BOROUGH OF HOPATCONG
SUSSEX COUNTY, NEW JERSEY

MUNICIPAL STORMWATER MANAGEMENT PLAN

March 2005

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Table of Contents

List of Figures

1.0 INTRODUCTION

This document has been prepared in accordance with the New Jersey Department of Environmental Protection (herein referred to as NJDEP) *Tier A Stormwater Guidance Document* dated April, 2004, and the *New Jersey Stormwater Best Management Practices (BMP) Manual,* dated February 2004 in order to document Hopatcong Borough's strategy to address and reduce stormwater runoff and related non-point source pollution impacts. It is important to note that this plan will require several updates including a required modification to incorporate the adopted municipal stormwater control ordinances in early 2006. In addition, Hopatcong Borough must reexamine the Stormwater Management Plan at each reexamination of the Borough's Master Plan in accordance with N.J.S.A 40:55-D89.

1.1 How Does Stormwater Runoff Affect Us?

Figure 1

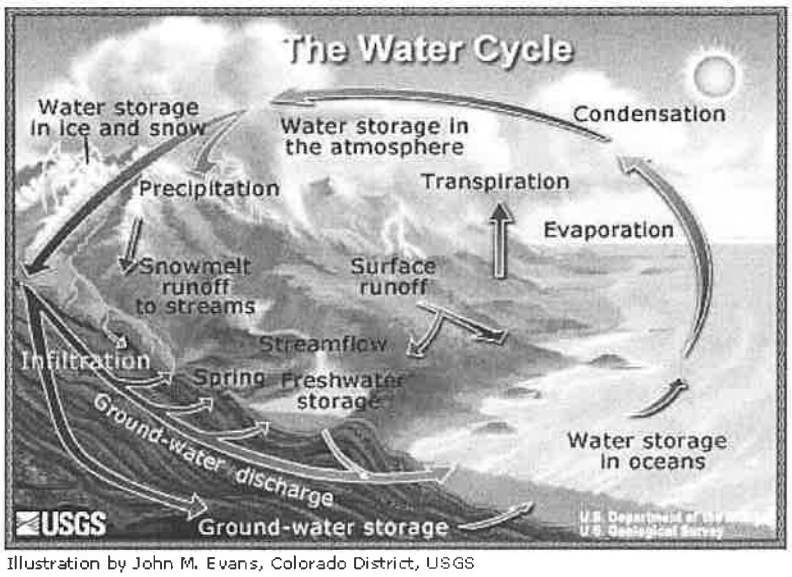


Illustration by John M. Evans, Colorado District, USGS

Stormwater runoff is one of the largest detrimental impacts to our nation's water resources and is a major component of non-point source pollution. It is estimated that up to 60 percent of existing water pollution problems are attributable to non-point source pollution. Non-point source pollution, and particularly, stormwater runoff is difficult to identify, control, and treat. In natural environments, those undisturbed by anthropogenic activities, native vegetation either directly intercepts precipitation or draws from runoff that has infiltrated into the ground and returns it to the atmosphere through the process of evapotranspiration. A portion of precipitation runs off the land's surface replenishing the surface waters. Further, a portion of the rainfall that lands on the ground's surface infiltrates through the soil to the groundwater table and provides natural recharge of the groundwater and either replenishes aquifers or provides baseflow to rivers and streams. This process, known as the hydrologic cycle (or water cycle), functions in equilibrium, but is extremely susceptible to impacts resulting from changes to the cycle's processes. The hydrologic cycle is illustrated on Figure 1.

It has been shown that development can dramatically impact the hydrology of a watershed if stormwater runoff related impacts are not considered carefully. Development typically alters natural vegetation through replacement of forests and fields with lawns and impervious cover, thereby reducing the watershed's evaporation,

transpiration and infiltration rates. Construction activities compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. In the past, development typically involved the construction of impervious areas connected to each other through gutters, channels, and storm sewers. These structures can transport runoff more quickly than natural surfaces and cause erosion, water quality and flooding problems in areas downstream of development. Many times the general public does not know or understand that there are alternatives to the traditional way of managing *improved* properties. For example, homeowners can have a green lawn without excessive doses of fertilizers and pesticides; pet owners should collect and properly dispose of pet waste and not leave it at the curb. Typically, people are unaware that storm drains often discharge directly to waterbodies. When people allow motor oil, trash, and their pet's waste to enter the storm sewer in their street, they don't realize that it may end up in Lake Hopatcong, Muscontcong River or their public drinking water supply. Individually these acts may seem insignificant, but the cumulative impacts of these activities contribute to stormwater runoff non-point source pollution, and thus reduce water quality.

1.2 Municipal Separate Stormwater Systems (MS4) Program

In response to the United States Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) Phase II regulations adopted in December 1999, the State of New Jersey developed the Municipal Stormwater Regulation Program. This program addresses pollutants entering our waters from storm drainage systems operated by local, county, state, interstate, and federal government agencies. These systems are referred to as "municipal separate storm sewer systems" or MS4s and are regulated under the New Jersey Pollutant Discharge Elimination System (NJPDES) Rules (N.J.A.C. 7:14A). The NJDEP created four (4) NJPDES Stormwater General Permits for the various Municipal Separate Storm Sewer System (MS4s). These general permits include the Tier A Municipal Stormwater General Permit, Tier B Municipal Stormwater General Permit, Public Complex Stormwater General Permit, and the Highway Agency Stormwater General Permit.

For each General Permit, NJDEP has mandated Statewide Basic Requirements (herein referred to as SBRs), which include minimum standards, measurable goals, and implementation schedules. The minimum standards are one or more actions that must be taken to comply with the requirement of the permit. The measurable goals are the mechanism for reporting to the NJDEP the progress that the Municipality has made to implement the requirements of the permit and are accomplished primarily through the submittal of an Annual Report and Certification. The implementation schedule sets the deadlines for permit compliance.

All municipalities within the State of New Jersey have been classified as either Tier A or Tier B communities depending on population density as determined in the 2000 United States Census. Hopatcong Borough is regulated under the NJPDES Stormwater Tier A General Permit, NJPDES No. NJ0141852. Tier A Municipalities are generally located within the more densely settled regions of the State or along or near the Atlantic Ocean.

There are currently 467 listed Tier A Municipalities, which contain about 70 percent of New Jersey's land area and 96 percent of New Jersey's population (2000 census). Tier A Municipalities are found in every county. As part of the permit, several SBRs were mandated and an associated implementation schedule was established (refer to Appendix A of this plan for a copy of the Tier A Permit). To satisfy the permit requirements, each Tier A municipality is required to develop, implement, and enforce a Stormwater Program. In addition, Tier A municipalities are required to prepare and implement a Stormwater Pollution Prevention Plan (SPPP) that describes the stormwater program and serves as the mechanism for the implementation of the SBRs. The following SBRs apply to all Tier A municipalities, including Hopatcong Borough.

1. **Public Notice** – Municipalities must comply with State and local public notice requirements when providing for public participation in the development and implementation of their stormwater program.

2. **Post Construction Stormwater Management in New Development and Redevelopment** – Municipalities shall develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that discharge into the municipality's small MS4. In its post construction program, the municipality shall complete the following:

    a. Adopt and reexamine a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) in accordance with N.J.A.C. 7:8-4.

    b. Adopt and implement a municipal stormwater control ordinance or ordinances in accordance with N.J.A.C. 7:8-4. The ordinance(s) will control stormwater from non-residential development and redevelopment projects.

    c. Ensure that any residential development and redevelopment projects that are subject to the Residential Site Improvement Standards (RSIS) for stormwater management (N.J.A.C. 5:21-7) comply with those standards (including any exception, waiver, or special area standard that was approved under N.J.A.C. 5:21-3).

    d. Where necessary to implement the municipal stormwater management plan, the municipal stormwater control ordinance(s) will also:

        i. Control aspects of residential development and redevelopment projects that are not pre-empted by the RSIS; and

        ii. Set forth special area standards approved by the Site Improvement Advisory Board for residential development or redevelopment projects under N.J.A.C. 5:21-3.5.

e. Ensure adequate long-term operation and maintenance (O&M) of Best Management Practice (BMPs).

f. Enforce, through stormwater control ordinance(s) or a separate ordinance, compliance with standards set forth in Attachment C of the permit to control passage of solid and floatable materials through storm drain inlets.

g. Require compliance with the applicable design and performance standards established under N.J.A.C. 7:8 for major development, unless:

   i. Those standards do not apply because of a variance or exemption granted under N.J.A.C. 7:8; or

   ii. Alternative standards are applicable under an area-wide or Statewide Water Quality Management Plan adopted in accordance with N.J.A.C. 7:15.

3. **Local Public Education** – Each municipality shall develop a local public education program that describes how the municipality will distribute educational information which contains specific information on how educational activities and an educational event will be conducted to satisfy the SBR and BMP topics. The following SBRs are included in the public education program:

   a. Distribution of an annual mailing or brochure, provided by the NJDEP, to all residents and businesses of the municipality to cover educational topics such as stormwater/non-point source pollution, storm drain inlet labeling, fertilizer/pesticide use, waste disposal, pet waste, litter, wildlife feeding, and yard waste.

   b. Conduct an annual educational "event" in which the informational brochure is made available to the public.

   c. Establish a storm drain inlet labeling program and label all storm drain inlets in areas operated by the municipality.

4. **Improper Disposal of Waste** – Tier A municipalities must adopt and enforce the following waste disposal ordinances:

   a. Pet Waste – Requires pet owners or their keepers to immediately and properly dispose of their pet's solid waste deposited on their property or any other property, public or private, not owned or possessed by that person.

b. Litter – Adopt and enforce a litter ordinance or enforce the existing State litter statute (N.J.S.A. 13:1E-99.3).

c. Improper Disposal of Waste – Prohibits the improper spilling, dumping, or disposal of materials other than stormwater into the small MS4.

d. Wildlife Feeding – Prohibits the feeding in any public park or on any other property owned or operated by the municipality of any wildlife (excluding confined wildlife in zoos, parks, or rehabilitation centers or unconfined wildlife at educational centers).

e. Yard Waste Ordinance / Collection Program – Prohibits placing non-containerized yard wastes in the street and/or the municipality shall develop a yard waste collection and disposal program.

5. **Illicit Connection Elimination and MS4 Outfall Pipe Mapping** – Each Tier A Municipality must complete the following requirements to identify and eliminate illicit connections:

a. Develop a map showing the end of all MS4 outfall pipes that are operated by the Municipality, and discharge within the municipality's jurisdiction to a surface water body. The map shall show the location and name of all surface water bodies receiving discharges and each pipe shall be assigned an alphanumeric identifier. A copy of the map shall be provided to the NJDEP upon request.

b. Each municipality shall also adopt and enforce an ordinance that prohibits illicit connections to the municipality's MS4.

c. Each municipality shall adopt and implement a program to detect and eliminate illicit connections into the MS4. The program, at minimum, must include an initial inspection of all outfall pipes, and further investigate any found to have dry weather flow in accordance with Permit A requirements. After the completion of the initial inspection of all outfall pipes, Tier A municipalities shall maintain an ongoing program to detect and eliminate illicit connections.

6. **Solids and Floatable Controls** – Each Tier A municipality must take the following actions to reduce the amount of solids and floatable materials from entering surface waters.

a. Street Sweeping – Municipalities shall sweep all municipally owned curbed streets with storm drains that have a posted speed limit of 35

miles per hour (mph) or less in predominantly commercial areas at a minimum of once each month (conditions permitting).

b. Storm Drain Inlets – Municipalities are required to retrofit existing storm drain inlets to meet standards listed in Attachment C of the Tier A Permit (Appendix A).

c. Stormwater Facility Maintenance – Develop and implement a stormwater facility maintenance program for cleaning and maintaining all stormwater facilities in accordance with permit requirements.

d. Road Erosion Control Maintenance – Develop a roadside erosion control maintenance program to identify and repair erosion along streets operated by the municipality. Tier A municipalities are also required to regularly inspect and maintain the stability of shoulders, embankments, ditches, and soils along these roadways to protect against erosion.

e. Outfall Pipe Stream Scouring Remediation – Develop and implement a stormwater outfall pipe scouring detection, remediation and maintenance program to detect and control localized stream and stream bank scouring in the vicinity of all outfall pipes operated by the municipality.

7. **Maintenance Yard Operations (Including Maintenance Activities at Ancillary Operations)** – Tier A Municipalities are required to comply with the following maintenance yard operation requirements:

a. De-icing Material Storage – A permanent structure must be constructed with an impermeable floor (completely roofed and walled) for the storage of salt, and other de-icing materials. Once constructed, the municipality is required to regularly inspect and maintain the structure in accordance with permit requirements.

b. Fueling Operations – Develop and implement standard operating procedures (SOPs) for vehicle fueling and receiving of bulk fuel deliveries in accordance with the requirements listed in Attachment D of the Tier A Permit (Appendix A).

c. Vehicle Maintenance – Develop and implement SOPs for vehicle maintenance and repair activities that occur at municipal maintenance yard operations.

d. Good Housekeeping Practices – Implement good housekeeping procedures for all materials and machinery listed in the Inventory

Requirements for Municipal Maintenance Yard Operations prepared in accordance with Attachment D of the Tier A permit (Appendix A).

8. **Employee Training** – Each Tier A municipality shall develop and conduct an annual employee training program to include at minimum the topics and programs specified in the development and implementation of the SBRs specified in the Tier A permit.

Each requirement listed in the Tier A permit has a specific implementation schedule based on the effective date of permit authorization. This implementation schedule is summarized in Table 1.

Table 1
Tier A Permit Requirement Implementation Schedule for Hopatcong Borough

Implementation Schedule	Permit Requirement
April 1, 2004	Ensure public notice requirements are met when developing and implementing the municipal stormwater program.
April 1, 2004	Ensure major development projects comply with RSIS.
April 1, 2004	Ensure adequate O&M of BMPs on municipal property.
April 1 2005	Adopt Borough Stormwater Management Plan.
April 1, 2005	Adopt Borough SPPP.
April 1, 2005	Ensure new municipal storm drain inlets meet design standards.
April 1, 2005	Establish Local Public Education Program.
April 1, 2005	Implement Solids and Floatable Controls programs, including street sweeping, storm drain inlet retrofits, stormwater facility maintenance, and roadside erosion control.
April 1, 2005	Adopt and comply with Maintenance Yard Operations Plan.
April 1, 2005	Implement Employee Training Program.
April 1, 2005	Adopt a municipal storm drain inlet labeling program.
May 2, 2005	Submit first Annual Report and Certification to NJDEP.
Sept. 1, 2005	Adopt and enforce improper waste disposal ordinances.
Sept. 1, 2005	Adopt and enforce Illicit Connections ordinance and implement Illicit Connection Elimination Program.
Sept. 1, 2005	Adopt and implement Roadside Erosion Control Program and Outfall Pipe Stream Scouring Detection, Remediation, and Maintenance Program.
April 1, 2006	Ensure adequate O&M of BMPs on private property.
April 1, 2006	Adopt stormwater control ordinances.
April 1, 2006	Ensure new storm drain inlets meet design standards for all projects.
April 1, 2007	Label 50% of municipal storm drain inlets.
April 1, 2007	Complete mapping of one sector of MS4 outfall pipes.
April 1, 2009	Label all municipal storm drain inlets.
April 1, 2009	Complete mapping of all MS4 outfall pipes.
April 1, 2009	Complete NJDEP's Illicit Connection Inspection Report.

1.3 Stormwater Management Regulations

On February 2, 2004 the State of New Jersey adopted the revised Stormwater Management Rules (N.J.A.C. 7:8). The revisions to the State's Stormwater Management Rules serve as the first major update to the rules since their inception in 1983 and detail fundamental changes in the management of stormwater runoff in New Jersey. Through the revision of these rules other regulations were modified, including the Residential Site Improvement Standards (RSIS) (N.J.A.C. 5:21), the Freshwater Wetlands Protection Act (N.J.A.C. 7:7A), the Flood Hazard Area Control Act (N.J.A.C. 7:13), the Watershed Management Rules (N.J.A.C. 7:15), and the New Jersey Dam Safety Standards (N.J.A.C. 7:20).

The new Stormwater Management Rules provide a framework and incentives for managing runoff and resolving non-point source impairment on a drainage area basis for new development, redevelopment and existing developed areas. Additionally, they establish a hierarchy for implementation of BMP stormwater management measures with initial reliance on low impact development (LID) site design techniques to maintain natural vegetation and drainage patterns before incorporating structural measures. These new rules also establish runoff control performance standards for groundwater recharge, water quality, and water quantity, establish special protection area measures for pristine and exceptional value waters; provide regulatory consistency among local and State regulatory agencies; and provide safety standards for stormwater management basins.

As of February 2, 2004, the design requirements identified in the Stormwater Management Rules including groundwater recharge, water quality and water quantity must be met for all projects regulated under RSIS. The Stormwater Rules (N.J.A.C. 7:8-4) require that all municipalities within the State of New Jersey adopt a municipal Stormwater Management Plan. The Tier A General Permit mandates that this be completed no later than 12 months from the effective date of the permit authorization, of April 1, 2005. Additionally, N.J.A.C. 7:8-4 mandates that stormwater control ordinances be adopted and implemented for all municipalities in the State no later than 12 months from the date of adoption of the Stormwater Management Plan.

2.0 STORMWATER MANAGEMENT PLAN GOALS

Minimum goals for the municipal stormwater management plans for Tier A communities in the NJDEP Guidance Document are listed as follows:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge;
- Prevent, to the greatest extent feasible, an increase in non-point pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater runoff from new and existing development in order to restore, enhance and maintain the chemical, physical, and biological integrity of the waters of the State, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water;
- Protect public safety through the proper design and operation of stormwater management basins.

In addition to the minimum goals required by NJPDES General Permit, in accordance with the Hopatcong Borough Master Plan, the following goals are set forth in this Stormwater Management Plan:

- Establish a balance of residential and nonresidential uses so as to provide a full range of services as well as residential opportunities to the residents of Hopatcong Borough.
- Provide safe and convenient access to all areas of the Borough.
- Provide adequate sewerage and water services throughout the Borough so as to protect the public health and surface and groundwater quality.
- Provide a range of year-round recreation activities for residents of the Borough.

- Protect environmentally sensitive lands from the impacts of development.

- Ensure that new development within the community be designed with the environmental resources of the borough in mind.

To achieve the above goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines specific design standards for stormwater infrastructure to protect public safety.

3.0 BACKGROUND

3.1 Municipal Background

Hopatcong Borough encompasses an area of 12.34 square miles (1.38 square miles is open water within the Borough Municipal limits) located in Sussex County. Hopatcong Borough occupies the entire southeastern corner of Sussex County, abutting Morris County to the east and south. The Borough lies along the western and northern shores of Lake Hopatcong, the largest lake in New Jersey. Hopatcong Borough is easily reached via Interstate 80 (exit 28) and State Highways 206 and 46. The location and boundaries of Hopatcong Borough are depicted on Figure 2.

Hopatcong Borough experienced a large increase in growth between 1960 and 1980, increasing from 3,391 residents in 1960 to a population of 15,531 in 1980. Census information is presented in Table 2. In recent years, the population of Hopatcong Borough has slowed, growing to 15,888 residents in 2000. The Borough estimates its maximum population will be reached at 20,000 persons or fewer.

Table 2
Hopatcong Borough Census Data

2000	15,888
1990	15,586
1980	15,531
1970	9,052
1960	3,391
1950	1,172
1940	660
1930	534
1920	179
1910	146
1900	75

Source: U.S. Census

There are approximately 6,200 residences in Hopatcong, the majority of which are single family homes. Currently, 79% (6,204 acres) of the Borough is zoned for residential use. The remaining 21% (1,202 acres) of the Borough is designated as non-residential. Because of restraints on the land by steep slopes, water, and rock, the residential growth of the Borough is most likely to be restricted to an additional 300 acres or less with some locations for business and light industrial use.

The Borough water utility provides public water, from municipal wells, to 2,200 residences. The remainder of the homes utilize private wells. Prior to 2004, all residences in Hopatcong Borough were on private septic systems. However, the Borough is currently installing a public sewer system. The initial two phases of the project will reach approximately 45% of the Borough. By the end of 2005, approximately 1,900 homes will be connected to the public sewer system, and by the end of 2006 an additional 1,000 homes will be added.

3.2 Environmental Resources Summary

Geology

Hopatcong Borough is located within the Highland physiographic province, with hilly topography characterized by hard, crystalline, resistant Precambrian igneous and metamorphic rock dominating the area's geology. The general rock formations in the area consist of highly metamorphosed marble, granite, and gneiss. The area was developed as a series of northeast trending fault blocks, resulting in abrupt changes in topography that characterize the surrounding watershed. Two main ridges, oriented in roughly an east/west direction, define the northern and southern boundaries of the surrounding watershed. These ridges rise to approximately 1,000 feet above mean sea level (Princeton Hydro, 1995).

Soils

The soils in the area are primarily represented by three soil associations. The Rockaway-Hibernia-Urban Land Association, comprised of deep, well-drained to somewhat poorly-drained, gently sloping to steep gravely sandy loams and stony to extremely stony loams and sandy loams that overlie granitic gneiss, and includes strongly sloping to very steep rock outcrops. The Rockaway-Rock Outcrop-Whitman Association is comprised of steep and very steep, deep, well-drained gravely to very stony, loamy soils, rock outcrops and nearly level, deep, very poorly drained extremely stony, loamy soils. These soils are typically marginally suited or unsuited for on-site wastewater (septic) treatment.

Surface Water

New development and subsequent changes in the Borough's landscape as well as in surrounding municipalities has resulted in considerable demand and have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. The attached figures illustrate the waterways within and surrounding Hopatcong Borough. Hopatcong Borough is located within the Upper Musconetcong River Watershed, which includes the Upper Musconetcong River, Lake Musconetcong, Lake Hopatcong, Lake Shawnee, Beaver Brook and Mountain Brook, as well as a number of smaller tributaries and intermittent streams.

The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the State's waterways. There are over 800 AMNET sites throughout New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics. Beaver Brook and Mountain Brook have both been designated by NJDEP as FW2-NT waters. FW2-NT or Non-trout waters are not considered suitable for trout, but may be suitable for other fish species. Lake Hopatcong, Lake

Musconetcong, and the Musconetcong River have been designated as FW2-TM waters. FW2-TM waters are those recognized by the state as suitable for trout maintenance.

Hopatcong Borough is situated on the western and northern shores of Lake Hopatcong. Lake Hopatcong is New Jersey's largest and most heavily utilized inland freshwater recreational waterbody. It has been designated by NJDEP as a State Aquatic Park and facilities are used extensively throughout the year. For example, more than a half million people visited Lake Hopatcong in 1997 (Princeton Hydro, 1999). Lake Hopatcong is also designated by NJDEP as an emergency water supply reservoir. However, over the past 40 years there has been a significant decline in the water quality of the lake. The visible symptoms of this decline include periodic algal blooms, excessive aquatic weed growth, depletion of oxygen in the deep water (hypolimnion) of the lake and the accumulation of organic sediments in shallow covers. These impacts have been directly attributed to non-point sources. The following Section 3.3 summarizes the investigations conducted to determine these non-point sources of pollution in the area surrounding Hopatcong Borough.

3.3 Water Quality Issues

Non-point source pollution has emerged as a public issue in New Jersey, and in response to Section 319 of the Clean Water Act, the State has developed a Non-point Source Assessment and Monitoring Program (NJDEP, 1989). As part of that process, New Jersey's existing non-point source pollution problems were identified and an assessment of waterbodies potentially affected by non-point sources was conducted. The Upper Musconetcong River Watershed, was identified as an area suspected of having received significant impacts from non-point source pollution. These findings are consistent with earlier studies of Lake Hopatcong (1984) and Lake Musconetcong (1990) conducted through the U.S. Environmental Protection Agency (USEPA) Clean Lakes Program (Section 314).

In an effort to address non-point source pollution issues, a storm sewer inventory was initiated in 1994 by Hopatcong Borough in accordance with the Coastal Storm sewer Infrastructure Act (N.J.S.A 58:25-33 et seq) (Coastal, 1994). The inventory, *Municipal Non-Point Source Abatement Program for the Borough of Hopatcong*, collected data to determine areas where BMPs would be logistically feasible and/or appropriate from a cost/benefit perspective.

In 1995, the *Regional Non-Point Source Pollution Control Management Plan for the Upper Musconetcong River Watershed* was prepared for the NJDEP by the Lake Musconetcong and Lake Hopatcong Regional Planning Boards in conjunction with Princeton Hydro, LLC. This study focused on identifying and quantifying pollutant loadings from non-point sources. This study also developed management recommendations for the headwaters portion of the Upper Musconetcong River. The Musconetcong River is recognized as being impacted by stormwater runoff. Smaller tributaries located in the headwaters of the Musconetcong River Watershed, notably Beaver Brook and Mountain Brook, have also experienced increased pollutant loading as

a result of the development of their respective sub-watersheds. This is reflected in the water quality data compiled over the past 15 years as part of the monitoring efforts at Lake Hopatcong (Princeton Hydro, 1995)

The 1995 Regional Non-Point Source Pollution Control Management Plan for the Upper Musconetcong River Watershed, along with other studies, also documented that septic systems (on-site disposal systems (OSDS)) are a significant source of pollutants in the Lake Hopatcong portion of the Upper Musconetcong watershed. This study, combined with soils data, indicates the entire watershed has severe limitations for septic system design and operation.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more Total Maximum Daily Loads (TMDLs) are needed. Both Lake Hopatcong and Lake Musconetcong were listed as Sublist 5 waterbodies in the June, 2002 Integrated Water Quality Monitoring and Assessment Report. Lake Hopatcong did not meet the water quality standards for nutrients/sedimentation, aquatic life, fecal coliform, and fish-mercury. Lake Musconetcong did not meet the water quality standards for nutrient/sedimentation.

In response to the June 2002 Integrated Water Quality Assessment, the State of New Jersey recently completed a TMDL analysis of the Upper Musconetcong River watershed. The TMDL focused primarily on phosphorus, which is typically the primary nutrient that limits algal and aquatic plant growth. Phosphorus has also been identified by the State, under the 303(d) program, as one of the parameters responsible for the documented impairment of Lake Hopatcong and Lake Musconetcong (NJDEP, 2003a). Thus, the TMDL analysis for the two major waterbodies within the Upper Musconetcong River watershed focuses on phosphorus (Princeton Hydro, 2005).

The completion and acceptance of the phosphorus TMDL resulted in the delisting of both Lake Hopatcong and Lake Musconetcong on the New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report to Sublist 4a for phosphorus (formerly listed as nutrients/sedimentation). Former Sublist 5 Waterways are delisted to Sublist 4a once all TMDL(s) have been developed and approved by EPA that, when implemented, are expected to result in full attainment of the standard. Lake Hopatcong remains on Sublist 5 for fecal coliform, fish community (formerly listed as aquatic life), and fish-mercury until all TMDLs for each pollutant have been completed and approved by EPA.

As described previously in Section 3.1, in order to reduce phosphorous loads to Lake Hopatcong, the Borough of Hopatcong is currently in the process of sewering a significant portion of its homes. The sewering of houses which currently use on-site wastewater disposal systems (septic systems) in the Borough of Hopatcong is one of the primary restoration measures recommended for Lake Hopatcong to reduce watershed-

based phosphorous load to the targeted levels (Princeton Hydro, 2005). The proper management of remaining septic systems is extensively discussed in the *Municipal Non-Point Source Abatement Program for the Borough of Hopatcong* (Coastal, 1994), with the objectives of the septic management program two-fold; to prevent the installation of new septic systems in areas where soil absorption systems will not provide adequate treatment of effluent; and regular maintenance of existing systems with emphasis on their pump-out and certified inspection at least once every three to five years.

Additional recommendations of the TMDL study were the installation of structural BMPs and retrofits designed to reduce existing surface water phosphorous loads. The implementation of this Stormwater Management Plan is intended to further reduce the impacts of phosphorus attributed to non-point source pollution to surface water resources of Hopatcong Borough.

3.4 Existing Stormwater Infrastructure

Hopatcong Borough has a total of 37 stormwater outlets that discharge into Lake Hopatcong. Their locations, descriptions and associated water quality characteristics are presented in the Municipal Non-Point Source Abatement Program for the Borough of Hopatcong (Coastal, 1994). The Borough is in the process of mapping all inlets and related piping. The Borough will be assessing the condition of these structures and developing a maintenance plan to address deficiencies.

3.5 Water Quality Issues

Water quality is within the Borough is significantly impacted by flooding and erosion. Significant portions of the Borough's infrastructure is undersized and in poor condition. The Borough is improving its infrastructure on a priority basis.

4.0 DESIGN AND PERFORMANCE STANDARDS

To prevent or minimize water quality impacts, the Borough will develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects (including projects operated by the municipality itself) that disturb one acre or more, including projects less than 1,500 square feet that are part of a larger common plan of development or sale, that discharge into the municipality's MS4.

The Borough will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins.

The Borough will follow the following implementation schedule:

1. Upon the effective date of permit authorization, the Borough will for new development and redevelopment projects:

    a. Ensure that any residential development and redevelopment projects that are subject to the Residential Site Improvement Standards for stormwater management (N.J.A.C. 5:21-7) comply with those standards (including any exception, waiver, or special area standard that was approved under N.J.A.C. 5:21-3).

    b. Ensure adequate long-term operation and maintenance of BMPs on property owned or operated by the municipality.

2. Within 12 months from the effective date of permit authorization, the Borough will:

    a. Adopt a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) pursuant to the Stormwater Management Rules (N.J.A.C. 7:8-4);

    b. Comply with the standards set forth in Attachment C of the permit to control passage of solid and floatable materials through storm drain inlets for storm drain inlets the municipality installs within the Tier A Municipality's small MS4.

3. Within 12 months from the adoption of the municipal stormwater management plan, the Borough will adopt stormwater control ordinances

(2) to implement that plan, and shall submit the adopted municipal stormwater management plan and ordinances (s) to the appropriate county review agency for approval.

4. The Borough will enforce stormwater control ordinances(s) when approved in accordance with N.J.A.C. 7:8-4.

5. Within 24 months from the effective date of permit authorization the Borough will:

   a. Ensure adequate long-term operation and maintenance of BMPs on property not owned or operated by the municipality;

   b. Enforce, through the stormwater control ordinances (s) or a separate ordinance compliance with the standards set forth in Attachment C of the permit to control passage of solid floatable materials through storm drain inlets for storm drain inlets not installed by the Tier A Municipality.

6. During construction, Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

The Borough will comply with the applicable meet several different but related requirements. These requirements are concerned with:

- The Department's Stormwater Management rules (N.J.A.C. 7:8), which are implemented in part through the Residential Site Improvement Standards: govern the contents of municipal stormwater management plans and stormwater control ordinances, and establish stormwater management design and performance standards for new development and redevelopment.

- The Residential Site Improvement Standards (RSIS) for stormwater management established by the New Jersey Department of Community Affairs (NJDCA) at N.J.A.C. 5:21.

- Municipal stormwater management plans and stormwater control ordinances adopted under the Stormwater Management Act (N.J.S.A. 40:55D-93 to 99), which is a portion of the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.)

- Long-term operation and maintenance of BMPS.

- Storm drain inlets.

The Borough's post-construction program will comply with the applicable design and performance standards for major development established in N.J.A.C 7:8, unless those

standards do not apply because of a variance or exemption granted under N.J.A.C. 7:8, or unless alternative standards under a Water Quality Management (WQM) Plan (adopted in accordance with the Department's Water Quality management Planning rules at N.J.A.C. 7:15) are applicable. The Borough will require such compliance through the RSIS, and through municipal stormwater management plans and stormwater control ordinances.

The requirements in N.J.A.C. 7:8-5.2 AND 5.3 to incorporate the following nonstructural stormwater management strategies into the design.

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
- Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
- Maximize the protection of natural drainage features and vegetation;
- Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
- Minimize land disturbance including clearing and grading;
- Minimize soil compaction;
- Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
- Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and
- Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff (see N.J.A.C. 7:8-5.3(a)9 and the New Jersey Stormwater Best Management Practices Manual for examples).

The standard in N.J.A.C. 7:8-5.4 to encourage and control infiltration and groundwater recharge, including requirements that the design engineer (except in certain specified circumstances) either:

- Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; **or**

- Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.

The standard in N.J.A.C. 7:8-5.4 to control stormwater runoff quantity impacts.

- This standard provides the design engineer with various alternatives, such as, for example, designing stormwater management measures so that the post-construction peak runoff rates for the two, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates.

- The "Stormwater runoff quality standards" in N.J.A.C. 7:8-5.5, including:

    - The requirement that stormwater management measures be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80 percent of the anticipated load from the developed site, expressed as an annual average. Table 2 in N.J.A.C. 7:8-5.5 presents the presumed TSS removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual.

    - The requirement that stormwater management measures be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm.

    - The requirement that the applicant preserve and maintain 300-foot "special water resource protection areas" along all waters designated "Category One" in the Department's Surface Water Quality Standards at N.J.A.C. 7:9B, and along perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the U.S. Geological Survey (USGS) Quadrangle Maps or in the County Soil Surveys, within the associated hydrologic unit code 14 (HUC14) drainage. The Borough currently does not have a Category One waters within the municipal boundary.

- The maintenance requirements in N.J.A.C. 7:8-5.8

The requirements for "compliance with the applicable design and performance standards established under N.J.A.C. 7:8" pertains to all applicable design and performance standards established under the Stormwater Management rules, not jut to the "Stormwater runoff quality standards" in N.J.A.C. 7:8-5.5. Problems such as human-induced base-flow reduction (due to reduced recharge) and exacerbation of flooding and erosion also present water quality problems because they alter the chemical, physical, or biological integrity of the waters of the State, or otherwise contribute to water pollution.

5.0 PLAN CONSISTENCY

The Borough is not currently within a Regional Stormwater Management Planning Area. However, a TMDL study has been undertaken. This plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs at this time. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Borough's Stormwater Management Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

6.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Borough has reviewed the Master Plan, Official Map and Ordinances to incorporate nonstructural stormwater management strategies. The Borough will revise all ordinances which relate to land development and incorporate NJDEP's nonstructural stormwater management strategies. Once the ordinance texts are completed, they will be submitted to Sussex County for review and approval within 24 months of the effective date of the Stormwater Management Rules. A copy will be sent to the Department of Environmental Protection at the time of submission.

Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge.

It is noted that although attempts to mimic pre-existing natural conditions may be adequate to satisfy the State stormwater rules, alteration of land always modifies hydrology. Therefore, some measure (or BMP) will be required for every project qualifying as a major development. It is important to note that this BMP section serves only as a synopsis of the BMPs discussed and detailed in the NJDEP BMP Manual and in no way is to be construed as a replacement to that document.

6.1 Nonstructural BMPs/ Low Impact Development (LID)

With the increasing emphasis on nonpoint source pollution and concerns over the environmental impacts of land development, it has become necessary to develop effective alternatives to the centralized conveyance and treatment strategy that has been the basis for much of the historical stormwater management systems and programs in the State. New strategies must be developed to minimize and even prevent adverse stormwater runoff impacts from occurring. If elimination of adverse impacts is not possible treatment closer to the origin of those impacts must be provided. Such strategies, known collectively as LID design seek to reduce and/or prevent adverse runoff impacts through sound site planning and both nonstructural and structural techniques that preserve or closely mimic the site's natural or pre-developed hydrologic response to precipitation. Rather than responding to the rainfall-runoff process using centralized structural facilities, LID design techniques control stormwater runoff and pollutants closer to the source and provide site design measures that can significantly reduce the overall impact of land development on stormwater runoff.

Any land area containing a nonstructural stormwater management measure to meet the above identified design standards shall be dedicated to Hopatcong Borough, Sussex County, or the State, subjected to a conservation restriction filed with the County Clerk's office, or subject to an NJDEP approved or equivalent restriction that ensures the specific measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity. Additionally, in general all proposed stormwater

management measures must avoid creating concentrated stormwater runoff flows or discharges on habitat for threatened and endangered (T&E) species as documented in the NJDEP's Landscape Project or Natural Heritage Database.

To the maximum extent practicable, the design standards identified in Section 4 above shall be met by incorporating nonstructural stormwater management strategies into the design. The person(s) submitting an application for review shall identify the nonstructural strategies incorporated into the design of the project and shall complete a Low LID Checklist as provided in the BMP Manual (a sample is included in Appendix E of this report) to be included in the application to the Borough for review. In accordance with the Stormwater Management Rules, nonstructural stormwater management strategies incorporated into site design shall:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

3. Maximize the protection of natural drainage features and vegetation;

4. Minimize the decrease in the "time of concentration (Tc)" from pre-construction to post-construction;

5. Minimize land disturbance including clearing and grading;

6. Minimize soil compaction;

7. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

8. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and

9. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:

    i. Site design features that help to prevent accumulation of trash and debris in drainage systems;
    ii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
    iii. When establishing vegetation after land disturbance, applying fertilizer at the rates in accordance with the requirements established under the

Standards for Soil Erosion and Sediment Control in New Jersey. No more fertilizer shall be applied than listed.

While the nonstructural stormwater management strategies listed above represent a wide range of both objectives and practices, Strategies 1 through 8 can be directly addressed through the use of specific nonstructural LID-BMPs that can be grouped into four general categories:

1. Vegetation and Landscaping Techniques;
2. Minimizing Site Disturbance;
3. Impervious Area Management; and
4. Time of Concentration (Tc) Modifications.

Information on the specific nonstructural LID-BMPs recommended for each of these categories in Hopatcong Borough is presented below. Prior to utilizing any of the specific nonstructural LID-BMPs described below, applicants are urged to review the land development regulations of the municipality and/or agency from which they are seeking development approval. Engineers and site designers should recognize the importance of accurately computing existing or pre-developed runoff at a land development site. While this is an important computation at all development sites, it is particularly important at those sites where nonstructural LID-BMPs will be utilized. This is because, to a large degree, these nonstructural measures will utilize and/or mimic the pre-developed site's rainfall-runoff response. As such, accurate computation of pre-developed hydrologic conditions is vital to successful LID-BMP development. It is recommended that engineers and site designers consult with regulatory entities, such as the State, municipality, or local soil conservation district, regarding pre-developed hydrologic conditions. A pre-design meeting with the Borough Engineer will help to refine concepts before final design.

6.1.1 Vegetation and Landscaping Techniques

There are three (3) key types of vegetation and landscaping nonstructural measures that should be considered in land development proposed within the Borough.

- **Best Management Practice #1:** Preservation of existing natural vegetated areas

Description/Implementation: This should be considered throughout the design of a land development project, despite the fact that Hopatcong Borough is mostly built-out. As indicated in Section 3.0 – Municipal Background above, there are several areas with significant hydrologic functions including forested areas, riparian corridors, and T&E species habitat that have been identified within the Borough limits. Close attention should be placed on the preservation of natural vegetation within these areas in particular.

Maintenance Responsibilities: The maintenance responsibilities for this technique are minimal in that the area should be placed in an easement or deed restriction to ensure that the natural vegetation is not removed.

Recommended applications: Water quality, soil erosion and sediment control, and water quantity control.

- **Best Management Practice #2:** Native ground cover

Description/Implementation: As indicated in Section 1.0 above, areas covered with turf grass typically generate more runoff pollution than other types of vegetation. This is especially true when comparing grass areas with naturally wooded areas or wild meadows. Therefore, the amount of lawns and other grass areas at land development sites should be minimized. Instead, alternative vegetation, particularly native plants, should be used to re-vegetate disturbed site areas. Native ground cover can create infiltration characteristics similar to those of natural areas. Naturally wooded areas or wild meadows should also be restored or reestablished at land development sites where opportunity exists.

Maintenance Responsibilities: The use of native plants decreases maintenance in the form of reduced mowing frequency and reduced use of fertilizers, when compared to turf grass.

Recommended applications: Water quality, soil erosion and sediment control, and water quantity control.

- **Best Management Practice #3:** Vegetative Filters/Buffers

Description/Implementation: Native ground cover can provide a vegetated buffer to help filter stormwater runoff and provide locations for runoff from impervious areas to infiltrate. Water flowing as sheet flow across a vegetated area is slowed and filtered prior to infiltrating into the soil. Dense vegetative cover, long flow path lengths, and low surface slopes provide the most effective vegetated filters. Vegetative filters and buffers can be created by preserving existing vegetated areas over which runoff will flow or by planting new vegetation. Vegetative filters located immediately downstream of impervious surfaces such as roadways and parking lots can achieve pollutant removal, groundwater recharge, and runoff volume reduction. Vegetated buffers adjacent to streams, creeks, and other waterways and water bodies can also help mitigate thermal runoff impacts, maintain stream base flow, provide wildlife habitat, and increase site aesthetics.

Maintenance Responsibilities: The use of vegetative filters decreases the use of curbs stormwater collection systems and subsequently their respective maintenance and inspection requirements. Vegetative filters should be inspected

for erosion and loss of vegetation. Debris should be removed after large rainfall events and at least once (1) per year.

Recommended applications: Water quality, groundwater recharge, and water quantity control.

6.1.2 Minimizing Site Disturbance

- **Best Management Practice #4:** Minimizing land disturbance

Description/Implementation: Minimizing land disturbance at a development site is a nonstructural LID-BMP that can be used during all phases of a land development project. Additionally, minimizing land disturbance can help reduce post-construction site runoff volumes and pollutant loads and maintain existing groundwater recharge rates and other hydrologic characteristics by preserving existing site areas. Minimum disturbance begins during the project's planning and design phases by fitting the development into the terrain, as opposed to changing the terrain to fit the development. Roadway and building patterns that match the existing land forms and limit the amount of required clearing and grading should be chosen.

Key Land Disturbance Considerations:
- Do not concentrate flow
- Minimize grading
- Build within the existing topography
- Do not alter natural drainage areas
- Minimize impervious cover
- Increased structural loads contribute to ground failures
- Minimize changes to existing soil profiles including cut/fill

Maintenance Requirements: The applicant will ensure compliance by including these requirements in soil erosion and sediment control plans, construction plans, and contract documents.

Recommended applications: Water quality, Groundwater recharge, soil erosion and sediment control, and water quantity control.

6.1.3 Impervious Area Management

Reductions in impervious area translate into more surface storage, infiltration and groundwater recharge, less stormwater runoff, and reduced storm sewer construction, maintenance, and repair costs. It is important to note that all reductions in the amount and dimensions of impervious surfaces at a land development site must also recognize safety and the level of use of the impervious surfaces. There are three (3) impervious area management techniques that may be considered for major development projects proposed within the Borough.

- **Best Management Practice #5:** Minimizing parking area and driveways

Description/Implementation: Parking area and driveway requirements are mandated by the Borough Land Development Ordinances and, in the case of residential areas, the RSIS. The RSIS provides flexibility in selecting parking and driveway size, provided that supporting local data is available. A mix of residential and nonresidential uses at a development site can share parking areas, thereby reducing the total parking area and impervious cover. The RSIS also allows a reduction in the standard 18-foot parking space length provided that room is provided for overhang by the vehicle. The overhang area can then be vegetated to further reduce (and possibly help disconnect) impervious surfaces. Non-residential uses can follow suit in the Borough as well. At all development sites, consideration should be given to constructing some or all driveways and parking areas from pervious paving material. This is particularly true for overflow parking areas as well as driveways (and other access roadways) that are used relatively infrequently by maintenance and emergency vehicles. Parking can also be located underground or beneath buildings, which can help reduce the site's overall impervious coverage.

Maintenance Requirements: Should pervious paving materials be utilized as part of this BMP there is some maintenance required. Refer to BMP #16 for more details.

Recommended applications: Water quality, water quantity control, and soil erosion and sediment control.

- **Best Management Practice #6:** Unconnected impervious areas

Description/Implementation: This technique includes impervious surfaces that are not directly connected to a site's drainage system. In this strategy runoff from an unconnected impervious area is allowed to sheet flow from the impervious area across a downstream pervious surface, where it has the opportunity to re-infiltrate into the soil, thereby reducing the total runoff volume. In most circumstances, impervious areas can be considered unconnected under the following conditions:

1. All runoff from the unconnected impervious area must be sheet flow;

2. Upon entering the downstream pervious area, all runoff must remain as sheet flow;

3. Flow from the impervious surface must enter the downstream pervious area as sheet flow or, in the case of roofs, from downspouts equipped with elongated splash pads, level spreaders, or dispersion trenches that reduce flow velocity and induce sheet flow in the downstream pervious area;

4. All discharges onto the downstream pervious surfaces must be stable and non-erosive;

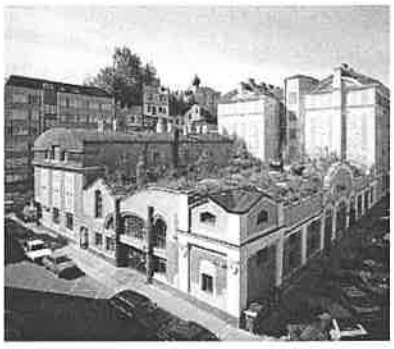
5. The shape, slope, and vegetated cover in the downstream pervious area must be sufficient to maintain sheet flow throughout its length. Maximum slope of the downstream pervious area is eight (8) percent;

6. The maximum roof area that can be drained by a single downspout is 600 square feet.

Maintenance Requirements: There is minimal maintenance required for this BMP, however, some repair may be necessary of eroded surfaces.

Recommended applications: Water quality and water quantity control.

- **Best Management Practice #7:** Vegetated Roofs



Description/Implementation: Vegetated roofs, also known as green roofs, are an innovative way to reduce impervious surfaces at development sites, and are relatively new in New Jersey. A vegetated or green roof consists of a lightweight vegetated planting bed that is installed on a new or existing roof. Vegetated roofs can be implemented using specialized commercial products. It is important to note that the structural integrity of the roof must be taken into consideration when designing a green roof. The Borough Building Code Official must be consulted prior to use of this technique.

Maintenance Requirements: Except for periodic limited or as needed fertilization and watering, a meadow-like planting of perennial plants can require minimal maintenance.

Recommended applications: Water quantity and soil erosion and sediment control.

6.1.4 Time of Concentration (Tc) Modifications

Changes in peak flow result from changes in Tc from drainage areas, with longer times yielding smaller peak runoff rates and shorter times causing greater ones. Site factors that affect a drainage area's Tc include precipitation, flow length, flow regime, surface roughness, channel shape, and slope. Typically, land development modifies most of these factors in ways that cause the Tc of a drainage area to become shorter (and, therefore the peak runoff rates to be greater) after development than prior to development. However, during site design, it is possible to minimize this decrease in Tc by controlling the various site factors that affect it. Considerations for three (3) factors are presented below.

- **Best Management Practice #8:** Surface roughness changes

  Description/Implementation: Based upon hydraulic theory, surface roughness coefficients used in sheet flow computations are based on the land cover of a drainage area, with areas of dense vegetation having generally higher coefficients (and longer times of concentration) than smoother surfaces such as paved or grassed areas. Site designers should preserve existing native vegetation or use native plants with varied topography to restore disturbed areas as discussed above in order to increase surface roughness and Tc, and consequently reduce the peak flows from a drainage area.

  Maintenance Requirements: Not applicable.

  Recommended applications: Water quantity control and soil erosion and sediment control.

- **Best Management Practice #9:** Slope reduction

  Description/Implementation: Ground slope is an important factor in determining a drainage area's Tc and peak discharge. Reducing slopes in graded areas can help minimize Tc reductions and peak flow increases. In addition, terraces and reduced slope channels with grade breaks can be constructed on a sloping area to provide additional travel time. Terraces can also be used to redirect runoff to flow along rather than across the slope, decreasing the slope and increasing the flow length and, subsequently, the Tc. Care should also be taken to ensure that the grading of vegetated areas is sufficient to allow for positive drainage as required by local or state regulations, particularly adjacent to buildings and other structures.

  Maintenance Requirements: Not applicable.

  Recommended applications: Water quantity control and soil erosion and sediment control.

- **Best Management Practice #10:** Vegetated conveyance

  Description/Implementation: The use of vegetated conveyance measures such as channels and swales can increase the surface roughness along the Tc flow path and increase the overall Tc. In addition, vegetated channels can provide opportunities for runoff treatment, runoff infiltration, and evapotranspiration. In designing vegetated conveyance measures, care should be taken to protect transitions to and from culverts from erosion caused by flow acceleration and turbulence. The vegetation must be tolerant of the hydrologic regime associated with the channel.

Maintenance Requirements: Maintenance of vegetated conveyance involves mowing at least once (1) per year to inhibit woody vegetation growth and removal of any debris at least once (1) per year and after any storm event larger than 1 inch of rainfall.

Recommended applications: Water quality, water quantity control, and soil erosion and sediment control.

At the time this plan was prepared, no actual quantitative values for pollutant removal efficiency had been assigned to nonstructural BMPs by NJDEP. NJDEP is currently in the process of establishing a "point" system for the use of these techniques and projects designed will then be required to have a minimum number of points before approval will be granted.

6.2 Structural BMPs

As mentioned previously, wherever possible, all major development projects proposed in the Borough must utilize nonstructural stormwater management measures to meet the requirements of the Stormwater Management Rules, where feasible. When structural measures are required, the following standards apply:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; and drainage area and drainage patterns;

2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning

3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant;

4. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at N.J.A.C. 7:8-6 and as identified below;

5. Stormwater management measure guidelines are available in the BMP Manual and as described below. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, ground water recharge and water quality design and performance standards established by this subsection;

6. For all proposed structural stormwater management measures the Borough Engineer must evaluate the ability to clean out the selected structural BMP(s); the expense of replacement equipment, safety, and training for the BMP(s); and the ease of access to maintain the structure(s).

This plan details the ten (10) types of structural BMPs identified in the BMP Manual. These BMPs include the following:

- **Best Management Practice #11:** Bioretention system

Description/Implementation: A bioretention system consists of a soil bed planted with native vegetation located above an underdrained sand layer. It can be configured as either a bioretention basin or a bioretention swale. Stormwater runoff entering the bioretention system is filtered first through the vegetation and then the sand/soil mixture before being conveyed downstream by the underdrain system. Runoff storage depths above the planting bed surface are typically shallow. **The adopted total suspended solids (TSS) removal rate for bioretention systems is 90 percent.** Bioretention systems can be used to filter runoff from both residential and nonresidential developments. Bioretention systems are most effective if they receive runoff as close to its source as possible. They can vary in size and can receive and treat runoff from a variety of drainage areas within a land development site. They can be installed in lawns, median strips, parking lot islands, unused lot areas, and certain easements. The elevation of the Seasonal High Water Table (SHWT) is critical to ensure proper functioning of the bioretention basin, and must be evaluated to ensure that the SHWT is at least 1 foot below the bottom of the bioretention basin's underdrain system during non-drought conditions. Additionally for areas within Tier I and Tier II of the wellhead protection areas in the Borough, an impermeable bottom layer must be installed to ensure no stormwater runoff enters the groundwater table.

Maintenance Requirements: Effective bio-retention system performance requires regular and effective maintenance. All bioretention system components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation after every storm exceeding one (1) inch of rainfall and at least four (4) times annually. Sediment removal should take place when the basin is thoroughly dry. Vegetation should be trimmed and grass should be mowed at least once a month during the growing season. Vegetated areas should be inspected for a decrease in vegetative cover as well as invasive species. Corrective action must be taken within one (1) month to ensure proper operation of the bioretention system. All structural components must be thoroughly inspected for cracking, subsidence, spalling, erosion, and deterioration at least once per year and should be reviewed after every storm exceeding 1 inch of rainfall. The maintenance plan for a bioretention system must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the ground surface in the bioretention system. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the system's planting soil bed, underdrain system,

and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system. Additionally, the planting soil bed at the bottom of the swale should be inspected after every storm exceeding one (1) inch of rainfall.

Recommended applications: Water quality, water quantity control, and groundwater recharge.

- **Best Management Practice #12:** Constructed stormwater wetland

Description/Implementation: Constructed stormwater wetlands are designed to maximize the removal of pollutants from stormwater runoff through settling and, uptake and filtering by vegetation. Constructed stormwater wetlands temporarily store runoff in relatively shallow pools that support conditions suitable for the growth of wetland plants. **The adopted TSS removal rate for constructed stormwater wetlands is 90 percent.** Constructed stormwater wetlands are used to remove a wide range of stormwater pollutants from land development sites as well as provide wildlife habitat and aesthetic features. The minimum drainage area to a constructed stormwater wetland is 10 acres to 25 acres, depending on the type of wetland. Constructed stormwater wetlands should not be constructed within natural wetland areas, since they will not typically have the same full range of ecological functions and are not permitted by regulation. It is important to note that a constructed stormwater wetland must be able to maintain its permanent pool level.

Maintenance Requirements: Effective constructed stormwater wetland performance requires regular and effective maintenance. All constructed stormwater wetland components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation after every storm exceeding one (1) inch of rainfall and at least four (4) times annually. Mowing and/or trimming of vegetation must be performed at least once a month during the growing season. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original

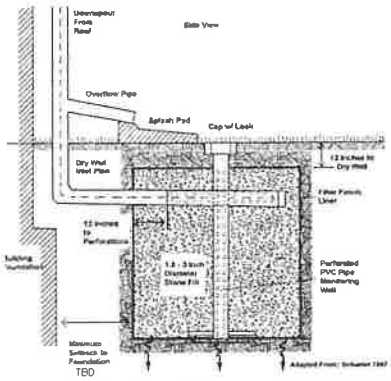
Key Considerations for Constructed Wetland systems:

- Medium-fine texture soils are optimal
- An impermeable liner may be required where infiltration is too rapid
- Shallow depths to bedrock may make these systems not cost effective
- Pretreatment can reduce incoming velocities and capture coarse sediments

specifications after a professional assessment of the vegetation loss has been conducted. The assessment may include modifications to the original specifications to alleviate the vegetation loss as appropriate. All structural components must be thoroughly inspected for cracking, subsidence, spalling, erosion, and deterioration at least once per year and should be visually observed at all inspections of the constructed wetland system. The maintenance plan for the constructed wetland must indicate the approximate time it would normally take to drain the maximum design storm runoff and return the various wetland pools to their normal standing water levels. If significant increases or decreases in the normal drain time are observed, the wetland's outlet structure, forebay, and groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the wetland.

Recommended applications: Water quality, water quantity control, and soil erosion and sediment control.

- **Best Management Practice #13:** Dry well



Description/Implementation: A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs of structures. Discharge of detained runoff within a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. Due to the relatively low level of expected pollutants in roof runoff, a dry well cannot be used to directly comply with the suspended solids and nutrient removal requirements contained in the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. However, due to its storage capacity, a dry well may be used to reduce the total stormwater quality design storm runoff volume that a roof would ordinarily discharge to downstream stormwater management facilities. Dry wells can also be used to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules. The use of dry wells is applicable only where their subgrade soils have the required permeability rates. Like other BMPs that rely on infiltration, dry wells are not appropriate for areas where high pollutant or sediment loading is anticipated due to the potential for groundwater contamination. As noted above, this structure cannot be utilized for sites with known contamination and caution should be utilized in selecting these units in Tier I and II of the wellhead protection areas. Dry wells are not assigned any TSS removal rate and pre-treatment is required for any stormwater runoff other than rooftop stormwater runoff directed to these units.

Maintenance Requirements: Effective dry well performance requires regular and effective maintenance. A dry well should be inspected after every storm

exceeding 1 inch of rainfall and at least four (4) times annually. The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume from the dry well. If significant increases in the normal drain time are observed or if it exceeds the 72-hour maximum, appropriate measures must be taken to comply with the drain time requirements and maintain the proper functioning of the dry well.

Key Considerations for Dry Wells:
- The drainage area to the unit must not exceed 1 acre
- Tests for permeability and soil characteristics must be conducted at exact location prior to final design
- Roof gutter guards and sumps or traps should be included in the conduits of the dry well

Recommended applications: Water quantity control and groundwater recharge.

- **Best Management Practice #14:** Extended Detention Basin

Description/Implementation: An extended detention basin is a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and somewhat promotes the settlement of pollutants. An extended detention basin is normally designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity management. **The adopted TSS removal rate for extended detention basins is 40 to 60 percent, depending on the duration of detention time provided in the basin, which does not meet the requirements of the Stormwater Management Rules exclusively.** Extended detention basins can be used in part to address both the stormwater runoff quantity and quality impacts of land development. Extended detention basins are designed for complete evacuation of runoff and normally remain dry between storm events. Extended detention basins may be used at sites where significant increases in runoff are expected from site development. In addition, standard detention basins may be retrofitted or converted to extended detention by increasing the time over which the basin releases the stormwater quality design storm runoff volume, provided that erosion and flood control volumes and outflow rates are not adversely altered. It is stressed that extended detention basins have a limited effectiveness in removing both particulate and soluble pollutants, which may preclude their use for complying with regulated TSS removal rates.

Maintenance Requirements: Extended detention basin performance requires regular and somewhat intensive maintenance. All extended detention basin components expected to receive and/or trap debris and sediment must be

inspected for clogging and excessive debris and sediment accumulation after every storm exceeding one (1) inch of rainfall and at least four (4) times annually. Sediment removal should take place when the basin is thoroughly dry. Grass, if used, should be mowed at least once a month during the growing season. Native vegetation such as wildflower meadow or wet meadow cover is preferred, and will require less frequent mowing (1 to 4 times per year). Low-flow channels should be eliminated. The vegetative cover should be maintained at 85 percent and corrective action must be taken should the vegetation become more than 50 percent damaged. All structural components must be thoroughly inspected for cracking, subsidence, spalling, erosion, and deterioration at least once (1) per year and should be visually observed at each inspection of the extended detention basin. The maintenance plan must indicate the approximate time it would normally take to completely drain the maximum design storm runoff volume from the basin. If significant increases or decreases in the normal drain time are observed, the basin's outlet structure, underdrain system, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the basin.

Key Considerations for Extended Detention Basins:

- Should collect as much site runoff as possible to be effective
- Shallow bedrock depths may make construction not cost effective
- Forebays are recommended for sediment capture.

Safety Requirements: All new stormwater management basins within the Borough must, at a minimum, include trash racks, overflow grates, and escape provisions at outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets. Stormwater management basins shall include escape provisions as follows:

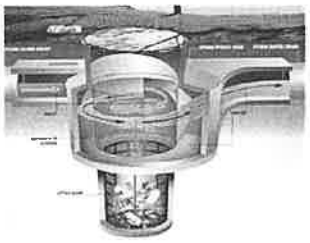
1. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. With the prior approval of the reviewing agency pursuant to N.J.A.C. 7:8-6.3(a), a freestanding outlet structure may be exempted from this requirement.

2. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See N.J.A.C. 7:8-6 Appendix A for an illustration of safety ledges in a stormwater management basin.

3. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.

Recommended applications: Water quantity control.

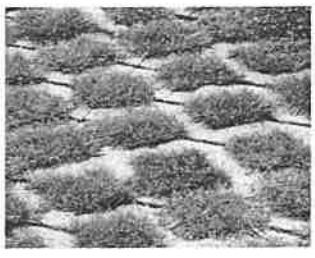
- **Best Management Practice #15:** Manufactured Treatment Device



Description/Implementation: A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff. Manufactured treatment devices may be used to meet the requirements of the Stormwater Management Rules, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology (NJCAT) and certified by NJDEP. Other manufactured treatment devices not certified under the NJCAT program may be utilized if they are approved by NJDEP prior to their use. Other pollutants, such as nutrients, metals, hydrocarbons, and bacteria can be included in the verification/certification process if the data supports their removal efficiencies. Manufactured treatment devices are intended to capture sediments, metals, hydrocarbons, floatables, or other pollutants in stormwater runoff before being conveyed to a storm sewer system, additional stormwater quality treatment measure, or waterbody. A manufactured treatment device is adequate for small drainage areas that contain a predominance of impervious cover that is likely to contribute high hydrocarbon and sediment loadings, such as small parking lots and gas stations. For larger sites, multiple devices may be necessary. Devices are normally used for pretreatment of runoff before discharging to other, more effective stormwater quality treatment facilities. The Borough Engineer should be consulted about each manufactured treatment device proposed and consideration should be given to maintenance, training, and future costs to the Borough before approval.

Maintenance Requirements: The maintenance of manufactured treatment devices depends on the manufacturer's guidance. All manufacturer maintenance requirements must be followed to ensure proper operation of these BMPs.

- **Best Management Practice #16:** Pervious paving



Description/Implementation: Pervious paving materials can be used at some site locations in the Borough to replace standard impervious pavement in parking lots and driveways in the Borough. For all sites where pervious paving is proposed, care should

be taken in assessing soil conditions, high groundwater conditions, and potential sources of contamination. Further, it is recommended that some form of pre-treatment (i.e. filter strips) be utilized to minimize the chance of clogging the pervious paving. All design criteria identified in the BMP Manual should be followed if this technique is selected. Also, the use of pervious paving materials shall be discussed with Borough officials and the Sussex County Soil Conservation District prior to use on a project site. Careful consideration must be given to freezing weather and to drainage and flooding if clogging occurs.

Key Considerations for pervious paving systems:

- Maximum surface slope is 5 percent
- Permeability rate must be 2 times the maximum design storm rainfall intensity
- 80% TSS removal pretreatment required for runoff directed to system that does not pass through surface course

Maintenance Requirements: Effective pervious paving system performance requires regular and effective maintenance. The surface course of all pervious paving systems must be inspected for cracking, subsidence, spalling, deterioration, erosion, and the growth of unwanted vegetation at least once a year. Care must be taken when removing snow from the pervious paving surface courses. Pervious paving surface courses can be damaged by snowplows or loader buckets that are set too low to the ground. This is particularly true with permeable paver systems where differential settlement of pavers has occurred. Sand, grit, or cinders should not be used on pervious paving surface courses for snow or ice control. If mud or sediment is tracked onto the surface course of a pervious paving system, it must be removed as soon as possible. Removal should take place when the surface course is thoroughly dry. The surface course of a porous paving system must be vacuum swept at least four (4) times a year. A high pressure hosing should follow vacuum sweeping. All dislodged sediment and other particulate matter must be removed and properly disposed. Maintenance of permeable pavers should be consistent with the manufacturer's recommendations. Grass should be mowed at least once a month during the growing season. Vegetated areas should be inspected at least annually. The vegetative cover should be maintained at 85 percent. The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the pervious paving system's surface course. If a significant increase or decrease in the normal drain time or prolonged ponding is observed, the various system components and groundwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system.

Recommended applications: Water quantity and groundwater recharge.

- **Best Management Practice #17:** Sand filter

Description/Implementation: A sand filter consists of a forebay and underdrained sand bed. It can be configured as either a surface or sub-surface

facility. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris, and coarse sediment, and then through the sand bed to an outlet pipe. Sand filters use solids settling, filtering, and adsorption processes to reduce pollutant concentrations in stormwater. **The adopted TSS removal rate for sand filters is 80 percent.** Sand filters are normally used in highly impervious areas with relatively high TSS, heavy metal, and hydrocarbon loadings such as roads, driveways, drive-up lanes, parking lots, and urban areas. However, due to their relatively high sediment removal capabilities, sand filters are not generally recommended in pervious drainage areas where high coarse sediment loads and organic material such as leaves can quickly clog the sand bed. Where such loadings cannot be avoided, effective pretreatment is absolutely required. Since sand filters can be located underground, they can also be used in areas with limited surface space.

Key Considerations for Sand Filters:

- A drain and valve must be provided to facilitate sediment removal
- Underground sand filters must be completely watertight
- Pretreatment is recommended

Maintenance Requirements: Effective sand filter performance requires regular and effective maintenance. All sand filter components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation after every storm exceeding 1 inch of rainfall and at least four (4) times annually. Such components may include inlets and diversion structures, forebays, sand beds, and overflows. Sediment removal should take place when all runoff has drained from the sand bed and the sand is reasonably dry. In addition, runoff should be properly drained or pumped from forebays with permanent pools before removing sediment. In surface sand filters with turf grass bottom surfaces, mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected at least annually. The filter bottom must be inspected for unwanted underbrush and tree growth at least once a year. Inspections of vegetation health, density, and diversity should be performed during both the growing and non-growing season. All structural components must be thoroughly inspected for cracking, subsidence, spalling, erosion, and deterioration at least once per year. A visual observation of all structural components should be part of every inspection of the sand filter. The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the top of the filter's sand bed. If significant increases or decreases in the normal drain time are observed, the filter's sand bed, underdrain system, and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the filter. The infiltration rate of the sand bed should be retested at least once per year.

Recommended applications: Water quality and groundwater recharge.

- **Best Management Practice #18:** Vegetative filter

Description/Implementation:
Similar to BMP #3 described above, a structural vegetative filter strip can be employed using native ground cover or other vegetation to provide pollutant removal from stormwater runoff. A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation called a vegetated filter strip. The vegetation in a filter strip can range from turf (least effective) and native grasses to herbaceous and woody vegetation. It is important to note that all runoff to a vegetated filter strip must both enter and flow through the strip as sheet flow. Failure to do so can severely reduce and even eliminate the filter strip's pollutant removal capabilities. The TSS removal rate for vegetative filters will depend upon the vegetated cover in the filter strip. Vegetated filter strips can be effective in reducing sediment and other solids and particulates, as well as associated pollutants such as hydrocarbons, heavy metals, and nutrients. The pollutant removal mechanisms include sedimentation, filtration, adsorption, infiltration, biological uptake, and microbacterial activity. Vegetated filter strips with planted or indigenous woods may also create shade along water bodies that lower aquatic temperatures, provide a source of detritus and large woody debris for fish and other aquatic organisms, and provide habitat and corridors for wildlife. Depending upon their TSS removal rate, vegetated filter strips can be used separately or in conjunction with other stormwater quality practices to achieve an overall pollutant removal goal.

Key Considerations for Vegetative Filters:
- Adequate filter area and length of flow is essential to water quality treatment
- Slopes less than 5 percent are most effective
- Mulching is required

Maintenance Requirements: Effective vegetated filter strip performance requires regular and effective maintenance. All vegetated filter strip components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation after every storm exceeding 1 inch of rainfall and at least four (4) times annually. Such components may include vegetated areas and stone cutoffs and, in particular, the upstream edge of the filter strip where coarse sediment and/or debris accumulation could cause inflow to concentrate. Sediment removal should take place when the filter strip is thoroughly dry. Grass should be mowed at least once a month during the growing season. Vegetated areas must be thoroughly inspected at least once per year. Visual observations should be noted at the time of each inspection of the filter. The vegetative cover should be maintained at 85 percent. All areas of the filter strip should be inspected for excess ponding after significant storm events. The maintenance plan must indicate the approximate time it would normally take for the filter strip to drain the maximum design storm runoff volume and begin to dry. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the filter strip's planting soil bed, vegetation, and groundwater levels must be evaluated and appropriate measures

taken to comply with the maximum drain time requirements and maintain the proper functioning of the filter strip.

Recommended applications: Water quality, water quantity, and soil erosion and sediment control.

- **Best Management Practice #19:** Wet Ponds

Description/Implementation: A wet pond is a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settlement of pollutants. A wet pond is normally designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity management and the design must comply with N.J.A.C. 7:20 – Dam Safety Standards. **The adopted TSS removal rate for wet ponds ranges from 50 to 90 percent depending on pool volume and detention time.** A wet pond's permanent pool can retain runoff from the stormwater quality design storm, thereby promoting pollutant removal through sedimentation and biological processing. The permanent pool can also protect deposited sediments from resuspension. Higher stages in the basin can also be used to provide additional stormwater quality treatment through extended detention and/or attenuate the peak rates of runoff from larger storms through the use of multi-stage outlets for flood and erosion control. Wet ponds can also provide aesthetic and recreational benefits as well as water supply for fire protection and/or irrigation. Wet ponds require sufficient drainage area and, in turn, dry weather or base flow to maintain the volume and environmental quality of the permanent pool. Therefore, the minimum drainage area to a wet pond must be 20 acres. Wet ponds should not be located within the limits of natural ponds or wetlands, since they will typically not have the full range of ecological functions as these natural facilities. While providing some habitat and aesthetic values, wet ponds are designed primarily for pollutant removal and erosion and flood control. It is important to note that a wet pond must be able to maintain its permanent pool level. If the soil at the site is not sufficiently impermeable to prevent excessive seepage, construction of an impermeable liner or other soil modifications will be necessary.

Maintenance Requirements: All wet pond components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four (4) times annually as well as after every storm exceeding one (1) inch of rainfall. The primary location for debris and particularly sediment accumulation will be within a wet pond's permanent pool.

Key Considerations for Wet Ponds:
- An adequate inflow of surface and/or groundwater
- Sediment entering basin should be carefully considered
- Thermal effects should be considered especially for trout production waters
- Pretreatment is highly recommended

Additional components may include forebays, inflow points, trash racks, outlet structures, and riprap or gabion aprons. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations. Studies have shown that readily visible stormwater management facilities like wet ponds receive more frequent and thorough maintenance than those in less visible, more remote locations. Maintenance and mosquito control personnel can also inspect readily visible facilities faster and more easily. Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation. All structural components must be inspected for cracking, subsidence, spalling, erosion and deterioration at least annually. All outlet valves are to be inspected and exercised at least four times annually. The maintenance plan must indicate the approximate time it would normally take to completely drain the maximum design storm runoff volume and return the pond to its permanent pool level. This normal drain time should then be used to evaluate the pond's actual performance. If significant increases or decreases in the normal drain time are observed, the pond's outlet structure and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements.

Recommended applications: Water quality, water quantity control, and soil erosion and sediment control.

- **Best Management Practice #20:** Infiltration system

Description/Implementation: An infiltration system is either an aboveground or subsurface facility constructed within highly permeable soils that provides temporary storage of stormwater runoff. Discharge of this stored runoff occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. **The adopted TSS removal rate for surface infiltration systems is 80 percent. Pretreatment of at least 50% TSS removal is required for all subsurface infiltration systems.** Infiltration systems can also be used to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules. The use of surface infiltration systems is applicable only where their subgrade soils have the required permeability rates (a measured rate of 1.0 inch/hour or better for surface systems and 0.4 inch/hour for subsurface systems). Like other BMPs that rely on infiltration, these systems are not appropriate for areas where high pollutant or

sediment loading is anticipated due to the potential for groundwater contamination and clogging. As noted above, this structure cannot be utilized for sites with known contamination and caution should be utilized in selecting these units in Tier I and II of the delineated wellhead protection areas (WHPAs). Additionally, infiltration structures should not be placed in areas of hydric soils as identified on the Groundwater Recharge Map in Appendix B.

Maintenance Requirements: Effective infiltration system performance requires regular and effective maintenance. An infiltration system should be inspected after every storm exceeding 1 inch of rainfall and at least four (4) times annually. The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume from the infiltration system. If significant increases in the normal drain time are observed or if it exceeds the 72-hour maximum, appropriate measures must be taken to comply with the drain time requirements and maintain the proper functioning of the system.

Key Considerations for Infiltration Systems:

- Tests for permeability and soil characteristics must be conducted at exact location prior to final design
- Preventing compaction of subgrade soils during construction is vital
- Pretreatment is highly recommended in the form of vegetative filters, forebays or manufactured treatment devices

Recommended applications: Water quantity control and groundwater recharge.

7.0 Land Use/Build-Out Analysis

There are four steps to preparing a build-out analysis that satisfies the requirements for a municipal stormwater management plan:

1. Determine the total land area within each of the HUC14s of the municipality.

2. Determine the area of constrained lands within each HUC14 of the municipality.

3. Determine the land available for development by simply subtracting the constrained lands from the total land area for each HUC14. In essence, the land available within each HUC14. Existing residential, commercial, and industrial areas are also eligible for redevelopment and should be considered as land available for development.

4. For each HUC14, complete a build-out analysis by using the municipal zoning map and applicable ordinances to determine the acreage of new development. Once the build-out acreage of each land use is determined for each HUC14, nonpoint source loadings can be determined for the build-out scenario. Shown below are examples of build-out analyses for two HUC14s located in the municipality.

A detailed land use analysis for the Borough has not been conducted at this time. This requirement is not operative until February 2, 2006. The Borough will be working closely with the County of Sussex to complete this requirement.

8.0 MITIGATION PLAN

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

If a suitable site cannot be located in the same drainage area as the proposed development as discussed above, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue. For example, if a variance is given because the 80 percent TSS requirement is not met, the selected project may address water quality impacts.

The Borough may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in an addendum to this Municipal Stormwater Management Plan or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation and the cost associated with the long-term maintenance requirements of the mitigation measure. In those cases where an applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in this plan, and in N.J.A.C. 7:8-5, a waiver from strict compliance may be granted by Hopatcong Borough. In such cases, the applicant must submit a mitigation plan detailing how the project's failure to strictly comply will be compensated.

A mitigation plan must identify measures required to offset any potential impact(s) created by the granting of the waiver. For example, because of natural site constraints, a proposed development might be unable to fully meet the groundwater recharge criteria, with the projected impact being an annual net loss of 50,000 cubic feet of groundwater recharge volume. In this case, a mitigation plan might require recovery of the lost recharge volume by capturing existing runoff from an impervious area on a site within the same drainage basin. Applicants may identify potential properties suitable for the mitigation project, secure the easements necessary to implement the projects and ensure long-term maintenance requirements are met.

Strategies that may be used to mitigate a development project and its impacts include, in the order of their preference, the following:

1. **Equivalent, or "in-kind"** mitigation (as per the requirements of N.J.A.C. 7:8-4.2c(11)) is the most preferred method where a mitigation project is identified

within the same drainage area, or HUC-14, within which the subject project is proposed, so that it provides benefits and protection similar to those that would have been achieved if the stormwater and recharge performance standards had been satisfactorily completed. In-kind mitigation must also directly compensate for the projected impact for the performance standard(s) for which the waiver was granted.

If there are no "in-kind" mitigation options available within the same HUC-14 drainage area, the Borough may consider implementation of a similar compensating measure to mitigate the same impact(s) of the proposed project, but within a different watershed.

2. **Non-equivalent, or alternative** mitigation options may be considered by the Borough if equivalent or "in-kind" mitigation measures for the projected environmental impact(s) is not feasible. In this case, the Borough may consider implementation of an alternative compensating measure at a designated municipal site or as part of an adopted regional stormwater management plan.

3. **Funding, or "in-lieu"** mitigation is the least preferred option. In this case, an applicant may provide contributions in the form of funding to the Borough for future or alternative stormwater management projects. In this case, the funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the costs associated with the long-term maintenance requirements of the mitigation measure.

The following projects have been identified by Hopatcong Borough for potential consideration as mitigation projects. These projects were listed as priority sub-watershed target areas for BMP installation and/or retrofit of the current stormwater infrastructure in the *Refined Phosphorus TMDL and Restoration Plans for Lake Hopatcong and Lake Musconetcong, Morris and Sussex Counties* (Princeton Hydro, 2005) report to maximize the Borough's pollutant removal efficiency and meet the targeted phosphorus reduction to Lake Hopatcong. **Before proceeding with any actions involving these projects, an applicant must receive prior approval by, and direction from the Borough.**

- **Priority Area H-A.** This area falls mainly between sub-watersheds 22 and 23 and is located near Route 607 and the Roxbury Township border, bounded by Stone Avenue, Lakeside Boulevard and Randolph Avenue. To achieve the targeted phosphorus reduction in this area, recommended BMPs include a three-tiered approach for sub-watershed 22 consisting of a subsurface sand filter, infiltration basin and a bioretention system, combined with a two-tiered approach to sub-watershed 23 consisting of a sub-surface sand filter and a bioretention system. The combination of these five BMPs applied to Priority Area H-A would remove a predicted level of 21 kg/yr of total phosphorus to Lake Hopatcong.

Priority Area H-A

BMP Description	Sub-watershed Number	Predicted TP Removal Level (kg/yr)
Subsurface sand filter	22	6
Infiltration basin		4
Bioretention system		2
Sub-surface sand filter	23	7
Bioretention system		2
Total		**21**

- **Priority Area H-B.** This area falls within sub-watersheds 20 and 21 and includes the immediate drainage discharging into the southern end of Crescent Cove. The area is bounded by Mountain Road and River Styx Road, Jefferson Trail and Lehigh Way, Brooklyn Mountain Road and Squire Road, and River Styx Road. Emphasis should be placed in the area where Crescent Road, Lakeside Boulevard and Bell Avenue intersect because of the high pollutant loading associated with this area. To achieve the targeted phosphorus reduction in this area, recommended BMPs include a three-tiered approach to sub-watershed 20 consisting of a sub-surface sand filter, a bioretention system and an infiltration basin, combined with a four-tiered approach to sub-watershed 21, consisting of a sub-surface sand filter, an infiltration basin, a bioretention system and a pervious paving system. The combination of these seven BMPs applied to Priority Area H-B would remove a predicted level of 29 kg/yr of total phosphorus to Lake Hopatcong.

Priority Area H-B		
BMP Description	**Sub-watershed Number**	**Predicted TP Removal Level (kg/yr)**
Sub-surface sand filter	20	7
Bioretention system		2
Infiltration basin		4
Sub-surface sand filter	21	6
Infiltration basin		4
Bioretention system		2
Pervious paving system		4
Total		**29**

- **Priority Area H-C.** This area falls mainly within sub-watersheds 18 and 19 and includes the immediate drainage area discharging to the southern end of Bryam Cove. The area is bounded by Maxim Drive, Squaw Trail and Brooklyn Mountain Road, and Rollins Trail. Emphasis should be placed on the drainage area of the small unnamed tributary (from Rocky Trail to where Maxim Drive circles the cove toward the west) because of the high pollutant loading associated with this area. To achieve the targeted phosphorus reduction in this area, recommended BMPs include a three-tiered approach to sub-watershed 18

consisting of two (2) sub-surface sand filters and an infiltration basin, combined with a single-tiered approach consisting of a subsurface sand filter for sub-watershed 19. The combination of these four BMPs applied to Priority Area H-C would remove a predicted level of 26 kg/yr of total phosphorus to Lake Hopatcong.

Priority Area H-C		
BMP Description	**Sub-watershed Number**	**Predicted TP Removal Level (kg/yr)**
Sub-surface sand filter	18	10
Sub-surface sand filter		6
Infiltration basin		4
Sub-surface sand filter	19	6
Total		**26**

Appendix A

Figures

Appendix B

Ordinances

ORDINANCE 2005-_____

AN ORDINANCE TO AMEND AND SUPPLEMENT CHAPTER 167 OF THE CODE OF THE BOROUGH OF HOPATCONG ENTITLED "PEACE AND GOOD ORDER" BY ADDING ARTICLE II ENTITLED "SUPPLEMENTAL STORMWATER CONTROL STANDARDS"

WHEREAS, the New Jersey Department of Environmental protection has adopted Stormwater Management Regulations on March 3, 2004 as are set forth in N.J.A.C. 7:8-1 et seq; and

WHEREAS, said regulations require every municipality in the State of New Jersey to develop a Stormwater Management Plan and to further adopt ordinances implementing Best Management Practices for stormwater management in each municipality; and

WHEREAS, the Borough of Hopatcong wishes to adopt the ordinance as required by NJDEP;

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Borough of Hopatcong as follows:

Section 1.

There is hereby adopted in the Borough of Hopatcong, Article II to Chapter 167 of the Code of the Borough of Hopatcong entitled "Supplemental Stormwater Control Standards" to read as follows:

167-27 Pet Waste

The purpose of this ordinance is to establish requirements for the proper disposal of pet solid waste in the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

A. Definitions:

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated unless their use in the text of Article clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

Immediate – shall mean that the pet solid waste is removed at once, without delay.

Owner/Keeper – any person who shall possess, maintain, house or harbor any pet or otherwise have custody of any pet, whether or not the owner of such pet.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Pet – a domesticated animal (other than a disability assistance animal) kept for amusement or companionship.

Pet solid waste – waste matter expelled from the bowels of the pet; excrement.

Proper disposal – placement in a designated waste receptacle, or other suitable container, and discarded in a refuse container which is regularly emptied by the municipality or some other refuse collector; or disposal into a system designated to convey domestic sewage for proper treatment and disposal.

B. **Requirement for Disposal:**

All pet owners and keepers are required to immediately and properly dispose of their pet's solid waste deposited on any property, public or private, not owned or possessed by that person.

C. **Exemptions:**

Any owner or keeper who requires the use of a disability assistance animal shall be exempt from the provisions of this section while such animal is being used for that purpose.

167-28 Litter Control

The purpose of this ordinance is to establish requirements to control littering in the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent

with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

Litter – any used or unconsumed substance or waste material which has been discarded, whether made of aluminum, glass, plastic, rubber, paper, or other natural or synthetic material, or any combination thereof, including, but not limited to, any bottle, jar or can, or any top, cap or detachable tab of any bottle, jar or can, any unlighted cigarette, cigar, match or any flaming or glowing material or any garbage, trash, refuse, debris, rubbish, grass clippings or other lawn or garden waste, newspaper, magazines, glass, metal, plastic or paper containers or other packaging or construction material, but does not include the waste of the primary processes of mining or other extraction processes, logging, sawmilling, farming or manufacturing.

Litter Receptacle – a container suitable for the depositing of litter.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

B. **Prohibited acts and regulated activities:**

(1) It shall be unlawful for any person to throw, drop, discard or otherwise place any litter of any nature upon public or private property other than in a litter receptacle, or having done so, to allow such litter to remain.

(2) Whenever any litter is thrown or discarded or allowed to fall from a vehicle or boat in violation of this ordinance, the operator or owner, or both, of the motor vehicle or boat shall also be deemed to have violated this ordinance.

167-29 Improper Disposal of Waste Ordinance

The purpose of this ordinance is to prohibit the spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm sewer system (MS4) operated by the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phases, words, and their derivations shall have the meanings stated herein unless their use in the text of the

Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is not always mandatory and not merely directory.

Municipal separate storm sewer system (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough of Hopatcong or other public body, and is designed and used for collecting and conveying stormwater.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Stormwater – water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

B. **Prohibited Conduct:**

The spilling, dumping, or disposal of materials other than stormwater to the municipal separate storm system operated by the Borough of Hopatcong is prohibited. The spilling, dumping, or disposal of materials other than stormwater in such a manner as to cause the discharge of pollutants to the municipal separate storm sewer system is also prohibited.

C. **Exceptions to Prohibition:**

(1) Water line flushing and discharges from potable water sources

(2) Uncontaminated ground water (e.g., infiltration, crawl space or basement sump pumps, foundation or footing drains, rising ground waters)

(3) Air conditioning condensate (excluding contact and non-contact cooling water)

(4) Irrigation water (including landscape and lawn watering runoff)

(5) Flows from springs, riparian habitats and wetlands, water reservoir discharges and diverted stream flows

(6) Residential car washing water, and residential swimming pool discharges

(7) Sidewalk, driveway and street wash water

(8) Flows from fire fighting activities

(9) Flows from rinsing of the following equipment with clean water:

Beach maintenance equipment immediately following their use for their intended purposes; and

Equipment used in the application of salt and de-icing materials immediately following salt and de-icing materials applications. Prior to rinsing with clean water, all residual salt and de-icing materials must be removed from equipment and vehicles to the maximum extent practicable using dry cleaning methods (e.g., shoveling and sweeping). Recovered materials are to be returned to storage for reuse or properly discarded.

Rinsing of equipment, as noted in the above situation is limited to exterior, undercarriage, and exposed parts and does not apply to engines or other enclosed machinery.

167-30 Wildlife Feeding

The purpose of this ordinance is to prohibit the feeding of unconfined wildlife in any public park or on any other property owned or operated by the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The work "shall" is always mandatory and not merely directory.

Feed – to give, place, expose, deposit, distribute or scatter any edible material with the intention of feeding, attracting or enticing wildlife. Feeding does not include baiting in the legal taking of fish and/or game.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Wildlife – all animals that are neither human nor domesticated.

B. **Prohibited Conduct:**

No person shall feed, in any public park or on any other property owned or operated by the Borough of Hopatcong, any wildlife, excluding confined wildlife (for example, wildlife confined in zoos, parks or rehabilitation centers, or unconfined wildlife at environmental education centers).

167-31 Containerized Yard Waste

The purpose of this ordinance is to establish requirements for the proper handling of yard waste in the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words in the plural number include the singular number, and words used in the singular number include the plural number. The work "shall" is always mandatory and not merely directory.

Containerized – means the placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Street – means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.

Yard Waste – means leaves and grass clippings.

B. **Prohibited Conduct:**

The owner or occupant of any property, or any employee or contractor of such owner or occupant engaged to provide lawn care or landscaping services, shall not sweep, rake, blow or otherwise place yard waste, unless the yard waste is containerized, in the street. If yard waste that is not containerized is placed in the street, the party responsible for placement of yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

167-32 Yard Waste Collection Program

The purpose of this ordinance is to establish a yard waste collection and disposal program in the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

Containerized – means the placement of yard waste in a trash can, bucket, bag or other vessel, such as to prevent the yard waste from spilling or blowing out into the street and coming into contact with stormwater.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Street – means any street, avenue, boulevard, road, parkway, viaduct, drive, or other way, which is an existing State, county, or municipal roadway, and includes the land between the street lines, whether improved or unimproved, and may comprise pavement, shoulders, gutters, curbs, sidewalks, parking areas, and other areas within the street lines.

Yard Waste – means leaves and grass clippings.

B. **Yard Waste Collection:**

Sweeping, raking, blowing or otherwise placing yard waste that is not containerized at the curb or along the street is only allowed during seven (7) days prior to a scheduled and announced collection, and shall not be placed closer than 10 feet from any storm drain inlet. Placement of such yard waste at the curb or

along the street at any other time or in any other manner is a violation of this ordinance. If such placement of yard waste occurs, the party responsible for placement of the yard waste must remove the yard waste from the street or said party shall be deemed in violation of this ordinance.

167-33 Illicit Connection

The purpose of this ordinance is to prohibit illicit connections to the municipal separate storm sewer system(s) operated by the Borough of Hopatcong, so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.

A. **Definitions:**

For the purpose of this ordinance, the following terms, phrases, words, and their derivations shall have the meanings stated herein unless their use in the text of this Chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. The definitions below are the same as or based on corresponding definitions in the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A-1.2.

Domestic sewage – waste and wastewater from humans or household operations.

Illicit connection – any physical or non-physical connection that discharges domestic sewage, non-contact cooling water, process wastewater, or other industrial waste (other than stormwater) to the municipal separate storm sewer system operated by the Borough of Hopatcong, unless that discharge is authorized under a NJPDES permit other than the Tier A Municipal Stormwater General Permit (NJPDES Permit Number NJ0141852). Non-physical connections may include, but are not limited to, leaks, flows, or overflows into the municipal separate storm sewer system.

Industrial waste – non-domestic waste, including, but not limited to, those pollutants regulated under Section 307(a), or (c) of the Federal Clean Water Act (33 U.S.C. §1317(a), (b), or (c)).

Municipal separate storm sewer system (MS4) – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Borough of Hopatcong or other public body, and is designed and used for collecting and conveying stormwater.

NJPDES permit – a permit issued by the New Jersey Department of Environmental Protection to implement the New Jersey Pollutant Discharge Elimination System (NJPDES) rules at N.J.A.C. 7:14A.

Non-contact cooling water – water used to reduce temperature for the purpose of cooling. Such waters do not come into direct contact with any raw material, intermediate product (other than heat) or finished product. Non-contact cooling water may however contain algaecides, or biocides to control fouling of equipment such as heat exchangers, and/or corrosion inhibitors.

Person – any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.

Process wastewater – any water which, during manufacturing 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. Process wastewater includes, but is not limited to, leachate and cooling water other than non-contact cooling water.

Stormwater – water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewage or drainage facilities, or is conveyed by snow removal equipment.

B. **Prohibited Conduct:**

No person shall discharge or cause to be discharged through an illicit connection to the municipal separate storm sewer system operated by the Borough of Hopatcong any domestic sewage, non-contact cooling water, process wastewater, or other industrial waste (other than stormwater).

167-34 Enforcement

The provisions of this article shall be enforced by the Zoning Officer, Animal Control Officer, Police Department and Health Department of the Borough of Hopatcong.

167-35 Violations and Penalty

Any person violating any provision of this chapter shall, upon conviction, be punishable by a fine not exceeding $1,250 or imprisonment for a term not exceeding 90 days or a period of community service not exceeding 90 days, or any combination

thereof. Each violation of any of the provisions of this chapter and each day that such offense shall continue shall be deemed to be separate and distinct offenses.

167-36 Severability

Each section, subsection, sentence, clause and phrase of this Ordinance is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this Ordinance to be unconstitutional, voice, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

Section 2 Effective Date

This ordinance shall take effect immediately upon passage and publication as required by law.

ORDINANCE 2005-_____

AN ORDINANCE TO AMEND AND SUPPLEMENT CHAPTER 191 OF THE CODE OF THE BOROUGH OF HOPATCONG ENTITLED "SITE PLAN REVIEW" TO INCORPORATE NONSTRUCTURAL BEST MANAGEMENT PRACTICES FOR STORMWATER CONTROL AS REQUIRED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

WHEREAS, the New Jersey Department of Environmental Protection has adopted Stormwater Management Regulations on March 3, 2004, as are set forth in N.J.A.C. 7:8-1 et seq; and

WHEREAS, said regulations require every municipality in the State of New Jersey to develop a Stormwater Management Plan and to further adopt ordinances implementing Best Management Practices for stormwater management in each municipality; and

WHEREAS, the New Jersey Department of Environmental Protection Regulations require municipalities to incorporate Nonstructural Best Management Practices as part of any Stormwater Management Plan and Ordinance; and

WHEREAS, the Borough of Hopatcong wishes to adopt the Ordinances as required by NJDEP;

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Borough of Hopatcong as follows:

Section 1.

Section 191-24 of the Code of the Borough of Hopatcong entitled "Design Standards Enumerated" is hereby amended to add a new subparagraph "T" to read as follows:

> Notwithstanding any other provision of this ordinance to the contrary, the Borough hereby adopts and incorporates herein by reference the current nonstructural stormwater management strategies as the same may be amended and supplemented from time to time and as are set forth in N.J.A.C. 7:8-1 et seq. The applicant shall compare current nonstructural stormwater management practices as set forth in the aforesaid regulation to the standards set forth in this ordinance. In the event of any conflict between the provisions of this ordinance and the current nonstructural stormwater management regulations, the regulations shall be controlling. The approving board shall only approve developments which comply with the provisions of N.J.A.C. 7:8-1 et seq. as amended to the maximum

extent feasible considering the constraints of the specific development project. Any Borough regulation in conflict with said regulations shall be superseded by the provisions of N.J.A.C. 7:8-1 et seq. as amended.

Section 2.

This Ordinance shall take effect upon passage and publication as required by law.

ORDINANCE 2005-_____

AN ORDINANCE TO AMEND AND SUPPLEMENT CHAPTER 242 OF THE CODE OF THE BOROUGH OF HOPATCONG ENTITLED "ZONING" TO ADOPT A STORMWATER CONTROL ORDINANCE FOR THE BOROUGH INCORPORATING BEST MANAGEMENT PRACTICES AS REQUIRED BY THE NEW JERSEY DEPARATMENT OF ENVIRONMENTAL PROTECTION

WHEREAS, the New Jersey Department of Environmental protection has adopted Stormwater Management Regulations on March 3, 2004 as are set forth in N.J.A.C. 7:8-1 et seq; and

WHEREAS, said regulations require every municipality in the State of New Jersey to develop a Stormwater Management Plan and to further adopt ordinances implementing Best Management Practices for stormwater management in each municipality; and

WHEREAS, the Borough of Hopatcong wishes to adopt the ordinance as required by NJDEP;

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Borough of Hopatcong as follows:

Section 1. Chapter 242 of the Code of the Borough of Hopatcong entitled "Zoning" is hereby amended and supplemented by the addition of a new Article XIX entitled "Stormwater Control" to read as follows:

242-73 Scope and Purpose

A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 242-74 in accordance with N.J.A.C. 7:8-1 et seq.

C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:

a. Non-residential major developments; and

b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.

2. This ordinance shall also be applicable to all major developments undertaken by the Borough of Hopatcong.

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

243-74 Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance it's most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

"BMP" means Best Management Practices.

"CAFRA Planning Map" means the geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

"CAFRA Centers, Cores or Nodes" means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

"Compaction" means the increase in soil bulk density.

"Core" means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

"County review agency" means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

"Department" means the New Jersey Department of Environmental Protection.

"Designated Center" means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

"Design engineer" means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

"Development" means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

"Drainage area" means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

"Environmentally critical areas" means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or

threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

"Empowerment Neighborhood" means a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

"Erosion" means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

"Impervious surface" means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

"Infiltration" is the process by which water seeps into the soil from precipitation.

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land. Disturbance for the purpose of this ordinance is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

"Municipality" means any city, borough, town, township, or village.

"Node" means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

"Nutrient" means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

"Person" means any individual, corporation, company, partnership, firm, association, Borough of Hopatcong, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Recharge" means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

"Sediment" means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

"Site" means the lot or lots upon which a major development is to occur or has occurred.

"Soil" means all unconsolidated mineral and organic material of any origin.

"State Development and Redevelopment Plan Metropolitan Planning Area (PA1)" means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

"State Plan Policy Map" is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

"Stormwater" means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

"Stormwater runoff" means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

"Stormwater management basin" means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

"Stormwater management measure" means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

"Tidal Flood Hazard Area" means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

"Urban Coordinating Council Empowerment Neighborhood" means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

"Urban Enterprise Zones" means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

"Urban Redevelopment Area" is defined as previously developed portions of areas:

(1)Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;

(2)Designated as CAFRA Centers, Cores or Nodes;

(3)Designated as Urban Enterprise Zones; and

(4)Designated as Urban Coordinating Council Empowerment Neighborhoods.

"Waters of the State" means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

"Wetlands" or "wetland" means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

242-75 General Standards

A. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 242-76. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

242-76 Stormwater Management Requirements for Major Development

A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 242-82.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).

C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections F and G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;

2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and

3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections F and G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;

2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Subsections F and G to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements of Subsections F and G, existing structures currently in use, such as homes and buildings, would need to be condemned; and

4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Subsections F and G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Subsections F and G shall be met by incorporating nonstructural stormwater management strategies set forth at Subsection E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Subsection 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.

2. Nonstructural stormwater management strategies incorporated into site design shall:

a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

c. Maximize the protection of natural drainage features and vegetation;

d. Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;

e. Minimize land disturbance including clearing and grading;

f. Minimize soil compaction;

g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:

(1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection E.3. below;

(2) Site design features that help to prevent discharge of trash and debris from drainage systems;

(3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

(4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

3. Site design features identified under Subsection E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating,

suspended, or settleable solids. For exemptions to this standard see Subsection E.3.c. below.

a. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

   (1) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

   (2) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

   Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

c. This standard does not apply:

   (1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

   (2) Where flows from the water quality design storm as specified in Subsection G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

      (a) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

      (b) A bar screen having a bar spacing of 0.5 inches.

(3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Subsection G.1; or

(4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections F and G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 242-79, or found on the Department's website at www.njstormwater.org.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.

a. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

b. The minimum design and performance standards for groundwater recharge are as follows:

(1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:

(a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or

(b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.

(2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below.

(3) The following types of stormwater shall not be recharged:

(a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

(b) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

(4) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 242-77, complete one of the following:

(1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

(2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;

(3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

(4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (1), (2) and (3) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2. Any application for a new agricultural development that meets the definition of major development at Section 242-74 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, "agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.

G. Stormwater Runoff Quality Standards

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water

quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 242-79, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 242-79. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.

3. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

   $R = A + B - (AXB)/100$

   Where

   R = total TSS percent load removal from application of both BMPs, and

   A = the TSS percent removal rate applicable to the first BMP

   B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80

Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.

5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Subsections F and G.

6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 242-79.

7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.

8. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

   a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

      (1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided. (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for

example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

b. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

c. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

   (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;

   (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;

   (3) Temperature shall be addressed to ensure no impact on the receiving waterway;

   (4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;

   (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and

   (6) All encroachments proposed under this section shall be subject to review and approval by the Department.

d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Subsection 242-76G 8 has been approved by

the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to 242-76G 8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 242-76G 8a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

e. Subsection 242-76G 8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

242-77 Calculation of Stormwater Runoff and Groundwater Recharge

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:

   a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or

   b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Subsection A.1.a and the Rational and Modified Rational Methods at Subsection A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or

with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.

4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

B. Groundwater recharge may be calculated in accordance with the following:

1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

242-78 Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the

outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Subsection 242-80D.

3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.

5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 242-80.

B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 242-76 of this ordinance.

C. Manufactured treatment devices may be used to meet the requirements of Section 242-76 of this ordinance provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

242-79 Sources for Technical Guidance

A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.

1. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

2. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

B. Additional technical guidance for stormwater management measures can be obtained from the following:

1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;

2. The Rutgers Cooperative Extension Service, 732-932-9306; and

3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, and (609) 292-5540.

242-80 Safety Standards for Stormwater Management Basins

A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin.

B. Requirements for Trash Racks, Overflow Grates and Escape Provisions

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

   a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.

   b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

   c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.

   d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

b. The overflow grate spacing shall be no less than two inches across the smallest dimension.

c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.

3. For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:

a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 242-80C a free-standing outlet structure may be exempted from this requirement.

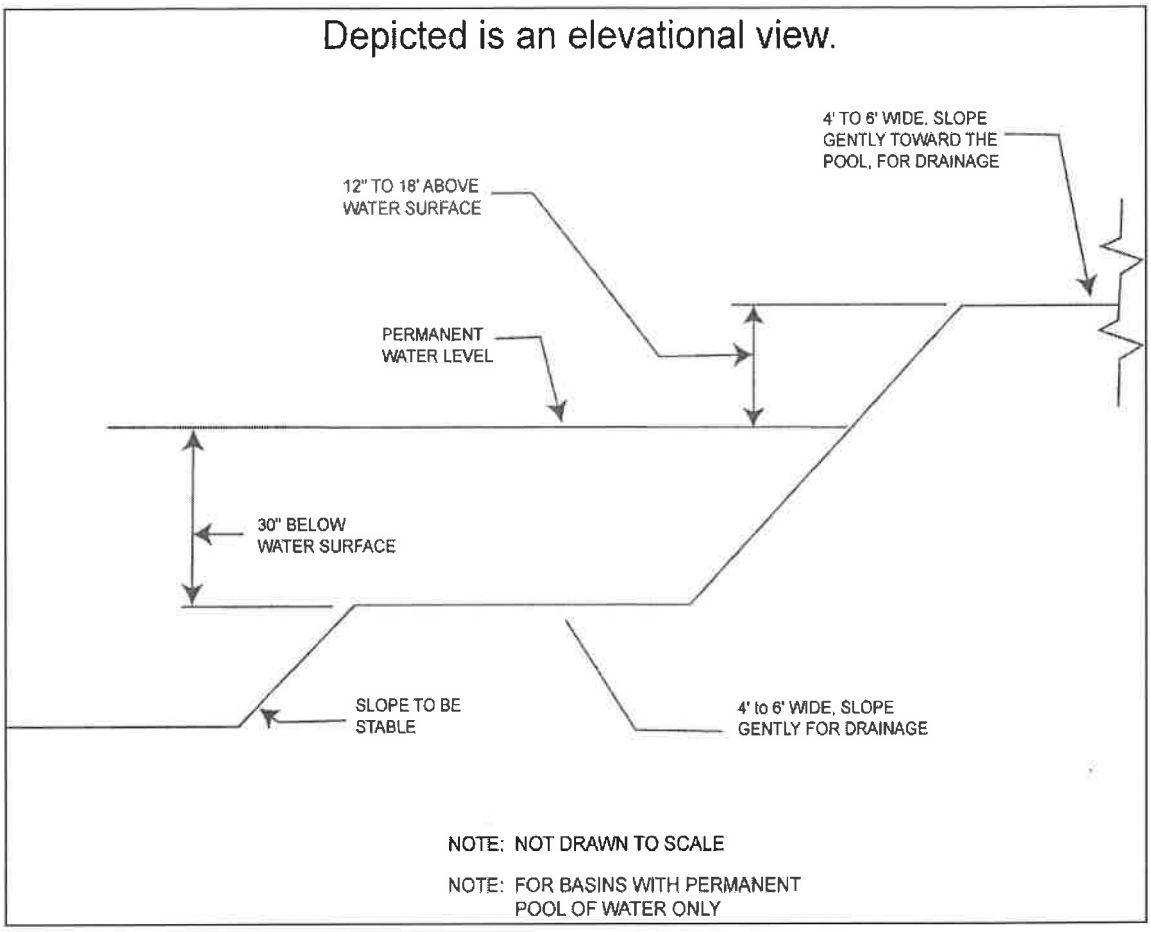
b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Subsection 242-80D for an illustration of safety ledges in a stormwater management basin.

c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

D. Illustration of Safety Ledges in a New Stormwater Management Basin


Depicted is an elevational view.
4' TO 6' WIDE, SLOPE GENTLY TOWARD THE POOL, FOR DRAINAGE
12" TO 18' ABOVE WATER SURFACE
PERMANENT WATER LEVEL
30" BELOW WATER SURFACE
SLOPE TO BE STABLE
4' to 6' WIDE, SLOPE GENTLY FOR DRAINAGE
NOTE: NOT DRAWN TO SCALE
NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

242-81 Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Subsection C below as part of the submission of the applicant's application for subdivision or site plan approval.

2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.

3. The applicant shall submit [*specify number*] copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection C.

B. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive

features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s)

   A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan

   This plan shall provide a demonstration of how the goals and standards of Sections 242-75 through 242-78 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

   The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

   a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

   b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6. Calculations

   a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 242-76.

   b. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 242-82.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Subsections 242-80C.1 through C.6 of this article when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

242-82 Maintenance and Repair

A. Applicability

1. Projects subject to review as in Subsection 242-73C of this article shall comply with the requirements of Subsections B and C.

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

4. If the person responsible for maintenance identified under Subsection B.2 above is not a public agency, the maintenance plan and any future revisions based on Subsection B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

6. The person responsible for maintenance identified under Subsection B.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

7. The person responsible for maintenance identified under Subsection B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

8. The person responsible for maintenance identified under Subsection B.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Subsections B.6 and B.7 above.

9. The requirements of Subsections B.3 and B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

10. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to affect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

C. Nothing in this section shall preclude the Borough of Hopatcong from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

242-83 Minor Development

"Minor Development" means any "development" that provides for disturbing 1,500 or more square feet of land but less than one acre of land. Disturbance for the purpose of this ordinance is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting or removing of vegetation. All of the provisions of this article shall be applicable to a minor development. However, any of

the provisions of this article may be waived by the Borough Engineer and/or reviewing board provided that the applicant demonstrates that the applicant has otherwise complied with all other applicable best management practices.

242-84 Low Impact Development Checklist

The low impact development checklist as is specified in Appendix A of the New Jersey Stormwater Best Management Practices Manual adopted by NJDEP is hereby adopted by reference and incorporated herein. All applications for development shall include a completed low impact development checklist.

242-85 Effective Date

This ordinance shall take effect immediately upon the approval by the county review agency, or sixty (60) days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

242-86 Severability

If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.

ORDINANCE 2005-_____

AN ORDINANCE TO AMEND AND SUPPLEMENT CHAPTER 209 OF THE CODE OF THE BOROUGH OF HOPATCONG ENTITLED "SUBDIVISION OF LAND" TO INCORPORATE NONSTRUCTURAL BEST MANAGEMENT PRACTICES FOR STORMWATER CONTROL AS REQUIRED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

WHEREAS, the New Jersey Department of Environmental Protection has adopted Stormwater Management Regulations on March 3, 2004, as are set forth in N.J.A.C. 7:8-1 et seq; and

WHEREAS, said regulations require every municipality in the State of New Jersey to develop a Stormwater Management Plan and to further adopt ordinances implementing Best Management Practices for stormwater management in each municipality; and

WHEREAS, the New Jersey Department of Environmental Protection Regulations require municipalities to incorporate Nonstructural Best Management Practices as part of any Stormwater Management Plan and Ordinance; and

WHEREAS, the Borough of Hopatcong wishes to adopt the Ordinances as required by NJDEP;

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Borough of Hopatcong as follows:

Section 1.

Section 209-26 of the Code of the Borough of Hopatcong entitled "Streets, Sidewalks and Curbs" is hereby amended to by repealing Subsection "C" through and including Subsection "O" and Subsection "Q" through Subsection "U".

Section 2.

Sections 209-27 entitled "Blocks"; Section 209-28 entitled "Lots"; Section 209-30 entitled "Streams"; Section 209-31 entitled "Storm sewers and other drainage structures"; Section 209-32 entitled "Monuments"; Section 209-33 entitled "Street signs"; Section 209-35 entitled "Testing and certification" and Section 209-36 entitled "Underground Utilities" are hereby repealed in their entirety.

Section 3.

A new Section to Chapter 209 is hereby adopted as follows:

Nonstructural Stormwater Management Best Management Practices.

Notwithstanding any other provision of this ordinance to the contrary, the Borough hereby adopts and incorporates herein by reference the current nonstructural stormwater management strategies as the same may be amended and supplemented from time to time and as are set forth in N.J.A.C. 7:8-1 et seq. The applicant shall compare current nonstructural stormwater management practices as set forth in the aforesaid regulation to the standards set forth in this ordinance. In the event of any conflict between the provisions of this ordinance and the current nonstructural stormwater management regulations, the regulations shall be controlling. The approving board shall only approve developments which comply with the provisions of N.J.A.C. 7:8-1 et seq. as amended to the maximum extent feasible considering the constraints of the specific development project. Any Borough regulation in conflict with said regulations shall be superseded by the provisions of N.J.A.C. 7:8-1 et seq. as amended.

Section 4.

This Ordinance shall take effect upon passage and publication as required by law