

Chapter 4

Milestone 4 Part A:
**The Pompeston Creek Regional Stormwater
Management Plan:
Applicable Provisions**
Including
Basis and Background

December 2007

The logo for Rutgers University, featuring the word "RUTGERS" in a large, red, serif font. The letter "R" is stylized with a long, sweeping tail that extends downwards and to the left.

New Jersey Agricultural
Experiment Station

**Completed by the
Rutgers Cooperative Extension
Water Resources Program**
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A. Introduction

A Regional Stormwater Management Plan has been created for the Pompeston Creek Watershed, in Burlington County, NJ. Initial steps of this process included the formation of a committee, a stormwater characterization and assessment, and a compilation of drainage area specific water quality, quantity and recharge objectives. The final steps before the implementation and adoption of a plan is to identify management measures that will achieve the drainage area objectives.

The management measures have been separated into two distinct components that will differ in their implementation. Part A defines the regulatory actions that will be adopted into the Areawide Water Quality Plan to address identified stormwater problems. Part B identifies and prioritizes specific management projects that have been quantified as to their potential in pollutant reduction, stream flow reduction, cost, and other characteristics. This document describes Part A, the regulatory section of the plan.

Basis of Plan

The Pompeston Creek Regional Stormwater Management Plan was created using the guidelines set forth in the New Jersey Stormwater Management Rules found at N.J.A.C. 7:8. Initial steps included the formation of a Regional Stormwater Management and the appointment of a Lead Planning Agency. The invitation to participate on the committee went to municipalities, counties, Soil Conservation Districts, environmental committees in addition to other parties as directed by N.J.A.C. 7:8 -3.2.

A stormwater characterization and assessment of the Pompeston Creek Watershed that was created provides the basis for which the recommendations are culled. This characterization and assessment is a separate document (found at www.water.rutgers.edu) and includes models of hydrology and the runoff of pollutants carried by stormwater, as well as analysis of groundwater, soils, and land use. Also included in this characterization and assessment are maps of the Pompeston Creek Watershed and a GIS project that contains all relevant information to stormwater characteristics.

This plan shall be submitted to the New Jersey Department of Environmental Protection to seek the amending of the Areawide Water Quality Management Plan in accordance with the with the Water Quality Management Planning Rules at N.J.A.C. 7:15. Once the plan has been adopted, the Department will use the adopted Pompeston Creek Regional Stormwater Management Plan as the basis for reviewing the stormwater management aspects of projects or activities regulated pursuant to rules applicable to permittee (as per N.J.A.C. 7:8-3.10). In addition, each municipality in the Pompeston Creek Regional Stormwater Planning Area shall incorporate the applicable provisions of the regional stormwater management plan.

B. General Information on the Basis and Background

The rationales used to develop the measures that are recommended here and in Part B of the Pompeston Creek Regional Stormwater Management Plan have been developed through the initial steps of the analysis of this watershed. Qualification and quantification of the impacts of stormwater in an urbanized watershed were obtained through the analysis of land use, gradients, stream channel features and design storms. Models of the hydrology, hydraulics and the non-point source runoff were created. These models were calibrated for two of the eight subbasins, but in whole they were designed to be used in a theoretical manner.

In evaluating water quantity, the HEC-HMS hydrologic model was adjusted to reflect a variety of design storms. These design storms ranged from the 1.25"/24 hour water quality storm to the 100-year storm. It was important to determine the factor within the watershed that was able to be adjusted using a regional stormwater management plan. The curve number which defines the runoff characteristic was found to be a reliable indicator of the magnitude of change that could be expected in the infiltration/runoff properties of the land.

The effect that stormwater has on the water quality of the Pompeston Creek Watershed was determined by using an Aerial Non-point Loading Analysis, using the runoff coefficients supported by the New Jersey Department of Environmental Protection (see Milestone 2 of the Pompeston Creek Regional Stormwater Plan). This analysis identified areas of the watershed that contributed the higher loads of critical pollutants. This could then be combined with the water quantity analysis and problem areas that needed to be addressed by best management practices could be identified.

For the details of the quantification and qualification of the impact of stormwater on the Pompeston Creek Watershed, please refer to the documents representing Milestone 2 (Characterization and Assessment).

C. Overview of Ordinances

1. The Stormwater Management Control Ordinance

Goal: To apply adopted design and performance standards to a broader range of development given the types and effects of development in the Pompeston Creek Watershed.

Minimum Standard: N.J.A.C. 7:8-3.3 allows the Regional Stormwater Management Plan to be more restrictive than those that apply to the State.

Since the effects of urbanization have been noted on the streams and the entire watershed, the modification and addition of several ordinances will be required to mitigate deleterious effects. The sample Stormwater Management Control Ordinance that was provided to all municipalities in the New Jersey Stormwater Best Management Practices Manual (New Jersey Department of Environmental Protection Division of Watershed Management, April 2004) has been revised to reflect the recommended changes identified by the Regional Stormwater Management Planning Committee including a change in the definition of “major development.”

Within the Pompeston Creek Watershed, smaller homes are being replaced with larger homes that can double or even triple the amount of impervious cover that was originally on the lot. The new definition captures this redevelopment and requires stormwater controls to be installed for this type of major development. The revised Stormwater Management Control Ordinance also requires commercial and industrial sites that are repaving parking areas or resurfacing roof tops to disconnect 20% of these surfaces and design Best Management Practices to infiltrate the two-year design storm runoff volume that emanates from these disconnected areas. The primary goal is to decrease the directly connected impervious areas that route stormwater directly to storm sewers without the benefit of being able to recharge groundwater aquifers. This decrease in direct connection will also aid in achieving a modulated baseflow and will help to reduce erosion due to flashy stream flows. Due to the possibility of low infiltration rates created by the soils and geology of the area, design modifications of traditional infiltration basins, or the opportunity to capture and reuse is made an option to direct infiltration.

Restoration of compacted soil which occur with site development is intended to provide the level of infiltration that was available to that pervious surface before the site was disturbed. A simple method that should be considered is for soil to be rototilled to a depth of 18 inches before site development completion.

The revised Stormwater Management Control Ordinance is provided in Appendix A of this document.

a. Rationale for Stormwater Ordinance

The stormwater ordinance that will be adopted for use in the Pompeston Creek Watershed builds upon the stormwater ordinance that is already in place through the Stormwater Rules promulgated in February of 2004. The ordinance stated herein will be adopted but not be less protective than that which the municipality has currently adopted. The Pompeston Creek Watershed displays particular characteristics that require a more focused plan. Most of the impervious cover within the watershed is connected directly to

the stream. This increases flooding and has a negative impact on water quality. Through disconnection of these impervious surfaces and infiltration or capture/reuse of the runoff from the two-year design storm, many of these flooding and water quality problems can be decreased.

The Pompeston Creek Watershed has a high percentage of impervious cover. The total impervious area in the watershed is 25%, with Cinnaminson having 28%, Delran having 26%, Moorestown having 22% and Riverton having 19% impervious surface on their land within the watershed. These impervious surfaces increase stormwater runoff flows and volumes, which have a detrimental affect on water quality, increase stream bank erosion and exacerbate flooding.

Minimal land in the watershed remains available for major development as defined the Stormwater Rules adopted in February 2004. Therefore, mitigation options are limited unless the definition of “major development” is broadened. This will allow strategies to address the impacts that may occur under a variety of development options. By including development involving additions or knock-down & rebuild situations in the definition of major development, this regional plan and ordinance will attend to loss of recharge and additional impervious areas that may be directly connected to the Creek.

The disconnection and infiltration/reuse of runoff from roofs and/or parking lots prior to resurfacing or replacement simply seeks to reduce the current state of peak volumes and velocity that has been seen to create deleterious effects on bank stability, loss in groundwater/baseflow recharge and water quality. This recommendation seeks to direct stormwater management to increase the recharge of precipitation events which will decrease directly connected runoff and the pollutants that are carried by such runoff. This will also aid in maintaining stream baseflow necessary for aquatic life and lessen the impacts of water removal from aquifers. The disconnection of impervious surfaces and infiltration of runoff from these surfaces play a significant role in changing the runoff conditions (i.e. curve number) that the drainage area possesses prior to disconnection based solely on land use and soil type (see Milestone 2, Water Quantity). Guidance for disconnection has been included in the Regional Stormwater Plan as a separate document entitled, “RU Disconnected?”

Several site specific disconnection plans were provided as a part of this stormwater management plan for the Pompeston Creek Watershed. Although cost estimates are provided for these projects, these are considered site specific and should not be applied on a watershed basis. Through site surveillance, it was determined that in most cases, the disconnection of 20% of the impervious surface can be achieved without the loss of parking spaces. Some of these systems can be installed in the pervious areas left on site, which would be less expensive than removing impervious area.

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Since the Pompeston Creek Watershed lies on top of areas of low recharge known to contain glauconitic soils, a test of the infiltration rate should be conducted before designing any infiltration system. If it is found that the soils would not infiltrate at an appropriate rate, soil replacement and an underdrain system would need to be added to the design. An alternative option would be to collect the stormwater runoff and reuse the water to irrigate lawn areas or other vegetative areas.

In order to minimize potential groundwater contamination that may occur with the sheet flow from parking areas or roadways, projects that infiltrate the recommended volume of stormwater using disconnection and infiltration techniques for the roof runoff should be considered first. If infiltration of this roof runoff is not feasible, stormwater runoff from parking areas or roadways will be considered, but may require pretreatment prior to infiltration.

To account for the loss of vegetation and/or pervious area upon development, a fund would be created and as part of the construction permit process, developers that create impervious area will be charged ten cents per square foot for all construction over 5,000 square feet of building or other impervious area footprint. This will also serve in the sustainability of the watershed. To maximize benefits for the Pompeston Creek Watershed, it will be necessary to keep all tree planting/reforestation funded under this ordinance within the watershed boundary. Management of these funds will be administered by the municipalities. Municipal ordinances that intend to duplicate the intent of this ordinance, but may differ in its administration, shall be considered.

The general buffers that are contained in the ordinance are intended to minimize the effect of contaminants in runoff, and also to stabilize the stream banks. Vegetated buffers around streams prevent excess nutrients, sediment and organic matter from reaching surface waters. These buffers are important for providing shade, aiding in infiltration to enhance base flow in the stream and mitigate flooding downstream. The installation of buffers will decrease the runoff capacity (i.e. curve number) as discussed in hydrologic model alternative scenarios (Milestone 2).

Bioretention systems that are designed as vegetated swales (New Jersey Stormwater Best Management Practices Manual, 9.1) are an important component of providing a greater level of sustainability in the recharge, water quality and water quantity within the watershed. These swales provide effective pretreatment for downstream stormwater best management practices (BMPs) by trapping, filtering and infiltrating particulates and associated pollutants. The design total suspended solids (TSS) removal rate for vegetative swales is 60-70%. Typically, vegetated swales have a removal rate of 30% for nitrogen and phosphorus. Swales also can provide a location for snow storage during winter months. Additionally, construction may cost less than conventional curb and gutter systems. Vegetated swales help to control and reduce the quantity of water runoff from a

site. They reduce the peak flow from a site by increasing the infiltration and time of concentration for a site.

2. Low/No Phosphorus Fertilizer Ordinance

Goal: To reduce the input of phosphorus from fertilizers into the waterways by requiring the use of a low to no phosphorus fertilizers.

Minimum Standard: To provide a local ordinance that requires residents to use low or no phosphorus lawn products. Adoption of ordinance is required as soon as alternative products are available.

The Regional Stormwater Management Planning Committee recognizes that the State of New Jersey should pass legislation that bans or limits the use of phosphorus in lawn fertilizers on a state-wide basis. This would force the fertilizer suppliers to take action and readily provide products that do not contain phosphorus and/or have a reduced amount of phosphorus. Since the Committee has no authority to require the State Legislature to take action on this issue, the passage of a Low/No Phosphorus Fertilizer Ordinance is an interim management measures that is being required by this Regional Stormwater Management Plan.

The recommended Low Phosphorus Fertilizer Ordinance is provided in Appendix B of this document.

a. Rationale for Low/No Phosphorus Fertilizer Ordinance

Phosphorus is a limiting nutrient in fresh water systems. An addition of phosphorus to a waterbody has the potential of encouraging algal growth and reducing the water oxygen level upon respiration of alga and decomposition of alga. Typical soils in New Jersey do not require the addition of phosphorus for optimal plant growth. In addition, water quality testing in the Pompeston Creek Watershed has indicated that phosphorus has been found to exceed water quality standards (Section IV, Pompeston Creek Stormwater Characterization and Assessment).

Soil testing in many of the watersheds in New Jersey has indicated that many lawns need only minimal phosphorus or none at all. Some of the fertilizer companies have already begun to reduce phosphorus in their products. For example, Scotts-Miracle Grow has publicized plans to reduce their phosphorus content by 50% for their four step product by 2009. Since Scotts-Miracle Grow provides over 50% of the homeowner lawn fertilizer in New Jersey, this reduction in phosphorus could be significant. It is recommended that testing be performed to examine how these changes in fertilizer mixes result in reduced phosphorus concentrations in runoff from residential lawns. Rutgers Turf Center has test plots that could be used for this experiment. Side by side tests of the old product and new

product can be conducted to determine the reduced loads that would be expected to New Jersey's waterways. If testing indicates that soils do require phosphorus, the ordinance allows for its application.

The most preferable method of addressing the phosphorus issue would be to pass legislation on a statewide basis that would ban or limit the use of phosphorus in lawn fertilizers. This would force the manufacturers of lawn care products to supply the desired product. It is only then that New Jersey residents and landscaping businesses will be able to acquire the recommended fertilizer easily. In the interim, the municipalities of the Pompeston Creek Watershed shall implement this ordinance to reduce the entrance of excess phosphorus into the waterways.

3. Coal Tar Reduction Ordinance

Goal: To reduce the input of petroleum hydrocarbons into the waterways by restricting the use of coal tar sealers on residential driveways.

Minimum Standard: To provide an ordinance that will guide the proper application of products necessary to the maintenance of paved surfaces while minimizing the negative impact on water resources. Adoption of ordinance is required as soon as alternative products, such as asphalt based sealers, are available.

The use of coal tar driveway sealers is a state-wide issue that requires action be taken by the State Legislature to eliminate the use of this product, which has a high potential to leach petroleum hydrocarbons into stormwater runoff. These petroleum hydrocarbons are ultimately sequestered in the sediments of the waterways. As an interim measure until the State Legislature takes action, the passage of an ordinance that limits the use of coal tar driveway sealers is being required by this Regional Stormwater Management Plan.

The recommended Coal Tar Pavement Product Restriction Ordinance is provided in Appendix C of this document.

a. Rationale for Coal Tar Reduction Ordinance

Coal tars contain a high level of polycyclic aromatic hydrocarbons (PAHs). Application of coal tar sealants on parking lots and driveways abrade away with weathering and tire wear and need to be applied regularly. Sediment concentration of PAHs in urban ponds has been found to be increasing with time (USGS, Van Metre, 2006). Although no specific data exists for sediment PAH concentration in the Pompeston Creek sediments, avoidance of future issues is the key to this ordinance. Given that urban impoundments can be expected to require dredging at certain time intervals, contamination of the sediment with PAHs will cause the sediment to be more costly to dispose and will

increase the availability of a carcinogen in the environment. In addition, since the Pompeston Creek discharges to the Delaware River, a lower contaminant concentration in the water would reduce the pollutant load contribution to the sediments of the Delaware River. Several studies indicate that PAHs are located in the sediments in both the upper and lower Delaware Estuary (Costa and Sauer (1994); DRBC 1994; NOAA 1994, USEPA 1995). Frithsen *et al.* (1995) estimated that approximately 35,000 kg/hr of total PAHs enter the Delaware Estuary from urban runoff and atmospheric deposition, with the urban runoff being responsible for approximately 95% of the total input. The passage of this ordinance is expected to aid in the reduction of contamination.

Asphalt sealer is one alternative that is available. Asphalt sealer is expected to contribute a lower load of PAHs to the ecosystem.

4. MS4 Permit Educational Mandate Focus

Goal: To ensure that groundwater recharge is a primary focus of stormwater education programs.

Minimum Standard: Promote the infiltration of stormwater runoff by incorporating infiltration techniques into educational materials and programming that are delivered as a part of the MS4 permit requirements.

Each municipality has been issued an MS4 permit that requires them to distribute education materials on stormwater as well as host an annual event to promote stormwater management education. Since the Regional Stormwater Management Plan has identified capturing and infiltrating runoff as important to control flooding and mitigate water quality issues in the watershed, this Regional Stormwater Management Plan requires each municipality to focus additional educational efforts on promoting groundwater recharge where appropriate through disconnection of impervious surfaces and infiltrating the runoff. This education needs to also include watershed specific issues such as reduced infiltration in areas of glauconitic soils and proper modifications to address such issues.

a. Rationale for MS4 Permit Educational Mandate Focus

Municipalities are regulated to perform specific educational programs regarding stormwater through the Tier A MS4 permitting process. Under number 4 of the State Basic Requirements, the permit specifies nine areas that comprise the minimum standard that the municipality must meet in order to fulfill permit requirements. With the Pompeston Creek Watershed recharging critical aquifers and with the loss of recharge area due to development in the watershed, the Pompeston Creek Regional Stormwater Management Plan will require that an additional component regarding infiltration of precipitation to promote groundwater recharge. This component will include information

regarding disconnection of impervious surfaces and the promotion of rain gardens/bioretention areas as well as other systems that infiltrate stormwater runoff.

5. Terminal Catch Basin Cleaning

Goal: *To reduce the introduction of catch basin debris into waterways.*

Minimum Standard: *To include additional inspection and potentially additional catch basin cleaning that will promote additional benefits of reduced NPS pollutants to the waterway.*

The Regional Stormwater Management Plan requires that a catch basin be rescheduled for additional inspection and potential cleaning if, upon its mandated (MS4 permit requirement) yearly cleaning, it presents as half full or more. Inspection documentation should be maintained for the terminal catch basins as these are most likely to present the greatest impact on water quality if not properly maintained.

a. Rationale for Terminal Catch Basin Cleaning

In a 2001 study by Richard Ahn and Dr. George Van Orden at Rutgers University, the proper maintenance of catch basins was found to have the greatest single effect on the level of enterococci found after initialization of precipitation. The last catch basin in the run tends to not only accumulate pollutants that are directly discharged to it but captures pollutants from the upstream sewer system as well. The reduction of the source was determined to be close to one order of magnitude. Concentrating on additional maintenance to the terminal catch basin will focus resources for the greatest effect on water quality. Inspection during permit mandated maintenance will determine if a catch basin other than the terminal catch basin requires additional maintenance.

The Pompeston Creek Watershed has been documented as having difficulties in achieving the water quality standards for bacteria (Pompeston Creek Stormwater Characterization and Assessment, Section IV). Given the severity of the contamination and the study relating the benefits of catch basin cleaning, the Pompeston Creek Watershed should adopt such an ordinance.

6. Stream Corridor Protection Ordinance

Goals:

-To delineate a contiguous stream corridor to buffer the Pompeston Creek and its tributaries from the impacts of development and nonpoint pollution.

-To control the unnatural alteration of the stream channel, flood plains, wetlands and steep slopes

Minimum Standard: To adopt an ordinance that will provide a legal basis for the municipal review agencies to strengthen the stream corridor protection.

The Regional Stormwater Management Plan requires that each municipality adopt a Stream Corridor Protection Plan to maximize pollutant reduction, flood storage and habitat preservation. This ordinance would provide the legal mandate to ensure that the Pompeston Creek be maintained near its natural state. Although some municipalities have a stream corridor protection ordinance currently, all municipalities that contain portions of the Pompeston Creek Watershed should implement an ordinance for the protection of the stream corridor. A sample ordinance is provided in Appendix D.

a. Rationale for Stream Corridor Protection Ordinance

The New Jersey Department of Environmental Protection has recently proposed that the portion of Pompeston Creek from Route 130 to the Broad Street Bridge should be designated a Category One Waterway. This proposed designation is based on the exceptional ecological significance, in that this waterway provides ideal habitat for the State Threatened Eastern Pondmussel. As a tributary to the Delaware River, the Pompeston Creek has the tides and fine sediment that the Pondmussel require.

The 2.61 mile section of the Pompeston Creek that is included in this potential designation is the area downstream of the Lakeview Memorial Park Cemetery to Broad Street in Riverton and Cinnaminson. However, the headwaters of this stream begin in Moorestown and Delran. Creating comprehensive protection for the entire length of the stream will be the most appropriate way to deal with the deleterious effects associated with developed land.

The beneficial use of vegetated filter strips, or buffers, alongside of streams has been documented (Schueler, T.R. 1987; NJ Department of Agriculture, 1999; Munoz-Carpena et al., 1999). When the stream corridor is maintained in as natural a state as conditions allow, it can function to remove sediment and pollutants in overland flow, while reducing bank and streambed erosion. This area should also serve to infiltrate a larger percentage of precipitation which will reduce the peak flow and aid in maintenance of the base flow for the stream. Another important aspect of the maintenance of a contiguous stream corridor is to help prevent flood related damage to surrounding communities by providing flood storage capacity.

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***Appendix A: Model Stormwater Control Ordinance for
Municipalities***

Model Stormwater Control Ordinance for Municipalities

Important note: *This sample ordinance is from NJDEP's BMP Manual. Since most municipalities simply adopted this ordinance or a slightly modified version of this ordinance, the required changes to this ordinance are provided in **bold red italics**.*

SECTION I. 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.

Note: Municipalities are encouraged to participate in the development of regional stormwater management plans, and to adopt and implement ordinances for specific drainage area performance standards that address local stormwater management and environmental characteristics.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 2.

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 *[insert name of municipality]*.

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.

SECTION II. 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 its 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.

“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

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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-*half* or more acres of land *or increases impervious cover by 5,000 square feet thereby changing the stormwater drainage of the land.* Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation, *or razing and replacement of existing structures.*
- “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, [*insert name of municipality*], 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.

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“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.

SECTION III. 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 4. 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 **unless otherwise noted** 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.

Note: Alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5.

SECTION IV. 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 10.
- 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 Sections 4.F and 4.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 Sections 4.F and 4.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 Sections 4.F and 4.G to the maximum extent practicable;
 - 3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.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 Sections 4.F and 4.G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.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 Paragraph 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 ***and restore areas that have been compacted;***
 - 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. ***The vegetated, open channel conveyance system should be used as the default conveyance system in all areas. Maintenance of these channels should be performed on a sectional basis***

to avoid stretches no longer than fifty feet that consist of immature vegetation with the potential of releasing soil and nutrients, and scouring is limited at all times;

- 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 Section 4.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 Section 4.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 Section 4.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.

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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 Section 4.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 Section 4.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 Sections 4.F and 4.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 7, or found on the Department's website at www.njstormwater.org.
- 6. Twenty percent (20%) of all surfaces greater than 5,000 square feet will be required to be disconnected prior to resurfacing, excluding municipally owned or county owned roadways, but including municipally owned and county owned parking lots, privately owned parking lots or other publicly or privately owned paved surfaces. The two-year design storm runoff volume from these disconnected areas shall be infiltrated if the soils and geology of the area permits. Permeability testing should be performed before design of infiltration practice is complete, and options of soil replacement with an underdrain system or a capture and reuse system could provide alternatives to low infiltration areas. Pretreatment may be required for paved areas that have a potentially high pollutant load. A waiver can be granted from this requirement provided the applicant performs a mitigation measure to offset the required action.*
- 7. Twenty percent (20%) of all roofs greater than 5,000 square feet will be required to be disconnected prior to resurfacing or replacement. The two-year design storm runoff volume from these disconnected areas shall be infiltrated if the soils and geology of the area permits. Permeability testing should be performed before design of infiltration practice is complete, and options of soil replacement with an underdrain system or a capture and reuse system could provide alternatives to low infiltration areas. A waiver can be granted from this requirement provided the applicant performs a mitigation measure to offset the required action.*
- 8. The disconnection and infiltration of roof runoff in place of the disconnecting and infiltrating parking lot area will be the preferred method if the site conditions comply. Areas equal to those areas determined in numbers 6 and 7 above will apply, with the runoff from the roof given priority to infiltrate.*
- 9. The runoff from the disconnection of parking lots may require water quality treatment before it is infiltrated. This will be determined in the permitting process and will comply with F.1.b.3. of this ordinance.*
- 10. All major development will offset their construction by contributing ten cents per square foot developed to a fund that will be dedicated to*

reforestation or other beneficial tree planting, or commit an equal contribution to town managed tree protection and preservation.

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 two-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;

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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 5, complete one of the following **(these requirements only apply for major development one or more acres in size)**:
 - (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 2 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.
 3. ***All land disturbances that are not buffered by a minimum of 50 feet of vegetation will be required to comply with the provisions of the Soil Erosion and Sediment Control Act, N.J.S.A. 4:29-39 et seq.;***

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

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volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

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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 7, or found on the Department’s website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. 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

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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 Sections 4.F and 4.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 7.
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 Section 4.G(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 G.8 shall maintain or enhance the current functional value and overall

condition of the special water resource protection area as defined in G.8.a.(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. Paragraph G.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.

SECTION V. 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 Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.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.

SECTION VI. 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 Section 8.D.
 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 8.
- 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 4 of this ordinance.
- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance provided the pollutant removal rates are verified by

the New Jersey Corporation for Advanced Technology and certified by the Department.

SECTION VII. 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, (609) 292-5540.

SECTION VIII. 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.

Note: The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.

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.

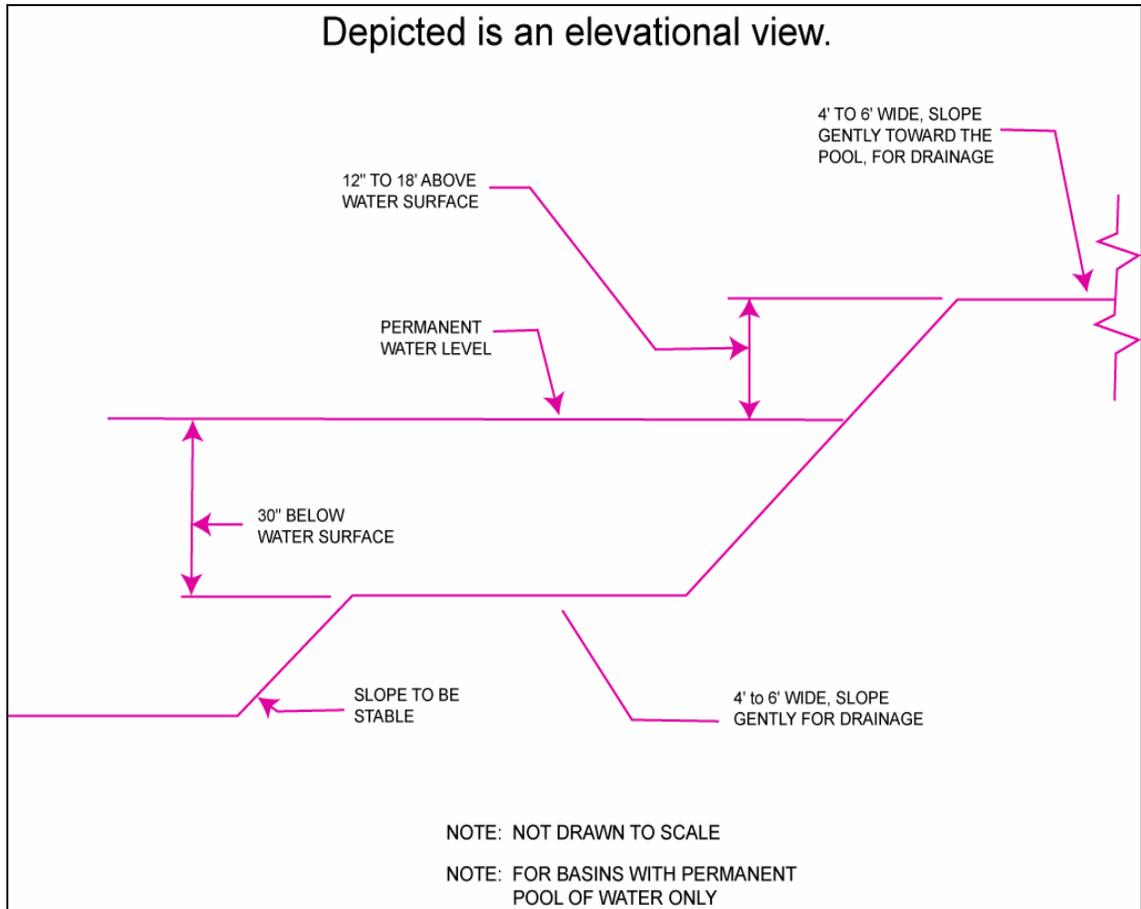
- c. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
- 3. For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, 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 8.C 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 Section 8.D 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

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SECTION IX. 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 Section 9.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 Section 9.C of this ordinance.

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 3 through 6 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 4 of this ordinance.

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 10.

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 Sections 9.C.1 through 9.C.6 of this ordinance 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.

SECTION X. Maintenance and Repair:

A. Applicability

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.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

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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 Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.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 Section 10.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 Section 10.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 Section 10.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 Sections 10.B.6 and 10.B.7 above.
9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

(Note: It may be appropriate to delete requirements in the maintenance and repair plan that are not applicable if the ordinance requires the facility to be dedicated to the municipality. If the municipality does not want to take this responsibility, the ordinance should require the posting of a two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53. Guidelines

for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)

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 effect 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.

B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

SECTION XI. Penalties:

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to the following penalties: [*Municipality to specify*].

SECTION XII. 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.

SECTION XIII. 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.

Appendix B: Fertilizer Application Model Ordinance

Fertilizer Application Model Ordinance

SECTION I. Purpose:

An ordinance to regulate the outdoor application of fertilizer so as to reduce the overall amount of excess nutrients entering waterways, thereby helping to protect and improve surface water quality. This ordinance does not apply to fertilizer application on commercial farms.

SECTION II. Basis and Background:

Elevated levels of nutrients, particularly phosphorus, in surface waterbodies can result in excessive and accelerated growth of algae and aquatic plants (eutrophication). Excessive plant growth can result in diurnal variations and extremes in dissolved oxygen and pH, which, in turn, can be detrimental to aquatic life. As algae and plant materials die off, the decay process creates a further demand on dissolved oxygen levels. The presence of excessive plant matter can also restrict use of the affected water for recreation and water supply.

While healthy vegetated areas are protective of water quality by stabilizing soil and filtering precipitation, when fertilizers are applied to the land surface improperly or in excess of the needs of target vegetation, nutrients can be transported by means of stormwater to nearby waterways, contributing to the problematic growth of excessive aquatic vegetation. Most soils in New Jersey contain sufficient amounts of phosphorus to support adequate root growth for established turf. Over time, it is necessary to replenish available phosphorus, but generally not at the levels commonly applied. Other target vegetation, such as vegetable gardens and agricultural/horticultural plantings, will have a greater need for phosphorus application, as will the repair or establishment of new lawns or cover vegetation. A soils test and fertilizer application recommendation geared to the soil and planting type is the best means to determine the amount of nutrients to apply. Timing and placement of fertilizer application is also critical to avoid transport of nutrients to waterways through stormwater runoff. Fertilizer applied immediately prior to a runoff-producing rainfall, outside the growing season or to impervious surfaces is most likely to be carried away by means of runoff without accomplishing the desired objective of supporting target vegetation growth. Therefore, the management of the type, amount and techniques for fertilizer application is necessary as one tool to protect water resources.

This ordinance does not apply to application of fertilizer on commercial farms, but improper application of fertilizer on farms would be problematic as well. Stewardship on the part of commercial farmers is needed to address this potential source of excess nutrient load to waterbodies. Commercial farmers are expected to implement best management practices in accordance with conservation management plans or resource conservation plans developed for the farm by the Natural Resource Conservation Service and approved by the Soil Conservation District Board.

SECTION III. 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 Ordinance 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.

- a. Buffer - the land area, 25 feet in width, adjacent to any waterbody.
[The Department believes that 25 feet is the appropriate buffer width to be protective of water quality. However, in situations that warrant additional flexibility, such as where lot sizes are exceptionally small or where the 25 ft buffer constitutes the majority of the available property, the municipality may reduce the buffer to 10 feet in width, with the additional requirement that a drop spreader be used for fertilizer application]
- b. Commercial farm - a farm management unit producing agricultural or horticultural products worth \$2,500 or more annually.
- c. Fertilizer - means a fertilizer material, mixed fertilizer or any other substance containing one or more recognized plant nutrients, which is used for its plant nutrient content, which is designed for use or claimed to have value in promoting plant growth, and which is sold, offered for sale, or intended for sale.
- d. Impervious Surface - a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water. This term shall be used to include any highway, street, sidewalk, parking lot, driveway, or other material that prevents infiltration of water into the soil.
- e. Person - any individual, corporation, company, partnership, firm, association, or political subdivision of this State subject to municipal jurisdiction.
- f. Phosphorus fertilizer - any fertilizer that contains phosphorus, expressed as P₂O₅, with a guaranteed analysis of greater than zero; except that it shall not be considered to include animal (including human) or vegetable manures, agricultural liming materials, or wood ashes that have not been amended to increase their nutrient content.
- g. Soils Test - a technical analysis of soil conducted by an accredited soil testing laboratory following the protocol for such a test established by Rutgers Cooperative Research and Extension.
- h. Waterbody - a surface water feature, such as a lake, river, stream, creek, pond, lagoon, bay or estuary.

SECTION IV. Prohibited Conduct:

No person may do any of the following:

- a. Apply fertilizer when a runoff producing rainfall is occurring or predicted and/or when soils are saturated and a potential for fertilizer movement off-site exists.
- b. Apply fertilizer to an impervious surface. Fertilizer inadvertently applied to an impervious surface must be swept or blown back into the target surface or returned to either its original or another appropriate container for reuse.
- c. Apply fertilizer within the buffer of any waterbody.
- d. Apply fertilizer more than 15 days prior to the start of or at any time after the end of the recognized growing season [**insert season applicable to municipality as identified by the USDA Plant Hardiness Zones. USDA Plant Hardiness Zones mapping can be found in *The Standards for Soil Erosion and Sediment Control in New Jersey, July 1999*. The growing seasons are identified as follows: Zones 5b and 6a (northwestern New Jersey) - March 15 to October 31; Zone 6b (northeastern, central and part of southern New Jersey) – March 1 to November 15; Zones 7a and 7b (Atlantic Coastal area and southwestern New Jersey) – February 1 to November 30. Refer to USDA Plant Hardiness Zone mapping for more information**].

SECTION V. Phosphorus Fertilizer Application

No person may do the following:

- a. Apply phosphorus fertilizer in outdoor areas except as demonstrated to be needed for the specific soils and target vegetation in accordance with a soils test and the associated annual fertilizer recommendation issued by Rutgers Cooperative Research and Extension.
- b. Exceptions
 - 1. Application of phosphorus fertilizer needed for
 - i. establishing vegetation for the first time, such as after land disturbance, provided the application is 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,
 - i. re-established or repairing a turf area.
 - 2. Application of phosphorus fertilizer that delivers liquid or granular fertilizer under the soils surface, directly to the feeder roots.

3. Application of phosphorus fertilizer to residential container plantings, flowerbeds, or vegetable gardens.

SECTION VI. Enforcement:

This ordinance shall be enforced by the **[Police Department and/or other Municipal Officials]** of **[insert name of municipality]**.

SECTION VII. Violations and Penalties:

Any person(s) found to be in violation of the provisions of this ordinance shall be subject to a fine not to exceed **[insert amount]**.

SECTION VIII. 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, void, or ineffective for any cause, or reason, shall not affect any other portion of this Ordinance.

SECTION IX. Effective date:

This Ordinance shall be in full force and effect **[insert appropriate language for ordinance adoption in municipality such as: from and after its adoption and any publication as may be required by law]**.

ALL OF WHICH IS ADOPTED this ___day of _____, 2___, by the _____.

Appendix C: Coal Tar Pavement Product Restriction Ordinance

*(Sample Ordinance Derived from
Ordinance # 20051117-070 Austin, Texas)*

Coal Tar Pavement Product Restriction Ordinance

SECTION I. Purpose:

To reduce the entrance of polyaromatic hydrocarbons (PAHs) to the waterways and sediment of the watershed from the application of PAH containing seal coating to asphalt surfaces.

SECTION II. Definitions:

Coal tar pavement product: a material that contains coal tar and is for use on an asphalt or concrete surface, including a driveway or parking area.

SECTION III. Prohibited acts and regulated activities:

Use of coal tar pavement products prohibited

- a. Except as provided in section below, a person may not use a coal tar product within the City's planning jurisdiction.
- b. A person who owns property on which a coal tar pavement product is used is presumed to have used a coal tar pavement product in violation of this section.

Sale of Coal Tar Pavement Products Restricted

Exemptions

- a. The person is researching the effect of a coal tar pavement product on the environment or is developing an alternative technology, and the use of a coal tar pavement product is not available for the intended use.

Restrictions and penalties to be determined by the municipality.

This ordinance was derived from Ordinance # 20051117-070 Austin, Texas.

Appendix D: Stream Corridor Protection Ordinance

***Sample Ordinance from the Stony Brook Millstone Association
(www.thewatershed.org)***

STREAM CORRIDOR PROTECTION ORDINANCE

SECTION 1.00

PURPOSES

The purposes of this ordinance are as following:

- (1) Maintain the quality streams and improve the currently impaired streams of the watershed.
- (2) Protect significant ecological components of stream corridors such as wetlands, floodplains, woodlands, steep slopes and wild life and plant life habitats within the stream corridors of the watershed; and prevent flood related damage to the communities of the watershed.
- (3) Complement the existing state, regional, county and municipal stream corridor protection and management regulations and initiatives.

SECTION 2.00

DEFINITIONS

As used in this ordinance, the following words and terms shall have the following meanings:

Activity means any land disturbance, including any development for which an application for development is necessary.

One Hundred Year Flood Line means the line which is formed by following the outside boundaries of the area inundated by a 100 year flood. A 100 year flood is estimated to have one percent chance or one chance in 100 of being equaled or exceeded in any one year. The 100 year flood line shall be determined by reference to FEMA studies (*cite specific study*).

Stream means a waterway depicted on the United States Geological Survey Hydrologic Map: Open File

Report # _____, such report being on file with _____

Stream Corridor shall mean the stream channel (the bed and banks of a stream which confine and conduct continuously or intermittently flowing water), the area within the one hundred year flood line and a minimum of 100 feet from the one hundred year flood line, extending outward from the stream channel, on both sides of the stream. If there is no one hundred year flood line delineated, the distance shall be measured outward from the bank of the stream channel. If slopes greater than 15% abuts the outer boundary of the stream corridor, the area of such slopes shall also be included as the stream corridor.

This ordinance covers development activities whether or not covered by site plan and subdivision review and, unless the reference to "any land disturbance" is deleted, should be included in the Other Provisions section of the zoning regulations.
If it is deleted, the ordinance should be included in the site plan and subdivision regulations.²

SECTION 3.00

STREAM CORRIDOR PROTECTION

3.10 APPLICABILITY

All tracts falling in whole or in part within a stream corridor shall be subject to the standards set forth in section 3.20 et. seq., except that this section shall not be applicable when an activity is reviewed by the Delaware and Raritan Canal Commission under N.J.A.C. 7:45-7: Stream Corridor Impact Regulations for the Review Zone of the Delaware and Raritan Canal State Park (adopted February, 1994) or successive regulations and amendments.

3.20 STANDARDS

3.21 ACTIVITIES PERMITTED IN STREAM CORRIDORS

Stream corridors shall remain in their natural state, with no clearing or cutting of trees and brush (except for removal of dead vegetation or removal of non-native and invasive species and pruning for reasons of public safety), altering of watercourses, regrading or construction except for the following activities:

- (1) Wildlife sanctuaries, woodland preserves and arboretums, but excluding enclosed structures.
- (2) Game farms, fish hatcheries and fishing reserves, operated for the protection and propagation of wildlife, but excluding enclosed structures.
- (3) Unpaved hiking, bicycle and bridle trails.
- (4) Fishing areas.
- (5) Reconstruction of a structure which pre-dates the adoption of this ordinance in the event of damage or destruction by fire, storms, natural hazards, or other acts of God, provided that the reconstruction does not have a greater footprint or total area than that of the damaged structure and that no change in land use occurs; and further provided that the reconstruction shall be permitted only if no more than 50% of the structure is destroyed.

***3.22 LOCATION OF ACTIVITIES ON TRACTS PARTIALLY WITHIN STREAM
CORRIDORS***

- (1) All new lots in major and minor subdivisions and site plans shall be designed to provide sufficient areas outside of stream corridors to accommodate primary structures as well as any normal accessory uses appurtenant thereto.
- (2) The board of jurisdiction may allow an average stream corridor width of 100 feet from the one hundred year flood line, thus allowing reasonable flexibility to accommodate site planning when necessitated by the size and shape of the tract and physical conditions thereon. The stream corridor width may be reduced to a minimum of 50 feet from the one hundred year flood line provided there is an equivalent increase in the width elsewhere on site and all relevant permits (e.g., Stream Encroachment, Freshwater Wetlands) are obtained.³

***3.23 ACTIVITIES PERMITTED IN STREAM CORRIDORS WHEN THERE IS NO
REASONABLE
OR PRUDENT ALTERNATIVE***

The following are permitted in a stream corridor when subdivisions or site plans cannot be designed in the manner set forth in section 3.22 or, in the case of a pre-existing lot for a one-family or two-family dwelling, when there is insufficient room outside the stream corridor for permitted accessory uses. In either case, there must be no other reasonable or prudent alternative to placement in the stream corridor:

- (1) Yard improvements such as lawns.
- (2) Recreational use, whether open to the public or restricted to private membership, such as parks, camps, picnic areas, sports or boating clubs, not to include enclosed structures, but permitting piers, docks, floats or shelters usually found in developed outdoor recreational areas.
- (3) Outlet installation for sewage treatment plants and sewage pumping stations and the expansion of existing sewage treatment facilities.
- (4) Private or public water supply wells that have a sanitary seal, flood proofed water treatment facilities or pumping facilities.
- (5) Dredging or grading when incidental to permitted structures or uses, including stream cleaning and stream rehabilitation work undertaken to prove hydraulics or to protect public health.
- (6) Culverts, bridges and roads provided that they cross the corridor directly as practical.
- (7) Sanitary or storm sewers.
- (8) Utility transmission lines installed during periods of low stream flow in accordance with soil erosion and sediment control practices and approved by the State Soil Conservation District in a manner which will not impede flows or cause ponding of water.
- (9) Structures comprising part of a regional flood detention project.
- (10) Detention or retention basins and related outfall facilities.

**3.24 ACTIVITIES PERMITTED IN STREAM CORRIDORS WHEN PROHIBITING
SUCH
ACTIVITIES WOULD CAUSE EXTREME ECONOMIC HARDSHIP**

- (1) New structures (other than those permitted as exceptions to sections 3.21 and 3.23), including retaining walls, parking facilities and roads (but not those which are parallel to the stream) are permitted in a stream corridor only if:
 - (a) Upon a clear and convincing demonstration by the applicant that prohibiting such activity would result in extreme economic hardship or would conflict with a compelling public need.

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[a] The board of jurisdiction shall use the following standards in determining whether extreme economic hardship exists:

(i) Prohibiting the activity would result in an extreme economic hardship, as distinguished from mere inconvenience, because of the particular physical surroundings, shape or topographical conditions of the property involved. The necessity of acquiring additional land to locate development outside the stream corridor shall not be considered an economic hardship unless the applicant can demonstrate that there is no adjacent land which is reasonably available; and

(ii) An applicant shall be deemed to have established the existence of an extreme economic hardship only if the applicant demonstrates, based on the specific facts, 4 that the subject property is not capable of yielding a reasonable economic return if its present use is continued or if it is developed as unauthorized by provisions of this ordinance and that this inability to yield a reasonable economic return results from unique circumstances peculiar to the subject property which:

- [i] do not apply to or affect other property in the immediate vicinity;
- [ii] relate to or arise out of the characteristics of the subject property rather than the personal situations of the applicant; and
- [iii] are not the result of any action or inaction by the applicant or the owner or his predecessors in title.

[b] An applicant shall be deemed to have established compelling public need if the applicant demonstrates, based on specific facts, that:

- (i) the proposed project will serve as an essential public health or safety need;
- (ii) the public health and safety require the proposed activity;
- (iii) the proposed use is required to serve existing public health or safety need;
- (iv) there is no alternative available to meet the established public health or safety need;
- (v) the activity will not be materially detrimental or injurious to other property or improvements in the area in which the subject property is located and will not endanger public safety; and
- (vi) the exception granted is the minimum relief necessary to relieve the compelling public need.

(2) If an exception set forth in subsections 3.24-(1)-(a) or (b) is granted the board of jurisdiction or the zoning officer, as the case may be, may reduce the width of the stream corridor to no less than 50 feet from the one hundred year flood line.

(3) If such an exception is granted, the applicant shall rehabilitate an environmentally degraded stream corridor within or adjacent to the same tract at least equivalent in size to the stream corridor reduction permitted and if not possible rehabilitate or expand a stream corridor of such size within a nearby tract and if available, within the Pompeston Creek Watershed. Rehabilitation shall include reforestation, stream bank stabilization and removal of debris. The area to be rehabilitated and the rehabilitation plan shall be acceptable to the board of jurisdiction or the zoning officer, as the case may be.

3.25 PROHIBITED ACTIVITIES

All activities not permitted pursuant to subsection 3.21, 3.23 and 3.24 shall be prohibited. In no circumstance shall the following be permitted as exceptions to such subsections:

- (a) Any solid or hazardous waste facilities, including but not limited to sanitary landfills, transfer stations and wastewater lagoons.
- (b) Junkyards, commercial and industrial storage facilities and open storage of vehicles and materials.

3.26 PROVISIONS GOVERNING ACTIVITIES IN STREAM CORRIDORS

If the standards set forth in section 3.20 are included in the zoning regulations rather than in the site plan and subdivision section, this exception should be treated as a conditional use. 5

(1) The applicant for any activity permitted in a stream corridor shall rehabilitate any degraded areas within the stream corridor, in a manner acceptable to the board of jurisdiction or the zoning officer, as the case may be, unless the applicant demonstrates that it is economically infeasible to do so.

(2) The applicant shall also;

(a) rehabilitate or cure the affects of the disturbance caused during construction;

(b) maintain the integrity of the surrounding habitat; and

(c) maintain the existing ability of the stream corridor to buffer the stream.

(3) The applicant shall provide whatever additional measures are necessary to assure that areas designated as stream corridors will be preserved and to prevent additional encroachments in stream corridor likely to occur as a result of the approval granted.

(4) The board of jurisdiction, in the case of an application for development, and the zoning officer, in all other cases, shall require conservation easements or deed restrictions assuring that there will be no further intrusion on the stream corridor than that permitted by the activity approved.

3.3 SUBMISSION REQUIREMENTS

An applicant for an activity in a stream corridor shall submit to the municipality a map of the project site delineating the following (at a scale of -- 1 inch : 200 ft), using the best available information:

- (a) one hundred year flood line; and
- (b) state wetland boundary lines; and
- (c) the stream corridor boundary; and
- (d) any slopes >15% within the site; and
- (e) the location of all improvements and land disturbance proposed to be located within any of the above boundaries.

In addition, the following shall be submitted:
