Municipal Stormwater Management Plan

for

Sandyston Township

Sussex County, New Jersey

Prepared by:

HAROLD E. PELLOW & ASSOCIATES, INC.
Consulting Engineers
17 Plains Road
Augusta, New Jersey 07822-2009

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Harold E. Pellow, P.E. & L.S.
New Jersey Professional Engineer & Land Survey License #13229

Table of Contents

List of Figures

ACKNOWLEDGEMENTS

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Fred MacDonald

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INTRODUCTION

As a result of the U.S. Environmental Protection Agency's "Phase II" rules published in December 1999, the New Jersey Department of Environmental Protection has developed a Municipal Stormwater Regulation Program , N.J.A.C. 7:14A-25, aimed at addressing the problem of pollutants entering our waters from storm drainage systems owned and operated by local government agencies. These systems, also called "municipal separate storm sewer systems ,or MS4s for short, are currently conduits for pollutants and sediments to enter into existing water systems. According to federal and state studies, it is now believed that up to 60% of our existing water pollution problems are attributable to stormwater/nonpoint pollution. The fundamental principal of this program is that by regulating the condition of stormwater entering into the MS4 (called nonpoint discharges) the stormwater exiting the MS4 pipe network (called point discharges) into the impaired waterways can be a way of improving the quality of said waterways. Through public education programs explaining the problems associated with garbage disposal, lawn fertilizing and pet waste control as they relate to non-point discharges to the diligence of the municipality in its review, approval and implementation of new development and re-development projects, the Municipal Stormwater Regulation Program, over time, will have a positive affect on the quality of existing water systems.

The first step initiated by the Municipal Stormwater Regulation Program is to develop and institute a Municipal Stormwater Management Plan (MSWMP). This MSWMP is an instructional document intended to provide guidance for Sandyston Township ("the Municipality") in the many facets of the regulation plan as how to address stormwater-related impacts to existing waterways as required by the Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules including how to address groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major developments. These projects are defined as those new projects or redevelopment projects that disturb one or more acres of land or those projects that increase the impervious site coverage by 0.25 acres. This plan describes standards to be initiated that are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies. This plan also describes long-term operation and maintenance measures for existing and future stormwater facilities.

A "build-out" analysis will eventually be included as part of this plan based upon the existing zoning and land available for development. This build-out analysis will be utilized to isolate areas of potential concern based upon expected municipal growth. The plan will also address the review of and update of existing ordinances, the municipal Master Plan, and other planning documents to allow for project designs that include low impact development techniques.

The final component of the plan is a mitigation strategy for when variances or exemptions of the design and performance standards are sought when the required standard procedures cannot be met. As part of the mitigation section of the stormwater management plan, specific stormwater management measures will be identified to lessen the impact of existing development. These mitigation measures will include on-site and off-site mitigation processes to be implemented by developers as well as developer funding for future mitigation processes implemented by the municipality. It is anticipated that this mitigation procedure will be a dynamic process requiring timely re-evaluation to ensure that the needs of the municipality are met by an applicant requesting such waivers.

GOALS

The general purpose of the Municipal Stormwater Regulation Program is to regulate stormwater/non-point discharge pollution from entering into existing waterways. Nine (9) specific implementation goals of this program are as follows:

1. *to reduce flood damage, including damage to life and property;*
2. *to minimize, to the extent practical, any increase in stormwater runoff from any new development;*
3. *to reduce soil erosion from any development or construction project;*
4. *to assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;*
5. *to maintain groundwater recharge;*
6. *to prevent, to the greatest extent feasible, an increase in nonpoint pollution;*
7. *to maintain the integrity of stream channels for biological and drainage function;*
8. *to minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and*
9. *to protect public safety through the proper design and operation of stormwater basins.*

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

PURPOSE

The specific purpose of this Municipal Stormwater Management Plan (MSWMP) is to provide a guidance document for the implementation of the N.J.D.E.P. Municipal Stormwater Regulation Program in order to protect our waterways from pollution related to point discharges as well as non-point discharges. Through the implementation of the

aforementioned plan goals, it is believed that the quality of our existing waterways will be substantially improved.

BACKGROUND

Sandyston is a rural Township located in the northwestern corner of Sussex County. It encompasses approximately 43.31 square mile area (27,718 acres) with approximately two-thirds of the Township positioned in the Delaware Water Gap National Recreational Area, Stokes State Forest and lands owned by the New Jersey Division of Fish, Game & Wildlife within the Kittatiny Mountain Range. The Township is rural in character and is bordered by Montague Township to the North, Pike County, PA to the East, Frankford Township to the East & South and Walpack Township to the West.

The landscape is generally made up of undeveloped forested lands, agricultural lands, steep hills and environmentally sensitive lands with intermittent single family homes and developments situated between. Commercial and retail developments are positioned along the major thoroughfare situated in the Township known as Route U.S. 206 and Sussex County Routes 560 & 645. As indicated in the current Master Plan, approximately 25.9% of the Township consisted of residential lands (6,970 acres), 1.5% consisted of non-residential development (423 acres) and approximately 72.6% was publicly owned land (19,551 acres). The market for homes in this area is attractive to home buyers due to the rural charm possessed by the Township as well as the scenic, undisturbed settings.

The population of the Township has increased by 22.9% during the period from 1980 to 2000 according to the U.S. Bureau of the Census. The 2000 population was 1,825; the 1990 population was 1,736; and the 1980 population was 1,485. In 2000, the population was housed in 907 units. This yields an average 2.01 persons per unit. This trend of increasing population is expected to continue until the Township reaches a build-out condition, whereas the amount of unconstrained land cannot sustain the market demand for increased housing. The estimated future population for Sandyston Township in the year 2020 is 2,100 as indicated in the Sussex County Strategic Growth Report. This indicates a future increase of 15.1% and consists of the slow and gradual residential growth that the Township has experienced as indicated in the Master Plan.

According to the Sandyston Township Master Plan, development in the Township is meant to “promote a desirable visual environment through creative development techniques and good civic design and arrangements” and “to promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions and preservation of the environment.” This vision of the Master Plan is intended to be met through the designation of Village Centers around the Township

The "Village Center" approach to development allows for residential components to be directly integrated with the commercial/retail/industrial components in a "walk to work" atmosphere. This innovated planning technique, which was the standard for original city and town planning, will negate the intense need for motor vehicle usage, and will lend to a more environmentally friendly atmosphere. Also by concentrating development in such a village center approach, more open space can be preserved through zoning changes which would direct development into specific areas rather than sprawled around the Township.

Sandyston Township currently possesses three (3) existing villages. These include the Village of Layton, the Village of Hainesville and the Village of Kittatinny Lake. The Township also possesses two (2) existing hamlets. These include Tuttle's Corner and Peter's Valley. In an effort to maintain and support the viability of its villages and hamlets, and encourage the continuance of farms and other privately owned open spaces, the Township is taking specific steps. Firstly the official designation by the State of these villages and hamlets will allow public funding for the maintenance of community infrastructure to occur enabling the areas to preserve their current boundaries. Secondly, the Township is reviewing their land use regulations to encourage compact development in commercial zones as well as to discourage strip development and industrial development solely along the major thoroughfares while encouraging such developments within the designated center areas. Also, steps are being taken to ensure that the population densities in the villages, hamlets and the remaining vacant lands in the Township increase at the current slow and gradual rate.

There are thirteen (13) named major waterways located within Sandyston Township. These are the Delaware River (classified as Zone 1C waterway), Forked Brook (classified as a FW2-Trout Production C1 waterway), Big Flat Brook (classified as a FW2-Trout Production C1 waterway), Little Flat Brook (classified as a FW2-Trout Production C1 waterway), Parker Brook (classified as a FW2-Trout Production C1 waterway), Criss Brook (classified as a FW1-Trout Production waterway), Tillman Brook (classified as a FW1-Trout Production waterway), Stony Brook (classified as a FW1-Trout Production waterway upstream of Stony Lake and classified as a FW2-Trout Production C1 waterway downstream of Stony Lake), Beerskill Creek (classified as a FW2-Trout Production C1 waterway), Lake Ashroe Outflow to the Big Flat Brook (classified as a FW2-Trout Production C1 waterway), Unnamed Tributary to Lake Ocquittunk (classified as a FW1-Trout Production waterway) and Lake Ocquittunk outflow to the Big Flat Brook (classified as a FW2-Trout Production C1 waterway). There are six (6) major water bodies located within the Sandyston Township. These are Lake Wapalanne (classified as a FW2- NonTrout C1 waterbody), Kittatinny Lake (classified as a FW2- NonTrout C1 waterbody), Lake Ashroe (classified as a FW2- NonTrout C1 waterbody), Lake Shawanni (classified as a FW2- NonTrout C1 waterbody), Stony Lake (classified as a FW2- Trout Maintenance C1 waterbody) and Lake Ocquittunk (classified as a FW2- NonTrout C1 waterbody). The listed designations associated with the aforementioned waterways and waterbodies are as published in the N.J.D.E.P. Surface Water Quality Standards N.J.A.C. 7:9B.

All of the waterways and water bodies located in the Township are present within the Upper Delaware Watershed Management Area (WMA#1) and are specifically associated with the Flatbrook Watershed. All of the waterways and water bodies classified as Category 1 Waters

(C1), as well any tributary thereto, as indicated on the U.S.G.S. mapping or Soil Conservation District Mapping, would be subject to a Special Resource Protection Area (SRPA). This SRPA, measured 300' outwards from the banks associated with said waters, is meant to protect near stream vegetation that buffers pollutants from entering into waterways as well as environmentally sensitive areas associated with stream corridors. It is evident from the Trout Production and Trout Maintenance classification assigned to most of the aforementioned waterways and waterbodies, that said waters can be reasonably assumed to be healthy from an ecological and biological standpoint.

STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed (see Figure 1). In a pre-developed condition, existing native vegetation acts to intercept precipitation falling on the site and draws that portion of this precipitation into the ground towards the root line. A portion of this intercepted rainfall is then returned back to the atmosphere through plant evapo-transpiration. Natural micro-topography of the lands surface creates depressions and gullies where accumulated rainfall temporarily collects as the infiltrative properties of the undisturbed soils allows this collected water to infiltrate back into the ground where it is stored as base flow for adjacent streams and ponds. In a developed condition, this beneficial vegetation and the natural make up of the topography and soil composition is usually removed. The mature growth vegetation is replaced with lawns or impervious cover, the natural imperfection of the landscape is graded to remove the natural depressions, and the undisturbed soil properties allowing infiltration are removed through construction disturbance and compaction. All of these processes experienced during typical construction operations can and does have a negative affect on the normal hydrologic cycle and affects runoff quantity, runoff quality and recharge potential of lands within a watershed.

RUNOFF QUANTITY

As indicated previously, rainfall is intercepted by vegetation, land topography and soil composition. The amount of rainfall during a storm event which is not intercepted, but is allowed to accumulate in the natural drainage basin and "runoff" the sites in question is referred to as *Runoff Quantity*. This runoff quantity naturally drains across the lands through sheet flow and shallow concentrated flow where it is discharged into streams, channels and other waterways. During pre-developed conditions, the amount of rainfall introduced into these waterways is naturally mitigated through years of evolution of the natural drainage system. The established environmental properties of these systems allows for the proper distribution of accumulated stormwater through the system without severe detriment to the environment by flooding and erosion due to the natural environmental balance achieved.

When a site is disturbed, the amount of the initial interception of rainfall is reduced allowing a greater percentage of the accumulated "runoff" to enter into the waterways. Through the modifications to natural vegetation (i.e. forests to lawns) and the placement of impervious

areas that are connected to each other through gutters, channels, and storm sewers, the transport of runoff from developed conditions occurs more quickly and at greater rates than that of the pre-developed natural conditions. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster, higher and for greater lengths of time than natural conditions would permit. This process tends to increase and aggravate existing downstream flooding and erosion problems.

Historically, this increase in "runoff" from developed sites indicated previously was thought to be mitigated by controlling the release or rate of flow from the developed site to that of pre-development conditions. Simply stated the rate of runoff from the site in the developed condition was to be equal to or less than the rate of runoff from the pre-developed site. It was believed that if the peak rate of runoff was maintained, the downstream waterways could assimilate the runoff in the same manner as before development. This feat was accomplished through the use of detention/retention basins to temporarily store the excess stormwater generated from the site and release it at the calculated pre-developed rates.

This design approach to controlling the addition runoff from developed sites has been shown to be incorrect since it only attenuates the rate of flow and does nothing to control the amount or volume of stormwater generated by the site. Watershed studies in New Jersey have demonstrated that by controlling the stormwater rate of discharge only, the contributing flows from these basins have actually extended the duration of the peak flows and actually have increased flooding and erosion problems downstream. These same watershed studies determined that, by reducing peak post-development site runoff to rates <u>less</u> than pre-developed site conditions throughout the watershed, the volume of post-development runoff was redistributed and pre-development peaks were maintained or reduced throughout the watershed.

RUNOFF QUALITY

Land development often results in the accumulation of pollutants on the land surface that stormwater runoff mobilizes and transports into streams and other water bodies. This action is found to degrade the *Water Quality* of the stormwater system. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants such as acidic deposits from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles and man-made products. A listing of common pollutants includes the following:

- solids & floatable debris (bulk garbage)
- sediment (material from erosion)
- nutrients (nitrates & phosphates)
- pesticides (insecticides, herbicides, rodenticides and fungicides)
- heavy metals (lead, arsenic, copper, cadnium, mercury, etc.)
- road salt & grit
- petroleum hydrocarbons from oils and gasoline

- pathogens (viral and bacterial)

In addition to increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout which are ultra-sensitive to changes in water temperature in relation to maintenance and production. Development can also remove trees along stream banks that normally provide shading, stabilization, filtration and leaf litter that falls into streams and becomes food for the aquatic community.

INFILTRATIVE RECHARGE

As indicated previously, part of the hydrologic cycle is for the absorption of rainfall through the soil into the underlying geology where it is stored in the soil's saturated zone as ground water. This process is known as "infiltrative recharge". The role of groundwater is commonly thought to be solely for the supply of water supply wells in human development. More importantly and in addition to this supply purpose, groundwater is a provider of base flows to streams, wetlands and other water bodies and has a direct affect on the ecology and germorphology of these resources. When lands are developed, increases in impervious areas along with decreases of naturally infiltrative areas are created. This creates a condition where a larger volume of stormwater leaves the site creating a deficit of the underlying groundwater and a subsequent decrease in the base flow potential for streams and wetlands. A cascading affect ensues allowing for wetland areas and streams to dry up, vegetation to die due to lack of substantial nutrients and the subsequent erosion and deposit of eroded material downstream due to lack of stabilized stream banks.

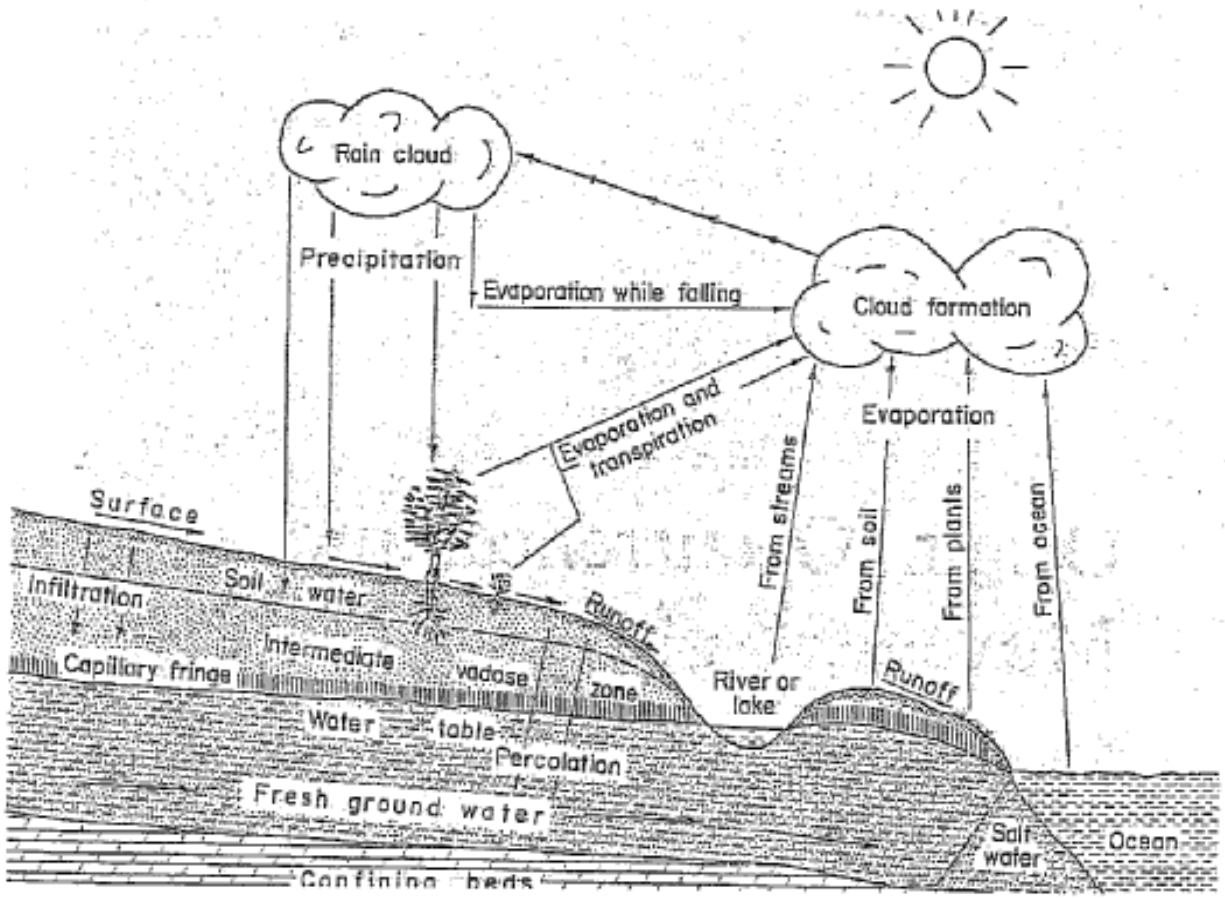


Figure 1: Groundwater Recharge in the Hydrologic Cycle

DESIGN AND PERFORMANCE STANDARDS

As part of this Municipal Stormwater Management Plan, the municipality will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8. This is done to minimize the adverse impact of stormwater runoff generated from all projects classified as "major development" on water quality and water quantity as well as loss of groundwater recharge in receiving water bodies. These design and performance standards include the language for water quality control as indicated in N.J.A.C. 7:8-5.5, for water quantity control as indicated in N.J.A.C. 7:8-5.4(a)3, for groundwater recharge as indicated in N.J.A.C. 7:8-5.4(a)2, for maintenance of stormwater management measures as indicated in N.J.A.C. 7:8-5.8, and for safety standards as indicated in N.J.A.C. 7:8-8.6.

APPLICABILITY

A potential project is considered to be a "MAJOR DEVELOPMENT" if it provides for the ultimate disturbance of one or more acres of land or the increase in impervious surface by one-quarter acre or more as defined in N.J.A.C. 7:8. Disturbance for the purpose of this rule is the placement of impervious surfaces or exposure and/or movement of soil or bedrock, or the clearing, cutting or removing of vegetation. Projects undertaken by any government agency which otherwise meets the definition of "major development but which does not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered to be major developments.

The following linear type development projects are exempt from these standards, even if they are found to be consistent with a "major project":

- The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
- The construction of above ground utility lines provided that the existing conditions are maintained to the maximum extent practicable;
- The construction of pedestrian access such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of a permeable material

A waiver from strict compliance from these standards may be obtained from the administrative authority 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;

- The applicant should demonstrate that there is a public need for the project that cannot be accomplished by any other means;
- The applicant should demonstrate through an alternative analysis that the design option selected complies with these standards to the maximum extend practicable through the use of nonstructural and structural stormwater management measures.
- The applicant should demonstrate that in order to meet these standards, existing structures currently in use, such as homes and buildings, would need to be condemned; and
- The applicant should demonstrate that it does not own or have legal rights to areas, including potential to obtain said areas through condemnation excluding the aforementioned structures, within the upstream drainage area of the receiving water bodies affected, that would provide additional opportunities to mitigate the standards found to be unachievable on-site.

LOW IMPACT DEVELOPMENT

With increasing emphasis on non-point source pollution and concerns over the environmental impacts of land development, it has become necessary to develop effective alternatives to the centralized conveyance and treatment strategy that has been the basis for much of the stormwater management systems and programs in the state. Simply directing stormwater

along curbed gutters to drainage inlets where piping conveys this stormwater to open detention basins for attenuation is no longer an acceptable means of treating stormwater. Implementation of new strategies is essential to minimize and even prevent adverse stormwater impacts from occurring while also providing for the necessary water quality treatment of pollutants at the source of these stormwater flows. Such strategies, referred to as *Low Impact Development*, seeks to reduce and/or prevent adverse runoff impacts through sound site planning and through both non-structural and structural management techniques that preserve or closely mimic the site's natural or pre-developed hydrologic responses to precipitation. As such, low impact development promotes the concept of designing with nature.

Effective low impact development includes non-structural and structural techniques referred to as Best Management Practices (BMP's). The non-structural BMP's utilized in low impact development concentrate on the following practices to be utilized in site development:

- Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
- Minimize impervious surfaces and disconnect or break up flow of runoff over impervious surfaces;
- Maximize the protection of natural drainage features and vegetation;
- Minimize the "decrease" in the time of concentration of stormwater generated from project drainage areas from the pre-construction condition to the post-construction condition;
- Minimize land disturbance including clearing and grading;
- Minimize soil compaction;
- Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
- Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
- Provide drainage source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of these pollutants into stormwater runoff.

The structural BMP's utilized in low impact development concentrate on the following practices to be utilized in site development in conjunction with the non-structural methods described above:

- Bio-retention Systems – A bioretention system consists of a soil bed planted with native vegetation located above and underdrained sand layer. It can be configured either as a basin or a swale.
- Constructed Stormwater Wetlands – Constructed wetlands are wetlands systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by the vegetation.
- Dry Wells - A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs and structures. Discharge of

the accumulated stormwater from a dry well occurs through infiltration into the surrounding soils.

- Extended Detention Basins - An extended detention basin is a facility constructed through excavation or embankments that provides temporary storage of stormwater runoff. It has an outlet structure that detains runoff inflow and allows for controlled outflow to aid in mitigating stormwater flows from development. Usually this type of structure is utilized to provide both water quantity and water quality mitigation.
- Infiltrative Basins – Infiltration Basins are similar to detention basins in that they both temporarily store stormwater runoff generated from development project. The principal outlet to this type of basin is not a constructed outlet structure, but rather the highly permeable soils allowing for infiltration into the surrounding subsoils.
- Manufactured Treatment Devices – A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.
- Pervious Paving Systems – Pervious pavement utilizes paving material which allows for stormwater to infiltrate through the pavement rather than accumulate as is the case with standard paving material. Pervious pavement utilizes void areas within the paving material to provide for this permeable feature.
- Vegetated Rooftops – (Reserved)
- Sand Filters – A sand filter consists of a forebay and an underdrained sand bed. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris and coarse sediments, and then infiltrates through the sand bed to an outlet pipe at the bottom of said filter.
- Vegetative Filters – A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation, called a vegetative filter strip. The vegetation in a filter strip can range from turf grass to woody vegetation.
- Wet Ponds - An wet pond is a facility constructed through excavation or embankments that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows promoting the settlement of pollutants.

All structural stormwater management measures (structural BMP's) shall be designed according to the following conditions:

- They should 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).
- They should 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 be 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 N.J.A.C. 7:8-7.D.

- They should be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvements Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.
- 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.
- Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section N.J.A.C. 7:8-7.
- 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 this subchapter.
- Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.
- In order to ensure adequate long term operation as well as preventative and corrective maintenance of stormwater management measures and structural BMP's, the designers of such facilities should submit to the municipality a *Maintenance Plan* indicating specific maintenance tasks and schedules as indicated in N.J.A.C. 7:8-5.8 "Maintenance Requirements". This maintenance plan will require the ultimate user of said structural BMP's to provide an annual certification that the stormwater management measures approved are functioning as designed and that the proper maintenance and inspection of said measures have been performed. Random spot inspections by the municipality will be conducted to ensure compliance along with appropriate enforcement actions such as fines to be levied should non-compliance result.

DESIGN STANDARDS

The following specific stormwater management performance standards will be met:

Runoff Quantity

Peak flow reductions requirements are to be implemented into the stormwater system design in order to mitigate the expected stormwater flow and volume increases created through

proposed development. The peak flow reduction requirements, which are similar to those previously published in the N.J.D.E.P. Flood Hazard Area Control Act Rules and the New Jersey Department of Community Affairs Residential Site Improvement Standards (R.S.I.S.), are as follows:

2 year design storm	allowable peak rate for proposed development is 50% of existing peak rate (or 50% reduction)
10 year design storm	allowable peak rate for proposed development is 75% of existing peak rate (or 25% reduction)
100 year design storm	allowable peak rate for proposed development is 80% of existing peak rate (or 20% reduction)

Runoff Quality

Stormwater management measures implemented during land development shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80% of the anticipated load from the developed site, expressed as an annual average. Table 2 in N.J.A.C.7:8-5.5 presents the presumed TSS removal rates for certain BMP's designed in accordance with the New Jersey Best Management Practices Manual. It shall also be designed to reduce, to the maximum extend feasible, the post-construction nutrient load from the developed site in stormwater runoff generated from the water quality storm.

A 300 foot Special Water Resource Protection Area (S.W.R.P.A.) shall be preserved and maintained along all waters designated as Category One Waters in the N.J.D.E.P. Surface Water Quality Standards at N.J.A.C. 7:9B, and along perennial or intermittent streams that drain into or upstream of the Category One Waters as shown on the U.S.G.S. Quadrangle Maps or in the Sussex County Soils Survey, within the associated hydrologic unit code 14 (HUC14) drainage area. This SWRPA shall be measured radial/parallel from the streambank of the water body or, in the absence of defined banks, from the center of the stream.

Recharge:

Groundwater recharge shall be designed in accordance with the following:

100% of the development site's average annual pre-developed groundwater recharge volume will be maintained as calculated using the New Jersey Regional Groundwater Spreadsheet (N.J.G.R.S.) provided by the New Jersey Geological Society (N.J.G.S.)

or

100% of the difference between the development site's pre-developed and post-developed 2 year design storm runoff amounts as calculated by utilizing current engineering design practices such as the Rational Method, Modified Rational Method, S.C.S. TR-55 Method as appropriate.

This groundwater recharge requirement does not apply to projects within "urban redevelopment areas" or to projects subject to the following types of stormwater:

- 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, and areas where recharge would be inconsistent with Department approved remediation action work plan or landfill closure plan and areas with high risks for spills of toxic material, such as gas stations and vehicle maintenance facilities

- 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, waster material, 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.

The project shall be designed in regards to recharge such that the hydraulic impact on the groundwater table is avoided. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonal high water table so as to cause surficial ponding, flooding of basements or interference with the proper operation of subsurface disposal systems and other subsurface structures in the vicinity or down gradient of the recharge area.

PLAN CONSISTENCY

Recommended Stormwater Control Ordinances

The Municipal Stormwater Management Plan is consistent with N.J.A.C. 7:8.5 in regards to the development of recommend Stormwater Control Ordinances. The recommended stormwater control ordinances to be utilized by the municipality are as published in the N.J.D.E.P. Best Management Practices Manual – February 2004 in Appendix D. Upon adoption of this plan by the municipality and approval by the Sussex County Technical Review Team, specific stormwater control ordinances will be prepared and adopted by the governing body of the municipality.

Residential Site Plan Improvement Standards

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

Soil Erosion and Sediment Control Standards

The Municipality's Stormwater Management Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. Because the municipality is not an exempt municipality, review, approval, and inspections related to Soil Erosion and Sediment Control are provided by the Sussex County Soil Conservation District. However, during construction activities, municipal inspectors will observe land disturbance as well as on-site soil erosion and sediment control measures and will report any inconsistencies to the local Soil Conservation District**.**

Regional Stormwater Management Plans

Because the municipality is not located within an adopted Regional Stormwater Management Planning Area, conformance to a regional stormwater management plan (RSWMP) is not required. Any RSWMPs proposed in the future will require an update to this Municipal Stormwater Management Plan as appropriate in order for conformance to take place.

Total Maximum Daily Loads (TMDL's)

TMDLs represent the assimilative or carrying capacity of the receiving water taking into consideration point and nonpoint sources of pollution, natural background, and surface water withdrawals. A TMDL is developed as a mechanism for identifying all the contributors to surface water quality impacts and setting goals for load reductions for specific pollutants as necessary to meet surface water quality standards. TMDLs are required, under Section 303(d) of the federal Clean Water Act, to be developed for water bodies that cannot meet surface water quality standards after the implementation of technology-based effluent limitations. TMDLs may also be established to help maintain or improve water quality in waters that are not impaired.

A TMDL establishes Waste Load Allocations and Load Allocations for point and nonpoint sources, respectively. Regulations concerning TMDLs are contained in EPA's Water Quality Planning and Management Regulations (40 CFR 130). "A TMDL is established at a level necessary to implement the applicable water quality standards with seasonal variations and a

margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." (40 CFR 130.7(c)).

Revisions to New Jersey's TMDL requirements have recently been proposed as part of the Water Quality and Watershed Management rules. Where TMDLs are required to address documented surface water quality impairment, allocations are made to the varying sources contributing to the water quality problem in order to reduce the total pollutant load received by the waterbody. Load reduction goals established through TMDLs are achieved through the issuance of waste load allocations for point source discharges and load allocations for nonpoint source discharges. Since nonpoint source pollution, by definition, does not come from discrete, identifiable sources, load allocations would consist of the identification of categories of nonpoint sources that contribute to the parameters of concern. The load allocation would also include specific load reduction measures for those categories of sources, to be implemented through best management practices (BMPs) including local ordinances for stormwater management and nonpoint source pollution control, headwaters protection practices, or other mechanisms for addressing the priority issues of concern.

A TMDL is considered "proposed" when NJDEP publishes the TMDL Report as a proposed Water Quality Management Plan Amendment in the New Jersey Register (NJR) for public review and comment. A TMDL is considered to be "established" when NJDEP finalizes the TMDL Report after considering comments received during the public comment period for the proposed plan amendment and formally submits it to EPA Region 2 for thirty (30)-day review and approval. The TMDL is considered "approved" when the NJDEP-established TMDL is approved by EPA Region 2. The TMDL is considered to be "adopted" when the EPA-approved TMDL is adopted by NJDEP as a water quality management plan amendment and the adoption notice is published in the NJR.

Currently, no published TMDL’s are observed in any waterways or water bodies within the Township of Sandyston. If any additional TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent with this feature.

ACHIEVEMENT OF GOALS

Specific examples of utilizing the aforementioned stormwater management design and performance standards in achieving the nine (9) goals of this plan are as follows:

1. Reduction of flood damage, including damage to life and property;
   By instituting the design practices found in N.J.A.C. 7:8-5 regarding stormwater collection and control, as well as requiring groundwater recharge requirements of proposed development to match that of existing lands, flood damage potential is greatly reduced. By limiting the quantity of stormwater leaving the site and controlling the rate of discharge, overburden of downstream areas is eliminated. Also, by controlling the rate of groundwater infiltration into the ground, "base flows" associated with amounts of groundwater available to streams and ponds are preserved thereby allowing the ecological functions of the streams to continue rather than "dry up"; leaving un-vegetated stream banks and non-ecological areas susceptible to channel and stream erosion.

2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
   Through the implementation of the aforementioned performance standards, increases in stormwater runoff from development sites will be prevented reducing the potential for flooding and flood damage along receiving water bodies and downstream properties. By reducing the amount of connected impervious surfaces, utilization of low impact development techniques including conservation of native vegetation, increasing the time of concentration for storm events through site manipulation and preservation of existing infiltrative soil properties, the amount, duration and peak discharge of stormwater runoff can be maintained without increase from the pre-development to post-development conditions.

3. Reduce soil erosion from any development or construction project;
   As a condition of any approval for private development in the municipality as well as during the process of design and implementation of capital improvements, a Soil Erosion & Sediment Control permit is required prior to the start of any construction on-site. In order to receive this permit, review and certification of the construction plans by local Soil Conservation District must be obtained. Through this process and adherence to State Soil Conservation Standards, this objective is met.

4. Adequacy of existing and proposed culverts and bridges, and other in-stream structures;
   As a condition of any approval for private development in the municipality as well as regards to proposed culverts and bridges, the municipality will adhere to current design practices for the implementation of these structures during the design of all capital improvements projects undertaken as well as during the review of all private development conducted within the municipality. The municipality will ensure that the

proper jurisdictional agency is properly notified of the design process including both the N.J.D.E.P. Land Use Regulation Program for wetlands and stream encroachment permitting as well as the local Soil Conservation District for the control of soil erosion and sediment control. In regards to existing culverts and bridges, the municipality, in part through their public works department, already examines the adequacy of these structures and provides for the appropriate capital improvement schedule to repair any problem areas.

5. Maintain groundwater recharge;
Through the implementation of the aforementioned performance standards, the preservation of existing groundwater recharge amounts will be maintained during site development. This will directly lead to groundwater base flows remaining at current levels and will indirectly lead to the preservation of existing watercourse vegetation and soil erosion prevention

6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
Through the implementation of the aforementioned performance standards, the minimization of nonpoint source pollutants will occur. Through public education programs specifically introduced to instill a sense of civic responsibility in regards to garbage and litter management, responsible lawn care and fertilizer use as well as prevention of wildlife feeding, non-point pollution control will be realized by the residents of the municipality.

7. Maintain the integrity of stream channels for biological and drainage function;
Through the preservation of ground water recharge amounts affecting ground water base flow, the control of stormwater runoff quantity on-site through low impact development and the treatment and removal of pollutants affecting stormwater quality, the biological integrity and drainage function of the receiving water bodies will occur and ultimately improve over time.

8. Minimize pollutants in stormwater runoff from new and existing development
Through the implementation of the aforementioned performance standards, the minimization of nonpoint and point source pollutants will occur. In order to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the municipality, to protect the public health and well being or residents, to safeguard fish, aquatic life, scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of existing waterways, the minimization of pollutant loading within the waterways as well as on the lands adjacent to said waterways must be accomplished.

Pollutant transport from new development may be controlled through water quality provisions implemented in the design of stormwater control. These provisions include the establishment of 80% suspended solids removal from accumulated stormwater as indicated the “Best Management Practices” manual as well as strict adherence to any TMDL’s specified for specific receiving water bodies within the municipality. Other areas of pollutant control from new development will be

regulated through adherence to soil erosion and sediment control practices and adherence to the new stormwater inlet design standards.

Existing pollutant transport may be eliminated through public education programs aimed at educating citizens to everyday pollution prevention practices. Informational mailings detailing the pitfalls of improper disposal of waste, improper yard maintenance, septic system care, water conservation and improper wildlife feeding will be provide to Municipality residents will provide a long term solution for pollutant transport.

9. Protect public safety through the proper design and operation of stormwater basins; In order to provide protection of the public during design of stormwater basins, design standards will be implemented according to current engineering practices for the design and construction of detention basins. These standards will be required as part of the design process and will be utilized as a reference during the municipal review process. In order to provide protection of the public during operation of stormwater basins, all new stormwater basins will be required to be registered with the Municipality with data such as emergency contacts, ownership responsibilities and maintenance responsibilities/schedules provided on approved plans and documents for enforcement purposes. An examination of existing stormwater basins in the Municipality will be performed to isolate problem basins and to obtain information regarding the existing ownership and maintenance responsibility. Based upon this information, the Municipality will have current data as to the number of stormwater basins in municipality as well as the knowledge of problem sites that might degrade due to non-maintenance. A maintenance plan will be developed for all sites with problematic areas noted for quick reference.

LAND USE / BUILD-OUT ANALYSIS

This section of the Stormwater Management Plan is not required to be prepared until ***February 2006****. It will include the following items:*

- *A build-out analysis of the municipality assuming full development under existing zoning criteria.*
- *Established HUC14 drainage areas in the municipality along with an estimate of the future non-point source pollutant load associated with the impervious surfaces estimated to be included in such areas.*
- *An evaluation of the municipality's entire mater plan, including the land use plan element, official map, and development regulations, including zoning ordinances, to ensure the principles expressed in the nonstructural stormwater management strategies set forth in N.J.A.C. 7:8-5.3(b) are achieved.*

MITIGATION PLANS

When it is found that a proposed development cannot meet the design and performance standards specified in this plan, a variance or exemption from these standards will be permitted subject to the following conditions:

Justification of the variance or exemption should be provided to the administrative authority detailing the reasoning why that portion of the standards cannot be met. An alternatives analysis should be provided detailing how the proposed development is affected if strict compliance with the standards is enforced.

Off-site Mitigation of existing stormwater systems within the same watershed is to be provided for the area(s) of the standards which have not been met at a magnitude equivalent to the impacts felt by the project.

Specific mitigation projects options are as follows:

<RESERVED>

The municipality will also accept proposals from applicants seeking variances and exemptions for mitigation projects recommended by the applicant not specifically listed above. General examples of mitigation proposals are as follows:

- Re-establishment of vegetated cover and buffers to provide shading of water bodies and pollutant filtration.
- Wildlife management measures to prevent the excessive depositing of nutrients on lawn areas.
- Retrofit of existing stormwater management systems to provide for water quantity, water quality and groundwater recharge.
- Reconditioning of existing paved areas with pervious pavement.
- Conservation of off-site lands adjacent to water bodies through deed restrictions.

Should mitigation potential not be available in the same drainage area as the proposed project, the municipality will entertain mitigation projects conducted in other drainage areas at a magnitude greater than the impacts felt by the project.

The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified by the

municipality in the Municipal Stormwater Management Plan above, or towards the development of a future Regional Stormwater Management Plan. The contributed funding must be equal to or greater than the cost to implement the mitigation as indicated by the municipality with said funding being used exclusively for the mitigation project identified.

Considerations of mitigation proposals for approval of variances or exemptions sought will be accomplished by the administrative authority on a case by case basis.

REFERENCES:

1) Sandyston Township Master Plan, 1993 revised February 1995, prepared by Dorram Associates, Inc.

2) Sussex County Strategic Growth Plan

3) N.J.D.E.P. Best Management Practices Manual - Feb. 2004

4) Tier B – Municipal Stormwater Guidance Document

5) Residential Site Plan Improvement Standards - 2004

6) Water Quality Management Plan Amendment – Total Maximum Daily Loads for Fecal Coliform to Address 28 Streams in Northwest Water Region – proposed April 21, 2003

Draft Storm Water Control Ordinance

Section 1: Scope and Purpose

A. Policy Statement

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

B. Purpose

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

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 2: 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

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

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

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

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

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

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

“Environmentally critical areas” means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department’s Landscape Project as approved by the Department’s Endangered and Nongame Species Program.

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

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

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

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

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

“Municipality” means any city, borough, town, township, or village.

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

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

“Person” means any individual, corporation, company, partnership, firm, association, [*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.

"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 3: 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 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.

Section 4: 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;

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

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

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

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

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.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

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

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

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

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

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

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

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

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

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

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

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

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:

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

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

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

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

2. Any application for a new agricultural development that meets the definition of major development at Section 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.

G. Stormwater Runoff Quality Standards

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination

System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

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

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 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 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 5: 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 6: 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 7: 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 8: Safety Standards for Stormwater Management Basins

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

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

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

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

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

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

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

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

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

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

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

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

   a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 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

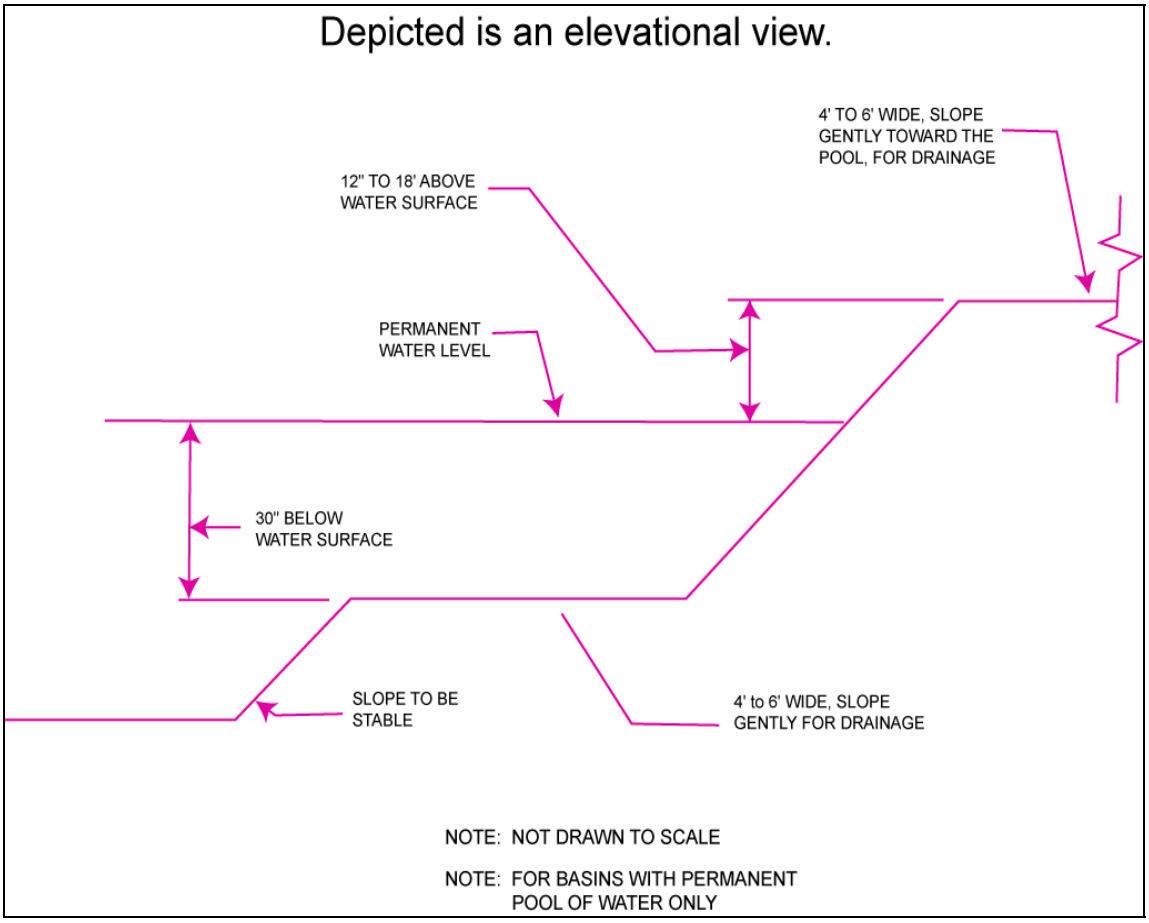
ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.D for 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



Section 9: 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 10: 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 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.

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 11: 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: <RESERVED>].

Section 12: 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 13: 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.