.

3.3.3 Sources of Pollution

Given the current conditions in Southborough, a future public education program could target the following sources of pollution.

- *Illicit discharges:* An education program could be targeted to both landowners and contractors in Southborough, about what defines illicit discharges (including septic tie ins) and the importance and consequences of adhering to illicit discharge regulations.

- *Septic systems*: Failing septic systems will result in gray water/wastewater migrating into the storm water system (path of least resistance) or in contaminating the groundwater. Increasing education about this issue and expanding on Southborough Septic System Betterment Loan Program would be beneficial.

- *Pet waste management:* Another potentially significant source of pathogens is pet waste. An education program could be targeted to pet owners on the importance of proper disposal and collection of pet wastes.

- *Yard waste disposal:* Improper waste disposal by residents into watercourses or the municipal storm water system could be an issue even though the Town offers means for the proper disposal of these wastes. If so, an education program targeted to residents regarding proper yard waste disposal practices would be beneficial.

- *Industrial/Commercial Facilities:* There are thirty-seven EPA-regulated facilities located in Southborough. While most of these fall under EPA's other/unknown category, approximately ten can be categorized as automotive repair or transportation facilities. Since there is no dominant type of industry potential pollutants would be consistent with those associated with pavement run-off (i.e. nutrients, salt, sediments). However, thirty-three of the thirty-seven are regulated for Hazardous Waste. Therefore, providing these industries with education materials on proper waste management and disposal is recommended.

3.4 Implementation Alternatives

The goal of a public education program in Southborough should include several elements as follows:

- Provide a general education to the public about storm water quality issues that will both improve their awareness, change habits that could impact water quality, and build support for funding of storm water quality programs.

- Develop school programs that will build long-term awareness and support for storm water programs.

- Target specific areas and issues where enhanced public education could provide significant benefits.

While a number of resources are available to Southborough for a future public education program on storm water quality, work still needs to be completed in actually organizing and

implementing a formal program. The following outlines potential alternatives for improving public education and outreach under this minimum control measure.

3.4.1 Provide General Education

- Coordinate with regional and state agencies as well as neighboring municipalities on developing a broad based public education program. This would allow each of the participating municipalities to take advantage of some economy of scale for conveying a similar message to each community. A committee of representatives from participating communities should be established. This could be an extension of the existing Phase II Storm Water Committee organized by the Town Planner.

- Involve both stakeholders as well as interested residents in the Phase II Storm Water Committee. The purpose of the local committee would be to continue the work in planning and organizing public education events, coordinating with school curriculum committees and providing a potential source of speakers for a speakers' bureau. Media, such as newspapers or local radio, should be used to notify residents of the need for a committee and an organization meeting.

- Meet with organizations such as SuAsCo, SVT, and SWaMP to finalize what level of commitment they can offer Southborough towards a public education campaign.

- Consider installing signage or kiosks on public lands, which provide access to natural resources (i.e. boat launches along the Sudbury River and Reservoir). They should provide information to the public about the significance of water quality and conservation. The Town should take advantage of the public's use and access to natural resources. SVT's stewardship program that focuses on providing and maintaining access to open lands may be able to assist the Town in recommending locations for the signs and with installing signs. Attractive informational signs on the river walk, roadways at stream and river crossings, and along the new rail trail may be used to generate awareness of surface water's sensitivity to pollutants and its significance to the community.

- While SVT is not allowed to lobby for it, they have expressed interest in the Town Planning Board and Conservation Commission passing the Community Preservation Act. This Act was voted down last year but is up again this year. Perhaps passing this act will promote SVT's involvement with installing kiosks. Passing this act will also help address growth and development issues, noted by EOEA, impacting Southborough's watersheds.

- Consider posting signs at storm water outfalls (particularly in areas with public access) identifying the outfall serial number and a phone number to call if problems are identified.

Southborough Outfall # 43
Call (508) 485-1210 to report any problems

- Publish a newsletter as a means to provide information on proper yard waste, pet waste, and hazardous waste storage and disposal.

- Work with the Southborough's Newcomers Club to inform residents of the town's storm water program, BMPs, and information about storm water pollution. Provide simple, attractive pamphlets with the basic information necessary for new residents to determine how to prevent storm water pollution and the importance of citizen involvement. Include emergency phone numbers, such as MADEP, a storm water hotline, and the fire department, and what to do in the event of an accidental spill.

- Use volunteers for simple tasks that would improve water quality as well as raise the public's awareness. Public participation will enhance the public education of the storm water program with the following tasks:

    - Stencil catch basins with informational phrases such as, "NO DUMPING, DRAINS TO RIVER."
    - Assist with installing and operating kiosks.
    - Create local speakers panel to discuss the Town's storm water program and pollution prevention with targeted residents and businesses. Broadcast the discussions over a local cable station.

3.4.2 School Programs

- Meet with school officials responsible for environmental/science curriculum development. Several meetings will likely be required in order to develop a storm water/water quality curriculum that is appropriately designed for specific grade levels. While some teachers may have the necessary knowledge, an investment will need to be made to "educate the educators." The use of programs identified in this report could be used to help fund and conduct teacher training. During these meetings, school staff should also be made aware of the educational resources presented herein.

- State or regional organizations could plan and conduct a regional training event for teachers and could also develop a sample curriculum. Some of this training and curriculum material is currently offered by third parties (i.e. MassWWP, MWRA). Also, SuAsCo has been preparing a report to address public education and outreach for all 36 communities in the SuAsCo watershed. Since a regional effort would likely be the most efficient method to accomplish this task it may be worthwhile to see if they would be interested in implementing a training program after the report is complete.

- Encourage students to publish an environmental newsletter for other students and faculty with topics about stewardship, achievements, and education. The newsletter could also be targeted to the parents and guardians of students.

3.4.3 Target Specific Areas and Issues

- Develop flyers/public meetings for the Sudbury River and Sudbury Reservoir watersheds that focus specifically on proper septic systems maintenance, lawn management (water conservation, fertilizer and pesticide use), and pet waste management. A newspaper release may also be helpful to generate some interest with this issue. Also consider publicizing more information on the Southborough Septic System Betterment Loan Program including success stories.

- Identify businesses in Southborough that have significant potential to impact water quality. These businesses could include commercial developments that generate large traffic volumes and auto maintenance facilities that have potential for exposed materials and handle hazardous wastes. Develop and distribute a mailer to these businesses about pollution prevention, proper waste management, BMPs, and operation and maintenance issues. Annual or biannual attendance at a Chamber of Commerce meeting may be a way to reach these businesses. An annual award to most environmentally focused businesses that is advertised in the newspaper could also encourage participation.

According to USEPA guidance documents, potential measurable goals to track BMP and program effectiveness could include:

- Regional and local storm water committee is established; a storm water hotline to report pollution/polluters is developed; businesses for outreach efforts targeted.

- Information distributed to residents on proper application of fertilizers and pesticides, disposal of yard waste, illicit connections and yard and pet waste disposal; new signage at public areas bordering sensitive waters is installed; after-school library programs are implemented; water quality-based field trips and classroom activities are added to school curricula; a volunteer educator training program is implemented; an outreach program for businesses likely to impact storm water quality is developed.

- Measured increase in volunteerism for storm water cleanup projects; illegal dumping has decreased.

- A number of illicit discharges have been eliminated; the amount of litter found and removed from storm drains has reduced.

4.0 PUBLIC PARTICIPATION/INVOLVEMENT

4.1 State and Federal Regulatory Requirements

The objective of this minimum control measure is to encourage public participation in the Town's storm water program. The anticipated benefits of public involvement and the

success of the program are: free intellectual and labor resources, greater support for programs operated by citizen volunteers, faster implementation of minimum control measures (such as illicit discharge detection), fewer legal challenges, and a potential measure of program success. Involvement can include participating in public meetings, providing legislative activism, developing and implementing BMPs, or becoming an educator. To satisfy the requirements of this minimum control, the town must:

1. Comply with applicable State, Tribal, and local public notice requirements; and

2. Determine the appropriate BMPs and measurable goals for this minimum control measure.

4.2 Available Resources

The following section describes some of the organizations and programs that may help the Town implement the public participation component of its storm water program. Encouraging public participation in existing volunteer programs that are offered by local and regional groups can minimize the need for creating new programs and allow the Town to focus its financial and human resources on outreach and sponsorship for these programs.

4.2.1 School Programs

P. Brent Trottier Middle School

Eighth graders are required to complete two hours of community service that could involve work with environmental citizens (i.e. river clean-up, storm drain stenciling).

Algonquin Regional High School

Algonquin Regional High School students receive credit for volunteering in a variety of community programs. Most of the volunteer work is done through Community Action Programs (CAP). CAP is a cooperative effort between the Southborough Center for Family and Youth Services, the Northborough Center for Family and Youth Services and the High School. While CAP does not currently focus of environmental outreach and services in the community the program could be expanded. CAP is also a potential source for reaching students who are eager to help out in the community.

4.2.2 Boy and Girl Scouts of America

Boys and girls may be involved in Scout programs from ages 5 through 17 and are supervised by adult volunteers. Scouts are involved in various community service projects and can be beneficial to implementing outfall identification, storm drain marking, and river cleanup projects or environmental awareness outreach programs.

Coordination with local Scout leaders is necessary to implement any activity with their group. The Boy Scouts have District Executives monthly meeting to discuss possible

projects. Material about potential storm water related projects can be distributed at this meeting and then passed on to troop leaders. The Girl Scouts have Field Coordinators and Service Managers in every town. Information about potential projects can be shared with the Field Coordinators, who will in turn pass the information onto the Service Managers and then the troops. Distributing information about the impacts of polluted storm water on our environment, the city's Phase II program, and the capacity in which boy and girl scouts can help their community are the first steps to promote participation.

The Boy Scouts provides its youth with a conservation program designed to be incorporated throughout the Scouting program and teaches awareness and understanding of conservation as a wise and intelligent management of natural resources. The conservation "Good Turn" program is an opportunity for scouts to join with conservation and environmental organizations (federal, state, local, and private) to carry out conservation "Good Turn" in their home communities. The Boy Scouts also provide an outdoor adventures program of which their "Leave No Trace" policy plays a key role. This principles of this policy include planning ahead (not bringing materials that create waste and knowing the area to be explored), traveling and camping on durable surfaces (not trampling vegetated areas which can lead to erosion), dispose of waste properly (pack out what you pack in, dispose of wastewater far enough from surface water), leave what you find, minimize campfire impacts, respect wildlife, and be considerate of other visitors. A "Leave No Trace Awareness Award" is available to scouts who successful follow these principles. In Southborough, scouts have participated in many activities in their communities including Earth Day and Pilgrim Church town road cleanups. The Southborough Troop (Troop1) has been participating in Earth Day cleanups for 10 years, which last year brought them to Woodland Road where they collected more than six truckloads of trash.

The Girl Scouts are offering partnership initiative called Linking Girls to the Land. This partnership is between the Girl Scouts of the USA and nine natural resource conservation agencies including USDI Bureau of Land Management, USDA Forest Service and USDA Natural Resource Conservation Service. This initiative encourages girls to become involved in conservation and natural resource issues and careers on a national and local level. Most program activities fall into four areas; environmental education, volunteers service, outdoors skills development, and career awareness.

The Water Drop Patch, a facet of Linking Girls to the Land, is a project jointly developed by the United States Environmental Protection Agency and the Girl Scout Council of the Nation's Capital (GSCNC). The participants gain hands-on skills in water management and resource conservation by encouraging the girls to:

- Make a difference in their communities by becoming watershed and wetlands stewards;
- Use their skills and their knowledge to educate others in their community about the need to protect the nation's valuable water resource
- Explore the natural world to gain an interest in science and math; and
- Use the Internet as a source of information.

For additional information about the Water Drop patch view the project booklet at www.epa.gov/adopt/patch/ or by calling the National Service Center for Environmental Publications at 1-800-490-9198.

Funding for these can be acquired through the EarthPACT (Plant and Animal Conservation Team), which will award implementation grants to each council for up to $2,500. The EarthPACT encourage the formation of partnerships with local environmental education, nature, or science-related organizations, business or county government agencies.

The Girl Scouts are also offering a new program called GirlFACTS (Girls, Families, and Communities Together in Science). This program offers two related activities entitled "geology rocks" and "weather wise" which discuss the topics of the water cycle and acid rain. The topics of storm water runoff pollution and prevention could easily be added as a topic to these established programs.

The Montachusett Girl Scout Council, Inc serves the Worcester, Massachusetts area and can be contacted at (508) 853-1070 or mgscinfo@mgsc.org. The field coordinator of the Southborough Girl Scouts program is Ms. Evening Dupre at extension (781) 893-6113 311.

The Boy Scouts of Knox Trail Council office is located at 490 Union Ave, Framingham, MA 01702-5817 and may be found at www.ktc-bssa.org. The District Director of the area, which includes Southborough, is Mr. Bob Wyman, (508) 872-6551 or at rwyman@bsamail.org. Mr. Timothy Deschamps can provide contact information for group activities in Southborough at Tdeschamps@worldnet.att.net or view their web page at www.bsa-troop1.org.

4.2.3 Citizen's Groups

The groups outlined in the Public Education/Outreach minimum control measure may also provide opportunities for public involvement in a variety of watershed based or specific water body protection and cleanup projects. Some existing projects may help achieve Southborough's goals in their program with or without modification and, in some cases, new programs may need to be established. The following is a listing of groups and a summary of some of their current activities available to residents are listed below.

Phase II Storm Water Committee

The Town of Southborough has created a Phase II Stormwater Committee to help address the requirement of EPA's Storm Water Phase II Ruling and to participate in the implementation of this storm water management program. Currently the board consists of Janice C. Conlin, Louis J. Bartolini, Paul C. Pisinski, John W. Boland, Jr., and Karen M. Galligan. For more information please contact the Southborough Town Hall at 508-485-0710.

Sudbury Watershed Monitoring Program

SWaMP has been monitoring the Sudbury River since 1998. Three out or their four monitoring sites; Cedar Street Bridge, east end of Cordaville millpond, and the west side of Route 85 bridge are within the Town of Southborough. They test primarily with Lamotte meters for water clarity, water depth, water temperature, pH, dissolved oxygen, and conductivity. While monitoring, they also note any fish or wildlife, and any disturbances (including dumping, suspicious culvert runoff, etc.). If disturbances are witnessed, SWaMP notifies officials in the appropriate local or state agencies. SWaMP approached the New England Wild Flower Society to conduct a shoreline and riverbank inventory of the Sudbury River in Southborough. They are interested in a species inventory and habitat evaluation as well as impacts from invasive species. Plant Conservation Volunteers (PCV's) worked on this project as volunteers conducting general botanical surveys. SWaMP's water quality testing, equipment, and supplies are funded by a $5,000 grant

For current volunteer opportunities with SWaMP contact Ms. Linda Hubley, RideNApp@aol.com.

Sudbury Valley Trustees

Sudbury Valley Trustees is a voluntary association of individuals, families, and businesses committed to protecting wildlife habitat and the ecological integrity of the Sudbury, Assabet, and Concord Rivers for the benefit of present and future generations. SVT carries out its mission through land acquisition and stewardship, advocacy, and education, working in partnership with the towns, watershed associations, and other environmental organizations within the greater Concord Basin. Founded in 1953, SVT is supported by a membership of approximately 3,000 individuals, families, and corporations. The organization currently owns, through gift and purchase, more than 2,000 acres in 13 communities. In addition, it holds conservation restrictions on more than 500 acres and has been instrumental in preserving several thousand acres now protected by public agencies.

SVT's land trusts, which give private citizens the opportunity to become directly involved in conserving open space. They are private, voluntary organizations supported by financial contributions from individuals and businesses that share a commitment to protecting the local environment. Work is done with private landowners, municipal boards and state environmental agencies in order to permanently protect and conserve this land. The SVT has protected, land in trust, areas in the Town of Southborough.

Volunteer preserve stewards assist SVT staff by taking primary responsibility for monitoring one of the SVT reservations. Stewardship staff and volunteers routinely visit our properties and work closely with neighbors to monitor for any possible encroachment other violations to the property.

SVT strives to maintain the ecological integrity of our properties. These are the three main foci of the stewardship program:

- Ecosystem and Habitat Protection - Protecting and restoring wildlife habitat and watershed functions.
- Maintaining Vistas and Access - Creating and maintaining attractive and safe access that minimizes environmental impacts.
- Defending our Legacy - Protecting the resource by preventing violations and encroachments

The SVT works through existing organizations, such as Mass Audubon, New England Wild Flower Society, MA Division of Fisheries and Wildlife, SuAsCo watershed groups, conservation commissions, and land trusts to educate he public on what lives in the watershed, the threats to its survival, and ways they can help to protect it. They also encourage concerned citizens to become involved in local and state policies to promote policies, programs, and legislation protection the area.

SVT also offers many membership options at varying supporting levels. Current rates are $40 (Supporter), $60 (Protector), $100 (Guardian), $250 (Preservationist), $500 (Trustee), and $1,000 (Friend). Members will receive a complete set of property maps that serve as trail guides and provide information on both the property's history and the flora and fauna.

Sudbury Valley Trustees headquarters are at 2 Clock Tower Place, Suite 500, Maynard, MA, (978) 897-5500, www.sudburyvalleytrustees.org. For more information about their Stewardship program, contact Ms. Laura Mattei, Stewardship Director, lmattei@sudburyvalleytrustees.org.

4.2.4 Regional, State and National Resources

Adopt Your Watershed. As described in the public education and outreach section of this report, the USEPA has created this campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality in their watershed. The networking and training resources available from this program can help educators, communities, or private citizens improve water quality and implement their local storm water program through education and participation.

Give Water a Hand. This is a national watershed education program of the University of Wisconsin Environmental Resources Center. Support for Give Water a Hand is provided by National Fish and Wildlife Foundation, the U.S. Department of Agriculture, CSREES and NRCS designed to involve young people in local environmental service projects (www.uwex.edu/erc/gwah/). The program provides guidance to students on how to complete an environmental service project and the basic information necessary to understand their watershed. Free guides are available on the internet, but printed copies require printing and shipping fees. The publications are the youth Action Guide (also in Spanish) and the teacher's Leader Guidebook.

Massachusetts Audubon Society

Massachusetts Audubon Society offers a variety of volunteer and internship opportunities for people of all interests, ages, and experience levels. Volunteers and interns assist the Society in delivering its mission of conservation, education, and advocacy, and provide an important link to the community. Volunteers may also gain invaluable experience in their fields of interest, whether for pleasure or career advancement.

ASRI also offers many membership options for the individual and family, defender, donor, and sponsor. Current rates are $50, $75, $100 and $250 respectively. Members are eligible for benefits including free admission to 41 wildlife sanctuaries statewide, a Guide to Massachusetts Audubon Wildlife Sanctuaries, savings on purchases at the Audubon's gift shops, discounts on hundreds of programs, courses, lectures and camps, and a one-year subscription to the Mass Audubon magazine, *Sanctuary*.

For current volunteer opportunities throughout the Mass Audubon organization contact Nancy Leonard at (781) 259-9506 x 7111 or contact the local wildlife sanctuary for opportunities in a particular area.

Massachusetts Riverways Program

A strong aspect of MRP that is based citizen involvement is their Adopt-a-Stream program. This program provides direct support to watershed associations in each of the state's 28 major river basins as well as sub-basins and about 140 Adopt-a-Stream groups (i.e. SWaMP). This support includes the preparation of educational curricula, riparian land mapping, shoreline surveys, water quality monitoring programs and other resource protection tools. Rachel Calabro is the Adopt-A-Stream Coordinator and can be contacted at Riverways Program, 251 Causeway Street, Suite 400 Boston, MA 02114. Her phone number and email are (617) 626-1549 and Rachel.Calabro@state.ma.us.

Massachusetts Watershed Initiative

Massachusetts Watershed Initiative (MWI) is a broad partnership of state and federal agencies, conservation organizations, businesses, municipal officials and individuals. The Watershed Initiative is an innovated, result-oriented program that protects and restores natural resources and ecosystems on a watershed basis by:

- Finding the sources of pollution and taking cooperative action to clean them up;
- Teaching and helping groups and communities to protect and restore their local waters;
- Expanding communication among local, private, and public partners so everyone works together to solve water resource problems;
- Improving coordination among government agencies, and,
- Directing resources to critical needs so limited funds go further to resolve the most important problems

Watershed teams, made up of representatives of governmental agencies and community partners (non-profit organizations, municipal boards, and businesses), coordinate the watershed protection efforts in each of the 27 major watersheds of Massachusetts. The primary goals of the Watershed Initiative are to improve water quality; restore natural flows to rivers; protect and restore habitats; improve public access and balanced resource use; improve local capacity to protect water resources; and, promote shared responsibility for watershed protection and management.

For more information on the Watershed Initiative, contact them at the Executive Office of Environmental Affairs, 251 Causeway Street - 9th Floor, Boston, Massachusetts 02114, (617) 626-1000 or the SuAsCo Watershed (Sudbury, Assabet, & Concord Rivers) Team Leader, Michael Fleming at 180 Beaman Street, West Boylston, MA 01583, Mike.Fleming@state.ma.us, (508) 835-4816 ext. 502

SuAsCo Watershed Team

The SuAsCo Watershed Team consists of state and federal agencies and volunteer groups such as the State of Massachusetts, the Executive Office of Environmental Affairs (EOEA), Sudbury Valley Trustees, the Organization for the Assabet River (OAR), and the SuAsCo Watershed Community Council. They are a non-profit organization whose goals include improving the overall health of the SuAsCo by protecting land along the river, improving water quality and wildlife habitat, increasing protection of water supplies, and foster natural resource management. For more information please contact Mike Fleming, SuAsCo Team leader, at the EOEA (508) 835-4816 ext. 502 or by email mike.fleming@state.ma.us. The organizations within the Team can also provide additional information

4.3 Implementation Alternatives

To comply with this control measure, the town must, at a minimum, conduct public hearings on the Town's Phase II program to allow citizens an opportunity to provide input on the program that is ultimately implemented by the town. However, it is recommended that the Town expand its public participation program to take advantage of the intellectual and labor resources of its citizens. Specific recommendations are as follows:

- Expand on the local Phase II Storm Water Committee addressing the public education/outreach component of the program. This committee could assist the Town with recruiting and directing resources to implement recommended measures.

- Adopt a storm drain stenciling program with the help of students, businesses, and residents. Businesses may stencil their own catch basins or those located in their business district.

- Coordinate with the SWaMP's leaders on water quality sampling projects. An effective way to employ the program would be to initially screen storm water outfalls with dry weather discharges as part of the illicit discharge detection program.

SWaMP would also be interested in initiating clean-up efforts along the Sudbury River that are currently impossible due to liability and access issues.

- Coordinate with local Boy and Girl Scout organizations to discuss potential resources that they could contribute to the program.

- Coordinate with existing regional organizations to discuss enhancing their recruiting efforts and targeting specific storm water related issues in Southborough.

Specific tasks that could be completed as part of the public participation program include:

- Establish "neighborhood watershed" groups to encourage protection of surface waters and report spills and illegal dumping.

- Sponsor cleanup projects that allow businesses, school, and residents to get involved. Provide incentives to businesses by providing them with stickers or plaques to display at their businesses.

- Establish partnerships with local businesses or community groups to remove litter from portions of streets and watercourses.

- Recruit volunteer educators to speak to business and industry owners through workshops. Local professionals may wish to contribute their time or resources for this task.

- Recruit high school or St. Mark's students to serve as environmental educators for younger students. Coordinate with the high school's MassCAP program and offer incentives such as media recognition or trips to environmental science fairs.

According to USEPA guidance documents, potential measurable goals to track BMP and program effectiveness could include:

- Advertise and hold a public meeting; establish a citizen panel; volunteers organized to locate illicit discharges and stencil drains.

- Radio or local television advertisements promoting the program and participation; final recommendations of the citizen panel; community cleanup programs established.

- Local watershed partnerships established to promote storm water pollution prevention in their neighborhoods; certain number of members of the community involved in cleanup or other participatory programs.

- Outreach to every sector of the population completed; certain number of business sponsors or collaborative with the Town.

5.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION

The Town is required to develop and implement a plan to detect and eliminate illicit discharges to its MS4, including development of a storm sewer outfall map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls. While Southborough is non-sewered, the potential for illicit discharges remains with illegal connections that are often the result of failing septic systems or industrial discharges. The following sections detail the regulatory requirements for this effort, the Town's existing programs and controls to meet these requirements, and recommended measures for the Town to become fully compliant with these regulatory requirements.

5.1 State and Federal Regulatory Requirements

Commonly, municipal separate storm sewer system (MS4) discharges include wastes and other wastewaters from non-storm water sources that can significantly impact water quality. Sanitary sewage, process wastewater, floor drains and other wastewaters have been documented in MS4 systems. A common impact is elevated levels of bacteria and pathogens as a result of improper sanitary connections. Because of these water quality impacts, these discharges must either be permitted or removed and connected to the municipal sanitary sewer system for treatment at a wastewater treatment plant. These non-storm water discharges are often more common in older storm sewer systems due to less awareness and enforcement in the past when these connections were made.

National Pollution Discharge Elimination System (NPDES) Phase II Storm Water Regulations define these discharges as "illicit discharges," which are further defined in Rule 31(b) Definitions as:

"Illicit discharge means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges from fire fighting activities."

Specific requirements of this program consist of the following:

1. Develop, if not already completed, a storm sewer system map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.

2. To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

3. Develop and implement a plan to detect and address non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

4. Inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.

Table 5.1 provides examples of sources of common illicit discharges.

TABLE 5.1
EXAMPLES OF SOURCES OF ILLICIT DISCHARGES

Sanitary Wastes
Improper Oil Disposal
Radiator Flushing
Laundry Wastewaters
Automobile and Household Hazardous Wastes

The USEPA regulations allow several categories of non-storm water discharges to an MS4 if they are not identified as significant contributors of pollutants in the system. Table 5.2 lists allowable non-storm water discharges, provided they do not adversely impact water quality.

TABLE 5.2
ALLOWABLE NON-STORM WATER DISCHARGES

Water Line Flushing
Landscape Irrigation
Diverted Stream Flows
Rising Ground Waters
Uncontaminated Ground Water Infiltration
Uncontaminated Pumped Groundwater
Discharges from Potable Water Sources
Foundation Drains
Air Conditioning Condensation
Irrigation Water
Springs
Water from Crawl Space Sumps
Footing Drains
Lawn Watering
Individual Residential Car Washing
Flows from Riparian Habitats and Wetlands
Dechlorinated Swimming Pool Discharges
Street Wash Water Discharges
Flows from Fire Fighting Activities

With the exception of discharges listed above, current NPDES regulations prohibit non-storm water discharges to a storm sewer system without specific authorization from USEPA in the form of a NPDES permit. This is addressed in Rule 8 of the United States

Environmental Protection Agency (USEPA) NPDES regulations that prohibit any discharge of pollutants without a permit.

5.2 Mapping

It is understood that the town of Southborough has limited existing mapping of storm sewer drainage system within the town and is incorporating this mapping into a geographic information system (GIS) database that they plan to deploy by October 2003. In order to comply with the requirements of the Phase II storm water program, additional efforts will be required to identify all outfalls to waters of the United States. A recommended program to collect information on these outfalls and evaluate the potential for illicit discharges is provided in Section 5.4.

This element of the storm water management plan will likely be the most intensive component of the plan. The Town has contracted with Fuss and O'Neill to map all storm water outfalls and conduct an initial illicit connection investigation.

5.3 Municipal Regulations

The town does not currently have a municipal ordinance that expressly prohibits non-storm water discharges to watercourses or the Town's MS4. Following a review of the Town's existing bylaws, the following sections of the Town's ordinances and bylaws have been identified as regulating or otherwise controlling unauthorized discharges to the Town's MS4 and regulated water bodies.

Southborough Wetland Regulations

- Section 1.3: This section prohibits any unauthorized discharge to or within a specified distance of any of several defined natural resource areas, including surface waters or storm flowages.
- Section 11: This section provides enforcement authority to the wetlands commission and its agents, including the authority to enter upon privately owned lands for the purpose of performing duties under the wetlands regulations. Allowance for fines to be imposed for each day of violation under the wetlands regulations is also provided in this section.

Southborough Code

§ 174-13.3.4. Water Resource Protection:

- Part A(1) of this section provides operational and design guidelines to protect against the discharge of hazardous materials or wastes generated or stored at a proposed facility.
- Part A(3) of this section requires that all floor and lavatory drainage be directed to an impervious retention facility for controlled removal.

- Part B of this section requires that a special permit be acquired for certain facilities, including any discharges from a site requiring a NPDES permit. This special permit requires that applications include information on hazardous materials used or stored on site and measures to provide containment and protection around these materials. In addition, special permits are only granted following a finding by the special permit granting authority that no provisions of the Massachusetts Surface Water Quality Standards will be violated as a result of the proposed site use or activities.

§ 223-14 Sewage Disposal – Discharge into Watercourse

- This section prohibits the discharge of any sanitary sewage, gray water, the effluent of any sewage or waste treatment plant or other polluting water from being discharged to any water body or covered drain tributary unless approved by the Massachusetts Department of Environmental Quality Engineering.

§ 223-22 Sewage Disposal – Maintenance

- This section requires that owners keep sewers and disposal systems in proper operational condition and maintained as ordered by the Board of Health. This includes maintaining sewage disposal works in a manner that will not cause the works to become a source of pollution to any waters of the commonwealth.

§ 223-26 Sewage Disposal – General Requirements

- This section requires that the location and installation of any sewage disposal system function in a manner, with proper maintenance, that will not result in a nuisance or discharge to any watercourse of the commonwealth.

§ 244-10 Definitive Plan

- Part A(15)(a) of this section requires that applications for any subdivision of land include plans showing the size and location of existing and proposed utilities, including sewer pipes and their appurtenances and/or sewage disposal system. Any such system must be designed in accordance with the requirements of sewage disposal systems and wetland regulations.

§ 223-6 Sewage Disposal – Plan of Sewage Disposal System

- Part F(1) of this section requires that any proposed sewage disposal system be designed in accordance with the requirements of the Massachusetts Department of Environmental Quality Engineering, Title 5, and the Town of Southborough Rules and Regulations.

- Plans submitted for approval under this section must show the location and elevations of all components of the disposal system.

§ 223-12 Sewage Disposal System – Inspection of Installation

- This section requires that the installation of all sewage disposal systems be inspected prior to backfilling to ensure conformance to the approved plans and other applicable requirements.

5.4 Implementation Alternatives

The following recommendations have been developed for the Town to fulfill the requirements under the Phase II storm water program.

Mapping

A plan has been developed for the Town to develop mapping to satisfy the following requirement under the Phase II program:

Develop, if not already completed, a storm sewer system map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.

This plan includes a program to compile a map of existing storm sewer outfalls in Southborough based on existing municipal mapping and its ongoing geographic information system (GIS) project. This program includes the following elements:

- Review existing municipal records, drainage mapping, storm drain mapping, aerial photography, orthophotos, the Town's GIS system, and field surveys to identify known outfall locations. This information will be supplemented with interviews with municipal DPW staff to identify outfall locations. These locations will be shown schematically on a GIS base map in order to provide general locations to the engineer for outfall inspections.
- During the effort to inspect outfalls, the outfall will be located by geographic positioning system (GPS) or traditional survey. This location will be recorded in a format compatible with the Town's GIS system in order to develop a Storm Water Outfall data layer.

Municipal Regulations

A proposed amendment to the Town's ordinance has been identified to satisfy the following requirement under the Phase II program:

To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

This draft model ordinance has been prepared by the Massachusetts Department of Environmental Management for adoption by state towns to meet the requirements of this program element. This ordinance is provided as (Appendix B) at the end of this report. Additional model ordinances prepared for the elimination of illicit discharges have been identified and are provided in (Appendix C) for the Town's consideration.

Illicit Discharge Detection and Elimination

A proposed strategy has been developed to satisfy the following requirement under the Phase II program:

Develop and implement a plan to detect and address non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

At least initially, it is recommended that the goal of this program not necessarily be to detect all illicit discharges to the MS4, but instead to focus on identifying the discharges that may actually impact water quality of receiving waters throughout the state. For example, this program is focused on eliminating illicit discharges that are actually observed to be discharged to waters of the state as opposed to all discharges that may evaporate or infiltrate prior to being discharged from the MS4.

The development of the storm sewer map as outlined in this plan will complete the initial step to detect non-storm water discharges by locating outfalls where there is a dry weather flow component. While dry weather flow could be groundwater infiltrating into the storm sewer, it is also potentially indicative of an illicit discharge. Once this initial step is completed, the following steps are recommended to first determine whether the observed flow is from an illicit discharge and, if so, to identify the source of the discharge.

- Beginning October 2003, inspect each outfall location (subject to the Town's ability to arrange for or provide access across private property as required) to document the following information on an outfall inspection report:
    - Observed dry weather flow (a digital photograph will be taken of each outfall),
    - Outfall size, material and condition,
    - Approximate height of outfall above receiving watercourse,
    - Outfall receiving watercourse,
    - Coordinate location as determined by GPS,
    - Any additional outfalls observed during the outfall inspections, and
    - Any other observations of the outfall and/or surrounding area (odor, turbidity, color, site conditions).

To the extent possible, at least 72 hours of dry weather should precede any field work associated with this program. These inspections should occur during dry weather such that stream height will be lower to expose submerged outfalls as well as to better observe dry weather flows from outfalls that may be indicative of an illicit discharge.

In addition, each outfall will be numbered uniquely such that its data can be correlated with a location on the storm sewer base mapping to be developed. All collected data will be organized and reviewed by the person responsible for implementing this element of the program.

- Collect samples to be analyzed for pH, temperature, specific conductivity, ammonia, surfactants and fecal coliform from outfalls where dry weather flow is observed. If the results of these analyses indicate that a potential illicit discharge exists, the upgradient drainage system will be examined to identify the extent of the system where that dry weather flow exists. During these investigations, the following information will be collected on upstream structures:

  - Condition of the structure (including a digital photograph),
  - Pipe sizes, and
  - Specific conductivity of the flow as measured in the field.

  An outfall inspection report will be prepared to document the results of the investigations. This report will include the following:

  - a cost estimate and work plan to further identify the source(s) of the dry weather flow observed, and
  - an opinion of construction cost to correct the anticipated problems.

  Any required additional investigations or corrective activities will be completed during subsequent phases of this program.

Public participation in this program is encouraged to help prioritize investigations and ensure complete mapping.

Public Education

This following requirement under the Phase II program is addressed in the public education best management practice recommendations.

Inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.

5.5 Measurable Goals

The following table is provided to assist the town in tracking implementation of the above recommendations.

TABLE 5.3
IMPLEMENTATION MEASURES TRACKING

Program Element	Planned Completion Date	Actual Completion Date
Prepare Outfall Mapping		
Review Existing Records		
Prepare Schematic Map		
Perform Outfall Inspections/Locate Outfalls		
Incorporate Locations/Acquired Data into GIS Database		
Municipal Regulations		
Draft Proposed Ordinance		
Evaluate Proposed Ordinance		
Adopt Proposed Ordinance		
Illicit Discharge Detection and Elimination		
Collect Samples at Outfalls		
Evaluate Analytical Results		
Investigate Upgradient Conditions		
Propose Further Investigations with Cost Estimates		
Propose Corrective Actions with Cost Estimates		

6.0 CONSTRUCTION SITE RUNOFF CONTROL

6.1 State and Federal Regulatory Requirements

Typical construction activities have significant potential to impact surface water quality in the State by creating the potential for sediment, construction materials, waste and other pollutants to be transported to surface waters by wind or storm water runoff. As a result, the USEPA promulgated construction site runoff control regulations as part of its Phase I Storm Water permitting program. This program focused on projects that disturb more than five (5) acres of land for the total project. The Massachusetts Department of Environmental Protection (DEP) has administrative control over activities under this permit in lieu of USEPA.

Surface discharges that are not permitted through USEPA and are presumably polluted require a separate permit administered by DEP and includes all point source discharges to surface waters of the Commonwealth. Under this permit, DEP regulates any surface water discharge that has come into contact with hazardous substances, process wastes, raw materials, or oil and grease.

However, it is through the Rivers Protections Act and Wetlands Protection Act (310 CMR 10.00) that impacts to surface waters and sensitive habitats from storm water runoff are regulated. Massachusetts' *Stormwater Policy Handbook* and *Stormwater Technical Handbook* provide guidance and policies for management of storm water runoff that may have impacts to protected areas. These documents were prepared by DEP and the Massachusetts Office of Coastal Zone Management (CZM) to improve water quality in the state.

As a result, any construction work that is subject to the Wetlands Protection Act must meet Standard 8 of the Massachusetts' *Stormwater Policy Handbook*, which states: "Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities." Examples of BMPs listed in the handbook include staked hay bales, filter fences, hydroseeding and phased development. The handbook also provides a reference for more detailed technical guidance and BMP selection: *The Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas: A Guideline for Planners, Designers, and Municipal Officials (EOEA).*

Although the Wetlands Protection Act regulations originated at the State level, the towns and cities of the Commonwealth, through their conservation commissions, primarily have the administrative duty to implement and enforce them. The Wetlands Protection Act provides the Department of Environmental Protection and the local Conservation Commissions with the authority to enforce the regulations of the Act by issuance of enforcement orders that include:

- Cease and desist orders for activities in violation of the Act;
- Requirements for remediation of wetlands altered by activities;
- Requirements for corrective action to prevent future violations; and
- Fines, civil action, and/or imprisonment.

While the regulations currently in place address activities within, or that directly impact, specific jurisdictional areas, the Phase II program promulgated by the USEPA requires regulated municipalities to develop, implement, and enforce a program to reduce pollutants in storm water runoff to small municipal storm sewer systems (MS4s) from construction projects that result in a land disturbance of greater than or equal to one (1) acre. Sites smaller than this would still require a permit if the land is part of a plan that alters a total area of greater than one (1) acre, such as a subdivision. Small construction projects are eligible for waivers of permit requirements if either:

1. The value of the rainfall erosivity factor, "R", is less than five (5) based on the revised Universal Soil Loss Equation (see below) during construction; or

2. A Total Maximum Daily Load (TMDL) establishes acceptable loads for pollutants of concern in impaired surface water or an equivalent analysis, which determines that allocations of pollutants of concern for the project are not necessary to maintain water quality.

The Universal Soil Loss Equation:

$$A = R \times K \times L \times S \times C \times P$$

Where:

A = Average annual soil loss (tons/acre/year)
R = Rainfall (erosivity) and runoff factor
K = Soil erodibility factor
L = Slope length
S = Steepness factor
C = Cover and management factor
P = Support practice factor

DEP or USEPA Region I office may designate small construction activities that disturb less than one (1) acre of land if the activity contributes to a violation of water quality standards, or for significant contribution of pollutants, such as Total Suspended Solids (TSS), to any surface water. There are currently no DEP regulations that apply to disturbances of land less than five (5) acres that are not otherwise subject to the Wetlands Protection Act.

The specific state and federal requirements of the construction site runoff control minimum measures, which the Town must develop and implement, are as follows:

1. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under state or local law;

2. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (BMPs);

3. Requirements for construction site operators to control construction wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality;

4. Procedures for site plan review, which incorporate consideration of potential water quality impacts;

5. Procedures for receipt and consideration of information submitted by the public; and

6. Procedures for site inspection and enforcement of control measures.

Currently, DEP is preparing a guidance document and model by-laws to assist municipalities with Phase II program compliance. The by-laws are intended to address construction site and post-construction runoff control while eliminating the need for each regulated Massachusetts municipality to develop individual by-laws. The benefit of time and labor savings does not preclude a municipality's ability to customize the model by-laws according to the needs of its storm water plan and the community. This approach will also provide a consistent Phase II regulatory framework among the communities that participate in adopting the model ordinances or variations thereof.

6.2 Existing Municipal Ordinances

6.2.1 Municipal Code

Chapters of the Municipal Code where soil erosion and sediment control for land disturbing activities is not addressed, but is relevant, include:

- §85 Earth Removal
- §103 Gas Installations
- §152 Streets and Sidewalks
- §174-8.9 Wetland and Floodplain District
- §174-8.10 Critical Resource District

6.2.2 Subdivision of Land Regulations

Erosion and sedimentation controls are addressed in the Subdivision of Land Regulations (§244 of the Municipal Code) as a part of the required environmental assessment report to be submitted with the definitive plan. However, the assessment is only required for subdivisions "creating frontage potentially allowing ten (10) or more dwelling units or serving ten (10) or more acres of non-residentially zoned land." As stated in §244-10(D)(3), construction site runoff control must be addressed in the environmental assessment report based upon an analysis and development of alternatives for the following:

> "Capability of soils, vegetative cover and proposed erosion control efforts to support proposed development without danger of erosion, silting or other instability."

6.2.3 Zoning By-Law

Chapters of the Zoning By-Law where soil erosion and sediment control for land disturbing activities is relevant include:

- §174-8.9 Wetland and Floodplain District
- §174-8.10 Critical Resource District
- §174-10 Site Plan Approval. Currently this process requires development projects, other than single-family or two-family residences, to be reviewed by the Site Plan Review Committee.
    - Minor Plan Review is required for projects that add less than 2,000 square feet of floor area or requires at least 5 but less than 20 parking spaces. Erosion and sedimentation controls are not specifically required, but discretion is left to Committee to require additional information.
    - Major Plan Review is required for projects that add 2,000 square feet or more of floor area or requires 20 or more parking spaces. Erosion and sedimentation controls are not specifically required, but approval is based upon compliance with standards that include §174-10(D)(1)(a) "Minimize…soil erosion and threat of air or water pollution" and §174-10(I) "Where the commencement of removal, fill or change of grade of earth materials precedes construction by three (3) months or more, the submission and approval of the site plan may be undertaken in two (2) stages…" The initial earthwork phase does not state any requirements for erosion and sedimentation controls.

6.2.4 Wetlands Regulations

The Town's Wetlands Regulations are in place to protect waterways and wetlands from activities that may have a "significant or cumulative effect" upon the value of these and other resources. Unless permitted by the Southborough Conservation Commission, no alteration of resource areas, or within twenty (20) feet of resource areas, is allowed. Further, the Commission must approve any work within 100 feet of a resource area. Construction runoff control is specifically addressed in Section 2.4 of the regulations and requires the following erosion and sedimentation control BMPs during construction activities:

- Minimization of the area and duration of exposed ground;
- Reduction of the steepness and length of slopes on-site;
- Diversion of flows away from disturbed areas;

- Protection of exposed surfaces through vegetative or other stabilizing cover;
- Reduction of the velocity of runoff through acceptable construction practices;
- Entrapment of sediment in basins and behind barriers; and
- Maintenance and adjustment of sediment control measures.

The minimum plan requirements for permit applications pertaining to construction site runoff control include:

- Erosion and sedimentation control plans;
- Methods for stabilizing cleared areas of one (1) acre or more during extended periods when no work occurs; and
- Sequence of construction for proposed erosion and sedimentation controls, clearing and grubbing, grading, etc.

The regulations allow exceptions to the Wetlands By-Law provided that work conforms to the General Performance Standards of Section 2.4 or where the presumption that land disturbing activities will not result in erosion and sedimentation. In addition to the nature of the proposed activity, the presumption may be overcome by evidence that site conditions will not contribute to erosion or sedimentation. The following types of projects are exempt from the application and permit process under the By-Law, unless otherwise required by State or Federal law:

- Maintaining, repairing, replacing, but not enlarging a lawful single-family residence or appurtenance;
- Maintaining, repairing, replacing, but not substantially changing or enlarging an existing lawfully located public utility, provided written notice is given to the Commission prior to the activity; and
- Maintenance or improvement of land in agricultural use, provided written notice is given to the Commission prior to the activity.

6.2.5 Enforcement

6.2.5.1 Municipal Code

The regulations contained in pertinent sections of the Municipal Code identified above (§85 Earth Removal, §103 Gas Installations, §152 Streets and Sidewalks, §174-8.9 Wetland and Floodplain District, §174-8.10 Critical Resource District) are enforced by various responsible parties including the Building Inspector, Highway Superintendent, and Conservation Commission. These sections do not have erosion control requirements.

6.2.5.2 Subdivision of Land Regulations

The Planning Board is responsible for approval, rejection and coordination of reviews of proposed subdivision applications. A performance bond or surety delivered by the property owner is required prior to granting approval of the subdivision by the Board (§244-11(C)). The Board may use the bond to correct unacceptable conditions or complete improvements in the subdivision. As allowed under §244-32, inspections may be conducted by the "proper town official" at various stages of construction and documented on standard inspections forms.

6.2.5.3 Zoning By-Law

The requirements of the Zoning By-Law are enforced by the Building Inspector under §174-24 of the Municipal Code. Any land or structure in violation of §174 Zoning is subject to a fine of not more than $50 for each day the violation occurs after compliance has been ordered and sufficient time has elapsed to correct the violation.

6.2.5.4 Wetlands Regulations

The Conservation Commission may perform inspections of activities to verify compliance with the Wetlands Regulations and the Wetlands Protection Act and investigates reports of suspected violations. Enforcement of the regulations is executed by the Commission and may include the following mechanisms:

- A Performance Bond to ensure compliance with the Permit;
- Issuance of an Administrative Order notifying the landowner of the violation and the necessity for immediate corrective action;
- Issuance of an Enforcement Order, which may result in fines up to $25,000, imprisonment up to two years, or both, as allowed by the Wetlands Protection Act regulations for non-compliance with the Act; and
- Issuance of fines up to $500 per violation of the Regulations and subject to an Administrative Hearing by the Conservation Commission.

6.3 Implementation Alternatives

The following paragraphs detail actions that the Town of Southborough should undertake to comply with the EPA Phase II regulations.

1. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law.

We recommend that the Town adopt an ordinance that addresses soil erosion and sediment controls (SESC) for construction activities that occur within the Town's jurisdiction. An example ordinance is attached as Appendix E and is summarized below:

- Section 1: Purpose. This section should serve as an introduction to the ordinance and provide a summary of the reasons behind the adoption of the ordinance such as the increase in erosion of stream channels, the contamination of drinking water supplies due to contaminated storm water discharges to surface waters, etc. Additionally, this section should discuss the main objectives of the ordinance and may, for example, include phrases such as "To prevent pollutants from entering the Town of Southborough's municipal separate storm water system (MS4) and to minimize discharge of pollutants from the MS4."

- Section 2: Definitions. Terms and phrases expressed in the ordinance should be defined in this section.

- Section 3: Applicability. This section should discuss the cases in which the ordinance will and will not apply. For example, the acquisition of a permit from the Town may be necessary for development projects that disturb 10,000 square feet of land or more. Exemptions can also be listed in this section and may include projects that maintain existing landscaping, gardens or lawns and do not alter the drainage characteristics; projects that require an Order of Conditions from the Town's Conservation Commission; or projects that do not occur within 100 feet of any storm drain inlet or conveyance feature.

- Section 4: Responsibility for Administration. This section discusses the rights, responsibilities, and rules of those who will administer and enforce the ordinance.

- Section 5: Permits. This section discusses the procedure associated with the acquisition and retention of a permit and may include information such as:

    - Contents of the application package;
    - Size requirements and copies of submitted drawings and supporting materials;
    - A time period for the Town to complete its review;
    - Possible Town decisions (Approved with Conditions, Disapproved, etc.);
    - Fee structure;
    - Actions to be taken if changes in the project are encountered; and
    - Actions to be taken at the project's completion.

Consider requiring an emergency action plan for wet weather, spills or BMP failure, especially in locations that would be sensitive to a failure, such as an adjacent surface water or storm drainage system. The Town may also want to consider requiring a schedule of construction activities for all projects to aid in the coordination of inspections.

- Section 6: Erosion and Sediment Control Plan. This section should discuss the required elements of a Soil Erosion and Sediment Control Plan that will need to be submitted to obtain a permit and should include enough information for the Town to evaluate the environmental impacts and effectiveness of the proposed measures (existing and proposed hydrology, topography, storm water conveyances, wetlands, drainage areas, etc.).

- Section 7: Inspection and Site Supervision. The soil erosion and sediment controls implemented at construction sites will need to be inspected periodically during the project and at the project's completion. This section should discuss the inspection timeline and frequency for construction activities. Additionally, this section should discuss the persons authorized to conduct the inspections and the procedures involved.

- Section 8: Surety. This section could include a provision that requires a surety or performance bond before the start of a land disturbance project. We recommend that this section be added to the ordinance to allow the Town to use surety funds to implement corrective measures in the event the project's developer does not comply with the permit requirements.

- Section 9: Final Reports. After the work is complete, a final report should be submitted to the Town. This section should outline the requirements of the report. For example, as-built drawings certified by a Professional Engineer or Certified Professional in Erosion and Sediment Control certifying that all erosion and sediment control devices have been completed in accordance with the permit.

- Section 10: Enforcement. This section should discuss the parties responsible for the ordinance enforcement, the allowable orders and procedures by which the orders can be issued and enforced, the consequence of the violation of an order, the appeals process and any other related topics.

- Section 11: Certificate of Completion. This section outlines the procedures by which a Certificate of Completion will be issued for projects in compliance with the ordinance.

- Section 12: Severability. This section states that if any portion of this ordinance is held invalid for any reason, all other provisions shall remain valid.

The Town may consider adding an additional section entitled "Design Standards" that cites the Massachusetts *Stormwater Management Policy*. A list of the standards is provided in Appendix H. The addition of this section may aid developers and landowners to understand the rules as well as ensure that all permitted projects will meet the standards developed by the Commonwealth.

A non-structural best management practice for construction and post-construction runoff control that has become popular recently is low-impact development (LID). The intent of a LID is to treat and manage storm water at or near the source as opposed to constructing large BMPs at the lowest point of a site's watershed. This practice also encourages preservation of open space and reduced impervious areas. This strategy can result in smaller land disturbances and lower potential for soil erosion.

2. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (BMPs).

   Section 6 of the model ordinance provides requirements for a SESC Plan. The Town may wish to consider adding specific non-structural measures to these requirements such as avoiding the creation of slopes greater than 10%, the use of vegetative matting when warranted, and the retention of trees and/or existing vegetation whenever possible.

   Additionally, the Town may wish to require the planning, design and installation of structural BMPs such as grassed and paved waterways, diversions, detention basins when warranted, and retaining walls. Other BMPs could be incorporated into the performance principles such as restrictions on the time period during which unprotected soil conditions may exist due to inactivity on a portion of the site as well as BMPs for dewatering operations. The Town may also want to consider whether there are any BMPs that should be disallowed.

3. Requirements for construction site operators to control construction wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality.

   The model ordinance does not address the management of construction wastes. As a result, we recommend the addition of the following items:

   - Require SESC plans to include provisions for controlling construction wastes, such as those described above that may cause adverse impacts to water quality. These controls should be described in the project narrative and shown on the site plans.

   - Consider including additional provisions for disposal of clearing/grubbing wastes such as stumps and asphalt that are often disposed of on-site.

4. Procedures for site plan review which incorporate consideration of potential water quality impacts.

   - Provide training, if required, for all personnel responsible for reviewing the site plans to determine compliance with the newly adopted soil erosion and sediment control ordinance are adequately trained for such practices and allowable exemptions.

   - Ensure that the land disturbance area requiring erosion control review is equal to or greater than the threshold cited in the newly created ordinance. It should also be determined whether the project is exempt from a permit or erosion controls based on criteria established in the ordinance.

   - Develop a checklist to ensure reviewers that minimum application requirements are met and BMPs are used appropriately.

5. Procedures for receipt and consideration of information submitted by the public.

   The existing Subdivision of Land Regulations require public notice and a public hearing before any definitive plan is approved or disapproved. The public has access to all proceedings of the review board and is allowed to present oral and written comments related to the proposed project. The following recommendations are proposed to formalize this process as stipulated in the USEPA guidance documents.

   - Provide a form at the Building Inspector's office to document public inquiries and comments for construction projects.

   - Consider providing an internet-based method of communicating public comment such as e-mail or an editable website document.

   - Adopt procedures to respond or address public inquiries or concerns once submitted to the Building Inspector. It is not USEPA's intention that the Town of Southborough should develop a burdensome process to respond to every public inquiry. The Building Inspector may log complaints and direct them to the inspector responsible for a particular site. The inspector may prioritize inquiries based on the severity of the suspected violation and investigate accordingly.

6. Procedures for site inspection and enforcement of control measures.

The model ordinance specifies that periodic inspections are to be conducted by any party authorized by the Town. Additionally, the authorized inspector will conduct a final inspection of the site and prepare a summary report at which time the applicant/owner may request the release of the performance bond. We recommend that the following items be implemented as part of the newly created ordinance to aid in the inspection process:

- Evaluate the need for additional staff to enforce the regulations and conduct appropriate inspections.

- Consider the use of summer interns to assist with a SESC inspection program. After some initial training they could, at a minimum, assist Southborough staff in determining whether controls have been installed and determine if sedimentation is occurring in down gradient streams.

- Review the possibility of training existing building department staff to conduct SESC inspections as part of their typical inspections currently completed at building construction sites. While inspectors may not have sufficient time to conduct a thorough inspection, they can confirm that controls are in place and whether any downstream sedimentation or erosion is observed that could prompt a more thorough inspection by the person responsible for enforcement and inspections.

- Prioritize inspections based on the scale of the construction project, sensitivity of nearby water resources, an approved construction phasing schedule, or potential impacts as determined by the scope of the project in order to conserve the time of inspectors.

- Operators of construction projects should provide notice to the designated authority at a reasonable time in advance of the commencement of construction.

- Consider the development of an electronic database to track progress of construction, complaints and inspections. While adding some administrative and financial commitments, a database would also provide readily accessible documentation of compliance with the regulations.

While not specifically required in the regulations, some contractor training may be appropriate. This training would be valuable in communicating the need for SESC to contractors and the minimum requirements for both applications and construction. This could consist of mailers and brochures distributed to local contractors, developers, and engineers as well as more formal training. However, instead of the Town of Southborough shouldering the burden for a program that would actually benefit the region, we would recommend that the Commonwealth of Massachusetts, DEP or a regional agency, such as the Massachusetts Water Resources Authority, consider developing this program.

The Town may also address the issue of contractor training issue as part of the Education and Outreach minimum control measure of the Phase II regulations. Training could consist of workshops hosted by DEP or qualified professionals to educate area designers and contractors of the Town's ordinance and the proper design and implementation of erosion control BMPs.

6.4 Measurable Goals

Establishing measurable goals is required for the construction site runoff control minimum control measure of the Phase II regulations and may include:

- Implementation of an enforceable ordinance;
- Implementation of site inspection procedures;
- Improvement in the rate of contractor compliance;
- Reduction of Total Suspended Solids (TSS) levels in the Town's surface waters.

7.0 POST-CONSTRUCTION RUNOFF CONTROL

7.1 State and Federal Regulatory Requirements

The USEPA's Phase II Storm Water management regulations require regulated municipalities to develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb one acre or more of land and discharge into the municipality's MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts. This program must include the following elements:

1. Develop and implement strategies, which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community;

2. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law; and

3. Ensure adequate long-term operation and maintenance of BMPs.

The Rivers Protections Act and Wetlands Protection Act were developed by MADEP to contribute to the protection of water supplies, pollution prevention, protection of wildlife, flood control, and others[1]. The release of storm water runoff into areas subject to protection under the Act must meet the storm water management standards established in Massachusetts' *Stormwater Policy Handbook.* As such, point source discharges, which constitute conveyances of, storm water to watercourses, wetlands, or other resource, are mandated to specific performance standards even when work is outside jurisdictional areas.

1 Wetlands Protection Act Regulations: 310 CMR 10.01(2), May 12, 2000.

Eight of the nine storm water management performance standards described in the *Stormwater Policy Handbook* are associated with post-construction runoff. The summary of these standards includes:

- No new storm water conveyances may discharge untreated storm water directly to or cause erosion in wetlands or waters of the Commonwealth.

- Storm water management systems must be designed so that post-development peak discharge rates are less than pre-development peak discharge rates.

- Post-development groundwater recharge rates should approximate pre-development rates.

- For a new development, storm water management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). The standard is contingent upon the implementation of structural and non-structural BMPs with an appropriate maintenance program.

- Storm water discharges from areas with higher potential pollutant loads require specific BMPs while prohibiting infiltration practices.

- Storm water discharges to critical resources must implement BMPs.

- Redevelopment of previously developed sites must meet the standards to the maximum extent practicable using treatment retrofits or new BMPs.

- A storm water operation and maintenance for all BMPs.

The above standards are not applicable to: single-family house projects; residential subdivisions with four or fewer lots, provided any discharge will not affect a critical area; or emergency repairs to roads and associate drainage systems. Projects subject to the storm water management standards to the "extent practicable" are: residential subdivisions with four or fewer lots with a discharge potentially affecting a critical area; and residential subdivisions with five to nine lots, provided any discharge will not affect a critical area.

7.2 Existing Ordinances

7.2.1 Municipal Code

Post-construction runoff controls are not stipulated in the municipal code.

7.2.2 Subdivision of Land Regulations

§244-11(C) Performance Guaranty. A performance guaranty is required to ensure that work is completed in accordance with the subdivision regulations and the approved plans.

§244-16 Drainage. This section addresses management of runoff but does not provide requirements or standards for storm water quality. Operation and maintenance is also not specified for storm water facilities.

7.2.3 Zoning By-Law

Zoning By-Law §174-13.2 Major Residential Development requires a special permit. Among others, the objective is to promote open space, protect resources, and minimize urban sprawl, which is a non-structural best management practice. Specific post-construction controls are not provided in the Code, but could be incorporated in conditions of project approval. Related to storm water discharges for all new non-residential construction, §174-13.4 of the Zoning By-Law states the following:

"Provision shall be made for on-site recharge of all storm water runoff from impervious surfaces unless, following consultation with the Conservation Commission, the Building Inspector, determines that either recharge is infeasible because of site conditions or is undesirable because of uncontrollable risks to water quality from such recharge. Recharge shall be by surface infiltration through vegetative surfaces unless otherwise approved by the Building Inspector following consultation with the Conservation Commission."

Other controls, such as long-term operation and maintenance or water quality design requirements, are not provided in the By-Law.

7.2.4 Wetlands Regulations

The Town's Wetlands Regulations have requirements for the hydraulic design of post-construction runoff control BMPs, but do not address long-term maintenance requirements or specific BMP practices. Projects subject to the Wetlands Regulations must adhere to specific standards and incorporate storm water management practices in accordance with the Massachusetts *Stormwater Policy Handbook.* The standards are incorporated in the Wetlands Regulations by reference of the provisions of the state's Wetlands Protection Act. Standard 9 of the *Stormwater Policy Handbook* requires an operation and maintenance plan that may include: the owner of the storm water management system; the party responsible for operation and maintenance; funding for the continued operation and maintenance of the system; and schedule of specific maintenance tasks to be performed.

The compliance with Standard 9 may be stipulated in the permit issued by the Southborough Conservation Commission for work within regulated areas in the form of an Order of Conditions.

7.2.5 Enforcement

7.2.5.1 Municipal Code

Enforcement of post-construction runoff controls is not stipulated in the municipal code.

7.2.5.2 Subdivision of Land Regulations

Enforcement is not stipulated for post-construction controls. However, most subdivisions use storm water facilities that are transferred to the Town upon final acceptance of the road and all associated public improvements. For privately owned facilities, the Building Inspector could enforce permit conditions of operation and maintenance for the approved use of the property.

7.2.5.3 Zoning By-Law

As with construction sites, post-construction sites are still subject to the Zoning By-Law. The By-Law is enforced by the Building Inspector under §174-24 of the Municipal Code. Any land or structure in violation of §174 Zoning is subject to a fine of not more than $50 for each day the violation occurs after compliance has been ordered and sufficient time has elapsed to correct the violation. If conditions for long-term maintenance are stipulated in a permit for site development, the failure of a site operator to properly operate and maintain the site and its appurtenances may by subject to enforcement by the Building Inspector to compel permit compliance.

7.2.5.4 Wetlands Regulations

As previously stated, Standard 9 of the Massachusetts *Stormwater Policy Handbook* requires an operation and maintenance plan. At the completion of a project, an applicant may request a Certificate of Compliance, or release, from the Order of Conditions if all improvements have been constructed according to the Order. Long-term maintenance or monitoring requirements may be retained by specific reference in a Certificate of Compliance that is issued for other activities of an approved project. The Conservation Commission retains the authority to enforce the Wetlands Regulations and Wetlands Protection Act by issuing administrative orders and fines.

7.3 Implementation Alternatives

In order to fully comply with the EPA Phase II requirements, we recommend that the Town of Southborough create, as part of the newly created soil erosion and sedimentation control ordinance, a guidance document that will serve as a reference and regulation for designers, contractors and landowners to control storm water runoff and new developments. This can be done by adhering to the requirements set forth as part of the EPA Phase II regulations. The following paragraphs summarize recommendations to comply with the minimum requirements of this control measure.

1. Develop and implement strategies that include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community.

The Town of Southborough currently has no way of evaluating, through the regulation process, the use of BMPs at developments. We recommend the following items to comply with this requirement.

- Develop required BMPs to remain in place after construction activities are complete at locations throughout the Town of Southborough. These requirements can be added to Section 5 of the model ordinance along with provisions to evaluate each proposed BMP on a site-specific basis. The review of proposed BMPs could also address new technologies for sediment control and pollutant removal and stipulate that they be used only after adequate data is provided, reviewed, and approved.

- Consider whether the Town, based on past experience, should expressly prohibit any BMPs. For instance, there are some controls such as infiltration trenches that, while commonly shown in BMP manuals, have limited application in the northeastern United States, especially in urban environments.

- Consider an alternative approach to addressing post-construction runoff that determines an appropriate level of controls based on the risk to water quality that a development poses. This would result in a lower level of controls for projects with greater risks. Appendix D includes one approach that was implemented in Waterford, Connecticut to innovatively control water quality impacts as well as costs to BMPs to developers. It outlines a matrix that defines three (3) escalating tiers of controls that are based on location of sensitive receiving waters, land use, percent imperviousness and size of development. If desired by the Town, this approach should also be incorporated as part of a public participation program. This program should include both the regulated community as well as other stakeholders.

2. *Use an ordinance or other regulatory mechanisms to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law.*

There are no existing regulations that address storm water quality issues. These regulations are needed in order to comply with Phase II requirements. It is necessary to specify planning and design standards for BMPs as well as specifying long-term maintenance and monitoring requirements. The following items are recommended to comply with this requirement.

- Create regulations that require BMPs for land development or redevelopment projects that disturb greater than one acre. As the subdivision regulations apply to all land development and redevelopment projects in Southborough, the newly created regulations should be focused on these projects. Two mechanisms exist to create these regulations:

  a) Adopt a post-construction storm water control ordinance using DEP's draft model ordinance provided in Appendix F.

b) Add to the model ordinance specific provisions to address storm water quality. These provisions should include, at a minimum, the following components:

i. Water quality standards such as the demonstration by an applicant that their proposed controls remove the average annual TSS by at least 80%.

ii. Nuisance and landscape controls at a development are key elements to the adequate control of storm water runoff.

iii. Specific maintenance requirements for sediment and erosion controls at the development are important to ensure the continuous function of the implemented controls.

iv. Site plan calculations and a narrative description of the project and the proposed controls are very helpful in evaluating the detailed descriptions of the BMPs, their effectiveness and their maintenance requirements. By including these in the required submittals, the Town will be better able to meet the EPA Phase II regulations.

v. Maintenance agreements and performance bonds will ensure that and developers and owners will be parties to enforceable agreements to maintain their BMPs, with performance surety to ensure maintenance.

vi. The incorporation of clear enforcement procedures and mechanisms will eliminate any ambiguity that may exist if violations of the control ordinance are encountered.

- Implement regulatory modifications as part of a public participation program. At a minimum, this program will review proposed regulatory modifications with the public. However, the program can be expanded to form a committee of interested citizens, including other consulting engineers and developers, to develop final regulatory changes.

3. Ensure adequate long-term operation of BMPs.

We recommend that the ordinance contain the following items:

- Amend the Zoning By-Law and Subdivision and Land Development regulations to require long-term maintenance of all storm water facilities. An example of a post-construction model ordinance is provided in Appendix F of this report to assist the Town with developing appropriate language for establishing long-term maintenance and compliance through the use of

maintenance agreements, record keeping, and inspections. This language should also include provisions for reimbursement to the Town for O&M performed by Town staff when the property owner defaults on these responsibilities.

- Consider development of an electronic database to track BMP maintenance, complaints and inspections. The administrative commitment could be part of that developed to track sites during construction and would also provide a readily accessible documentation of compliance with the regulations.

- Consider adding a post-construction reporting component for the public (e.g. internet-based, etc.) that is part of a plan to receive inquiries under the Construction Site minimum control measure. This could help the Town in identifying non-compliance of BMP maintenance requirements and sources of potential pollution discharge into the Town's MS4 or surface waters. Require long-term maintenance of sediment and erosion control measures.

- Consider implementing a public education program dedicated to land developers and owners of commercial and industrial properties that addresses more detailed maintenance needs for specific BMPs. Suggested practices for specific BMPs are summarized in Appendix G of this report.

- Consider including requirements for long-term monitoring of BMPs, especially for sensitive land development projects. Influent and effluent grab samples could be collected from storm events that generate between 0.5 and 1.0 inch of rainfall during a 24-hour period. Before sampling, there should be at least a 72-hour period of no rainfall, and pre-treatment (influent) samples should be collected during the first flush of the storm. Runoff generated by the first half-inch or first inch of precipitation is typically considered the first flush. Post-treatment (effluent) samples should be collected after pre-treatment samples are collected with a delay in time equal to the time the water is detained in the treatment system during that storm. Initial and long-term post-construction monitoring of water quality controls is recommended.

Initial Monitoring: Initial monitoring should be performed within one year following installation and initial startup of the control system to assess the system's design and short-term pollutant removal efficiency. Sampling of five separate storm events is recommended in order to make a statistically valid conclusion as to the effectiveness of the treatment system. The samples should be collected during early spring (April) and late summer (August) in order to examine seasonal variation of treatment performance. At least two storm events should be sampled during each season.

Long-Term Monitoring: Biennial (i.e., once every two years) monitoring should be performed to provide information on the long-term pollutant removal efficiency and operation and maintenance of water quality controls for developments requiring

secondary or tertiary controls. Biennial monitoring should be initiated following completion of the initial, first-year monitoring program.

The parameters that are recommended for initial and long-term monitoring are listed in Table 7.1 below. Discharge quality goals are also listed for each parameter. The ultimate goal would be for discharge quality to be non-toxic to aquatic life, however, this sampling does not account for stream dilution that would affect actual toxicity. At a minimum, it is recommended that storm water discharges achieve the listed quality goals that are achievable with proper storm water controls.

TABLE 7.1
BMP MONITORING PARAMETERS AND QUALITY GOALS

Parameter	Quality Goal
Oil & Grease	5 mg/l
BOD5	5 mg/l
COD	75 mg/l
Total Kjeldahl Nitrogen (TKN)	2.5 mg/l
Nitrate as Nitrogen	1.5 mg/l
Total Suspended Solids (TSS)	100 mg/l
Total Phosphorous	0.5 mg/l
Fecal Coliform	2000 /ml
pH	6 - 9

- Consider the use of agreements or deed language that requires private owners of projects for significant water quality impacts to properly maintain their BMPs. This language should also include provisions for reimbursement to the town for O&M performed by the town when the property owner defaults on these responsibilities.

4. Ensure controls are in place that would minimize water quality impacts.

Currently, there are no controls in place that would minimize water quality impacts. With the proposed additions to the Town by-laws and regulations, specific requirements for these controls will be stipulated, thereby minimizing the opportunity for inappropriate controls to be implemented as part of a development or re-development project. However, the Town's ability to ensure compliance with approved plans is limited based on available staff. We offer the following recommendations.

- Complete final inspection, including inspections of BMPs, prior to the Building Department's issuance of a Certificate of Occupancy. Submittal of as-built drawings to the Town Engineer may be desired for projects with complex systems or that pose substantial risks to water quality.

- Prioritize sites of concern and include those sites in periodic inspections (e.g. once every two years) to ensure proper maintenance of implemented BMPs.

As part of this, the Town could also require specified projects to submit annual maintenance records.

- Successful implementation of these efforts would require staff time for both enforcement as well as record keeping. This, with the additional Phase II requirements, will likely exceed available staff time. The City could consider the use of a summer intern(s) to assist with this effort.

7.4 Measurable Goals

Measurable goals must be established to meet the post-construction site runoff minimum control measure. According to USEPA guidance documents, goals could include:

- Development of strategies to include structural and non-structural BMPs;
- Implementation of appropriate regulations or ordinances;
- Reduction of impervious areas in new or re-development projects; and
- Improved the quality of the Town's surface waters.

8.0 POLLUTION PREVENTION /GOOD HOUSEKEEPING

8.1 State and Federal Regulatory Requirements

The goal of this element of the storm water pollution prevention plan is twofold. The first is to minimize the pollutants that enter the Municipal Separate Storm Sewer System (MS4) prior to being discharged to surface waters of the state. This would consist of pollutants from land uses that drain to Southborough's MS4 as well as those pollutants that are swept from municipally owned streets, parking lots and facilities such as the highway garage. The second goal is to minimize non-point source pollution caused by operation and maintenance activities at municipally owned facilities such as use and storage of materials and wastes where they are exposed to precipitation.

The Phase II program that has been promulgated by the United States Environmental Protection Agency (USEPA) requires regulated municipalities to develop a pollution prevention/good housekeeping element that achieves the above referenced goals. This element largely consists of properly maintaining existing infrastructure such as roads and drainage structures as well as implementing appropriate pollution control practices at municipal facilities. Specific regulatory requirements for this element of the storm water pollution prevention plan are:

1. Develop and implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system; and

2. Include employee training on incorporating pollution prevention/good housekeeping techniques into municipal operations such as landscaping, car and truck fleet maintenance, building and public works yard maintenance, new construction, land disturbances, and storm water system maintenance. Training materials available from the USEPA and MADEP may be used to assist with this task.

It should be noted that Massachusetts Department of Environmental Protection (MADEP) has not defined "minimum" measures for an operation and maintenance program or for employee training. For example, there is no minimum standard for catch basin cleaning. As a result, specific actions are left to each MS4 owner or operator.

8.2 Facility/Site Walkovers

Information for this plan was gathered at a town workshop held at the Department of Public Works, and interviews of town employees. During this workshop, site walkovers were conducted at the DPW facility, the transfer station, recycling center, consolidated Police and Fire Headquarters, and cemetery properties. The DPW is currently evaluating facility improvements at the existing yard to include a salt storage facility.

8.3 Town Personnel Training Program

At this time there is no formal storm water related training program for Town personnel. We suggest that this be incorporated into the Health and Safety program the Town is developing. We suggest developing the program in Year 1 of the permit and implementing it through the remainder of the permit term.

8.4 Current Practices and Responsibilities

The Town of Southborough currently implements a street and drainage system maintenance program with the goal of minimizing the pollutants that discharge from their MS4. Information regarding these current practices and responsibilities for pollution prevention and good housekeeping were obtained personal interviews with staff from the planning, engineering, public works, recreation, school and emergency response departments. The following summarizes the pollution prevention and good housekeeping techniques and policies employed by the Town.

8.4.1 Public Street and Parking Lot Sweeping

Annual sweeping is performed on most public streets and parking lots with some areas receiving additional sweeping as necessary to remove excessive sediment buildup. Annual sweeping typically begins in April. There is no documented list of streets that receive more frequent cleaning

There are no parking bans in effect during the street sweeping season, it is typically performed in early morning hours.

Streets and municipal parking lots are swept using the two town-owned mechanical brush-type sweepers ranging in age from 2 to 25 years. The sediment collected by the sweepers is stockpiled at the DPW for beneficial re-use or ultimate disposal.

8.4.2 Detention Basin, Catch Basin and Storm Drain Inspection and Cleaning

Catch basins are cleaned using a truck mounted clam bucket, typically when calls are received from the public requesting maintenance or when municipal staff observe flooding problems. There is currently no cleaning program that targets specific areas or establishes schedules for cleaning the Town's catch basins, detention basins, or drain pipes.

According to the available information, there are several detention basins in Southborough. At this time, only detention ponds for public roadways are maintained by the DPW. For private roads/developments it has been the policy of the Town to require the developer to establish a homeowner's association to maintain detention basins in the project. There are no records available documenting maintenance practices or schedules for these facilities.

8.4.3 Fleet Vehicle Maintenance

Maintenance and repairs of all fleet municipal vehicles with the exception of the Fire Department are performed indoors at the Public Works garage. This includes vehicles operated by the Police and Public Works Departments, among others. New and waste automotive fluids are stored indoors in barrels or lockers while waste motor oil is stored indoors in marked 55-gallon drums. Waste oil is burned in the waste oil-burning furnace between the months of October and April.

Reportedly, the garage has floor drains in use that are connected to an oil-water separator prior to discharge into a tight tank on the property. The tank is inspected annually and pumped as needed. All vehicles are washed outdoors. DPW vehicles are washed at the Public Works garage, and School Department, Fire Department and Police Department vehicles are washed at their own facilities.

The Fire Department performs maintenance at its own main facility on Main Street. There are six floor drains in the bays and one in the hose tower. All maintenance is performed inside the facility. The Fire Department has plans to contract out all vehicle maintenance to a private company within the next year. The Fire Department has currently contracted an outside consulting firm to evaluate alternatives for drain realignment to conform to MADEP standards.

8.4.4 Winter Road and Lot Maintenance

The DPW, with assistance from private contractors, maintain public roads and parking lots in town. Streets are plowed then treated with a 2:1 sand/salt mix as necessary during winter months. For the most part, snow is plowed to the sides of roadways and edge of parking areas. As necessary, excess snow is removed from Main Street and deposited on an open

parcel of land adjacent to School Street. Salt and sand are stored outdoors adjacent to the DPW building.

8.4.5 Municipal Landscaped Areas Maintenance

Pesticides and fertilizers are used regularly on public landscaped areas, including school athletic fields. The Town contracts Robinson Landscaping for all mowing and landscaping. Only Town employees perform fertilizer and pesticide application. There are three Town employees certified to apply pesticide in accordance with the Town's Integrated Pesticide Management program. The DPW has reported an increase in the amount of fertilizer and pesticide applied to Town properties since the IPM program was implemented. DPW employees perform trimming and lawn cutting at the cemetery using mulching mowers. Grass clippings are not collected.

DPW staff collects trash from barrels located throughout the operated grounds of the public park areas and transfers it to large receptacles at each site where private contractors remove the waste.

There is no pet waste control ordinance, but there are signs at the cemetery requesting pet owners to remove pet waste from the grounds.

8.4.6 Solid Waste Removal and Handling

Solid wastes are brought to the transfer station in Southborough by residents for a $50 per year fee, or residents can hire private haulers to pick it up at their home. All wastes from the transfer station are hauled away by private haulers for appropriate disposal. There is also a recycling center at the transfer station, and residents with transfer station permits may bring their recyclables there

8.4.7 Hazardous Materials Handling and Storage

The Department of Public Works garage generates and controls a small portion of the municipal hazardous waste generated in Southborough due to the nature of facility operations, such as automotive fleet maintenance. New and waste fluids are stored indoors in protected containers (some with secondary measures such as basins for drum storage) or in lockable, fireproof storage closets.

The Fire Department is consulted regarding potentially hazardous conditions, spills or accidents.

The Town hosts a household hazardous waste day annually. This program is sponsored by the Board of Health. Residents may bring their approved household hazardous waste to the transfer station on the scheduled day only.

8.5 Implementation Alternatives

The Town of Southborough currently implements some of the elements of a successful operation and maintenance program. Critical to the success of this program will be defining specific responsibilities and a documented schedule for implemented controls. The following paragraphs describe ways to achieve compliance with the standards of the Pollution Prevention/Good Housekeeping minimum control measure.

1. Develop and implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system; and

While the Town of Southborough has incorporated some of the elements of a successful operation and maintenance program, this report offers several recommendations for the Town to consider upgrading the effectiveness of its current programs. These recommendations have been divided into each of the principal operation and maintenance functions provided by the Town.

a) Public Street and Parking Lot Sweeping

- Formally identify streets that will be swept more frequently and develop a schedule for sweeping those streets. This information can be included in the Town's GIS by adding routes as a data layer.

- Develop sweeping records to allow the sweeping program to be evaluated and determine specifically what streets should be swept more frequently and at what intervals. These records could simply consist of noting the dates that the street was swept and the approximate volume of sediment removed. This data could be used to determine if more frequent sweeping should be conducted on some streets and less frequent sweeping on others. This data could also be used and compared to sand application data to determine the effectiveness of the sweeping program. By incorporating routes as a data layer in the Town's GIS, the Town can more readily track information such as curb-miles swept, or even cubic yards/tons of material picked up. The Town could also determine if route adjustments would make the program more effective.

- Note areas that collect sediment or trash rapidly during sweeping operations as part of the record keeping process. These areas should then be further investigated to determine the source of the pollutants (e.g. erosion, poor waste handling operations, or construction activities).

- Enforce on-street parking bans or limit parking to one side of the street during the scheduled day of sweeping. Sweeping effectiveness can be significantly enhanced if the sweepers have access to the curb.

- Consider replacing older sweepers when they reach the end of their service life with newer vacuum assisted equipment to provide greater efficiency. Given the maintenance costs associated with this equipment, a cost/benefit analysis of this equipment replacement should be completed first.

- Consider implementing annual street sweeping in the fall as well to collect leaf litter and other debris that accumulates in the street gutter. If the Town wants to further consider this item, it is recommended that a pilot program be implemented on a few streets and records maintained to determine if this program would bring significant pollutant removal benefits as it has in other communities.

- Develop a training program for equipment operators to include operation of equipment to prevent pollution, record keeping and proper storage of sweepings.

b) Detention basin, catch basin and storm drain inspection and cleaning

- Establish a documented inspection and cleaning schedule that prioritizes areas based on potential pollution and flooding impacts. Consider linking this to the Town's GIS program.

- Maintain records of all cleaning and inspections for the town's storm sewer system to allow easy reference by street and to identify potential problem areas. Again, this information can be tracked in the Town's GIS.

- Develop a checklist for inspection procedures and a reporting mechanism to allow any necessary cleaning to be scheduled. Using sketches to map the storm sewer system may help with future maintenance and identify problem areas.

- Consider replacing or reconstructing catch basins, particularly in conjunction with roadway improvements, in problem areas. Also, affixing hoods at catch basin outlets in parking lots or roads where the risks of floatable pollutants entering the drainage system are greater may be appropriate if proper maintenance is feasible. Many of the catch basins in the Southborough system are old and do not meet today's standards that have been developed to trap sediments and floatables.

c) Fleet vehicle maintenance

- Develop procedures for spill prevention and cleanup procedures. Appropriate staff, including drivers and "first responders," should receive training in these procedures to both raise awareness as well as to minimize the potential for a spill to enter the MS4.

- As an interim measure, consider constructing a small retention area for vehicle wash waters at the DPW garage.

- Conduct a detailed annual inspection of the Public Works and School Department garages to identify potential pollution sources and take appropriate action to address the problem.

d) Winter road and lot maintenance

- Consider developing ways to reduce the amount of sand and salt used on roads and parking lots such as ensuring proper spreader calibration and using road temperature sensors to estimate an appropriate level of salt application. Also, records of salt use, meteorological conditions, and effectiveness could be maintained for areas where large of amounts of deicing salts have historically been used.

e) Municipal landscaped areas maintenance

- Provide signage that instructs users of public lands to remove their pets' waste.

- Continue to implement the Integrated Pest Management Program recommendations, particularly as it relates to sampling soils prior to fertilizer application.

f) Solid waste removal and handling

- Install signage along municipal open parcels of land where yard waste disposal and litter debris has been observed, such as the parcel adjacent to School Street, banning illegal dumping, warning potential polluters of mandatory fines, and providing an incident report telephone number.

- Conduct a survey of residents to determine their current practices to dispose of household hazardous wastes and waste oils and automotive fluids. This survey would determine whether public education of proper waste disposal should be enhanced as well as increase public awareness.

g) Hazardous materials handling and storage

- Post prominently displayed emergency action plans in areas where hazardous materials are used or stored in the event of spills or accidents.

- Provide easily accessible equipment or materials to properly minimize the impacts of spills. Also provide instructions on proper disposal of cleanup waste.

- Perform training and practice drills to reinforce proper emergency action and to determine weaknesses in current operations or to develop new BMPs.

- Conduct a detailed inspection of the Public Works and Fire Department garages to identify potential pollution sources and take appropriate action to address the problem.

9.0 PLAN SUMMARY/IMPLEMENTATION MEASURES

The Town of Southborough currently implements many of the elements of a successful Storm Water Management Program. In order to fully comply with the NPDES General Permit issued by MA DEP and USEPA, the Town must implement additional measures. Appendix K outlines those measures, the responsible parties, identifies measurable goals and provides a schedule for implementation over the five year permit term. The listed measures were identified through several workshops conducted with the Town's Storm Water Committee. Technical memorandums (TMs) were prepared for each of the six minimum control measures. At these workshops the TMs were reviewed and implementation alternatives were discussed. The following summarizes the implementation measures identified to be used to satisfy the NPDES General Permit requirements. Where possible, the measurable goals are identified as quantifiable measures. In other instances the measurable goals are presented as discrete activities. For these, the conduct of the activity is intended to serve as the goal.

10.0 PROGRAM EVALUATION

10.1 Revisions to Storm Water Management Program

The Town must annually evaluate the compliance of its storm water management program with the conditions of the general permit. The evaluation must consider the appropriateness of the selected BMPs in efforts towards achieving the defined measurable goals. The storm water management program and associated plan may be changed in accordance with the following provisions:

- Changes adding (but not subtracting or replacing) components, controls or requirements to the Plan may be made at any time upon written notification to EPA and MADEP,
- Changes replacing an ineffective or infeasible BMP specifically identified in the Plan with an alternative BMP may be requested at any time.

Unless denied, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented 60 days from submittal of the request. If the request is denied, EPA will send the Town a written explanation of the denial. Storm water management program revision requests must include the following information:

- An analysis of why the BMP is ineffective or infeasible (including cost prohibitive),
- Expectations on the effectiveness of the replacement BMP, and
- An analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced.

Revision requests or notifications must be in writing and signed in accordance with the signatory requirements of 40 CFR 122.22.

EPA or MADEP may require changes to the Plan as needed to:

- Address impacts on receiving water quality caused or contributed to by discharges from the MS4,
- To include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements, or
- To include such other conditions deemed necessary to comply with the goals and requirements of the Clean Water Act.

10.2 Annual Report

The Town must submit an annual report that summarizes information regarding storm water management activities during the previous calendar year and planned activities for the upcoming year. The initial report is due one year from the effective date of the general permit and annually thereafter. Provided at Appendix I is a template for annual reporting. Reports should be submitted to both EPA and MADEP at the following addresses:

United States Environmental Protection Agency
Water Technical Unit
P.O. Box 8127
Boston, MA 02114

and

Massachusetts Department of Environmental Protection
Division of Watershed Management
627 Main Street
Worcester, Massachusetts 01608

The following information must be contained in the annual report:

- A self assessment review of compliance with the permit conditions,
- An assessment of the appropriateness of the selected BMPs,
- An assessment of the progress towards achieving the measurable goals,
- A summary of results of any information that has been collected and analyzed, including any type of data,
- A discussion of activities for the next reporting cycle,
- A discussion of any changes in identified BMPs or measurable goals,

- Reference any reliance on another entity for achieving any measurable goal.

10.3 Record Keeping

All records required by the general permit must be kept for a period of three years. Records include information used in the development of the storm water management program, any monitoring, copies of reports, and all data used in the development of the notice of intent.

Records need to be submitted to EPA or MADEP only when specifically requested by the permitting authority. The Town must make this plan and records relating to the general permit available to the public.

11.0 ENDANGERED SPECIES

To be eligible for coverage under the Phase II general permit, storm water discharges from the Town's regulated MS4 cannot jeopardize the continued existence of any species that are listed as endangered or threatened under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA ("critical habitat"). Based on correspondence with the Massachusetts Division of Fisheries and Wildlife (Appendix J), there are no endangered or threatened species or critical habitat in close proximity to the regulated MS4 or the point where authorized discharges reach the receiving waters.

12.0 HISTORIC PLACES

To be eligible for coverage under the Phase II general permit, storm water discharges from the Town's regulated MS4 cannot adversely affect properties listed or eligible to be listed on the National Register of Historic Places. The Town must comply with the requirements of the National Historic Preservation Act and coordinate any necessary activities to avoid or minimize impacts. Based on correspondence with the Massachusetts Historical Commission (Appendix J), storm water discharges from the Town's regulated MS4 were determined not to adversely affect listed historic properties.

APPENDIX A

SUASCO STORM WATER COMMUNITY ASSISTANCE PROGRAM

SuAsCo Storm Water Community Assistance Program

Planning Year Product

January 31, 2003

Contractual Agreement and Implementation Notes

Contractual Agreement and Understanding

When implemented as described, the documents and materials prepared by the SuAsCo Watershed Community Council (WCC) under this Agreement are suitable for use in the Municipality's NPDES Phase II Storm Water Management Program. By accepting the materials in the SuAsCo Storm Water Phase II Community Assistance Program (SuAsCo Storm Water CAP), the Municipality agrees to distribute and use them only within its municipal boundaries, with the exception of sharing them with regulatory agencies.

Any modifications or additions to the SuAsCo Storm Water CAP made by the Municipality will be the sole responsibility of the Municipality to implement.

In participating in this Agreement and the SuAsCo Storm Water CAP, it is understood that although the SuAsCo WCC is partnering with the Municipality on its NPDES Phase II Storm Water Management Program, compliance with the permit conditions of the NPDES Phase II Storm Water regulatory program is solely the responsibility of the Municipality.

The terms of this agreement involve an annual subscription to the SuAsCo Storm Water CAP. Annual invoices will be sent out by the SuAsCo WCC in the spring of each year for the next five years.

Implementation Notes to Municipality

This five-year storm water management program plan covers control measures: #1 "Public Education & Outreach" and #2 "Public Involvement & Participation". (Some information may also be helpful with other control measures, but the purpose of this program is to fulfill control measures #1 and #2.)

The SuAsCo Storm Water CAP education and participation materials created over the five-year storm water management program will focus on storm water from a watershed perspective and will recognize that a municipality may be in more than one watershed.

You will need to combine the electronic version of the SuAsCo Storm Water CAP plan on the enclosed CD-ROM (file name: SWMP#1,2) with your NPDES Phase II Storm Water Management Program Plan for the other four control measures to create a complete storm water management program plan for your municipality. Information also is provided on the CD-ROM (file name: NOI#1,2) to help simplify the process of filling out the Notice of Intent form for these two minimum control measures. The CD-ROM files are in Microsoft word. Some hints are listed below to assist you in this process.

Instructions for customizing the SuAsCo Storm Water CAP to your community:

To customize the program plan for public education & outreach and public participation & involvement to your municipality, do a global search and replace for " the municipality" and replace "the municipality" with "**the name of your municipality**".

Under “Responsible Party” in every section where it presently reads “municipality”, you **must** replace the word “municipality” with the name of the person or department in the municipality who will make sure that the control measure is implemented.

Tips for integrating the SuAsCo Storm Water CAP into your community’s final storm water management program:

The program plan for control measures #1 and #2 is complete and ready for inclusion in your storm water management program. Simply copy the text of the file “SWMP#1,2” and paste it into the appropriate sections of your storm water management program plan.

You may also wish to add community-specific material by inserting it before, within, or after the existing text. Activities already happening in your community, such as stream team surveys or hazardous waste collection days, are appropriate for inclusion. Such an addition, however, is **optional**, as the SuAsCo Storm Water CAP activities, if implemented as proposed, adequately meet the regulatory requirements.

You may edit this program plan to add in additional annual BMP outreach & education and participation & involvement activities. However, please note that you are solely responsible for carrying out any changes you make to the SuAsCo Storm Water CAP.

Opportunity for public comment on the municipal storm water management program and public notice of that opportunity is a required element of the NPDES Phase II program. Therefore, you should plan to present your five-year storm water management program to the public before submitting your Notice of Intent. You can do so by presenting your storm water management program at a public meeting for which public notice has been given, such as at a meeting of a municipal board, such as the Board of Selectmen or the City Council. According to the NPDES Phase II draft general permit, an opportunity must be provided “for the public to participate in the development, implementation and review of the storm water management program” and “all public involvement activities must comply with state public notice requirements at MGL Chapter 39 Section 23B.”

Please send a copy of your final storm water management program to the SuAsCo WCC. Having your program plan in our records will better enable us to serve your needs.

SuAsCo Storm Water Community Assistance Program

Planning Year Product

January 31, 2003

5-Year Storm Water Management Program Plan

SuAsCo Storm Water Phase II Community Assistance Program

5-Year Storm Water Management Program Plan

January 31, 2003

SuAsCo Storm Water Phase II Community Assistance Program Description

The SuAsCo Watershed Community Council (WCC) has developed the "SuAsCo Storm Water Phase II Community Assistance Program (SuAsCo Storm Water CAP)" to aid municipalities in their compliance with two of the six storm water control measures, specifically minimum control measure #1: "Public Education & Outreach" and minimum control measure #2: "Public Involvement & Participation". The SuAsCo WCC is providing contracted communities with a 5-year storm water management program plan for the public education & outreach and public involvement & participation control measures, as well as assistance with the Notice of Intent language on this portion of their permit. Municipalities annually contracting with the SuAsCo WCC's storm water service will receive yearly education & outreach and involvement & participation materials to implement in their community.

The SuAsCo Storm Water CAP provides a uniform and consistent approach to storm water education from a watershed perspective. Because municipal boundaries do not align with watershed boundaries, the materials created in this program will recognize that a municipality may be in more than one watershed. The SuAsCo Storm Water CAP materials and activities and can be applied in all watersheds.

The SuAsCo Storm Water CAP materials developed under this Program will feature a unique "storm water logo" that will help the public to identify with the concept of storm water. The storm water logo will be simple and uniquely identifiable, instituting an effect of concept recognition similar to the well-known three-arrowed recycle logo.

The five years of education & outreach and involvement & participation materials and activities developed under this Program are intended to build upon themselves, instilling in the community a momentum of increased understanding and recognition of storm water issues. Although created for a particular permit year, these materials and activities may be used over and over again as appropriate.

A team of diverse watershed professionals including consultants, municipal officials, state agency staff, teachers, and interested citizens are creating the SuAsCo Storm Water CAP education & outreach and involvement & participation materials and activities. The watershed citizenry will benefit from the breadth and excellence of the program materials and the uniformity of the storm water education message. In turn, this greater awareness and involvement by the populace will lead to changes in behavior and decision-making that will translate into improved water quality.

Responsible Party: SuAsCo Watershed Community Council Description

The SuAsCo Watershed Community Council (WCC) is a unique non-profit corporation. It brings diverse interest groups together – **businesses, municipal officials, environmental organizations, and state and federal government** - to collaborate on environmental issues in the Sudbury-Assabet-Concord River (SuAsCo) Watershed. The SuAsCo WCC is modeled after the philosophy of the Massachusetts Watershed Initiative. The Council concept is viewed by the Commonwealth and the nation as a model for how to identify, prioritize, and implement solutions to watershed issues through collaboration.

The SuAsCo WCC is organized into a Steering Committee, Executive Committee and Task Forces. The **Steering Committee** provides a policy voice for the watershed. The Steering Committee representatives are nominated to ensure a balanced representation of the four interest groups: business and industry; municipal government; environmental organizations; and state, federal, regional government and the Legislature. A balanced subset of the Steering Committee is elected to serve on the **Executive Committee** (Board of Directors) to manage the administrative affairs of the SuAsCo WCC. The **Task Forces** are composed of Steering Committee members and other volunteers for the purpose of carrying out specific action plans on key issues in the watershed. To date, the SuAsCo WCC has sponsored four Task Forces: Water Quality and Quantity; Biodiversity; Land Use and Open Space; and Outreach and Education. The Water Quality and Quantity Task Force is the team working on the SuAsCo Storm Water CAP.

The Annual SuAsCo River Visions Forum will be used as a venue for furthering storm water education & outreach and involvement & participation. The Forum is typically held between March and May on either a Saturday or a weekday evening at a location within the SuAsCo Watershed. The River Visions Forum attracts a large and diverse audience and receives considerable media attention. The Forum agenda typically includes a keynote speaker, workshops on a variety of topics, a "state-of-the-watershed" panel, an awards presentation, and exhibitor tables.

Mission Statement of the SuAsCo WCC

The mission of the SuAsCo WCC is "to build a community-based alliance that promotes the sustainable economic and environmental well-being of the SuAsCo Watershed. The alliance is working together to:

- protect the natural resources of the SuAsCo Watershed,
- restore water quality and flow,
- coordinate land use and water resource planning across community boundaries,
- encourage stewardship of the recreational and historic character of the watershed,
- foster cooperation among divergent interest groups,
- promote education on watershed challenges, assets, and opportunities, and
- channel financial and technical assistance to creatively solve identified problems."

SuAsCo WCC Contact Information:

Address: Suite 500
2 Clock Tower Place
Maynard, MA 01754
Phone: 978-461-0735
Fax: 978-461-0322
E-mail: suasco@compuserve.com
Website: www.suasco.org
Contact person: Nancy A. Bryant, Executive Director

Permit Year # 1: March 2003-March 2004

Control Measure # 1: Public Education and Outreach

Best Management Practice: Send out Storm Water Flyer to Community Residents

BMP Description: A storm water flyer will be sent to residents in the community during year #1. The flyer will cover topics such as pesticide and herbicide use in lawns and gardens, water conservation practices, pet waste management, trash management, car washing, and proper disposal of household hazardous wastes including motor oil. In a user-friendly and appealing manner, the flyer will explain what storm water is and will frame storm water concerns from a watershed perspective. The flyer is meant to be both an educational and motivational tool, increasing public awareness of storm water and empowering citizens regarding their influence on storm water quality and flow.

The flyer will include a storm water awareness survey that citizens can tear-off and submit to the municipality for compilation. The tear-off survey can be returned at the storm water display (see Permit Year #1, Control Measure #2), through the mail to a storm water municipal official, or by some other means. The purpose of the survey is to establish a baseline on general awareness of storm water issues in the municipality.

Primary Audience: homeowners and general public

Measurable Goal:

- ✓ flyer distributed to a minimum of 75% of residents
- ✓ compiled and considered municipal and multi-watershed-wide "survey" results

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the text and layout of the flyer. The SuAsCo WCC will provide a master hard copy and an electronic copy of the flyer to the municipality. The SuAsCo WCC will also post a generic version of the flyer on its website.

The municipality will duplicate the flyer and distribute the flyer to residents. Implementation strategies for distribution of the flyer include sending it as a water or utility bill insert, sending it with property tax bills, sending it home via school children, posting flyers in strategic places around the community, or by some other means.

Timeline: The flyer will be distributed in the Fall of 2003. Survey results will be compiled by February of 2004.

Annual Evaluation: The SuAsCo WCC will provide a master tabulation form to the municipality for compiling the results of returned flyer surveys. The municipality will compile survey results on the tabulation form and provide the completed tabulation form to

the SuAsCo WCC. The SuAsCo WCC will compile the survey results from all of the municipalities into a multi-watershed-wide survey summary that it will provide to the municipality. The municipality may use these survey results as a baseline from which to gauge the effectiveness of its storm water education and participation program.

The SuAsCo WCC will prepare an annual summary on the education and outreach BMP for permit year #1, the storm water flyer for community residents. The municipality will revise this summary to reflect its community-specific experience with the storm water flyer for residents.

Permit Year # 1: March 2003-March 2004

Control Measure # 2: Public Involvement and Participation

Best Management Practice: Circulate Storm Water Traveling Display in Community

BMP Description: The Storm Water Traveling Display is a portable folding display board that can be located at various locations in the community, such as the municipal building, public library, schools, post office, and at community events. The display will have a professional, attractive appearance that is eye-catching and appealing. The display can be conveniently placed on a table in a visible and central location frequented by the general public. Extra storm water flyers will be posted with the display along with a collection box for the citizen storm water survey.

Similar to the flyer, the display will explain what storm water is and will frame storm water concerns from a watershed perspective. The display will present practical ideas for how citizens can manage housekeeping practices so as to have a positive impact on storm water. Such practices may include pesticide and herbicide use on lawns and gardens, water conservation, pet waste management, trash management, car washing, and proper disposal of household hazardous wastes including motor oil. The display is meant to be both an educational and motivational tool, increasing public awareness of storm water and empowering citizens regarding their influence on storm water quality and flow.

Primary Audience: homeowners and general public

Measurable Goals:

- ✓ storm water display circulates around the community for a minimum of 3 months in permit year #1
- ✓ storm water display is posted at a minimum of 3 different public locations in the community in permit year #1
- ✓ storm water display is also used in future permit years for posting in public places or at storm water events

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the text and layout of the storm water traveling display. The SuAsCo WCC will provide one completely prepared folding display board to the municipality in the Fall of 2003.

The municipality will comply with the state public notice requirements at MGL Chapter 39 Section 23B in implementing this BMP. The municipality will identify and arrange for display locations, such as the municipal building, public library, schools, post office and specific community events. The municipality will rotate the display around the community by transporting it and posting it in these identified public places. Periodically, the municipality will check the display integrity, replenish the flyers, and collect the surveys.

Timeline: The storm water traveling display will be exhibited during the period from the Fall of 2003 through March of 2004.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the involvement and participation BMP for permit year #1, the storm water traveling display. The municipality will revise this summary to reflect their community-specific experience with the storm water traveling display.

Permit Year # 2: March 2004-March 2005

Control Measure # 1: Public Education and Outreach

Best Management Practice: Teach Storm Water Lesson Plan to 5th Grade Students

BMP Description: The lesson plan for the fifth grade level will be straightforward, self-explanatory and easy to teach. It will be a stand-alone lesson plan that can be readily fit into the curriculum. The lesson plan will consist of a few simple teaching exercises and worksheets. The lesson plan will cover: what is a watershed (including a map), what is storm water, why storm water is a concern, what students can do to lessen their impacts on storm water, and a reminder of the poster contest (see Permit Year #2, Control Measure #2).

Primary Audience: fifth grade school students and the general public

Measurable Goals:

- ✓ develop and distribute lesson plan to implement at the Grade 5 level
- ✓ lesson plan is taught in one or more Grade 5 classrooms in the community

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the text of the lesson plan and accompanying worksheets. The SuAsCo WCC will provide a master copy of the lesson plan and worksheets in hard copy and electronic copy to the municipality.

At River Visions 2004, the SuAsCo WCC will host a workshop for teachers to familiarize them with the storm water lesson plan. Attendance at the workshop will be optional as it will enhance but not be necessary to the effective instruction of the lesson plan.

The municipality will duplicate and distribute the lesson plan packets to the fifth grade teachers, recommending implementation.

Teachers may elect to combine the lesson plan with similar subject matter, such as activities from Project WET or Project WILD. Teachers may also expand on the lesson plan by combining it with field trips, or by inviting appropriate speakers such as from a state agency, from the municipality or from a local Stream Team. Teachers will encourage students to participate in the storm water poster contest.

Timeline: The lesson plan will be provided to the municipality in the spring of 2004. The lesson plan will be taught in the Fall of 2004.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the education and outreach BMP for permit year #2, the storm water lesson plan. The municipality will

revise this summary to reflect their community-specific experience with the storm water lesson plan.

Permit Year # 2: March 2004-March 2005

Control Measure # 2: Public Involvement and Participation

Best Management Practice: Hold a Storm Water Poster Contest for 5th Grade Students

BMP Description: The Storm Water Poster Contest will engage fifth grade students in understanding storm water and creatively depicting their knowledge through a poster medium. The general public will also be involved in the poster contest through parent interaction with the students, the creation of a panel of judges, and display of the posters in public locations.

Primary Audience: fifth grade school students and the general public

Measurable Goals:

- ✓ poster contest is held and entries are received, judged and displayed

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the poster contest rules and will provide the rules in the fifth grade lesson plans. The contest rules also will be posted on the SuAsCo WCC website.

The municipality will comply with the state public notice requirements at MGL Chapter 39 Section 23B in implementing this BMP.

Municipalities are encouraged to offer prizes as an incentive for students to enter the poster contest.

Poster entries will be submitted to the municipality by the end of January. The municipality will nominate a panel of judges for the poster contest. Poster winners will be declared in February. The municipalities may display all poster entries in a variety of locations such as at the schools, public library, or municipal buildings. The first place winner for a municipality will be submitted to the SuAsCo WCC multi-watershed-wide contest.

In an open forum, the SuAsCo WCC will judge from among the municipal winners to determine watershed winners. Note that only entries from municipalities that have subscribed to the SuAsCo storm water program will be accepted into the contest. The watershed winners will be posted on the SuAsCo WCC website. The SuAsCo WCC also will display, and possibly award, the first place municipal winners and watershed winners at the River Visions 2005 Forum.

The SuAsCo WCC and the municipality may use the poster entries for future outreach and education materials and events.

Timeline: The SuAsCo WCC will provide poster contest rules to the municipality by the Fall of 2004. The deadline for receipt of poster entries will be by the end of January of 2005. Poster entries will be displayed and judged in February of 2005. The first place winner in each municipality may be displayed and recognized at the River Visions 2005 Forum.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the involvement and participation BMP for permit year #2, the storm water poster contest. The municipality will revise this summary to reflect their community-specific experience with the storm water poster contest.

Permit Year # 3: March 2005-March 2006

Control Measure # 1: Public Education and Outreach

Best Management Practice: Send out Storm Water Flyer to Community Businesses

BMP Description: A storm water flyer will be sent to businesses in the community during permit year #3. The flyer will explain what storm water is and will frame storm water concerns from a watershed perspective. The flyer will discuss potential impacts by businesses on storm water quality and flow. The flyer is meant to be both an educational and motivational tool, increasing awareness of storm water in the business community and challenging businesses to take steps towards storm water quality improvements in their own business practices. The storm water flyer will include a self-test for businesses to grade their own storm water "compliance". Businesses that deem themselves "storm water aware and participatory", i.e. compliant with good storm water practices according to the self-test, will be given a decal sticker of the storm water logo to display in their establishment for the general public to see. Storm water "participatory measures" may include improved housekeeping in parking areas, litter management in loading docks, restaurant installation and maintenance of grease traps, stores carrying and promoting environmentally friendly products, employee training and other similar activities.

Primary audience: businesses and the general public

Measurable Goals:

- ✓ flyer distributed to a minimum of 50% of businesses in municipality such as auto shops and gas stations, commercial and retail operations with parking lots, lawn care companies, restaurants, construction and development companies
- ✓ storm water logo displayed by half of the businesses receiving the flyer

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the text and layout of the flyer. The SuAsCo WCC will provide a master hard copy and an electronic copy of the flyer to the municipality. The SuAsCo WCC will provide a master hard copy and electronic copy of the storm water decal to the municipality for reproduction, or it may provide a set number of already produced decal stickers to the municipality.

The municipality will duplicate and distribute the flyer to pre-selected or to all businesses in the community, depending on the means of distribution chosen. Implementation strategies for distribution of the flyer include sending it as a water or utility bill insert, sending it with commercial property tax bills, or distributing it through the local Chamber of Commerce.

The municipality will duplicate as necessary and distribute the decal to businesses. The decal may be mailed directly with the flyer or it may be distributed in response to a business' completion and submission of the flyer self test.

The municipality may organize a junior achievement group, student honor society, scouts troop, or senior citizen organization to follow up with businesses to assess their storm water compliance and confirm that they are displaying their storm water decal.

Timeline: The flyer will be distributed in the Fall of 2005. The percentage of businesses displaying decals will be assessed by February of 2006.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the education and outreach BMP for permit year #3, the storm water flyer for community businesses. The municipality will revise this summary to reflect their community-specific experience with the storm water flyer for businesses.

Permit Year # 3: March 2005-March 2006

Control Measure # 2: Public Involvement and Participation

Best Management Practice: Hold Storm Water Photo Contest for High School Students

BMP Description: The Storm Water Photo Contest will engage high school students in understanding storm water, its effect on water quality, and good storm water management strategies. The photo contest will challenge high school students to creatively depict their knowledge through a photographic medium. The general public will also be involved in the photo contest through parent interaction with the students, the creation of a panel of judges, and display of the photographs in a public location.

Primary audience: high school students and the general public

Measurable Goals:

- ✓ photo contest is held and entries are received, judged and displayed

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will create the photography contest rules and will provide the rules to the municipality. The contest rules will also be posted on the SuAsCo WCC Website.

The municipality will comply with the state public notice requirements at MGL Chapter 39 Section 23B in implementing this BMP. The municipality will pass the photography contest rules along to the high school and when applicable, to the high school cable studio.

Municipalities are encouraged to offer prizes as an incentive for students to enter the photo contest.

Photo contest entries will be submitted to the municipality by the end of January. The municipality will nominate a panel of judges for the photo contest. It is recommended that judges be selected from the businesses displaying their storm water decal. Photo winners will be declared in February. The municipalities may display all photo entries in a variety of locations such as at the high school, public library, or municipal buildings. The first place winner for a municipality will be submitted to the SuAsCo WCC multi-watershed-wide contest.

In an open forum, the SuAsCo WCC will judge from among the municipal winners to determine watershed winners. Note that only entries from municipalities that have subscribed to the SuAsCo storm water program will be accepted into the contest. The watershed winners will be posted on the SuAsCo WCC website. The SuAsCo WCC will display, and possibly award, the first place municipal winners and watershed winners at the River Visions 2006 Forum.

The SuAsCo WCC and the municipality may use the photo entries for future outreach and education materials and events.

Timeline: The SuAsCo WCC will provide photography contest rules to the municipality by the Fall of 2005. The deadline for receipt of photo entries will be by the end of January of 2006. Photo entries will be displayed and judged in February of 2006. The first place winner in each municipality may be displayed and recognized at the River Visions 2006 Forum.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the involvement and participation BMP for permit year #3, the storm water photo contest. The municipality will revise this summary to reflect their community-specific experience with the storm water photo contest.

Permit Year # 4: March 2006-March 2007

Control Measure # 1: Public Education and Outreach

Best Management Practice: Hold a Storm Water Media Campaign

BMP Description: The Storm Water Media Campaign will engage local news media (newspapers, radio stations, and cable stations) in raising public awareness about storm water. Media information packets and periodic press releases will be developed for use in the "campaign". The media information packet will explain general storm water issues and impacts, the NPDES Storm Water Phase II program, and the municipality's and the SuAsCo WCC's role in storm water management. The packet will also include examples of storm water program activities. The press releases will cover such topics as what is storm water, the municipality's 5-year storm water management program, the SuAsCo WCC's storm water education and involvement program, how the general public can help improve storm water quality and prevent polluted runoff, ongoing community and collaborative efforts to manage storm water, and the Storm Water Summit (see Permit Year #4, Control Measure #2).

Primary audience: general public

Measurable Goals:

- ✓ media information packet delivered to the local media
- ✓ 4 press releases generated and issued to local media and major media outlets

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will develop media kits and periodic storm water press releases. The SuAsCo WCC will provide the media kit and press releases to the municipality in hard copy and electronic copy.

The storm water contact in the municipality may edit the media information packet and storm water press releases as appropriate to include community-specific information and to include community contact names and phone numbers. The municipal storm water contact will forward the media information packet and completed press releases to the local press, availing of potential opportunities for more in-depth interviews by reporters. The municipal storm water contact will invite local officials, legislators, local reporters, radio announcers, and community access cable station managers to attend the Storm Water Summit (see Permit Year # 4, Control Measure # 2).

The SuAsCo WCC will also issue the storm water press releases to major newspapers, and will post the storm water press releases on the SuAsCo WCC website. A calendar of events and other information about storm water management will also be posted on the SuAsCo WCC website and will be updated regularly.

Timeline: The media information packet will be provided to the municipality in the spring or summer of 2006. Storm water press releases will be generated and issued to the media on approximately a quarterly basis through March of 2007.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the education and outreach BMP for permit year #4, the storm water media campaign. The municipality will revise this summary to reflect their community-specific experience with the storm water media campaign.

Permit Year # 4: March 2006-March 2007

Control Measure # 2: Public Involvement and Participation

Best Management Practice: Hold a Local Storm Water Summit

BMP Description: A "Storm Water Summit" will be held as a special event for the general public (residents and community businesses) to learn about and discuss storm water concerns. The Storm Water Summit will show case the municipality's storm water program and progress. The agenda will include guest speakers on topics such as the municipality's storm water program and good housekeeping practices that citizens and businesses can employ to reduce the pollutants in and volume of storm water. The summit may also be used as a forum to seek input on new or proposed bylaws that address pre- and post-construction site runoff. The summit will also provide citizens with an opportunity to raise concerns about storm water situations in their own neighborhoods.

The Storm Water Summit will run from two to three hours in duration as an early evening program, and may include refreshments, displays, videos, speakers, and demonstrations for the general public. The summit will actively involve residents and businesses in their municipal storm water program, giving them ideas that they can implement and soliciting their feedback on the municipal program. The poster contest and photo contest entries, as well as the traveling display, may be exhibited at the summit to help foster a sense of citizen ownership and community pride in the storm water program.

Primary Audience: general public

Measurable Goals:

- ✓ hold local or multi-community Storm Water Summit
- ✓ advertise to encourage Storm Water Summit community attendance

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will provide guidelines to the municipality for organizing the Storm Water Summit. The guidelines will address a recommended agenda, venue and guest speakers for the summit. The SuAsCo WCC will provide a speaker for the event. The SuAsCo WCC will assist with advertising the event by posting the summit in the SuAsCo e-mail calendar and on the SuAsCo WCC website.

The municipality will comply with the state public notice requirements at MGL Chapter 39 Section 23B in implementing this BMP. The municipality will plan and coordinate the summit logistics, establishing a date and location for the event, and lining up guest speakers and facilitators. The municipality will advertise the summit by issuing a public announcement and a press release. The municipality will invite the media to attend the event in order to generate follow-up coverage for a broader audience. Municipal officials in charge of the storm water program will attend and facilitate the event.

Municipalities are encouraged to collaborate with one another on hosting a multi-community storm water summit where feasible. Neighboring communities that share the same tributary or river segment within the watershed may find it practical to pool their resources in hosting one event together. A multi-community summit also has the advantage of creating a forum where communities can learn from one another.

Timeline: The local or multi-community Storm Water Summit will be held between September of 2006 and February of 2007.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the involvement and participation BMP for permit year #4, the local or multi-community storm water summit. The municipality will revise this summary to reflect their community-specific experience with the storm water summit.

Permit Year # 5: March 2007-March 2008

Control Measure # 1: Public Education and Outreach

Best Management Practice: Show a Storm Water Video on Local Cable Stations and at Local Meetings

BMP Description: A high-quality video about storm water will be shown to the general public at local meetings and through local cable stations. In a user-friendly and engaging manner, the video will explain what storm water is and will address how citizens can help improve storm water quality and flow.

Primary audience: general public

Measurable Goals:

- ✓ show storm water video at a minimum of one public meeting
- ✓ air storm water video at least once on local cable station

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies: The SuAsCo WCC will either create a storm water video, perhaps in collaboration with other entities such as high schools or other organizations, or the SuAsCo WCC will obtain a video from another source that it may distribute freely. The SuAsCo WCC will provide one master copy of the video to the municipality and one master copy to the local cable stations.

The municipality will feature the storm water video at selected events and meetings as appropriate. The municipality may also elect to share the video with local civic groups such as Rotary Clubs, potentially sending a municipal staff person to accompany the video as a guest speaker. The municipality will contact the local cable station to offer interview opportunities and local information that the cable station may use to enhance their airing of the video as a public education piece.

Timeline: The SuAsCo WCC will provide the storm water video to the municipality and the local cable station in the Spring of 2007. The video will be aired as feasible throughout the permit year both at municipal public meetings and on the local cable station.

Annual Evaluation: The SuAsCo WCC will prepare an annual summary on the education and outreach BMP for permit year #5, the storm water video. The municipality will revise this summary to reflect their community-specific experience with the storm water video.

Permit Year # 5: March 2007-March 2008

Control Measure # 2: Public Involvement and Participation

Best Management Practice: Participate in the SuAsCo Storm Water Super Summit and Conduct an Evaluation and Assessment of Public Awareness of Storm Water

BMP Description: The SuAsCo "Watershed-Wide Super Summit" will be held as part of the River Visions 2007 Forum. It will include speakers from agencies, businesses, and municipalities, providing a unique opportunity for communities to share information and exchange experiences about their storm water programs.

The Evaluation and Assessment will provide municipal citizens with a storm water "self-test" through which they can "grade" their own storm water knowledge. The purpose of the self-test will be to see how widely received the storm water program activities have been over the past four years and to gauge the public's familiarity with storm water concepts.

Primary audience: general public

Measurable Goals:

- ✓ municipal participation in the Storm Water Super Summit
- ✓ Storm Water Self Test distributed to a minimum of 75% of residents
- ✓ compiled and considered municipal and multi-watershed-wide "self test" results

Responsible Parties: SuAsCo Watershed Community Council (WCC), municipality

Implementation Strategies:

The SuAsCo WCC will coordinate and host a "Storm Water Super Summit" as part of the River Visions 2007 program. At the Super Summit, municipalities will share their communities' successes, goals, lessons learned, and measurable results. The Super Summit provides a unique opportunity for communities to share information and exchange experiences about their storm water programs. Speakers from agencies and organizations will also provide updates on the Phase II storm water program and the outlook for the next 5-year permit period. The SuAsCo WCC will issue two press releases before and after the River Visions 2007 Forum that will highlight the Storm Water Super Summit.

The municipality will comply with the state public notice requirements at MGL Chapter 39 Section 23B in implementing this BMP. The municipality will advertise the Storm Water Super Summit by issuing public notices, posting flyers in public locations, or by some other means. The municipality will send public officials to the Super Summit.

The SuAsCo WCC will create the text of the "self test" which may also list helpful resources. The SuAsCo WCC will provide a master hard copy and electronic copy of the self-test to the municipality.

The municipality will duplicate and distribute the "self test". Implementation strategies for distribution of the "self test" include sending it as a water or utility bill insert, sending it with property tax bills, sending it home via school children, posting it in strategic places around the community, giving out the self-test at public meetings such as an annual town meeting, posting it on the municipal website, airing it on local cable following the storm water video, or by some other means. Implementation strategies for collection of the "self test" include posting collection boxes in public places, combining it with a redeemable coupon to encourage return, returning it at hazardous waste collection days, or by some other means. Communities may want to offer an incentive or prize to encourage residents to return the "self test".

Timeline: The Storm Water Super Summit will be held in the spring of 2007. "Self tests" will be available throughout the permit year. "Self test" results will be compiled by the end of February of 2008.

Annual Evaluation: The SuAsCo WCC will provide a master tabulation form to the municipality for compiling the results of returned "self tests". The municipality will compile the "self test" results on the tabulation form and provide the completed tabulation form to the SuAsCo WCC. The SuAsCo WCC will compile the "self test" results from all of the municipalities into a multi-watershed-wide assessment of program outreach success. The SuAsCo WCC will provide the multi-watershed-wide assessment to the municipality.

The municipality may compare the self test results against the year # 1 survey results to gauge the effectiveness of its storm water education and participation program. The municipal and multi-watershed-wide "self test" results will be an important tool in evaluating the success of the 5-year program and designing the next 5-year program plan.

The SuAsCo WCC will prepare an annual summary on the involvement and participation BMP for permit year #5, the storm water evaluation and assessment and the Super Summit. The municipality will revise this summary to reflect their community-specific experience with the storm water evaluation and assessment and the Super Summit.

SuAsCo Storm Water Community Assistance Program

Planning Year Product

January 31, 2003

Information For Completing NOI Form BRP WM 08A

Information For Completing NOI Form BRP WM 08A

The numbering system used below identifies public education and outreach control measure BMPs by the permit year # and #1. The numbering system used below identifies public involvement and participation control measure BMPs by permit year # and #2. If you have adopted a different numbering system you may change this system accordingly.

Please follow the instructions for completion in italics below.

Storm Water Management Program (SWMP) Summary

1) To complete the Public Education and Public Participation sections of the Storm Water Management Program Summary of the NOI Form BRP WM 08A, simply copy the material below from the file "NOI#1,2" and insert it into the appropriate sections of your NOI Form.

*2) Under responsible party for each BMP, you **must** replace the word "municipality" with the name of the person or department in your municipality who will make sure that the control measure is implemented.*

Public Education and Outreach

BMP # (year - control measure): Best Management Practice; Responsible Parties; Measurable Goals

BMP 1-1: Storm Water Flyer to Community Residents; SuAsCo Watershed Community Council and municipality; flyer distributed to a minimum of 75% of residents, and compiled and considered municipal and multi-watershed-wide "survey" results

BMP 2-1: Storm Water Lesson Plan for Fifth Grade Students; SuAsCo Watershed Community Council and municipality; develop and distribute lesson plan to implement at the Grade 5 level, and lesson plan is taught in one or more Grade 5 classrooms in the community

BMP 3-1: Storm Water Flyer to Community Businesses; SuAsCo Watershed Community Council and municipality; flyer distributed to a minimum of 50% of businesses in municipality, and storm water logo displayed by half of the businesses receiving the flyer

BMP 4-1: Storm Water Media Campaign; SuAsCo Watershed Community Council and municipality; media information packet delivered to the local media, and 4 press releases generated and issued to local media and major media outlets

BMP 5-1: Storm Water Video; SuAsCo Watershed Community Council and municipality; show storm water video at a minimum of one public meeting, and air storm water video at least once on local cable station

Public Involvement and Participation

BMP #: Best Management Practice; Responsible Parties; Measurable Goals

BMP 1-2: Storm Water Traveling Display; SuAsCo Watershed Community Council and municipality; storm water display circulates around the community for a minimum of 3 months in permit year #1, and storm water display is posted at a minimum of 3 different public locations in the community in permit year #1, and storm water display is also used in future permit years for posting in public places or at storm water events

BMP 2-2: Storm Water Poster Contest for Fifth Grade Students; SuAsCo Watershed Community Council and municipality; poster contest is held and entries are received, judged and displayed

BMP 3-2: Storm Water Photo Contest for High School Students; SuAsCo Watershed Community Council and municipality; photo contest is held and entries are received, judged and displayed

BMP 4-2: Storm Water Summit Special Event; SuAsCo Watershed Community Council and municipality; hold local or multi-community Storm Water Summit and advertise to encourage community attendance

BMP 5-2: Participate in SuAsCo Storm Water Super Summit and Conduct an Evaluation and Assessment of Public Awareness of Storm Water; SuAsCo Watershed Community Council and municipality; municipal participation in the Storm Water Super Summit, and Storm Water Self Test distributed to a minimum of 75% of residents, and compiled and considered municipal and multi-watershed-wide "self test" results

SWMP Time Frames Chart

Fill in time frame chart as noted below.

Public Education and Outreach

BMP 1-1: straight line from Fall 03 through Winter 03-04

BMP 2-1: x for Spring 04 and x for Fall 04

BMP 3-1: straight line from Fall 05 through Winter 05-06

BMP 4-1: straight line from Spring 06 through Winter 06-07

BMP 5-1: straight line from Spring 07 through Winter 07-08

Public Involvement and Participation

BMP 1-2: straight line from Fall 03 through Winter 03-04

BMP 2-2: straight line for Fall 04 through Winter 04-05

BMP 3-2: straight line from Fall 05 through Winter 05-06

BMP 4-2: straight line from Fall 06 through Winter 06-07

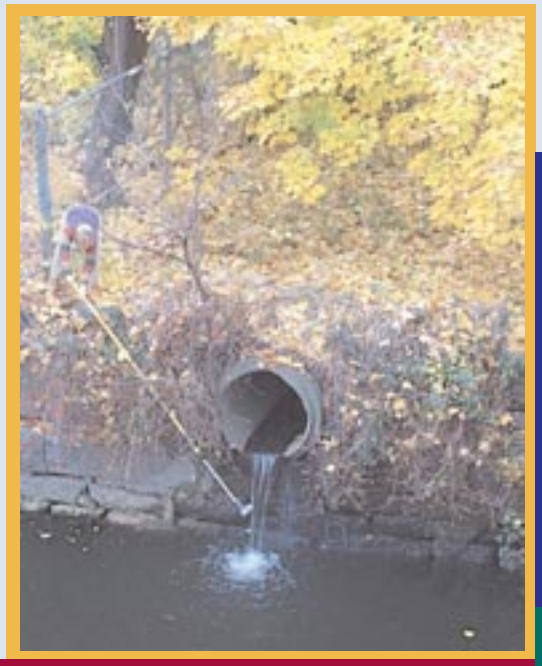
BMP 5-2: straight line from Spring 07 through Winter 07-08

APPENDIX B

NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION (NEIWPCC) MODEL ILLICIT DISCHARGE CONNECTION ORDINANCE

ILLICIT DISCHARGE DETECTION AND ELIMINATION MANUAL

A Handbook for Municipalities



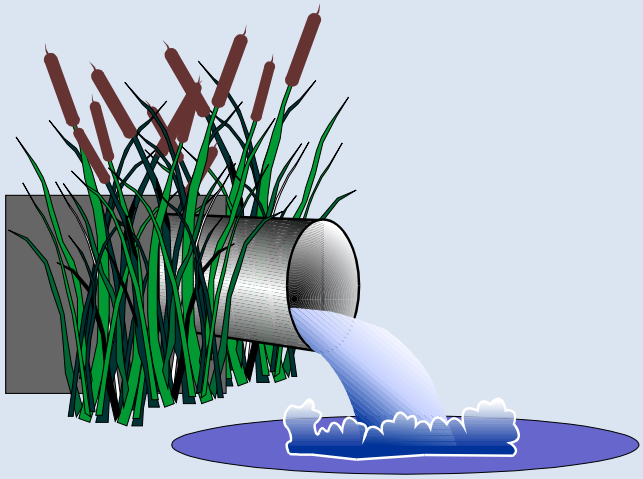
NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION

January 2003

This page is intentionally blank.

ILLICIT DISCHARGE DETECTION AND ELIMINATION MANUAL

A Handbook for Municipalities



Prepared by the

NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION

Boott Mills South

100 Foot of John Street

Lowell, Massachusetts 01852

Ronald F. Poltak, *Executive Director*

COMPACT MEMBER STATES

Connecticut
Maine
Massachusetts
New Hampshire
New York
Rhode Island
Vermont

Copies of this document may be downloaded from *www.neiwpcc.org.*

January 2003

ACKNOWLEDGEMENTS

This manual was developed by the New England Interstate Water Pollution Control Commission (NEIWPCC). NEIWPCC is a nonprofit interstate agency, established by an Act of Congress in 1947, that serves its member states (Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont) by providing coordination, public education, training, and leadership in the management and protection of water quality.

This project was initiated by NEIWPCC's Storm Water Workgroup, which is composed of state and federal environmental agency staff. The group perceived a need for resources to help municipalities in NEIWPCC-member states that are regulated under the U.S. Environmental Protection Agency's (EPA's) Phase II storm water program comply with regulatory requirements. This manual is intended to help municipalities develop illicit discharge detection and elimination programs—one of the six minimum control measures under Phase II.

This manual was made possible by a grant from the U.S. Environmental Protection Agency. The contents do not necessarily reflect the views and policies of EPA or NEIWPCC's member states, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.

This manual was compiled and written by Rebekah Lacey, with assistance from Kim Starbuck and other NEIWPCC staff. Editing, graphic design, and layout were performed by Ellen Frye and Ricki Pappo of ENOSIS. Thelma Murphy served as the EPA Project Officer. NEIWPCC would like to thank Andrea Donlon, NHDES, for her many contributions to this document, which included providing information, comments, and photographs—most of the photographs in the manual were either provided by Andrea or taken by NEIWPCC staff while accompanying Andrea on field work.

NEIWPCC would also like to thank the following people who contributed their time in providing information for and/or reviewing the manual:

Interviews or Other Information

Kathy Baskin, Charles River Watershed Association
Paul Barden, BWSC
Michael Cuneo, Town of Dedham, MA
Andrea Donlon, NHDES
Tim Grover, City of Winooski, VT
Charlie Jewell, BWSC
Natalie Landry, NHDES
Ginny Scarlet, MADEP

Review

Jeff Andrews, NHDES
Andrea Donlon, NHDES
Bryant Firmin, MADEP
Greg Goblick, RIDEM
Tim Grover, City of Winooski, VT
David Ladd, MEDEP
Steve Lipman, MADEP
Thomas Mahin, MADEP
Thelma Murphy, USEPA
Jim Pease, VTDEC
Ginny Scarlet, MADEP
Chris Stone, CTDEP

CONTENTS

ACRONYMS

BMP	Best Management Practice
BWSC	Boston Water and Sewer Commission
GIS	Geographic Information System
GPS	Global Positioning System
IDDE	Illicit Discharge Detection and Elimination
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NOV	Notice of Violation
SIC	Standard Industrial Classification

EPA	U.S. Environmental Protection Agency
CTDEP	Connecticut Department of Environmental Protection
MEDEP	Maine Department of Environmental Protection
MADEP	Massachusetts Department of Environmental Protection
NHDES	New Hampshire Department of Environmental Services
NYSDEC	New York State Department of Environmental Conservation
RIDEM	Rhode Island Department of Environmental Management
VTDEC	Vermont Department of Environmental Conservation

This page is intentionally blank.

INTRODUCTION

Although the quality of the nation's waters has improved greatly since the passage of the Clean Water Act in 1972, many water bodies are still impaired by pollution. According to the U.S. Environmental Protection Agency's (EPA's) 2000 National Water Quality Inventory, 39 percent of assessed river and stream miles, 46 percent of assessed lake acres, and 51 percent of assessed estuarine square miles do not meet water quality standards. The top causes of impairment include siltation, nutrients, bacteria, metals (primarily mercury), and oxygen-depleting substances. Polluted storm water runoff, including runoff from urban/suburban areas and construction sites, is a leading source of this impairment. To address this problem, EPA has put into place a program that regulates certain storm water discharges.

Polluted storm water runoff, including runoff from urban/suburban areas and construction sites, is a leading source of water quality impairment. To address this problem, EPA has put into place a program that regulates certain storm water discharges.

In 1990, EPA promulgated Phase I of its storm water program under the National Pollutant Discharge Elimination System (NPDES) permit provisions of the Clean Water Act. Phase I addressed storm water runoff from "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater, construction activity that would disturb five or more acres of land, and 10 categories of industrial activity. To further reduce the adverse effects of storm water runoff, EPA instituted its Storm Water Phase II Final Rule on December 8, 1999.

WHO ADMINISTERS THE PHASE II STORM WATER PROGRAM?

The Phase II storm water program is part of EPA's NPDES program, which in many states is delegated to state authorities to administer. Connecticut, Maine, New York, Rhode Island, and Vermont are authorized to serve as NPDES permitting authorities. EPA Region 1 serves as the permitting authority for Massachusetts and New Hampshire. EPA is also the permitting authority for all federally recognized Indian Country lands and for federal facilities in Massachusetts, New Hampshire, and Vermont.

WHAT IS REGULATED UNDER PHASE II?

Phase II regulates discharges from small MS4s located in "urbanized areas" (as delineated by the Census Bureau in the most recent census) and from additional small MS4s designated by the permitting authority. Phase II also regulates construction activities that would disturb between one and five acres of land. In addition, the Phase II Final Rule ends the temporary exemption from Phase I requirements for some municipally operated industrial activities[1] and revises the "no exposure" provision for Phase I-regulated industrial activities.

MS4s are typically operated by municipalities, but the Phase II definition of "municipal separate storm sewer systems" includes storm sewer systems owned or operated by other public bodies (e.g., states, counties, Indian tribes, departments of transportation, universities). EPA also notes that an MS4 is not always just a system of underground pipes; it can include roads with drainage systems, gutters, and ditches.

[1] This temporary exemption was provided by the Intermodal Surface Transportation Act (ISTEA) of 1991.

The rules for determining which small MS4s are regulated under Phase II are somewhat complex; MS4 operators should consult the NPDES permitting authority for their state to determine whether their MS4s are regulated. Note also that requirements may be different if a municipality is located only partially within an urbanized area.

WHERE DOES IDDE FIT IN?

EPA's Phase II rule specifies that permitting authorities must issue general permits for "automatically designated" small MS4s by December 9, 2002. The rule requires that operators of these automatically designated small MS4s apply for NPDES permit coverage within 90 days of permit issuance, and no later than March 10, 2003[2]. To obtain this coverage, an MS4 operator must develop, implement, and enforce a storm water management program that is designed to reduce the discharge of pollutants to the maximum extent practicable, protect water quality, and satisfy the applicable water quality requirements of the Clean Water Act. EPA's Storm Water Phase II Final Rule states that this storm water management program must include the following six minimum control measures:

- Public education and outreach on storm water impacts
- Public involvement and participation
- ➤ **Illicit discharge detection and elimination (IDDE)**
- Construction site storm water runoff control
- Post-construction storm water management in new development and redevelopment
- Pollution prevention and good housekeeping for municipal operations

As part of their applications for permit coverage, MS4 operators must identify the best management practices they will use to comply with each of the six minimum control measures and the measurable goals they have set for each measure.

ABOUT THIS MANUAL

This manual is intended to help municipalities in the New England states and New York develop illicit discharge detection and elimination (IDDE) programs required by EPA's Phase II storm water program. EPA's Phase II storm water regulations provide guidelines that are used by permitting authorities in writing their permits. This manual provides general information based on EPA's Phase II storm water regulations; it is important to consult the permitting authority in your state (see Chapter 10) to find out about state-specific requirements.

EPA's Phase II storm water regulations provide guidelines that are used by permitting authorities in writing their permits. This manual provides general information based on EPA's Phase II storm water regulations; it is important to consult the permitting authority in your state to find out about state-specific requirements.

Chapter 1 explains the IDDE requirement of EPA's Phase II regulations. Chapters 2 through 8 describe the required elements of an IDDE program and provide information to help municipalities execute each of these elements. Chapter 9 provides information on best management practices and measurable goals for IDDEs. Chapter 10 lists additional resources and contacts that may be helpful in developing an IDDE program.

[2] There are some exceptions to this deadline; contact the permitting authority in your state for up-to-date official information.

1 GETTING STARTED WITH YOUR IDDE PROGRAM

As you set out to develop your illicit discharge detection and elimination (IDDE) program, you will need to start by making sure that you know the answers to two key questions: (1) What is an illicit discharge? and (2) What are the required elements of an IDDE program? In this chapter we'll review the answers to these questions; we'll provide supporting information and details in subsequent chapters.

WHAT IS AN ILLICIT DISCHARGE?

The term "illicit discharge" is defined in EPA's Phase II storm water regulations as "any discharge to a municipal separate storm sewer that is not composed entirely of storm water, except discharges pursuant to an NPDES permit and discharges resulting from fire-fighting activities."

Illicit discharges can be categorized as either direct or indirect.

- Examples of direct illicit discharges:
  - sanitary wastewater piping that is directly connected from a home to the storm sewer
  - materials (e.g., used motor oil) that have been dumped illegally into a storm drain catch basin
  - a shop floor drain that is connected to the storm sewer
  - a cross-connection between the municipal sewer and storm sewer systems
- Examples of indirect illicit discharges:
  - an old and damaged sanitary sewer line that is leaking fluids into a cracked storm sewer line
  - a failing septic system that is leaking into a cracked storm sewer line or causing surface discharge into the storm sewer

Illicit discharge

Any discharge to a municipal separate storm sewer that is not composed entirely of storm water, except discharges pursuant to an NPDES permit and discharges resulting from fire-fighting activities.

WHAT ARE THE ELEMENTS OF AN IDDE PROGRAM?

EPA's Phase II regulations state that an IDDE program must incorporate the following four elements.

- Develop (if not already completed) a storm sewer system map showing the location of all outfalls, and the names and location of all waters of the United States that receive discharges from those outfalls.

NON-STORM WATER DISCHARGES THAT YOUR IDDE PROGRAM MAY NOT NEED TO ADDRESS

According to EPA's Phase II storm water regulations, an illicit discharge detection and elimination program need only address the following categories of non-storm water discharges if the operator of a small MS4 identifies them 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
- 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

- To the extent allowable under state, tribal, or local law, effectively prohibit through ordinance, or other regulatory mechanism, illicit discharges into the separate storm sewer system and implement appropriate enforcement procedures and actions as needed.
- Develop and implement a plan to detect and address illicit discharges, including illegal dumping, to the system.
- Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

For each of these mandatory elements, EPA suggests a variety of approaches that can help in creating a successful IDDE program. The mandatory elements and the suggested approaches will be discussed further in the next seven chapters.

REFERENCES: CHAPTER 1

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

USEPA. 2000. EPA Storm Water Phase II Final Rule Fact Sheet 2.5: *Illicit Discharge Detection and Elimination Minimum Control Measure.* EPA 833-F-00-007. January 2000. *http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm*

2 DEVELOPING A STORM SEWER MAP

The creation of a storm sewer map is the first mandatory element of an IDDE program. Phase II requires that the operator of a regulated MS4 develop a map of the MS4 that shows, at a minimum, the location of all outfalls and the names and locations of all waters of the United States that receive discharges from those outfalls. While many municipalities in the Northeast already have detailed maps of their storm sewer systems, others, typically those in older or more rural areas, have the information scattered in different locations. These municipalities will have the most work to do to comply with this requirement. If you need to develop a map, begin by collecting any existing information on outfall locations (e.g., review city records, drainage maps, storm drain maps, state or federal storm water permit files, state transportation maintenance maps), and then conduct field surveys to verify the locations.

CONDUCTING A FIELD SURVEY

A field survey of outfall locations will often be necessary to create a map or verify and update an existing map. The References section at the end of the chapter provides a Web link for a sample guide for conducting a storm drain mapping survey (MA DFWELE, 2002). Field outfall surveys generally include the following basic steps:

- Survey receiving waters on foot or by boat to look for all outfalls (i.e., wade small receiving waters or use a boat for larger receiving waters).
- Note the locations of outfalls on a map. The map scale should be such that outfalls can be located accurately.
- Assign a code or label to each outfall. Adopt a logical, easy-to-understand system (e.g., distance along the stream).
- Fill out a survey sheet for each outfall, noting characteristics such as dry weather discharge and deposits or stains.

MAPPING OPTIONS

For municipalities that do not already have a storm sewer map, it is important to determine the type of map (e.g., topographic, hand or computer drafted) that best fits your needs. Because there is no specific mapping standard in the Phase II rule, the goal of a mapping program should be functionality—find a way to map outfalls such that you

The goal of a mapping program should be functionality—find a way to map outfalls such that you (and the permitting authority) can locate any specific outfall to check on discharges.

CAN A DITCH BE AN OUTFALL?

The paragraph below is an excerpt from EPA's Storm Water Phase II Final Rule (USEPA, 1999).

The term "outfall" is defined in 40 CFR 122.26(b)(9) as "a point source at the point where a municipal separate storm sewer discharges to waters of the United States." The term "municipal separate storm sewer" is defined at 40 CFR 122.26(b)(8) as "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains)." Following the logic of these definitions, a "ditch" may be part of the municipal separate storm sewer, and at the point where the ditch discharges to waters of the United States, it is an outfall. As with any determination about jurisdictional provisions of the CWA, however, final decisions require case-specific evaluations of fact.

(and the permitting authority) can locate any specific outfall to check on discharges. The most basic way to meet the mapping requirement is to use an existing map (e.g., a topographic map) that shows receiving waters. You can then mark outfall locations on the map by hand (using existing information augmented by a field survey). Make sure the names of receiving waters are shown on the map; for receiving waters that don't have names, it is helpful to indicate the nearest named water body downstream. The graphic at the beginning of this chapter shows an example of a marked-up United States Geological Survey map (markings do not represent actual outfalls). The next step up is a more sophisticated paper map (e.g., blueprint-style). Figure 1 presents an example of a simple paper map showing outfalls and other key features of the storm sewer system.

In many municipalities, a paper map may be completely adequate for carrying out an IDDE program. However, if your MS4 has the resources, or if your municipality has a complex storm sewer system, you may want to make use of available computer technology in making your map.

Global Positioning System (GPS) technology can be used to obtain the coordinates (longitude and latitude) for each outfall. A GPS unit, which uses data from the U.S. Department of Defense's constellation of GPS satellites to constantly update position, can be carried with you on your field survey. A particular position can be recorded and later downloaded into a Geographic Information System (GIS) database. Using GIS, the coordinates can be linked with other site-specific information, such as a picture and history of the outfall. GPS units can be purchased or rented.

There are various computerized mapping programs. A GIS program (e.g., ArcGIS) combines a georeferenced database with mapping capability, so that different geographical attributes (e.g., streets, outfalls, land use, monitoring data) can be mapped as

"layers" and displayed either separately or together. AutoCAD®, a design/drafting platform, is another program commonly used for storm sewer mapping.

If you plan to map via computer, decide if you want to make the mapping system compatible with other departments within your municipality and/or with other data sources (e.g., state agencies that provide GIS layers). Since storm sewer systems are often constructed in roadways, the use of the GIS road line data layer can be helpful in developing a map. If this layer is available, it is usually very accurate and frequently updated by state or regional agencies. Local or regional planning commissions may be able to provide assistance with GIS technology and map development. Once a particular software system has been chosen, it is helpful to require developers to submit compatible electronic updates for subsequent development to ensure that the map and data remain current after the initial mapping effort is finished.

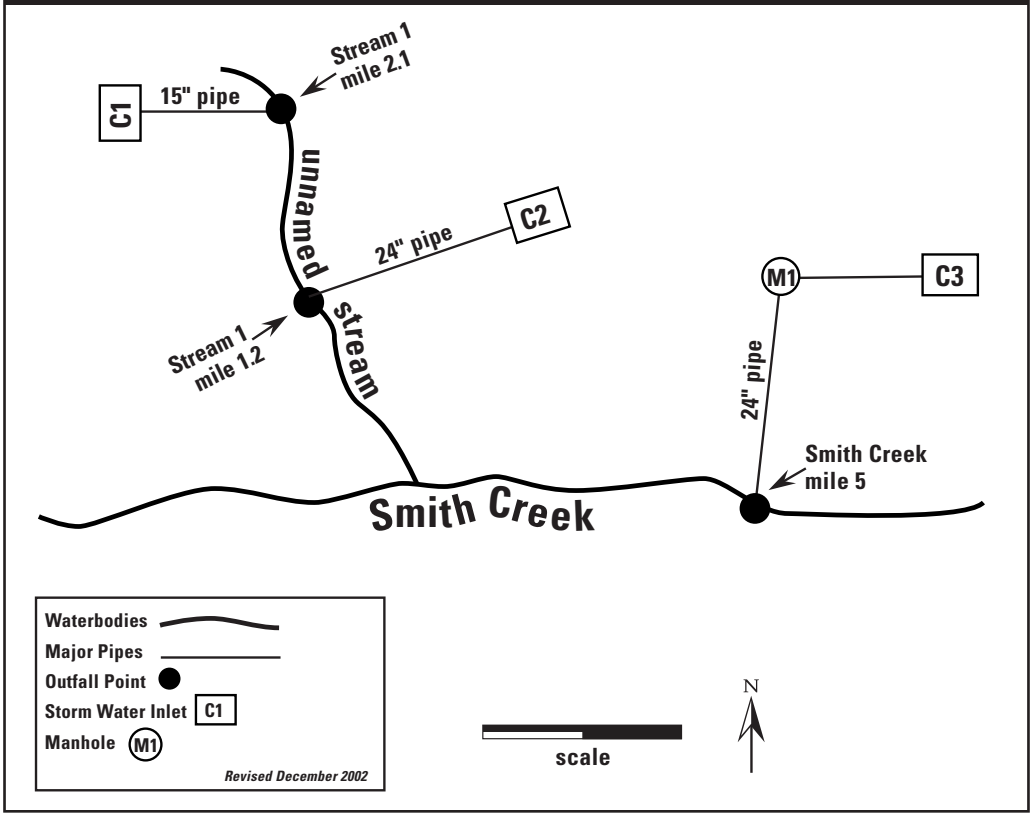
PRIORITIZING AREAS TO BE MAPPED

You may find that practical considerations will dictate the need to conduct mapping in phases. In this case, it is best to prioritize your mapping agenda. For example, older developed areas are more likely to have illicit discharges than newer areas for various reasons (e.g., many municipalities have imposed inspection requirements on new construction that help to prevent illegal connections). Therefore, if your community has limited resources, you would benefit from mapping the older areas first to ensure that priority areas are mapped.

You may find that practical considerations will dictate the need to conduct mapping in phases. In this case, it is best to prioritize your mapping agenda.

Other considerations in setting mapping priorities include land uses, reports of illicit discharges, and other information specific to each MS4. Although EPA's Phase II regulations require that only outfalls be mapped, once an illicit discharge is detected at an outfall, it may be necessary to map the portion of the storm sewer system leading to the outfall so that you are able to locate the source of the discharge. If possible, mapping the entire storm sewer system may prove very helpful to your IDDE program.

Figure 1 SAMPLE MAP



REFERENCES: CHAPTER 2

Colorado Department of Public Health and Environment, Water Quality Control Division. 2001. *Colorado's Phase II Municipal Guidance: A guide to application requirements and program development for coverage under Colorado's Phase II municipal stormwater discharge permit.* *http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html*

Massachusetts Division of Fisheries, Wildlife, and Environmental Law Enforcement. 2002. *Storm Drain Mapping Project Field Manual* (Draft). *http://www.state.ma.us/dfwele/River/pdf/rivstormdrainmanual.pdf*

Oakland County, Michigan. 2002. *Illicit Discharge Elimination Program.* *http://www.co.oakland.mi.us/drain/program_service/illicit_disch.html*

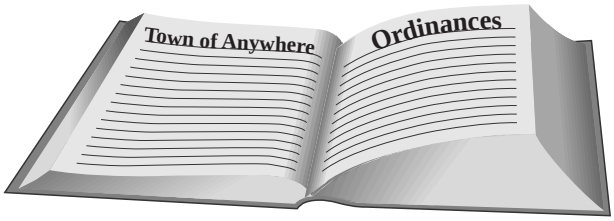
Pitt, R., M. Lalor, R. Field, D.D. Adrian, and D. Barbe. 1993. *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide.* USEPA Office of Research and Development. EPA/600/R-92/238. *http://www.epa.gov/clariton*

Rohrer, C.A., and Beckley, R.J. Undated. *Using GIS Tools to Implement an Illicit Discharge Elimination Program in Livonia, Michigan.* Rouge River Demonstration Project. *http://www.rougeriver.com/proddata*

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

3 PROHIBITING ILLICIT DISCHARGES

The second mandatory element of a Phase II IDDE program requires that MS4 operators "to the extent allowable under State, Tribal, or local law, effectively prohibit through ordinance, or other regulatory mechanism, illicit discharges into the separate storm sewer system and implement appropriate enforcement procedures and actions as needed."



ILLICIT DISCHARGE ORDINANCES

As EPA's guidance specifies, a municipal ordinance created to comply with Phase II regulations must include a *prohibition* of illicit discharges and an *enforcement* mechanism. Note that it is also essential for the municipality to establish legal authority to inspect properties suspected of releasing contaminated discharges into the storm sewer system. Your municipality may already have a sewer use ordinance or similar bylaw that meets Phase II requirements, or that can be amended to meet the requirements. Consult with your town counsel and other municipal authorities to review your town's existing bylaws and regulations and determine what changes or additions are needed and what the procedure is for making those changes. If you need to make changes, you may want to review the model bylaws and other guidance discussed below.

EPA's nonpoint source pollution program Web site offers several examples of local ordinances for illicit discharges (USEPA, 2002). Appendix A of this manual presents EPA's general model ordinance, which synthesizes a number of existing municipal ordinances. In using any of these ordinances as a model, a community should take into account the legal authority granted to it under state law, the Phase II permit requirements in that state, the enforcement methods it deems appropriate, and any other locality-specific considerations.

A municipal ordinance created to comply with Phase II regulations must include a* prohibition *of illicit discharges and an* enforcement *mechanism.

A workgroup chaired by Massachusetts Department of Environmental Protection (MADEP) staff has been working on developing model bylaws that municipalities in the state can use to help them comply with Phase II regulations. The products of this group's work (model bylaws and associated guidance) are expected to be available on the MADEP Web site (see Chapter 10) by the time this manual is published. This group found that many of the available model ordinances did not fit well with the structure of Massachusetts government and, therefore, developed models that would work for towns in the state. The group also found that entry onto private property can be a tricky legal issue and should be treated carefully in any new or amended bylaws.

The Boston Water and Sewer Commission's (BWSC's) *Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains* are available on the Web (*http://*www.bwsc.org; click on "Engineering" then "Regulations") and may serve as a useful local model. The regulations specify certain conditions under which BWSC

representatives must be granted access to property; denial of access may lead to termination of water service.

Note that illicit discharges to *storm* sewers should be addressed hand-in-hand with the issue of illegal connections of extraneous water to *sanitary* sewers (typically referred to as infiltration/inflow or I/I programs); bylaws or regulations should make clear which discharges belong in which system.

REFERENCES: CHAPTER 3

BWSC. 2002. *Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains.* *http://www.bwsc.org*

Personal communication from Ginny Scarlet, MADEP, November 29, 2002.

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851.

USEPA. 2002. *Model Ordinances to Protect Local Resources: Illicit Discharges.* *http://www.epa.gov/owow/nps/ordinance/discharges.htm*

4 DEVELOPING AND IMPLEMENTING AN IDDE PLAN: LOCATING PRIORITY AREAS

Developing and implementing a plan to detect and address illicit discharges is the third mandatory element of a Phase II IDDE program. EPA recommends that the plan include the following four components: locating priority areas; tracing the source of an illicit discharge; removing the source of an illicit discharge; and program evaluation and assessment. The first component, locating priority areas, is the subject of this chapter. Each of the other three components will be discussed in chapters five, six, and seven respectively.

THE IDDE PLAN

- ➤ **Locating priority areas**
- **Tracing the source of an illicit discharge**
- **Removing the source of an illicit discharge**
- **Program evaluation and assessment**

The process of identifying "priority areas" can be broken down into three steps:

- ➤ ***Use available information to identify potential hot spots***
- ➤ ***Conduct dry-weather field screening to look for non-storm water discharges***
- ➤ ***Conduct water quality tests to see if these non-storm water discharges seem to be illicit discharges***

The following sections focus on each of these approaches.

IDENTIFYING POSSIBLE HOT SPOTS

"Hot spots" are areas that are considered to be likely sources of illicit discharges, based on available information. The following list provides examples of potential hot spots.

Commercial/ industrial areas These areas have been found in some communities' IDDE programs to (a) have significant numbers of illicit connections and/or (b) have discharges with a high potential to affect water quality (Tuomari, 1999 and Pitt et al., 1993). Specific business sectors can be prioritized (e.g., businesses subject to waste water pretreatment rules, businesses falling under certain Standard Industrial Classification [SIC] codes, or business sectors with a record of enforcement actions).

Older areas of town Older development may predate more stringent construction codes regarding illegal connections and may have deteriorating sewer and/or storm sewer infrastructure that can lead to infiltration problems.

Hot spots
Areas that are considered to be likely sources of illicit discharges, based on available information.

Areas where there have been repeated complaints Areas where illegal dumping or apparently contaminated discharges have been reported are obvious priority targets. Geographic Information System (GIS) mapping can be useful for visualizing complaint locations. These maps can be overlain with other pertinent resource information (e.g., locations of facilities that have had compliance violations, water quality data for receiving waters).

Locations identified from ambient water quality sampling data The locations of high levels of particular contaminants (e.g., bacteria) can help to target priority outfalls. Good resources for this information are the periodic water quality assessment reports ("305(b) reports") and lists of impaired waters ("303(d) lists") that the Clean Water Act requires each state to prepare and submit to EPA. These reports are prepared by each state's environmental agency and are available to the public, often on the state's Web site. Also, local watershed groups monitor many water bodies, particularly those in more developed areas. In addition to providing sampling data, these groups can often serve as valuable resources for information about a particular water body and potential problem areas. Other possible sources of water quality data include local Boards of Health (in Massachusetts, they must test at beaches) and water districts or departments.

CONDUCTING DRY-WEATHER OUTFALL/MANHOLE SURVEYS

Once your general geographic priority areas have been determined, dry-weather surveys of outfalls and/or manholes can be undertaken to look for non-storm water flows.

EPA recommends that you make visual observations of outfalls during dry weather. Some operators have found that dry-weather manhole inspections can also be useful. The presence of flow in a storm sewer outfall or manhole during dry weather indicates a likely illicit discharge. (Other explanations for the presence of such flow include infiltrating ground water or the diversion of a surface stream into the storm sewer system.) Because illicit discharges are often intermittent, you should ideally check for discharges multiple times in a given location (particularly in a priority location). Please note that only those with confined-space training should enter a manhole or outfall. The observation and sampling strategies described below can typically be conducted without entering manholes or outfalls.

IMPORTANT NOTE:
Only those with confined-space training should enter a manhole or outfall.

In implementing your dry-weather survey, consider adopting the following strategies.

- Combine this survey with the outfall mapping field survey (see Chapter 2) and/or water quality sampling of the discharges (discussed in the next section of this chapter).
- Enlist a watershed association or other volunteer organization to help with the outfall survey.
- Notify the public that the survey will be taking place (e.g., send notices to property owners in the area). Note that while it is desirable to keep the public informed

about the presence of survey-takers to prevent undue alarm, notification may also tip off an illegal discharger to curtail discharges; use your judgment as to the most appropriate course of action. For example, you might just specify a very general time frame during which the survey will take place.

- Keep safety considerations at the forefront of survey procedures at all times. Likely hazards should be anticipated and discussed with the individuals carrying out the survey, and individuals should be instructed to use their judgment and err on the side of caution as they conduct the survey. The survey should be conducted in groups of two or more. If manholes are opened for inspection as part of the survey, staff should wear high-visibility safety vests and block off their work area with traffic cones; police presence can be helpful for safety and to allay public concerns that can be created by individuals opening manholes.

- Determine your criterion for "dry weather." The working definition of dry weather used for sampling programs can vary depending on location-specific factors. Pitt et al. (1993) suggest that storm-runoff drainage ends in most urban areas no more than 12 hours after a storm event, but many programs (e.g., Boston, NH DES, San Diego) use a longer time period, such as no rain or no more than 1/10 inch of rain in the last 48 or 72 hours.

- Observe dry-weather flows for odor, color, turbidity, and floatable matter. Observe outfalls for deposits and stains, vegetation, and damage to outfall structures. This information can help identify contaminants present in the discharge and/or the likely nature of the discharge (e.g., sanitary, industrial). Some of the resources listed in Chapter 10 provide examples of data and observation sheets to be filled out for each outfall.

- Look up some of the resources listed in the references for this chapter for more detailed instructions for conducting dry-weather field surveys (e.g., MA DFWELE, 2002).

CASE STUDY: BOSTON WATER AND SEWER COMMISSION

USING SANDBAGS TO DETECT ILLICIT DISCHARGES

The Boston Water and Sewer Commission has had success using sandbags to help detect illicit discharges. Sandbags are placed in storm drain outlets that empty into manholes and/or water bodies. The sandbags are small enough that they do not block the storm drain outlet. They must be placed in the outlet after 48 hours of dry weather (1/10 inch of rain or less). After the bag is placed in the outlet, another 48 hours of dry weather is needed (total of 96 hours of dry weather). The outlet is then observed, and any water buildup behind the sandbag is sampled. This method is very effective in narrowing down the manhole junctures that contain illicit discharges. Sandbags cost approximately $60 each and can be reused. The main difficulty in using this method is the need for 96-hour periods of dry weather.

Information from an interview with Paul Barden, Deputy Director of Engineering Services, and Charlie Jewell, Project Director, Boston Water and Sewer Commission, August 15, 2002.

CONDUCTING WATER QUALITY TESTS

When dry-weather flow is observed, visual or odor observations (e.g., observation of pieces of toilet paper, strongly colored or very muddy discharge, or the odor of sewage or chemicals) may provide enough information to determine that the discharge is illicit and to identify the likely source. If not, water quality sampling can be used to determine whether the flow is likely to have resulted from an illicit discharge.

Certain water quality parameters can serve as indicators of the likely presence or absence of a specific type of discharge. Some of these parameters can be measured in the field with probes or test kits; others must be analyzed for in the laboratory. A wide variety of water quality parameters can be measured in an IDDE program, and many references exist that describe these parameters. Some of the more commonly used and useful parameters are summarized in Table 1, which focuses on parameters suggested in Pitt et al. (1993) and the subset of those recommended in EPA's Phase II regulations.

CASE STUDY: WINOOSKI, VERMONT

USE OF OPTICAL BRIGHTENERS

The city of Winooski, Vermont has found that testing for optical brighteners is an efficient, cheap way to determine the presence of a non-storm water discharge in a particular outfall. Optical brighteners are used in laundry detergents and thus serve as a marker for household or commercial laundry discharges. These tests are extremely sensitive to the presence of detergents.

To perform an optical-brightener test, an untreated cotton pad ($9/100 pads) surrounded by a mesh bag or a suet cage is placed in a storm drain outlet, manhole, or catch basin that has been found to have dry-weather discharge and left for a certain period of time (i.e., 5-7 days). The cotton pad is then brought back to the lab and placed under a UV lamp (approximately $200) in a dark room. A blue color indicates the presence of detergents, signifying either illegal dumping, a direct illicit connection, a leaking sewer, or leakage from a failed septic system. If the test is positive for detergents, further tests need to be performed to determine the source.

Information from an interview with Tim Grover, Water Pollution Control Facility Superintendent, City of Winooski, August 9, 2002.

TABLE 1 WATER QUALITY TEST PARAMETERS AND USES

Water Quality Test	Use of Water Quality Test	Comments
Conductivity	Used as an indicator of dissolved solids	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field with a probe
Ammonia	High levels can be an indicator of the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Used very often and equipment is readily available; Boston, MA uses a field test kit (see case example)
Surfactants	Indicate the presence of detergent (e.g., laundry, car washing)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Boston, MA uses a field test kit (see case example)
pH	Extreme pH values (low or high) may indicate commercial or industrial flows; not useful in determining the presence of sanitary wastewater (which, like uncontaminated baseflows, tends to have a neutral pH, i.e., close to 7)	- Pitt et al. 1993 suggested parameter; EPA Phase II regulations recommended parameter - Typically measured in the field or lab with a probe
Temperature	Sanitary wastewater and industrial cooling water can substantially influence outfall discharge temperatures. This measurement is most useful during cold weather.	- Pitt et al. 1993 suggested parameter - Measured in the field with a thermometer or probe
Hardness	Used to distinguish between natural and treated waters	- Pitt et al. 1993 suggested parameter
Total Chlorine	Used to indicate inflow from potable water sources; not a good indicator of sanitary wastewater because chlorine will not exist in a "free" state in water for long (it will combine with organic compounds)	- Pitt et al. 1993 suggested parameter
Fluoride	Used to indicate potable water sources in areas where water supplies are fluoridated	- Pitt et al. 1993 suggested parameter
Potassium	High levels may indicate the presence of sanitary wastewater	- Pitt et al. 1993 suggested parameter
Optical Brighteners (Fluorescence)	Used to indicate presence of laundry detergents (which often contain fabric whiteners, which cause substantial fluorescence)	-Pitt et al. 1993 suggested parameter -Used by City of Winooski, VT (see case example)
Bacteria (fecal coliform, *E. coli,* and/or *enterococci)*	Used to indicate the presence of sanitary wastewater	- Used by NHDES (see case example in chapter 5)

REFERENCES: CHAPTER 4

Clark County (WA) Public Works. 2000. *Illicit Discharge Screening Project: Annual Summary 2000.* *http://www.co.clark.wa.us/site/clean/download/2000rept.pdf*

Colorado Department of Public Health and Environment, Water Quality Control Division. October 2001. *Colorado's Phase II Municipal Guidance: A guide to application requirements and program development for coverage under Colorado's Phase II municipal storm water discharge permit.* *http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html*

Donlon, A. 2001. *2000 Coastal Illicit Connection Remediation Grant Program: Final Report.* New Hampshire Department of Environmental Services and New Hampshire Estuaries Project. R-WD-01-10. *http://www.des.state.nh.us/wmb/was/nhep2000.pdf*

Interview with Paul Barden and Charlie Jewell, BWSC, August 15, 2002.

Interview with Andrea Donlon, NHDES, July 29, 2002.

Interview with Tim Grover, City of Winooski, VT, August 9, 2002.

Jewell, C. 2001. A Systematic Methodology for Identification and Remediation of Illegal Connections. Presented at the Water Environment Federation Specialty Conference *2001 A Collection Systems Odyssey: Combining Wet Weather and O&M Solutions.* *http://www.wef.org*

Massachusetts Division of Fisheries, Wildlife, and Environmental Law Enforcement. *Storm Drain Mapping Project Field Manual* (Draft). January 2002. *www.state.ma.us/dfwele/River/pdf/rivstormdrainmanual.pdf*

North Central Texas Council of Governments. 2002. *Storm Water Management in North Central Texas: Illicit Discharge Detection and Elimination.* *http://www.dfwstormwater.com/Storm_Water_BMPs/illicit.html*

Pitt, R., M. Lalor, R. Field, D.D. Adrian, and D. Barbe. 1993. *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide.* USEPA Office of Research and Development. EPA/600/R-92/238.

San Diego Stormwater Copermittees Jurisdictional Urban Runoff Management Program. 2001. *Illicit Connection/Illicit Discharge (IC/ID) Detection and Elimination Model Program Guidance.* *http://www.projectcleanwater.org/html/model_programs.html*

Sargent, D. and W. Castonguay. 1998. *An Optical Brightener Handbook.* *http://www.mvpc.org/services_sec/mass_bays/optical_handbook.htm*

Tuomari, D. 1999. *Dos and Don'ts on Implementing a Successful Illicit Connection Program.* Rouge River Demonstration Project. *http://www.rougeriver.com/proddata*

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851.

USEPA. 2002. Storm Water Phase II Menu of BMPs - *Illicit Discharge Detection and Elimination: Identifying Illicit Connections.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_2.cfm*

5 DEVELOPING AND IMPLEMENTING AN IDDE PLAN: TRACING THE SOURCE OF AN ILLICIT DISCHARGE

Developing and implementing a plan to detect and address illicit discharges is the third mandatory element of a Phase II IDDE program. EPA recommends that the plan include the following four components: (1) locating priority areas; (2) tracing the source of an illicit discharge; (3) removing the source of an illicit discharge; and (4) program evaluation and assessment. The second component, tracing the source of an illicit discharge, is the subject of this chapter.

THE IDDE PLAN

- Locating priority areas
- ➤ Tracing the source of an illicit discharge
- Removing the source of an illicit discharge
- Program evaluation and assessment

Once storm drain outlets with evidence of illicit discharges have been located, various methods can be used to pinpoint the exact source of the discharge. These techniques, many of which are already used by municipal sewer departments, include manhole observation, video inspection, smoke testing, dye testing, aerial infrared and thermal photography, and tracking illegal dumping.

MANHOLE OBSERVATIONS

A key tracing technique is to follow dry-weather flows upstream along the conveyance system to bracket the location of the source. This can be accomplished by taking the following steps:

- ➤ Consult the drainage system map.
- ➤ Check the next "upstream" manhole with a junction to see if there is evidence of discharge. You may wish to sample each manhole that has a discharge.
- ➤ Repeat these steps until a junction is found with no evidence of discharge; the discharge source is likely to be located between the junction with no evidence of discharge and the next downstream junction.
- ➤ Be aware of the surrounding areas and look for water in gutters and streets.

A key tracing technique is to follow dry-weather flows upstream along the conveyance system to bracket the location of the source.

Note that the Boston Water and Sewer Commission has had success working in the opposite direction (i.e., upstream to downstream) (Jewell 2001). Manhole observations can be time-consuming, but they are generally a necessary step before conducting other tests.

VIDEO INSPECTION

Mobile video cameras can be guided remotely through storm sewer lines to observe possible illegal connections into storm sewer systems and record observations on a videocassette or DVD. Public works staff can observe the videos and note any visible illegal connections. This technique is time-consuming and expensive but thorough and usually definitive, and it does not require the intrusion on members of the public that some of the other methods do.

SMOKE TESTING

This technique involves injecting non-toxic smoke into storm sewer lines and then noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the storm sewer lines. The injection is accomplished by placing a smoke bomb in the storm sewer manhole below ground and forcing air in after it. Smoke-generating machines can also be used. Test personnel should be stationed at points of suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm sewer infrastructure). Prior to performing this test, it is necessary to inform building owners and occupants in the area in advance. It is also advisable to inform the police and fire departments.

Smoke testing involves injecting non-toxic smoke into storm sewer lines and then noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the storm sewer lines.

For a more thorough smoke-test program, the sanitary sewer lines can also be smoked. For houses that do not emit smoke during either the sanitary sewer or the storm sewer system tests, sewer gas may be venting inside, which is hazardous. Interviews with various IDDE program staff suggest that the smoke-test method is more effective in infiltration/inflow investigations of the sanitary sewer system than in detecting illegal connections to the storm sewer system.

Smoke may cause minor irritation of respiratory passages; residents with respiratory conditions should receive special attention to determine if it is safe for them to be present for the testing. Smoke testing is typically used to survey an area all at once, in contrast to dye testing, which tests one building at a time.

DYE TESTING

This technique involves flushing non-toxic dye into toilets and sinks and observing storm sewer and sanitary sewer manholes and storm sewer outfalls for the presence of the dye. Prior to performing this test, it is necessary to inform building owners and occupants in advance and gain permission for entry. Local public health and state water quality staff should also be notified so that they will be prepared to respond to citizens calling about any dye observed in surface waters.

To perform the test, you need a crew of two or more people (ideally, all with two-way radios). One person is inside the building; the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which

CASE STUDY: NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

LOCATING AND TRACING ILLICIT DISCHARGES IN NEW HAMPSHIRE COASTAL COMMUNITIES

In 1996, the New Hampshire Department of Environmental Services (NHDES) began a program of investigating and eliminating illicit connections to storm drainage systems in coastal communities to reduce bacterial contamination in coastal waters. The following excerpt from the NHDES report on the first phase of the project describes the process used to detect and trace illicit discharges.

Beginning in the summer of 1996, the coastal shorelines were surveyed by foot or canoe at low tide for potential pollution sources. All pipes, seeps, streams, and swales with flow were sampled for bacteria. In addition, temperature was measured, and observations related to the condition of the pipe (stained or structurally damaged), odor, evidence of untreated wastewater (e.g., toilet paper), turbidity, color, debris, estimated flow, and any other observations were noted. Dry pipes were rechecked on several occasions for intermittent flow. Evidence indicating the presence of wastewater and/or elevated bacteria levels prompted further investigation of these locations.

Upstream catch basins and manholes associated with the outfall pipes that were identified by the screening process were surveyed for evidence of wastewater and sampled for bacteria. Smoke testing (using non-toxic smoke blown into catch basins) was then used to identify buildings connected to the storm drainage system by canvassing the neighborhood for vents emitting smoke. Final confirmation of an illicit connection from the buildings that emitted smoke was accomplished by dye testing indoor plumbing and observing the storm drainage and sewer systems for the presence or absence of the dye.

Feeder streams were surveyed for outfall pipes with dry-weather flow. Other potential bacteriological sources (e.g., pigeon roosting sites on bridges) were bracketed with water quality sampling stations. Where contaminated seeps and swales were suspected, the drainage area was surveyed for potential sources, such as broken sewer mains.

Landry, N. 1999. Elimination of Illicit Connections in Coastal New Hampshire Spurs Cooperation and Controversy: A Final Report to the New Hampshire Estuaries Project. New Hampshire Department of Environmental Services.

should be opened) and/or outfalls. The inside person drops dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The inside person then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test is relatively quick (about 30 minutes per test), effective (results are usually definitive), and cheap. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

AERIAL INFRARED AND THERMAL PHOTOGRAPHY

Aerial infrared and/or thermal photography can be used to locate illicit discharges from outfalls and failing septic systems using temperature and vegetation as markers. This technique requires knowledge of aerial photo interpretation. Using aerial infrared or thermal photographs, do the following:

- For outfalls
  - Note if discharge has a higher temperature than that of the stream
  - Note if algae growth is concentrated near an outfall
- For potentially failing septic systems
  - Note evidence of increased moisture in surrounding soil
  - Observe vegetation located close to the potentially failing septic system, and note any increase in vegetation compared to the surrounding area
  - Observe any increase in temperature readings at the septic system location

Aerial infrared and/or thermal photography can be used to locate illicit discharges from outfalls and failing septic systems using temperature and vegetation as markers.

This is still a developing technology and not commonly used for IDDE programs. You may still need further tests to determine specific houses/businesses with illegal connections. This technique has been used primarily for the detection of failing septic systems, which are only considered "illicit discharges" under the Phase II Storm Water program if they discharge into the storm sewer system.

TRACKING ILLEGAL DUMPING

Developing a coordinated system for collecting and tracking reports of illegal dumping can help pinpoint this difficult-to-find source of illicit discharges. Suggestions for tracking illegal dumping include the following:

- Create a hotline that can be used to report any illegal-dumping behavior (i.e., who illegally dumped and where illegal dumping occurred).
- Observe the materials that have been illegally dumped and trace the potential sources of the materials.
- Note where dumping occurs most often, record patterns of time of day and day of the week, and note common responsible parties.

Developing a coordinated system for collecting and tracking reports of illegal dumping can help pinpoint this difficult-to-find source of illicit discharges.

Challenges in addressing illegal dumping include the difficulty of catching dumpers in the act and the significant staff time needed to receive, respond to, and track complaints.

REFERENCES: CHAPTER 5

Center for Watershed Protection. *Pollution Prevention Fact Sheet: Illegal Dumping Control.* *http://www.stormwatercenter.net/Pollution_Prevention_Factsheets/IllegalDumpingControl.htm*

City of Cambridge, MA. 2002. *Cambridge Sewer and Stormwater Line Inspection and Testing Program.* *http://www.ci.cambridge.ma.us/~TheWorks/dye.html*

Jewell, C. 2001. A Systematic Methodology for Identification and Remediation of Illegal Connections. Presented at the Water Environment Federation Specialty Conference *2001 A Collection Systems Odyssey: Combining Wet Weather and O&M Solutions.* *http://www.wef.org*

Johnson, B. and D. Tuomari. 1998. *Did you know…The Impact of On-site Sewage Systems and Illicit Discharges on the Rouge River.* Rouge River Demonstration Project. *http://www.rougeriver.com/proddata*

Pierce County (WA) Public Works and Utilities. 2002. *BMP S.1: Eliminate Illicit Storm Drain Connections.* *http://www.co.pierce.wa.us/pc/services/home/environ/water/swm/sppman/bmps1.htm*

San Diego Stormwater Copermittees Jurisdictional Urban Runoff Management Program. 2001. *Illicit Connection/Illicit Discharge (IC/ID) Detection and Elimination Model Program Guidance.* *http://www.projectcleanwater.org/html/model_programs.html*

Town of Cary, NC. 2002. *Town of Cary Smoke Test.* *http://www.townofcary.org/smoke*

Tuomari, D. 1999. *Dos and Don'ts on Implementing a Successful Illicit Connection Program.* Rouge River Demonstration Project. *http://www.rougeriver.com/proddata*

USEPA. 2002. Storm Water Phase II Menu of BMPs - *Illicit Discharge Detection and Elimination: Failing Septic Systems.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_1.cfm*

USEPA. 2002. Storm Water Phase II Menu of BMPs - *Illicit Discharge Detection and Elimination: Identifying Illicit Connections.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_2.cfm*

USEPA. 2002. Storm Water Phase II Menu of BMPs - *Illicit Discharge Detection and Elimination: Illegal Dumping.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_3.cfm*

USEPA Region 5. 1998. *Illegal Dumping Prevention Guidebook.* EPA905-B-97-001. Waste, Pesticides, and Toxics Division, Chicago, Illinois. *http://www.epa.gov/reg5rcra/wptdiv/illegal_dumping/*

This page is intentionally blank.

6 DEVELOPING AND IMPLEMENTING AN IDDE PLAN: REMOVING THE SOURCE OF AN ILLICIT DISCHARGE

Developing and implementing a plan to detect and address illicit discharges is the third mandatory element of a Phase II IDDE program. EPA recommends that the plan include the following four components: (1) locating priority areas; (2) tracing the source of an illicit discharge; (3) removing the source of an illicit discharge; and (4) program evaluation and assessment. The third component, removing the source of an illicit discharge, is the subject of this chapter.

THE IDDE PLAN

- Locating priority areas
- Tracing the source of an illicit discharge
- ➤ Removing the source of an illicit discharge
- Program evaluation and assessment

Because there are various sources of illicit discharges to the storm sewer system, there are different kinds of actions municipalities may have to take to remove those sources and prevent future illicit discharges. This section groups those actions into three categories: compliance assistance and enforcement for illegal connections to homes and businesses; proper construction and maintenance of MS4s; and responding to and preventing illegal dumping.

COMPLIANCE ASSISTANCE AND ENFORCEMENT FOR ILLEGAL CONNECTIONS TO HOMES AND BUSINESSES

There is a range of ways in which municipalities may wish to handle the removal of illegal connections between homes or businesses and the storm sewer system. Enforcement measures should be spelled out in the required IDDE ordinance (see Chapter 3), but the MS4 operator will normally be allowed to use judgment about what mix of compliance assistance and enforcement actions is appropriate in a given situation. Typically, a municipality responds to the discovery of an illegal connection in a graduated manner, beginning with efforts to obtain voluntary compliance and escalating to increasingly severe enforcement actions if compliance is not obtained.

Voluntary Compliance

Often, home or business owners are not aware of the existence of illegal connections between their buildings and the storm sewer systems. In these cases, providing the responsible party with information about the connection, its environmental consequences, the applicable regulations, and how to remedy it may be enough to secure vol-

untary compliance. The cost of removing the connection and reconnecting it to the sanitary sewer system can be an obstacle. Recognizing this, some localities (e.g., Boston and coastal New Hampshire) have chosen to provide assistance with these costs, using municipal public works funds or state or federal grants.

Typically, a municipality responds to the discovery of an illegal connection in a graduated manner, beginning with efforts to obtain voluntary compliance and escalating to increasingly severe enforcement actions if compliance is not obtained.

Enforcement

EPA's model illicit discharge ordinance (Appendix A) provides an example of the enforcement steps that might be specified in a typical local ordinance. These steps are summarized below.

- The authorized enforcement agency sends the property owner a Notice of Violation (NOV), which may require the violator to take steps such as monitoring, elimination of an illicit connection or discharge, or payment of a fine.
- The person receiving the NOV may appeal it.
- If the person receiving the NOV does not appeal or loses the appeal and fails to correct the violation, the enforcement agency may "take any and all measures necessary to abate the violation and/or restore the property." The agency then may require reimbursement from the violator for the cost of the abatement, including administrative costs.
- The authorized enforcement agency also has the ability to seek an injunction against the violator "restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation."

If the municipality has not yet obtained enforcement authority (e.g., because a local ordinance has not yet been passed), it may be possible for the municipality to seek enforcement action from state or federal authorities. Involvement of state or federal

CASE STUDY: WAYNE COUNTY, MICHIGAN

ENFORCEMENT PROCEDURE

Wayne County, Michigan, began its illicit discharge detection and elimination program by targeting certain industrial and commercial facilities for site inspections—starting at the other end of the pipe from the outfall survey approach. County personnel visited the facilities, dye tested a representative number of plumbing fixtures, and observed general "housekeeping" practices.

If no violations were found, a thank you letter was sent to the facility acknowledging staff participation and closing the file. If a facility was found to have an illicit connection, a violation letter was sent, giving the facility 30 to 90 days to correct it. If a facility failed to comply with the request, the municipal plumbing inspector or building department became involved. If the municipality was not able to gain compliance, the facility was referred to the Michigan Department of Environmental Quality. When an illicit connection was eliminated, the county provided confirmation. Once a correction was confirmed, a confirmation/thank you letter was sent to facility management, thanking them for their participation and closing the file.

Information from Tuomari, D. 1999. Dos and Don'ts on Implementing a Successful Illicit Connection Program. *Technical Report of the Rouge River Demonstration Project.* ***http://www.rougeriver.com/proddata***

CASE STUDY: ST. LOUIS, MISSOURI

ENFORCEMENT PROCEDURE

The Metropolitan St. Louis Sewer District has a comprehensive ordinance regulating users who discharge into the sanitary sewer and storm sewer systems. Upon discovery of a violation of this ordinance, the Sewer District notifies the user of the nature of the violation and directs that actions be taken to remedy the noncompliance. Within 30 days of receipt of the notice, the user must submit a plan for correction of the violation to the Sewer District. If a violation is found within the house or business that appears to present an immediate danger to human health or welfare, a verbal notification is given immediately by telephone or visit, directing the user to take immediate action to discontinue or reduce the discharge to safe levels. A written notice is sent within five days of the verbal notification.

The Sewer District has the power to issue the following Administrative Orders: Cease and Desist Order (directing the user to stop the violating action), Compliance Order (directing the user take action to correct violation), Show Cause Order (directing the user to show cause why a proposed enforcement action should not be taken), and Consent Order (establishing an agreement with a user to correct a violation).

If the violator does not take action within the time allotted, the Sewer District has the right to eliminate the illicit discharge at the expense of the violator. Legal actions can be taken against, and penalties imposed on, any violator that does not comply.

Information from Metropolitan St. Louis Sewer District Ordinance No. 8472, on EPA's nonpoint source pollution Web site at ***http://www.epa.gov/owow/nps/ordinance/discharges.htm***

authorities may also be necessary if the source of an illicit discharge is located outside of the municipality's boundaries. Examples of enforcement procedures implemented in Wayne County, Michigan, and St. Louis, Missouri, are included in this section.

PROPER CONSTRUCTION AND MAINTENANCE OF MS4s

Some illicit discharge problems may be the responsibility of the MS4 operator. These problems include cross-connections between the sanitary sewer and storm sewer systems and infiltration into damaged or deteriorating storm sewer pipes.

Cross-connections between a municipality's sanitary sewer and storm sewer systems may exist by mistake, because of deterioration over time, or as part of the design in an antiquated system. Complete and accurate maps of the sewer and storm sewer systems can help identify these cross-connections and prevent them during any new construction that takes place.

Contamination can infiltrate into a cracked or leaking MS4 from leaking sanitary sewer pipes, failing septic systems, or contaminated groundwater. To help prevent this, both MS4s and sanitary sewer systems should be inspected periodically and maintained properly to keep them in good repair.

PREVENTING AND RESPONDING TO ILLEGAL DUMPING

It is often difficult to identify and locate the individuals responsible for illegal dumping; therefore, a program to address illegal dumping should focus on prevention, backed up by enforcement to the extent possible.

EPA Region 5 has prepared an *Illegal Dumping Prevention Guidebook* that suggests the following key strategies that can be used to prevent illegal dumping.

- **Site maintenance and controls** Measures should be taken to clean up areas where illegal dumping has taken place, and controls such as signs or access restrictions should be used, as appropriate, to prevent further dumping.
- **Community outreach and involvement** Outreach is the linchpin of an illegal-dumping prevention program and can include the following components:
  - Educating businesses, municipal employees, and the general public about the environmental and legal consequences of illegally disposing of waste into the storm sewer system
  - Providing and publicizing ways for citizens to properly dispose of waste
  - Providing opportunities for citizens to get involved in preventing and reporting illegal dumping
- **Targeted enforcement** This strategy should include a prohibition against illegal dumping via ordinance or another similar measure, backed up by trained law-enforcement personnel and possibly field operations.
- **Program measurement** Tracking and evaluation methods should be used to measure the impact of illegal-dumping prevention efforts and determine whether goals are being met.

Although the EPA Region 5 guidebook is targeted more to land dumping of solid waste, these strategies can also be applied to illegal dumping into the storm drain system. Some specific methods that municipalities can use to implement these strategies include the following:

- **Site maintenance and controls**
  - Storm-drain stenciling program
  - Spill-response plans for hazardous-waste spills
- **Community outreach and involvement**
  - An illegal-dumping reporting hotline
  - Outreach to business sectors that handle hazardous materials and/or have a history of illegal-dumping problems; outreach should include information on Best Management Practices for spill prevention and proper waste disposal

- Printed outreach materials for the public
- Publicizing of waste-disposal options, such as used oil recycling and household hazardous waste collections

➤ **Targeted enforcement**

- An illegal-dumping ordinance (or section of IDDE ordinance)
- Surveillance of known illegal-dumping locations
- Business facility inspections
- Training of municipal employees, police officers, and other local entities to be on lookout

➤ **Program measurement**

- Tracking of incident locations
- Compilation of statistics (e.g., annual cleanup costs, facility compliance, arrests, convictions, fines, complaints)

REFERENCES: CHAPTER 6

California Coastal Commission. 2002. *Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities.* *http://www.coastal.ca.gov/la/murp.html*

Center for Watershed Protection. *Pollution Prevention Fact Sheet: Illegal Dumping Control.* *http://www.stormwatercenter.net/Pollution_Prevention_Factsheets/IllegalDumpingControl.htm*

Interview with Paul Barden and Charlie Jewell, BWSC, August 15, 2002.

Interview with Andrea Donlon, NHDES, July 29, 2002.

North Central Texas Council of Governments. 2002. *Storm Water Management in North Central Texas: Illicit Discharge Detection and Elimination.* *http://www.dfwstormwater.com/Storm_Water_BMPs/illicit.html*

San Diego Stormwater Copermittees Jurisdictional Urban Runoff Management Program. 2001. *Illicit Connection/Illicit Discharge (IC/ID) Detection and Elimination Model Program Guidance.* *http://www.projectcleanwater.org/html/model_programs.html*

USEPA. 1997. *Guidance Manual for Implementing Municipal Storm Water Management Programs – Volume 1: Planning and Administration* (Draft). Office of Wastewater Management and Office of Research and Development. *http://www.epa.gov/npdes/pubs/owm0233.pdf*

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

USEPA. 2002. Storm Water Phase II Menu of BMPs - *Illicit Discharge Detection and Elimination: Illegal Dumping.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/illi_3.cfm*

USEPA. 2002. *Model Ordinances to Protect Local Resources: Illicit Discharges.* *http://www.epa.gov/owow/nps/ordinance/discharges.htm*

This page is intentionally blank.

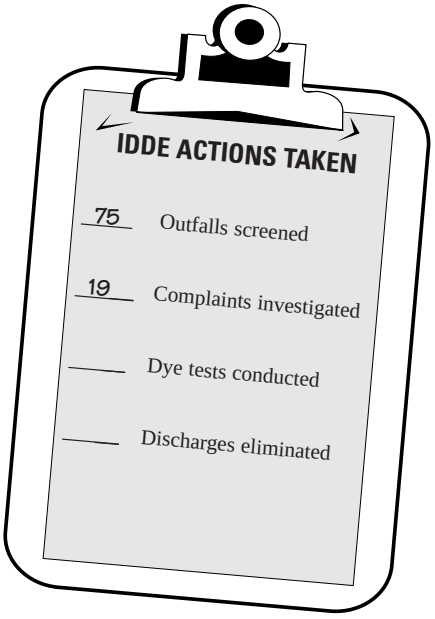
7 DEVELOPING AND IMPLEMENTING AN IDDE PLAN: EVALUATION OF THE IDDE PROGRAM

Developing and implementing a plan to detect and address illicit discharges is the third mandatory element of a Phase II IDDE program. EPA recommends that the plan include the following four components: (1) locating priority areas; (2) tracing the source of an illicit discharge; (3) removing the source of an illicit discharge; and (4) program evaluation and assessment. The fourth component, program evaluation and assessment, is the subject of this chapter.

THE IDDE PLAN

- Locating priority areas
- Tracing the source of an illicit discharge
- Removing the source of an illicit discharge
- ➤ Program evaluation and assessment

EPA recommends that the IDDE plan include procedures for program evaluation and assessment. Program evaluation is the time to step back, look at what has been done, determine what worked and what didn't, and make adjustments to planned future actions as appropriate. In this final component of your IDDE plan, you outline how you will go about evaluating your program.



EVALUATION STRATEGY

Evaluation procedures should include documentation of actions taken to locate and eliminate illicit discharges. Such documentation might include numbers of outfalls screened, complaints taken and investigated, feet of storm sewers videotaped, numbers of discharges eliminated, or number of dye or smoke tests conducted. Note that this component of the IDDE plan fits in with the overall Phase II requirements for identifying measurable goals for each Best Management Practice (BMP) and reporting on progress toward achieving those goals. (Chapter 9 discusses BMPs and measurable goals in more detail.) Annual reports are necessary during the first permit term (typically five years), and in years two and four in subsequent terms. (For more information on reporting requirements, see EPA's Fact Sheet 2.9.)

Evaluation procedures should include documentation of actions taken to locate and eliminate illicit discharges.

Determining the impact of these actions is more of a challenge, but it is an important part of the overall process because EPA allows for adjustments to the storm water management program over the life of the permit. Assessment of what worked and what didn't provides the information needed to make these adjustments to your IDDE program. EPA's Phase II regulations do not specify exactly how to evaluate your IDDE program, so check whether your permitting authority has made any particular specifications, and brainstorm from there.

Here are few suggestions for assessing the effectiveness of various IDDE strategies:

- Evaluate the number of possible illicit discharges that were detected using different detection methods. This can help you determine which detection methods are most effective.
- Evaluate the number of discharges and/or quantity of discharges eliminated using different possible enforcement and compliance measures.
- If you have access to monitoring data for receiving waters, evaluate changes in the water quality of receiving waters.
- Program evaluation might also include procedures for considering efficiency and feasibility. Questions you might want to ask include:
  - How much staff time and expense did it take to achieve a given result?
  - Were practical difficulties encountered with this approach? What were they, and how much of a problem did they present?

The strategies listed above are only suggestions. Because you are allowed a great deal of flexibility in determining what procedures you will use for program evaluation and assessment, you can decide what procedures will be most helpful in providing the information that you will need to move forward with your IDDE program.

REFERENCES: CHAPTER 7

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

USEPA. 2000. EPA Storm Water Phase II Final Rule Fact Sheet 2.9: *Permitting and Reporting: The Process and Requirements.* EPA 833-F-011. January 2000. *http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm*

USEPA New England. 2002. *NPDES General Permit for Storm Water Discharges from Regulated Small Municipal Separate Storm Sewer Systems (MS4s*) (Draft). September 27, 2002. *http://www.epa.gov/region01/npdes/ms4.html*

8 OUTREACH TO EMPLOYEES, BUSINESSES, AND THE GENERAL PUBLIC

The fourth mandatory element of an IDDE program calls for the MS4 operator to "inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste." As noted in the Introduction, the requirement for public education and outreach on storm water impacts is also one of the six minimum control measures in the storm water management program. Therefore, fulfilling the outreach requirement for IDDE helps the MS4 to comply with this mandatory element; IDDE outreach can be integrated into the broader storm water outreach program.

Some suggestions for conducting IDDE outreach to the different community sectors are presented below. Many examples of storm water outreach materials, including some that are intended to be modified and used by anyone, are available on the Web; some useful Web sites are listed in Chapter 10. Operators of regulated small MS4s may want to work together with other operators in their area in developing outreach materials and campaigns to share ideas and save money.

PUBLIC EMPLOYEES

While it is clear that public works employees should receive specific technical training on the requirements of the IDDE program and the techniques that will be used to carry it out, other municipal departments should also be targeted for training.

A training program for municipal employees on pollution prevention techniques is required under the "Pollution Prevention/Good Housekeeping for Municipal Operations" minimum control measure. Preventing non-storm water discharges into the storm sewer system from municipal operations can be one part of this training.

Many public employees can play an important role as partners in the detection and/or prevention of illicit discharges.

Many public employees can play an important role as partners in the detection and/or prevention of illicit discharges. For example, highway department staff who maintain catch basins can look for signs of illicit discharges. Municipal building inspectors can help ensure that illegal connections to the storm sewer system do not take place in construction and renovation projects. Police officers, public works employees, and other municipal staff whose jobs keep them outside and mobile can help spot illegal dumpers. Fire and police department personnel who respond to hazardous material spills can help keep these spills out of the storm sewer system and adjacent water bodies.

BUSINESSES

Most businesses are willing to comply with environmental requirements and take proactive steps to prevent pollution if they understand the issues and the possible solutions. Here are some steps you can take to reach out to businesses.

Most businesses are willing to comply with environmental requirements and take proactive steps to prevent pollution if they understand the issues and the possible solutions.

- Create a general brochure and presentation to inform businesses about the IDDE program. This information can be presented and/or made available at Chamber of Commerce meetings and other business forums.
- Conduct compliance assistance outreach (e.g., visits, group training, and/or printed materials) for specific business types (e.g., auto repair shops, mobile carpet cleaning, restaurants).
- Provide contractors and developers with information on preventing illegal connections (in coordination with training on construction and post-construction storm water requirements).

GENERAL PUBLIC

There are many ways in which the general public can be made aware of environmental issues and the things they can do to help mitigate or prevent problems. Here are some things you can do to inform and involve the public.

- Work with citizen groups to conduct storm-drain stenciling (e.g., "Don't Dump – Drains to River") and outfall surveys.
  - In conducting these activities, you should:
    - Educate the groups about their activity (either informally or via a video or other presentation)
    - Make sure volunteers understand constraints associated with storm-drain stenciling activities (e.g., heavy traffic use areas, historic districts)
    - Have volunteers sign liability forms, if necessary
  - You may also wish to:
    - Publicize the activities through the media
    - Give volunteers brochures to hand out to the public with who they interact
    - Repeat stenciling periodically (due to paint wear off), unless placards are used—stenciling on curbs lasts longer than on street surfaces
    - See Chapter 10 for information on storm-drain stenciling resources

If made aware of environmental issues, the general public can help mitigate or prevent problems.

- Create a program to promote, publicize, and facilitate public reporting of illicit connections or discharges (e.g., a hotline). Some considerations in running a hotline include:
  - Callers should be able to at least leave a message at any time of day
  - It may be helpful to have the hotline staffed during business hours
  - A system should be created for monitoring the hotline so that staff can follow up quickly on reports of discharges

  - The municipality may wish to offer a small reward for callers that provide information leading to the detection of an illicit discharge source

- Distribute (by mail and by making available at various locations and events) printed outreach materials. A general flyer about illicit discharges might include information on the following:
  - Background information on water pollution
  - A definition of what constitutes an illicit discharge
  - Measures to prevent illicit discharges
  - Information about the municipality's illicit discharge ordinance
- Create Public Service Announcements for radio and/or television.
- Work with the local access cable station and local newspapers to develop features on illicit discharge prevention.
- Create and publicize a household hazardous waste disposal/recycling program.
- Provide classroom speakers and/or printed information for schools.

REFERENCES: CHAPTER 8

Chesterfield County (VA). Undated. *Household Guide to Chesterfield County's Illicit Discharge Ordinance.* *http://www.chesterfield.gov/CommunityDevelopment/Engineering/HouseholdFactSheet.pdf*

North Central Texas Council of Governments. 2002. *Storm Water Management in North Central Texas: Illicit Discharge Detection and Elimination.* *http://www.dfwstormwater.com/Storm_Water_BMPs/illicit.html*

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

USEPA. 2000. *Storm Water Phase II Compliance Assistance Guide.* EPA 833-R-00-002. Office of Water. *http://www.epa.gov/npdes/pubs/comguide.pdf*

USEPA. 2000. EPA Storm Water Phase II Final Rule Fact Sheet 2.3: *Public Education and Outreach Minimum Control Measure.* EPA 833-F-00-005. January 2000. *http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm*

USEPA. 2000. EPA Storm Water Phase II Final Rule Fact Sheet 2.8: *Pollution Prevention/Good Housekeeping Minimum Control Measure*. EPA 833-F-00-010. January 2000. *http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm*

USEPA. 2002. Storm Water Phase II Menu of BMPs – *Public Education and Outreach on Storm Water Impacts.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/pub_ed.cfm*

USEPA. 2002. Storm Water Phase II Menu of BMPs – *Public Education and Outreach on Storm Water Impacts: Proper Disposal of Household Hazardous Wastes.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/edu_5.cfm*

This page is intentionally blank.

9 BMPS AND MEASURABLE GOALS FOR IDDE

As mentioned in the Introduction, operators of regulated small MS4s generally must submit applications for Phase II storm water general permits by March 10, 2003. As part of their application, they must identify best management practices (BMPs) that they will use to comply with each of the six minimum control measures, and the measurable goals that they will use to demonstrate BMP implementation. Within the first permit term, the operators have to fully implement their storm water management programs.

GETTING STARTED

EPA allows MS4 operators a great deal of flexibility in determining what BMPs are most appropriate for their storm water programs. The agency has developed the following materials to assist operators in identifying appropriate BMPs:

- A *National Menu of Best Management Practices for Storm Water Phase II*, which includes a toolkit of example BMPs for each of the Phase II minimum control measures (available on the Web)
- *Measurable Goals Guidance for Small MS4s*
- A *Storm Water Phase II Compliance Guide*, which offers examples of BMPs and measurable goals for each of the six minimum measures

EPA allows MS4 operators a great deal of flexibility in determining what BMPs are most appropriate for their storm water programs.

Others, including states, regional agencies, trade associations, and non-profit organizations have also developed BMP information.

A sample list of IDDE BMPs and measurable goals is presented below. This list draws from BMP and measurable goal recommendations that have been offered by EPA and others. The list has not been officially endorsed by EPA or state agencies; it is intended to serve as a starting point to help municipalities think about the BMPs and measurable goals that are appropriate to their IDDE programs. BMPs are listed in bold, followed by the measurable goals for each BMP. (The BMPs are organized according to the four elements required in an IDDE program.)

STORM SEWER MAP

- **Create a storm sewer map**
  - Map a certain percentage of outfalls (adding up to 100% by the end of the permit term) or of the area of the town

ORDINANCE

➤ Pass an illicit discharge ordinance

- Draft an IDDE ordinance (or storm water ordinance with IDDE component) or an amendment to existing bylaws
- Pass an ordinance or amendment

IDDE PLAN

➤ Prepare an IDDE plan

- Complete a final plan and obtain the signature of the person overseeing the plan

➤ Conduct dry weather field screening of outfalls

- Screen a certain percentage of outfalls (adding up to 100% by the end of the permit term)

➤ Trace the source of potential illicit discharges

- Trace the source of a certain percentage of continuous flows (adding up to 100% by the end of the permit term)
- Trace the source of a certain percentage of intermittent flows and illegal dumping reports (100% may never be an achievable goal in this case)

➤ Eliminate illicit discharges

- Eliminate a certain number of discharges and/or a certain volume of flow, or a certain percentage of discharges whose source is identified (adding up to 100% by the end of the permit term)

OUTREACH

➤ Implement and publicize a household hazardous waste collection program

- Hold a periodic (e.g., annual) hazardous waste collection day
- Mail flyers about the hazardous waste collection program to all town residences

➤ Create and distribute an informational flyer for homeowners about IDDE

- Mail the flyer to town residences
- Print the flyer as a doorknob hanger and have water-meter readers distribute it

➤ Create and distribute an informational flyer for businesses about IDDE

- Mail the flyer to targeted businesses

➤ Work with community groups to stencil storm drains

- Stencil a certain percentage of drains

➤ **Create and publicize an illicit discharge reporting hotline**

- Put the hotline in place
- Include an announcement of the hotline in sewer bills
- Follow up on all hotline reports within 48 hours

REFERENCES: CHAPTER 9

North Central Texas Council of Governments. 2002. *Storm Water Management in North Central Texas: Illicit Discharge Detection and Elimination.* *http://www.dfwstormwater.com/Storm_Water_BMPs/illicit.html*

USEPA. 1999. National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule. *Federal Register* Vol. 64 No. 235 (December 8, 1999), pp. 68722-68851. *http://www.epa.gov/npdes/regulations/phase2.pdf*

USEPA. 2000. *Storm Water Phase II Compliance Assistance Guide.* EPA 833-R-00-002. Office of Water. *http://www.epa.gov/npdes/pubs/comguide.pdf*

USEPA. 2000. EPA Storm Water Phase II Final Rule Fact Sheet 2.9: *Permitting and Reporting: The Process and Requirements.* EPA 833-F-011. January 2000. *http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm*

USEPA. 2002. *National Menu of Best Management Practices for Storm Water Phase II.* *http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm*

USEPA. 2002. *Measurable Goals Guidance for Phase II Small MS4s.* *http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm*

This page is intentionally blank.

10 RESOURCES

WEB SITES AND PUBLICATIONS

Key Information Available on EPA's Storm Water Web Site

Entry Point and General Information
http://www.epa.gov/npdes
→ click on "Storm Water"
→ click on "Municipal Separate Storm Sewer Systems" or "Phase II"

Storm Water Phase II Final Rule
http://www.epa.gov/npdes/regulations/phase2.pdf
IDDE section of the Phase II Final Rule: see section II(H)(3)(b)(iii), pp. 68756-68758.

EPA's Fact Sheet Series
http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm

Overview
1.0 *Storm Water Phase II Final Rule: An Overview*

Small MS4 Program
2.0 *Small MS4 Storm Water Program Overview*
2.1 *Who's Covered? Designation and Waivers of Small Regulated MS4s*
2.2 *Urbanized Areas: Definition and Description*

Minimum Control Measures
2.3 *Public Education and Outreach*
2.4 *Public Participation/Involvement*
2.5 *Illicit Discharge Detection and Elimination*
2.6 *Construction Site Runoff Control*
2.7 *Post-Construction Runoff Control*
2.8 *Pollution Prevention/Good Housekeeping*
2.9 *Permitting and Reporting: The Process and Requirements*
2.10 *Federal and State-Operated MS4s: Program Implementation*

Construction Program
3.0 *Construction Program Overview*
3.1 *Construction Rainfall Erosivity Waiver*

Industrial "No Exposure"
4.0 *Conditional No Exposure Exclusion for Industrial Activity*

Documents
Storm Water Phase II Compliance Assistance Guide
http://www.epa.gov/npdes/pubs/comguide.pdf

National Menu of BMPs for Storm Water Phase II
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/menu.cfm

Measurable Goals Guidance for Phase II Small MS4s
http://cfpub.epa.gov/npdes/stormwater/measurablegoals/index.cfm

Storm Water Web Sites

The Rouge River National Wet Weather Demonstration Project
http://www.rougeriver.com
(See specific information on IDDE at http://www.rougeriver.com/techtop/illicit/overview.html .)

Center for Watershed Protection's Storm Water Manager's Resource Center
http://www.stormwatercenter.net

The University of Tennessee's Municipal Technical Advisory Service NPDES Phase II Storm Water Management BMP Toolkit
http://www.mtas.utk.edu/bmptoolkit.htm
The Illicit Discharge section provides a number of useful web links and downloadable PDFs.

Organization Web Sites

Water Environment Federation
http://www.wef.org

American Public Works Association
http://www.apwa.net

Local Government Environmental Assistance Network
http://www.lgean.org

Center for Watershed Protection
http://www.cwp.org

The Boston Water and Sewer Commission
(the Web site includes the BWSC's regulations, outreach information, and other useful items)
http://www.bwsc.org

Storm Water Manuals

California Coastal Commission. 2002. *Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities.* *http://www.coastal.ca.gov/la/murp.html*

Colorado Department of Public Health and Environment, Water Quality Control Division. October 2001. *Colorado's Phase II Municipal Guidance: A guide to application requirements and program development for coverage under Colorado's Phase II municipal stormwater discharge permit.*
http://www.cdphe.state.co.us/wq/PermitsUnit/wqcdpmt.html

IDDE Manuals

San Diego Stormwater Copermittees Jurisdictional Urban Runoff Management Program. 2001. *Illicit Connection/Illicit Discharge (IC/ID) Detection and Elimination Model Program Guidance.*
http://www.projectcleanwater.org/html/model_programs.html

Pitt, R., M. Lalor, R. Field, D.D. Adrian, and D. Barbe. 1993. *Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems: A User's Guide.* USEPA Office of Research and Development. EPA/600/R-92/238. (Available on the Web via EPA's National Environmental Publications Information System, *http://www.epa.gov/clariton*.)

North Central Texas Council of Governments. 2002. *Storm Water Management in North Central Texas: Illicit Discharge Detection and Elimination.*
http://www.dfwstormwater.com/Storm_Water_BMPs/illicit.html

Information on Specific Topics

Ordinances

USEPA's Model Ordinances to Protect Local Resources: Illicit Discharges.
http://www.epa.gov/owow/nps/ordinance/discharges.htm
(The same information can be found at *http://www.stormwatercenter.net.*)

Boston Water and Sewer Commission's *Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains. http://www.bwsc.org*

The Massachusetts Citizen Planner Training Collaborative offers "Tips on Drafting Bylaws" for Massachusetts municipalities: *http://www.umass.edu/masscptc/Tips_on_Drafting.html*

Optical Brighteners

Sargent, D. and W. Castonguay. 1998. *An Optical Brightener Handbook.* Available at:
http://www.mvpc.org/services_sec/mass_bays/optical_handbook.htm and
http://www.naturecompass.org/8tb/sampling/

Dye Testing

Dye supplier used by a reviewer of this manual: NORLAB, Inc., Amherst, OH. 1-800-247-9422;
http://www.norlabdyes.com

Smoke Testing

Smoke testing equipment supplier used by a reviewer of this manual: Hurco Technologies, Inc., 1-800-888-1436;
http://www.hurcotech.com

Outfall/Manhole Surveys

Massachusetts Division of Fisheries, Wildlife, and Environmental Law Enforcement. Storm Drain Mapping Project Field Manual (Draft). January 2002. *http://www.state.ma.us/dfwele/River/pdf/rivstormdrainmanual.pdf*

Jewell, C. 2001. A Systematic Methodology for Identification and Remediation of Illegal Connections. Presented at the Water Environment Federation Specialty Conference *2001 A Collection Systems Odyssey: Combining Wet Weather and O&M Solutions.* (Available for purchase via the WEF Web site, *http://www.wef.org*.)

Outreach

- **Household Hazardous Waste Collection**
  Household hazardous waste collection days in New Hampshire can be viewed online at *http://www.des.state.nh.us/hhw/hhwevent.htm.*

  Environmental Depot, Burlington VT. *http://www.cswd.net/facilities/hazardous_waste.shtml*

- **Storm-Drain Stenciling**
  Earthwater Stencils, an organization that does storm drain stenciling: *http://www.earthwater-stencils.com/*

  The Ocean Conservancy's Storm Drain Sentries program has a goal of having volunteers stencil one million storm drains with educational pollution prevention messages. The Ocean Conservancy supplies volunteers with a fact sheet about nonpoint source pollution, tips on conducting a stenciling project, and stencils for volunteer organizations to use. In return, stenciling project leaders are asked to submit data about the number of storm drains they stenciled, the types of pollutants found near the storm drains, and potential pollutant sources. This information is added to a growing database maintained by the Ocean Conservancy. Contact the Ocean Conservancy's Office of Pollution Prevention and Monitoring at 757-496-0920 or *stormdrain@oceanconservancyva.org.*
  http://www.oceanconservancy.org/dynamic/getInvolved/events/sentries/sentries.htm

  Resources for storm drain stenciling programs in New Hampshire:

  - Coordinated by Julia Peterson of UNH-Cooperative Extension in the coastal watershed *http://ceinfo.unh.edu/Common/Documents/gsc5401.htm*. Also described at *http://www.seagrant.unh.edu/extension.htm*
  - Coordinated by the NH Coastal Program (part of the Office of State Planning) *http://www.state.nh.us/coastal/CoastalEducation/marinedebris.htm*
  - Description of Manchester's storm drain stenciling on EPA's Web site describing the SEPP *http://www.epa.gov/region1/eco/csoman/sepp.html* (See #1 and #6)

- **Outreach Materials**
  EPA is preparing educational materials on different water topics each month as part of the year-long celebration of the 30th anniversary of the Clean Water Act. April 2003 will be Storm Water Month. The public education kit is expected to include:

  - General Storm Water Awareness brochure
  - Homeowner Guide (car washing, vehicle fluids changing, lawn & garden care, pet waste, septic system management)
  - Small Construction Guide poster
  - Press release
  - Public service announcement for the radio
  - Stickers
  - Door hanger with illicit discharge message
  - PowerPoint presentation

  These items will be available for download or order on EPA's Year of Clean Water Web site, *http://www.epa.gov/water/yearofcleanwater/month.html*. Before the materials are available on the Web site, you can contact EPA's contractor, TetraTech, to be on the mailing list for the materials.
  Email Kathryn Phillips at *tetratech1@earthlink.net* or *kathryn.phillips@tetratech-ffx.com.*

CONTACTS

USEPA-New England is the NPDES permitting authority for Massachusetts and New Hampshire. The other five NEIWPCC member states serve as NPDES permitting authorities for the storm water program. Contact information below was taken from the EPA-New England Web site *http://www.epa.gov/region01/npdes/stormwater/administration.html*, the EPA NPDES Web site *http://www.epa.gov/npdes*, and the New York State Department of Environmental Conservation Web site *http://www.dec.state.ny.us*.

U.S. EPA

EPA Region 1, New England
Regional Storm Water Coordinator
Thelma Murphy 617-918-1615; *murphy.thelma@epa.gov*

Regional Storm Water Assistance Team
Ann Herrick 617-918-1560; *herrick.ann@epa.gov*
Shelly Puleo 617-918-1545; *puleo.shelly@epa.gov*
Olga Vergara 617-918-1519, *vergara.olga@epa.gov*

Massachusetts Assistance
Dave Gray 617-918-1577; *gray.davidj@epa.gov*

EPA Region 2
Regional Storm Water Coordinator
Karen O'Brien 212-637-3717; *obrien.karen@epa.gov*

STATES

Connecticut
Connecticut Department of Environmental Protection
Bureau of Water Management
Permitting, Enforcement, and Remediation Division
http://www.dep.state.ct.us

Contact: Chris Stone 860-424-3850; *chris.stone@po.state.ct.us*

Maine
Maine Department of Environmental Protection
Bureau of Land and Water Quality
http://www.state.me.us/dep/blwq/stormwtr/index.htm

Contact: David Ladd 207-287-5404; *david.ladd@state.me.us*

Massachusetts
Massachusetts Department of Environmental Protection
Division of Watershed Management
http://www.state.ma.us/dep/brp/stormwtr/stormhom.htm

Contacts: Ginny Scarlet 508-767-2797; *ginny.scarlet@state.ma.us*
Linda Domizio 508-849-4005; *linda.domizio@state.ma.us*

New Hampshire
New Hampshire Department of Environmental Services
Storm Water Fact Sheet: *http://www.des.state.nh.us/factsheets/wwt/web-8.htm*
Storm Water Web Site: *http://www.des.state.nh.us/StormWater*
Contacts: Jeff Andrews 603-271-2984
Public Information and Permitting Office 603-271-2975

New York
New York State Department of Environmental Conservation
Division of Water
http://www.dec.state.ny.us/website/dow/mainpage.htm
Contact: Mike Rafferty 518-402-8094; *mrraffer@gw.dec.state.ny.us*

Rhode Island
Rhode Island Department of Environmental Management
Water Resources – Permitting
http://www.state.ri.us/dem/programs/benviron/water/permits/ripdes/stwater/index.htm
Contacts: Margarita Chatterton 401-222-4700 x7605; *mchatter@dem.state.ri.us*
Greg Goblick 401-222-4700 x7265; *ggoblick@dem.state.ri.us*

Vermont
Vermont Department of Environmental Conservation
Water Quality Division
http://www.anr.state.vt.us/dec/waterq/stormwater.htm
Contact: Peter LaFlamme 802-241-3765; *petel@dec.anr.state.vt.us*

APPENDIX A

Model Illicit Discharge and Connection Stormwater Ordinance[1]

ORDINANCE NO. _____

SECTION 1. PURPOSE/INTENT.

The purpose of this ordinance is to provide for the health, safety, and general welfare of the citizens of (_____) through the regulation of non-storm water discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are:

1)To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user

(2) To prohibit Illicit Connections and Discharges to the municipal separate storm sewer system

(3) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance

SECTION 2. DEFINITIONS.

For the purposes of this ordinance, the following shall mean:

Authorized Enforcement Agency: employees or designees of the director of the municipal agency designated to enforce this ordinance.

Best Management Practices (BMPs): schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act. The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity. Activities subject to NPDES Construction Permits. Currently these include construction projects resulting in land disturbance of 5 acres or more. Beginning in March 2003, NPDES Storm Water Phase II permits will be required for construction projects resulting in land disturbance of 1 acre or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials. Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Discharge. Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section X of this ordinance.

Illicit Connections. An illicit connection is defined as either of the following:

---

[1] USEPA. 2002. *Model Ordinances to Protect Local Resources: Illicit Discharges.* http://www.epa.gov/owow/nps/ordinance/discharges.htm

Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or,
Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.
Industrial Activity. Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).
National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit. means a permit issued by EPA (or by a State under authority delegated pursuant to 33 USC § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.
Non-Storm Water Discharge. Any discharge to the storm drain system that is not composed entirely of storm water.
Person. means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner or as the owner's agent.
Pollutant. Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.
Premises. Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.
Storm Drainage System. Publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.
Storm Water. Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.
Stormwater Pollution Prevention Plan. A document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to Stormwater, Stormwater Conveyance Systems, and/or Receiving Waters to the Maximum Extent Practicable.
Wastewater means any water or other liquid, other than uncontaminated storm water, discharged from a facility.

SECTION 3. APPLICABILITY.
This ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency.

SECTION 4. RESPONSIBILITY FOR ADMINISTRATION.
The_____ [authorized enforcement agency] shall administer, implement, and enforce the provisions of this ordinance. Any powers granted or duties imposed upon the authorized enforcement agency may be delegated in writing by the Director of the authorized enforcement agency to persons or entities acting in the beneficial interest of or in the employ of the agency.

SECTION 5. SEVERABILITY.
The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Ordinance.

SECTION 6. ULTIMATE RESPONSIBILITY.

The standards set forth herein and promulgated pursuant to this ordinance are minimum standards; therefore this ordinance does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

SECTION 7. DISCHARGE PROHIBITIONS.

Prohibition of Illegal Discharges.

No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.

The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

(1) The following discharges are exempt from discharge prohibitions established by this ordinance: water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, swimming pools (if dechlorinated - typically less than one PPM chlorine), fire fighting activities, and any other water source not containing Pollutants.

(2) Discharges specified in writing by the authorized enforcement agency as being necessary to protect public health and safety.

(3) Dye testing is an allowable discharge, but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

(4) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

Prohibition of Illicit Connections.

(1) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(2) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(3) A person is considered to be in violation of this ordinance if the person connects a line conveying sewage to the MS4, or allows such a connection to continue.

SECTION 8. SUSPENSION OF MS4 ACCESS.

Suspension due to Illicit Discharges in Emergency Situations

The _____ [authorized enforcement agency] may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or Waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or Waters of the United States, or to minimize danger to persons.

Suspension due to the Detection of Illicit Discharge

Any person discharging to the MS4 in violation of this ordinance may have their MS4 access terminated if such

termination would abate or reduce an illicit discharge. The authorized enforcement agency will notify a violator of the proposed termination of its MS4 access. The violator may petition the authorized enforcement agency for a reconsideration and hearing.

A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the authorized enforcement agency.

SECTION 9. INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES.

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the _____ [authorized enforcement agency] prior to the allowing of discharges to the MS4.

SECTION 10. MONITORING OF DISCHARGES.

1. Applicability.
   This section applies to all facilities that have storm water discharges associated with industrial activity, including construction activity.

2. Access to Facilities.

(1) The_____ [authorized enforcement agency] shall be permitted to enter and inspect facilities subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.

(3) Facility operators shall allow the _____[authorized enforcement agency] ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge storm water, and the performance of any additional duties as defined by state and federal law.

(3) The _____ [authorized enforcement agency] shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's storm water discharge.

(4) The _____ [authorized enforcement agency] has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.

(5) Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the [authorized enforcement agency] and shall not be replaced. The costs of clearing such access shall be borne by the operator.

(6) Unreasonable delays in allowing the _____ [authorized enforcement agency] access to a permitted facility is a violation of a storm water discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge storm water associated with industrial activity commits an offense if the person denies the authorized enforcement agency reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.

(7) If the _____ [authorized enforcement agency] has been refused access to any part of the premises from which stormwater is discharged, and he/she is able to demonstrate probable cause to believe that there may be a violation of this ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this ordinance or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the authorized enforcement agency may seek issuance of a search warrant from any court of competent jurisdiction.

SECTION 11. REQUIREMENT TO PREVENT, CONTROL, AND REDUCE STORM WATER POLLUTANTS BY THE USE OF BEST MANAGEMENT PRACTICES.

[Authorized enforcement agency] will adopt requirements identifying Best Management Practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the U.S. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of these structural and non-structural BMPs. Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of storm water associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section. These BMPs shall be part of a stormwater pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

SECTION 12. WATERCOURSE PROTECTION.

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

SECTION 13. NOTIFICATION OF SPILLS.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the authorized enforcement agency in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the _____ [authorized enforcement agency] within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 14. ENFORCEMENT.

1. Notice of Violation.
   Whenever the _____ [authorized enforcement agency] finds that a

person has violated a prohibition or failed to meet a requirement of this Ordinance, the authorized enforcement agency may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:
(a) The performance of monitoring, analyses, and reporting;
(b) The elimination of illicit connections or discharges;
(c) That violating discharges, practices, or operations shall cease and desist;
(d) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and
(e) Payment of a fine to cover administrative and remediation costs; and
(f) The implementation of source control or treatment BMPs.
If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency or a contractor and the expense thereof shall be charged to the violator.

SECTION 15. APPEAL OF NOTICE OF VIOLATION.
Any person receiving a Notice of Violation may appeal the determination of the authorized enforcement agency. The notice of appeal must be received within _ days from the date of the Notice of Violation. Hearing on the appeal before the appropriate authority or his/her designee shall take place within 15 days from the date of receipt of the notice of appeal. The decision of the municipal authority or their designee shall be final.

SECTION 16. ENFORCEMENT MEASURES AFTER APPEAL.
If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or , in the event of an appeal, within __ days of the decision of the municipal authority upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

SECTION 17. COST OF ABATEMENT OF THE VIOLATION.
Within __ days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment within __ days. If the amount due is not paid within a timely manner as determined by the decision of the municipal authority or by the expiration of the time in which to file an appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment.
Any person violating any of the provisions of this article shall become liable to the city by reason of such violation. The liability shall be paid in not more than 12 equal payments. Interest at the rate of __ percent per annum shall be assessed on the balance beginning on the _st day following discovery of the violation.

SECTION 18. INJUNCTIVE RELIEF.
It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. If a person has violated or continues to violate the provisions of this ordinance, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

SECTION 19. COMPENSATORY ACTION.
In lieu of enforcement proceedings, penalties, and remedies authorized by this Ordinance, the authorized enforcement agency may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

SECTION 20. VIOLATIONS DEEMED A PUBLIC NUISANCE.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

SECTION 21. CRIMINAL PROSECUTION.

Any person that has violated or continues to violate this ordinance shall be liable to criminal prosecution to the fullest extent of the law, and shall be subject to a criminal penalty of _____ dollars per violation per day and/or imprisonment for a period of time not to exceed ____ days.

The authorized enforcement agency may recover all attorney's fees court costs and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

SECTION 22. REMEDIES NOT EXCLUSIVE.

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

SECTION 23. ADOPTION OF ORDINANCE.

This ordinance shall be in full force and effect __ days after its final passage and adoption. All prior ordinances and parts of ordinances in conflict with this ordinance are hereby repealed.

PASSED AND ADOPTED this ____ day of _____, 19__, by the following vote:

APPENDIX C

ALTERNATE MODEL ILLICIT DISCHARGE CONNECTION ORDINANCES

"Illicit discharges to the municipal storm sewer system are comprised of non-storm water discharges that are expressly prohibited from the municipal storm sewer system unless the discharges have received all required federal, state and local permits including the National Pollutant Discharge Elimination System (NPDES) or is included in one of the following categories of discharges: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water springs, water from crawl space sumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, and street wash water discharges, flows from fire fighting activities. If an illicit discharge to the municipal storm sewer system is detected, the owner of the discharge shall cease said discharge within seven calendar days. If the owner does not cease said discharge within seven calendar days, the Town of Southborough shall have the right to take whatever actions it deems necessary to correct the violations and to assert a lien on the subject property in an amount equal to the costs of the remedial actions. The lien shall be enforced in the manner provided or authorized by law for the enforcement of common law liens on personal property. The lien shall be recorded in the land evidence records of the Town of Southborough, and shall incur legal interest from the date of the recording. The imposition of any penalty shall not exempt the offender from compliance with the provisions of this ordinance, including revocation of the performance bond or assessment of a lien on the property."

APPENDIX D

TOWN OF WATERFORD, CONNECTICUT JORDAN BROOK WATERSHED MANAGEMENT PLAN

The Jordan Brook Watershed Management Plan: Protecting Wetlands and Water Quality from Future Development

Abstract

This paper presents a comprehensive watershed management plan for the Jordan Brook watershed, a 21.2 square-kilometer (8.2 square-mile) coastal watershed located in a developing area of southeastern Connecticut on Long Island Sound. The plan provides a consistent framework for evaluating and controlling impacts to wetlands and watercourses from development in the watershed. The watershed management plan includes a baseline assessment of wetland resources throughout the watershed to identify particularly high value wetlands and wetlands which require special levels of protection. The recommended plan consists of five major components including stormwater quality controls, upland protection zones for wetlands and watercourses, groundwater recharge and peak flow requirements, open space protection, and water quality monitoring. A multi-tiered framework is recommended for determining the level of stormwater quality controls required for development projects in order to protect downstream receiving waters and wetlands. The recommended watershed management plan provides a framework which could be applied in other municipalities, especially those affected by EPA's recently promulgated Stormwater Phase II regulations.

Introduction

Research has demonstrated that urbanization is a major cause of degradation to wetlands and surface water quality and typically results in:

Increased volume of stormwater runoff,
Increased pollutant loadings from stormwater runoff,
Reduced infiltration and groundwater recharge,
Lower dry weather stream flows,
Degraded stream habitat, and
Reduced wetland moisture levels.

In most states, protection of wetlands and watercourses is regulated at the local level by municipalities. However, many communities do not have a consistent framework for evaluating wetland and watercourse impacts from development projects.

This paper presents a watershed management plan that provides a consistent framework for evaluating and controlling impacts to wetlands and watercourses from development. The plan was developed to protect wetland resources in the Jordan Brook watershed, a coastal watershed located in southeastern Connecticut on Long Island Sound. While the southern

portion of the watershed has been developed, large areas of the northern watershed remain undeveloped and are experiencing significant development pressure.

The Jordan Brook watershed management plan includes an evaluation of existing watershed resources, including wetlands, stream water quality, land use, and hydrologic conditions. A baseline assessment of wetland resources throughout the watershed was conducted to identify particularly high value wetlands and determine which wetlands require special levels of protection. A geographic information system (GIS)-based pollutant loading model was developed to evaluate subwatershed pollutant loadings, and a hydrological model was developed for the watershed to address stormwater quantity management issues.

The recommended watershed management plan consists of five major components:

Stormwater quality controls,
Upland protection zones for wetlands and watercourses,
Groundwater recharge and stormwater peak flow requirements,
Open space protection within the watershed, and
Water quality monitoring.

The following sections describe existing conditions in the Jordan Brook watershed, an evaluation of the watershed wetlands, and the major components of the recommended watershed management plan.

Watershed Conditions

The Jordan Brook watershed is a 21.2 square-kilometer (8.2 square-mile) watershed located in southeastern Connecticut. A majority of the watershed (94 percent) is located in the Town of Waterford, with a small portion of the watershed (6 percent) located in the City of New London. This watershed is oriented in a north-south direction, extending approximately 8.8 kilometers (5.5 miles) from its headwaters south to Jordan Cove which discharges to Long Island Sound.

The upper reaches of the Jordan Brook watershed are largely undeveloped. Jordan Brook crosses several highways, including Interstate-95, Interstate-395, and State Route 85 through the central portion of the watershed. Development and corresponding imperviousness increase as the brook flows south. Jordan Brook reaches its confluence with Nevins Brook approximately 400 feet upstream of Jordan Cove. Nevins Brook drains the southeastern portion of the watershed. Several smaller tributaries oriented in an east-west direction feed the central and southern portions of Jordan Brook. Figure 1 shows the location of the Jordan Brook watershed.

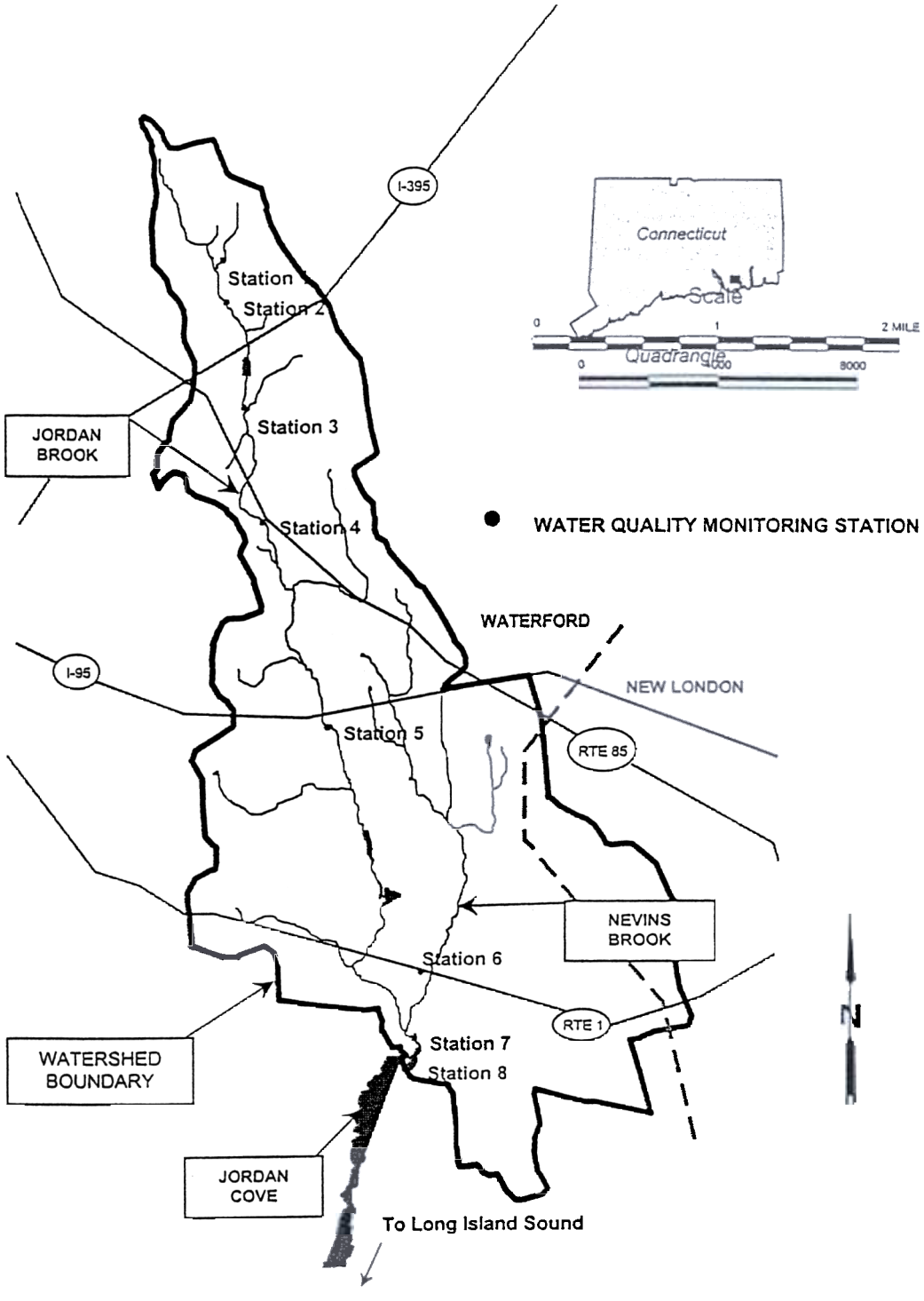


Figure 1. Location map of the Jordan Brook watershed.

Land Use

Watershed land use affects the quantity and quality of stormwater generated in the watershed. Factors such as impervious area, drainage system, development characteristics, traffic volume, air emissions, and exposure of other pollutant sources are dependent on land

use. Approximately 76 percent of the watershed consists of a combination of undeveloped, single family residential, and public facility land uses. Approximately 17 percent of the watershed consists of commercial, industrial and multi-family land uses. Highways and roads comprise approximately 7 percent of the watershed area.

Water Quality

Surface water quality in the watershed generally meets "fishable and drinkable" (Class A) standards established for the State of Connecticut. While surface water quality still meets standards, in-stream concentrations of pollutants increase downstream as development and impervious surfaces increase. Overall watershed imperviousness is approximately 12 percent, while highly developed areas in the southern portion of the watershed are up to 30 percent impervious. These levels of imperviousness are generally within the widely-cited range of impervious coverage values (10 to 30 percent) at which impacts to downgradient water resources are observed (Booth and Reinfelt 1993; Shaver and Maxted 1996; Schueler 1993; Arnold and Gibbons 1996). Additionally, modeling of future pollutant loads indicates that stormwater pollutant loadings could increase by more than 100 percent for zinc and between 30 and 50 percent for phosphorous, copper, and lead under a future full build-out scenario.

Groundwater

The Jordan Brook watershed is underlain by areas of stratified drift that could serve as groundwater aquifers. Potential groundwater aquifers are generally concentrated along Jordan Brook, Nevins Brook, and their associated tributaries. A widespread area of thick stratified drift deposits is located in the southern portion of the watershed. The Town of Waterford has identified this area as a potential public water supply source. However, this area is also susceptible to groundwater contamination from point and non-point sources of pollution due to the high degree of development in the area.

Wetlands Evaluation

A field survey and evaluation of wetlands and watercourses in the watershed was performed in April 1998. The purpose of this survey was to develop a description and biological evaluation of significant surface water and wetland ecosystems within the Jordan Brook watershed in order to identify particularly high value wetlands and wetlands which require special levels of protection.

Wetlands within the Jordan Brook watershed were evaluated using an adaptation of the method developed by the Connecticut Department of Environmental Protection (CTDEP) (Ammann, et al., 1991). This method was designed for use by municipalities as a planning tool and consists of a scientifically defensible numerical scoring system that can

be used to compare the relative value of all wetlands within the same watershed. Wetland value rankings (Low, Average, High or Very High), which reflect the comparative value of wetlands within the watershed, were assigned to each wetland based upon the numerical scores.

The evaluation also identified wetlands within the watershed that would benefit greatly by improvements in the quality of stormwater flowing into them. These wetlands are either

Located in undeveloped areas and would be significantly impacted by degraded stormwater from road runoff or construction related sedimentation,
Degraded surface waters which flow through developed areas and would be significantly enhanced by water quality improvements, or
Wetlands deemed especially sensitive and meriting all possible measures of protection or preservation.

Recommended Plan

A recommended watershed management plan was developed to control wetland and watercourse impacts that may be caused by new development or altered land use activities in the Jordan Brook watershed. The goal of this plan is to maintain or improve existing ecological conditions in watershed wetlands and watercourses while not unreasonably restricting future development. In general, this plan controls several types of potential impacts associated with development. These potential impacts include:

Degradation of surface water quality and wetland habitat
Reduction of groundwater base flows
Increase in stream flood flows

The following are the major elements of the recommended watershed plan.

Stormwater Quality Controls

A stormwater quality control selection methodology was recommended for future development projects to protect watershed wetlands and water quality. This recommended methodology utilizes a tiered approach to define the appropriate level of stormwater controls that would be necessary to protect downstream resources based on the type and size of development and its potential impacts. Three tiers of stormwater controls were recommended, which are triggered based on development characteristics such as level of imperviousness, size of the development, land use, and also based on receiving water/wetland resources.

Base Level Controls

Base level controls are intended to provide baseline protection against degradation of downstream resources across the entire watershed. Base level controls provide gross contaminant and sediment reduction and serve to dissipate the potential erosive energy of stormwater runoff. A base level of stormwater quality controls would be required for all new developments. Redevelopments that result in land use changes or modifications to the storm drainage system would also be required to implement these controls as an opportunity to improve watershed water quality. Base level controls would not be required for single-family houses or residential subdivisions with four or fewer lots that have no new roads, provided that any discharge from the subdivision would not affect a wetland or watercourse that is sensitive to water quality. Development that is part of a phased development project would not be exempt from base level controls.

Base level controls would be required for diffuse runoff and point discharges and would consist of, at a minimum, one or a combination of stormwater Best Management Practices (BMPs) such as vegetated buffer strips, oil/particle separators, level spreaders, sediment basins (with floatables trap), infiltration basins, and vegetated drainage swales. These measures provide a minimum level of stormwater treatment by promoting infiltration and filtration of stormwater pollutants by vegetation or by removal of gross solids and floatables.

Secondary and Tertiary Controls

In addition to the base level controls required for all future development, more stringent stormwater quality controls would be required for developments that have the potential to generate higher pollutant loadings. Similarly, stormwater discharges to wetlands or watercourses identified as being sensitive to water quality would also require an additional level of protection to limit pollutant impacts to these resources. Under this stormwater quality control selection methodology, two levels of additional controls may be required for stormwater discharges that meet these criteria.

Secondary controls would require implementation of stormwater BMPs that remove at least 80 percent of the total suspended solids (TSS) load. The 80 percent TSS removal requirement applies to post-development conditions after a site is stabilized. Examples of BMPs which have been shown to achieve 80 percent TSS removal on average include:

Extended detention pond (equipped with sediment forebay)
Wet pond (equipped with sediment forebay)
Constructed wetland
Sand or organic filter

Devices using swirl/vortex technology
Other proprietary technologies demonstrated to provide 80 percent TSS removal

Floatables such as oil and grease could be removed using a base level control such as an oil/water separator in combination or in addition to the above measures.

Tertiary controls has the goal of no net increase in future pollutant loadings as compared to existing conditions, considering maximum attainable reductions in stormwater pollutant loadings. This level of controls would require at least 80 percent removal of TSS, removal of floatables, and demonstration of no net increase in loadings of other pollutants suspected of being present in the stormwater (e.g., nutrients, metals, coliform bacteria) through the use of a stormwater pollutant loading model. Required stormwater controls would likely consist of one or a series of state-of-the-art stormwater BMPs. This level of control would be required only for those developments with the greatest potential for significant pollutant loadings or potential impacts to wetlands or watercourses which are sensitive to water quality.

Selection Criteria

Selection of the appropriate level of stormwater quality controls for a particular development would be based on consideration of the following criteria:

Receiving water resource - Wetlands or watercourses which are sensitive to water quality would be protected by providing the maximum attainable level of stormwater controls. Tertiary stormwater quality controls would be required for all developments which discharge to such wetlands or watercourses as a point source, either directly or via a storm drainage system, or as uniform, diffuse flow. Stormwater discharges to all other wetlands or watercourses would require base level or secondary controls, depending on the other selection criteria.

Land use of proposed development - Tertiary controls would be required for developments with industrial, high-intensity commercial, or other land uses with the potential for significant pollutant loadings (e.g., gas stations, vehicle service facilities, salt storage areas, marinas).

Level of imperviousness - Developments with less than 10 percent impervious area would require base level controls. Developments with more than 10 percent impervious area would require secondary stormwater quality controls.

Size of development - Developments with greater than five acres of disturbed area would require secondary stormwater quality controls, which is consistent with the CTDEP's existing stormwater general permit that requires projects that result in more

than five acres of disturbance to install controls with a goal of at least 80 percent TSS reduction.

Stormwater quality control selection thresholds for each of these criteria are summarized in Table 1. The most stringent of the applicable control levels would dictate the required level of controls for a particular development project.

Table 1. Stormwater quality control level selection methodology.

Selection Criteria	Stormwater Quality Control Level		
	Base Level Controls	Secondary Controls	Tertiary Controls
Receiving Water Resource	All other wetlands/watercourses	All other wetlands/watercourses	Discharge to wetland/ watercourse sensitive to water quality
Land Use	All other land uses	All other land uses	Facilities with potential for extremely high pollutant loadings
Percent Impervious	0 to 10 percent	Greater than 10 percent	—
Size of Development	0 to 5 acres	Greater than 5 acres	—

Upland Protection Zones

One of the most effective ways to protect wetlands of special significance is to designate an Upland Protection Zone of undisturbed vegetation along the wetland boundary. Natural vegetation stabilizes transitional soils between uplands and wetlands, thereby preventing erosion and sedimentation. The ability to anchor soils on steep slopes is especially important. The vegetation slows the passage of stormwater, allowing infiltration into the soil, thereby removing nutrients and other pollution. Edge habitats in uplands bordering wetlands are also heavily utilized by wildlife, especially birds. An Upland Protection Zone 50 feet in width is recommended for all wetlands, and a 100-foot width is recommended adjacent to perennial streams. These widths are believed adequate to prevent soil erosion on sloping land, provide upland nesting sites for birds, and provide an unbroken travel corridor for mammals, reptiles and amphibians.

No structures, other than bridge supports, culvert abutments, stormwater control devices, or utility lines would be allowed in the Upland Protection Zone. Site-specific

factors which should be considered in adjusting the width of an upland protection zone include the significance of the wetland resource, land slope, soil type, and flood plain limits.

Groundwater Recharge and Peak Stormwater Flows

The watershed management plan recommends that new developments maintain pre-development groundwater base flows. One means of potentially accomplishing this recommendation would be for new developments to infiltrate "clean" roof runoff from non-metallic roofs. Alternatively, new developments could be allowed to infiltrate less water by demonstrating through an engineering evaluation of actual site conditions that less water can be infiltrated and still maintain groundwater base flows.

Increased development could result in increased impervious surfaces and, without adequately sized stormwater controls, will increase peak stormwater flows and increase the volume and rate at which runoff will drain from the site. In order to control this potential impact from new development, the plan recommends that developers include detention/retention devices such that pre-development peak discharge rates from the site are maintained. Some developments that have little potential to significantly impact off-site peak discharge rates could be exempted from this requirement. The developments that could be exempted are small projects that would generate a net increase of peak stormwater flows of less than 1 cubic foot per second and where this level of control may be overly burdensome and include:

Single family residences,
Subdivisions with four lots or less with no new public/private roads,
A project with a net increase of less than 5,000 square feet of impervious surfaces.

The plan requires that new development projects demonstrate no net increase in pre-development peak flows from the site for proposed conditions and compare total proposed peak discharge from the site to existing peak flows at downstream points-of-concern (culverts, wetlands, floodprone areas, etc.). If the total proposed peak discharge from the site exceeds 10 percent of the existing peak flow at a downstream point-of-concern, the project must demonstrate no net increase in pre-development peak flows at each point-of-concern between the site and the downstream most point-of-concern.

Open Space Protection

While encroachment of new development into wetland areas can be prevented through existing regulations, upland areas can be developed, within limitations, unless that land is controlled/or owned by an entity (public or private) that prevents its development. The intent and benefit of maintaining adjacent upland areas is for maintenance of wetland

hydrology and ecological setting. The watershed management plan recommends that the Town of Waterford continue to acquire upland open space that would improve the value of wetlands in the watershed.

Water Quality Monitoring

The plan recommends continued surface water quality monitoring in the watershed to evaluate trends in water quality and the overall success of the watershed management program. Biannual wet and dry weather sampling of Jordan Brook is recommended to monitor conventional water quality parameters. Water quality monitoring of stormwater BMPs is also recommended to confirm that new developments have appropriate controls. Initial and long-term post-construction monitoring of BMPs is recommended.

Conclusions

The watershed management plan described in this paper provides a framework which could be applied to watershed management in other municipalities, especially those affected by EPA's recently promulgated Stormwater Phase II regulations which will require expanded stormwater controls for small- to mid-size municipalities. Field evaluation of wetlands and water resources in the watershed is a critical component of this framework, which prioritizes the required level of stormwater quality controls based on a number of site-specific factors, including the relative value of the receiving water resource. The success of this watershed management plan will be measured through ongoing water quality and stormwater BMP monitoring, as well as future wetlands evaluations.

References

Ammann, A.P., R.W. Franzen and J.L. Johnson, 1991. Method for the Evaluation of Inland Wetlands in Connecticut: A Watershed Approach, Bulletin No. 9, Department of Environmental Protection, 79 Elm Street, Hartford, Connecticut.

Arnold, C.L., Jr., and C.J. Gibbons, 1996. Impervious Surface Coverage: The Emergence of a Key Environmental Indicator, Journal of the American Planning Association, 62(2).

Booth, D.B. and L.E. Reinfelt, March 1993. Consequences of Urbanization on Aquatic Systems - Measured Effects, Degradation Thresholds, and Corrective Strategies, In Proceedings of the Watershed '93 Conference, Alexandria, Virginia.

Schueler, T.R., 1994. The Importance of Imperviousness, Watershed Protection Techniques, Vol. 1, No. 3

Shaver, E.J. and J.R. Maxted, 1996. Technical Note 72 Habitat and Biological Monitoring

Reveals Headwater Stream Impairment in Delaware's Piedmont, Watershed Protection Techniques, Vol. 2, No. 2.

APPENDIX E

DRAFT MODEL STORM WATER MANAGEMENT AND LAND DISTURBANCE BY-LAW

CLEAN REVISED VERSION
Dated April 7, 2003

ADOPTION OF LOCAL STORM WATER BYLAWS

Models and Guidance for Massachusetts Municipalities

Acknowledgements

The model bylaws and accompanying guidance are the result of the hard work of many people. Linda Domizio Phase II Planner, and Ginny Scarlet, Phase II Storm Water Coordinator of DEP chaired a Phase II Bylaws Subcommittee of the DEP Stormwater Advisory Committee charged with the drafting. We are grateful to the committee members for so generously sharing expertise, and for their persistence and good humor. The members were:

Jay Brolin, Fuss and O'Neill, Inc.
Mike Cuneo, Conservation Agent, Town of Dedham
Kelli Lawrence, Assistant Attorney General
Tyler Phillips, Comprehensive Environmental, Inc.
Martin Pillsbury, Metropolitan Area Planning Council
Margaret Van Dusen, Esq., Charles River Watershed Association
Vincent Vignaly, Metropolitan District Commission
Ernest Williams, Superintendent of Public Works, Town of Canton

Special thanks to John W. Giorgio, Esq., of Kopelman and Paige, P.C. for review and comments.

Table of contents

Introduction

These model bylaws are intended to help regulated Massachusetts communities comply with the National Pollutant Discharge Elimination System (NPDES) Storm Water Phase II permit program. Phase II requires that regulated municipalities reduce the discharge of pollutants in storm water to the maximum extent practicable. As part of the reduction measures municipalities must develop and adopt, or already have in place, bylaws or ordinances to address control of sources of pollutants entering the municipal storm drain system. These model bylaws and related guidance were developed for use by Massachusetts municipalities regulated by the Phase II Storm Water Rule.

More specifically, the Massachusetts Department of Environmental Protection (DEP) formed and chaired the Phase II Bylaws Subcommittee whose members are identified in the Acknowledgements section of this guidance to draft model storm water bylaws to fit the structure of Massachusetts local governments, Massachusetts state law, and the Massachusetts Storm Water Management Policy. The objective for creating the models was to assist the 251 Massachusetts towns in developing bylaws or ordinances necessary to ensure compliance with Phase II. In addition, the use of the models is intended to promote consistency in the way municipalities regulate certain Phase II storm water discharges. DEP emphasizes, however, that it is not requiring regulated municipalities to adopt these specific model bylaws. Each community will still need to tailor them to fit with the existing town bylaws or city ordinances. In every case, municipalities need to consult with and use their legal counsel in developing and adopting the required bylaws or ordinances, including when making the decision to adopt these model bylaws, in whole or in part.

Phase II requirements applicable to Small MS4s

The federal Phase II requirements for adopting bylaws or ordinances in connection with the implementation of certain of the required minimum control measures by small municipal separate storm sewer systems ("small MS4s") are contained in 40 CFR 122.34(b)(3-5), and in DEP's recently revised Surface Water Discharge Permit Regulations at 314 CMR 3.06(11)(b)5. These requirements are also incorporated in the small MS4 General Permit jointly issued by EPA and DEP. See sections II.B. 3.(b), IIB.4. (a)-(g), and II.B.5.(a)&(b) of the General Permit. A Small Municipal Separate Storm Sewer System or "small MS4" is defined in 40 CFR 122.26(b)(8) and 314 CMR 3.02 as "all separate storm sewers that are:

(a) Owned or operated by the United States, the Commonwealth of Massachusetts, a city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having

jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Federal Act that discharges to waters of the United States.

(b) Not defined as a large or medium municipal separate storm sewer systems pursuant to 40 CFR s.122.26(b)(4) and (b)(7) or designated under 40 CFR s.122.26(a)(1)(v).

(c) This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospitals or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas such as individual buildings."

The key components of the required bylaws, ordinances or other regulatory mechanisms are as follows:

1. A bylaw, ordinance, or other regulatory mechanism that addresses Illicit Connection Detection & Elimination and must:

- prohibit non-storm water discharges into the MS4; and
- contain enforcement procedures and actions.

2. A bylaw, ordinance, or other regulatory mechanism to control Construction Site Storm Water Runoff that must:

- apply to sites disturbing 1 acre or more THAT contribute RUNOFF TO THE MS4;
- also apply to smaller sites that are part of a common plan that together will disturb 1 or more acres of land;
- require Erosion and Sedimentation controls;
- include a process for public input;
- ensure site plan review, including preconstruction review, and that considers potential water quality impacts;
- require control of construction waste;
- provide for site inspections; and
- have procedures for enforcement of control measures.

3. A bylaw, ordinance, or other regulatory mechanism to control Post-construction Storm Water Management from New Development and Redevelopment that must:

- apply to projects that newly discharge runoff to the MS4;
- apply to projects that disturb 1 or more acres;
- apply to projects less than one acre if part of a common plan that all together will disturb 1 or more acre;
- require permanent storm water controls to minimize water quality impacts;

- require storm water controls appropriate to the community; and
- ensure long term operation & maintenance of structural storm water controls.

Evaluating the task of adopting the required bylaws

At the outset, the relevant municipal officials and their legal counsel should evaluate the extent to which the municipality's existing bylaws or ordinances already address the required small MS4 minimum control measures described above. The involvement of municipal counsel is critical at this and subsequent stages of the bylaw evaluation and development task. Municipal counsel should review existing bylaws, ordinances and regulations, determine what relevant legal controls are already in place, and provide advice on the scope and substance of any new or modified bylaws or ordinances needed to comply with the relevant small MS4 minimum control measures.

The model bylaws contained in this guidance have been drafted as separate bylaws to emphasize each area that must be addressed and to provide the required elements of each. However, municipalities may decide to combine the models into a master storm water management bylaw or keep them separate. Alternatively, a municipality may cut and paste as appropriate to develop the needed modifications or additions to existing bylaws. The goal is to make sure that all of the required Phase II components are incorporated into one or more municipal bylaws. Municipalities have flexibility in how they accomplish that goal.

The decision whether to amend existing bylaws or adopt new bylaws

As a general rule, it is usually easier to persuade town meeting to amend an existing bylaw than to adopt a whole new bylaw. On the other hand, a series of amendments to existing bylaws may result in a more complicated and unwieldy process. A municipality, in consultation with its legal counsel, should weigh the pros and cons of these alternative approaches. Keep in mind that even if a municipality decides to adopt one of the models in its entirety, it must first ensure that each section of the model bylaw applies appropriately to the municipality – i.e., it accurately reflects the physical landscape, the types of existing infrastructure, and is not conflict with any existing bylaw.

The Use of **General Bylaws vs. Zoning Bylaws**

The Phase II Bylaw Subcommittee drafted these model bylaws as general bylaws, and strongly recommends that municipalities adopt the required bylaws as general bylaws. Zoning bylaws must be adopted in accordance with the procedures provided in G.L. c. 40A, § 5, (http://www.state.ma.us/legis/laws/mgl/40a%2D5.htm), have prospective effect only on uses and structure, and enjoy certain "grandfathering" protections. Non-zoning (or "general") bylaws do not require extra procedures for adoption, are not given certain statutory protections, and do not grandfather existing uses unless the bylaw itself otherwise provides. More specifically, zoning bylaws require a 2/3 majority of town/city council or town meeting, while general by-laws require a simple majority vote.

The distinction between "general" bylaws and a zoning by-law is important because zoning bylaws are accorded additional levels of protection under G.L. c. 40A. For example, zoning bylaws provide protection to land shown on subdivision plans that is related to the effective date of a bylaw. Specifically, G.L. c. 40A, § 6, allows land shown on a definitive subdivision plan (or preliminary plan followed within seven months by a definitive plan) to be governed by the zoning bylaws that are in effect at the time of the first submission of the plan to the planning board *as long as* (emphasis added) written notice is also given to the town clerk before the effective date of the amended zoning by-law. Therefore, if a plan is submitted and written notice is given to the town clerk before the amended or subsequent zoning by-law takes effect (i.e., date of adoption by town meeting), the land shown on that plan will be protected from amendments to the zoning bylaws by town meeting for eight years (or longer if an appeal is taken.). ***http://www.state.ma.us/legis/laws/mgl/40a-6.htm*** The delay in effect caused by such "grandfathering" protections means zoning changes will not provide effective controls on the relevant storm water activities until after the end of the first 5 year term of the Phase II small MS4 General Permit.

Assign responsibility for drafting amendments or bylaws.

The decision to amend or draft the required bylaws should be made or ratified by the chief executive of the municipality. Consultation among town boards and departments during the drafting process is essential. A committee of municipal officials with the most relevant responsibilities is one way to achieve this consultation. Recruiting volunteers from the community to the committee can spread the workload and start the necessary process of publicizing the project. As stated earlier, municipal counsel should be involved at this and subsequent stages in the process.

Set a schedule.

Phase II requires that the municipal storm water controls be in place no later than the end of the first permit term, March 10, 2008. It is a good idea to adopt the bylaws as soon as practical. The bylaws give the town necessary mechanisms to use in complying with Phase II. For example, the Bylaw Governing Discharges to the Municipal Storm Drain System confers express enforcement authority on the municipality to require elimination

or correction of improper or "illicit" connections to its separate sewer (or drainage) system.. The process from the drafting of a bylaw through its final adoption is lengthy. Local requirements for adopting bylaws may vary according to terms of local law. Consultation with and the assistance of municipal legal counsel is essential throughout the bylaw development and adoption process.

When developing a schedule for adopting the bylaw(s), include time for Attorney General review and subsequent publication and posting of the bylaw(s). This is because thenew bylaw(s) will not take effect until these steps have been completed. The effective date of a general bylaw is governed by G.L. c. 40 §□□32 which establishes the procedures that must be followed in order for a general bylaw to take effect. First, the bylaw must be submitted to and approved by the Attorney General or ninety days elapse after submittal without any action by the Attorney General. Second, once approved by the Attorney General (or if the bylaw is constructively approved by failure of the Attorney General to act within 90 days), the town must post and publish the bylaw as set out in section 32. (To read the text of G.L. c. 40, section 32, go to *http://www.state.ma.us/legis/laws/mgl/40-32A.htm).* In comparison, the effective date of zoning bylaws is more complicated and is governed by G.L. 40A Sections 5 and 6. If a municipality is amending or adopting a zoning bylaw, it is particularly important to consult with municipal legal counsel to confirm the process and timing of adopting such a bylaw.

Designating Responsibility for Administering the Bylaw.

Designate the most appropriate municipal board or department to administer each new bylaw.

- ✓ Consider the current task and expertise distribution in town. There may be an obvious choice.
- ✓ Planning Boards, Zoning Boards of Appeals, and Boards of Health can legally collect consultant fees using a special account (See fees section below) . Conservation Commissions cannot collect fees unless there's been a special act of the Legislature setting up an account or the Commission has a revolving fund reauthorized <u>each year</u> at Town Meeting. Without the use of some sort of special account any funds taken in by any board must go into the municipality's general fund.
- ✓ If the municipality has in house expertise (i.e., town engineer or engineering dept.), fees for review can appropriately go to the general fund and be based on average review costs.
- ✓ DPW probably knows the most about the MS4.

Whole Town vs. Urbanized Area.
The Phase II small MS4 Rule requires the adoption of bylaws in small MS4s located within the boundaries of an "Urbanized Area" of Massachusetts, which have been designated by EPA based on federal Census Bureau data. Accordingly, a municipality is required to adopt bylaws that apply only to the "Urbanized Area" of the municipality.

However, as a practical matter, this approach of limiting the scope of the bylaws to the Urbanized Area of the municipality may be difficult to administer. For example, the coverage area would need to be changed at Town Meeting after each decennial census when the Census Bureau recalculates Urbanized Areas. In cases where the Urbanized Area encompasses the majority of the municipality, the Phase II Bylaws Subcommittee recommends that the bylaws apply throughout the municipality. Where this is not the case, a municipality will need to weigh the pros and cons of applying the bylaws beyond the scope of the regulated Urbanized Area.

Entry onto Private Property Municipal officials do not have the authority under a local bylaw to conduct warrantless searches of private property without permission of the owner. Commonwealth v. John G. Grant & Sons Co., Inc., 403 Mass. 151, 159-60 (1988). When entry upon private property is necessary or appropriate for the investigation of an apparent or suspected violation of a bylaw, it would be necessary for the municipal body authorized to enforce the bylaw to obtain a warrant to do so in the absence of express permission by the owner or other lawful means. In a nutshell; start by asking nicely. If refused, get a warrant. Consult municipal legal counsel about the procedure for getting a warrant and a reasonable expectation of the time needed to do so.

Agriculture. Agriculture is protected from local regulation by state laws that exempt regulation of agriculture, therefore the model bylaws contain exemptions for agricultural activities. MGL c. 40A, § 3, paragraph. 1 – provides that towns cannot prohibit, unreasonably regulate, or require a Special Permit for the use of land for the primary purpose of agriculture. The only exception is land under 5 acres that is not zoned agricultural.

Note that the models cite the definition of agriculture in the regulations for the Wetlands Protection Act, c131, § 40 at 310 CMR 10.04. That definition makes it clear that agriculture is a commercial activity. Backyard gardens are not agriculture. Cutting trees is not agriculture unless carried out in accordance with a Forest Cutting Plan approved by the Department of Environmental Management (DEM) under the provisions of M.G.L. c. 132, § 40 through 46. Conservation commissions should have a copy of 310 CMR 10.00 (DEP's Wetlands Regulations). Copies are also available from the State House Bookstore and DEP's website at: http://www.state.ma.us/dep/brp/ww/regs.htm

Fees. Towns should be aware that application of their fee provisions could result in municipal revenues brushing up against or exceeding the limits imposed on local government by state statutes. The town should discuss with town counsel whether the fee provisions, collectively, and as applied, amount to a tax not specifically authorized by the Legislature and are therefore unlawful.

Valid fees are generally distinguishable from invalid taxes by three criteria: (i) the fee is assessed for a particular government service benefiting the party paying the fee in a manner not shared by other persons; (ii) the person assessed has the option to decline the service and thus avoid the charge; and (iii) the amounts paid compensate the town for its costs and expenses of providing the services rather than raising revenues. Emerson College v. Boston, 391 Mass. 415, 427-428 (1984). Moreover, a lawful fee is one that only covers the board's reasonably anticipated costs of providing the services for which the fee is assessed. Southview Cooperative Housing Corp. v. Rent Control Board of Cambridge, 396 Mass. 395, 402 (1985).

Fees to Cover the Cost of Review by a Municipality's Consultant.

General Laws Chapter 44 §□□53, [found at, http://www.state.ma.us/legis/laws/mgl/44-53.htm] provides that "all moneys received by a city, town or district officer or

department, except as otherwise provided by special acts and except fees provided for by statute, shall be paid by such officers or department upon their receipt into the city, town or district treasury. Therefore, any fees collected by the town from an applicant to cover consultant review must be deposited with the Town Treasurer and made part of the town's general fund. Such funds would ***only*** be available for the purpose for which they were assessed (paying the consultant) once an appropriation is made by Town Meeting

G.L. c. 44 §53G is an illustration of "as otherwise provided by special acts and except fees provided for by statute." General Laws Chapter 44 §53G authorizes zoning boards, planning boards, and boards of health acting under authority conferred by G.L. c. 40A §9 and 12, c. 41 §81Q, c. 40B, §21, and c. 111, to impose a fee to pay for its anticipated expenses in retaining a consultant, to draw upon the funds collected for the stated purpose, and to return unused portions to the applicant. Note that the Legislature did not include conservation commissions within the small class of local boards that enjoy the benefits of Section 53G. Such inclusion would require special legislation or an amendment to the statute.

Another such general law is established by G.L. c. 44, §53E-1/2, authorizing revolving funds. There are many practical problems and difficulties in trying to adapt the functionality of the revolving fund to purposes which the fund established under G.L. c. 44, §53G, was uniquely designed to achieve. Revolving funds were authorized by the Legislature for the deposit of "departmental receipts received in connection with the programs supported by such revolving fund." It is not entirely clear whether the term "programs" is malleable enough to be applicable to the project-oriented review functions of an administrating board, or that the "consultant fee" is the functional equivalent of the "program fee" for which revolving fees were authorized by the Legislature. It is important to point out, however, that the purposes intended require an applicant to give money to the town to cover anticipated "but only estimated" expenses for consulting services.

Moreover, unused portions of the fee may not be returned to the applicant if the fee was deposited either to the general fund under G.L. c. 44, §53, or in a revolving fund under G.L. c. 44 §53E-1/2. Section 53G funds are equipped with a statutory basis for the return of unused portions.

Lastly, G.L. c. 44 §53E-1/2, requires revolving funds to be established and renewed annually by Town Meeting, and may not be set up in the body of a town by-law. Each town meeting has the power to decide whether or not to authorize a revolving fund for the upcoming fiscal year and if so, what particular receipts will be credited to the fund and how the funds may be spent. One town meeting cannot bind future town meetings with respect to authorizing a revolving fund. The town should consult with Town Counsel so as to assure that all of the provisions of G.L. c. 44, §53E-1/2, are complied with in the handling of such fees.

State and Federal Government

State agencies are generally exempt from local regulation that would prevent or interfere with the performance of an "essential governmental function of that agency or unless the relevant statute expressly subjects the agency to local regulation or when the state agency has chosen to submit to local regulation. The doctrine of federal supremacy protects the legitimate activities of the United States Government from regulation by state and local authorities. Municipalities should consult with their legal counsel as to the circumstances in which state and federal government will be subject to the provision of the model bylaws.

Penalties

General Laws Chapter 40, Section 21., gives towns the authority to make ordinances and bylaws. The statute also provides, "*They may, except as herein provided, affix penalties for breaches thereof not exceeding three hundred dollars for each offense, which shall enure to the town or to such uses as it may direct. Notwithstanding the provisions of any special law to the contrary, fines shall be recovered by indictment or on complaint before a district court, or by noncriminal disposition in accordance with section twenty-one D.*" Municipalities should consult their legal counsel when setting penalties consistent with the maximum amount allowed under the above statute and in developing the enforcement provisions of the bylaw.

Non-criminal Disposition

General Laws, Chapter 40, Section 21D, allows municipalities to use non-criminal disposition as a method to enforce town bylaws. The law has several specific requirements. Section 21D requires that a bylaw contain a reference to the enforcing person. The enforcing person is the person empowered to enforce the particular bylaw. Section 21D also requires that the violation be subject to a specific penalty. Non-criminal disposition is not available for the violations having a range of penalties. Before the town applies the non-criminal disposition provision of a bylaw, the town must provide for an enforcing person and specific penalties for violations.

Public Education

In addition to the adoption of the required minimum controls applicable to small MS4s under Phase II, enactment of new or amended municipal bylaws requires publication, posting, and persuasion. These activities can be part of meeting the public education requirements of Phase II. It is wise to start public education early. Have at least one public meeting about the proposed bylaws before town meeting, even if a hearing is not required. Assemble and present information about specific storm water effects in your town to illustrate the need for and effect of the bylaws.

More Resources:

http://www.epa.gov/region01/npdes/ms4.html **[Paul and/or Ginny - please verify that this is the correct website address for the General Permit]** The Final National

Pollutant Discharge Elimination System General Permit F Storm Water Discharges From Small Municipal Separate Storm Systems (small MS4s).

http://www.umass.edu/masscptc/Tips_on_Drafting.html This website has a very helpful document about drafting bylaws.

http://www.stormwatercenter.net/ This site has other model bylaws. They don't fit well with the structure of Massachusetts governments but are useful for other viewpoints on storm water management.

http://www.state.ma.us/legis/laws/mgl/ The General Laws of Massachusetts. The site cautions that it is not official but the index and search features make it an excellent ready reference during the drafting process.

The Models:

ARTICLE ___

Bylaw Governing Discharges To The Municipal Storm Drain System

SECTION 1. PURPOSE

Increased and contaminated stormwater runoff are major causes of

(1) impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;

(2) contamination of drinking water supplies;

(3) alteration or destruction of aquatic and wildlife habitat; and

(4) flooding.

Regulation of illicit connections and discharges to the municipal storm drain system is necessary for the protection of the [*city or town's*] water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment.

The objectives of this by-law are:

(1) To prevent pollutants from entering the [*city or town's*] municipal separate storm sewer system (MS4);

(2) To prohibit illicit connections and unauthorized discharges to the MS4;

(3) To require the removal of all such illicit connections;

(4) To comply with state and federal statutes and regulations relating to stormwater discharges; and

(5) To establish the legal authority to ensure compliance with the provisions of this by-law through inspection, monitoring, and enforcement.

SECTION 2. DEFINITIONS

For the purposes of this by-law, the following shall mean:

AUTHORIZED ENFORCEMENT AGENCY: The *[insert appropriate Town body/dept./board]* (hereafter *[the Board]*), its employees or agents designated to enforce this by-law.

BEST MANAGEMENT PRACTICE (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of storm water runoff.

CLEAN WATER ACT: The Federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq*.) as hereafter amended

DISCHARGE OF POLLUTANTS: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

GROUNDWATER: Water beneath the surface of the ground.

ILLICIT CONNECTION: A surface or subsurface drain or conveyance, which allows an illicit discharge into the municipal storm drain system, including without limitation sewage, process wastewater, or wash water and any connections from indoor drains, sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this by-law *[or ordinance]*

ILLICIT DISCHARGE: Direct or indirect discharge to the municipal storm drain system that is not composed entirely of storm water, except as exempted in Section 7. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or a Surface Water Discharge Permit, or resulting from fire fighting activities exempted pursuant to Section 7, subsection 4, of this by-law.

IMPERVIOUS SURFACE: Any material or structure on or above the ground that prevents water infiltrating the underlying soil. Impervious surface includes without limitation roads, paved parking lots, sidewalks, and roof tops.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)or MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying storm water, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the *[town/city of _____]*.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER DISCHARGE PERMIT: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

NON-STORMWATER DISCHARGE: Discharge to the municipal storm drain system not composed entirely of storm water.

PERSON: An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POLLUTANT: Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants shall include without limitation**:**
(1) paints, varnishes, and solvents;

(2) oil and other automotive fluids;

(3) non-hazardous liquid and solid wastes and yard wastes;

(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;

(5) pesticides, herbicides, and fertilizers;

(6) hazardous materials and wastes; sewage, fecal coliform and pathogens;

(7) dissolved and particulate metals;

(8) animal wastes;

(9) rock; sand; salt, soils;

(10) construction wastes and residues;

(11) and noxious or offensive matter of any kind.

PROCESS WASTEWATER: Water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

RECHARGE: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

STORMWATER: Runoff from precipitation or snow melt.

SURFACE WATER DISCHARGE PERMIT. A permit issued by the Department of Environmental Protection pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

TOXIC OR HAZARDOUS MATERIAL or WASTE: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or

radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

WATERCOURSE: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

WATERS OF THE COMMONWEALTH: all waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, costal waters, and groundwater.

WASTEWATER: any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

SECTION 3. APPLICABILITY

This by-law shall apply to flows entering the municipally owned storm drainage system.

SECTION 4. AUTHORITY

This bylaw is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, and the regulations of the federal Clean Water Act found at 40 CFR 122.34. **[Is it accurate to say that this municipal bylaw is being adopted under authority conferred on the municipality by the cited EPA regulations? The reg *requires* the muni to adopt a bylaw, ordinance or other regulatory mechanism, rather than authorizes a muni to do so]**

SECTION 5. RESPONSIBILITY FOR ADMINISTRATION

[The Board] shall administer, implement and enforce this by-law**.** Any powers granted to or duties imposed upon *[the Board]* may be delegated in writing by the *[the Board]* to employees or agents of *[the Board]*.

SECTION 6. REGULATIONS

[The Board] may promulgate rules and regulations to effectuate the purposes of this by-Law. Failure by the *[the Board]* to promulgate such rules and regulations shall not have the effect of suspending or invalidating this by-law.

SECTION 7. PROHIBITED ACTIVITIES

1. Illicit Discharges

No person shall dump, discharge, cause or allow to be discharged any pollutant **or non-stormwater discharge** into the municipal separate storm sewer system (MS4), into a watercourse, or into the waters of the Commonwealth.

2. **Illicit Connections**

No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.

3. **Obstruction of Municipal Storm Drain System**

No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior written approval from *[The Board]*.

4. **Exemptions**

A. Discharge or flow resulting from fire fighting activities;

B. The following **non-storm water discharges** or flows are exempt from the prohibition of non-storm waters provided that the source is not a significant contributor of a pollutant to the municipal storm drain system:

(1) Waterline flushing;

(2) Flow from potable water sources;

(3) Springs;

(4) Natural flow from riparian habitats and wetlands;

(5) Diverted stream flow;

(6) Rising groundwater;

(7) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;

(8) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;

Comment

Sump pumps are a common source of discharge into storm drain systems. If pumping uncontaminated storm water, sump pumps are permissible under the Phase II regulations. If the intake is inside a structure's living area, however, contamination is likely. Some towns, e.g. Canton, require a permit for sump pumps. Permitting allows education of the owner concerning the prohibition of contaminants and the permit can be withdrawn if the water is contaminated.

(9) Discharge from landscape irrigation or lawn watering;

(10) Water from individual residential car washing;

(11) Discharge from dechlorinated swimming pool water (less than one ppm chlorine) provided the water is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance;

(12) Discharge from street sweeping.

(13) Dye testing, provided verbal notification is given to the *[the Board]* prior to the time of the test;

(14) Non-storm water discharge permitted under an NPDES permit or a Surface Water Discharge Permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations; and

(15) Discharge for which advanced written approval is received from the *[the Board]* as necessary to protect public health, safety, welfare or the environment.

SECTION 8. EMERGENCY SUSPENSION OF STORM DRAINAGE SYSTEM ACCESS

[The Board] may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened discharge of pollutants that presents imminent risk of harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the Authorized Enforcement Agency may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

SECTION 9. NOTIFICATION OF SPILLS

Notwithstanding other requirements of local, state or federal law, as soon as a person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of or suspects a release of materials at that facility or operation resulting in or which may result in discharge of pollutants to the municipal drainage system or waters of the Commonwealth, the person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police

departments and *[insert other appropriate departments]*. In the event of a release of non-hazardous material, the reporting person shall notify the Authorized Enforcement Agency no later than the next business day. The reporting person shall provide to the Authorized Enforcement Agency written confirmation of all telephone, facsimile or in-person notifications within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 10. ENFORCEMENT

1. *[The Board]* or an authorized agent of *[the Board]* shall enforce this by-law, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

2. **Civil Relief**

If a person violates the provisions of this by-law, regulations, permit, notice, or order issued thereunder, the *[the Board]* may seek injunctive relief in a court of competent jurisdiction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation**.**

3. **Orders**

[The Board] or an authorized agent of *[the Board]* may issue a written order to enforce the provisions of this by-law or the regulations thereunder, which may include: (a) elimination of illicit connections or discharges to the MS4; (b) performance of monitoring, analyses, and reporting; (c) that unlawful discharges, practices, or operations shall cease and desist; and (d) remediation of contamination in connection therewith.

If the enforcing person determines that abatement or remediation of contamination is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the *[city or town]* may, at its option, undertake such work, and expenses thereof shall be charged to the violator.

.

Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the *city or town*, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with *[the Board]* within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of *[the Board]* affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs

at the statutory rate provided in G.L. Ch. 59, § 57 after the thirty-first day at which the costs first become due.

4. **Criminal Penalty**

Any person who violates any provision of this by-law, regulation, order or permit issued thereunder, shall be punished by a fine of not more than $____.__. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

5. **Non-Criminal Disposition**

As an alternative to criminal prosecution or civil action, the [city or town] may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch. 40, §21D and *the insert citation town enabling vote/bylaw* of the Town of _____, in which case *the insert title or other authorized agent* of the *city/town* shall be the enforcing person. The penalty for the 1st violation shall be $___. The penalty for the 2nd violation shall be $____. The penalty for the 3rd and subsequent violations shall be $ _____. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

6. **Entry to Perform Duties Under this By-Law**

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the _____, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this by-law and regulations and may make or cause to be made such examinations, surveys or sampling as the _____ deems reasonably necessary

7. **Appeals**

The decisions or orders of the _____ shall be final. Further relief shall be to a court of competent jurisdiction.

9. **Remedies Not Exclusive**

The remedies listed in this by-law are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION 11. SEVERABILITY

The provisions of this by-law are hereby declared to be severable. If any provision, paragraph, sentence, or clause, of this by-law or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this by-law.

SECTION 12 TRANSITIONAL PROVISIONS

Residential property owners shall have _____days from the effective date of the by-law to comply with its provisions provided good cause is shown for the failure to comply with the by-law during that period.

STORMWATER MANAGEMENT AND LAND DISTURBANCE BYLAW
DRAFT

SECTION 1. PURPOSE

A. The harmful impacts of soil erosion and sedimentation are:

1. impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;

2. contamination of drinking water supplies;

3. alteration or destruction of aquatic and wildlife habitat;

4. flooding; and,

5. overloading or clogging of municipal catch basins and storm drainage systems.

B. The objectives of this bylaw are to:

1. protect water resources;

2. require practices that eliminate soil erosion and sedimentation and control the volume and rate of storm water runoff resulting from land disturbance activities;

3. promote infiltration and the recharge of groundwater;

4. ensure that soil erosion and sedimentation control measures and storm water runoff control practices are incorporated into the site planning and design process and are implemented and maintained;

5. require practices to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

6. comply with state and federal statutes and regulations relating to storm water discharges; and,

7. establish the [city or town's] legal authority to ensure compliance with the provisions of this by-law through inspection, monitoring, and enforcement.

SECTION 2. DEFINITIONS

ABUTTER: The owner(s) of land abutting the activity.

AGRICULTURE: The normal maintenance or improvement of land in agricultural or aquacultural use, as defined by the Massachusetts Wetlands Protection Act and its implementing regulations.

APPLICANT: Any person, individual, partnership, association, firm, company, corporation, trust, authority, agency, department, or political subdivision, of the Commonwealth or the Federal government to the extent permitted by law requesting a soil erosion and sediment control permit for proposed land-disturbance activity.

AUTHORIZED ENFORCEMENT AGENCY: The *[appropriate Town body/dept./board, hereafter the Board]*, its employees or agents designated to enforce this by-law.

CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC): A certified specialist in soil erosion and sediment control. This certification program, sponsored by the Soil and Water Conservation Society in cooperation with the American Society of Agronomy, provides the public with evidence of professional qualifications.

CONSTRUCTION AND WASTE MATERIALS: Excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter and sanitary waste at a construction site that may adversely impact water quality.

CLEARING: Any activity that removes the vegetative surface cover.

EROSION: The wearing away of the land surface by natural or artificial forces such as wind, water, ice, gravity, or vehicle traffic and the subsequent detachment and transportation of soil particles.

EROSION AND SEDIMENTATION CONTROL PLAN: A document containing narrative, drawings and details developed by a qualified professional engineer (PE) or a Certified Professional in Erosion and Sedimentation Control (CPESC), which includes best management practices, or equivalent measures designed to control surface runoff, erosion and sedimentation during pre-construction and construction related land disturbance activities.

ESTIMATED HABITAT OF RARE WILDLIFE AND CERTIFIED VERNAL POOLS: Habitats delineated for state-protected rare wildlife and certified vernal pools for use with the Wetlands Protection Act Regulations (310 CMR 10.00) and the Forest Cutting Practices Act Regulations (304 CMR 11.00).

LAND-DISTURBING ACTIVITY: Any activity that causes a change in the position or location of soil, sand, rock, gravel, or similar earth material.

MASSACHUSETTS ENDANGERED SPECIES ACT: (M.G.L. c. 131A) and its implementing regulations at (321 CMR 10.00) which prohibit the "taking" of any rare plant or animal species listed as Endangered, Threatened, or of Special Concern.

MASSACHUSETTS STORM WATER MANAGEMENT POLICY: The Policy issued by the Department of Environmental Protection, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act MGL c. 131 s. 40 and Massachusetts Clean Waters Act MGL c. 21, ss. 23-56. The Policy addresses storm water impacts through implementation of performance standards to reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or municipal storm drain system: The system of conveyances designed or used for collecting or conveying storm water, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the [*town/city of* _____].

OWNER: A person with a legal or equitable interest in property.

PERSON: An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

PRE-CONSTRUCTION: All activity in preparation for construction.

PRIORITY HABITAT OF RARE SPECIES: Habitats delineated for rare plant and animal populations protected pursuant to the Massachusetts Endangered Species Act and its regulations.

RUNOFF: Rainfall, snowmelt, or irrigation water flowing over the ground surface.

SEDIMENT: Mineral or organic soil material that is transported by wind or water, from its origin to another location; the product of erosion processes.

SEDIMENTATION: The process or act of deposition of sediment.

SITE: Any lot or parcel of land or area of property where land-disturbing activities are, were, or will be performed.

SLOPE: The incline of a ground surface expressed as a ratio of horizontal distance to vertical distance.

SOIL: Any earth, sand, rock, gravel, or similar material.

STABILIZATION: The use, singly or in combination, of mechanical, structural, or vegetative methods, to prevent or retard erosion.

STRIP: Any activity which removes the vegetative ground surface cover, including tree removal, clearing, grubbing, and storage or removal of topsoil.

VERNAL POOLS: Temporary bodies of freshwater which provide critical habitat for a number of vertebrate and invertebrate wildlife species.

WATERCOURSE: A natural or man-man channel through which water flows or a stream of water, including a river, brook, or underground stream.

WETLAND RESOURCE AREA: Areas specified in the Massachusetts Wetlands Protection Act M.G.L. c. 131, s.40 and in the (city or town's) wetland bylaw/ordinance.

WETLANDS: Tidal and non-tidal areas characterized by saturated or nearly saturated soils most of the year that are located between terrestrial (land-based) and aquatic (water-based) environments, including freshwater marshes around ponds and channels (rivers and streams), brackish and salt marshes; common names include marshes, swamps and bogs.

SECTION 3. AUTHORITY

This bylaw is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, and the regulations of the federal Clean Water Act found at 40 CFR 122.34. **[Is it accurate to say that this municipal bylaw is being adopted under authority conferred on the municipality by the cited EPA regulations? The reg *requires* the muni to adopt a bylaw, ordinance or other regulatory mechanism, rather than authorizes a muni to do so]**

SECTION 4. APPLICABILITY

This bylaw shall apply to all activities that result in disturbance of one or more acres of land that drains to the municipal separate storm sewer system. Except as authorized by the **[insert appropriate board, commission, department or its agent, hereafter known as "The Board"]** in a Land Disturbance Permit or as otherwise provided in this bylaw, no person shall perform any activity that results in disturbance of an acre or more of land. Normal maintenance and improvement of land in agricultural or aquacultural use, as defined by the Wetlands Protection Act regulation 310 CMR 10.4, are exempt.

Comment

The use of "*one or more acres of disturbance"* as the trigger for regulation comes directly from the Phase II requirements. Disturbance of less than one acre may have impacts and towns may want to consider setting a lower threshold e.g. 10,000 square feet.

SECTION 5. RESPONSIBILITY FOR ADMINISTRATION

A. **[*The Board*]** shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon [*the Board*] may be delegated in writing by [*the Board*] to its employees or agents.

B. Waiver. [*The Board*] may, where such action is allowed by law, and is in the public interest and not inconsistent with the purpose and intent of this by-law, waive strict compliance with any requirement of this by-law or the rules and regulations promulgated hereunder.**[The Illicit Discharge model bylaw doesn't contain this broadly stated waiver provision – why is it appropriate in this bylaw? At a minimum, the phrase "where such action is allowed by law" needs to be broader in scope and more specific – e.g., "…allowed by federal and state statutes and/or regulations".]**

C. Rules and Regulations. [*The Board*] may adopt, and periodically amend rules and regulations to effectuate the purposes of this by-law. Failure by [*the Board*] to promulgate such rules and regulations shall not have the effect of suspending or invalidating this by-law.

SECTION 6. PERMITS and PROCEDURE

A. Application A completed application for a Land Disturbance Permit shall be filed with [*the Board*]. Permit issuance is required prior to the commencement of land disturbing activity that results in the disturbance of 10,000 square feet of area or more. **[If a person knows that their proposed construction activity will disturb 1 or more acre, shouldn't they be prohibited from undertaking any construction before obtaining a permit? See section 4 of the Post-Construction Bylaw]** The Land Disturbance Permit Application package shall include:

1. a completed Application Form with original signatures of all owners;

2. a list of abutters, certified by the Assessors Office;

3. three (3) copies of the Erosion and Sediment Control Plan as specified in Section VI of this bylaw;

4. payment of the application and review fees; and,

5. one (1) copy each or the application Form and the list of abutters filed with the Town Clerk.

B. Entry. Filing an application for a permit grants [*the Board*] or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with permit conditions.

C. Other Boards. The [the Board] shall notify the Town Clerk of receipt of the application, shall give one copy of the application package to the Conservation Commission, and one to the Department of Public Works.

D.. Public Hearing. [T*he Board*] shall hold a public hearing within twenty-one (21) days of the receipt of a complete application and shall take final action within twenty-one (21) days from the time of the close of the hearing unless such time is extended by agreement between the applicant and [*the Board*]. Notice of the public hearing shall be given by publication and posting and by first-class mailings to abutters at least seven (7) days prior to the hearing. [*the Board*] shall make the application available for inspection by the public during business hours at the [*city or town*] [*specify office*].

Comment
The timeline can be changed in your bylaw to fit the schedule of the administrating board. We suggest intervals of not less than 21 day or more than 60 days.

E. Information requests. The applicant shall submit all additional information requested by [*the Board*] to issue a decision on the application.

F. Action by [the Board] [T*he Board*] may:

1. Approve the Land Disturbance Permit Application and issue a permit if it finds that the proposed plan will protect water resources and meets the objectives and requirements of this by-law;

2. Approve the Land Disturbance Permit Application and issue a permit with conditions, modifications or restrictions that [the Board] determines are required to ensure that the project will protect water resources and meets the objectives and requirements of this by-law;

3. Disapprove the Land Disturbance Permit Application and deny the permit if it finds that the proposed plan will not protect water resources or fails to meet the objectives and requirements of this by-law.

G. Failure of [*the Board*] to take final action upon an Application within the time specified above shall be deemed to be approval of said Application. Upon certification by the Town Clerk that the allowed time has passed without [*the Board's*] action, the Land Disturbance Permit shall be issued by [*the Board*].**[Why is it appropriate to allow a permit to be presumptively approved due to the muni's failure to act? Does such an approach meet the intent & substance of the relevant small MS4 minimum control?]**

H. Fee Structure. Each application must be accompanied by the appropriate application fee as established by [*the Board*]. Applicants shall pay review fees as determined by [*the Board*] sufficient to cover any expenses connected with the public hearing and review of the Land Disturbance Permit Application before the review process commences. [*the*

Board] is authorized to retain a Registered Professional Engineer or other professional consultant to advise [*the Board*] on any or all aspects of the Application.

I. Project Changes. The permittee, or their agent, must notify [*the Board*] in writing of any change or alteration of a land-disturbing activity authorized in a Land Disturbance Permit before any change or alteration occurs. If [*the Board*] determines that the change or alteration is significant, based on the design requirements listed in Section 7.B. and accepted construction practices, [*the Board*] may require that an amended Land Disturbance Permit application be filed and a public hearing held. If any change or alteration from the Land Disturbance Permit occurs during any land disturbing activities, [*the Board*] may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.

SECTION 7. EROSION AND SEDIMENT CONTROL PLAN

A. The Erosion and Sediment Control Plan shall contain sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sedimentation controls. The applicant shall submit such material as is necessary to show that the proposed development will comply with the design requirements listed in Section 7.B. below.

B. The **design requirements** of the Erosion and Sediment Control Plan are:

1. Minimize total area of disturbance;

2. Sequence activities to minimize simultaneous areas of disturbance;

3. Minimize peak rate of runoff in accordance with the Massachusetts Storm Water Policy;

4. Minimize soil erosion and control sedimentation during construction, provided that prevention of erosion is preferred over sedimentation control;

5. Divert uncontaminated water around disturbed areas;

6. Maximize groundwater recharge;

7. Install, and maintain all Erosion and Sediment Control measures in accordance with the manufacturers specifications and good engineering practices;

8. Prevent off-site transport of sediment;

9. Protect and manage on and off-site material storage areas (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project);

10. Comply with applicable Federal, State and local laws and regulations including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control;

11. Prevent adverse impact from the proposed activities to habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or Of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, and Priority Habitats of Rare Species;

12. Institute interim and permanent stabilization measures, which shall be instituted on a disturbed area as soon as practicable but no more than 14 days after construction activity has temporarily or permanently ceased on that portion of the site;

13. Properly manage on-site construction and waste materials; and

14. Prevent off-site vehicle tracking of sediments.

C. Erosion and Sedimentation Control Plan Content. The Plan shall contain the following information:

1. Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan;

2. Title, date, north arrow, names of abutters, scale, legend, and locus map;

3. Location and description of natural features including:

a.Watercourses and water bodies, wetland resource areas and all floodplain information, including the 100-year flood elevation based upon the most recent Flood Insurance Rate Map, or as calculated by a professional engineer for areas not assessed on these maps;

b.Existing vegetation of various kinds including tree lines, shrub layer, ground cover and herbaceous vegetation, and trees with a caliper twelve (12) inches or larger, noting specimen trees and forest communities;

c.Habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, and Priority Habitats of Rare Species within five hundred (500) feet of any construction activity.

4. Lines of existing abutting streets showing drainage and driveway locations and curb cuts;

5. Existing soils, volume and nature of imported soil materials

6. Topographical features including existing and proposed contours at intervals no greater than two (2) feet with spot elevations provided when needed;

7. Surveyed property lines showing distances and monument locations, all existing and proposed easements, rights-of-way, and other encumbrances, the size of the entire parcel, and the delineation and number of square feet of the land area to be disturbed;

8. Drainage patterns and approximate slopes anticipated after major grading activities (Construction Phase Grading Plans);

9. Location and details of erosion and sediment control measures with a narrative of the construction sequence/phasing of the project, including both operation and maintenance for structural and non-structural measures, interim grading, and material stockpiling areas;

10. Path and mechanism to divert uncontaminated water around disturbed areas, to the maximum extent practicable;

11. Location and description of industrial discharges, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which are covered by this permit;

12. Storm water runoff calculations in accordance with the Department of Environmental Protection's Storm Water Management Policy;

13. Location and description of and implementation schedule for temporary and permanent seeding, vegetative controls, and other stabilization measures;

14. A description of construction and waste materials expected to be stored on-site. The Plan shall include a description of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to storm water, and spill prevention and response;

15. A description of provisions for phasing the project where one acre of area or greater is to be altered or disturbed;

16. Plans must be stamped and certified by a qualified Professional Engineer registered in Massachusetts or a Certified Professional in Erosion and Sediment Control and

17. Such other information as is required by [*the Board*].

SECTION 8. INSPECTION AND SITE SUPERVISION

A. Preconstruction Meeting
Prior to starting excavation or construction, the applicant, the applicant's technical representative, the general contractor or any other person with authority to make changes to the project, shall meet with [*The Board*], to review the permitted plans and their implementation.

B. Board Inspection
[*The Board*] or its designated agent shall make inspections as hereinafter required and shall either approve that portion of the work completed or shall notify the permittee wherein the work fails to comply with the land disturbance permit as approved. The Permit and associated plans for grading, stripping, excavating, and filling work, bearing the signature of approval of [*the Board*], shall be maintained at the site during the progress of the work. In order to obtain inspections, the permittee shall notify [*the Board*] at least two (2) working days before each of the following events:

1. Erosion and sediment control measures are in place and stabilized;

2. Site Clearing has been substantially completed;

3. Rough Grading has been substantially completed;

4. Final Grading has been substantially completed;

5. Close of the Construction Season; and

6. Final Landscaping (permanent stabilization) and project final completion.

C. Permittee Inspections
The permittee or his/her agent shall conduct and document inspections of all control measures) no less than weekly or as specified in the permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the control plan, and the need for maintenance or additional control measures. The permittee or his/her agent shall submit monthly reports to [*the Board*] or designated agent in a format approved by [*the Board*].

D. Access Permission
To the extent permitted by state law, or if authorized by the owner or other party in control of the property, [*the Board*] its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this by-law and may make or cause to be made such examinations, surveys or sampling as [*the Board*] deems reasonably necessary to determine compliance with the permit.

SECTION 9. SURETY

[T*he Board*] may require the permittee to post before the start of land disturbance activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by town counsel, and be in an amount deemed sufficient by [*the Board*] to insure that the work will be completed in accordance with the permit. If the project is phased, [*the Board*] may release part of the bond as each phase is completed in compliance with the permit but the bond may not be fully released until the board has received the final report as required by Section 10 and issued a certificate of completion.

SECTION 10. FINAL REPORTS

Upon completion of the work, the permittee shall submit a report (including certified as-built construction plans) from a Professional Engineer (P.E.), surveyor, or Certified Professional in Erosion and Sediment Control (CPESC), certifying that all erosion and sediment control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved permit. Any discrepancies should be noted in the cover letter.

SECTION 11. ENFORCEMENT

A. [*The Board*] or an authorized agent of [t*he Board*] shall enforce this by-law, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

B. Orders

1. [*The Board*] or an authorized agent of the [*the Board*] may issue a written order to enforce the provisions of this by-law or the regulations thereunder, which may include:

    a. a requirement to cease and desist from the land-disturbing activity until there is compliance with the bylaw and provisions of the land-disturbance permit;

    b. maintenance, installation or performance of additional erosion and sediment control measures;

    c. monitoring, analyses, and reporting;

    d. remediation of erosion and sedimentation resulting directly or indirectly from the land-disturbing activity.

2. If the enforcing person determines that abatement or remediation of erosion and sedimentation is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the [*city or town*] may, at its option, undertake such work, and the property owner shall reimburse the [*city or town's*] expenses.

3. Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the [*city or town*], including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with [*the Board*] within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of [*the Board*] affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate, as provided in G.L. Ch. 59, § 57, after the thirty-first day following the day on which the costs were due.

C. Criminal Penalty Any person who violates any provision of this by-law, regulation, order or permit issued there under, shall be punished by a fine of not more than $___.__. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

D. Non-Criminal Disposition As an alternative to criminal prosecution or civil action, the [city or town] may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch.. 40, §21D and *the insert citation town enabling vote/bylaw* of the Town of _____, in which case *the insert title or other authorized agent* of the *city/town* shall be the enforcing person. The penalty for the 1st violation shall be $___. The penalty for the 2nd violation shall be $____. The penalty for the 3rd and subsequent violations shall be $ ___.__. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

E. Appeals
The decisions or orders of [*the Board*] shall be final. Further relief shall be to a court of competent jurisdiction.

F. Remedies Not Exclusive
The remedies listed in this by-law are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION 12. CERTIFICATE OF COMPLETION

The issuing authority will issue a letter certifying completion upon receipt and approval of the final reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with this bylaw.

SECTION 13. SEVERABILITY

If any provision, paragraph, sentence, or clause of this by-law shall be held invalid for any reason, all other provisions shall continue in full force and effect.

LAND DISTURBANCE PERMIT APPLICATION

To [*The Board*]*:*
The undersigned wishes to submit a Land Disturbance Permit Application as defined in the Zoning By-Laws of the Town of [insert Town] Section [reference] and requests a review and determination by the [*the Board*] of said Land Disturbance Plan.

The Land Disturbance Plan involves property where owner's title to the land is derived under deed from_____, dated_____, and recorded in the [Insert] County Registry of Deeds, Book _____, Page_____, or Land Court Certificate of Title No. _____, Registered in _____ District, Book _____, Page

Give a brief summary of the nature of the project.

The property (building) is described as being located at _____
; it is currently used as _____, and the changes proposed to be made are _____
_____.

The project is located on the parcel shown on Assessors Map _____, Parcel _____.

Applicant's Signature _____ Owners' Signature(s)_____
Applicant's Name (print) _____ Owners' Names(s) _____
Applicant's Address _____ Owners' Address _____
_____ _____
_____

Date Received by Town Clerk: _____
Signature _____

Please note: 1) An applicant for a Land Disturbance Plan Review must file with the [*the Board*] a completed Land Disturbance Permit Application, a list of abutters, three (3) copies of the Land Disturbance Plan Package, and the application and review fees as noted in the Land Disturbance Plan Review Fee Schedule. 2) The applicant shall also file a copy of the Land Disturbance Plan and the application with the Town Clerk. The date of receipt by the Town Clerk shall be the official filing date.

Land Disturbance Plan Review Fee Schedule

The following fee schedules are minimum fees. [*The Board*] may require higher fees if deemed necessary for proper review of an application or to ensure compliance.

Lot Area	Professional Review Fee	Application Fee
Less Than 3 Acres		$ _____.__
3 to 10 Acres	$ _____.__	$ ___.__
Greater than 10 Acres	$ ___.__ times the acreage	$ ___.__

Resubmittal/Amendment

Filing Fee $_____

Review Fee $_____

GENERAL

1. Any application not accompanied by the appropriate fee shall be deemed incomplete. Payment must be made to [*the Board*] *in* cash, money order, bank or certified check payable to the Town of [insert name].

2. An Applicant's failure to pay any additional review or inspection fee within five business days of receipt of the notice that further fees are required shall be grounds for disapproval.

3. [*The Board*] will publish the public notice and send abutter notifications. Abutter notification shall be by certified mail-return receipt requested. The applicant shall pay all costs associated with the publication and notification requirements. These costs shall not be imposed on the applicant if the applicant completes the public notice and abutter notification requirements, and provides [*the Board*] with copies of the public notices and the return receipt cards.

Professional review fees include engineering review, legal review, and clerical fees associated with the public hearing and permit processing. A fee estimate may be provided by [t*he Board's*] consulting engineer.

APPENDIX F

DRAFT MODEL POST-CONSTRUCTION STORM WATER MANAGEMENT BY-LAW FOR NEW DEVELOPMENTS AND REDEVELOPMENTS

BY-LAW GOVERNING POST-CONSTRUCTION STORMWATER MANAGEMENT OF NEW DEVELOPMENTS & REDEVELOPMENTS

SECTION 1. PURPOSE

Regulation of discharges to the municipal separate storm sewer system (MS4) is necessary for the protection of the [*city or town's*] water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. Increased and contaminated storm water runoff associated with developed land uses and the accompanying increase in impervious surface are major causes of

(5) impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;

(6) contamination of drinking water supplies;

(7) erosion of stream channels;

(8) alteration or destruction of aquatic and wildlife habitat; and

(9) flooding.

Therefore, this bylaw establishes storm water management standards for the final conditions that result from development and redevelopment projects to minimize adverse impacts offsite and downstream which would be born by abutters, townspeople and the general public.

The objectives of this by-law are:

(1) To require practices to control the flow of storm water from new and redeveloped sites into the [town/city] storm drainage system in order to prevent flooding and erosion;

(2) To protect groundwater and surface water from degradation;

(3) To promote groundwater recharge;

(4) To prevent pollutants from entering the [city or town's] municipal separate storm sewer system (MS4) and to minimize discharge of pollutants from the MS4;

(4) To ensure adequate long-term operation and maintenance of structural storm water best management practices so that they work as designed;

(5) To comply with state and federal statutes and regulations relating to stormwater discharges; and

(6) To establish the [*city or town's*] legal authority to ensure compliance with the provisions of this by-law through inspection, monitoring, and enforcement.

SECTION 2. DEFINITIONS

ALTERATION OF DRAINAGE CHARACTERISTICS: Any activity on an area of land that changes the water quality, force, direction, timing or location of runoff flowing from the area. Such changes include: change from distributed runoff to confined, discrete discharge, change in the volume of runoff from the area; change in the peak rate of runoff from the area; and change in the recharge to groundwater on the area.

BEST MANAGEMENT PRACTICE (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of storm water runoff.

THE BOARD – Town of _____ [*Planning Board, or whatever Dept. the Town decides is appropriate OR its authorized agent(s)*].

CLEARING: Any activity that removes the vegetative surface cover.

DEVELOPMENT: The modification of land to accommodate a new use or expansion of use, usually involving construction.

DISTURBANCE OF LAND: Any action that causes a change in the position, location, or arrangement of soil, sand rock, gravel of similar earth material.

GRADING: Changing the level or shape of the ground surface.

GRUBBING: The act of clearing land surface by digging up roots and stumps.

IMPERVIOUS SURFACE: Any material or structure on or above the ground that prevents water infiltrating the underlying soil. Impervious surface includes without limitation roads, paved parking lots, sidewalks, and roof tops.

MASSACHUSETTS STORM WATER MANAGEMENT POLICY: The Policy issued by the Department of Environmental Protection, and as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act MGL c. 131 s. 40 and Massachusetts Clean Waters Act MGL c. 21, §. 23-56. The Policy addresses storm water impacts through implementation of performance standards to reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAIN SYSTEM: The system of conveyances designed or used for collecting or conveying storm water, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the [*town/city of*_____].

OPERATION AND MAINTENANCE PLAN: A plan setting up the functional, financial and organizational mechanisms for the ongoing operation and maintenance of a storm water management system to insure that it continues to function as designed.

OUTFALL: The point at which storm water flows out from a point source discernible, confined and discrete conveyance into waters of the Commonwealth.

OUTSTANDING RESOURCE WATERS (ORWs): Waters designated by Massachusetts Department of Environmental Protection as ORWs. These waters have exceptional sociologic, recreational, ecological and/or aesthetic values and are subject to more stringent requirements under both the Massachusetts Water Quality Standards (314 CMR 4.00) and the Massachusetts Storm Water Management Standards. ORWs include vernal pools certified by the Natural Heritage Program of the Massachusetts Department of Fisheries and Wildlife and Environmental Law Enforcement, all Class A designated public water supplies with their bordering vegetated wetlands, and other waters specifically designated.

OWNER: A person with a legal or equitable interest in property.

PERSON: An individual, partnership, association, firm, company, trust, corporation, agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

POINT SOURCE means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, or container from which pollutants are or may be discharged.

REDEVELOPMENT: Development, rehabilitation, expansion, demolition or phased projects that disturb the ground surface or increase the impervious area on previously developed sites.

RUNOFF is rainfall, snowmelt, or irrigation water flowing over the ground surface.

STORM WATER MANAGEMENT PLAN: A drainage plan required as part of the application for a Storm Water Management Permit. See Section 6.

STORM WATER: Storm water runoff, snow melt runoff, and surface water runoff and drainage.;

TSS means Total Suspended Solids.

SECTION 3. AUTHORITY

This bylaw is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes and the regulations of the federal Clean Water Act found at 40 CFR 122.34. **[Is it accurate to say that this municipal bylaw is being adopted under authority conferred on the municipality by the cited EPA regulations? The reg *requires* the muni to adopt a bylaw, ordinance or other regulatory mechanism, rather than authorizes a muni to do so]**

SECTION 4. APPLICABILITY

A. No person may, by development or redevelopment activity, alter the drainage characteristics of **one or more acres of land** draining to the [*name of town*] municipal separate storm sewer system without a permit from [the Board]. The regulated projects shall include without limitation:

Comment

The scope of applicability of Section 4 is consistent with Phase II. A municipality should consider, including taking into account how large a portion of the municipality is a "urbanized area" subject to Phase II, whether to broaden the scope of the bylaw to apply to discharges throughout the municipality and/or to sites with smaller areas of disturbance.

1. Land disturbance associated with construction or reconstruction of structures;

2. Development or redevelopment involving multiple separate activities in discontinuous locations or on different schedules if the activities are part of a larger common plan of development that all together disturbs one or more acres.

3. Paving or other change in surface material causing a significant reduction of permeability or increase in runoff;

4. Construction of a new drainage system or alteration of an existing drainage system or conveyance serving a drainage area of more than 10,000 square feet **[Isn't this threshold sq footage in 4. and 5. below broader in scope than Phase II?]**;

5. Any activity that will, or may, result in increased stormwater runoff flowing from the property into a public way or the MS4.

6. Construction or reconstruction of structures where more than 10,000 square feet of roof drainage is altered.

B. Exemptions

1. Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation 310 CMR 10.04;

2. Maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling provided such maintenance does not include the addition of soil material, construction of any walls or alteration of existing grades**;**

3. The construction of fencing that will not alter existing terrain or drainage patterns;

4. Construction of utilities other than drainage (gas, water, electric, telephone, etc.) which will not alter terrain, ground cover, or drainage patterns;

5. Projects wholly within the jurisdiction of the Conservation Commission and requiring an Order of Conditions.

SECTION 5. ADMINISTRATON

A. [The B*oard*], shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon [*the Board*] may be delegated in writing by [*The Board*] to its employees or agents.

B. Rules and Regulations. [*The Board*] may adopt, and periodically amend, rules and regulations relating to the procedures and administration of this Stormwater Management By-law, by majority vote of [*the Board*], after conducting a public hearing to receive comments on any proposed revisions. Such hearing dates shall be advertised in a newspaper of general local circulation, at least seven (7) days prior to the hearing date.

SECTION 6. PERMITS and PROCEDURE

A. Filing Application.The site owner or his agent shall file with [*the Board*] hereinafter the Board, three (3) copies of a completed application package for a Stormwater Management Permit (SMP). Permit issuance is required prior to any site altering activity. While the applicant can be a representative, the permittee must be the owner of the site. The SMP Application package shall include:

1. a completed Application Form with original signatures of all owners;
2. a list of abutters**,** certified by the Assessors Office;
3. three (3) copies of the Stormwater Management Plan and project description as specified in Section 7.A.;

4. three (3) copies of the Operation and Maintenance Plan as required by Section 8 of this bylaw;
5. one (1) copy of the application form, the Stormwater Management Plan, the Operation & Maintenance Plan, and the list of abutters filed with the Town Clerk; and
6. payment of the application and review fees.

B. Entry. Filing an application for a permit grants the Board, or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with the resulting permit. **[I think that the Access Permission provision in Section 8.D. of the Land Disturbance Bylaw (p.33) is a more defensible approach to addressing right to entry. See also the related language that I am proposing be deleted on p.10.]**

C. Other Boards. The [the Board] shall notify the Town Clerk of receipt of the application, shall give one copy of the application package to the Conservation Commission, and one to the Department of Public Works.

Comment
As written, this draft assumes that the Planning Board is the review board. Towns may assign review to another board or department. Section 6.C. is intended to make sure the board designated to review applications communicates with the other boards on each application. All should have a chance to study the plans and comment on the project. Each town should modify Section 6.C. to fit with the town's process, boards and departments

D. Fee Structure. [*The Board*] shall obtain with each submission an Application Fee established by [*the Board*] to cover expenses connected with the public hearing and application review of the Storm Water Management Permit and a technical Review Fee sufficient to cover professional review. [*The Board*] is authorized to retain a Registered Professional Engineer or other professional consultant to advise the Board on any or all aspects of these plans. Applicants must pay review fees before the review process may begin.

E. Public Hearing. The [*the Board*] shall hold a public hearing within twenty-one (21) days of the receipt of a complete application and shall take final action within twenty-one (21) days from the close of the hearing unless such time is extended by agreement between the applicant and [insert appropriate board or department]. Notice of the public hearing shall be given by publication in a local paper of general circulation, by posting and by first-class mailings to abutters at least seven (7) days prior to the hearing.

Comment
The timeline can be changed in your bylaw to fit the schedule of the administrating board. We suggest intervals of not less than 21 day or more than 60 days.

F. **Actions**. [*The Board's*]'s action, rendered in writing, shall consist of either:

[Formatting below, including comment box, needs correcting.]

1. Approval of the Storm Water Management Permit Application based upon determination that the proposed plan meets the Standards in Section 7 and will adequately protect the water resources of the community and is in compliance with the requirements set forth in this by-law;

2. Approval of the Storm Water Management Permit Application subject to any conditions, modifications or restrictions required by the [*the Board*] which will ensure that the project meets the Standards in Section 7 and adequately protect water resources, set forth in this by-law;

Comment

Towns should not/need not try to re-engineer projects for applicants.

3. Disapproval of the Storm Water Management Permit Application based upon a determination that the proposed plan, as submitted, does not meet the Standards in Section 7 or adequately protect water resources, as set forth in this by-law.

G. Failure of [the Board] to take final action upon an Application within the time specified above shall be deemed to be approval of said Application. Upon certification by the Town Clerk that the allowed time has passed without Board action, [the Board] must issue a Storm Water Management Permit. **[Why is it appropriate to allow a permit to be presumptively approved due to the muni's failure to act? Does such an approach meet the intent & substance of the relevant small MS4 minimum control?]**

H. Plan Changes. The permittee, must notify [*the Board*] in writing of any drainage change or alteration in the system authorized in a **Storm Water Management Permit** before any change or alteration is made. If [*the Board*] determines that the change or alteration is significant, based on the Storm Water Management Standards in Section 7.B. and accepted construction practices, [*the Board*] may require that an amended application be filed and a public hearing held.

I. Project Completion. At completion of the project the permittee shall submit as-built record drawings of all structural storm water controls and treatment best management practices required for the site. The as-built drawing shall show deviations from the approved plans, if any, and be certified by a Registered Professional Engineer.

SECTION 7. STORM WATER MANAGEMENT PLAN

A. The application for a storm water management permit shall consist of submittal of a Storm Water Management Plan to the [*the Board*]. This Storm Water Management Plan

shall contain sufficient information for the [*the Board*] to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant for reducing adverse impacts from storm water. The Plan shall be designed to meet the Massachusetts Storm Water Management Standards as set forth in Part B of this section and DEP Storm Water Management Handbook Volumes I and II. The Storm Water Management Plan shall fully describe the project in drawings, and narrative. It shall include :

1. A locus map,
2. The existing zoning, and land use at the site,
3. The proposed land use,
4. The location(s) of existing and proposed easements,
5. The location of existing and proposed utilities,
6. The site's existing & proposed topography with contours at 2 foot intervals,
7. The existing site hydrology,
8. A description & delineation of existing storm water conveyances, impoundments, and wetlands on or adjacent to the site or into which storm water flows.
9. A delineation of 100-year flood plains, if applicable
10. Estimated seasonal high groundwater elevation (November to April) in areas to be used for storm water retention, detention, or infiltration.
11. The existing and proposed vegetation and ground surfaces with runoff coefficient for each,
12. A drainage area map showing pre and post construction watershed boundaries, drainage area and storm water flow paths,
13. A description and drawings of all components of the proposed drainage system including:
    a. locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization,
    b. all measures for the detention, retention or infiltration of water,
    c. all measures for the protection of water quality,
    d. the structural details for all components of the proposed drainage systems and storm water management facilities,
    e. notes on drawings specifying materials to be used, construction specifications, and typicals, and
    f. expected hydrology with supporting calculations.
14. Proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable,
15. Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization,
16. A maintenance schedule for the period of construction, and
17. Any other information requested by the Board.

B. Standards

Projects shall meet the Standards of the Massachusetts Stormn Water Management Policy, which are as follows:

1. No new storm water conveyances (e.g. outfalls) may discharge untreated storm water directly to or cause erosion in wetlands or water of the Commonwealth.

2. Storm water management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

3. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge rate from the pre-development or existing site conditions, based on soil types.

4. For new development, storm water management systems must be designed to remove 80% of the average annual load (post development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:

a. Suitable nonstructural practices for source control and pollution prevention and implemented;

b. Storm water management best management practices (BMPs) are sized to capture the prescribed runoff volume; and

c. Storm water management BMPs are maintained as designed.

5. Storm water discharges from areas with higher potential pollutant loads require the use of specific storm water management BMPs (see Storm Water Management Volume I: Storm Water Policy Handbook). The use of infiltration practices without pretreatment is prohibited.

6. Storm Water discharges to critical areas must utilize certain storm water management BMPs approved for critical areas (see Storm Water Management Volume I: Storm Water Policy Handbook). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.

7. Redevelopment of previously developed sites must meet the Storm Water Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) storm water management systems must be designed to improve existing conditions.

8. Erosion and sediment controls must be implemented to prevent impacts during disturbance and construction activities.

9. All storm water management systems must have an operation and maintenance plan to ensure that systems function as designed.

When one or more of the Standards cannot be met, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

Comment

Massachusetts Storm Water Management Policy standards were adopted by the Department of Environmental Protection in 1996 and have been administered locally by Conservation Commissions since as part of the wetlands protection process. The standards were developed by DEP and the Coastal Zone Management Office. The advantages of incorporating the Standards into a bylaw are:

- Technical back-up and documentation is immediately available.
- There will be no mismatch of standards of regulation for projects straddling the transition from upland to lowland.
- Many designers and engineers are already familiar with the standards.

C. Project Changes
The permittee, or their agent, shall notify [*the Board*] in writing of any change or alteration of a land-disturbing activity authorized in a Storm Water Management Permit before any change or alteration occurs. If [*the Board*] determines that the change or alteration is significant, based on the design requirements listed in Section _____ and accepted construction practices, [*the Board*] may require that an amended Storm Water Management Permit application be filed and a public hearing held. If any change or deviation from the Storm Water Management Permit occurs during a project, [*the Board*] may require the installation of interim measures before approving the change.

SECTON 8. OPERATION AND MAINTENANCE PLANS

An Operation and Maintenance plan (O&M Plan) is required at the time of application for all projects. The maintenance plan shall be designed to ensure compliance with the Permit, this Bylaw and the Water Quality Standards **[Note – "Water Quality Standards" is not a defined term. Do we mean our Surface Water Quality Standards at 314 CMR 4.00?]** are met in all seasons and throughout the life of the system. [*The Board*] shall make the final decision of what maintenance option is appropriate in a given situation. The Board will consider natural features, proximity of site to water bodies and wetlands, extent of impervious surfaces, size of the site, the types of storm water management structures, and potential need for ongoing maintenance activities when making this decision. The Operation and Maintenance Plan shall remain on file with [*the Board*] and shall be an ongoing requirement. The O&M Plan shall include:

A. The name(s) of the owner(s) for all components of the system

B. Maintenance agreements that specify:

1. The names and addresses of the person(s) responsible for operation and maintenance
2. The person(s) responsible for financing maintenance and emergency repairs.

3. A Maintenance Schedule for all drainage structures, including swales and ponds.
4. A list of easements with the purpose and location of each.
5. The signature(s) of the owner(s).

C. Storm Water Management Easement(s).

1. Storm water management easements shall be provided by the property owner(s) as necessary for:
   a. access for facility inspections and maintenance,
   b. preservation of storm water runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event.
   c. direct maintenance access by heavy equipment to structures requiring regular cleanout.
2. The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.
3. Storm water management easements are required for all areas used for off-site storm water control, unless a waiver is granted by the [The Board].
4. Easements shall be recorded with the _____County Registry of Deeds prior to issuance of a Certificate of Completion by the [Board].

D. Changes to Operation and Maintenance Plans

1. The owner(s) of the storm water management system must notify [the Board] of changes in ownership or assignment of financial responsibility.
2. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this by-law by mutual agreement of [the Board] and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility.

SECTION 9. SURETY

[*The Board*] may require the permittee to post before the start of land disturbance or construction activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by town counsel, and be in an amount deemed sufficient by [*the Board*] to insure that the work will be completed in accordance with the permit. If the project is phased, [*the Board*] may release part of the bond as each phase is completed in compliance with the permit but the bond may not be fully released until the board has received the final inspection report as required by Section 10 and issued a Certificate of Completion.

Comment
The town engineer or the Board's consulting engineer should review the amount of the bond.

SECTION 10. INSPECTIONS

The Board shall inspect the project site at the following stages:

A. Initial Site Inspection: prior to approval of any plan.

B. Erosion Control Inspection: to ensure erosion control practices are in accord with the filed plan.

C. Bury Inspection: prior to backfilling of any underground drainage or storm water conveyance structures.

D. Final Inspection. After the storm water management system has been constructed and before the surety has been released, the applicant must submit a record plan detailing the actual storm water management system as installed. [T*he Board*] shall inspect the system to confirm its "as-built" features. This inspector shall also evaluate the effectiveness of the system in an actual storm. If the inspector finds the system to be adequate he shall so report to [*the Board*] which will issue a Certificate of Completion.

If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Storm Water Management Plan, it shall be corrected by the permittee before the performance guarantee is released. If the permittee fails to act the [*town of* _____] may use the surety bond to complete the work. Examples of inadequacy shall be limited to: errors in the infiltrative capability, errors in the maximum groundwater elevation, failure to properly define or construct flow paths, or erosive discharges from basins.

SECTION 11. WAIVERS

[*The Board*] may, where such action allowed by law, in the public interest, and not inconsistent with the purpose and intent of this by-law, waive strict compliance with any requirement of this Storm Water Management By-law or its rules and regulations. **[The Illicit Discharge model bylaw doesn't contain this broadly stated waiver provision – why is it appropriate in this bylaw? At a minimum, the phrase "where such action is allowed by law" needs to be broader in scope and more specific – e.g., "…allowed by federal and state statutes and/or regulations".]**

A. Any applicant may submit a written request to be granted such a waiver. Such a request shall be accompanied by an explanation or documentation supporting the waiver request and demonstrating that strict application of the by-law does not further the purposes or objectives of this bylaw.

B. All waiver requests shall be discussed and voted on at the public hearing for the project.

C. If in the [*the Board's*] opinion, additional time or information is required for review of a waiver request, the [*the Board*] may continue a hearing to a date certain announced at the meeting. In the event the applicant objects to a continuance, or fails to provide requested information, the waiver request shall be denied.

SECTION 12. CERTIFICATE OF COMPLETION

[*The Board*] will issue a letter certifying completion upon receipt and approval of the final inspection reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with this bylaw.

SECTION 13. ENFORCEMENT

A. [*The Board*] or an authorized agent of [t*he Board*] shall enforce this by-law, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.

B. Orders

1. [*The Board*] or an authorized agent of the [*the Board*] may issue a written order to enforce the provisions of this by-law or the regulations thereunder, which may include requirements to:

   a. cease and desist from construction or land disturbing activity until there is compliance with the by-law and the storm water management permit;

   b. repair, maintain; or replace the storm water management system or portions thereof in accordance with the operation and maintenance plan.

   c. perform monitoring, analyses, and reporting;

   d. remediate adverse impact resulting directly or indirectly from malfunction of the storm water management system.

2. If the enforcing person determines that abatement or remediation of adverse impacts is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the [*city or town*] may, at its option, undertake such work, and the property owner shall reimburse the [*city or town's*] expenses.

3. Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the [*city or town*], including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis

of costs with [*the Board*] within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of [*the Board*] affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in G.L. Ch. 59, § 57, after the thirty-first day at which the costs first become due.

C. Criminal Penalty. Any person who violates any provision of this by-law, or regulation, order or permit issued thereunder, shall be punished by a fine of not more than $_____. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

F. Non-Criminal Disposition. As an alternative to criminal prosecution or civil action, the [*city or town*] may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch. 40, §21D and [*the insert citation town enabling vote/bylaw*] of the Town of _____, in which case [*the insert title or other authorized agent*] of the [*city/town*] shall be the enforcing person. The penalty for the 1st violation shall be $___. The penalty for the 2nd violation shall be $____. The penalty for the 3rd and subsequent violations shall be $ _____. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

G. Appeals
The decisions or orders of [*the Board*] shall be final. Further relief shall be to a court of competent jurisdiction.

F. Remedies Not Exclusive
The remedies listed in this by-law are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION 14. SEVERABILITY

If any provision, paragraph, sentence, or clause of this by-law shall be held invalid for any reason, all other provisions shall continue in full force and effect

STORM WATER MANAGEMENT PERMIT APPLICATION

To [*The Board*]:

The undersigned wishes to submit a Storm Water Management Permit Application as defined in the [*Zoning*] By-Laws of the Town of [*insert Town*] Section [reference] and requests a review and determination by [*The Board*] of the Storm Water Management Plan.

The Storm Water Management Plan involves property where owner's title to the land is derived under deed from_____, dated_____, and recorded in the [Insert] County Registry of Deeds, Book _____, Page_____, or Land Court Certificate of Title No. _____, Registered in _____ District, Book _____, Page _____.

Give a brief summary of the nature of the project.

The property (building) is described as being located at _____
; it is currently used as _____, and the changes proposed to be made are _____
_____.

The project is located on the parcel shown on Assessors Map _____, Parcel _____.

Applicant's Signature _____ Owners' Signature(s)_____
Applicant's Name (print) _____ Owners' Names(s) _____
Applicant's Address _____ Owners' Address _____
_____ _____
_____

Date Received by Town Clerk: _____
Signature _____

Please note: 1) An applicant for a Storm Water Management Plan Review must file with the [*The Board*] a completed Storm Water Management Permit Application Form, a list of abutters, three (3) copies of the Storm Water Management Plan Package, three (3)

copies of the Operation and Maintenance Plan, and the Application and Review Fees as noted in the Storm Water Management Plan Review Fee Schedule. 2) The applicant shall also file a copy of the Storm Water Management Plan, Operation & Maintenance Plan, and the Application Form with the Town Clerk. The date of receipt by the Town Clerk shall be the official filing date. 3) This application grants [the Board and its agents] permission to enter the property for inspection and verification of information submitted in the application.

Storm Water Management Plan Review Fee Schedule

The following fee schedules are minimum fees. [*The Board]* may require higher fees if deemed necessary for proper review of an application or to ensure compliance.

Lot Area	Professional Review Fee	Application Fee
Less Than 3 Acres	$ _____	$_____
3 to 10 Acres	$_____	$_____
Greater than 10 Acres	$ _____ times the acreage	$ _____
Resubmittal/Amendment		
Filing Fee	$____	
Review Fee	$____	

GENERAL

1. Any application not accompanied by the appropriate fee shall be deemed incomplete. Payment must be made to [*The Board*] *in* cash, money order, bank or certified check payable to the Town of [*insert name*].

2. An Applicant's failure to pay any additional review or inspection fee within five business days of receipt of the notice that further fees are required shall be grounds for disapproval.

3. The [*The Board*] will publish the public notice and send abutter notifications. Abutter notification shall be by certified mail-return receipt requested. The applicant shall pay all costs associated with the publication and notification requirements. These costs shall not be imposed on the applicant if the applicant completes the public notice and abutter notification requirements, and provides [*The Board*] with copies of the public notices and the return receipt cards.

Professional review fees include engineering review, legal review, and clerical fees associated with the public hearing and permit processing. A fee estimate may be provided by [*The Board's*] consulting engineer.

Comment
Consult the town counsel and the finance committee and your Regional Planning Agency in setting appropriate fees

APPENDIX G

STORM WATER BEST MANAGEMENT PRACTICES (BMP) OPERATION AND MAINTENANCE GUIDELINES

STORMWATER BEST MANAGEMENT PRACTICES (BMPs) OPERATION AND MAINTENANCE GUIDELINES

Stormwater treatment controls should be routinely inspected and maintained to ensure that the controls are in proper working condition and operating as designed. Operation and maintenance (O&M) guidelines for common stormwater Best Management Practices (BMPs) are summarized below. Detailed maintenance requirements for specific stormwater treatment BMPs can be found in the publication "Urban Runoff Quality Management" (Water Environment Federation and American Society of Civil Engineers, 1998) and the references listed therein.

General O&M requirements for stormwater treatment controls include

Inspections: Inspections should be performed at regular intervals to ensure proper operation of stormwater BMPs. Inspections should be conducted at least annually, with additional inspections following large storm events, especially storm events that exceed the design storm for the system. Inspections should include a comprehensive visual check for evidence of the following:

- Accumulation of sediment or debris at inlet and outlet structures
- Erosion, settlement, or slope failure
- Clogging or buildup of fines on infiltration surfaces
- Vegetative stress and appropriate water levels for emergent vegetation

Routine Maintenance: Routine maintenance should be performed following inspections to ensure proper BMP operation and aesthetics. Routine maintenance should include:

- Debris and litter removal
- Silt and sediment removal
- Clearing of vegetation around flow control devices
- Maintenance and mowing of healthy vegetative cover for infiltration/filtration BMPs

Nonroutine Maintenance: Nonroutine maintenance refers to corrective measures taken to repair or rehabilitate stormwater controls to proper working condition. Nonroutine maintenance is performed as needed, typically in response to problems detected during routine maintenance and inspections, and can include:

- Erosion and structural repair
- Sediment removal and disposal
- Nuisance control (odors, mosquitoes, weeds, excessive litter)

Recommended O&M practices for specific classes of stormwater BMPs are summarized below:

1) Vegetated Swales and Filter Strips

Inspect biofilters annually and after heavy rainfall.
- Damage to vegetation by foot or vehicular traffic
- Gully erosion and evidence of concentrated bypass flows around swale/strip
- Reduction in vegetation density

Keep biofilters free of lawn debris and pet waste.
Keep inlet flow spreaders even and free of debris.
Maintain dense grass cover through periodic mowing, spot reseeding, and weed control.
Do not mow grass too close to the ground or over-apply fertilizers and pesticides.
Mow vegetation to a height above the maximum flow depth.
At end of growing season, vegetation should be at least 2 inches above the design water depth.
Remove and properly dispose of grass cuttings.
Remove sediment with a flat-bottomed shovel.
Re-seed damaged areas and cover with erosion control fabric.

2) Infiltration Trenches

Inspect trenches several times in the first few months of operation, and then annually thereafter.
If possible, conduct inspections after large storms.
Check for surface water ponding or clogging.
Periodically check pretreatment inlets of underground trenches and clean out when sediment depletes more than 10% of available capacity.
Prune or trim adjacent trees to prevent leaves from clogging the trench.
Rehabilitate trench after it becomes clogged, typically after 10 to 15 years.

3) Infiltration Basins

Inspect after major storm events in the first few months after construction. Check for:
- Standing water after 48 to 72 hours following a storm
- Upland sediment erosion
- Low spots

Inspect basin annually thereafter. Check for:
- Differential settlement, cracking, erosion, or leakage through the embankment
- Condition of the riprap in the inlet and outlet channels
- Sediment accumulation in the basin

Mow the buffer, side-slopes, and basin floor at least twice a year to discourage woody growth and control weeds.
Mow dry ponds more frequently in residential areas adjacent to residences.
Remove all litter and debris during each mowing operation.
Immediately replace/revegetate eroding or barren areas.

Annual or semi-annual tilling may be required for basins located on marginally permeable soils.
Deep tilling, regrading, and leveling typically required every 5 to 10 years.
Carefully remove the top layer of accumulated sediment after the basin has thoroughly dried out, as necessary.

4) Media Filters

Inspect semiannually and after major storm events.
Remove sediment and floatables from the:
- settling basin when 4 inches of sediment accumulates
- filter when 0.1 inches accumulates or when there is standing water over the filter 40 hours after a storm

Clean the filter surfaces twice per year by raking off dried sediment

5) Extended Detention (Dry) Basins/Retention (Wet) Ponds

Mow the upper stage, side-slopes, embankment and emergency spillway at least twice a year to discourage woody growth and control weeds.
Mow ponds more frequently in residential areas adjacent to residences.
Inspect ponds annually. If possible inspections should be conducted during wet weather.
Regular inspections of the following components should be conducted:
- Check extended detention control device for clogging
- Check upper stage pilot channel for signs of erosion
- Check the pond's bed and banks for signs of erosion
- Check the condition of the emergency spillway
- Check for accumulation of sediment around the riser

Remove accumulated debris and litter from around the extended detention control device.
Regrade and replant vegetation to correct problems with pond side-slopes, emergency spillway, and embankment.
Reduce potential nuisance conditions (i.e., odors, mosquitoes, weeds, and litter).
Remove accumulated sediment from the lower stage of the pond every 5 to 10 years, on average.

6) Constructed Wetlands

Inspect quarterly in year 1, semiannually in years 2 and 3, and annually thereafter.
Conduct inspections with the as-built pondscaping plans in hand for:
- Wetland plant species distribution/survival
- Sediment accumulation
- Water elevations
- Condition of the outlet

Clean out accumulated sediments in the forebay every 3 to 5 years. Conduct cleanouts after draining the forebay.
Mow the maintenance access, bench, and embankment twice a year to prevent woody growth.

Replant or adjust plant types depending on water levels and operating conditions.
Remove potential nuisance plant species.

7) Oil/Water Separators

Inspect monthly during the wet season.
Clean several times per year.
Always clean before the start of the wet season.
Properly dispose of removed oil.

APPENDIX H

STANDARDS OF THE MASSACHUSETTS DEP STORM WATER MANAGEMENT POLICY

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

WILLIAM F. WELD
Governor

ARGEO PAUL CELLUCCI
Lt. Governor

TRUDY COXE
Secretary

DAVID B. STRUHS
Commissioner

STORMWATER MANAGEMENT POLICY

PURPOSE

The goal of the Stormwater Management Policy is to improve water quality and address water quantity problems by the implementation of performance standards for stormwater management. Urban runoff and discharges from stormwater outfalls are the single largest source responsible for water quality problems in the Commonwealth's rivers, lakes, ponds, and marine waters. The Stormwater Management Standards establish clear and consistent guidelines for stormwater management in Massachusetts. The Standards are designed for use under multiple statutory and regulatory authorities of the Department of Environmental Protection, including the Wetlands Protection Act, as amended by the Rivers Protection Act, and the Clean Waters Act.

Stormwater discharges occur as rainfall and snow melt carries pollutants to surface and groundwater. New and existing development increases impervious surfaces, which alters natural drainage features, increases peak discharge rates and volumes, and reduces recharge to maintain wetlands and baseflows in streams. Development also results in corresponding increases in the concentration and types of pollutant loadings, including nutrients, solids, metals, salt, pathogens, pesticides, and hydrocarbons. Best Management Practices (BMPs) reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site. The Stormwater Management Standards address both water quality (pollutants) and water quantity (flood control) problems by establishing the level of required controls through the use of BMPs.

The Stormwater Management Standards are intended to be applied during routine project review by issuing authorities under the Wetlands Protection Act. Use of the standards should prevent or minimize adverse environmental impacts due to unmanaged stormwater while limiting undue costs and recognizing site constraints. Applicants should submit the one-page form developed by DEP which presents in a simple and concise format how the Stormwater Management Standards have been met. The form will allow commissions and the Department easy access to the

stormwater management components of the project, and should simplify the review process for the applicant.

REGULATORY AUTHORITY

The basic approach to implement the Stormwater Management Standards is to rely on review by conservation commissions or the Department under the Wetlands Protection Act for new development and on the Department's authority under the state Clean Waters Act for remediation of existing discharges. The Standards support existing legal authority, serving as the Department's interpretation of its existing regulations[1].

For new development and redevelopment, conservation commissions or the Department should regulate stormwater through an Order of Conditions whenever jurisdiction is established under the Wetlands Protection Act. Unmanaged and untreated stormwater will alter resource areas and require conditions to meet certain performance standards and to protect the interests of the Act. The Guidance for Implementation of the Rivers Protection Act requires projects to manage stormwater according to these Standards.[2]

The regulations contain explicit jurisdiction over point source discharges, including stormwater. In the absence of an NPDES permit entitled to a presumption,[3] local conservation commissions or the Department should comply with 310 CMR 10.05(6) which instructs issuing authorities to impose conditions on the quality and quantity of discharges from either closed or open channel point sources to protect the interests of the Act provided the point source is within a resource area or the buffer zone. Even if the source of the stormwater discharge originates outside jurisdictional areas, issuing authorities should ensure that the Standards are met at the point of discharge, provided the discharge is within geographic jurisdiction.[4] In addition,

---

[1] Applicable Regulations and Requirements

Administered by conservation commissions and the Department:
- 310 CMR 10.00 (Wetlands Protection Act)
- Rivers Protection Act Amendments to the Wetlands Protection Act

Administered by the Department of Environmental Protection:
- 314 CMR 9.00 (401 Water Quality Certification)
- 314 CMR 3.00 (Surface Water Discharge Permit Program)
- 314 CMR 4.00 (Surface Water Quality Standards)
- 314 CMR 5.00 (Groundwater Discharge Permit Program)
- 314 CMR 6.00 (Ground Water Quality Standards)
- 401 Certification Conditions of EPA General Permits

[2] The performance standards also apply under the set back and BMP requirements for stormwater management in DEP's 401 Water Quality Certification program (314 CMR 9.06) and the state certification requirements for EPA's General and Multi-Sector Permits for Stormwater Discharges.

[3] Under 310 CMR 10.03, the effluent limits of an NPDES permit are presumed to protect the interests of the Act; this refers to individual rather than general permits. EPA has issued very few individual NPDES permits for stormwater discharges.

[4] For example, a developer proposes an overflow pipe within the buffer zone from a detention basin that is outside the riverfront area. The issuing authority can insist that the standards are met at the overflow pipe but cannot prescribe the BMP, such as the detention basin, used to achieve the standards. In order to evaluate whether the standards can be met, the issuing authority may require information about structures and practices beyond the riverfront area provided it is directly related to the discharge.

by placing limitations on the quantity of the discharge from any point sources, commissions and the Department can ensure that the stormwater generated from future developments cannot simply be routed through existing drainage outfall pipes.

To address existing discharges, the Department will use watershed assessments and remedial action under its Clean Waters Act authority. Existing discharges include municipal storm sewer systems and drainage structures from developed areas with point sources to wetlands or water bodies. Massachusetts has regulations under the state Clean Waters Act specifying when a state surface water discharge permit for stormwater is required. Discharges that meet the Stormwater Management Standards do not need permits. Discharges that do not meet the Standards may be identified during water quality sampling conducted in each basin as part of the watershed assessment and planning process. The Department will promote voluntary compliance wherever possible. In some cases, DEP may designate a discharge as a significant contributor of pollutants which requires a permit or use enforcement mechanisms to achieve remediation of stormwater-impaired waterways.

APPLICABILITY

The Stormwater Management Standards apply to industrial, commercial, institutional, residential subdivision, and roadway projects, including site preparation, construction, redevelopment, and on-going operation.

The Stormwater Management Standards do not apply to:[5]

(1) Single-family house projects;
(2) Residential subdivisions with four or fewer lots, provided any discharge will not affect a critical area; or
(3) Emergency repairs to roads or their drainage systems.

The Stormwater Management Standards apply to the extent practicable to:

(1) Residential subdivisions with four or fewer lots with a discharge potentially affecting a critical area; and
(2) Five to nine residential lots, provided any discharge will not affect a critical area.

BMPs for compliance "to the extent practicable" must, at a minimum, include: extended detention pond, water quality swale, dry well (rooftop runoff only), sand and organic

[5]For projects of any size, direct discharges of untreated stormwater from pipes to wetlands or waters are not allowed. Erosion and sedimentation control during construction must be provided.

filter, and pretreatment devices. Project proponents must demonstrate that they are implementing the highest practicable level of stormwater treatment. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.

The Stormwater Management Standards apply to five to nine lot residential subdivisions with discharges potentially affecting critical areas and any subdivision of 10 or more lots, as well as other activities. Residential development that is part of a phased development project does not qualify for the exemption. These thresholds do not preclude these activities from meeting applicable state regulatory requirements not directly related to the stormwater discharge.

STORMWATER MANAGEMENT STANDARDS

The Department will presume that projects meeting the Stormwater Management Standards satisfy regulatory requirements. When one or more of the Standards cannot be met, an applicant may demonstrate that an equivalent level of environmental protection will be provided.

1. No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

2. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

3. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.[6]

4. For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:
   (a) Suitable nonstructural practices for source control and pollution prevention are implemented;
   (b) Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and
   (c) Stormwater management BMPs are maintained as designed.

[6] "To the extent practicable" means the applicant has made all reasonable efforts to meet the standards, including evaluation of alternative BMP designs and their locations.

5. Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs (see chart on page 7). The use of infiltration practices without pretreatment is prohibited.

6. Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas (see list on page 9). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.

7. Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

8. Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

9. All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

EXPLANATION OF STANDARDS

Untreated Stormwater (Standard 1)

Treated stormwater is defined to be stormwater that meets the requirements in Standards 2 through 9. Rooftop runoff, except from metal roofs (which have higher potential pollutant loads), generally should be considered uncontaminated for the purposes of these Standards and therefore can be infiltrated directly without treatment.

Post-Development Peak Discharge Rates (Standard 2)

To meet Standard 2, controls must be developed for the 2-year and the 10-year 24-hour storm events. The 100-year 24-hour storm event must be evaluated to demonstrate that there will not be increased flooding impacts offsite.

Measurement of peak discharge rates must be calculated using the point of discharge or the downgradient property boundary. The topography of the site may require evaluation at more than one location if flow leaves the property in more than one direction. An applicant may demonstrate that a feature beyond the property boundary (e.g. culvert) is more appropriate as a design point.

Discharges to waters subject to tidal action do not need to maintain predevelopment peak discharge rates. All other Standards must be met.

Recharge to Groundwater (Standard 3)

The prescribed stormwater runoff volume to be recharged to groundwater should be determined using the existing site (pre-development) soil conditions (from a U.S. Natural Resources Conservation Service (NRCS, formerly SCS)) County Soils Survey, onsite soil evaluation, or other geologic information) and these rates:

Hydrologic Group	Volume to Recharge (x Total Impervious Area)
A	0.40 inches of runoff
B	0.25 inches of runoff
C	0.10 inches of runoff
D	waived

Water Quality (Standards 4-6)

The runoff volume to be treated for water quality is based on the following:

(1) For discharges to critical areas, the volume to be treated is calculated as 1.0 inch of runoff times the total impervious area of the post-development project site.
(2) For all other discharges, volume to be treated is calculated as 0.5 inches of runoff times the total impervious area of the post-development project site.

Using the impervious area as the basis for calculating stormwater runoff promotes the use of straight-forward volume calculations. The total impervious area of a site is determined based on final project site plans, not on pre-existing site conditions. Roof runoff (except from metal roofs) may be infiltrated, and any infiltrated volume may be subtracted from the total runoff volume.

Removal of 80% TSS (Standard 4)

BMPS must be selected so that a total of 80% TSS removal is provided by one or more BMPs as shown on the following chart. Use the column showing design rates for the projected removal rate, unless there is a demonstration that a higher or lower figure within the column showing the range of average TSS should be used. BMPs not listed below should be evaluated based on data on removal efficiencies provided by the applicant. The 80% TSS removal requirement[7] applies to post-development conditions after the site is stabilized. Monitoring should not be required.[8]

[7] Total suspended solids was selected as the target pollutant constituent for a removal standard because of its widespread contribution to water quality and aquatic habitat degradation, because many other pollutant constituents including heavy metals, bacteria, and organic chemicals sorb to sediment particles, and because the

TSS Removal Rates (adapted from Schueler, 1996 & EPA, 1993)

BMP List	Design rate	Range of Average TSS Removal Rates	Brief Design Requirements
[Extended] Detention Pond	70%	60-80%	Sediment forebay.
Wet Pond (a)	70%	60-80%	Sediment forebay.
Constructed Wetland (b)	80%	65-80%	Designed to infiltrate or retain.
Water Quality Swale	70%	60-80%	Designed to infiltrate or retain.
Infiltration Trench	80%	75-80%	Pretreatment critical.
Infiltration Basin	80%	75-80% (predicted)	Pretreatment critical.
Dry Well	80%	80% (predicted)	Rooftop runoff (uncontaminated only.
Sand Filter (c)	80%	80%	Pretreatment.
Organic Filter (d)	80%	80%+	Pretreatment.
Water Quality Inlet	25%	15-35% w/cleanout	Off-line only; 0.1" minimum Water Quality Volume (WQV) storage.
Sediment Trap [Forebay]	25%	25% w/cleanout	Storm flows for 2 year event must not cause erosion; 0.1" minimum WQV storage.
Drainage Channel	25%	25%	Check dams; non-erosive for 2yr.
Deep Sump and Hooded Catch Basin	15%	15% w/cleanout	Deep sump general rule=4 x pipe diameter or 4.0' for pipes 18" or less.
Street Sweeping	10%	10%	Discretionary non-structural credit, must be part of approved plan.

NOTES:
(a) Includes wet extended detention ponds, wet ponds, multiple pond designs.
(b) Includes shallow marsh, extended detention wetlands, pocket wetland, and pond/wetland designs.
(c) Includes surface, underground, pocket and perimeter designs.
(d) Includes compost, peat/sand, and Storm Treat designs.

Land Uses with Higher Potential Pollutant Loads (Standard 5)

Residential, office, and institutional development and roads normally will not yield high potential pollutant loads. However, certain land uses generate higher concentrations of pollutants than found in typical runoff, based on existing data. Source reduction is recommended. These areas are subject to the requirement of Standard 5:

---

available data sets for BMP removal efficiency reveal that TSS has been the most frequently and consistently sampled constituent.

[8] Issuing authorities may impose sampling or monitoring requirements when developers propose alternative stormwater management techniques or in unusual circumstances where deemed necessary to protect sensitive ecological receptors or public health.

(1) Stormwater discharges associated with Standard Industrial Classifications [NPDES stormwater permit program requirements apply]
(2) Auto salvage yards (auto recycler facilities)
(3) Auto fueling facilities (gas stations)
(4) Fleet storage areas (cars, buses, trucks, public works)
(5) Vehicle service, maintenance and equipment cleaning areas
(6) Commercial parking lots with high intensity use. Such areas typically include fast-food restaurants, convenience stores, high-turnover [chain] restaurants, shopping centers and supermarkets.
(7) Road salt storage and loading areas (if exposed to rainfall)
(8) Commercial nurseries
(9) Metal rooftops, including roofs made from aluminum, tin, galvanized steel, copper, or rooftops which have been documented to contribute significant pollutant loads
(10) Outdoor storage and loading/unloading areas of hazardous substances
(11) SARA 312 generators (if materials or containers are exposed to rainfall)
(12) Marinas (service, repainting, and hull maintenance areas)

Required within areas with higher potential pollutant loads:
(1) Source reduction (pollution prevention, snow management); and
(2) Pretreatment (water quality inlets, sediment traps, drainage channels, water quality swales, and/or deep sump catch basins).

Prohibited within areas of higher potential pollutant loads if also a critical area:
(1) Infiltration trenches;
(2) Infiltration basins; or
(3) Dry wells.

Restrictions apply to certain BMPs:
Sand or organic filters, detention basins, wet ponds, or constructed wetlands may be used only if sealed or lined.

<u>Critical Areas (Standard 6)</u>

BMPs approved for use near critical areas, designed to treat 1.0 inch of runoff times the total impervious surface of the post-development project site, are generally limited to:
Extended detention basins
Wet ponds
Constructed wetlands
Water quality swales
Sand filters
Organic filters

Infiltration basins
Infiltration trenches
Deep sump and hooded catch basins (used with other BMPs)

Stormwater management systems near public water supplies and other critical resources should incorporate designs which allow for shut-down and containment in the event of an emergency spill or other unexpected contamination event.

Redevelopment (Standard 7)

"Redevelopment" projects are defined as follows:

(1) Maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, and correcting substandard intersections and drainage, and repaving; and
(2) Development, rehabilitation, expansion, and phased projects on previously developed sites, provided the redevelopment results in no net increase in impervious area.

Components of redevelopment projects which include development of previously undeveloped sites do not fall under Standard 7.

Erosion and Sedimentation Controls (Standard 8)

Examples of BMPs for erosion and sedimentation control are staked hay bales, filter fences, hydroseeding, and phased development. Many stormwater BMP technologies (e.g infiltration technologies) are not designed to handle the high concentrations of sediments typically found in construction runoff and must be protected from construction-related sediment loadings. Construction BMPs must be maintained.

Operation and Maintenance Plans (Standard 9)

An operation and maintenance plan (O&M Plan) should, at a minimum, identify:

(1) stormwater management system(s) owner(s);
(2) the party or parties responsible for operation and maintenance;
(3) a schedule for inspection and maintenance; and
(4) the routine and non-routine maintenance tasks to be undertaken.

The owner of the BMP is generally considered to be the landowner of the property on which the BMP is located, unless other legally binding agreements are established with another entity. The Order of Conditions and Certificate of Compliance should be written to allow for routine maintenance during construction and post-development phases of the project as defined in the O&M Plan. A continuing condition in the Certificate of Compliance

will ensure that maintenance can be performed without triggering further filings under the Wetlands Protection Act.

Wetlands Protection Program Policy
Issued November 18, 1996

APPENDIX I

ANNUAL REPORT TEMPLATE

STORM WATER MANAGEMENT
ANNUAL REPORT TEMPLATE

TOWN OF SOUTHBOROUGH
Southborough, Massachusetts

DATE

STORM WATER MANAGEMENT
ANNUAL REPORT TEMPLATE
TOWN OF SOUTHBOROUGH

TABLE OF CONTENTS

STORM WATER MANAGEMENT
ANNUAL REPORT TEMPLATE
TOWN OF SOUTHBOROUGH

TABLE OF CONTENTS
(continued)

1.0 INTRODUCTION

2.0 PUBLIC EDUCATION AND OUTREACH

2.1 Education Materials Prepared

Appendix A examples

2.2 Education Materials Distributed

2.3 Workshops/Meetings Attended

2.4 Modifications to Plan

2.5 Activities Scheduled for Next Year

3.0 PUBLIC PARTICIPATION

3.1 Public Meetings Conducted

3.2 Presentations Given

3.3 Notices Published

Appendix B examples

3.4 Feed Back - Letters/Comments Received

3.5 Website

3.6 Modifications to Plan

3.7 Activities Planned for Next Year

4.0 ILLICIT DISCHARGE DETECTION/ELIMINATION

4.1 Illicit Discharge Investigation Activities

Location	Type	Date Identified	Identified By	Estimated Flow	Scheduled for Repair

4.2 Illicit Discharge Removal Activities

Location	Type	Date Removed	Removed By	Cost

4.3 Modifications to Plan

4.4 Planned for Next Year

5.0 CONSTRUCTION SITE RUNOFF CONTROLS

5.1 Construction Plans Reviewed

5.2 Construction Activities Commenced

5.3 Construction Sites Inspected

5.4 Modifications to Plans

5.5 Activities Planned for Next Year

Name	Site	Type	Date Reviewed	Date Commenced	Date Inspected

6.0 POST CONSTRUCTION STORM WATER MANAGEMENT

6.1 Structures Installed

6.2 Structures Inspected

6.3 Modifications to Plan

6.4 Activities Planned Next Year

Project	Site	Type Structure	Date Installed	Date Inspected

7.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING

7.1 Employee Training Conducted

7.2 Street Sweeping

Curb miles swept, # material removed

7.3 Snow Removal

7.4 Catch Basin Cleaning

cleaned, # material removed

7.5 Preventative Maintenance Activities

Work order tracking

7.6 Complaint Responses

7.7 Spill Response Activities

7.8 Transfer Station

7.9 Municipal Waste Disposal

7.10 Municipal Recycle

7.11 Household Hazardous Waste Collection

7.12 Municipal Facility Inspection

Appendix C

7.13 Modification to Plan

7.14 Activities Planned Next Year

APPENDIX J

NHPA/ESA INQUIRY FORMS

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: Town of Southborough - Stormwater Management Plan (SMP)

Location / Address: Town Wide

City / Town: Southborough

Project Proponent

Name: Town of Southborough - Public Works

Address: 147 Cordaville Road

City/Town/Zip/Telephone: Southborough, Massachusetts 01772 (508) 485-1210

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or funding (specify)

Project Description (narrative): To determine if there are any properties in Southborough, MA on the National Register of Historic Places and if so, will they be impacted by Southborough's SMP.

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition. N/A

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation. N/A

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

N/A

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify. The intent of this PNF is to confirm locations to satisfy permit and NHPA requirements.

What is the total acreage of the project area?

Woodland	4109.40 acres	Productive Resources:	
Wetland	116.8 acres	Agriculture	652.0 acres
Floodplain	unknown acres	Forestry	0 acres
Open space	186.22 acres	Mining/Extraction	0 acres
Developed	4896.3 acres	Total Project Acreage	9961.38 acres

What is the acreage of the proposed new construction? N/A acres

What is the present land use of the project area? Municipality - We expect no land use changes as a result of this project.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

Marlborough Quad
See attached map

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: _____ Date: 7/17/03

Name: Gerald J. Brolin - Fuss & O'Neill, Inc.

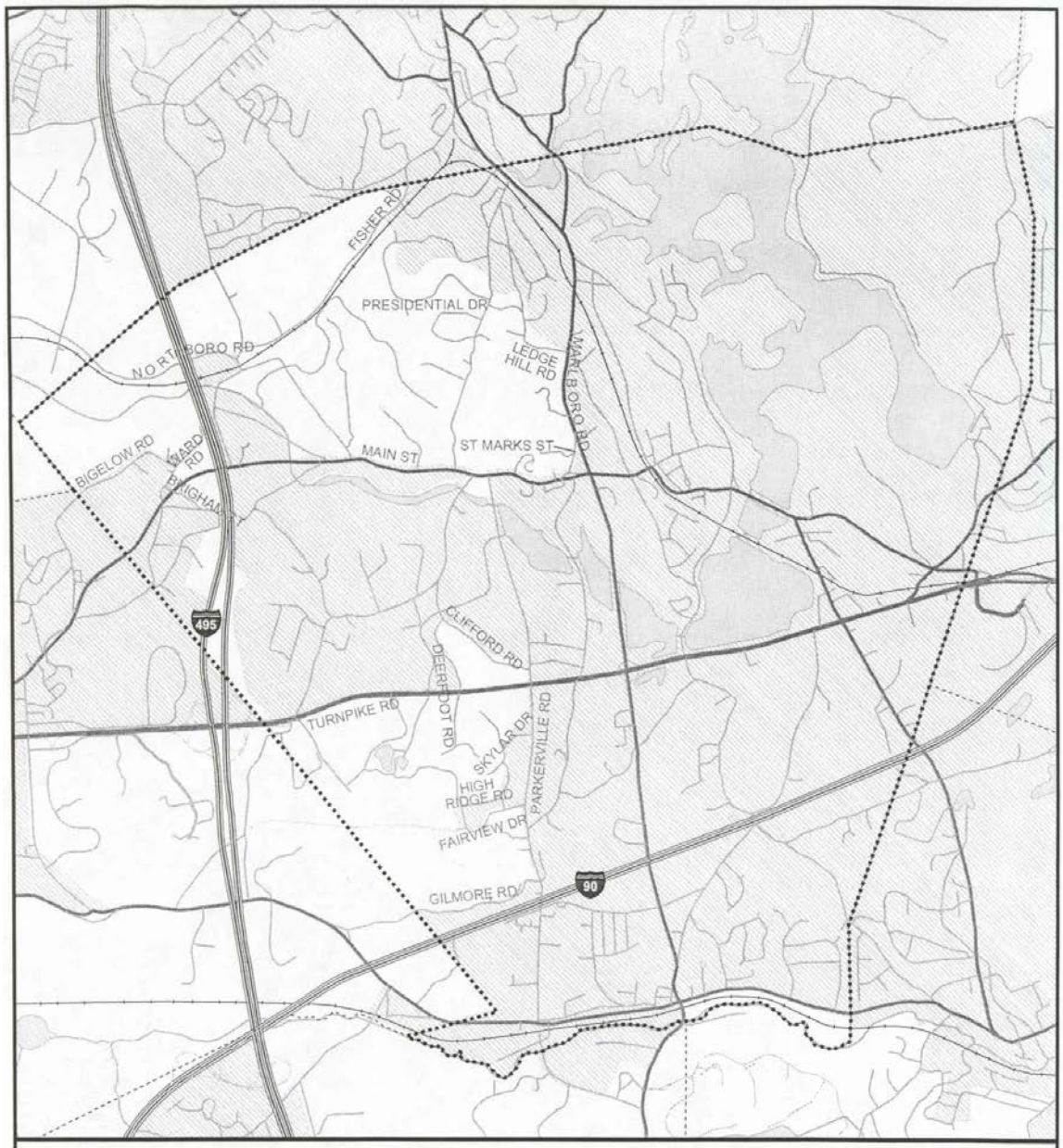
Address: 275 Promenade Street, Suite 350, Foundry Corporate Office Center

City/Town/Zip: Providence, RI 02908

Telephone: (401) 861-3070

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.



Area of Focus:

NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas
Southborough, Massachusetts

Southborough Town Boundary

Regulated Area (2000 Urbanized Area)

Town Population: 8,781
Regulated Population: 7,743

N
W E
S

EPA New England

0 0.3 0.6 0.9 Miles

Data Sources: Urbanized Areas from US Census Bureau (2000). Political boundaries from MassGIS. Hydrography from NHD. Transportation data from GDT at 1:24,000.
Map Created: 11/20/02; US EPA- New England GIS Center
L:/projects/stormwater/phase2/matowns/new/

Rare Species Information Request Form

Please complete this form to request site-specific information from The Natural Heritage and Endangered Species Program database (Please submit only one project per request form).

Requestor Information

Name: Mr. Jay Brolin

Affiliation: Fuss & O'Neill, Inc.

Address: Foundry Corporate Office Center
275 Promenade Street, Suite 350

City: Providence State: RI Zip Code: 02908

Daytime Phone: 401-861-3070 Ext. 4571

Project Information

Project or Site Name: Phase II Storm Water Management Plan

Town: Southborough, MA USGS Quad Map: 197890, 201890

Name of Landowner or Project Proponent: Town of Southborough, MA

Description of Proposed Project: (If necessary attach additional sheet)

Develop stormwater management plan. We are requesting this information to better define areas of the Town of Southborough that warrant special protection or attention as it relates to stormwater management. Priority sites of rare species habitats GIS layer polygon identifiers are PH761 and PH782.

- ☐ Will this project be reviewed as a Notice of Intent by the local Conservation Commission? No
- ☐ Will this project be undergoing review through MEPA? No
- ☐ Have you enclosed the required copy of a USGS topographic map in the scale 1:24,000 or 1:25,000 (not copy reduced) with the site location clearly marked and centered on the copy page? (Copies of Atlas pages are not accepted)

Please **mail** this completed form and topographic map to:
Environmental Review
Natural Heritage and Endangered Species Program
MA Division of Fisheries and Wildlife
Rte. 135
Westborough, MA 01581

Or **fax** to: (508) 792-7275
Natural Heritage Program
Attn: Environmental Review

*Questions regarding this form should be directed to (508) 792-7270 ext. 154

Persons requesting information should expect a 4 week turnaround time (time varies on amount of requests received per week). Please do not ask for an expedited review. Requests are processed in the order that they are received.

APPENDIX K

PERMIT APPLICATION FORM (MADEP FORM WM 08A)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Watershed Management

BRP WM 08A NPDES Stormwater General Permit

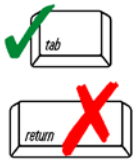
Notice of Intent for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)

W040764
Transmittal Number

Facility ID (if known)

A. Instructions

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Submission of this Notice of Intent constitutes notice that the entity named at item B1. of this form intends to be authorized by the DEP General Permit issued jointly with EPA for stormwater discharges from the small municipal separate storm sewer system (MS4), in the location identified at item B2. of this form. Submission of the Notice of Intent also constitutes notice that the party identified at item B1. has read, understands and meets the eligibility conditions of Part I.B. of the NPDES Small MS4 General Permit, agrees to comply with all applicable terms and conditions of the NPDES Small MS4 General Permit, and understands that continued authorization to discharge is contingent on maintaining eligibility for coverage. **In order to be granted coverage, all information required on BRP WM 08A, including the Stormwater Management Program Summary and Time Frames form, must be completed. Please read the permit and make sure you comply with all requirements, including the requirement to develop and implement a stormwater management program.**

B. Applicant Information

1. Small MS4 Operator/Owner Information:

Town of Southborough
Name

Public Works - 147 Cordaville Road
Mailing Address

Southborough
City/Town

MA
State

(508) 485-1210
Telephone Number

kgalligan@southboroughma.com
Email (if available)

2. Municipality Name

Town of Southborough
City/Town

3. Legal Status:

☐ Federal ☒ City/Town ☐ State ☐ Tribal ☐ Private

☐ Other public entity:
Specify Public Entity

4. Other regulated MS4(s) within municipal boundaries:

MA Turnpike Authority, MHD (Rt 9,30,85,I495, etc.), MBTA

5. Based on the instructions provided in Part I of the NPDES Small MS4 General Permit, have the eligibility criteria for “listed species” and critical habitat been met?

☐ yes ☒ pending ☐ no

B. Applicant Information (cont.)

6. Based on the instructions provided in Part I of the NPDES Small MS4 General Permit, have the eligibility criteria for protection of historic properties been met?

☐ yes ☒ pending ☐ no

Note: Section C may be duplicated to accommodate a larger list of receiving waters

C. Names of (Presently Known) Receiving Waters

Receiving Water: Name	No. of Outfalls Number	Listed as Impaired?	Impairment Specify
Sudbury Reservoir (ORW)	?	☐ Yes ☒ No	
Sudbury River	?	☒ Yes ☐ No	metals
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	

D. Stormwater Management Program Summary

1. Public Education:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal

2. Public Participation:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal

D. Stormwater Management Program Summary (Cont.)

3. Illicit Discharge Detection and Elimination:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal

4. Construction Site Runoff Control:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal

D. Stormwater Management Program Summary (Cont.)

5. Post Construction Runoff Control:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal

6. Municipal Good Housekeeping:

BMP ID #		
Please See Attached for all BMP's	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #		
Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
BMP ID #	Specify Best Management Practice	

D. Stormwater Management Program Summary (cont.)

7. BMPs for Meeting TMDL:

BMP ID #	Specify Best Management Practice	Responsible Dept./Person Name	Specify Measurable Goal
N/A	TMDL not complete for Sudbury River		

E. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name

Signature

Date

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Watershed Management

BRP WM 08A NPDES Stormwater General Permit Notice of Intent for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)

F. Storm Water Management Program TIME FRAMES

Transmittal Number _____

Facility ID (if known) _____

	PERMIT YEAR ONE				PERMIT YEAR TWO				PERMIT YEAR THREE				PERMIT YEAR FOUR				PERMIT YEAR FIVE				
BMP ID #	**Spring 03**	**Summer 03**	**Fall 03**	**Winter 03-04**	**Spring 04**	**Summer 04**	**Fall 04**	**Winter 04-05**	**Spring 05**	**Summer 05**	**Fall 05**	**Winter 05-06**	**Spring 06**	**Summer 06**	**Fall 06**	**Winter 06-07**	**Spring 07**	**Summer 07**	**Fall 07**	**Winter 07-08**	**Next Permit**
1.1																					
1.2					X		X														
1.3																					
1.4																					
1.5																					
1.6																					
1.7																					
1.8				X				X				X				X				X	
1.9																					
1.10																					
1.11																					
2.1																					
2.2					X				X				X				X				
2.3																					
2.4																					
2.5																					
2.6																					
2.7																					
2.8																					
2.9																					
2.10																					
2.11																					
2.12					X				X				X				X				
3.1																					
3.2																					
3.3																					
3.4																					
4.1																					
4.2																					
4.3																					
4.4																					
4.5																					
4.6																					

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Watershed Management

BRP WM 08A NPDES Stormwater General Permit Notice of Intent
for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)
F. Storm Water Management Program TIME FRAMES

Transmittal Number _____

Facility ID (if known) _____

	PERMIT YEAR ONE				PERMIT YEAR TWO				PERMIT YEAR THREE				PERMIT YEAR FOUR				PERMIT YEAR FIVE				
BMP ID #	**Spring 03**	**Summer 03**	**Fall 03**	**Winter 03-04**	**Spring 04**	**Summer 04**	**Fall 04**	**Winter 04-05**	**Spring 05**	**Summer 05**	**Fall 05**	**Winter 05-06**	**Spring 06**	**Summer 06**	**Fall 06**	**Winter 06-07**	**Spring 07**	**Summer 07**	**Fall 07**	**Winter 07-08**	**Next Permit**
5.1																					
5.2																					
5.3																					
5.4																					
6.1																					
6.2																					
6.3																					
6.4																					
6.5																					
6.6																					
6.7	X				X				X				X				X				
6.8	X				X				X				X				X				