MUNICIPAL STORMWATER MANAGEMENT PLAN

for the

TOWNSHIP OF PEMBERTON
(Burlington County)

NJPDES Permit #NJG0148652
P.I. ID #207721
Tier A Municipal Stormwater General Permit

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Glossary of Terms

AMNET: .....Ambient Biomonitoring Network

AMs: .....Additional Measures

BMPs:.....Best Management Practices

EDPA: .....Effective Date of Permit Authorization

GIS: .....Geographic Information System

HUC: .....Hydrologic Unit Code

MS4: .....Municipal Separate Storm Sewer System

MSRP:.....Municipal Stormwater Regulation Program

MSWMP:.....Municipal Stormwater Management Plan

NJAC:.....New Jersey Administrative Code

NJDEP: .....New Jersey Department of Environmental Protection

NJPDES:.....New Jersey Pollutant Discharge Elimination System

NJIS:.....New Jersey Impairment Score

NJRSIS: .....New Jersey Residential Site Improvement Standards

OMs:.....Optional Measures

RSWMP:.....Regional Stormwater Management Plans

SBRs:.....Statewide Basic Requirements

TMDL: .....Total Maximum Daily Load

WMA:.....Water Management Area

USEPA: .....United States Environmental Protection Agency

USGS:.....United States Geological Survey

Definition of Terms

Development: 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/or any use or change in the use of any building or other structure, or land or extension 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:

a. Any activity that requires a State permit.

b. Any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC).

c. Municipal review of any activity not exempted by the Right To Farm Act (N.J.S.A. 4:1C-1 et. seq.).

Erosion: The detachment and movement of soil or rock fragments by water, wind, ice or gravity.

HUC: 14 digit hydrologic code used by the USGS to identify the individual sub-watersheds that make up a larger watershed (known as a HUC11). The USGS has identified 921 HUC14 sub-watersheds within New Jersey that range in size between 0.1 and 42 square miles.

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

MS4: (Municipal Separate Storm Sewer); means a conveyance or system of conveyances (including roads, with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels or storm drains).

Non-Structural BMPS: Policies and procedures that manage land use in order to lessen the impacts of resource development and redevelopment on stormwater quality and quantity.

Sediment: 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.

Solid/Floatable Materials: Sediment, debris, trash and other floating, suspended, or settleable solids.

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

Structural BMPS: Stormwater management facilities designed and constructed for the treatment of stormwater with respect to quality and quantity. Examples of structural controls are vegetative strips, detention/water quality basins, and swirl separator.

Watershed: 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.

A. Introduction:

In 1987 the U.S. Environmental Protection Agency's (USEPA) Clean Water Act was amended to regulate the discharge of pollutants from non-point sources into U.S. waters via a National Pollutant Discharge Elimination permit. As a result in January 2004, the New Jersey Department of Environmental Protection (NJDEP) established a Municipal Stormwater Regulation Program (MSRP) and adopted a Phase II component to the New Jersey Pollutant Discharge Elimination System (NJPDES) permit to regulate such discharges throughout the State.

This permit is issued to all owners and operators of municipal separate storm sewer systems (MS4s), which include municipalities; federal, state and interstate agencies operating or maintaining highways; and various public complexes (e.g., universities and hospitals). The permit program establishes Statewide Basic Requirements (SBRs) that must be implemented to reduce non-point source pollutant loads from stormwater and better manage the stormwater runoff.

The NJDEP has issued a NJPDES Tier A Municipal Stormwater General Permit to the Township of Pemberton. This permit was issued in August of 2005 and the municipality's Effective Date of Permit Authorization (EDPA) is September 1, 2005 and expires February 28, 2009. In accordance with State regulations, this permit will need to be renewed every five years.

The permit authorizes all new and existing stormwater discharges to surface water and groundwater from municipal separate storm sewer systems (MS4s) that are owned or operated by the municipality. The overall goal of the permit is to reduce non-point source pollutant discharge to these waterbodies by implementing the NJDEP's SBRs (as outlined within Table 1).

In accordance with N.J.A.C. 7:14A-25 (Municipal Stormwater Regulations), the Township is required to develop a Municipal Stormwater Management Plan (MSWMP) to document the municipality's strategy in addressing groundwater recharge, stormwater quantity and stormwater quality impacts by incorporating stormwater design and performance standards for new development within the municipality.

This plan contains all of the required elements described in N.J.A.C. 7:8 (Stormwater Management Rules), addressing such issues as:

1. Minimizing impacts to groundwater recharge, stormwater quantity, and stormwater quality by incorporating stormwater design and performance standards for new major development (where major development is defined as a project that disturbs one of more acres of land).

   These standards are intended to minimize the adverse impacts of stormwater runoff on water quality and quantity, while minimizing the loss of groundwater recharges which provides essential base flow to receiving waterbodies.

2. Describing long-term operation and maintenance measures for existing and future stormwater management facilities.

3. Developing a "build-out" analysis based upon existing zoning regulations and remaining lands available for development.

4. Reviewing and updating existing municipal ordinances, the municipal Master Plan, and other such planning documents to incorporate low impact development techniques into site planning and development.

5. Developing a mitigation strategy to be implemented when a variance or exemption of the design and performance standards is being sought. This section will identify specific stormwater management measures which can be used to lessen the impact of existing development.

Table 1: Tier 'A' SBR Requirements

1. Implementation of SBRs.
2. Public Notice.
3. Post-Construction Stormwater Management in New Development and Redevelopment: a. Stormwater Management Plan. b. Stormwater Control Ordinance. c. Residential Site Improvement Standards. d. BMP Operation and Maintenance. e. Storm Drain Inlet Design Standards for New Construction.
4. Local Public Education: a. Local Public Education Program. b. Storm Drain Labeling.
5. Improper Disposal of Wastes: a. Pet Waste Ordinance. b. Litter Ordinance. c. Improper Waste Disposal Ordinance. d. Wildlife Feeding Ordinance. e. Yard Waste Ordinance / Collection Program.
6. Illicit Connection Elimination and MS4 Outfall Pipe Mapping: a. MS4 Outfall Pipe Mapping. b. Illicit Connection Elimination Program. c. Illicit Connection Ordinance.
7. Solid and Floatable Controls: a. Street Sweeping. b. Storm Drain Inlet Retrofitting. c. Stormwater Facility Maintenance. d. Road Erosion Control Maintenance. e. Outfall Pipe Stream Scouring Remediation.
8. Maintenance Yard Operations: a. De-icing Material Storage. b. Fueling Operations. c. Vehicle Maintenance. d. Good Housekeeping Practices.
9. Employee Training.

B. Goals:

The goals of this Municipal Stormwater Management Plan are to:

1. Reduce flooding damage (including damage to life and property).
2. Minimize to the maximum extent practical any increase in stormwater runoff from any new development.
3. Reduce soil erosion from any development or construction project.
4. Assure the adequacy of existing and proposed culverts, bridges and in-stream structures.
5. Maintain groundwater recharge.
6. Prevent, to the greatest extent feasible, an increase in non-point source pollution.
7. Maintain the integrity of stream channels for their biological functions, as well as for drainage.
8. Minimize pollutants in stormwater runoff from new and existing development in order to:
    a. Restore, enhance and maintain the chemical, physical and biological integrity of the waters of the State.
    b. Protect public health.
    c. Safeguard fish and aquatic life and scenic and ecological values.
    d. Enhance the domestic, municipal, recreational, industrial and other uses of water.
9. 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. The plan also provides the following:

- Proposes stormwater management controls to address impacts from existing development.
- Includes preventative and corrective maintenance strategies to ensure long-term effectiveness of stormwater management facilities.
- Outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Through this plan the municipality will endeavor to reduce the amount of pollutants discharging to our surface and ground waters as a result of land development and urbanization.

C. Stormwater Discussion:

The Hydrologic Cycle:

Water is essential to sustaining life on earth and although it is an abundant resource that covers a majority of our planet, almost 93% of our water resides in the oceans and as a result is toxic to humans and many plants and animals. Therefore maintaining and sustaining our clean freshwater resources is vital to our existence.

In order to sustain clean freshwater, it is necessary to understand how water is recycled through the hydrologic cycle. This cycle (depicted within Figure A) begins with the evaporation of water from surficial water surfaces (such as oceans, rivers, lakes, streams, etc.) and transpiration of water from plants and soils. Then as moist air is lifted into the atmosphere, it cools and the water vapor condenses to form clouds. The moisture within the clouds is then transported around the globe until it precipitates back to the earth in the form of rain or snow.

At the ground surface, the fallen precipitation can do either of the following, after which the cycle begins once again:

- Collect within surficial water surface bodies (where it evaporates back into the atmosphere).
- Percolate into the earth's surface and become groundwater.

  In such cases, the groundwater is stored within the soil and eventually either seeps back into the oceans, rivers, and streams, or is released into the atmosphere through transpiration (as water is taken in and released by plants).
- Travels along the earth surface as runoff where it empties into lakes, rivers and streams and is carried back to the oceans.

Land Development Impacts:

However, land development pressure and its associated stormwater impacts have become a serous threat to our freshwater resources. Increases in impervious surface coverage, and hence subsequently stormwater runoff can cause significant water quality, quantity and recharge issues.

Land development can disrupt and adversely impact this natural cycle by impacting local watersheds (see Figure B). Prior to development, native vegetation within a watershed intercepts precipitation where it is either collected in surficial waterbodies or is infiltrated into the ground. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Site clearing and grading can also remove depressions which store rainfall.

Construction activities compact surficial soils and diminish their infiltration ability, resulting in increased stormwater runoff volumes and discharge rates. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. 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 and higher than natural conditions.

Increases in impervious area can also decrease opportunities for stormwater infiltration and can more readily mobilize and transport pollutants which ultimately results in reduced stream base flows and groundwater recharge amounts. Reduced base flows combined with increased peak flows produce greater fluctuations between normal and storm flow rates resulting in increased channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Erosion and increased sediment loadings can alter stream geometries and destroy habitat from which some species are not to adapt to.

Studies have shown that stormwater runoff from urban and industrial areas typically contain the same types of pollutants that are found within industrial wastewater discharges. Such pollutants can include heavy metals, pesticides, herbicides, fertilizers, synthetic organic food wastes, oil, solvents, etc. Removing surface vegetation decreases the natural filtration of pollutants from stormwater runoff. The result is higher pollutant loadings within the stormwater runoff from streets, parking lots, construction sites and industrial facilities which are transported through storm sewers and ultimately discharge into downstream receiving waterbodies.

Land development can also adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored within detention or retention basins can become heated and raise the temperature of the downstream waterway, which in turn adversely affects cold water fish species such as trout. Trees along stream banks removed by development adversely impacts stream shading and degrade bank stabilization.

It is therefore critical during development that stormwater be properly managed to maximize onsite infiltration and minimize the potential for soil erosion and pollutant transport.

Figure A: The Overall Hydrologic Cycle

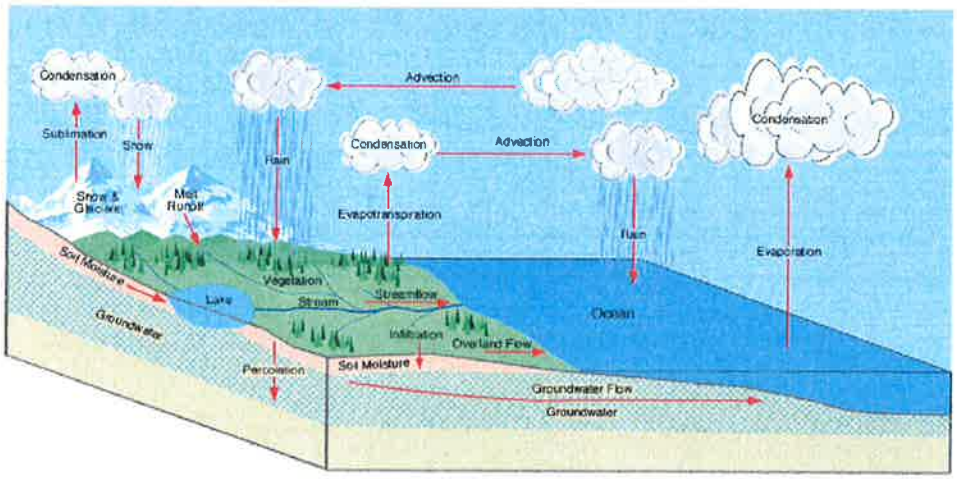
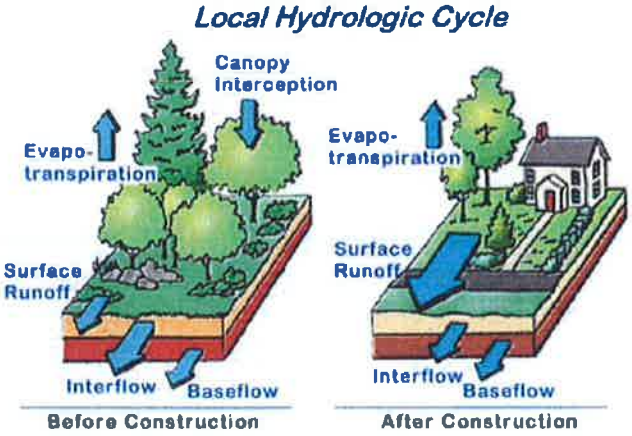


Figure B: The Local Hydrologic Cycle



D. Background:

Geographics:

Pemberton Township is located in the central portion of Burlington County, New Jersey and resides almost entirely within the Pinelands. The municipality is bounded by the following nine municipalities:

- To the north by Springfield Township, Wrightstown Borough, and New Hanover Township (all within Burlington County).
- To the east by Plumstead and Manchester Townships (both within Ocean County).
- To the south by Southampton and Woodland Townships (both within Burlington County).
- To the west by Eastampton Township (Burlington County).
- In should also be noted that Pemberton Borough lies entirely within the Township.

The municipality has a total land area of ±62.74 square miles and only ±1.22 square miles (or 2%) of this area is comprised of surface waterbodies. It should be noted that parts of the southeastern portion of the municipality are designated as State park lands (i.e., Lebanon State Forest). These lands encompass ±22.38 square miles of (or 36%) of the entire municipality. As such development within these areas is significantly restricted.

Figures 1 thru 13 depict the municipal boundary in relation to various geographic, zoning, land use and other miscellaneous features. As depicted within Figure 1, most of the existing development is situated within the northwest corner of the municipality and within the northeast section of Mirror Lake.

As depicted within Figures 4 and 8, the municipality has large areas of wetlands distributed throughout the municipality. The municipality is situated within the North Branch Rancocas Creek Watershed and all wetlands fall within this watershed. As such, development within these areas is significantly restricted.

Pemberton Township lies in the NJDEP Water Region 5 coastal watershed (a.k.a. Lower Delaware Water Region). Within this region lies smaller watershed management areas (WMA) of which Pemberton Township lies within WMA 19 (i.e., Rancocas Creek). WMA 19 is the largest watershed in south central New Jersey and is comprised of Mill Creek and the North Branch, South Branch and main stem of Rancocas Creek. This WMA covers ±360 square miles and reaches deep into the Pinelands Preservation Area, and portions of 33 different municipalities. WMAs are further subdivided into sub-watersheds of which 15 sub-watersheds are situated within Pemberton Township. The majority of the municipality drains to the Mirror Lake watershed via three major tributaries (Ong Run, Jacks Run and Goodwater Run).

A layout of the groundwater recharge areas within the municipality is shown in Figure 11.

Population Data:

In accordance with the 2000 Census, the municipality's population was 28,691 which equates to a population density of 457 persons per square mile. Since 1990, the population has remained relatively consistent, dropping by 2,651 persons (or 8%) over the ten year

period. Because large portions of the municipality lie within the Pinelands boundaries, development pressures will be confined by the Pinelands Commission's rules and regulations. The large expanse of open space further confines population growth to areas outside of the State park.

Water Quality Assessments:

As previously mentioned, studies have shown that stormwater and urban runoff can contain the same types of pollutants that are found within industrial wastewater discharges and therefore the NJDEP considers such discharges to be significant sources of pollutants that may be causing, threatening to cause, or contributing to the impairment of the water quality and beneficial uses of the receiving waterbodies in New Jersey.

Therefore in the early 1970's, the NJDEP began biological monitoring of New Jersey's waters. In 1992, the NJDEP established the Ambient Biomonitoring Network (AMNET) in order to monitor aquatic biota within New Jersey's watersheds. Using a five year monitoring cycle, AMNET monitors benthic macro invertebrate populations from over 800 sites throughout the state. Macro invertebrates are used as indicators of water quality since various select species can only be found in high quality waters. The sampling of these organisms was conducted in a semi-quantitative fashion.

Water Quality Assessments conducted by both the NJDEP and the NJ Water Supply Authority are used to identify the impairment of a number of waterbodies in New Jersey. Streams are classified as non-impaired, moderately impaired or severely impaired based on the AMNET data. This data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macro invertebrate community dynamics.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the State. These data show that the instream total phosphorus concentrations and fecal coliform concentrations within North Branch Rancocas Creek frequently exceed the State's criteria. This means that these rivers are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway.

TMDLs:

A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant (such as stormwater and wastewater discharges which require NJPDES permits to discharge) and non-point sources (which includes stormwater runoff from agricultural areas and residential areas) in addition to a margin of safety. Provisions may also be made for future sources in the form of reserve capacity.

An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report [305(b) and 303(d) Integrated List] is required by the Federal Clean Water Act to be prepared biennially

and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

The following table represents the most recent New Jersey 303(d) List of Impaired Waters with their Priority Ranking for waters within Pemberton Township, found on page B-18 of the following document:

http://www.state.nj.us/dep/wms/bwqsa/docs/

Table 2: New Jersey 303(d) List of Impaired Waters Summary

HUC14 ID	HUC14 Sub-Watershed Name	Parameter	Ranking
02040202020010	Gaunts Brook/Hawthorne Mill Stream	Copper	Medium
		Lead	Medium
02040202020020	Ong Run/Jacks Run	pH	Medium
02040202020030	Rancocas Creek NB (Mirror Lk-Gaunts Bk)	Copper	Medium
		Lead	Medium
		Mercury	Medium
		Pathogens	High
		pH	Medium
		Phosphorus	High
02040202020040	Rancocas Creek NB (NL Dam to Mirror Lake)	Mercury	Medium
		Pathogens	High
		pH	Medium
		Phosphorus	High
02040202030030	Mount Misery Bk MB/NB	Pathogens	High
02040202030050	Bucks Cove Run/Cranberry Branch	None[1]	
02040202030060	Pole Bridge Br (Country Lk dam - Co. line)	None[1]	
02040202030080	Bisphams Mill Creek (Below McDonalds Br)	None[1]	
02040202030090	Greenwood Br (Below Country Lake & MM Confl)	Pathogens	High
02040202040010	Rancocas Creek NB (Pemberton Br to NL Dam)	Copper	Medium
		Lead	Medium
		Mercury	Medium
		pH	Medium
		Phosphorus	High
02040202040020	Rancocas Creek NB (Ft Dix Trib)	Pollutant Unknown	Low
02040202040030	Rancocas Creek NB (206 to Pemberton Br)	Arsenic	Medium
		Copper	Medium
		Lead	Medium
		pH	Medium
		Phosphorus	High
		TSS	Low
02040202040040	Rancocas Creek NB (Smithville to 206)	Arsenic	Medium
		pH	Medium
		Phosphorus	High
02040202050060	Rancocas Creek SB (Above Friendship Ck)	PCBs	Medium
		Pollutant Unknown	Low
02040202050070	Jade Run	pH	Medium
		Dissolved Oxygen	Medium
		Phosphorus	High

It should be noted that footnote 1 within above Table #2 denotes that the waterbody is not included within the 303d list; but instead is identified in Sublist 3 of the "NJ 2006 Integrated List of Waters, Appendix A-1". Waterbodies are included in Sublist 3 when there is insufficient, or no, data and information to determine whether the designated use is attained. It is our understanding that the NJDEP will revisit such waterbodies in order to obtain the necessary information to reclassify the sublisting for the waterbody.

1. Mirror Lake

   The Mirror Lake Watershed has been identified as a TMDL lake in the *2004 Integrated List of Waterbodies*. This document identifies seventeen lakes as impaired with respect to pathogens in the Lower Delaware Water Region, of which Mirror Lake is one. As of the publishing of this report, Mirror Lake is included as one of the Impaired Waterbodies as identified on the *2004 Integrated List of Waterbodies* and the *2006 Integrated List* for which Pathogen TMDLs are being proposed. TMDLs have yet to be established for Mirror Lake.

   The TMDLs established for eutrophic lakes refers to the amount of phosphorous in the water body. Excess phosphorous can cause growth in plant life which can inhibit recreational use of the water body and in extreme cases lead to oxygen depletion and fish kills. Uncontrolled stormwater can increase phosphorous levels in lakes.

   The source for the Mirror Lake TMDL information is the following amendment to the Atlantic County Water Quality Management Plan, the Lower Delaware Water Quality Management Plan, the Ocean County Water Quality Management Plan and the Tri-County Water Quality Management Plan.

   http://www.state.nj.us/dep/watershedmgt/DOCS/TMDL/LowerDelawareTMDL071607.pdf

2. North Branch Rancocas

   a. Pathogen - Fecal Coliform TMDL:

      A TMDL for fecal coliform on the North Branch Rancocas Creek was adopted by the NJDEP. The municipality will incorporate any necessary amendments, standards or ordinances to comply with the TMDL. The following is the link to the amendment to the Lower Delaware Water Quality Management Plan.

      http://www.state.nj.us/dep/watershedmgt/DOCS/TMDL/june2006/Lower%20Delaware%20FC.pdf

      For stream TMDLs the pollutant is fecal coliform. A common bacterium, it is dangerous in heavy concentrations and makes water unfit for human consumption. Sources of fecal coliform can include stormwater runoff and leaking or failing septic systems. Fecal coliform can also be found in some municipal releases where septic and storm sewer lines combine or cross.

      Nonpoint and stormwater point sources are the primary contributors to fecal coliform loads in these streams and can include storm-driven loads transporting fecal coliform from sources such as geese, farms, and domestic pets to the receiving water. Nonpoint sources also include steady-inputs from sources such as failing sewage conveyance systems and failing or inappropriately located septic systems.

      Because the total point source contribution other than stormwater (i.e. Publicly-Owned Treatment Works, POTWs) is an insignificant fraction of a percent of the

total load, these fecal coliform TMDLs will not impose any change in current practices for POTWs and will not result in changes to existing effluent limits.

In order to evaluate and characterize fecal coliform loadings in the waterbodies of interest in these TMDLs, and thus propose proper management responses, source assessments are warranted. Source assessments include identifying the types of sources and their relative contributions to fecal coliform loadings, in both time and space variables.

i) Assessment of Nonpoint and Stormwater Point Sources:

Nonpoint and stormwater point sources include storm-driven loads such as runoff from various land uses that transport fecal coliform from sources such as geese, farms, and domestic pets to the receiving water. Domestic pet waste, geese waste, as well as loading from storm water detention basins will be addressed by the Phase II MS4 program.

Nonpoint sources also include steady-inputs from "illicit" sources such as failing sewage conveyance systems, sanitary sewer overflows (SSOs), and failing or inappropriately located septic systems. When "illicit" sources are identified, either through the Phase II MS4 requirements or track down studies conducted by the NJDEP, appropriate enforcement measures will be taken to eliminate them.

Options available to control nonpoint sources of fecal coliform typically include measures such as goose management strategies, pet waste ordinances, agricultural conservation management plans, and septic system replacement and maintenance. However, the effectiveness of these control measures is not easily measured.

Development of effective management measures depends on accurate source assessment. Fecal coliform is contributed to the environment from a number of categories of sources including human, domestic or captive animals, agricultural practices, and wildlife. Fecal coliform from these sources can reach waterbodies directly, through overland runoff, or through sewage or stormwater conveyance facilities.

Each potential source will respond to one or more management strategies designed to eliminate or reduce that source of fecal coliform, and each management strategy has one or more entities that can take lead responsibility to affect the strategy. Various funding sources are available to assist in accomplishing the management strategies. The NJDEP will address the sources of impairment through systematic source trackdown, matching strategies with sources, selecting responsible entities and aligning available resources to effect implementation.

Under those proposed rules and associated draft general permits, many municipalities (and various county, State, and other agencies) in the Lower Delaware Region will be required to implement various control measures that should substantially reduce bacteria loadings, including measures to eliminate "illicit connections" of domestic sewage and other waste to the small MS4, adopt and enforce a pet waste ordinance, prohibit feeding of unconfined

wildlife on public property, clean catch basins, perform good housekeeping at maintenance yards, and provide related public education and employee training.

Sewage conveyance facilities are potential sources of fecal coliform in that equipment failure or operational problems may result in the release of untreated sewage. These sources, once identified, can be eliminated through appropriate corrective measures that can be affected through the NJDEP's enforcement authority.

Inadequate on-site sewage disposal can also be a source of fecal coliform. Systems that were improperly designed, located or maintained may result in surfacing of effluent and illicit remedies such as connections to storm sewers or streams add human waste directly to waterbodies. Once these problems have been identified through local health departments, sanitary surveys or other means, alternatives to address the problems can be evaluated and the best solution implemented.

Agricultural activities are another example of potential sources of fecal coliform. Possible contributors are direct contributions from livestock permitted to traverse streams and stream corridors, manure management from feeding operations, or use of manure as a soil fertilizer/amendment.

Implementation of conservation management plans and best management practices are the best means of controlling agricultural sources of fecal coliform.

ii) Long-Term Management Strategies:

Long term strategies include source trackdown as well as selection and implementation of specific management measures that will address the identified sources.

The amendment to the Lower Delaware Water Quality Management Plan identified the following long-term management strategies that the Township will strive to achieve. Source categories and responses are summarized below:

Table 3: Long-Term Management Strategies

Source Category	Responses	Potential Responsible Entity	Funding Options
Human Sources			
Inadequate (per design, operation, maintenance, location, density) on-site disposal systems	Confirm inadequate condition; evaluate and select cost effective alternative, such as rehabilitation or replacement of systems, or connection to centralized treatment system	Municipality, MUA, RSA	CWA 604(b) for confirmation of inadequate condition; Environmental Infrastructure Financing Program for construction of selected option

Source Category	Responses	Potential Responsible Entity	Funding Options
Inadequate or improperly maintained stormwater facilities; illicit connections	Measures required under Phase II Stormwater permitting program plus Alternative measures as determined needed through TMDL process	Municipality, State and County regulated entities, stormwater utilities	CWA 319(h)
Malfunctioning sewage conveyance facilities	Identify through source trackdown	Owner of malfunctioning facility - compliance issue	User fees
Domestic/captive animal sources			
Pets	Pet waste ordinances	Municipalities for ordinance adoption and compliance	
Horses, livestock, zoos	Confirm through source trackdown: SCD/NRCS develop conservation management plans	Property owner	EQIP, CRP, CREP (when approved)
Agricultural practices	Confirm through source trackdown; SCD/NRCS develop conservation management plans	Property owner	EQIP, CRP, CREP (when approved)
Wildlife			
Nuisance concentrations, e.g. resident Canada geese	Feeding ordinances; Goose Management BMPs	Municipalities for ordinance; Community Plans for BMPs	CBT, CWA 319(h)
Indigenous wildlife	Confirm through trackdown; consider revising designated uses	State	

When specific Segment Recommendations are made for WMA 19 in the Pemberton Area, the Township will be sure to include those in their efforts.

b. Phosphorus TMDL:

A TMDL for total phosphorus is also under development on the Rancocas Creek. If the TMDL is adopted, the municipality will revise this SWMP accordingly.

As water flows over fertilized areas of land, the added phosphorous (contained in the fertilizer) can be washed into the lake. In order to bring phosphorous levels down, stormwater ordinances can be established for areas with heavy fertilizer use (such as agricultural areas).

Concerns:

AMNET has established the following 10 local biological monitoring sites (additional information and sampling results for these sites are provided in Table 4):

1. AN0143 located on North Branch Rancocas Creek (near outlet of Hanover Lake).
2. AN0144 located on Pole Bridge Branch (at Split Rock Road).
3. AN0145 located on the Mount Misery Brook (at Route 70).

4. AN0147 located on Bisphams Mill Creek (at Turkey Buzzard Bridge Road).
5. AN0148 located on Greenwood Branch (at New Lisbon Road).
6. AN0149A located on Ong Run (at West Lakeshore Drive).
7. AN0150 located on Budds Run (at Hanover Street).
8. AN0151A located on Indian Run (at Birmingham Road).
9. AN0154 located on Burrs Mill Bk (at Sooy Place Road).
10. AN0157A located on Jade Run (at Stockton Bridge Road).

This information can be found at the following location in downloadable format:

http://www.state.nj.us/dep/wms/bfbm/appendix/ldel01appendd.pdf

Based upon the AMNET sampling results from the NJ AMNET Study - 2001 Lower Delaware Region presented within Table 4 below, the Pole Bridge Branch, Greenwood Branch, Ong Run, Indian Run and Burrs Mill Run were found to be moderately impaired while Jade Run was found to be severely impaired. This means that the waterway is an impaired waterway and the NJDEP is required to develop a total maximum daily load (TMDL) for these pollutants for each waterway.

In addition to water quality problems, many of the streams within the municipality have exhibited water quantity problems including flooding, stream bank erosion and diminished base flow in its streams. Many of the culverts associated with road crossings in the municipality are undersized. During sever storm events, these undersized culverts do not have adequate capacity, thereby causing a backwater effect and flooding of upstream tributary areas and roadways.

These culverts were designed for much different hydrologic conditions (i.e., less impervious area) than presently exist within the municipality. As the impervious cover increases within the municipality, the peak rates and volumes of stream flows will also increase. The increased amount of stormwater will cause stream bank erosion, unstable areas at roadway/bridge crossings, and degraded stream habitats.

The impervious increases will also decrease the local groundwater recharge rates which ultimately results in decreased base flows to streams during dry weather periods. Lower base flows can have a negative impact on in stream habitat during the summer months.

Conclusion:

The Township's waterways have many uses including recreation and wildlife habitat. Water quality protection requires a diverse program aimed at those who drain to our streams. The growth within the municipality could threaten water quality in a number of ways, which include the following:

1. Everyday human activities send many types of pollutants into lakes and streams, including oils and hydrocarbons from automobiles, trash, pesticides and fertilizers from landscaping, and sediment resulting from construction sites and intensive land uses.
2. Increases in impervious surfaces due to buildings and pavement send more water more quickly to creeks and streams. This can contribute to erosion, changes in stream

temperature, and changes in the types and amounts of pollutants the water gathers as it drains.

3. Urban development creates new pollution sources as population density increases and brings with it proportionately higher levels of vehicle emissions, vehicle maintenance wastes, municipal sewerage, pesticides, household wastes. Pet wastes, trash, etc. which can be washed into the storm drains system. Urban areas generally contribute a higher level of pollutant load in streams than rural areas.

The NJDEP has not established TMDLs for all waterbodies within the municipality. However in the future should TMDLs be established for any water body, they should be incorporated into this document.

Table 4: AMNET Biological Monitoring Data

Source: New Jersey AMNET Study - 2001 Lower Delaware Region
http://www.state.nj.us/dep/wms//bfbm/download/ldel01.pdf

Site	Sampling Waterway	Water GIS	Site Location	Quad
AN0143	North Br Rancocas Ck	North Branch Rancocas Creek (Gaunts Bk)	Blw Hanover Lk	Browns Mills
AN0144	Pole Bridge Br	Pole Bridge Branch	Split Rock Rd	Browns Mills
AN0145	Mt Misery Bk	Greenwood Branch (Mt Misery Bk)	Rt 70	Browns Mills
AN0147	Bisphams Mill Ck	Bisphams Mill Creek (Mcdonald Br)	Turkey Buzzard Bridge Rd	Browns Mills
AN0148	Greenwood Br	Greenwood Branch (Mt Misery Bk)	New Lisbon Rd	Pemberton
AN0149A	Ong Run	Ong Run	W Lake Shore Dr	Browns Mills
AN0150	Budds Run	Budds Run	Hanover St	Pemberton
AN0151A	Indian Run	Indian Run	Birmingham Rd	Pemberton
AN0154	Burrs Mill Bk	Burrs Mill Bk	Sooy Place Rd	Pemberton
AN0157A	Jade Run	Jade Run	Stockton Bridge Rd	Pemberton

Site	2nd Sample Impairment Score 97/98	Impairment Rating	3rd Sample Impairment Score 00/01	Impairment Rating	Habitat Score
AN0143	12	Moderate	27	Non-Impaired	159**
AN0144	12	Moderate	19	Moderate	163*
AN0145	30	Non-Impaired	30	Non-Impaired	181*
AN0147	24	Non-Impaired	24	Non-Impaired	182*
AN0148	27	Non-Impaired	18	Moderate	166*
AN0149A	3	Severe	21	Moderate	148**
AN0150	6	Severe	21	Moderate	135**
AN0151A	18	Moderate	18	Moderate	142**
AN0154	21	Moderate	15	Moderate	171*
AN0157A	18	Moderate	3	Severe	173*

* Habitat Score of Optimal
** Habitat Score of Sub-Optimal

E. Design and Performance Standards:

The municipality will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving waterbodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 (Maintenance Requirements) and language for safety standards consistent with N.J.A.C. 7:8-6 (Safety Standards for Stormwater Management Basins). The ordinances will be submitted to the County for review and approval within 24 months of the effective date of the Stormwater Management Rules. The design and performance standards adopted by the Township for the Pinelands Area will be consistent with those of the Pinelands Comprehensive Management Plan. N.J.A.C. 7:50-6.84.

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

The New Jersey stormwater design and performance standards represent an initial effort to control non-point sources of pollution and to improve groundwater recharge. The effective control of point sources of pollution took many years. The USEPA and the NJDEP believe the further water quality improvements can now best be achieved by controlling non-point sources of pollution and stormwater runoff.

New stormwater management measures and design and performance standards will emerge over the ensuing years. The stormwater rules, NJPDES stormwater permits, and municipal stormwater plans and ordinances will similarly evolve and require amendments. Municipalities will be expected to control stormwater runoff, to improve or maintain surface water quality and groundwater recharge and to continue to utilize appropriate stormwater design and performance standards to achieve this goal.

With the increasing emphasis on non-point source pollution and concerns over the adverse impacts of uncontrolled land development, effective alternatives to the centralized stormwater conveyance and treatment strategies have been developed that are the basis for many of the new stormwater management standards in the State. New strategies have been developed to minimize and even prevent adverse stormwater runoff impacts from occurring.

Such strategies, known collectively as Low Impact Development techniques or LIDs, reduce and /or prevent adverse runoff impacts through sound site planning and both nonstructural and structural techniques that preserve or closely mimic a site's natural or pre-developed hydrologic response to precipitation. These new stormwater management strategies are explained in more detail in Section G of this MSWMP.

F. Plan Consistency:

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21 and the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-6.84). 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 and the Pinelands Comprehensive Management Plan.

As previously indicated, the municipality lies within WMA 19 (i.e., Rancocas Creek) and the agency responsible for planning in this WMA is the Burlington County Department of Resource Conservation.

However the plan must be consistent with the rules and regulations of all of the following agencies:

1. The Pinelands Commission's Comprehensive Management Plan regarding development and mitigation.

   Under this plan all development within the municipality is confined to areas of allowable growth which have been defined by both the Pinelands Commission and the municipality.

2. The New Jersey Residential Site Improvement Standards (NJRSIS) as required by N.J.A.C. 5:21.

   In order to remain consistent with this standard, the municipality will utilize the most current update of the NJRSIS in their review of residential and ultimately site plan developments.

   The MSWMP will be updated to be consistent with any future updates to the NJRSIS.

3. The Burlington County Soil Conservation District.

   The municipal stormwater management ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards.

   During construction, municipal inspectors will observe onsite soil erosion and sediment control measures and report any inconsistencies to the Burlington County Soil Conservation District.

4. Clean and Plentiful Water: A Management Plan for the Rancocas Creek Watershed.

   This plan will be consistent with the specific water quality objectives of the Public Advisory Committee (PAC) of the Rancocas Creek Watershed and strive to achieve the strategies outlined therein to achieve those objectives.

G. Stormwater Management Strategies:

Low Impact Development Techniques

The NJDEPs new Stormwater Management Rules include the specific provisions that must be addressed in a municipal stormwater management plan [N.J.A.C. 7:8-4.2(c)]. One of these requirements is that the plan must include an evaluation of the extent to which the master plan (including the land use element), official map, and development regulations (including zoning ordinances) implement the principles of the Stormwater Management Rules relating to nonstructural stormwater management strategies [N.J.A.C. 7:8-4.3(b)].

New stormwater management techniques have been developed that minimize and prevent adverse stormwater effects from land disturbance. These techniques are referred to by the NJDEP as Low Impact Development techniques (LIDs) and include both nonstructural and structural Best Management Practices (BMPs). LID-BMPs first minimize quantitative and qualitative changes to a sites' pre-developed hydrology (ie. Employ nonstructural techniques first) and the provide stormwater management through smaller sized structural techniques distributed throughout the site. The link to the NJDEP website to download the BMP Manual is:

http://www.njstormwater.org/bmp_manual2.htm

Nonstructural LID-BMPs include such practices as minimizing site disturbance, preserving important site features, reducing and disconnecting impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns and maintaining natural drainage features. It may be possible at some sites to satisfy all stormwater management requirements through nonstructural LID-BMPs. Structural BMPs are considered LIDs if they are located close to the source of runoff. Structural LID-BMPs include various types of basins, filters, devices and permeable surfaces located within residential lots and otherwise throughout residential, commercial, industrial or institutional development.

Because LIDs rely on nonstructural or relatively small structural BMPs distributed throughout a land development site, ownership and maintenance may be similarly distributed to an array of property owners. The new Stormwater Management Rules requires the use of deed restrictions for LID-BMPs to ensure that property owners fully recognize, understand and support the continuing use of LID-BMPs for stormwater management.

The NJDEP believes that effective, state-wide use of such practices can best be achieved through modifications to municipal master plans and land use ordinances to include LID goals and to provide for the use of specific LID-BMPs. The Stormwater Management Rules require municipalities to review their master plans and ordinances in order to incorporate LID techniques to maximum extent practicable.

The NJDEP Stormwater Management Rules (N.J.A.C. 7:8) require, in Section 5.2(a) that Major Development (disturbing one acre or more or increasing impervious surface by ¼ acre) incorporate nonstructural stormwater management strategies "to the maximum extent practicable". Nonstructural LID-BMPs are to be given preference over structural BMPs. Where it is not possible to fully comply with the Stormwater Management Rules through nonstructural LIDs, structural LID-BMPs are to be used in conjunction with standard structural BMPs to meet the Rules' requirements.

NJAC 7:8-5 further requires that an applicant seeking approval for major development or redevelopment specifically identify which and how these nine non structural strategies are incorporated or provide an engineering, environmental, or safety reason for their non-incorporation.

The NJ BMP manual contains a LID checklist which planning boards and development applicants can use to ensure LID techniques are being applied.

1. Nonstructural LID-BMPs:

   The NJDEP's new Stormwater rule's design and performance standards (NJAC 7:8-5.3(b)) require the maximum possible use of nine nonstructural strategies in order to:

   - Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
   - Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.
   - Maximize the protection of natural drainage features and vegetation.
   - Minimize the decrease in the pre-construction time of concentration.
   - 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 discharge into and through stable vegetated areas.
   - Provide preventative source controls.

   In addition, the Township will adopt the NJDEP model stormwater control ordinance, as amended for use and enforcement within the Township. This ordinance includes methodologies for incorporating non-structural stormwater strategies identified above, in design, "to the maximum extent practicable".

   If an applicant (or their Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies into the design of a particular project, the applicant will identify the strategy and provide a basis for the contention. It is understood that any project requiring NJDEP Land Use Regulation Program permitting or approvals will also be subject to a similar stormwater review by the appropriate agency.

   The non structural LID-BMPs have been grouped by the NJDEP into four general categories:

   a. Vegetation and Landscaping:

      Reduces runoff volumes and peaks through infiltration, surface storage, and evapotranspiration, provides pervious surface for groundwater recharge and removes pollutants from stormwater. Key techniques include:

      i) Preservation of Natural Areas:

Preserve areas with significant hydrologic functions including forested areas, riparian corridors and soils/geology with high recharge potential.

ii) Native Ground Cover:

Reduce the use of turf grass and preserve areas that naturally minimize runoff.

iii) Vegetative Filters and Buffers:

Provide native ground cover and grass areas to filter stormwater runoff from pervious areas and to provide locations for runoff to infiltrate.

b. Minimizing Land Disturbance:

Reduces runoff volume and pollutant loads and maintains existing recharge rates and other hydrologic functions. Key techniques include:

i) Planning and Design:

To fit the development to the terrain, limiting clearing and grading.

ii) Evaluating Site Conditions and Constraints:

Including soil types, geology, topography, slopes, drainage areas, wetlands, and floodplains to maintain high recharge areas and provide runoff storage areas.

iii) Utilizing Construction Techniques:

These techniques are used to limit disturbance and soil compaction.

iv) Restricting the Future Expansion:

Restricting the expansion of buildings and other improvements that will adversely affect runoff volumes and rates or recharge rates.

c. Impervious Area Management:

Reduces water quality impacts, runoff volume and peak rates, runoff velocity, erosion and flooding. Key techniques include:

i) Streets:

Use minimum acceptable pavement widths and incorporate pervious vegetated medians and islands with curb cuts for runoff access.

ii) Sidewalks:

Use pervious pavement with infiltration storage beneath and disconnect from the street drainage system.

iii) Parking and Driveways:

Use pervious pavement wherever practical and reduce parking space requirements by sharing requirements in mixed uses and by reducing parking space lengths by allowing for overhang into pervious areas.

iv) Pervious Paving Materials:

Use pervious materials in parking spaces, driveways, access roadways and sidewalks, including pavers, porous pavement and gravel.

v) Unconnected Impervious Areas:

Disconnect impervious areas and runoff form the site's drainage system allowing the sheet flow to cross pervious areas through curb cuts or by eliminating curbing and using shoulders and swales.

vi) Vegetated Roofs:

Install lightweight vegetative planting beds on new or existing roofs.

d. Time of Concentration Modification:

Minimize reductions to the time of concentration caused by changes in hydrologic characteristics in order to minimize the peak runoff rate. Key techniques include:

i) Surface Roughness Changes:

Increase surface roughness through the use of land cover and decrease the amount of connected smooth surfaces in order to increase runoff travel time throughout the drainage area.

ii) Slope Reduction:

Reduce slopes in graded areas and/or provide terraces and reduced slope channels to increase runoff travel length and time.

iii) Vegetated Conveyance:

Use vegetated channels and swales to increase roughness and runoff travel time and to provide opportunities for runoff treatment and infiltration.

In order to assure to the maximum extent possible the use of Nonstructural LIDs in new major development, the NJDEP prepared a Nonstructural Strategies Evaluation Worksheet.

2. Structural LID-BMPs:

In addition to these non structural LID-BMPs, structural stormwater management measures can be LID-BMPs. These structural BMPs become LID-BMPs by storing, infiltrating, and/or treating runoff close to the source of the stormwater. Unlike standard structural BMPs that are located along a site's drainage system, structural LID-BMPs are normally dispersed throughout a development and more closely mimic the hydrology.

LID-BMPs are typically standard structural BMPs, but their location, closer to the runoff source, allows them to be smaller in size. Standard structural BMPs that can be implemented at a LID scale include: drywells, infiltration systems, bioretention basins, and both surface and subsurface detention basins; downsized, to address stormwater close to its source as LIDs.

There are a number of structural stormwater BMPs that may be used to address the groundwater recharge and stormwater quality and quantity requirements of the NJDEP Stormwater Management Rules in N.J.A.C. 7:8.

The structural BMPs include the following techniques (see also *New Jersey Stormwater Best Management Practices Manual,* February 2004, which includes the planning, design, construction, and maintenance guidelines for these structural BMPs):

a. Bioretention Systems.

b. Constructed Stormwater Wetlands.

c. Dry Wells.

d. Extended Detention Basins.

e. Infiltration Basins.

f. Manufactured Treatment Devices.

g. Pervious Paving Systems.

h. Rooftop Vegetated Cover.

i. Sand Filters.

j. Vegetative Filters.

k. Wet Ponds.

Other BMPs that possess similar levels of effectiveness, efficiency, and endurance may also be utilized, provided that such levels can be demonstrated.

The municipality will review the Master Plan and local land use ordinances and incorporate structural stormwater management strategies (LID and standard structural stormwater BMPs) to the extent practicable and in accordance with sound planning, science, engineering and construction principles, as they apply to its unique environment.

Since the municipality is almost completely located within the Pinelands, the Township shall be subjected to the Pinelands stormwater management strategies and ordinances. The Township has adopted a stormwater management ordinance that is based on the model ordinance published by the Pinelands Commission. A copy of both the Pinelands and Non-Pinelands Stormwater Control Ordinances are included in Attachment 3.

As of the revision date of this publication, the Township is in the process of conducting a master plan re-examination. Once this is complete, any revisions will be included in future updates and revisions to this plan.

The Township is also in the process of reviewing their land use and zoning ordinances, and will provide a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval. A copy will be sent to the Pinelands Commission, and if necessary, to the County and the NJDEP at the time of submission.

It should be noted that the Township Code was previously reviewed with regard to incorporating nonstructural stormwater management strategies (which are not regulated or in conflict with the New Jersey Residential Site Improvement Standards) and the NJDEP would prefer that the following items to be revised and incorporated into the specific sections of the code:

- Section 190-39A(4): Buffers

  Require buffer areas along all lot and street lines separating residential uses from arterial and collector streets, separating a nonresidential use from either a residential use

or residential zoning district line, and along all street lines where loading and storage areas can be seen from the street.

The landscape requirements for these buffer areas in the existing section do not recommend the use of native vegetation. The language of this section was amended to require the use of native vegetation, which requires less fertilization and watering than non-native species.

Additionally, language was included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. It also requires the preservation of natural wood tracts and limits land disturbance for new construction.

- Section 190-52B(3)f: Cluster Development

  This section of the ordinance provides a cluster development option to preserve land for public and agricultural purposes, to prevent development on environmentally sensitive areas, and to aid in reducing the cost of providing streets, utilities and services in residential developments.

  This option is an excellent tool for reducing impervious roads and driveways. It allows for smaller lots with reduced front and side yard setbacks than traditional development options. It also minimizes the disturbance of large tracts of land, which is a key nonstructural stormwater management strategy.

  The cluster option is being amended to require that two percent (2%) of the total tract be preserved as common open space for residential area. The cluster option does require that twenty-five percent (25%) of the green or common area be landscaped with trees and/or shrubs.

  This language was amended to promote the use of native vegetation, which requires less fertilization and watering than non-native ornamental plants. Although the cluster option requires public concrete sidewalks to be installed along all streets, the option requires paths in open space to be mulched or stone to decrease the impervious area.

- Section 190-38A(2): Driveways and Accessways

  This ordinance describes the procedure for the construction of any new driveway or accessway to any street. This section was amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

- Section 190-39 and 159-32: Natural Features

  This section requires that natural features, such as trees, brooks, swamps, hilltops, and views, be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area.

  It was also amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

- Section 190-37F(7): Nonconforming Uses, Structures or Lots

  This section requires a variance for existing single-family homes proposing additions that exceed the maximum percent impervious. The homeowner must mitigate the

impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces.

This mitigation effort must address water quality, flooding, and groundwater recharge as described in within this plan. A detailed description of how to develop a mitigation plan is present in the Township Code.

- Section 159-31C: Off-site and Off-tract Improvements

  This section describes essential off-site and off-tract improvements. Language was added to this section to require that any off-site and off-tract stormwater management and drainage improvements must conform to the "Design and Performance Standards" described in this plan and also within the Township Code.

- Section 190-38A(3): Off-street Parking and Loading

  This ordinance details off-street parking and loading requirements. All parking lots with more than 10 spaces and all loading areas are required to have concrete or Belgian block curbing around the perimeter of the parking and loading areas.

  This section also requires the following:

  a. Concrete or Belgian block curbing be installed around all landscaped areas within the parking lot or loading areas.

  b. Allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management.

  c. Allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers.

     It also provides guidance on minimum parking space requirements. These requirements are based on the number of dwelling units and/or gross floor area.

  d. Allows a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces (if necessary).

  e. This section was amended to allow pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

- Section 190-39I: Performance Standards

  This section addresses pollution source control. This ordinance prohibits materials or wastes to be deposited upon a lot in such form or manner that they can be transferred off the lot, directly or indirectly, by natural forces such as precipitation, evaporation or wind. It also requires that all materials and wastes that might create a pollutant or a hazard be enclosed in appropriate containers.

- Section 159-25O(2): Shade Trees

  This section requires a minimum of three (3) shade trees per lot to be planted in the front yard. In addition the Township has a Tree Preservation Ordinance that restricts and otherwise controls the removal of mature trees throughout the Township.

This ordinance recognizes that the preservation of mature trees and forested areas is a key strategy in the management of environmental resources, particularly watershed management, air quality, and ambient heating and cooling.

These sections set out a "critical footprint area" that extends 20 feet beyond the driveway and building footprint where clearing of trees cannot occur. This complies with minimizing land disturbance, which is a nonstructural stormwater management strategy.

- Section 190-43A2: Sidewalks

  Describe sidewalk requirements for the Township. Although sidewalks are not required along all streets, the Township can require them in areas where the probable volume of pedestrian traffic, the development's location in relation to other populated areas and high vehicular traffic, pedestrian access to bus stops, schools, parks, and other public places, and the general type of improvement intended indicate the advisability of providing a pedestrian way.

  Sidewalks are to be a minimum of four feet wide and constructed of concrete. Language was added to this section to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate.

Regional Stormwater Management Planning:

Watershed Management Area #19 (The Rancocas Creek Watershed) currently has adopted a watershed management plan entitled "Clean and Plentiful Water: A Management Plan for the Rancocas Creek Watershed". The Township is situated within this WMA.

The Public Advisory Committee outlined several objectives and recommended strategies for all partners situated within WMA19 to help achieve the goals for this watershed. The objectives are listed below with their specific strategies as follows:

1. Improve and Maintain Water Quality:
   a. Educate local officials regarding watershed issues.
   b. Develop model ordinances to improve water quality and encourage their adoption.
   c. Encourage stormwater management retrofits.
   d. Conduct buffer gap assessment (completed by County).
   e. Conduct pesticide "snapshot" survey (completed by County).
2. Maximize water supplies through better water management:
   a. Encourage stormwater infiltration and retrofits.
   b. Develop model ordinances to improve water supply and encourage water conservation.
3. Reduce fecal coliform levels through wildlife habitat management:
   a. Conduct buffer gap assessment (completed).
   b. Revegetate buffers around Woolman Lake and at Iron Works Park (completed).

4. Reduce run-off and improve recharge through better site design in human habitats:
    a. Educate municipal officials and engineers regarding water resource planning.
    b. Develop municipal ordinances requiring better water resource management.
5. Secure lands to increase recreational use and public access along the Rancocas Creek:
    a. Promote the DVRPC Rancocas Greenways project, County Parks plan and local open space planning.
    b. Implement the Burlington County Parks and Open Space Master Plan.
6. Assure agricultural viability:
    a. Educate the public regarding the County Farmland Preservation Program.
    b. Obtain input from agricultural operators on how to further watershed goals and agricultural viability through water and soil conservation and resource protection and management.
7. Create and sustain partnerships through outreach and education:
    a. Invite individuals and municipalities affected by watershed issues to participate in PAC and subcommittee meetings
    b. Help Americorps provide river assessment training and water quality protection awareness programs for the general public
    c. Issue a quarterly newsletter for the general public.
    d. Develop and maintain a website promoting PAC and subcommittee meetings and related events and information.
    e. Provide presentations to interested organizations.

The Township will review and revise their Master Plan and local land use ordinances and consider incorporating the strategies set forth in the "Clean and Plentiful Water: A Management Plan for the Rancocas Creek Watershed" to the extent practicable and in accordance with sound planning, science, engineering and construction principles, as they apply to its unique environment.

Other Stormwater Management Strategies

The NJ BMP manual contains a LID checklist which planning boards and development applicants can use to ensure LID techniques are being applied.

H. Land Use / Build-Out Analysis:

General:

Since there is more than one square mile of combined vacant and agricultural lands throughout the municipality, build-out analyses and pollutant loading projections have been included within the MSWMP as required by N.J.A.C. 7:8 and 7:14A-25.

As a municipality matures towards its full land use potential, land development can tend to adversely impact both water quality and quantity. When lands are cleared and land uses become intensified (e.g. constructing housing developments on previously farmed agricultural lands), adverse impacts to water quality and quantity typically are manifested through stormwater runoff due to increases in impervious surface coverage and the accumulation and mobilization of pollutants.

As a result, downstream receiving waterbodies and ecosystems become impaired as flooding events are increased and intensified from the new impervious surface areas. Water quality is further degraded as increased stormwater pollutant loads enter the waterbodies and alter the chemical, physical and biological integrity of the receiving waters.

Therefore the build-out analyses and pollutant loading projections have been developed as a tool that the municipality can use to assess potential impacts from land development and stormwater runoff. The analysis projects and compares pollutant loadings generated by both present and future (built-out) land use covers. The methodology underlying the analysis and projections are generally based on the NJDEP's methodology specified within their regulations and guidance documents.

From the results of the analysis, the municipality is able to quantifiably project the impacts from development onto surface waters. Using this tool, the municipality can then develop better strategies to minimize, manage and/or mitigate these impacts through improved stormwater management and construction practices and via modifications to land use and zoning.

The analysis should be considered a tool to be used as an initial step towards assessing and quantifying adverse impacts from development and stormwater runoff. However as indicated by the following listing of reservations that we have identified in implementing the NJDEP's build-out and pollutant loading methodology, the analysis does have several apparent flaws that need to be realized when evaluating its results:

- The methodology greatly over-simplifies the complex hydrologic and pollutant transport mechanisms associated with these processes.
- The methodology does not account for the transient nature of development within a given watershed as it ignores the differences in time over which build-out will occur (assuming that all development will actually realize its full build-out and that they will all occur at relatively the same the time).

  The more probable scenario being one portion of a watershed within a specific zone may take 10 years to reach its build-out potential, while another portion may need 100 years or more to achieve full build-out.

- The impervious surface coverage analysis presumes that all development within a zone will realize its maximum impervious coverage permitted by the zone and that the municipality will not substantially change the maximum coverage permitted.

  In addition, there are several zones that do not specify a maximum impervious coverage. In such maximum coverage's from similar zones were assigned to these zones.

- The NJDEP presented little information about the origin and conditions that apply to their land cover pollutant loading coefficients for total phosphorus, total nitrogen and total suspended solids.

  For example, it is unclear as to what climatic, soils, hydrologic, geologic, topographic, and vegetative conditions these coefficients represent. Also the NJDEP does not specify what stormwater runoff controls were employed in generating the coefficients.

  Without this information, it is not possible to fully understand the implications of the pollutant loadings using these coefficients.

  As discussed later within the report, the model is largely dependent on only a few input parameters (predominantly land area, zoning parameters and the NJDEP land cover coefficients). Since zoning parameters and land areas can be accurately identified and quantified (via GIS technology), the proper implementation and use of accurate coefficients is essential to the accuracy of the results generated by the model.

- Because the NJDEP methodology projects pollutant loadings for only total phosphorus, total nitrogen and total suspended solids, the pollutant loading projections are biased against agricultural land uses.

  Specifically the NJDEP pollutant loading coefficients for agriculture are two to three times greater than those specified for low density residential development. As a result, the annual pollutant loadings are then two to three times lower for land transitioning from agriculture to residential development than if it were to remain as an agricultural use.

  This may be misconstrued to imply that the loss of agricultural lands to residential development is somehow desirable. Furthermore, because of the significant amount of agricultural land within the municipality, this methodology implies that residentially and commercially developed lands are less prone to the impacts of non-point source pollution, which is not the case.

  It is recognized that agricultural land uses are fundamentally important and vital to society, and as such the municipality does not advocate residential development (or any other development) as being more preferable to agricultural development.

  As the NJDEP continues their research and implementation of the build out analyses throughout the state, these coefficients may be refined and loading coefficients for new pollutants published.

  Accordingly the build-out analyses and pollutant loading program has been developed to permit adjustments to the values of the coefficients and to allow the model to be expanded to include other contaminant loading coefficients of concern.

- The NJDEP's land cover coefficients do not appear to consider or incorporate the new stormwater management techniques now required by the New Jersey stormwater regulations and the new LID BMP strategies. Furthermore, most developments within the municipality have required some form of stormwater control for 20 years or more.

  The NJDEP land cover coefficients therefore may be very conservative with respect to present development conditions and greatly overestimate the adverse impacts at build-out.

- In addition to total phosphorus, total nitrogen and total suspended solids, there are a number of other pollutants associated with non-point source pollution and stormwater runoff that are generated and mobilized through land development. These include among other parameters, petroleum hydrocarbons, metals, and pathogenic organisms which are not currently accounted for by the NJDEP methodology.

- Malfunctioning and/or inadequate onsite wastewater disposal systems are believed to be a major source of non-point source pollution. The NJDEP methodology does not account for pollution resulting from such onsite systems.

Despite these reservations, the build-out analyses and pollutant loading projections are valuable tools for assessing the potential impacts from development and stormwater runoff. The build-out analysis and pollutant loading projections have been developed with the flexibility to easily adjust the pollutant loading coefficients, zoning and other elements of the analysis and projections. The municipality utilized GIS data management and mapping software to perform these analyses in order to create the flexibility to adjust these parameters for each watershed or even HUC14 within the municipality.

Discussion:

The following is a discussion of the build-out analyses and pollutant loading projections and figures presented within this report.

1. Using the NJDEP's GIS mapping data for HUC14s, the 15 HUC14s drainage areas within Pemberton Township were identified and their boundaries delineated (see Figure 13).

   Table 5 below summarizes the total land areas for each of the HUC14 watersheds.

Table 5: HUC14 Drainage Areas

HUC14 ID	HUC14 Sub-Watershed Name	Area (acres)
02040202020010	Gaunts Brook/Hawthorne Mill Stream	248.67
02040202020020	Ong Run/Jacks Run	1,306.71
02040202020030	Rancocas Creek NB (Mirror Lk-Gaunts Bk)	3,948.54
02040202020040	Rancocas Creek NB (NL Dam to Mirror Lake)	3,050.11
02040202030030	Mount Misery Bk MB/NB	545.28
02040202030050	Bucks Cove Run/Cranberry Branch	2,183.01
02040202030060	Pole Bridge Br (Country Lk dam - Co. line)	3,510.08
02040202030080	Bisphams Mill Creek (Below McDonalds Br)	2,101.17

HUC14 ID	HUC14 Sub-Watershed Name	Area (acres)
02040202030090	Greenwood Br (Below Country Lake & MM Confl)	6,432.90
02040202040010	Rancocas Creek NB (Pemberton Br to NL Dam)	4,556.21
02040202040020	Rancocas Creek NB (Ft Dix Trib)	3,549.48
02040202040030	Rancocas Creek NB (206 to Pemberton Br)	3,224.68
02040202040040	Rancocas Creek NB (Smithville to 206)	1,001.93
02040202050060	Rancocas Creek SB (Above Friendship Ck)	104.15
02040202050070	Jade Run	4,299.59
	Total:	23,168.94

2. Using the Township's GIS mapping data of their land use zoning districts (see Figure 3 for an overview of these zones), the zones were overlaid over the HUC14 drainage areas to identify and delineate the land use zones within each individual HUC14 drainage area. This is the basis of the impervious land cover for the build-out calculations.

3. The existing impervious land covers were determined using photometric mapping techniques on the NJDEP's 1995 and 2002 digital aerial photography.

4. The land areas available for development and redevelopment are summarized for each HUC14 (see Attachment 2). In essence the land available for development is the agricultural, forest and/or barren lands and the land available for redevelopment consist of the eligible existing residential, commercial and industrially zoned parcels.

5. Using the maximum impervious surface coverage percentages specified within the municipal ordinance, the potential additional impervious surface coverage was calculated by multiplying land areas available for development and redevelopment by the maximum impervious surface coverage.

6. Non-point source pollutant loads were calculated for each HUC14 using the land use pollutant loads published in the NJDEP Stormwater BMP Manual 2004 (see Table 6 below) multiplied by the amount of potential maximum developable land areas within each municipality. Table 7 summarizes the results of this analysis.

For purposes of his analysis, the pollutants were limited to total phosphorus, total nitrogen and total suspended solids. However the analysis can be expanded in the future to include other contaminants of concern.

Table 6: Pollutant Loads by Land Cover

Land Cover	Total Phosphorus Load (lbs/acre/year)	Total Nitrogen Load (lbs/acre/year)	Total Suspended Solids Load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agricultural	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

Source: NJDEP Stormwater BMP Manual 2004 (Appendix C, Table C-2).

Results:

The results of the land use/build-out analysis are detailed in Attachment 2 and summarized below in Table 7 (for the potential maximum pollutant loadings) and Table 8 (for the potential increased impervious surface coverage).

Table 7: Pollutant Loading Summary (Build-out Conditions)

HUC14 ID	HUC14 Sub-Watershed Name	Area (acres)	TP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr)
02040202020010	Gaunts Brook/Hawthorne Mill Stream	225.93	225.93	2,259.30	27,111.60
02040202020020	Ong Run/Jacks Run	1,130.50	1,481.47	15,665.55	153,587.00
02040202020030	Rancocas Creek NB (Mirror Lk-Gaunts Bk)	2,634.41	3,247.04	34,391.76	458,135.80
02040202020040	Rancocas Creek NB (NL Dam to Mirror Lake)	1,986.85	2,159.87	21,449.88	265,226.00
02040202030030	Mount Misery Bk MB/NB	432.84	43.28	1,298.52	1,731.36
02040202030050	Bucks Cove Run/Cranberry Branch	825.65	682.52	7,396.50	94,141.42
02040202030060	Pole Bridge Br (Country Lk dam – Co. line)	2,163.68	1,725.62	16,690.51	278,794.60
02040202030080	Bisphams Mill Creek (Below McDonalds Br)	1,714.54	725.19	9,870.40	114,343.60
02040202030090	Greenwood Br (Below Country Lake & MM Confl)	4,678.15	2,997.63	31,414.65	440,996.60
02040202040010	Rancocas Creek NB (Pemberton Br to NL Dam)	2,446.11	5,401.75	28,226.14	490,925.60
02040202040020	Rancocas Creek NB (Ft Dix Trib)	2,070.48	2,513.55	22,046.36	439,868.20
02040202040030	Rancocas Creek NB (206 to Pemberton Br)	2,442.42	3,335.42	28,998.41	643,583.80
02040202040040	Rancocas Creek NB (Smithville to 206)	702.15	1,111.25	9,998.34	185,838.00
02040202050060	Rancocas Creek SB (Above Friendship Ck)	104.15	10.42	312.45	4,166.00
02040202050070	Jade Run	2,216.74	2,171.52	18,049.42	510,104.80
	Total:	25,774.6	27,832.46	248,068.19	4,108,554.38

TP = Total phosphorous
TN = Total nitrogen
TSS = Total suspended solids

Table 8: Land Use/Build-Out Calculation Summary

HUC14 ID	HUC14 Sub-Watershed Name	Total Area (acres)	Existing Imperv. Area (acres)*	Build-Out Imperv. Area (acres)	Imperv. Increase
02040202020010	Gaunts Brook/Hawthorne Mill Stream	248.67	10.88	112.97	1038.3%
02040202020020	Ong Run/Jacks Run	1,306.71	57.17	400.51	700.6%
02040202020030	Rancocas Creek NB (Mirror Lk-Gaunts Bk)	3,948.54	172.76	928.15	537.2%
02040202020040	Rancocas Creek NB (NL Dam to Mirror Lake)	3,050.11	133.45	819.16	613.8%
02040202030030	Mount Misery Bk MB/NB	545.28	23.86	21.64	90.7%
02040202030050	Bucks Cove Run/Cranberry Branch	2,183.01	95.51	173.44	181.6%
02040202030060	Pole Bridge Br (Country Lk dam - Co. line)	3,510.08	153.58	408.54	266.0%
02040202030080	Bisphams Mill Creek (Below McDonalds Br)	2,101.17	91.93	200.13	217.7%
02040202030090	Greenwood Br (Below Country Lake & MM Confl)	6,432.90	281.46	817.47	290.4%
02040202040010	Rancocas Creek NB (Pemberton Br to NL Dam)	4,556.21	199.35	511.01	256.3%
02040202040020	Rancocas Creek NB (Ft Dix Trib)	3,549.48	155.30	596.51	384.1%
02040202040030	Rancocas Creek NB (206 to Pemberton Br)	3,224.68	141.09	608.21	431.1%
02040202040040	Rancocas Creek NB (Smithville to 206)	1,001.93	43.84	228.14	520.4%
02040202050060	Rancocas Creek SB (Above Friendship Ck)	104.15	4.56	5.21	114.3%
02040202050070	Jade Run	4,299.59	188.12	225.57	119.9%
	Total:	40,062.51	1,752.86	6,056.66	

*Approximate based on 2002 total Impervious Acres
Imperv. = Impervious
Develop. = Developable

Ultimately land development under build-out conditions is projected to produce the following pollutant loadings throughout the entire municipality:

1. Entire Municipality (All Watersheds):

   a. ±27,832 lbs/year for total phosphorus.

   b. ±248,068 lbs/year for total nitrogen.

   c. ±4,108,554 lbs/year for total suspended solids.

In addition, the impervious surface coverage throughout the municipality is expected to increase under build-out conditions. The coverage of existing impervious in 1995 was determined to be ±1,690.58 acres (or ±4.22% of the total area of the municipality). The coverage of existing impervious was determined to be ±1,752.84 acres (or ±4.38% of the total area of the municipality). The total impervious coverage under build-out conditions is projected to be ±6,057 acres (or ±15% of the total area of the municipality). This value is typical for a rural based municipality.

Growth in the Township has slowed in recent years. The impervious cover only increased by 4% during the seven (7) year period from 1995 to 2002, which represents a ±0.51% increase per year. Assuming the impervious cover increases at the same rate in the future, the build-out impervious condition of 6,057 acres could be expected to occur in approximately 140 years.

Conclusions:

Although the scope of the land use/build-out analysis was limited to total phosphorous, nitrogen and suspended solids, any significant increases to the stormwater pollutant loadings under full build-out land development conditions will cause further degradation of water quality within receiving waterbodies.

Stormwater management strategies need to be established to reduce the potential for increased flood frequencies, volumes and soil erosion concerns that accompany dramatic increases in such impervious coverage. In general, impervious coverage percentages that exceed 15% may be indicative of potential watershed impairment from stormwater and land development. The Township should make all efforts to maintain (or even minimize) future amounts of impervious cover so as not to impair the watershed.

This analysis is the first step in understanding the impacts that future development will have on water quality and quantity. We recommend that the Township be proactive in developing strategies to minimize, manage and/or mitigate these impacts through such mechanisms as additional stormwater management control techniques and possible changes to the land use zoning.

Included within this plan, and also in the New Jersey Stormwater Management Regulations and guidance documentation, are strategies to minimize, manage and/or mitigate build-out impacts through the use of improved stormwater management techniques and construction practices. In addition, modifications to current land use and zoning will change the build-out impacts and the municipality's GIS data can be used to evaluate the results of such changes.

I. Mitigation Plans:

General:

As presented within Section E of this plan, the required design and performance standards for stormwater management measures are identified for land use developments deemed to be major developments. However in some instances site specific conditions may prevent strict compliance with these standards.

In accordance with NJAC 7:8-4.2(c)11, there are provisions that grant Planning and Zoning Boards the ability to issue variances and/or exemptions from these standards in such cases where an Applicant can satisfactorily demonstrate that they are not able to comply with a given standard(s) at the site in question.

In such cases, the governing Board may grant a variance or exemption from strict compliance with these standards if a mitigation plan is approved by the Board and the implementation of such a plan is identified as a condition of the project's approval. However, in order to consider an exemption for a proposed development in the Pinelands Area, it will be necessary for the municipality to amend this section of the Stormwater Management Plan to identify specific mitigation projects and parcels in the Pinelands Area where mitigation may occur and have that amendment certified by the Pinelands Commission.

Therefore the purpose of this section of the plan is to outline the mitigation plan options that are available to developments that fall into this category.

Mitigation Project Criteria:

In order to select an appropriate mitigation project to respond to a requested waiver/exemption requires, an assessment of the impact that would result from the requested deviation from full compliance with the standard(s) in the drainage area affected by the proposed project is required.

For example, a waiver for stormwater quantity requirements must focus on the impacts of increased runoff on flooding, considering both quantity and location. Stormwater quality mitigation must aim to prevent an increase in pollutant load to the waterbodies that would be affected by the waiver/exemption. Ground water recharge mitigation must seek to maintain the base flow and aquifer recharge in the area that would be affected by the waiver/exemption.

For the purpose of this discussion, the term "sensitive receptor" is used to refer to a specific area or feature that would be sensitive to the impact assessed above.

Selection of an appropriate mitigation project for a requested waiver/exemption must adhere to the following requirements:

1. The project must be within the same Pinelands drainage area that would contribute to the receptor impacted by the project. Note that depending on the specific performance standard waived, the sensitive receptor and/or the contributory area to that receptor may be different. If there are no specific sensitive receptors that would be impacted as the result of the grant of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality, and should be selected to provide the

most benefit relative to an existing stormwater problem in the same category (quality, quantity or recharge).

2. Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.

3. The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor. For example, if the project for which a waiver is obtained discharges to a tributary, but the closest location discharges to the main branch, it may be more beneficial to identify a location discharging to the same tributary.

4. For ease of administration, if sensitive receptors are addressed, it is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard.

5. It must be demonstrated that implementation of the mitigation project will result in no adverse impacts to other properties.

6. Mitigation projects that address stormwater runoff quantity can provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction.

Mitigation criteria consideration and specific plans are listed in the following two subsections. Mitigation projects must include a detailed plan and schedule defining the implementation of the mitigation project(s). A mitigation plan may include more than one mitigation project in order to achieve the objectives of location and/or impact offsets.

The Stormwater Coordinator will be responsible for developing and maintaining the list of mitigation projects that are acceptable to the municipality.

Mitigation Project Criteria Considerations:

1. Stormwater Quantity Considerations

   Increased stormwater runoff volume from new development can cause damages to property and habitat due to increased flood elevations and/or flood velocities. Mitigation project areas can include locations that will provide for additional storage and slower release of excess stormwater.

   Mitigation of stormwater quantity can be accomplished by increasing flood storage areas along the waterway, creating new best management practices (BMPs) to control previously uncontrolled runoff or by retrofitting existing stormwater structures to decrease the volume and peak of runoff.

   In areas adjacent to the stream, a hydrologic and hydraulic analysis can be performed to determine if increasing storage capacity would offset the additional volume of runoff and associated peak increase from sites upstream of the storage area. Increases in the storage capacity of an existing structure, such as upstream of a bridge or culvert, can also be considered provided that it is demonstrated that such an increase does not exacerbate flooding at other areas.

Note that work in regulated areas, such as floodplains and wetlands must be performed in accordance with applicable regulations such as the Flood Hazard Area Control Act Rules and the Freshwater Wetland Act Rules. Also, many areas of open space in New Jersey have received funding by the Department's Green Acres Program and many of those encumbered lands have restrictions placed on them as a result of that funding.

Any and all restrictions placed on these lands must be investigated by the municipality before these areas can be utilized for mitigation to ensure that there are no conflicts.

Some examples of areas or features sensitive to changes with regard to flooding include:

- Culverts and bridges - these features may constrict flow and cause flooding or may provide storage that, if lost, would cause downstream flooding problems.
- Property subject to flooding - areas of concern include those where there is historical evidence of recurrent problems, particularly if exacerbated over time because of increasing impervious surface in the contributing watershed.
- Eroding/widening stream banks or channels - particularly if due to changes in hydrology due to effects of development.
- Category One waters - flooding affects could alter habitat that was the basis for the designation.
- Wetlands - changes in hydrology can affect viability of wetlands, either by increasing or decreasing volumes and velocities of water discharging to the wetlands.

2. Stormwater Quality Considerations

Stormwater quality is regulated for the purpose of minimizing/preventing non-point source pollution from reaching the waterway. Mitigation for stormwater quality can be achieved either by directing the runoff from the water quality design storm into a natural area where it can be filtered and/or infiltrated into the ground, by constructing a new BMP to intercept previously untreated runoff or by retrofitting existing stormwater systems that previously did not provide sufficiently for water quality.

Existing forested and other vegetated non-wetland areas can also be used as a water quality mitigation area if runoff is discharged as sheet flow through the area in a non-erosive manner, and the vegetated area is restricted from future development. A discussion of the appropriate widths for these vegetative filters is provided in Chapter 9 of the New Jersey Stormwater Best Management Practices Manual (BMP Manual).

If a mitigation project cannot be identified that would compensate for a waiver related to water quality, and provided the project requiring a waiver would not result in a measurable change in water quality relative to TSS and nutrients, the mitigation project could be designed to address another parameter of concern in the watershed (as indicated by an impairment listing and/or an adopted TMDL) for which stormwater is a source, such as fecal coliform.

Some examples of areas or features sensitive to water quality changes include:

- Trout associated waters - chemical pollutants and temperature effects can diminish viability of populations.
- Lakes, ponds or other impoundments - these waterways are sensitive to addition of nutrients.
- Threatened and endangered species or their habitats - sensitive to both quality and quantity changes.
- Drinking water supplies - adverse affects on quality can increase the cost of treatment or threaten the use.
- Category One waters - an issue where quality was the basis of the designation waterways with a water quality or use impairment-deterioration of quality in an impaired waterway will increase the cost and challenge of restoration.

3. Ground Water Recharge Considerations

   Recharge is regulated to maintain the availability of ground water as a water supply source as well as to provide a stable source of baseflow in streams.

   There are two requirements associated with the recharge standard. The first is that 100 percent of the site's average annual pre-developed ground water recharge volume be maintained after development, and the second is that 100 percent of the difference between the site's pre- and post-development 2-year runoff volumes be infiltrated.

   To mitigate for groundwater recharge design requirements, either computational method can be utilized to determine the volume lost that needs to be provided by the mitigation project.

   One method to accomplish ground water recharge mitigation is to discharge runoff as sheet flow across a vegetated area to allow for the infiltration of runoff. It should be noted that, if this measure is used, calculating compliance with the recharge standard is limited to the 2-year storm standard, given existing methods.

   Some examples of areas or features sensitive to ground water recharge changes include:

   - Springs, seeps, wetlands, white cedar swamps - sensitive to changes in ground water level/hydrology.
   - Threatened and endangered species or their habitats - some are sensitive to changes in ambient ground water levels.
   - Streams with low base flow or passing flow requirements - would be particularly sensitive to changes in hydrology.
   - Aquifer recharge zones - loss of recharge in these areas can adversely affect ground water supply.
   - Category One waters - loss of base flow can affect many of the bases for designation.

Mitigation Projects:

The Township is in the process of identifying specific projects to include here. In the mean time, the applicant must supply a recommendation for the location of an appropriate project

site for mitigation of the performance standard for which they are requesting a waiver. The Township will review the proposed project and location to determine if the project will satisfy the requirements set her in this section.

1. Projects:
    a. Groundwater Recharge:
        i) Projects satisfying this mitigation requirement still need to be developed.
    b. Water Quality:
        i) Projects satisfying this mitigation requirement still need to be developed.
    c. Water Quantity:
        i) Projects satisfying this mitigation requirement still need to be developed.
2. If a suitable site cannot be located in the same drainage area as the proposed development (as discussed in above Option 1a), the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue.

    For example, if a variance is granted because the 80% TSS requirement is not being met, the selected project may address water quality impacts due to a fecal impairment.

The municipality may also allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a MSWMP. The funding agreement should be in a form that is acceptable to the municipality. In addition, the funding must be equivalent to the cost to implement the mitigation outline above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure for which an exception is granted. The municipality should then expend any contributions collected within 5 years of their receipt.

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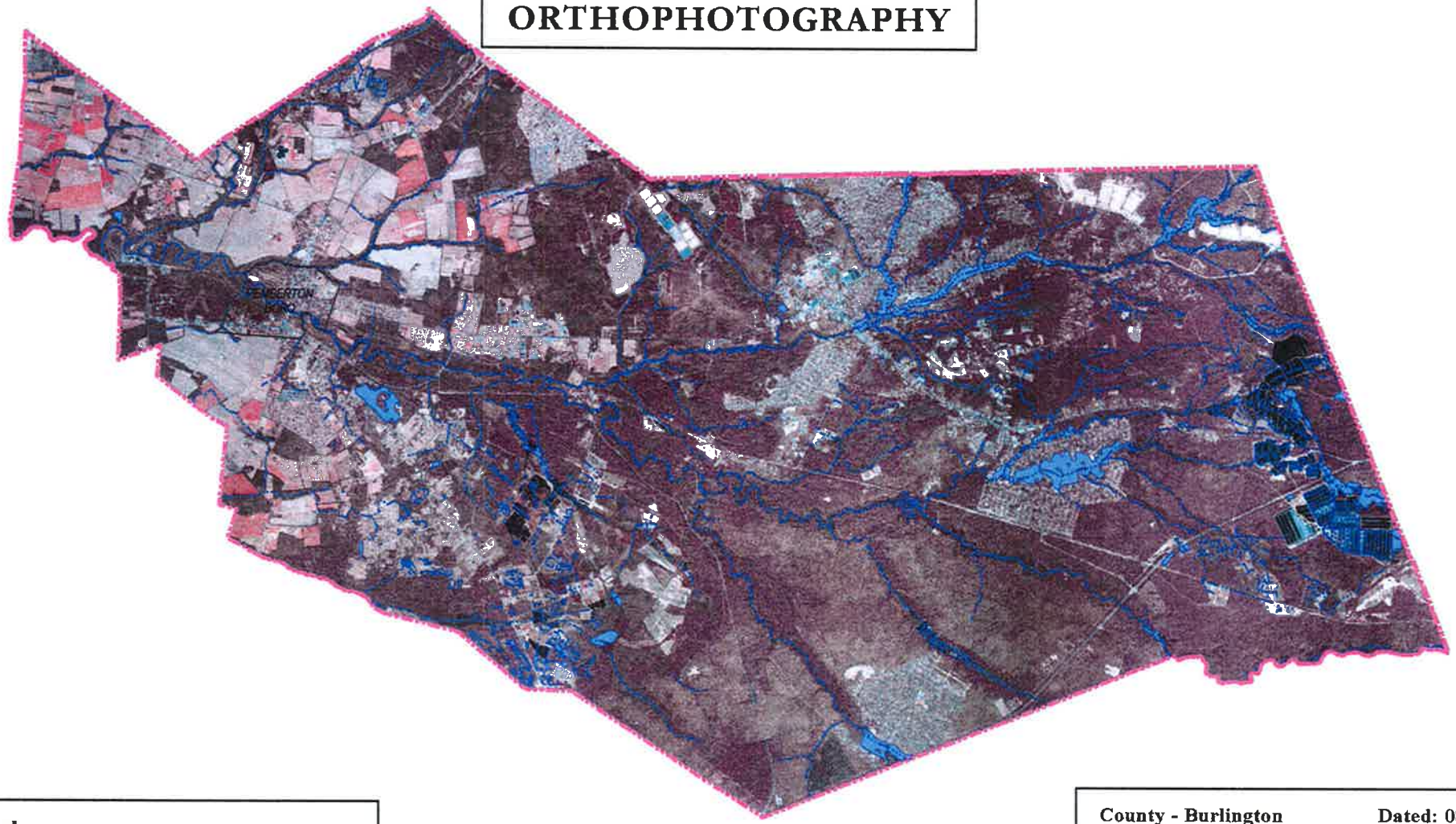
MAPS

Municipal Stormwater Management Plan

Figure No. 1

2002 DIGITAL ORTHOPHOTOGRAPHY

Civil Solutions



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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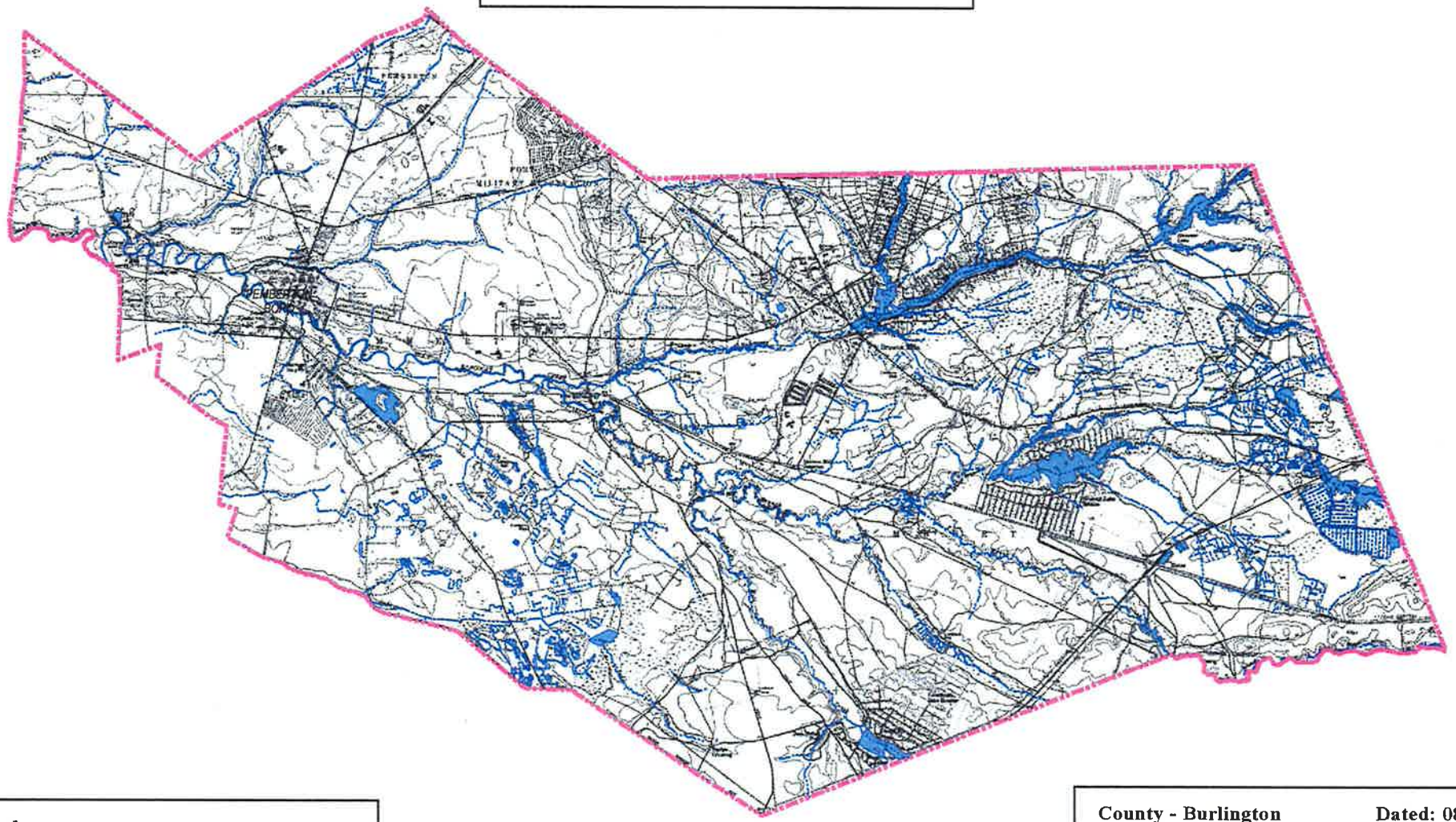
Municipal Stormwater Management Plan

Figure No. 2

QUADRANGLE MAP



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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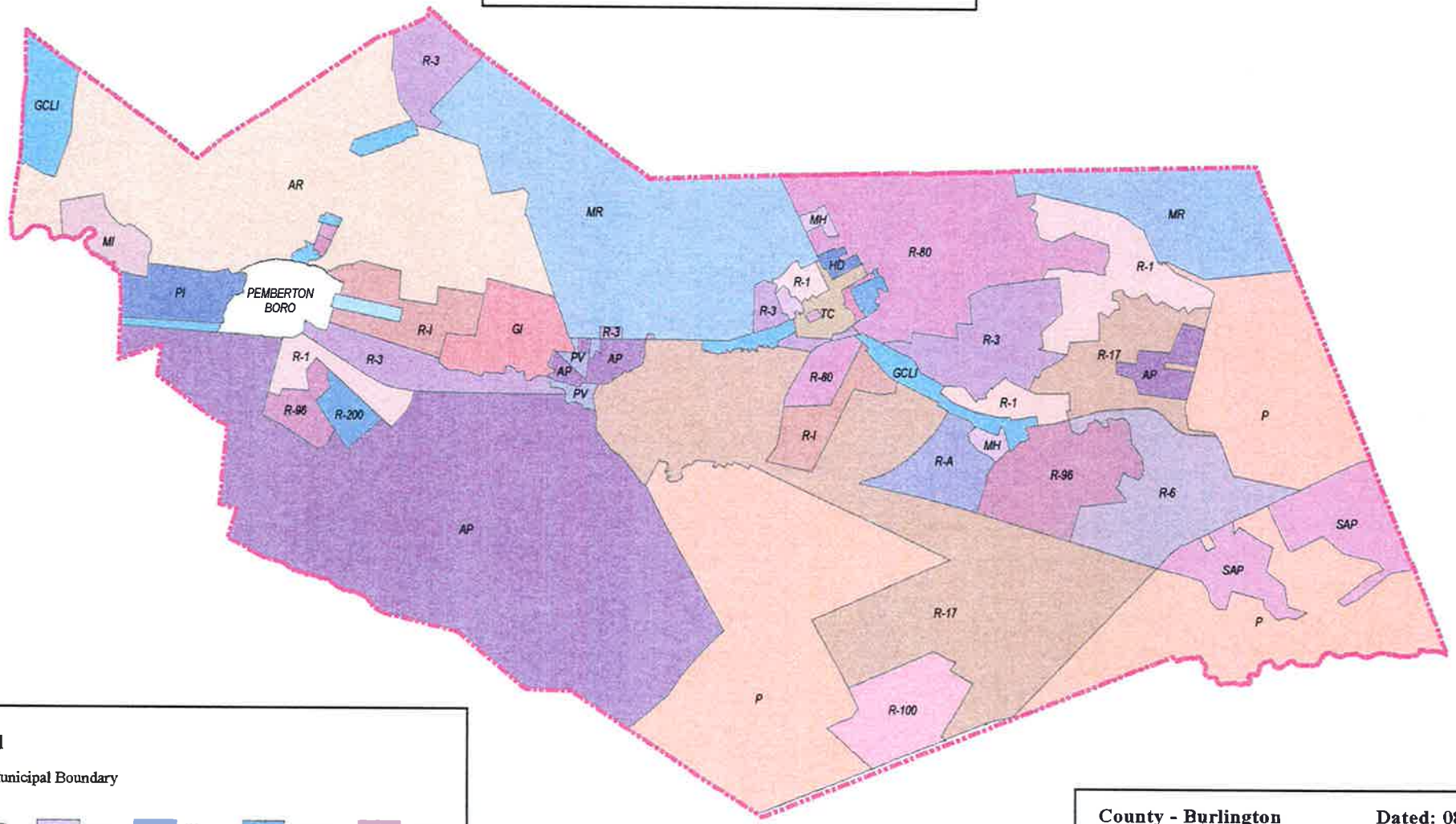
Municipal Stormwater Management Plan

Figure No. 3

ZONING MAP



Legend

Municipal Boundary

Zoning

AP	MH	PI	R-200	R-96
AR	MI	PV	R-3	R-A
GCLI	MR	R-1	R-6	R-I
GI	OP	R-100	R-60	SAP
HD	P	R-17	R-80	TC

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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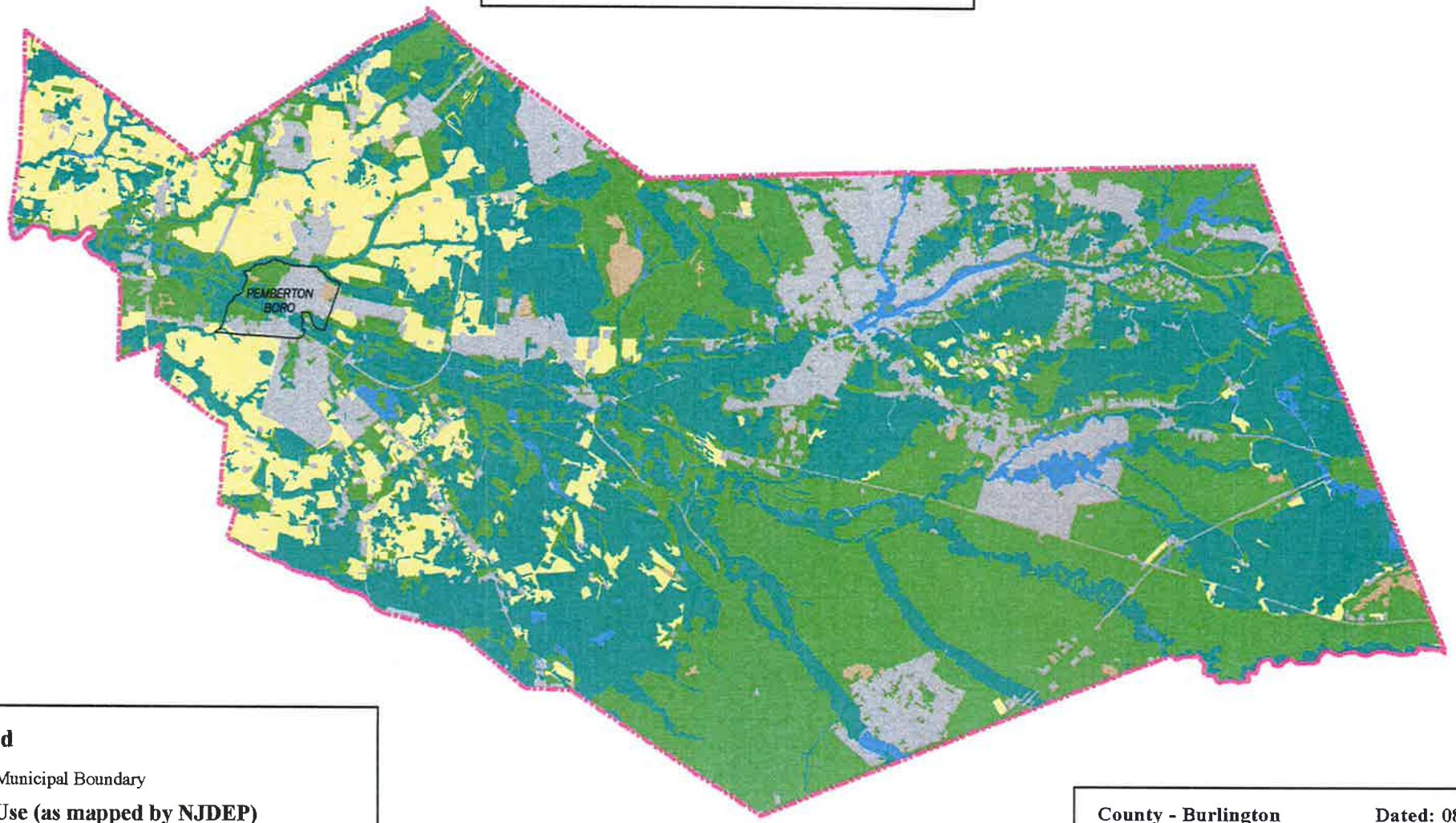
Municipal Stormwater Management Plan

Figure No. 4

2002 LAND USE MAP

Civil Solutions



Legend

Municipal Boundary

Land Use (as mapped by NJDEP)

TYPE 2002

- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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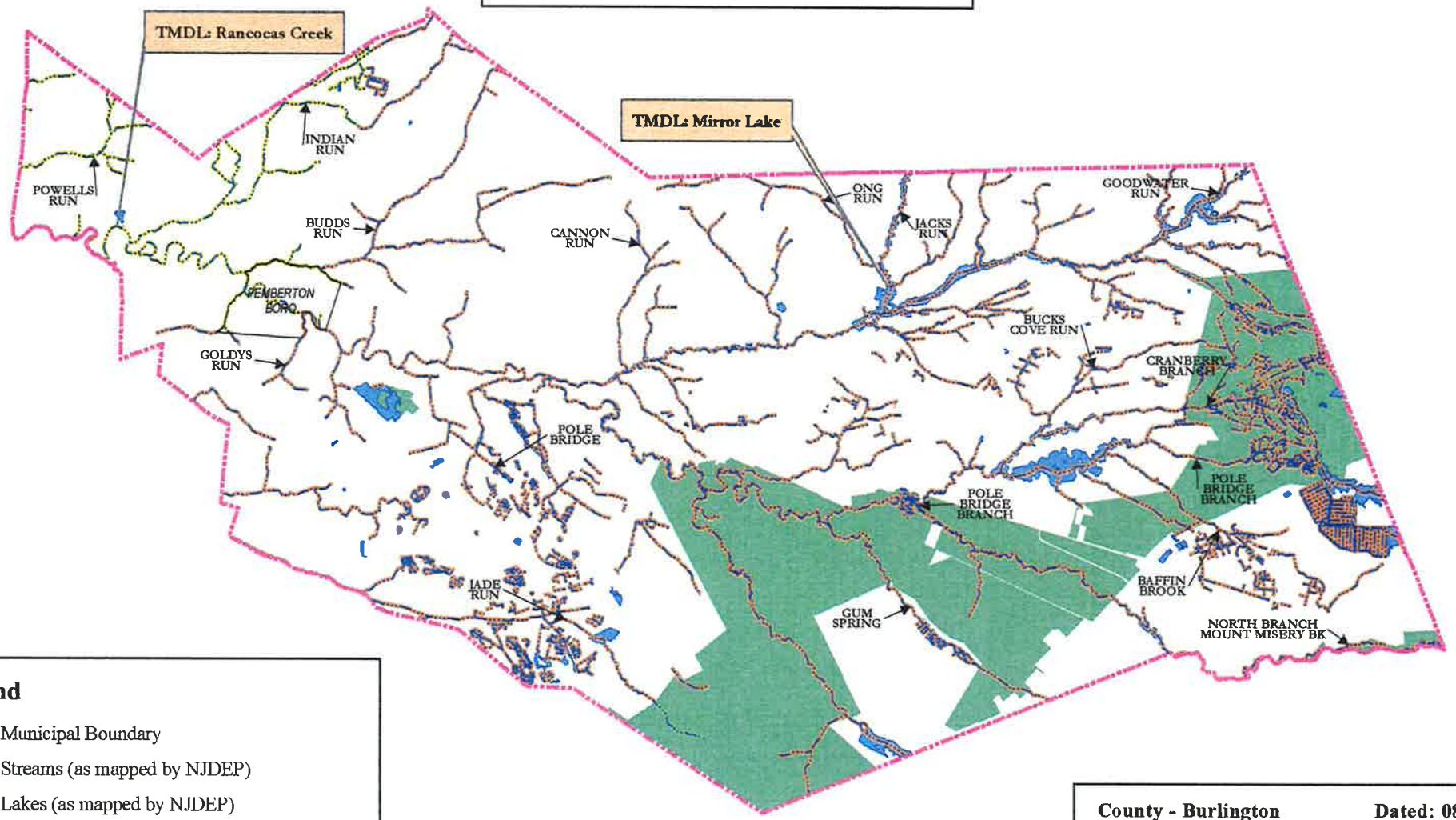
Municipal Stormwater Management Plan

Figure No. 5

CONSTRAINED AREAS



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)
- Open Space (as mapped by NJDEP)
- Category One 300 Foot Buffer Area

Surface Water Quality

FW1 — FW2-NT — PL

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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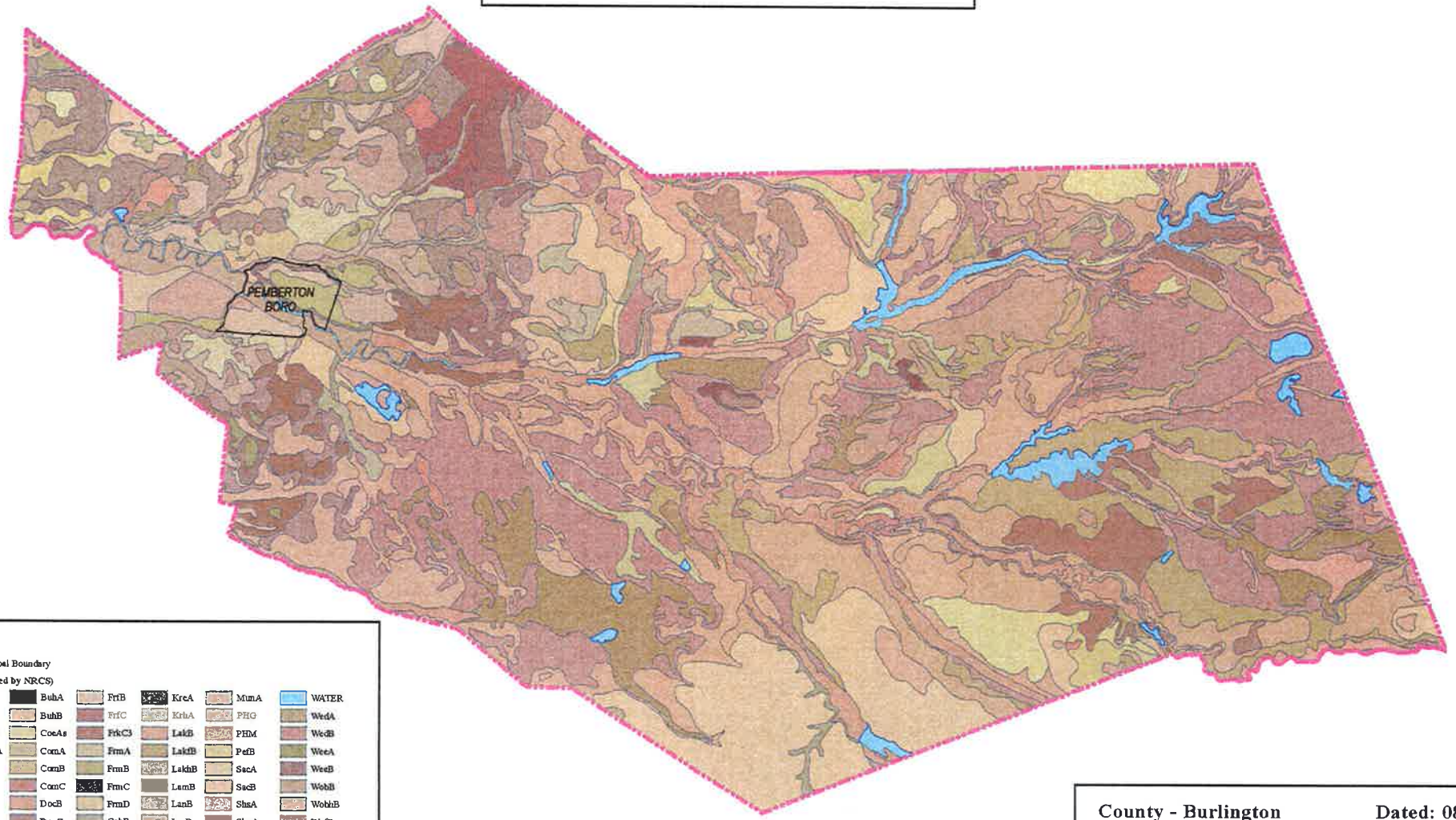
Municipal Stormwater Management Plan

Figure No. 6

SOILS MAP



Legend

Municipal Boundary

Soils (as mapped by NRCS)

AdmA	BuhA	FrfB	KreA	MunA	WATER
AdmB	BuhB	FrfC	KrhA	PHG	WedA
AdmkA	CoeAs	FrkC3	LakB	PHM	WedB
AdmmA	ComA	FrmA	LakfB	PefB	WeeA
AdnA	ComB	FrmB	LakhB	SacA	WeeB
AdotB	ComC	FrmC	LamB	SacB	WobB
AtsA	DocB	FrmD	LanB	ShsA	WobhB
AtshA	DocC	GahB	LasB	SluA	WofB
AttA	DoetB	GakB	LasC	ShwA	
AtthA	EveB	HoaB	LasD	ThfB	
BerAs	EveC	HodA	LasfB	ThfC	
BesAs	EvehB	HodB	LashB	ThftB	
BetAs	EvfB	JdrA	LathB	URSAAB	
BugA	FmgAt	KeaA	MakAt	UdrB	
BugB	FmhAt	KrbA	MapC	UdwB	

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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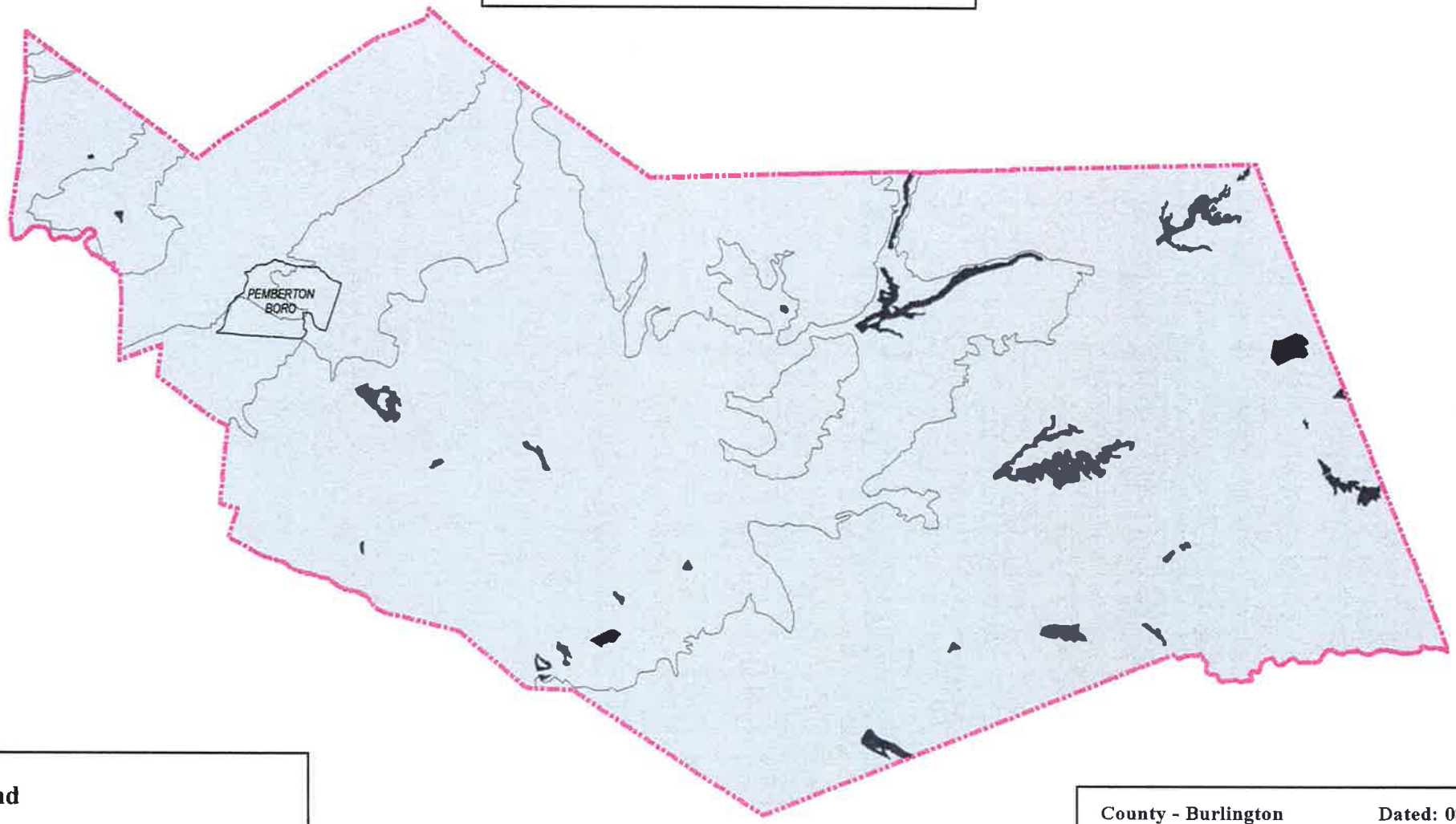
Municipal Stormwater Management Plan

Figure No. 7

GEOLOGY MAP

Civil Solutions



Legend

Municipal Boundary

Geology (as mapped by NJDEP)

Surficial

QG W X

8,000 4,000 0 8,000

Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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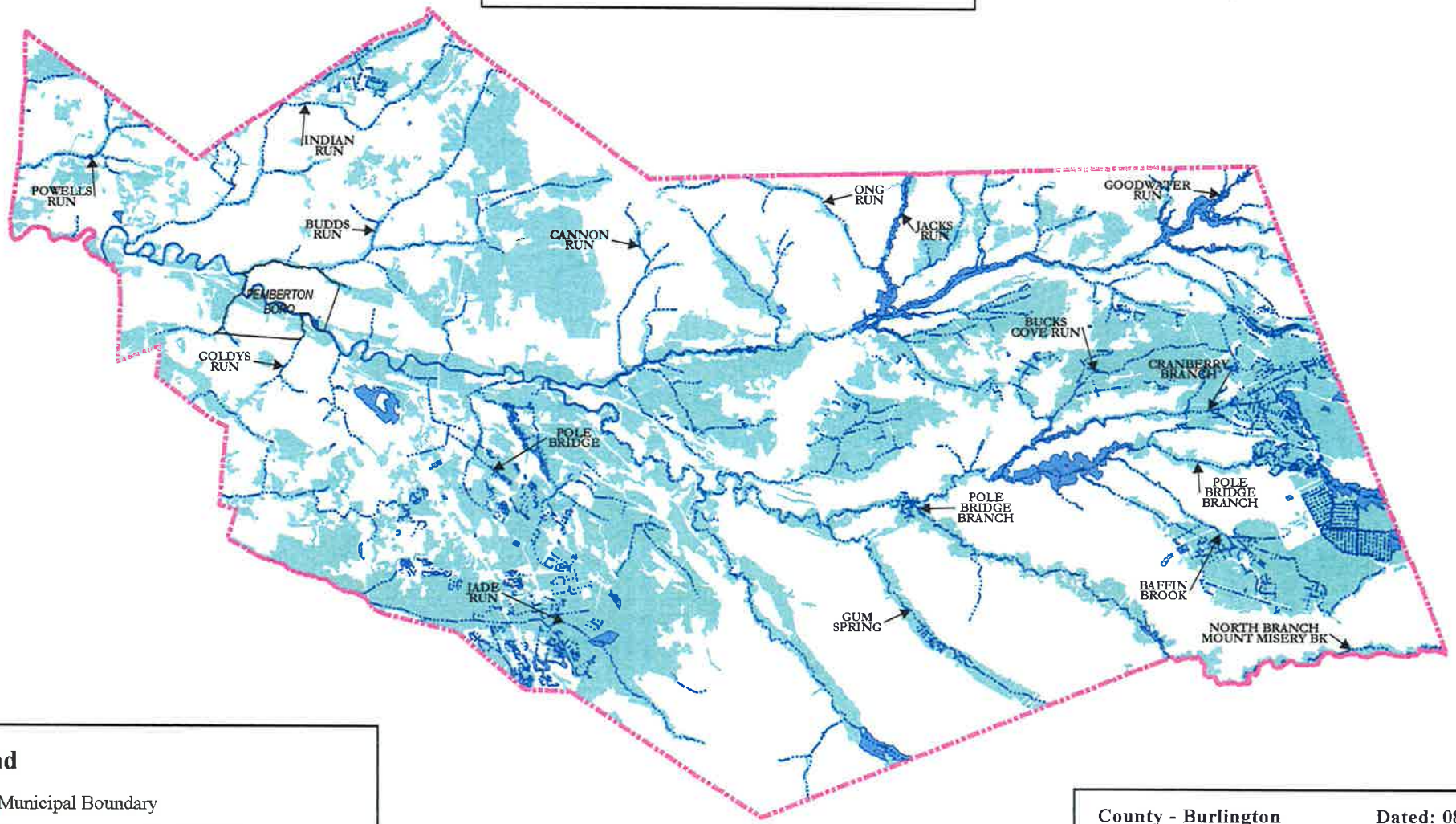
Municipal Stormwater Management Plan

Figure No. 8

WATERWAYS MAP



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)
- Wetlands (as mapped by NJDEP)
- Category One 300 Foot Buffer Area

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**
Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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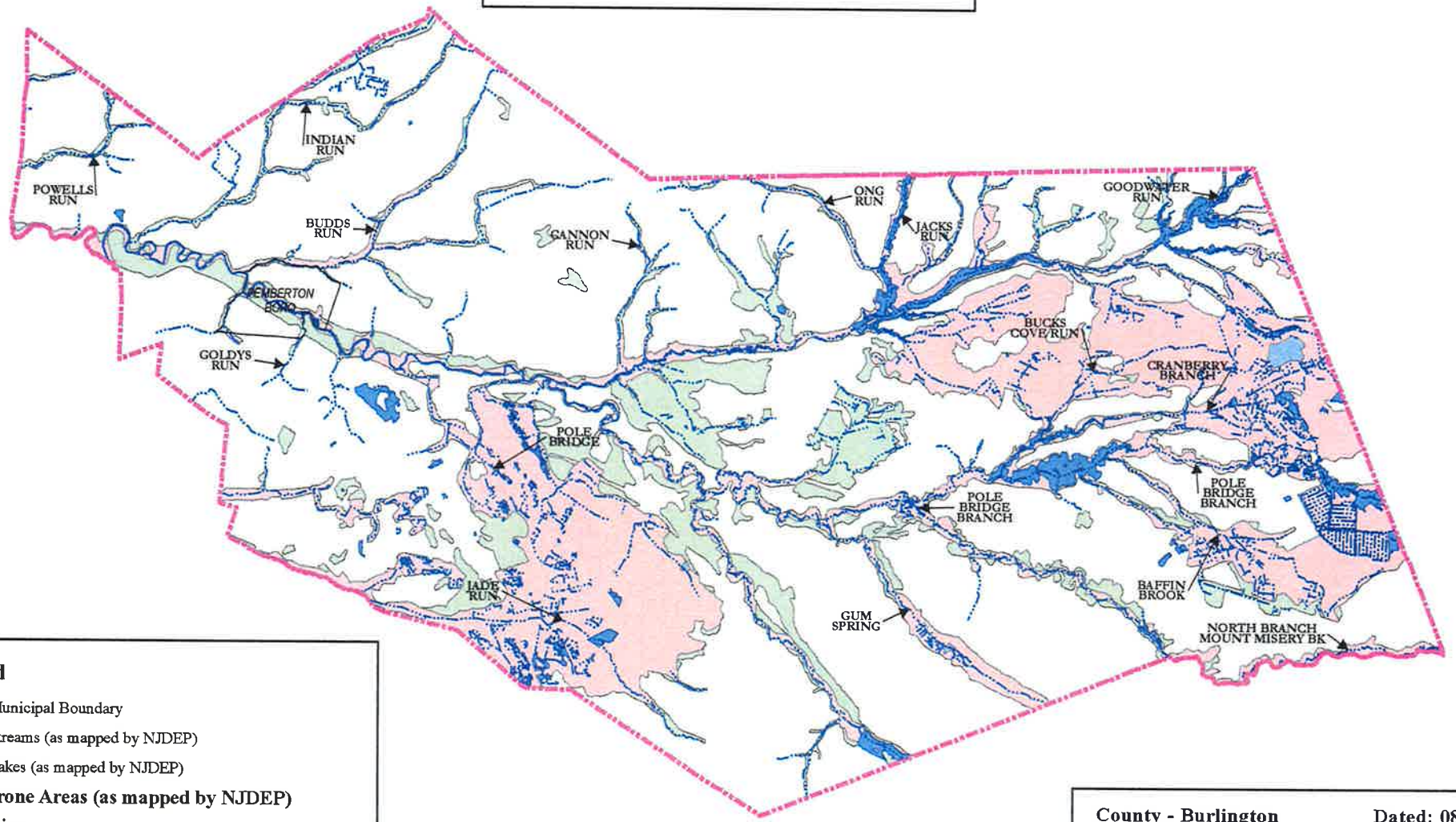
Municipal Stormwater Management Plan

Figure No. 9

FLOODPLAIN MAP

Civil Solutions



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)

Floodprone Areas (as mapped by NJDEP)

Description

- Not a Floodprone Area
- USGS Documented Floodprone Area
- Undocumented Floodprone Area
- Water

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**
Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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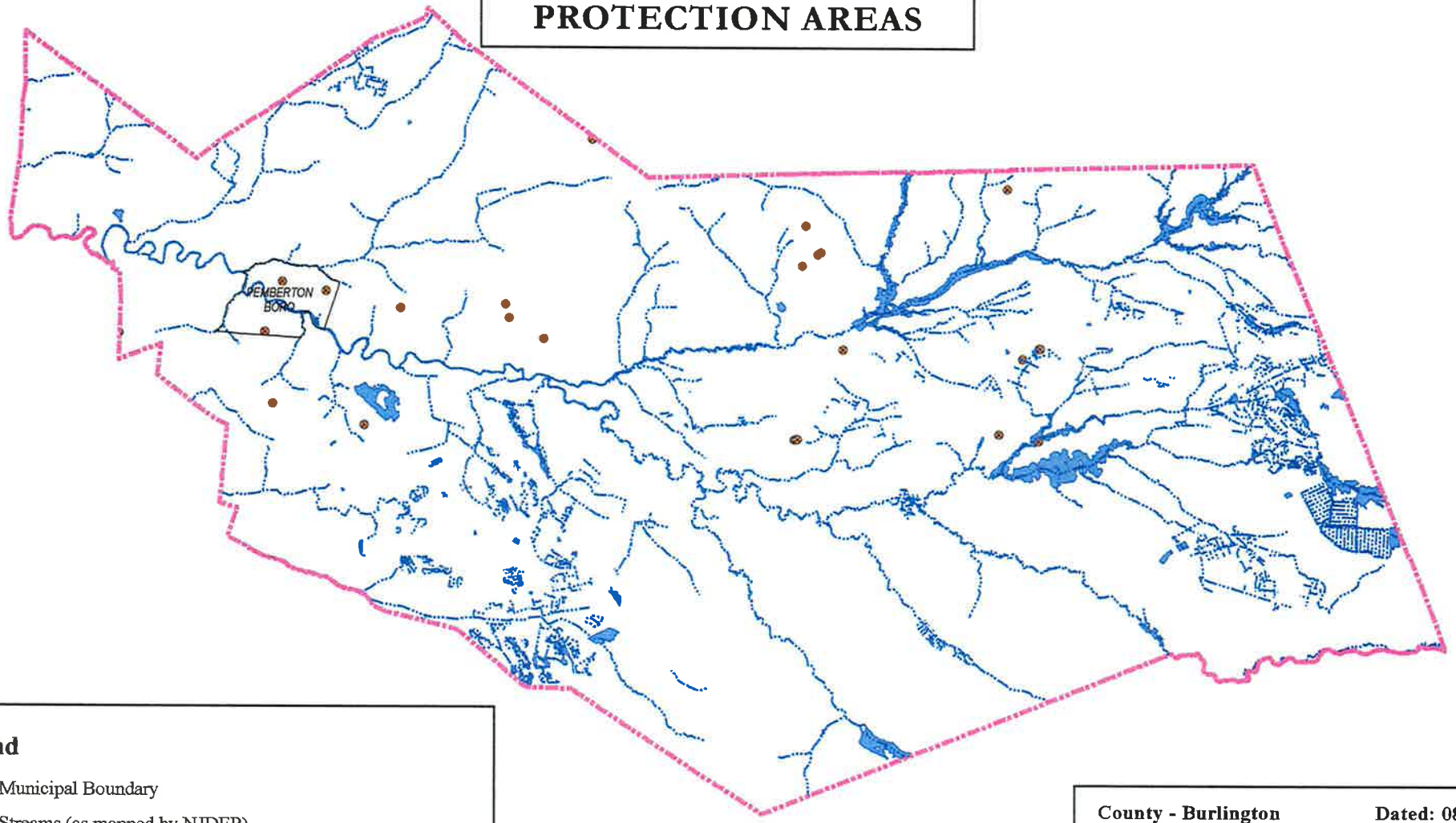
Municipal Stormwater Management Plan

Figure No. 10

WELLHEAD PROTECTION AREAS



Legend

- Municipal Boundary
- Streams (as mapped by NJDEP)
- Lakes (as mapped by NJDEP)
- Public Community Water Supply Wells (as mapped by NJGS)

All Pemberton Township Wellhead Protection Areas are Tier 1 and less than 1/2 acre in size and cannot be accurately depicted at this scale.

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**
Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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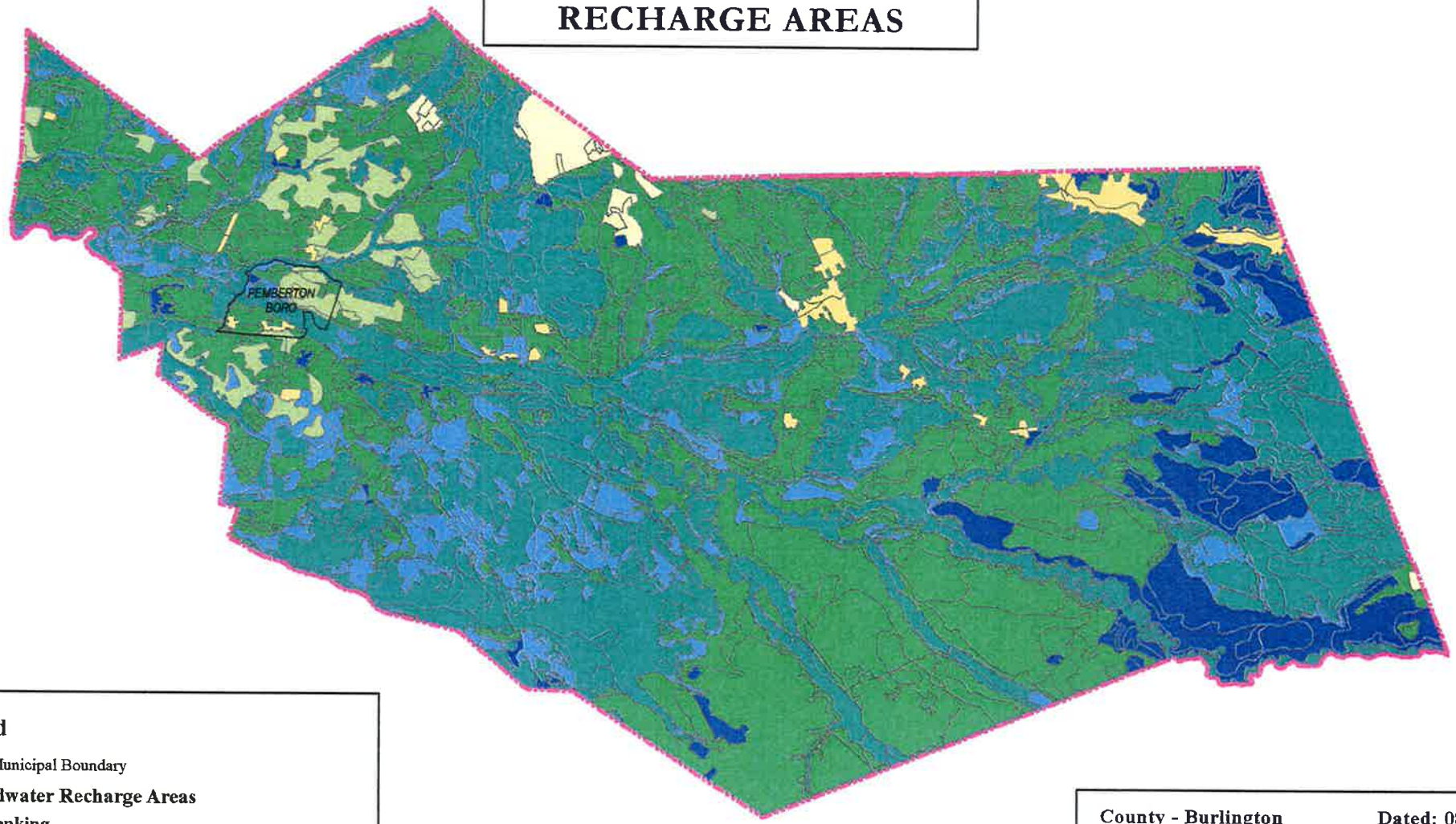
Municipal Stormwater Management Plan

Figure No. 11

GROUNDWATER RECHARGE AREAS

Civil Solutions



Legend

- Municipal Boundary

Groundwater Recharge Areas

State Ranking

- 16 to 12 in/yr
- 11 to 15 in/yr
- 8 to 10 in/yr
- 1 to 7 in/yr
- 0 in/yr
- Hydric Soils
- Wetlands and Open Water
- No Recharge Calculated

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**
Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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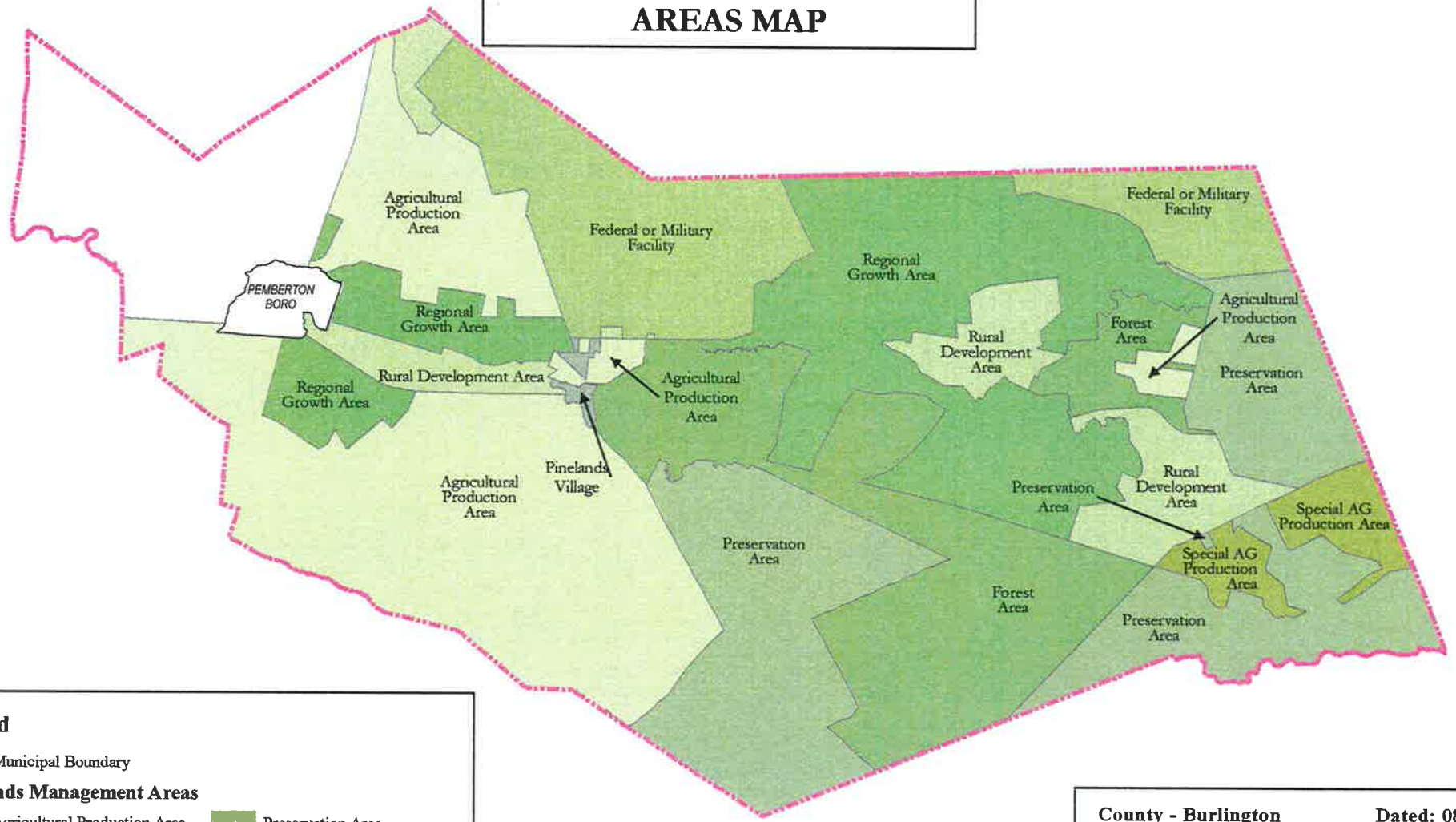
Municipal Stormwater Management Plan

Figure No. 12

PINELANDS MANAGEMENT AREAS MAP

Civil Solutions



Legend

- Municipal Boundary

Pinelands Management Areas

- Agricultural Production Area
- Federal or Military Facility
- Forest Area
- Pinelands Town
- Pinelands Village
- Preservation Area
- Regional Growth Area
- Rural Development Area
- Special AG Production Area

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**
Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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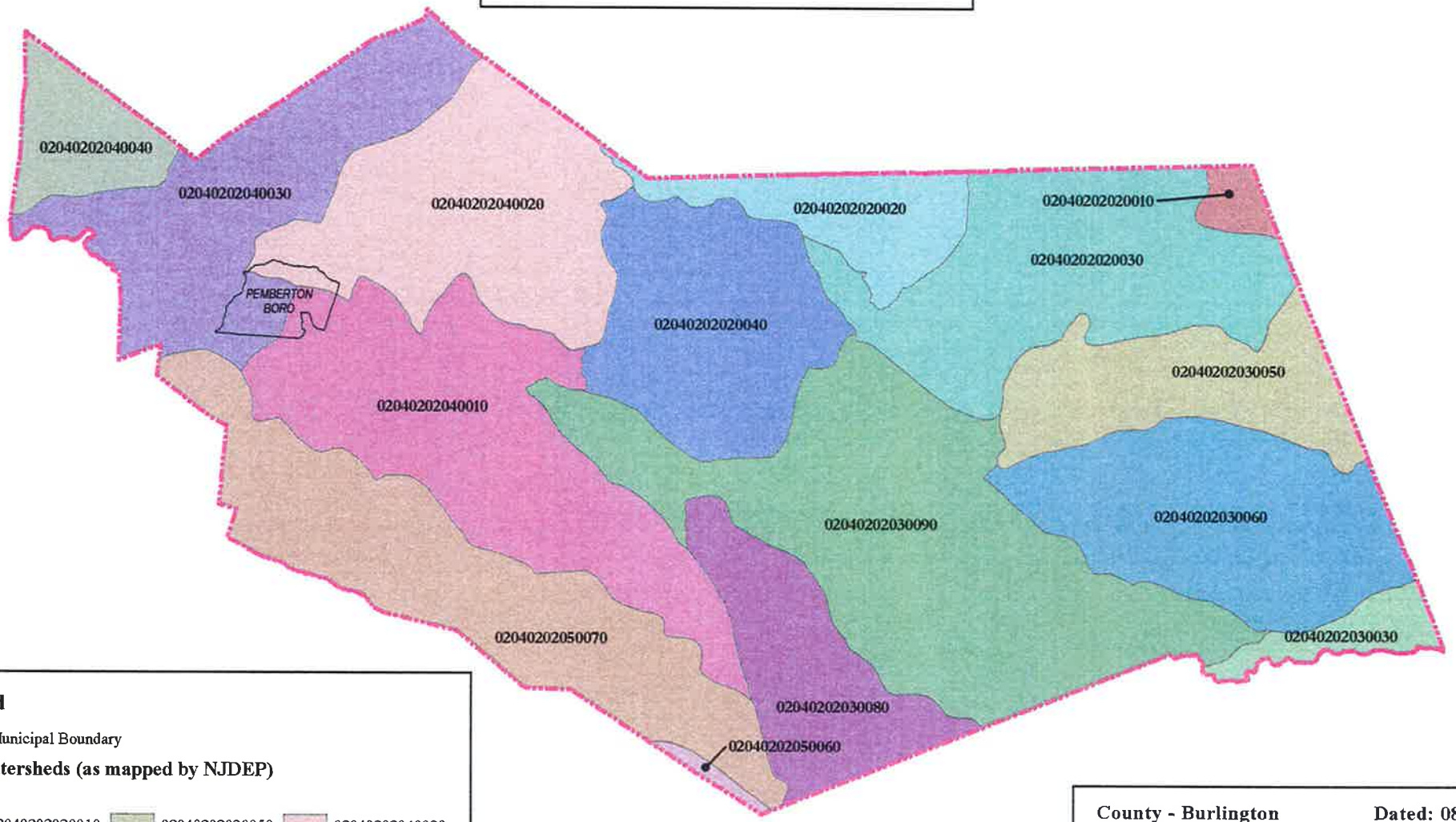
Municipal Stormwater Management Plan

Figure No. 13

HUC14 DRAINAGE AREAS



Legend

Municipal Boundary

Sub-watersheds (as mapped by NJDEP)

HUC14

02040202020010	02040202030050	02040202040020
02040202020020	02040202030060	02040202040030
02040202020030	02040202030080	02040202040040
02040202020040	02040202030090	02040202050060
02040202030030	02040202040010	02040202050070

8,000 4,000 0 8,000 Feet

County - Burlington **Dated: 08/06/07**

Township - Pemberton **Drawn by: SEB**

Note: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

ARH Project # 32-06002

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ATTACHMENTS

TABLE 1: PEMBERTON TOWNSHIP BUILD-OUT CALCULATIONS					
HUC14 and Zone	Total Area (Acres)	Wetlands/ Water Area (Acres)	Developable Area (Acres)	Allowable Impervious (%)	Build-Out Impervious (Acres)
02040202040030					
Agricultural Production (AP)	219.98	77.25	142.73	12%	17.13
Agricultural Residential (AR)	1,942.79	390.58	1,552.21	12%	186.27
General Commercial/Light Industrial (GCLI)	87.33	18.10	69.23	70%	48.46
Manufacturing Industrial (MI)	245.33	66.86	178.47	60%	107.08
Military Reservation (MR)	20.24	1.78	18.46	50%	9.23
Planned Industrial (PI)	350.68	84.65	266.03	70%	186.22
Medium Density Single-Family Residential (R-3)	358.33	143.04	215.29	25%	53.82
TOTALS	**3,224.68**	**782.26**	**2,442.42**	**25%**	**608.21**
02040202020020					
Hospital Development (HD)	10.78	1.73	9.05	70%	6.34
Mobile Home Residential (MH)	38.38	3.45	34.93	30%	10.48
Military Reservation (MR)	303.96	24.36	279.60	50%	139.80
Office Professional (OP)	3.08	0.00	3.08	50%	1.54
Very High Density Single-Family Residential (R-200)	18.46	0.11	18.35	30%	5.51
Very High Density Single-Family Residential (R-80)	928.59	146.12	782.47	30%	234.74
Town Center (TC)	3.46	0.44	3.02	70%	2.11
TOTALS	**1,306.71**	**176.21**	**1,130.50**	**35%**	**400.51**
02040202020010					
Military Reservation (MR)	248.67	22.74	225.93	50%	112.97
TOTALS	**248.67**	**22.74**	**225.93**	**50%**	**112.97**
02040202040040					
Agricultural Residential (AR)	649.82	195.74	454.08	12%	54.49
General Commercial/Light Industrial (GCLI)	352.11	104.04	248.07	70%	173.65
TOTALS	**1,001.93**	**299.78**	**702.15**	**32%**	**228.14**

TABLE 1: PEMBERTON TOWNSHIP BUILD-OUT CALCULATIONS					
HUC 14 and Zone	Total	Wetlands	Developable	Allowable	Build-out
02040202040020					
Agricultural Production (AP)	7.95	0.00	7.95	12%	0.95
Agricultural Residential (AR)	1,669.62	584.86	1,084.76	12%	130.17
General Commercial/Light Industrial (GCLI)	60.46	3.78	56.68	70%	39.68
Government Institution (GI)	183.69	79.88	103.81	50%	51.91
Military Reservation (MR)	1,443.01	767.13	675.88	50%	337.94
Pinelands Village (PV)	9.12	0.00	9.12	15%	1.37
High Density Single-Family Residential (R-1)	130.67	43.35	87.32	25%	21.83
Medium Density Single-Family Residential (R-3)	16.53	0.00	16.53	25%	4.13
Two-Family Residential (R-60)	1.86	0.00	1.86	30%	0.56
Very High Density Single-Family Residential (R-80)	12.68	0.00	12.68	30%	3.80
Very High Density Single-Family Residential (R-96)	13.89	0.00	13.89	30%	4.17
TOTALS	**3,549.48**	**1,479.00**	**2,070.48**	**29%**	**596.51**
02040202020030					
General Commercial/Light Industrial (GCLI)	78.48	19.95	58.53	70%	40.97
Hospital Development (HD)	36.53	0.77	35.76	70%	25.03
Military Reservation (MR)	856.76	81.62	775.14	50%	387.57
Office Professional (OP)	24.87	0.00	24.87	50%	12.44
Preservation (P)	320.27	156.99	163.28	5%	8.16
High Density Single-Family Residential (R-1)	758.05	262.52	495.53	25%	123.88
Very Low Density Single-Family Residential (R-17)	220.67	170.07	50.60	20%	10.12
Very High Density Single-Family Residential (R-200)	33.78	0.00	33.78	30%	10.13
Medium Density Single-Family Residential (R-3)	636.65	414.67	221.98	25%	55.50
Very High Density Single-Family Residential (R-80)	925.73	205.44	720.29	30%	216.09
Town Center (TC)	56.75	2.10	54.65	70%	38.26
TOTALS	**3,948.54**	**1,314.13**	**2,634.41**	**35%**	**928.15**

TABLE 1: PEMBERTON TOWNSHIP BUILD-OUT CALCULATIONS					
HUC14 and Zone	Total	Wetlands	Developable	Allowable	Build-out
02040202020040					
Agricultural Production (AP)	117.58	29.31	88.27	12%	10.59
General Commercial/Light Industrial (GCLI)	78.15	20.18	57.97	70%	40.58
Mobile Home Residential (MH)	29.47	1.16	28.31	30%	8.49
Military Reservation (MR)	1,360.68	237.24	1,123.44	50%	561.72
Preservation (P)	1.15	0.66	0.49	5%	0.02
Pinelands Village (PV)	17.65	2.08	15.57	15%	2.34
High Density Single-Family Residential (R-1)	78.18	0.68	77.50	25%	19.38
Very Low Density Single-Family Residential (R-17)	1,009.64	687.62	322.02	20%	64.40
Medium Density Single-Family Residential (R-3)	138.00	76.14	61.86	25%	15.47
Very High Density Single-Family Residential (R-80)	90.04	0.00	90.04	30%	27.01
Infill Single-Family & Multiple Family Residential (R-I)	35.12	0.00	35.12	25%	8.78
Town Center (TC)	94.45	8.19	86.26	70%	60.38
TOTALS	**3,050.11**	**1,063.26**	**1,986.85**	**41%**	**819.16**
02040202030050					
General Commercial/Light Industrial (GCLI)	38.39	0.73	37.66	70%	26.36
Mobile Home Residential (MH)	1.84	0.00	1.84	30%	0.55
Preservation (P)	1,231.33	989.57	241.76	5%	12.09
High Density Single-Family Residential (R-1)	158.55	50.65	107.90	25%	26.98
Very Low Density Single-Family Residential (R-17)	416.64	242.05	174.59	20%	34.92
Medium Density Single-Family Residential (R-3)	65.41	44.40	21.01	25%	5.25
Low Density Single-Family Residential (R-6)	85.67	29.51	56.16	25%	14.04
Very High Density Single-Family Residential (R-96)	176.53	0.45	176.08	30%	52.82
Special Agricultural Production (SAP)	8.65	0.00	8.65	5%	0.43
TOTALS	**2,183.01**	**1,357.36**	**825.65**	**21%**	**173.44**

TABLE 1: PEMBERTON TOWNSHIP BUILD-OUT CALCULATIONS					
HUC14 and Zone	Total	Wetlands	Developable	Allowable	Build-out
02040202040010					
Agricultural Production (AP)	2,589.15	1,531.94	1,057.21	12%	126.87
Agricultural Residential (AR)	20.75	18.18	2.57	12%	0.31
Government Institution (GI)	320.63	105.70	214.93	50%	107.47
Preservation (P)	198.97	36.89	162.08	5%	8.10
Pinelands Village (PV)	32.35	2.95	29.40	15%	4.41
High Density Single-Family Residential (R-1)	590.84	136.94	453.90	25%	113.48
Very High Density Single-Family Residential (R-200)	142.82	11.86	130.96	30%	39.29
Medium Density Single-Family Residential (R-3)	413.63	265.10	148.53	25%	37.13
Two-Family Residential (R-60)	59.17	0.32	58.85	30%	17.66
Very High Density Single-Family Residential (R-96)	187.90	0.22	187.68	30%	56.30
TOTALS	**4,556.21**	**2,110.10**	**2,446.11**	**21%**	**511.01**
02040202030090					
Agricultural Production (AP)	211.83	142.45	69.38	12%	8.33
General Commercial/Light Industrial (GCLI)	84.47	19.01	65.46	70%	45.82
Mobile Home Residential (MH)	51.80	1.14	50.66	30%	15.20
Preservation (P)	1,814.41	398.65	1,415.76	5%	70.79
Pinelands Village (PV)	27.72	5.98	21.74	15%	3.26
High Density Single-Family Residential (R-1)	0.06	0.00	0.06	25%	0.02
Very High Density Single-Family Residential (R-100)	193.70	0.00	193.70	30%	58.11
Very Low Density Single-Family Residential (R-17)	3,194.86	1,018.59	2,176.27	20%	435.25
Medium Density Single-Family Residential (R-3)	21.29	15.96	5.33	25%	1.33
Low Density Single-Family Residential (R-6)	0.50	0.00	0.50	25%	0.13
Very High Density Single-Family Residential (R-80)	110.51	4.77	105.74	30%	31.72
Very High Density Single-Family Residential (R-96)	85.46	0.20	85.26	30%	25.58
Infill Res Dist W/Planned Retirement Community (R-A)	366.96	43.93	323.03	25%	80.76
Infill Single-Family & Multiple Family Residential (R-I)	268.59	104.01	164.58	25%	41.15
Special Agricultural Production (SAP)	0.74	0.06	0.68	5%	0.03
TOTALS	**6,432.90**	**1,754.75**	**4,678.15**	**17%**	**817.47**

TABLE 1: PEMBERTON TOWNSHIP BUILD-OUT CALCULATIONS					
HUC14 and Zone	Total	Wetlands	Developable	Allowable	Build-out
02040202050070					
Agricultural Production (AP)	3,674.85	2,056.13	1,618.72	12%	194.25
Preservation (P)	618.78	26.44	592.34	5%	29.62
Very High Density Single-Family Residential (R-96)	5.96	0.28	5.68	30%	1.70
TOTALS	**4,299.59**	**2,082.85**	**2,216.74**	**10%**	**225.57**
02040202030060					
Preservation (P)	996.09	572.72	423.37	5%	21.17
Very Low Density Single-Family Residential (R-17)	107.86	5.62	102.24	20%	20.45
Low Density Single-Family Residential (R-6)	955.00	158.13	796.87	25%	199.22
Very High Density Single-Family Residential (R-96)	516.01	13.44	502.57	30%	150.77
Special Agricultural Production (SAP)	935.12	596.49	338.63	5%	16.93
TOTALS	**3,510.08**	**1,346.40**	**2,163.68**	**19%**	**408.54**
02040202030080					
Preservation (P)	1,548.25	350.15	1,198.10	5%	59.91
Very High Density Single-Family Residential (R-100)	405.87	36.48	369.39	30%	110.82
Very Low Density Single-Family Residential (R-17)	147.05	0.00	147.05	20%	29.41
TOTALS	**2,101.17**	**386.63**	**1,714.54**	**12%**	**200.13**
02040202030030					
Preservation (P)	545.28	112.44	432.84	5%	21.64
TOTALS	**545.28**	**112.44**	**432.84**	**5%**	**21.64**
02040202050060					
Preservation (P)	104.15	0.00	104.15	5%	5.21
TOTALS	**104.15**	**0.00**	**104.15**	**5%**	**5.21**

Table 2: Pollutant Loads by Land Cover

Land Cover	Total Phosphorus Load (lbs/acre/year)	Total Nitrogen Load (lbs/acre/year)	Total Suspended Solids Load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agricultural	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

Source: NJDEP Stormwater BMP Manual 2004.

NONPOINT SOURCE LOADS AT BUILD-OUT FOR PEMBERTON TOWNSHIP

HUC14 and Zone	Build-Out zoning	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/yr)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040202040030								
Agricultural Production (AP)	Agricultural	142.73	1.3	185.55	10	1,427.30	300	42,819.00
Agricultural Residential (AR)	Agricultural	1552.21	1.3	2,017.87	10	15,522.10	300	465,663.00
General Commercial/Light Industrial (GCLI)	Commercial	69.23	2.1	145.38	22	1,523.06	200	13,846.00
Manufacturing Industrial (MI)	Industrial	178.47	1.5	267.71	16	2,855.52	200	35,694.00
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	18.46	1.0	18.46	10	184.60	120	2,215.20
Planned Industrial (PI)	Industrial	266.03	1.5	399.05	16	4,256.48	200	53,206.00
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	215.29	1.4	301.41	15	3,229.35	140	30,140.60
TOTALS		**2442.42**		**3,335.42**		**28,998.41**		**643,583.80**
02040202020020								
Hospital Development (HD)	Commercial	9.05	2.1	19.01	22	199.10	200	1,810.00
Mobile Home Residential (MH)	High, Medium Density Residential	34.93	1.4	48.90	15	523.95	140	4,890.20
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	279.60	1.0	279.60	10	2,796.00	120	33,552.00
Office Professional (OP)	Commercial	3.08	2.1	6.47	22	67.76	200	616.00
Very High Density Single-Family Residential (R-200)	High, Medium Density Residential	18.35	1.4	25.69	15	275.25	140	2,569.00
Very High Density Single-Family Residential (R-80)	High, Medium Density Residential	782.47	1.4	1,095.46	15	11,737.05	140	109,545.80
Town Center (TC)	Commercial	3.02	2.1	6.34	22	66.44	200	604.00
TOTALS		**1,130.50**		**1,481.47**		**15,665.55**		**153,587.00**
02040202020010								
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	225.93	1.0	225.93	10	2,259.30	120	27,111.60
TOTALS		**225.93**		**225.93**		**2,259.30**		**27,111.60**
02040202040040								
Agricultural Residential (AR)	Agricultural	454.08	1.3	590.30	10	4,540.80	300	136,224.00
General Commercial/Light Industrial (GCLI)	Commercial	248.07	2.1	520.95	22	5,457.54	200	49,614.00
TOTALS		**702.15**		**1,111.25**		**9,998.34**		**185,838.00**
02040202040020								
Agricultural Production (AP)	Agricultural	7.95	1.3	10.34	10	79.50	300	2,385.00
Agricultural Residential (AR)	Agricultural	1,084.76	1.3	1,410.19	10	10,847.60	300	325,428.00
General Commercial/Light Industrial (GCLI)	Commercial	56.68	2.1	119.03	22	1,246.96	200	11,336.00
Government Institution (GI)	Urban, Mixed Urban, Other Urban	103.81	1.0	103.81	10	1,038.10	120	
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	675.88	1.0	675.88	10	6,758.80	120	81,105.60
Pinelands Village (PV)	Urban, Mixed Urban, Other Urban	9.12	1.0	9.12	10	91.20	120	1,094.40
High Density Single-Family Residential (R-1)	High, Medium Density Residential	87.32	1.4	122.25	15	1,309.80	140	12,224.80
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	16.53	1.4	23.14	15	247.95	140	2,314.20
Two-Family Residential (R-60)	High, Medium Density Residential	1.86	1.4	2.60	15	27.90	140	260.40
Very High Density Single-Family Residential (R-80)	High, Medium Density Residential	12.68	1.4	17.75	15	190.20	140	1,775.20
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	13.89	1.4	19.45	15	208.35	140	1,944.60
TOTALS		**2,070.48**		**2,513.55**		**22,046.36**		**439,868.20**

NONPOINT SOURCE LOADS AT BUILD-OUT FOR PEMBERTON TOWNSHIP

HUC 14 and Zone	Build-Out Zoning	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/yr)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040202020030								
General Commercial/Light Industrial (GCLI)	Commercial	58.53	2.1	122.91	22	1,287.66	200	24,582.60
Hospital Development (HD)	Commercial	35.76	2.1	75.10	22	786.72	200	15,019.20
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	775.14	1.0	775.14	10	7,751.40	120	93,016.80
Office Professional (OP)	Commercial	24.87	2.1	52.23	22	547.14	200	10,445.40
Preservation (P)	Forest, Water, Wetlands	163.28	0.1	16.33	3	489.84	40	653.12
High Density Single-Family Residential (R-1)	High, Medium Density Residential	495.53	1.4	693.74	15	7,432.95	140	97,123.88
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	50.60	0.6	30.36	5	253.00	100	3,036.00
Very High Density Single-Family Residential (R-200)	High, Medium Density Residential	33.78	1.4	47.29	15	506.70	140	6,620.88
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	221.98	1.4	310.77	15	3,329.70	140	43,508.08
Very High Density Single-Family Residential (R-80)	High, Medium Density Residential	720.29	1.4	1,008.41	15	10,804.35	140	141,176.84
Town Center (TC)	Commercial	54.65	2.1	114.77	22	1,202.30	200	22,953.00
TOTALS		**2,634.41**		**3,247.04**		**34,391.76**		**458,135.80**
02040202020040								
Agricultural Production (AP)	Agricultural	88.27	1.3	114.75	10	882.70	300	26,481.00
General Commercial/Light Industrial (GCLI)	Commercial	57.97	2.1	121.74	22	1,275.34	200	11,594.00
Mobile Home Residential (MH)	High, Medium Density Residential	28.31	1.4	39.63	15	424.65	140	3,963.40
Military Reservation (MR)	Urban, Mixed Urban, Other Urban	1,123.44	1.0	1,123.44	10	11,234.40	120	134,812.80
Preservation (P)	Forest, Water, Wetlands	0.49	0.1	0.05	3	1.47	40	19.60
Pinelands Village (PV)	Urban, Mixed Urban, Other Urban	15.57	1.0	15.57	10	155.70	120	1,868.40
High Density Single-Family Residential (R-1)	High, Medium Density Residential	77.50	1.4	108.50	15	1,162.50	140	10,850.00
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	322.02	0.6	193.21	5	1,610.10	100	32,202.00
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	61.86	1.4	86.60	15	927.90	140	8,660.40
Very High Density Single-Family Residential (R-80)	High, Medium Density Residential	90.04	1.4	126.06	15	1,350.60	140	12,605.60
Infill Single-Family & Multiple Family Residential (R-I)	High, Medium Density Residential	35.12	1.4	49.17	15	526.80	140	4,916.80
Town Center (TC)	Commercial	86.26	2.1	181.15	22	1,897.72	200	17,252.00
TOTALS		**1,986.85**		**2,159.87**		**21,449.88**		**265,226.00**
02040202030050								
General Commercial/Light Industrial (GCLI)	Commercial	37.66	2.1	79.09	22	828.52	200	15,817.20
Mobile Home Residential (MH)	High, Medium Density Residential	1.84	1.4	2.58	15	27.60	140	360.64
Preservation (P)	Forest, Water, Wetlands	241.76	0.1	24.18	3	725.28	40	967.04
High Density Single-Family Residential (R-1)	High, Medium Density Residential	107.90	1.4	151.06	15	1,618.50	140	21,148.40
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	174.59	0.6	104.75	5	872.95	100	10,475.40
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	21.01	1.4	29.41	15	315.15	140	4,117.96
Low Density Single-Family Residential (R-6)	Low Density, Rural Residential	56.16	0.6	33.70	5	280.80	100	3,369.60
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	176.08	1.4	246.51	15	2,641.20	140	34,511.68
Special Agricultural Production (SAP)	Agricultural	8.65	1.3	11.25	10	86.50	300	3,373.50
TOTALS		**825.65**		**682.52**		**7,396.50**		**94,141.42**

NONPOINT SOURCE LOADS AT BUILD-OUT FOR PEMBERTON TOWNSHIP

HUC14 and Zone	Build-Out Zoning	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/yr)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040202040010								
Agricultural Production (AP)	Agricultural	1057.21	1.3	1,374.37	10	10,572.10	300	317,163.00
Agricultural Residential (AR)	Agricultural	2.57	1.3	3.34	10	25.70	300	771.00
Government Institution (GI)	Urban, Mixed Urban, Other Urban	214.93	1.0	214.93	10	2,149.30	120	25,791.60
Preservation (P)	Forest, Water, Wetlands	162.08	0.1	16.21	3	486.24	40	6,483.20
Pinelands Village (PV)	Urban, Mixed Urban, Other Urban	29.40	1.0	29.40	10	294.00	120	3,528.00
High Density Single-Family Residential (R-1)	High, Medium Density Residential	453.90	1.4	635.46	15	6,808.50	140	63,546.00
Very High Density Single-Family Residential (R-200)	High, Medium Density Residential	130.96	14.0	1,833.44	15	1,964.40	140	18,334.40
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	148.53	1.4	207.94	15	2,227.95	140	20,794.20
Two-Family Residential (R-60)	High, Medium Density Residential	58.85	14.0	823.90	15	882.75	140	8,239.00
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	187.68	1.4	262.75	15	2,815.20	140	26,275.20
TOTALS		**2446.11**		**5,401.75**		**28,226.14**		**490,925.60**
02040202030090								
Agricultural Production (AP)	Agricultural	69.38	1.3	90.19	10	693.80	300	20,814.00
General Commercial/Light Industrial (GCLI)	Commercial	65.46	2.1	137.47	22	1,440.12	200	13,092.00
Mobile Home Residential (MH)	High, Medium Density Residential	50.66	1.4	70.92	15	759.90	140	7,092.40
Preservation (P)	Forest, Water, Wetlands	1,415.76	0.1	141.58	3	4,247.28	40	56,630.40
Pinelands Village (PV)	Urban, Mixed Urban, Other Urban	21.74	1.0	21.74	10	217.40	120	2,608.80
High Density Single-Family Residential (R-1)	High, Medium Density Residential	0.06	1.4	0.08	15	0.90	140	8.40
Very High Density Single-Family Residential (R-100)	High, Medium Density Residential	193.70	1.4	271.18	15	2,905.50	140	27,118.00
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	2,176.27	0.6	1,305.76	5	10,881.35	100	217,627.00
Medium Density Single-Family Residential (R-3)	High, Medium Density Residential	5.33	1.4	7.46	15	79.95	140	746.20
Low Density Single-Family Residential (R-6)	Low Density, Rural Residential	0.50	0.6	0.30	5	2.50	100	50.00
Very High Density Single-Family Residential (R-80)	High, Medium Density Residential	105.74	1.4	148.04	15	1,586.10	140	14,803.60
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	85.26	1.4	119.36	15	1,278.90	140	11,936.40
Infill Res Dist W/Planned Retirement Community (R-A)	High, Medium Density Residential	323.03	1.4	452.24	15	4,845.45	140	45,224.20
Infill Single-Damily & Multiple Family Residential (R-I)	High, Medium Density Residential	164.58	1.4	230.41	15	2,468.70	140	23,041.20
Special Agricultural Production (SAP)	Agricultural	0.68	1.3	0.88	10	6.80	300	204.00
TOTALS		**4,678.15**		**2,997.63**		**31,414.65**		**440,996.60**
02040202050070								
Agricultural Production (AP)	Agricultural	1,618.72	1.3	2,104.34	10	16,187.20	300	485,616.00
Preservation (P)	Forest, Water, Wetlands	592.34	0.1	59.23	3	1,777.02	40	23,693.60
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	5.68	1.4	7.95	15	85.20	140	795.20
TOTALS		**2,216.74**		**2,171.52**		**18,049.42**		**510,104.80**

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NONPOINT SOURCE LOADS AT BUILD-OUT FOR PEMBERTON TOWNSHIP

HUC14 and Zone	Build-Out Zoning	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/yr)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040202030060								
Preservation (P)	Forest, Water, Wetlands	423.37	0.1	42.34	3	1,270.11	40	16,934.80
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	102.24	0.6	61.34	5	511.20	100	10,224.00
Low Density Single-Family Residential (R-6)	Low Density, Rural Residential	796.87	0.6	478.12	5	3,984.35	100	79,687.00
Very High Density Single-Family Residential (R-96)	High, Medium Density Residential	502.57	1.4	703.60	15	7,538.55	140	70,359.80
Special Agricultural Production (SAP)	Agricultural	338.63	1.3	440.22	10	3,386.30	300	101,589.00
TOTALS		**2,163.68**		**1,725.62**		**16,690.51**		**278,794.60**
02040202030080								
Preservation (P)	Forest, Water, Wetlands	1,198.10	0.1	119.81	3	3,594.30	40	47,924.00
Very High Density Single-Family Residential (R-100)	High, Medium Density Residential	369.39	1.4	517.15	15	5,540.85	140	51,714.60
Very Low Density Single-Family Residential (R-17)	Low Density, Rural Residential	147.05	0.6	88.23	5	735.25	100	14,705.00
TOTALS		**1,714.54**		**725.19**		**9,870.40**		**114,343.60**
02040202030030								
Preservation (P)	Forest, Water, Wetlands	432.84	0.1	43.28	3	1,298.52	40	1,731.36
TOTALS		**432.84**		**43.28**		**1,298.52**		**1,731.36**
02040202050060								
Preservation (P)	Forest, Water, Wetlands	104.15	0.1	10.42	3	312.45	40	4,166.00
TOTALS		**104.15**		**10.42**		**312.45**		**4,166.00**

Township of Pemberton
500 Pemberton – Browns Mills Road
Pemberton, New Jersey 08068

October 18, 2006

Updated July 16, 2007

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ARH File#32-06002

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Section 1. Scope and Purpose.

A. Purpose.

1. It is hereby determined that:

   a) Land development projects and associated disturbance of vegetation and soil and changes in land cover, including increases in impervious cover, alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes. If inadequately or improperly managed, this stormwater runoff can deplete groundwater resources and increase flooding, stream channel erosion, and sediment transport and deposition. This stormwater runoff can also contribute to increased quantities of waterborne pollutants.

   b) Increases of stormwater runoff, soil erosion and nonpoint source pollutants have occurred in the past as a result of land development, and contribute to the degradation of the water resources of Pemberton Township.

   c) Certain lands of Pemberton Township lie within the Pinelands Area, and therefore, development in this portion of Pemberton Township is subject to the requirements of the Pinelands Protection Act (N.J.S.A. 13:18A-1 et seq.) and the implementing regulations and minimum standards contained in the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-1.1 et seq.) (CMP). The purpose and intent of these regulations and standards is to promote orderly development of the Pinelands so as to preserve and protect the significant and unique natural, ecological, agricultural, archaeological, historical, scenic, cultural and recreational resources of the Pinelands.

   d) Pinelands Area resources are to be protected in accordance with Pinelands Comprehensive Management Plan at N.J.A.C. 7:50 et seq., New Jersey's Stormwater Management Rules at N.J.A.C. 7:8-1.1 et seq. and New Jersey's surface water quality antidegradation policies contained in the New Jersey Surface Water Quality Standards at N.J.A.C. 7:9B-1.1 et seq.

   e) Increased stormwater rates and volumes and the sediments and pollutants associated with stormwater runoff from future development projects within the Pinelands Area have the potential to adversely affect Pemberton Township's streams and water resources and the streams and water resources of downstream municipalities.

   f) Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from development sites.

   g) It is in the public interest to regulate the discharge of stormwater runoff from "major development" projects, as defined in Section 7 of this ordinance, conducted within the Pinelands Area, as provided in this ordinance, in order to control and minimize increases in stormwater runoff rates and volumes, to maintain groundwater recharge, and to control and minimize soil erosion, stream channel erosion and nonpoint source pollution associated with stormwater runoff.

2. Therefore, it is the purpose of this ordinance to establish minimum stormwater management requirements and controls for major development, consistent with the statewide stormwater requirements at N.J.A.C. 7:8, the regulations and standards contained in the Pinelands CMP, and the provisions of the adopted master plan and land use ordinances of Pemberton Township.

B. Management Techniques.

1. In order to achieve the goals for stormwater control set forth in the Municipal Stormwater Management Plan, Pemberton Township has identified the following management techniques:

   a) Implementation of multiple stormwater management Best Management Practices (BMPs) may be necessary to achieve the performance standards for stormwater runoff quantity and rate, groundwater recharge, erosion control, and stormwater runoff quality established through this ordinance.

   b) Compliance with the stormwater runoff quantity and rate, groundwater recharge, erosion control, and stormwater runoff quality standards established through N.J.A.C. 7:8-1.1 et seq., and this ordinance, shall be accomplished to the maximum extent practicable through the use of nonstructural BMPs, before relying on structural BMPs. Nonstructural BMPs are also known as Low Impact Development (LID) techniques.

   c) Nonstructural BMPs shall include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater.

   d) Source control plans shall be developed based upon physical site conditions and the origin, nature and the anticipated quantity or amount of potential pollutants.

   e) Structural BMPs, where necessary shall be integrated with nonstructural stormwater management strategies and proper maintenance plans.

When using structural BMPs, multiple stormwater management measures, smaller in size and distributed spatially throughout the land development site, shall be used wherever possible to achieve the performance standards for water quality, quantity and groundwater recharge established through this ordinance before relying on a single, larger stormwater management measure to achieve these performance standards.

C. Applicability.

1. This ordinance shall apply to:

   a) All site plans and subdivisions for major developments occurring within the Pinelands Area that require preliminary or final site plan or subdivision review; and

   b) All major development projects undertaken by Pemberton Township.

D. Procedures.

In addition to other development review procedures set forth in the Code of Pemberton Township, major developments located within the Pinelands Area shall comply with the stormwater management requirements and specifications set forth in this ordinance. New agricultural development that meets the definition of major development in Section 7 of this ordinance shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of N.J.A.C. 7.8-5.4(b).

E. Compatibility with Other Permit and Ordinance Requirements.

1. 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 ordinance, code, rule, regulation, statute, act or other provision of law.
2. 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 or stringent provisions or higher standards shall control.
3. In the event that a regional stormwater management plan(s) is prepared and formally adopted pursuant to N.J.A.C. 7:8-1.1 et seq. for any drainage area(s) or watershed(s) of which Pemberton Township is a part, the stormwater provisions of such a plan(s) shall be adopted by Pemberton Township within one year of the adoption of a Regional Stormwater Management Plan (RSWMP) as an amendment to an Areawide Water Quality Management Plan. Local ordinances proposed to implement the RSWMP shall be submitted to the Commission for certification within six months of the adoption of the RSWMP per N.J.A.C. 7:8 and the Pinelands CMP (N.J.A.C. 7:50.)

Section 2. Requirements for a Site Development Stormwater Plan.

A. Submission of Site Development Stormwater Plan.

1. Whenever an applicant seeks municipal approval of a site development that is subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 2.C below as part of the applicant's application for subdivision or site plan approval. These required components are in addition to any other information required under any provisions of Pemberton Township's land use ordinance or by the Pinelands Commission pursuant to N.J.A.C. 7:50-1.1 et seq.
2. The applicant shall demonstrate that the site development project meets the standards set forth in this ordinance.
3. The applicant shall submit three (3) paper copies and one copy on compact disk of the materials listed in the checklist for site development stormwater plans in accordance with Section 3.C of this ordinance.

B. Site Development Stormwater Plan Approval.

1. The applicant's site development stormwater plan shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from whom 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. Any application for approval of a major development shall include submission of all required plans and reports in electronic format on compact disk. All required engineering plans shall be submitted to Pemberton Township in CAD Format, AutoCAD Version 15 or higher registered and rectified to NJ State Plane Feet NAD 83 or Shape File Format NJ State Plane Feet NAD 83. Reports shall be submitted in electronic file formats such as pdf, word processing, database or spreadsheet files. Six (6) paper copies and one copy on compact disk of all required plans and reports shall be submitted.

1. Topographic Base Map. The applicant shall submit a topographic base map of the site which extends a minimum of two hundred (200) feet beyond the limits of the proposed development, at a scale of one (1) inch = two hundred (200) feet or greater, showing one (1) foot contour intervals. The map shall indicate the following: existing surface water drainage, shorelines, steep slopes, soils, highly erodible soils, perennial or intermittent streams that drain into or upstream of any Category One or Pinelands Waters, wetlands and floodplains 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. Pemberton Township may require upstream tributary drainage system information for use in evaluation of the application.
2. Environmental Site Analysis. The applicant shall submit a written description along with the drawings of the natural and man-made features of the site and its environs. This description should include:

a) A discussion of environmentally critical areas, 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 for or constraints on development; and

b) Detailed soil and other environmental conditions on the portion of the site proposed for installation of any stormwater BMPs, including, at a minimum: soils report based on onsite soil tests; locations and spot elevations in plan view of test pits and permeability tests; permeability test data and calculations; and any other required soil data (e.g., mounding analyses results) correlated with location and elevation of each test site; cross-section of proposed stormwater BMP with side-by-side depiction of soil profile drawn to scale and seasonal high water table elevation identified; and any other information necessary to demonstrate the suitability of the specific proposed structural and nonstructural stormwater management measures relative to the environmental conditions on the portion(s) of the site proposed for implementation of those measures.

3. Project description and site plan(s). The applicant shall submit 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 will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.

4. Land Use Planning and Source Control Plan.

   a) The applicant shall submit a detailed Land Use Planning and Source Control Plan which provides a description of how the site will be developed to meet the erosion control, groundwater recharge and stormwater runoff quantity and quality standards at Section 4 through use of nonstructural or low impact development techniques and source controls to the maximum extent practicable before relying on structural BMPs. The Land Use Planning and Source Control Plan shall include a detailed narrative and associated illustrative maps and/or plans that specifically address how each of the following nine (9) nonstructural strategies identified in Subchapter 5 of the NJDEP Stormwater Management Rules (N.J.A.C. 7:8-5) and set forth below (4.a. i. through ix.) will be implemented to the maximum extent practicable to meet the standards at Section 4 of this ordinance on the site. If one or more of the nine (9) nonstructural strategies will <u>not</u> be implemented on the site, the applicant shall provide a detailed rationale establishing a basis for the contention that use of the strategy is not practicable on the site.

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

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

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

iv. Minimize the decrease in the "time of concentration" from pre-development to post-development;

v. Minimize land disturbance including clearing and grading;

vi. Minimize soil compaction;

vii. Provide low-maintenance landscaping that provides for the retention and planting of native plants and minimizes the use of lawns, fertilizers and pesticides, in accordance with N.J.A.C. 7:50-6.24;

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

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

(1) Site design features that help to prevent accumulation of trash and debris in drainage systems;

(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) 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, when establishing vegetation after land disturbance.

b) For sites where stormwater will be generated from "high pollutant loading areas" or where stormwater will be exposed to "source material," as defined in Section 7 of this ordinance, the applicant shall also demonstrate in the Land Use Planning and Source Control Plan that the requirements of Section 4 have been met.

c) The use of nonstructural strategies to meet the performance standards in Section 4 of this ordinance is not required for development sites creating less than one (1) acre of disturbance or for development sites creating less than one-quarter (1/4) acre of impervious surface. However, each application for major development and any other application where Pemberton Township otherwise requires a landscaping plan shall contain a landscaping or revegetation plan in accordance with the CMP standards at N.J.A.C. 7:50-6.24(c).

5. Stormwater Management Facilities Map. The applicant shall submit a map, at the same scale as the topographic base map, depicting the following information:

i. The total area to be disturbed, paved and/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 manage and dispose of stormwater; and

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

6. Calculations (groundwater recharge and stormwater runoff rate, volume and quality). The applicant shall submit comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 3. The standards for groundwater recharge and stormwater runoff rate, volume and quality required by Section 4 shall be met using the methods, calculations and assumptions provided in Section 3.

7. Inspection, Maintenance and Repair Plan. The applicant shall submit a detailed plan describing how the proposed stormwater management measure(s) shall meet the maintenance and repair requirements of Section 6 of this ordinance. Said plan shall include, at a minimum, the following elements:

   a) The frequency with which inspections will be made;

   b) The specific maintenance tasks and requirements for each proposed structural and nonstructural BMP;

   c) The name, address and telephone number for the entity responsible for implementation of the maintenance plan;

   d) The reporting requirements; and

   e) Copies of the inspection and maintenance reporting sheets.

8. Exception from submission requirements. An exception may be granted from submission of any of these required components (except 7. above, Inspection, Maintenance, and Repair Plan) if its absence will not materially affect the review process. However, items required pursuant to the application requirements in the Pinelands CMP (N.J.A.C. 7:50-4.2(b) shall be submitted to the NJ Pinelands Commission unless the Executive Director waives or modifies the application requirements.

Section 3. Methodologies for the Calculation of Stormwater Runoff Rate and Volume, Stormwater Runoff Quality, and Groundwater Recharge.

A. Method of Calculating Stormwater Runoff Rate and Volume.

1. In complying with the Stormwater Runoff Quantity and Rate Standards in Section 4.B, the design engineer shall calculate the stormwater runoff rate and volume using the USDA Natural Resources Conservation Service (NRCS) Runoff Equation, Runoff Curve Numbers, and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds as amended and supplemented. Alternative methods of calculation may be utilized, provided such alternative methods are at least as protective as the NRCS methodology when considered on a regional stormwater management basis.
2. In calculating stormwater runoff using the NRCS methodology, the design engineer shall separately calculate and then combine the runoff volumes from pervious and directly connected impervious surfaces within a drainage area within the parcel.
3. Calculation of stormwater runoff from unconnected impervious surfaces shall be based, as applicable, upon the Two-Step method described in the current New Jersey Stormwater Best Management Practices Manual or the NRCS methodology.
4. In calculating stormwater runoff using the NRCS methodology, the design engineer shall use appropriate 24-hour rainfall depths as developed for the project site by the National Oceanic and Atmospheric Administration, available online at http://hdsc.nws.noaa.gov/hdsc/pfds/index.html.
5. When calculating stormwater runoff for pre-developed site conditions, the design engineer shall use the following criteria:
    a) When selecting or calculating Runoff Curve Numbers (CNs) for pre-developed project site conditions, the project site's land cover shall be assumed to be woods in good condition. However, another land cover may be used to calculate runoff coefficients if:
        i. Such land cover has existed at the site or portion thereof without interruption for at least five (5) years immediately prior to the time of application; and
        ii. The design engineer can document the character and extent of such land cover through the use of photographs, affidavits, and/or other acceptable land use records.
    b) If more than one land cover has existed on the site during the five (5) years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations.
    c) All pre-developed land covers shall be assumed to be in good hydrologic condition and, if cultivated, shall be assumed to have conservation treatment.
    d) In calculating pre-developed site stormwater runoff, the design engineer shall include the effects of all land features and structures, such as ponds, wetlands, depressions, hedgerows, and culverts that affect pre-developed site stormwater runoff rates and/or volumes.
    e) Where tailwater will affect the hydraulic performance of a stormwater management measure, the design engineer shall include such effects in the measure's design.

B. Method of Calculating Stormwater Runoff Quality.

1. In complying with the Stormwater Runoff Quality Standards in Section 4.E, the design engineer shall calculate the stormwater runoff rate and volume using the USDA Natural Resources Conservation Service (NRCS) Runoff Equation, Runoff Curve Numbers, and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds, as amended and supplemented.
2. The design engineer shall also use the NJDEP Water Quality Design Storm, which is one and one-quarter (1.25) inches of rainfall falling in a nonlinear pattern in two (2) hours. Details of the Water Quality Design Storm are shown in Table 1.
3. Calculation of runoff volumes, peak rates, and hydrographs for the Water Quality Design Storm may take into account the implementation of nonstructural 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		

Source: N.J.A.C. 7:8-5.5 (a)

4. Total Suspended Solids (TSS) reduction calculations.

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

   $R = A + B - (A \times B) / 100$, where:

   R = total TSS percent load removal from application of both BMPs;
   A = the TSS percent removal rate applicable to the first BMP; and
   B = the TSS percent removal rate applicable to the second BMP.

   ii. If there is more than one onsite drainage area, the eighty percent (80%) 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. TSS removal rates for stormwater BMPs.

   a) For purposes of TSS reduction calculations, Table 2 presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey BMP Manual. The BMP Manual may be obtained from the address identified in Section 12.A or found on the NJDEP's website at www.njstormwater.org. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2.

   b) Alternative stormwater management measures, 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 Pemberton Township. Any alternative stormwater management measure, removal rate or method of calculating the removal rate shall be subject to approval by Pemberton Township and a copy shall be provided to the following:

      i. The Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, NJ, 08625-0418; and

      ii. The New Jersey Pinelands Commission, PO Box 7, New Lisbon, NJ, 08064.

Table 2: Pollutant Removal Rates for BMPs			
Best Management Practice	**TSS Percent Removal Rate**	**Total Phosphorus Percent Removal Rate**	**Total Nitrogen Percent Removal Rate**
Bioretention Systems	90	60	30
Constructed Stormwater Wetland	90	50	30
Extended Detention Basin	40-60 (final rate based upon detention time; see New Jersey BMP Manual, Chap. 9)	20	20
Infiltration basin	80	60	50
Manufactured Treatment Device	Pollutant removal rates as certified by NJDEP; see Section 3.	Pollutant removal rates as certified by NJDEP; see Section 3.	Pollutant removal rates as certified by NJDEP; see Section 3.
Pervious Paving Systems	80 (porous paving)	60	50
	80 (permeable pavers with storage bed)		
	0 - volume reduction only (permeable pavers without storage bed)	0 - volume reduction only (permeable pavers without storage bed)	0 - volume reduction only (permeable pavers without storage bed)
Sand Filter	80	50	35
Vegetative Filter Strip (For filter strips with multiple vegetated covers, the final TSS removal rate should be based upon a weighted average of the adopted rates shown in Table 2, based upon the relative flow lengths through each cover type.)	60 (turf grass)	30	30
	70 (native grasses, meadow and planted woods)		
	80 (indigenous woods)		
Wet Pond / Retention Basin	50-90 (final rate based upon pool volume and detention time; see NJ BMP Manual)	50	30

Source: N.J.A.C. 7:8-5.5 (c) and New Jersey BMP Manual Chapter 4.

6. Nutrient removal rates for stormwater BMPs. For purposes of post-development nutrient load reduction calculations, Table 2 presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey BMP Manual. If alternative stormwater BMPs are proposed, the applicant shall demonstrate that the selected BMPs will achieve the nutrient removal standard required in Section 4.E.

C. Methods of Calculating Groundwater Recharge.

1. In complying with the groundwater recharge requirements in Section 4.C.1.a, the design engineer may calculate groundwater recharge in accordance with the New Jersey Groundwater Recharge Spreadsheet (NJGRS) computer program incorporated herein by reference as amended and supplemented. Information regarding the methodology is available in Section 11.A or from the New Jersey BMP Manual.
2. Alternative groundwater recharge calculation methods to meet these requirements may be used upon approval by the municipal engineer.
3. In complying with the groundwater recharge requirements in Section 4.C.1.b, the design engineer shall:
   a) Calculate stormwater runoff volumes in accordance with the USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Runoff Curve Numbers, as described in the NRCS National Engineering Handbook Part 630 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds as amended and supplemented; and
   b) Use appropriate 2-year, 24-hour rainfall depths as developed for the project site by the National Oceanic and Atmospheric Administration, available online at http://hdsc.nws.noaa.gov/hdsc/pfds/index.html.
4. When calculating groundwater recharge or stormwater runoff for pre-developed site conditions, the design engineer shall use the following criteria:
   a) When selecting land covers or calculating Runoff Curve Numbers (CNs) for pre-developed project site conditions, the project site's land cover shall be assumed to be woods. However, another land cover may be used to calculate runoff coefficients if:
      i. Such land cover has existed at the site or portion thereof without interruption for at least five (5) years immediately prior to the time of application; and
      ii. The design engineer can document the character and extent of such land cover through the use of photographs, affidavits, and/or other acceptable land use records.
   b) If more than one land cover, other than woods, has existed on the site during the five (5) years immediately prior to the time of application, the land cover with the lowest runoff potential (including woods) shall be used for the computations.
   c) All pre-developed land covers shall be assumed to be in good hydrologic condition and, if cultivated, shall be assumed to have conservation treatment.

Section 4. Stormwater Management Performance Standards for Major Development.

A. Nonstructural Stormwater Management Strategies.

1. To the maximum extent practicable, the performance standards in Section 4 for major development shall be met by incorporating the nine (9) nonstructural strategies identified in Subchapter 5 of the NJ Stormwater Management Rules (N.J.A.C. 7:8-5), and set forth in Section 2.C.4.a, into the design. The applicant shall identify within the Land Use Planning and Source Control Plan required by Section 2.C.4 of this ordinance how each of the nine (9) nonstructural measures will be incorporated into the design of the project to the maximum extent practicable.

2. If the applicant contends that it is not practical for engineering, environmental or safety reasons to incorporate any of the nine (9) nonstructural strategies into the design of a particular project, the applicant shall provide a detailed rationale establishing a basis for the contention that use of the strategy is not practical on the site. This rationale shall be submitted in accordance with the Checklist Requirements established by Section 2 to Pemberton Township. A Determination by Pemberton Township that this rationale is inadequate or without merit shall result in a denial of the application unless the following conditions are met:

   a) The Land Use Planning and Source Control Plan is amended to include a description of how all nine (9) nonstructural measures will be implemented on the development site, and the amended Plan is approved by Pemberton Township;

   b) The Land Use Planning and Source Control Plan is amended to provide an alternative nonstructural strategy or measure that is not included in the list of nine (9) nonstructural measures, but still meets the performance standards in Section 4, and the amended Plan is approved by Pemberton Township; or

   c) The Land Use Planning and Source Control Plan is amended to provide an adequate rationale for the contention that use of the particular strategy is not practical on the site, and the amended Plan is approved by Pemberton Township.

3. Existing trees and vegetation to be preserved shall be protected during construction activities in accordance with the "Standard for Tree Protection During Construction" provided in the NJ State Soil Conservation Committee Standards for Soil Erosion and Sediment Control in New Jersey, which is incorporated herein by reference as amended and supplemented.

4. In addition to all other requirements of this section, each application for major development, and any other application where Pemberton Township otherwise requires a landscaping plan, shall contain a landscaping or revegetation plan in accordance with the Pinelands CMP standards at N.J.A.C. 7:50-6.24(c).

5. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Section 4 shall be dedicated to a government entity; shall be subjected to a conservation easement filed with the appropriate County Clerk's office; or shall be subjected to an equivalent form of restriction approved by Pemberton Township

that ensures that that measure, or equivalent stormwater management measure is maintained in perpetuity, as detailed in Section 6 of this ordinance.

6. Guidance for nonstructural stormwater management strategies is available in the New Jersey BMP Manual, which may be obtained from the address identified in Section 12.A or found on the NJDEP's website at www.njstormwater.org.

7. Exception for major development sites. The use of nonstructural strategies to meet the performance standards in Section 4 of this ordinance is not required for major development creating less than one (1) acre of disturbance or for major development creating less than one quarter (1/4) acre of impervious surface. However, the following requirements shall be met:

   a) Each application for major development and any other application where Pemberton Township otherwise requires a landscaping plan shall contain a landscaping or revegetation plan prepared in accordance with the Pinelands CMP standards (N.J.A.C. 7:50-6.24(c));

   b) Existing trees and vegetation to be preserved shall be protected during construction activities in accordance with the "Standard for Tree Protection During Construction" provided in the NJ State Soil Conservation Committee Standards for Soil Erosion and Sediment Control in New Jersey, which is incorporated herein by reference as amended and supplemented.

B. Stormwater Runoff Quantity and Rate Standards.

1. There shall be no direct discharge of stormwater runoff from any point or nonpoint source to any wetland, wetlands transition area or surface waterbody. In addition, stormwater runoff shall not be directed in such a way as to increase the volume and/or rate of discharge into any surface water body from that which existed prior to development of the site.

2. To the maximum extent practical, there shall be no direct discharge of stormwater runoff onto farm fields so as to protect farm crops from damage due to flooding, erosion and long term saturation of cultivated crops and cropland.

3. For all major developments, the total runoff volume generated from the net increase in impervious surfaces by a ten (10) year, twenty-four (24) hour storm shall be retained and infiltrated onsite.

4. In addition, the design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations contained in Section 3, complete one of the following:

   a) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, the post-developed stormwater runoff hydrographs from the project site for the 2, 10, and 100-Year storm events do not exceed, at any point in time, the site's pre-developed runoff hydrographs for the same storm events;

   b) 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;

c) Design stormwater management measures so that the peak post-developed stormwater runoff rates from the project site for the two (2), ten (10) and one hundred (100) year storms are fifty, seventy-five and eighty percent (50%, 75% and 80%), respectively, of the site's peak pre-developed stormwater runoff rates for the same storms. Peak outflow rates from onsite stormwater measures for these storms shall be adjusted where necessary to account for the discharge of increased stormwater runoff rates from project site areas not controlled by the onsite measures. These percentages do not have to be applied to those portions of the project site that are not proposed for development at the time of application, provided that such areas are:

i. Protected from future development by imposition of a conservation easement, deed restriction, or other acceptable legal measures; or

ii. Would be subject to review under these standards if they were proposed for any degree of development in the future.

5. In tidal flood hazard areas, a stormwater runoff quantity analysis in accordance with a, b, and c above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

6. The standards for stormwater runoff quantity and rate required by this section shall be met using the methods, calculations and assumptions provided in Section 3.

7. Exceptions

a) The provisions of Section 4.B.3 shall not apply to major developments that create less than one acre of disturbance or major developments that create less than one-quarter acre of impervious surface.

C. Groundwater Recharge Standards.

1. For all major developments, with the exception of those described in Section 4.C.4, below, the design engineer, using the assumptions and factors for stormwater runoff and groundwater recharge calculations contained in Section 3, shall either:

a) Demonstrate through hydrologic and hydraulic analysis that the post-developed project site maintains 100 percent of the site's pre-developed average annual groundwater recharge volume; or

b) Demonstrate through hydrologic and hydraulic analysis that any increase in the project site's stormwater runoff volume for the two (2) year, twenty four (24) hour storm from pre-developed to post-developed conditions is infiltrated on-site.

2. The design engineer shall assess the hydraulic impact on the groundwater table and design the project site and all site groundwater recharge measures so as to avoid adverse hydraulic impacts. Adverse hydraulic impacts include, but are not limited to: raising the groundwater table so as to cause surface ponding; flooding of basements and other subsurface structures and areas; preventing a stormwater infiltration basin from completely draining via infiltration within seventy-two (72) hours of a design storm

event; and interference with the proper operation of subsurface sewage disposal systems and other surface and subsurface facilities in the vicinity of the groundwater recharge measure.

3. The standards for groundwater recharge required by this section shall be met using the methods, calculations and assumptions provided in Section 3.

4. Exceptions.

   a) The preceding groundwater recharge standards shall not apply to major developments that create less than one (1) acre of disturbance or major developments that create less than one quarter (0.25) acre of impervious surface.

D. Erosion Control Standards. 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 its implementing regulations, N.J.A.C 2:90-1.1 through 1.4.

E. Stormwater Runoff Quality Standards.

1. There shall be no direct discharge of stormwater runoff from any point or nonpoint source to any wetland, wetland transition area or surface waterbody.

2. Stormwater management measures shall be designed to reduce the total suspended solids (TSS) load in the stormwater runoff from the post-developed site by eighty percent (80%) expressed as an annual average.

3. Stormwater management measures shall also be designed to reduce the nutrient load in the stormwater runoff from the post-developed site by the maximum extent practicable. In achieving this reduction, the design of the development site shall include nonstructural and structural stormwater management measures that optimize nutrient removal while still achieving the groundwater recharge, runoff quantity and rate, and TSS removal standards in this section.

4. The standards for stormwater runoff quality required by this section shall be met using the methods, calculations, assumptions and pollutant removal rates provided in Section 3.

5. Exceptions.

   a) The preceding stormwater runoff quality standards shall not apply to major development sites where less than one-quarter (0.25) acre of additional impervious surface is proposed.

   b) The TSS reduction requirement in Section 4.F.2 shall not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the NJPDES rules (N.J.A.C. 7:14A) or in a discharge specifically exempt under a NJPDES permit from this requirement.

F. Additional stormwater quality standards for high pollutant loading areas and areas where stormwater runoff is exposed to source material.

1. This subsection applies to the following areas of a major development as defined in Section 7 of this ordinance:

   a) High pollutant loading areas (HPLAs); and

b) Areas where stormwater is exposed to "source material."

2. For a major development in areas described in 1.a or 1.b above, in addition to the infiltration requirements specified in Section 4.B.2 and the groundwater recharge requirements specified in Section 4.C, the applicant shall demonstrate in the Land Use Planning and Source Control Plan required in Section 2.C.4 that the following requirements have been met:

   a) The extent of the areas described in 1.a. and 1.b. above have been minimized on the development site to the maximum extent practicable;

   b) The stormwater runoff from the areas described in 1.a and 1.b above is segregated to the maximum extent practicable from the stormwater runoff generated from the remainder of the site such that co-mingling of the stormwater runoff from the areas described in 1.a and 1.b above and the remainder of the site will be minimized;

   c) The amount of precipitation falling directly on the areas described in 1.a and 1.b above is minimized to the maximum extent practicable by means of a canopy, roof or other similar structure that reduces the generation of stormwater runoff; and

   d) The stormwater runoff from or co-mingled with the areas described in 1.a and 1.b above for the Water Quality Design Storm, defined in Section 3.B.Table 1 shall be subject to pretreatment by one or more of the following stormwater BMPs, designed in accordance with the New Jersey BMP Manual to provide 90 % TSS removal:

      i. Bioretention system;

      ii. Sand filter;

      iii. Wet ponds which shall be hydraulically disconnected by a minimum of 2 feet of vertical separation from the seasonal high water table and shall be designed to achieve a minimum 80%TSS removal rate.

      iv. Constructed stormwater wetlands; and/or

      v. Media filtration system manufactured treatment device with a minimum 80% TSS removal as verified by the New Jersey Corporation for Advanced Technology and as certified by NJDEP.

   e) If the potential for contamination of stormwater runoff by petroleum products exists onsite, prior to being conveyed to the pretreatment BMP required in Section 4.F.2.d above, the stormwater runoff from the areas described in 1.a and 1.b above shall be conveyed through an oil/grease separator or other equivalent manufactured filtering device to remove the petroleum hydrocarbons. The applicant shall provide the reviewing agency with sufficient data to demonstrate acceptable performance of the device.

G. Threatened and Endangered Species and Associated Habitat Standards. Stormwater management measures shall address the impacts of the development on habitat for threatened and endangered species, in accordance with N.J.A.C. 7:8-5.2(c), N.J.A.C. 7:50-6.27, and 7:50-6.33 and 34.

H. Exceptions and Mitigation Requirements.

1. Exceptions from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements established by this ordinance may be granted, at the discretion of the Pemberton Township, and subject to approval by the Pinelands Commission, provided that all of the following conditions are met:

   a) The exception is consistent with that allowed by Pemberton Township;

   b) Pemberton Township has an adopted and effective municipal stormwater management plan in accordance with N.J.A.C. 7:8-4.4, which includes a mitigation plan in accordance with N.J.A.C. 7:8-4.2(c)11, and is also certified by the Pinelands Commission. The mitigation plan shall identify what measures are necessary to offset the deficit created by granting the exception and the municipality shall submit a written report to the county review agency and the NJDEP describing the exception and the required mitigation. Guidance for developing municipal stormwater management plans, including mitigation plans, is available from the NJDEP, Division of Watershed Management and the New Jersey BMP Manual.

   c) The applicant demonstrates that mitigation, in addition to the requirements of mitigation plan discussed in b) above, will be provided consistent with one of the following options:

      i. Mitigation may be provided off-site, but within the Pinelands Area and within the same drainage area as the development site, and shall meet or exceed the equivalent recharge, quality or quantity performance standard which is lacking on the development site due to the exception; or

      ii. In lieu of the required mitigation, a monetary "in lieu contribution" may be provided by the applicant to Pemberton Township in accordance with the following:

         (a) The amount of the in lieu contribution shall be determined by Pemberton Township, but the maximum in lieu contribution required shall be equivalent to the cost of implementing and maintaining the stormwater management measure(s) for which the exception is granted;

         (b) The in lieu contribution shall be used to fund an off-site stormwater control mitigation project(s) located within the Pinelands Area, within the same drainage area as the development site, and shall meet or exceed the equivalent recharge, quality or quantity performance standards which is lacking on the development site. Such mitigation project shall be identified by Pemberton Township in Pemberton Township's adopted municipal stormwater management plan. The stormwater control project to which the monetary contribution will be applied shall be identified by Pemberton Township at the time the exception is granted. The applicant shall amend the project description and site plan required in Section 2.C.3 to incorporate a description of both the standards for which an on-site exception is being granted and of the selected off-site mitigation project.

         (c) Pemberton Township shall expend the in lieu contribution to implement the selected off-site mitigation project within five (5) years from the date that

payment is received. Should Pemberton Township fail to expend the in lieu contribution within the required timeframe, the mitigation option provided in Section 4.H.1.c.iii of this ordinance shall be void and Pemberton Township shall be prohibited from collecting in lieu contributions.

2. An exception from strict compliance granted in accordance with H.1. above shall not constitute a waiver of strict compliance from the requirements of the Pinelands Comprehensive Management Plan at N.J.A.C. 7:50. An applicant should contact the Pinelands Commission to determine whether a waiver of strict compliance is also required in accordance with N.J.A.C. 7:50, Subchapter 4, Part V.

Section 5. Design, Construction, and Safety Standards for Structural Stormwater Management Measures

A. General Design and Construction Standards

1. Structural stormwater management measures shall be designed to meet the standards established in this section. These standards have been developed to protect public safety, conserve natural features, create an aesthetically pleasing site and promote proper onsite stormwater management.

2. The following structural stormwater management measures may be utilized as part of a stormwater management system at a major land development in the Pinelands, provided that the applicant demonstrates that they are designed, constructed and maintained so as to meet the standards and requirements established by this ordinance. If alternative stormwater management measures are proposed, the applicant shall demonstrate that the selected measures will achieve the standards established by this ordinance.

   a) Bioretention systems;

   b) Constructed stormwater wetlands;

   c) Extended detention basins;

   d) Infiltration basins;

   e) Vegetated filter strips;

   f) Infiltration basins and trenches;

   g) Wet ponds with suitable liners;

   h) Pervious paving systems; and

   i) Manufactured treatment devices, provided their pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the NJDEP.

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

4. Structural stormwater management measures shall be designed and constructed 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 7.8 shall be deemed to meet this requirement); to minimize and facilitate maintenance and repairs; and to ensure proper functioning.

5. For all stormwater management measures at a development site, each applicant shall submit a detailed Inspection, Maintenance and Repair Plan consistent with the requirements of Section 6 of this ordinance.

6. To the maximum extent practicable, the design engineer shall design structural stormwater management measures on the development site in a manner that:

a) Limits site disturbance, maximizes stormwater management efficiencies, and maintains or improves aesthetic conditions;

b) Utilizes multiple stormwater management measures, smaller in size and distributed spatially throughout the land development site, instead of a single larger structural stormwater management measure;

c) Incorporates pretreatment measures. Pretreatment can extend the functional life and increase the pollutant removal capability of a structural stormwater management measure. Pretreatment measures may be designed in accordance with the New Jersey BMP Manual or other sources approved by the municipal engineer.

7. Stormwater management basins shall be designed in a manner that complements and mimics the existing natural landscape, including but not limited to the following design strategies:

a) Use of natural, non-wetland wooded depressions for stormwater runoff storage; and

b) Establishment of attractive landscaping in and around the basin that mimics the existing vegetation and incorporates native Pinelands plants, including, but not limited to, the species listed in N.J.A.C. 7:50-6.25 and 6.26.

8. Stormwater management basins shall be designed with gently sloping sides. The maximum allowable basin side slope shall be three (3) horizontal to one (1) vertical (3:1).

9. Guidance on the design and construction of structural stormwater management measures may be found in the New Jersey BMP Manual. Other guidance sources may also be used upon approval by the municipal engineer.

10. After all construction activities and required field testing have been completed on the development site, as-built plans depicting design and as-built elevations of all stormwater management measures shall be prepared by a Licensed Land Surveyor and submitted to the municipal engineer. Based upon the municipal engineer's review of the as-built plans, all corrections or remedial actions deemed by the municipal engineer to be necessary due to the failure to comply with the standards established by this ordinance and/or any reasons of public health or safety shall be completed by the applicant.

B. Design and Construction Standards for Stormwater Infiltration BMPs.

1. Stormwater infiltration BMPs, such as bioretention systems with infiltration, dry wells, infiltration basins, pervious paving systems with storage beds, and sand filters with infiltration, shall be designed, constructed and maintained to completely drain the total runoff volume generated by the basin's maximum design storm within seventy-two (72) hours after a storm event. Runoff storage for greater times can render the BMP ineffective and may result in anaerobic conditions, odor and both water quality and mosquito breeding problems.

2. Stormwater infiltration BMPs shall be designed, constructed and maintained to provide a minimum separation of at least two (2) feet between the elevation of the lowest point of the bottom of the infiltration BMP and the seasonal high water table.

3. A stormwater infiltration BMP shall be sited in suitable soils verified by field-testing to have permeability rates between one (1) and twenty (20) inches per hour. If such site

soils do not exist or if the design engineer demonstrates that it is not practical for engineering, environmental or safety reasons to site the stormwater infiltration BMP(s) in such soils, then the stormwater infiltration BMP(s) may be sited in soils verified by field testing to have permeability rates in excess of twenty (20) inches per hour, provided that a bioretention system, designed, installed and maintained in accordance with the New Jersey BMP Manual, is installed to meet one of the following conditions:

a) The bioretention system is constructed as a separate measure designed to provide pretreatment of stormwater and to convey the pretreated stormwater into the infiltration BMP; or

b) The bioretention system is integrated into and made part of the infiltration BMP and, as such, does not require an underdrain system. If this option is selected, the infiltration BMP shall be designed and constructed so that the maximum water depth in the bioretention system portion of the BMP during treatment of the stormwater quality design storm is twelve (12) inches in accordance with the New Jersey BMP Manual.

4. The minimum design permeability rate for the soil within a BMP that relies on infiltration shall be one-half (0.5) inch per hour. A factor of safety of two (2) shall be applied to the soil's field-tested permeability rate to determine the soil's design permeability rate. For example, if the field-tested permeability rate of the soil were four (4) inches per hour, its design permeability rate would be two (2) inches per hour). The minimum design permeability rate for the soil within a stormwater infiltration basin shall also be sufficient to achieve the minimum seventy-two (72) hour drain time described in 1. above. The maximum design permeability shall be ten (10) inches per hour.

5. A soil's field tested permeability rate shall be determined in accordance with the following:

   a) The pre-development field test permeability rate shall be determined according to the methodologies provided in Section 11.C.3 of this ordinance;

   b) The results of the required field permeability tests shall demonstrate a minimum tested infiltration rate of one (1) inch per hour;

   c) After all construction activities have been completed on the site and the finished grade has been established in the infiltration BMP, post-development field permeability tests shall also be conducted according to the methodologies provided in Section 11.C.3 of this ordinance;

   d) If the results of the post-development field permeability tests fail to achieve the minimum required design permeability rates in 5 above utilizing a factor of safety of two (2), the stormwater infiltration BMP shall be renovated and re-tested until such minimum required design permeability rates are achieved; and

   e) The results of all field permeability tests shall be certified by a Professional Engineer and transmitted to the municipal engineer.

6. To help ensure maintenance of the design permeability rate over time, a six (6) inch layer of K5 soil shall be placed on the bottom of a stormwater infiltration BMP. This soil layer shall meet the textural and permeability specifications of a K5 soil as provided at

N.J.A.C. 7:9A, Appendix A, Figure 6, and be certified to meet these specifications by a Professional Engineer licensed in the State of New Jersey. The depth to the seasonal high water table shall be measured from the bottom of the K5 sand layer.

7. The design engineer shall assess the hydraulic impact on the groundwater table and design the project site and all stormwater infiltration basins so as to avoid adverse hydraulic impacts. Adverse hydraulic impacts include, but are not limited to: raising the groundwater table so as to cause surface ponding; flooding of basements and other subsurface structures and areas; preventing a stormwater infiltration basin from completely draining via infiltration within seventy-two (72) hours of a design storm event; and interference with the proper operation of subsurface sewage disposal systems and other surface and subsurface structures in the vicinity of the stormwater infiltration basin.
8. The design engineer shall conduct a groundwater mounding analysis, as defined in Section 7, of all stormwater infiltration BMPs. The mounding analysis shall be conducted in accordance with the requirements in Section 11.C.3.l. Where the mounding analysis identifies adverse impacts, the stormwater infiltration BMP shall be redesigned or relocated as appropriate.
9. Stormwater infiltration BMPs shall be constructed in accordance with the following:
    a) To avoid sedimentation that may result in clogging and reduce the basin's permeability rate, stormwater infiltration basins shall be constructed according to the following:
        i. Unless the conditions in (ii) below are met, a stormwater infiltration basin shall not be placed into operation until its drainage area is completely stabilized. Instead, upstream runoff shall be diverted around the basin and into separate, temporary stormwater management facilities and sediment basins. Such temporary facilities and basins shall be installed and utilized for stormwater management and sediment control until stabilization is achieved in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey, which is incorporated herein by reference as amended and supplemented.
        ii. If the design engineer determines that, for engineering, environmental or safety reasons, temporary stormwater management facilities and sediment basins cannot be constructed on the site, the stormwater infiltration basin may be placed into operation prior to the complete stabilization of its drainage area provided that the basin's bottom during this period is constructed at a depth at least two (2) feet higher than its final design elevation. All other infiltration BMP construction requirements in this section shall be followed. When the drainage area is completely stabilized, all accumulated sediment shall be removed from the infiltration BMP, which shall then be excavated to its final design elevation in accordance with the construction requirements of this section and the performance standards in Section 4.
    b) To avoid compaction of subgrade soils of BMPs that rely on infiltration, no heavy equipment such as backhoes, dump trucks or bulldozers shall be permitted to operate within the footprint of the BMP. All excavation required to construct a stormwater

infiltration BMP shall be performed by equipment placed outside the BMP. If this is not possible, the soils within the excavated area shall be renovated and tilled after construction is completed to reverse the effects of compaction. In addition, post-development soil permeability testing shall be performed in accordance with B.5 of this section.

c) Earthwork associated with stormwater infiltration BMP construction, including excavation, grading, cutting or filling, shall not be performed when soil moisture content is above the lower plastic limit.

C. Safety Standards for Structural Stormwater Management Measures

1. If a structural stormwater management measure has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide readily accessible means of ingress and egress from the outlet structure.

2. A trash rack is a device intended to intercept runoff-borne trash and debris that might otherwise block the hydraulic openings in an outlet structure of a structural stormwater management measure. Trash racks shall be installed upstream of such outlet structure openings as necessary to ensure proper functioning of the structural stormwater management measure in accordance with the following:

   a) The trash rack should be constructed primarily of bars aligned in the direction of flow with one (1) inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the bars shall be spaced no greater than one-third (1/3) the width of the hydraulic opening it is protecting or six inches, whichever is less. Transverse bars aligned perpendicular to flow should be sized and spaced as necessary for rack stability and strength.

   b) The trash rack shall not adversely affect the hydraulic performance of either the outlet structure opening it is protecting or the overall outlet structure.

   c) The trash rack shall have sufficient net open area under clean conditions to limit the peak design storm velocity through it to a maximum of 2.5 feet per second.

   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 pounds per square foot.

3. An overflow grate is a device intended to protect the opening in the top of a stormwater management measure outlet 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;

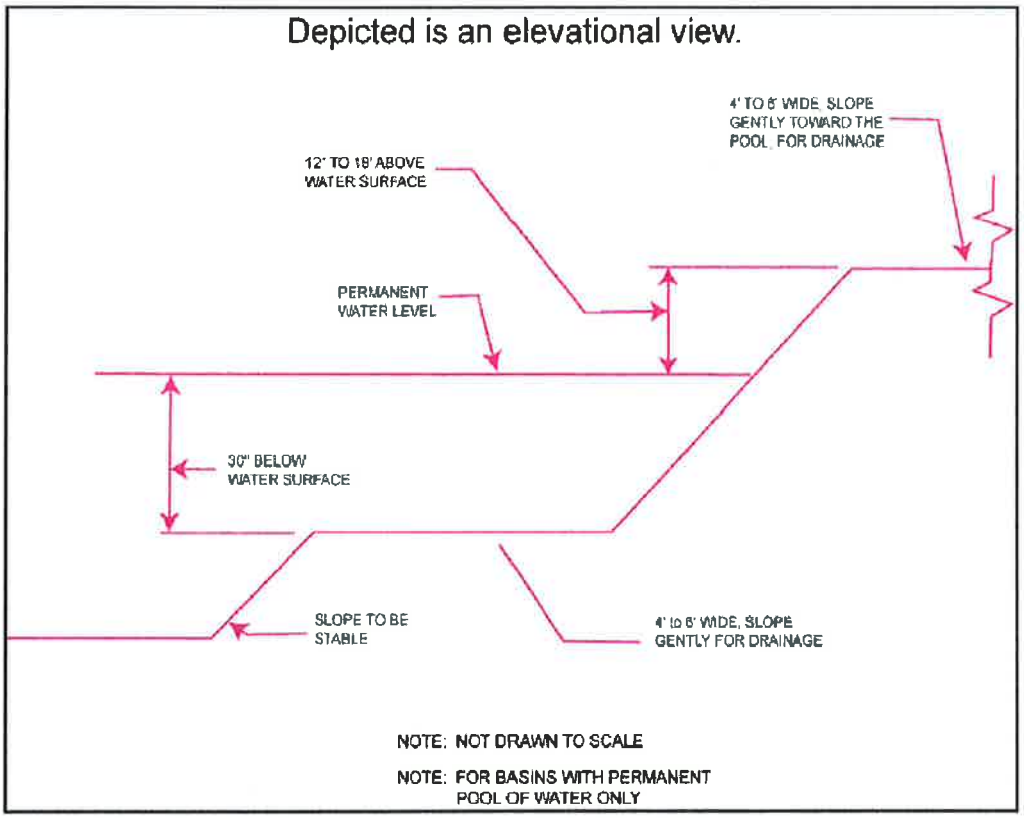
   b) The overflow grate spacing shall be no more than two (2) inches across the smallest dimension; and

   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 three hundred (300) pounds per square foot.

4. The maximum side slope for an earthen dam, embankment, or berm shall not be steeper than three (3) horizontal to one (1) vertical (3:1).

5. Safety ledges shall be constructed on the slopes of all new structural stormwater management measures 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 (4) to six (6) feet in width. One step shall be located approximately two and one-half (2½) feet below the permanent water surface, and the second step shall be located one (1) to one and one-half (1½) feet above the permanent water surface. See a) below, for an illustration of safety ledges in a stormwater management basin.

   a) Illustration of safety ledges.



Source: N.J.A.C. 7:8-6 Appendix A.

Section 6. Inspection, Maintenance and Repair of Stormwater Management Measures.

A. Applicability. Projects subject to review pursuant to Section 1.C of this ordinance shall comply with the requirements of Sections 6.B and 6.C below.

B. General Inspection, Maintenance and Repair Plan.

1. The design engineer shall prepare an Inspection, Maintenance and Repair Plan for the stormwater management measures, including both structural and nonstructural measures incorporated into the design of a major development. This plan shall be submitted as part of the Checklist Requirements established in Section 2.C. Inspection and maintenance guidelines for stormwater management measures are available in the New Jersey BMP Manual.

2. The Inspection, Maintenance and Repair Plan shall contain the following:

   a) Accurate and comprehensive drawings of the site's stormwater management measures;

   b) Specific locations of each stormwater management measure identified by means of longitude and latitude as well as block and lot number;

   c) Specific preventative and corrective maintenance tasks and schedules for such tasks for each stormwater BMP;

   d) Cost estimates, including estimated cost of sediment, debris or trash removal; and

   e) The name, address and telephone number of the person or persons responsible for regular inspections and preventative and corrective maintenance (including repair and replacement). If the responsible person or persons is a corporation, company, partnership, firm, association, municipality or political subdivision of this State, the name and telephone number of an appropriate contact person shall also be included.

3. The person responsible for inspection, maintenance and repair identified under Section 6.B.2 above shall maintain a detailed log of all preventative and corrective maintenance performed for the site's stormwater management measures, including a record of all inspections and copies of all maintenance-related work orders in the Inspection, Maintenance and Repair Plan. Said records and inspection reports shall be retained for a minimum of five (5) years.

4. If the Inspection, Maintenance and Repair Plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for inspection and 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 measure to such person under an applicable ordinance or regulation.

5. If the person responsible for inspection, maintenance and repair identified under Section 6.B.3 above is not a public agency, the maintenance plan and any future revisions based on Section 6.B.6 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan shall be undertaken.

6. The person responsible for inspection, maintenance and repair identified under Section 6.B.2 above shall evaluate the effectiveness of the Inspection, Maintenance and Repair Plan at least once per year and update the plan and the deed as needed.
7. The person responsible for inspection, maintenance and repair identified under Section 6.B.2 above shall submit the updated Inspection, Maintenance and Repair Plan to Pemberton Township when the Inspection, Maintenance and Repair Plan is updated.
8. The person responsible for inspection, maintenance and repair identified under Section 6.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 Inspection, Maintenance and Repair Plan and the documentation required by Sections 6.B.2 and 6.B.3 above.

C. Responsibility for inspection, repair and 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.

D. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including, but not limited to: repairs or replacement to any associated appurtenance of the measure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; repair or replacement of linings; and restoration of infiltration function.

E. Stormwater management measure easements shall be provided by the property owner as necessary for facility inspections and maintenance and preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities. The purpose of the easement shall be specified in the maintenance agreement.

F. In the event that the stormwater management measure becomes a public health nuisance or danger to public safety or public health, or if it is in need of maintenance or repair, Pemberton Township 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 the municipal engineer's designee. Pemberton Township, at 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 within the allowable time, Pemberton Township may immediately proceed to do so with its own forces and equipment and/or through contractors and shall bill the cost thereof to the responsible person.

G. Requirements for Inspection, Maintenance and Repair of Stormwater BMPs that rely on infiltration. If a stormwater infiltration BMP is incorporated into the design of a major development, the applicant shall include the following requirements in its Inspection, Maintenance and Repair Plan:

1. Once per month (if needed): Mow side slopes, remove litter and debris, stabilize eroded banks, repair erosion at inflow structure(s);
2. After every storm exceeding one (1) inch of rainfall: Ensure that infiltration BMPs drain completely within seventy-two (72) hours after the storm event. If stored water fails to infiltrate seventy-two (72) hours after the end of the storm, corrective measures shall be

taken. Raking or tilling by light equipment can assist in maintaining infiltration capacity and break up clogged surfaces;

3. Four times per year (quarterly): Inspect stormwater infiltration BMPs for clogging and excessive debris and sediment accumulation within the BMP, remove sediment (if needed) when completely dry;
4. Two times per year: Inspect for signs of damage to structures, repair eroded areas, check for signs of petroleum contamination and remediate;
5. Once per year: Inspect BMPs for unwanted tree growth and remove if necessary, disc or otherwise aerate bottom of infiltration basin to a minimum depth of six (6) inches; and
6. After every storm exceeding one (1) inch of rainfall, inspect and, if necessary, remove and replace K5 sand layer and accumulated sediment, to restore original infiltration rate.
7. Additional guidance for the inspection, maintenance and repair of stormwater infiltration BMPs can be found in the New Jersey BMP Manual.

H. Maintenance Guarantee.

1. The applicant shall provide a maintenance guarantee in accordance with N.J.S.A. 40:55D-53 to ensure that all stormwater management measures required under the provisions of this ordinance will be maintained in accordance with the specifications established herein.
2. Additionally, for those stormwater management measures that are to be inspected, maintained and repaired by a public agency, Winslow Township shall collect an prepaid fee from the applicant in the amount the Township determines is needed to provide long-term inspection, maintenance and repair of all stormwater management measures.

   This prepaid fee shall be placed in a dedicated cash management account and expended by Winslow Township for the sole purpose of conducting inspection, maintenance and repair activities for all stormwater management measures required under the applicant's major development application approval. The calculation of the fee shall be based upon the Inspection, Maintenance and Repair Plan (Plan) required to be prepared by the applicant and approved by Winslow Township.

   The Plan shall include an estimate of the present value of the cost to inspect, maintain and repair the stormwater management measure(s) in accordance with the Plan for the useful life of those measure(s). Winslow Township shall furnish the applicant their published hourly rates as prescribed by their salary ordinance for public works' and other personnel having responsibilities associated with stormwater management.

   Added to this fee shall be an amount mutually determined by Winslow Township and the applicant to account for the reconstruction/reconditioning of stormwater management measures that are based on the reasonable life expectancies of those facilities. After an agreed number of years, depending on the type of measure(s), the measure(s) will need to be reconstructed/reconditioned. The amount shall be based on the future value of the measure(s) being reconstructed/reconditioned.

   Both inflation rates and bank interest rates shall be based on the ten year average published in the Wall Street Journal or other approved publication. Interest accruing in

the account must also be accounted for at an agreed upon interest rate, to arrive at an amount. The costs for reconstructing/reconditioning the measure(s) shall be taken from the engineer's probable cost estimate that is utilized to determine the amount of the required performance guarantee. It is acceptable to attach a percentage of failure to certain line items in the estimate.

3. Additionally, for those stormwater management measures that are to be inspected, maintained and repaired by a homeowners association, condominium association or some other form of non-public ownership, no fee shall be collected by Winslow Township. Instead, the ownership entity shall establish and maintain a fund for the annual inspection and testing program, annual maintenance and repair program and annual contribution to a contingency fund for long-term reconstruction/reconditioning.

   The initial costs agreed to for the annual inspection and testing program and annual maintenance and repair program shall be based upon actual itemized proposals offered to the applicant by prospective vendors. The annual cost expended on inspection, testing and maintenance shall be reported to Winslow Township to verify that maintenance is not being deferred and to inform the Township on the magnitude of those services.

   The contingency fund shall require sufficient funds to be committed for long-term reconstruction/reconditioning of the stormwater management measure(s). Major reconstruction/reconditioning activities will necessitate proper financial planning. After an agreed number of years, depending on the type of measure(s), the measure(s) will need to be reconstructed/reconditioned. The contingency fund in the financial schedule shall be based on the future value of the measure being reconstructed/reconditioned.

   Both inflation rates and bank interest rates shall be based on the ten year average published in the Wall Street Journal or other approved publication. Interest accruing in the account must also be accounted for at an agreed upon interest rate, to arrive at an annual contribution amount.

Section 7. 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. When used in this ordinance, the following terms shall have the meanings herein ascribed to them.

"Pemberton Township" means the Planning Board, Zoning Board of Adjustment or other board, agency or official of Pemberton Township with authority to approve or disapprove subdivisions, site plans, construction permits, building permits or other applications for development approval. For the purposes of reviewing development applications and ensuring compliance with the requirements of this ordinance, Pemberton Township may designate the municipal engineer or other qualified designee to act on behalf of Pemberton Township.

"Aquaculture" means the propagation, rearing and subsequent harvesting of aquatic organisms in controlled or selected environments, and their subsequent processing, packaging and marketing, including but not limited to, activities to intervene in the rearing process to increase production such as stocking, feeding, transplanting and providing for protection from predators.

"Certification" means either a written statement signed and sealed by a licensed New Jersey Professional Engineer attesting that a BMP design or stormwater management system conforms to or meets a particular set of standards or to action taken by the Commission pursuant to N.J.A.C. 7:50-3, Part II or Part IV. Depending upon the context in which the term is use, the terms "certify" and "certified" shall be construed accordingly.

"Compaction" means the increase in soil bulk density caused by subjecting soil to greater-than-normal loading. Compaction can also decrease soil infiltration and permeability rates.

"Construction" means the construction, erection, reconstruction, alteration, conversion, demolition, removal or equipping of buildings, structures or components of a stormwater management system including but not limited to collection inlets, stormwater piping, swales and all other conveyance systems, and stormwater BMPs.

"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.

"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.

"Design permeability" means the tested permeability rate with a factor of safety of two (2) applied to it (e.g., if the tested permeability rate of the soils were four (4) inches per hour, the design rate would be two (2) inches per hour).

"Development" means the change of or enlargement of any use or disturbance of any land, the performance of any building or mining operation, the division of land into two or more parcels, and the creation or termination of rights of access or riparian rights including, but not limited to:

1. A change in type of use of a structure or land;
2. A reconstruction, alteration of the size, or material change in the external appearance of a structure or land;
3. A material increase in the intensity of use of land, such as an increase in the number of businesses, manufacturing establishments, offices or dwelling units in a structure or on land;
4. Commencement of resource extraction or drilling or excavation on a parcel of land;
5. Demolition of a structure or removal of trees;
6. Commencement of forestry activities;
7. Deposit of refuse, solid or liquid waste or fill on a parcel of land;
8. In connection with the use of land, the making of any material change in noise levels, thermal conditions, or emissions of waste material; and
9. Alteration, either physically or chemically, of a shore, bank, or flood plain, seacoast, river, stream, lake, pond, wetlands or artificial body of water.

In the case of development on agricultural land, i.e. lands used for an agricultural use or purpose as defined at N.J.A.C. 7:50-2.11, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Boards (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.

"Development, major" means any division of land into five or more lots; any construction or expansion of any housing development of five or more dwelling units; any construction or expansion of any commercial or industrial use or structure on a site of more than three acres; or any "development," grading, clearing or disturbance of an area in excess of five thousand square feet (5,000 ft^2). Disturbance for the purpose of this ordinance is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting or removing of vegetation.

"Development, minor" means all development other than major development.

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

"Environmentally critical area" 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 animal species; threatened or endangered plants of the Pinelands pursuant to N.J.A.C. 7:5-6.27(a); large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. T & E habitat constitutes habitat that is critical for the survival of a local population of threatened and endangered species or habitat that is identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program, whichever is more inclusive. Threatened and endangered wildlife shall be protected in conformance with N.J.A.C. 7:50-6.33.

"Exception" means the approval by the approving authority of a variance or other material departure from strict compliance with any section, part, phrase or provision of this ordinance. An exception may be granted only under certain specific, narrowly defined conditions described herein and does not constitute a waiver of strict compliance with any section, part, phrase or provision of the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-1.1 et seq.).

"Extended detention basin" means a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and promotes the settlement of pollutants. An extended detention basin is normally designed as a multi-stage facility that provides runoff storage and attenuation for both stormwater quality and quantity management. The term "stormwater detention basin" shall have the same meaning as "extended detention basin."

"Finished grade" means the elevation of the surface of the ground after completion of final grading, either via cutting, filling or a combination thereof.

"Grading" means modification of a land slope by cutting and filling with the native soil or re-distribution of the native soil, which is present at the site.

"Groundwater" means water below the land surface in a zone of saturation.

"Groundwater mounding analysis" means a test performed to demonstrate that the groundwater below a stormwater infiltration basin will not "mound up," encroach on the unsaturated zone, break the surface of the ground at the infiltration area or downslope, and create an overland flow situation.

"Heavy Equipment" means equipment, machinery, or vehicles that exert ground pressure in excess of eight (8) pounds per square inch.

"High Pollutant Loading Area" means an area in an industrial or commercial development site: where solvents and/or petroleum products are loaded/unloaded, stored, or applied; where pesticides are loaded/unloaded or stored; 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; where recharge would be inconsistent with NJDEP-approved remedial action work plan or landfill closure plan; and/or where a high risk exists for spills of toxic materials, such as gas stations and vehicle maintenance facilities. The term "HPLA" shall have the same meaning as "High Pollutant Loading Area."

"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 precipitation enters the soil through its surface.

"In lieu contribution" means a monetary fee collected by Pemberton Township in lieu of requiring strict on-site compliance with the groundwater recharge, stormwater runoff quantity and/or stormwater runoff quality standards established in this ordinance.

"Install" means to assemble, construct, put in place or connect components of a stormwater management system.

"Mitigation" means acts necessary to prevent, limit, remedy or compensate for conditions that may result from those cases where an applicant has demonstrated the inability or impracticality of strict compliance with the stormwater management requirements set forth in N.J.A.C. 7:8, in an adopted regional stormwater management plan, or in a local ordinance which is as protective as N.J.A.C. 7:8, and an exception from strict compliance is granted by Pemberton Township and the Pinelands Commission.

"New Jersey Stormwater Best Management Practices Manual" means guidance developed by the New Jersey Department of Environmental Protection, in coordination with the New Jersey Department of Agriculture, the New Jersey Department of Community Affairs, the New Jersey Department of Transportation, municipal engineers, county engineers, consulting firms, contractors, and environmental organizations to address the standards in the New Jersey Stormwater Management Rules, N.J.A.C. 7:8. The BMP manual provides examples of ways to meet the standards contained in the rule. An applicant may demonstrate that other proposed management practices will also achieve the standards established in the rules. The manual, and notices regarding future versions of the manual, are available from the Division of Watershed Management, NJDEP, PO Box 418, Trenton, New Jersey 08625; and on the NJDEP's website, www.njstormwater.org. The term "New Jersey BMP Manual" shall have the same meaning as "New Jersey Stormwater Best Management Practices Manual."

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

"NJPDES" means the New Jersey Pollutant Discharge Elimination System as set forth in N.J.S.A. 58:10A-1 et seq. and in N.J.A.C. 7:14A.

"NJPDES permit" means a permit issued by the NJDEP pursuant to the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and N.J.A.C. 7:14A for a discharge of pollutants.

"Nonpoint source" means:

1. Any human-made or human-induced activity, factor, or condition, other than a point source, from which pollutants are or may be discharged;
2. Any human-made or human-induced activity, factor, or condition, other than a point source, that may temporarily or permanently change any chemical, physical, biological, or radiological characteristic of waters of the State from what was or is the natural, pristine condition of such waters, or that may increase the degree of such change; or
3. Any activity, factor, or condition, other than a point source, that contributes or may contribute to water pollution.

The term "NPS" shall have the same meaning as "nonpoint source."

"Nonstructural BMP" means a stormwater management measure, strategy or combination of strategies that reduces adverse stormwater runoff impacts through sound site planning and design. Nonstructural BMPs include such practices as minimizing site disturbance, preserving important site features, reducing and disconnecting impervious cover, flattening slopes, utilizing native vegetation, minimizing turf grass lawns, maintaining natural drainage features and characteristics and controlling stormwater runoff and pollutants closer to the source. The term "Low Impact Development technique" shall have the same meaning as "nonstructural BMP."

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

"Permeability" means the rate at which water moves through a saturated unit area of soil or rock material at hydraulic gradient of one, determined as prescribed in N.J.A.C. 7:9A-6.2 (Tube Permeameter Test), N.J.A.C. 6.5 (Pit Bailing Test) or N.J.A.C. 6.6 (Piezometer Test). Alternative permeability test procedures may be accepted by the approving authority provided the test procedure attains saturation of surrounding soils, accounts for hydraulic head effects on infiltration rates, provides a permeability rate with units expressed in inches per hour and is accompanied by a published source reference. Examples of suitable sources include hydrogeology, geotechnical, or engineering text and design manuals, proceedings of American Society for Testing and Materials (ASTM) symposia, or peer-review journals. Neither a Soil

Permeability Class Rating Test, as described in N.J.A.C. 7:9A-6.3, nor a Percolation Test, as described in N.J.A.C. 7:9A-6.4, are acceptable tests for establishing permeability values for the purpose of complying with this ordinance.

"Permeable" means having a permeability of one (1) inch per hour or faster. The terms "permeable soil," "permeable rock" and "permeable fill" shall be construed accordingly.

"Person" means any individual, corporation, company, partnership, firm, association, 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.

"Pinelands Commission" or "Commission" means the Commission created pursuant Section 5 of the Pinelands Protection Act, N.J.S.A. 13:18A-5.

"Pinelands CMP" means the New Jersey Pinelands Comprehensive Management Plan (N.J.A.C. 7:50 1.1 et seq).

"Point source" means any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture.

"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 substances (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, suspended solids, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, groundwaters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Professional Engineer" means a person licensed to practice Professional Engineering in the State of New Jersey pursuant to N.J.S.A. 48:8-27 et seq.

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

"Replicate" means one of two or more soil samples or tests taken at the same location (within five feet of each other) and depth, within the same soil horizon or substratum. In the case of fill material, replicate tests are tests performed on sub-samples of the same bulk sample packed to the same bulk density.

"Sand" means a particle size category consisting of mineral particles, which are between 0.05 and 2.0 millimeters in equivalent spherical diameter. Also, a soil textural class having 85 percent or more of sand and a content of silt and clay such that the percentage of silt plus 1.5 times the percentage of clay does not exceed 15, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Seasonally high water table" means the upper limit of the shallowest zone of saturation which occurs in the soil, identified as prescribed in N.J.A.C. 7:9A-5.8.

"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, which is not a rock substratum, including sediments below the biologically active and/or weathered zones.

"Source material" means any material(s) or machinery, located at an industrial facility, which 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.

"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 infiltration BMP" means a basin or other facility constructed within permeable soils that provides temporary storage of stormwater runoff. An infiltration BMP does not normally have a structural outlet to discharge runoff from the stormwater quality design storm. Instead, outflow from an infiltration BMP is through the surrounding soil. The terms "infiltration measure" and "infiltration practice" shall have the same meaning as "stormwater infiltration basin."

"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. This includes, but is not limited to, structural and nonstructural stormwater Best Management Practices described in the New Jersey BMP Manual and designed to meet the standards for stormwater control contained within this ordinance. The terms "stormwater Best

Management Practice" and "stormwater BMP" shall have the same meaning as "stormwater management measure."

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

"Suitable soil" means unsaturated soil, above the seasonally high water table, which contains less than fifty percent (50%) by volume of coarse fragments and which has a tested permeability rate of between one (1) and twenty (20) inches per hour.

"Surface water" means any waters of the State, which are not groundwater.

"Time of concentration" means the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed.

"Total Suspended Solids" means the insoluble solid matter suspended in water and stormwater that is separable by laboratory filtration in accordance with the procedure contained in the "Standard Methods for the Examination of Water and Wastewater" prepared and published jointly by the American Public Health Association, American Water Works Association and the Water Pollution Control Federation. The term "TSS" shall have the same meaning as "Total Suspended Solids."

"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.

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

"Water table" means the upper surface of a zone of saturation.

"Well" means a bored, drilled or driven shaft, or a dug hole, which extends below the seasonally high water table and which has a depth which is greater than its largest surface dimension.

"Wetlands" mean those lands, which are inundated or saturated by water at a magnitude, duration and frequency sufficient to support the growth of hydrophytes. Wetlands include lands with poorly drained or very poorly drained soils as designated by the National Cooperative Soils Survey of the Soil Conservation Service of the United States Department of Agriculture. Wetlands include coastal wetlands and inland wetlands, including submerged lands. The "New Jersey Pinelands Commission Manual for Identifying and Delineating Pinelands Area Wetlands: A Pinelands Supplement to the Federal Manual for Identifying and Delineating Jurisdictional Wetlands," dated January, 1991, as amended, may be utilized in delineating the extent of

wetlands based on the definitions of wetlands and wetlands soils contained in this section, N.J.A.C. 7:50 2.11, 6.4 and 6.5. The term "wetland" shall have the same meaning as "wetlands."

"Wet pond" means a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settling of pollutants. A stormwater retention basin can also be designed as a multi-stage facility that also provides extended detention for enhanced stormwater quality design storm treatment and runoff storage and attenuation for stormwater quantity management. The term "stormwater retention basin" shall have the same meaning as "wet pond."

Section 8. 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 a fine of not less than one hundred dollars ($100.00) but not more than one thousand dollars ($1,000.00) and/or sentencing to a period of not more than ninety (90) days in jail. Every continuous day that a violation takes place shall be considered a separate occurrence.

Section 9. Effective Date.

This ordinance shall take effect immediately upon the following:

A) Certification by the Pinelands Commission in accordance with N.J.A.C. 7:50 Subchapter 3; and

B) Approval by the county review agency in accordance with N.J.A.C 7:8-4.4.

Section 10. 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.

Section 11. Appendices.

A. Methods for Calculating Groundwater Recharge.

1. The New Jersey Geological Survey Report GSR-32: A Method for Evaluating Ground-Water Recharge Areas in New Jersey. Available at http://www.njgeology.org/geodata/dgs99-2.htm.

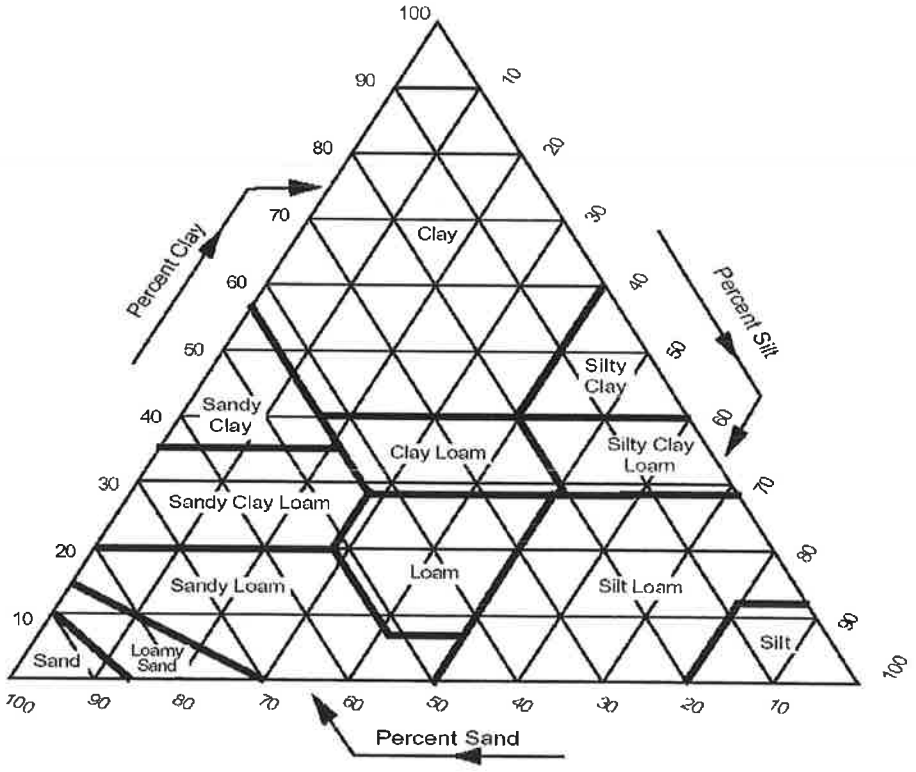
2. The New Jersey Groundwater Recharge Spreadsheet (NJGRS). Available in the New Jersey BMP Manual, Chapter 6, at http://www.njstormwater.org/bmp_manual2.htm.

B. NJDEP Nonstructural Stormwater Management Strategies Point System .

The New Jersey Stormwater Management Rules at N.J.A.C. 7:8-5.2(a), and Section 4.A. of this Ordinance, require nonstructural stormwater management strategies to be incorporated into the site design of a major development. A total of nine strategies are to be used to the maximum extent practical to meet the groundwater recharge, stormwater quality and stormwater quantity requirements of the rules prior to to utilizing structural stormwater management measures. The New Jersey Nonstructural Stormwater Management Strategies Point System(NSPS) provides a tool to assist planners, designers and regulators in determining the strategies have been used to the "maximum extent practical" at a major development as required by the rules. The New Jersey Nonstructural Stormwater Management Strategies Point System (NSPS) User's Guide and Spreadsheet are available at http://www.njstormwater.org.

C. Soils.

1. 1. USDA Soil Textural Triangle.



Source: US Department of Agriculture.

2. Definitions. For the purposes of this appendix, the following terms shall have the meanings herein ascribed to them.

"A-horizon" means the uppermost mineral horizon in a normal soil profile. The upper part of the A-horizon is characterized by maximum accumulation of finely divided, dark colored organic residues, known as humus, which are intimately mixed with the mineral particles of the soil.

"Artesian zone of saturation" means a zone of saturation which exists immediately below a hydraulically restrictive horizon, and which has an upper surface, which is at a pressure greater than atmospheric, either seasonally or throughout the year.

"Chroma" means the relative purity or strength of a color, a quantity that decreases with increasing grayness. Chroma is one of the three variables of soil color as defined in the Munsell system of classification.

"Clay" means a particle size category consisting of mineral particles, which are smaller than 0.002 millimeters in equivalent spherical diameter. Also, a soil textural class having more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Clay loam" means a soil textural class having 27 to 40 percent clay and 20 to 45 percent sand, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Coarse fragment" means a rock fragment contained within the soil which is greater than two millimeters in equivalent spherical diameter or which is retained on a two-millimeter sieve.

"County soil survey report" means a report prepared by the US Department of Agriculture, Natural Resources Conservation Service which includes maps showing the distribution of soil mapping units throughout a particular county together with narrative descriptions of the soil series shown and other information relating to the uses and properties of the various soil series.

"Direct supervision" means control over and direction of work carried out by others with full knowledge of and responsibility for such work.

"Equivalent spherical diameter" of a particle means the diameter of a sphere, which has a volume equal to the volume of the particle.

"Excessively coarse horizon" means a horizon of limited thickness within the soil profile which provides inadequate removal of pollutants from stormwater due to a high coarse fragment content, excessively coarse texture and/or excessively rapid permeability.

"Excessively coarse substratum" means a substratum below the soil profile which extends beyond the depth of soil profile pits and borings and which provides inadequate removal of pollutants from stormwater due to a high coarse fragment content, excessively coarse texture and/or excessively rapid permeability.

"Extremely firm consistence" means a type of soil material whose moist aggregated mass crushes only under very strong pressure; cannot be crushed between the thumb and forefinger and shall be broken apart bit by bit.

"Firm consistence" means a type of soil material who's moist aggregated mass crushes under moderate pressure between the thumb and forefinger but resistance is distinctly noticeable.

"Hard consistence" means a type of soil material whose dry aggregated mass is moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between the thumb and forefinger.

"Hue" means the dominant spectral color, one of the three variables of soil color defined within the Munsell system of classification.

"Hydraulically restrictive horizon" means a horizon within the soil profile which slows or prevents the downward or lateral movement of water and which is underlain by permeable soil horizons or substrata. Any soil horizon which has a saturated permeability less than one (1.0) inch per hour is hydraulically restrictive.

"Hydraulically restrictive substratum" means a substratum below the soil profile which slows or prevents the downward or lateral movement of water and which extends beyond the depth of profile pits or borings or to a massive substratum. A substratum which has a saturated permeability less than one (1.0) inch per hour is hydraulically restrictive.

"Loamy sand" means a soil textural class, as shown in Section 11.C.1 (USDA Soil Textural Triangle), that has a maximum of 85 to 90 percent (85-90%) sand with a percentage of silt plus one and a half (1.5) times the percentage of clay not in excess of fifteen (15); or a minimum of 70 to 85 percent (70-85%) sand with a percentage of silt plus one and a half (1.5) times the percentage of clay not in excess of thirty (30).

"Lower plastic limit" means the moisture content corresponding to the transition between the plastic and semi-solid states of soil consistency. This corresponds to the lowest soil

moisture content at which the soil can be molded in the fingers to form a rod or wire, one-eighth (1/8) inches in thickness, without crumbling.

"Mottling" means a color pattern observed in soil consisting of blotches or spots of contrasting color. The term "mottle" refers to an individual blotch or spot. The terms "color variegation," "iron depletion" and "iron concentration" are equivalent to the term "mottling." Mottling due to redoximorphic reactions is an indication of seasonal or periodic and recurrent saturation.

"Munsell system" means a system of classifying soil color consisting of an alpha-numeric designation for hue, value and chroma, such as "7.5 YR 6/2," together with a descriptive color name, such as "strong brown."

"O-horizon" means a surface horizon, occurring above the A-horizon in some soils, which is composed primarily of undecomposed or partially decomposed plant remains, which have not been incorporated into the mineral soil.

"Perched zone of saturation" means a zone of saturation which occurs immediately above a hydraulically restrictive horizon and which is underlain by permeable horizons or substrata, which are not permanently or seasonally saturated.

"Piezometer" means a device consisting of a length of metal or plastic pipe, open at the bottom or perforated within a specified interval, and used for the determination of depth to water, permeability or hydraulic head within a specific soil horizon or substratum.

"Platy structure" is characterized by a soil aggregate, which has one axis distinctly shorter than the other two and are oriented with the short axis vertical.

"Regional zone of saturation" means a zone of saturation, which extends vertically without interruption below the depth of soil borings and profile pits.

"Sandy clay" means a soil textural class having 35 percent (35%) or more of clay and 45 percent (45%) or more of sand, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Sandy loam" means a soil textural class, as shown in Section 11.C.1 (USDA Soil Textural Triangle), that has a maximum of 20 percent clay, and the percentage of silt plus twice the percentage of clay exceeds 30, and contains 52 percent or more sand; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

"Silt" means a particle size category consisting of mineral particles, which are between 0.002 and 0.05 millimeters in equivalent spherical diameter. It also means a soil textural

class having 80 percent or more of silt and 12 percent or less of clay, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Silt loam" means a soil textural class having 50 percent or more of silt and 12 to 27 percent of clay; or 50 to 80 percent of silt and less than 12 percent of clay, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Silty clay" means a soil textural class having 40 percent or more of clay and 40 percent or more of silt, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Silty clay loam" means a soil textural class having 27 to 40 percent of clay and less than 20 percent of sand, as shown in Section 11.C.1 (USDA Soil Textural Triangle).

"Soil aggregate" means a naturally occurring unit of soil structure consisting of particles of sand, silt, clay, organic matter, and coarse fragments held together by the natural cohesion of the soil.

"Soil color" means the soil color name and Munsell color designation determined by comparison of the moist soil with color chips contained in a Munsell soil color book.

"Soil consistence" means the resistance of a soil aggregate or clod to being crushed between the fingers or broken by the hands. Terms for describing soil consistence described are in N.J.A.C. 7:9A-5.3(h).

"Soil horizon" means a layer within a soil profile differing from layers of soil above and below it in one or more of the soil morphological characteristics including color, texture, coarse fragment content, structure, consistence and mottling.

"Soil log" means a description of the soil profile, which includes the depth, thickness, color, texture, coarse fragment content, mottling, structure and consistence of each soil horizon or substratum.

"Soil mapping unit" means an area outlined on a map in a County Soil Survey Report and marked with a letter symbol designating a soil phase, a complex of two or more soil phases, or some other descriptive term where no soil type has been identified.

"Soil phase" means a specific type of soil which is mapped by the Natural Resources Conservation Service and which belongs to a soil series described within the County Soil Survey Report.

"Soil profile" means a vertical cross-section of undisturbed soil showing the characteristic horizontal layers or horizons of the soil, which have formed as a result of the combined effects of parent material, topography, climate, biological activity and time.

"Soil series" means a grouping of soil types possessing a specific range of soil profile characteristics, which are described within the County Soil Survey Report. Each soil series may consist of several "soil phases" which may differ in slope, texture of the surface horizon or stoniness.

"Soil structural class" means one of the shape classes of soil structure described in N.J.A.C. 7:9A-5.3(g).

"Soil structure" means the naturally occurring arrangement, within a soil horizon, of sand, silt and clay particles, coarse fragments and organic matter, which are held together in clusters or aggregates of similar shape and size.

"Soil test pit" means an excavation made for the purpose of exposing a soil profile, which is to be described.

"Soil textural class" means one of the classes of soil texture defined within the USDA system of classification. (Soil Survey Manual, Agricultural Handbook No. 18, USDA Soil Conservation Service 1962.)

"Soil texture" means the relative proportions of sand, silt and clay in that portion of the soil, which passes through a sieve with two-millimeter openings.

"Static water level" means the depth below the ground surface or the elevation with respect to some reference level, of the water level observed within a soil profile pit or boring, or within a piezometer, after this level has stabilized or become relatively constant with the passage of time.

"Substratum" means a layer of soil or rock material present below the soil profile and extending beyond the depth of soil borings or profile pits.

"Unsuitable soil" means all soil other than suitable soil.

"USDA system of classification" means the system of classifying soil texture used by the United States Department of Agriculture, which defines 12 soil textural classes based upon the weight percentages of sand, silt and clay in that portion of the soil, which passes through a sieve with two-millimeter (2 mm) openings. The soil textural classes are shown graphically on the USDA Soil Textural Triangle, as shown in Section 11.C.1.

"Value" means the relative lightness or intensity of a color, one of the three variables of soil color defined within the Munsell system of classification.

"Very firm consistence" is characterized by a moist soil which crushes under strong pressure; barely crushable between thumb and forefinger.

"Very hard consistence" is characterized by a dry soil which is resistant to pressure, can be broken in the hands only with difficulty; not breakable between the thumb and forefinger.

"Zone of saturation" means a layer within or below the soil profile, which is saturated with ground water either seasonally or throughout the year. This includes both regional and perched zones.

3. Methods for Assessing Soil Suitability for Infiltration Stormwater Management BMPs. The results of a subsurface investigation shall serve as the basis for the site selection and design of stormwater infiltration BMPs. The subsurface investigation shall include, but not be limited to, a series of soil test pits and soil permeability tests conducted in accordance with the following:

   a) All soil test pits and soil permeability results shall be performed under the direct supervision of a Professional Engineer. All soil logs and permeability test data shall be accompanied by a certification by a Professional Engineer. The results and location (horizontal and vertical) of all soil test pits and soil permeability tests, both passing and failing, shall be reported to Pemberton Township.

   b) During all subsurface investigations and soil test procedures, adequate safety measures shall be taken to prohibit unauthorized access to the excavations at all times. It is the responsibility of persons performing or witnessing subsurface investigations and soil permeability tests to comply with all applicable Federal, State and local laws and regulations governing occupational safety.

   c) A minimum of two (2) soil test pits shall be excavated within the footprint of any proposed infiltration BMP to determine the suitability and distribution of soil types present at the site. Placement of the test pits shall be within twenty (20) feet of the basin perimeter, located along the longest axis bisecting the BMP. For BMPs larger than ten thousand (10,000) square feet in area, a minimum of one (1) additional soil test pit shall be conducted within each additional area of ten thousand (10,000) square feet. The additional test pit(s) shall be placed approximately equidistant to other test pits, so as to provide adequate characterization of the subsurface material. In all cases, where soil and or groundwater properties vary significantly, additional test pits shall be excavated in order to accurately characterize the subsurface conditions below the proposed infiltration BMP. Soil test pits shall extend to a minimum depth of eight (8) feet below the lowest elevation of the basin bottom or to a depth that is at least two (2) times the maximum potential water depth in the proposed infiltration BMP, whichever is greater.

d) A soil test pit log shall be prepared for each soil test pit. The test pit log shall, at a minimum, provide the elevation of the existing ground surface, the depth and thickness (in inches) of each soil horizon or substratum, the dominant matrix or background and mottle colors using the Munsell system of classification for hue, value and chroma, the appropriate textural class as shown on the USDA textural triangle, the volume percentage of coarse fragments (larger than two (2) millimeters in diameter), the abundance, size, and contrast of mottles, the soil structure, soil consistence, and soil moisture condition, using standard USDA classification terminology for each of these soil properties. Soil test pit logs shall identify the presence of any soil horizon, substratum or other feature that exhibits an in-place permeability rate less than one (1) inch per hour.

e) Each soil test pit log shall report the depth to seasonally high water level, either perched or regional, and the static water level based upon the presence of soil mottles or other redoximorphic features, and observed seepage or saturation. Where redoxomorphic features including soil mottles resulting from soil saturation are present, they shall be interpreted to represent the depth to the seasonal high water table unless soil saturation or seepage is observed at a higher level. When the determination of the seasonally high water table shall be made in ground previously disturbed by excavation, direct observation of the static water table during the months of January through April shall be the only method permitted.

f) Any soil horizon or substratum which exists immediately below a perched zone of saturation shall be deemed by rule to exhibit unacceptable permeability (less than one (1) inch per hour). The perched zone of saturation may be observed directly, inferred based upon soil morphology, or confirmed by performance of a hydraulic head test as defined at N.J.A.C. 7:9A-5.9.

g) Stormwater infiltration BMPs shall not be installed in soils that exhibit artesian groundwater conditions. A permeability test shall be conducted in all soils that immediately underlie a perched zone of saturation. Any zone of saturation which is present below a soil horizon which exhibits an in-place permeability of less than 0.2 inches per hour shall be considered an artesian zone of saturation unless a minimum one foot thick zone of unsaturated soil, free of mottling or other redoximorphic features and possessing a chroma of four or higher, exists immediately below the unsuitable soil.

h) A minimum of one (1) permeability test shall be performed at each soil test pit location. The soil permeability rate shall be determined using test methodology as prescribed in N.J.A.C. 7:9A-6.2 (Tube Permeameter Test), 6.5 (Pit Bailing Test) or 6.6 (Piezometer Test). When the tube permeameter test is used, a minimum of two replicate samples shall be taken and tested. Alternative permeability test procedures may be accepted by the approving authority provided the test procedure attains saturation of surrounding soils, accounts for hydraulic head effects on infiltration rates, provides a permeability rate with units expressed in inches per hour and is accompanied by a published source reference. Examples of suitable sources include hydrogeology, geotechnical or engineering text and design manuals, proceedings of American Society for Testing and Materials (ASTM) symposia, or peer-review journals. Neither a Soil Permeability Class Rating Test, as described in N.J.A.C.

7:9A-6.3, nor a Percolation Test, as described in N.J.A.C. 7:9A-6.4, are acceptable tests for establishing permeability values for the purpose of complying with this ordinance.

i) Soil permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum to be left in place below the basin as follows. Where no soil replacement is proposed, the permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum within four (4) feet of the lowest elevation of the basin bottom or to a depth equal to two (2) times the maximum potential water depth within the basin, whichever is greater. Where soil replacement is proposed, the permeability tests shall be conducted within the soil immediately below the depth of proposed soil replacement or within the most hydraulically restrictive horizon or substratum to a depth equal to two (2) times the maximum potential water depth within the basin, whichever is greater. Permeability tests may be performed on the most hydraulically restrictive soil horizons or substrata at depths greater than those identified above based upon the discretion of the design or testing engineer. The tested infiltration rate should then be divided by two (2) to establish the soil's design permeability rate. Such division will provide a 100% safety factor to the tested rate.

j) The minimum acceptable "tested permeability rate" of any soil horizon or substratum shall be one (1) inch per hour. Soil materials that exhibit tested permeability rates slower than one (1) inch per hour shall be considered unsuitable for stormwater infiltration. The maximum reportable "tested permeability rate" of any soil horizon or substratum shall be no greater than twenty (20) inches per hour regardless of the rate attained in the test procedure.

k) After all construction activities have been completed on the development site and the finished grade has been established in the infiltration BMP, a minimum of one permeability test shall be conducted within the most hydraulically restrictive soil horizon or substratum below the as-built BMP to ensure the performance of the infiltration BMP is as designed. Hand tools and manual permeability test procedures shall be used for the purpose of confirming BMP performance. In addition, the infiltration BMP shall be flooded with water sufficient to demonstrate the performance of the BMP. Test results shall be certified to the municipal engineer.

l) A groundwater mounding analysis shall be provided for each stormwater infiltration BMP. The groundwater mounding analysis shall calculate the maximum height of the groundwater mound based upon the volume of the maximum design storm. The Professional Engineer conducting the analysis shall provide the municipal engineer with the methodology and supporting documentation for the mounding analysis used and shall certify to Pemberton Township, based upon the analysis, that the groundwater mound will not cause stormwater or groundwater to breakout to the land surface or cause adverse impact to adjacent surface water bodies, wetlands or subsurface structures including but not limited to basements and septic systems. If there is more than one infiltration BMP proposed, the model shall indicate if and how the mounds will interact. The mounding analysis shall be calculated using the most restrictive soil horizon that will remain in place within the explored aquifer thickness unless alternative analyses is authorized by the municipal engineer. The mounding

analysis shall be accompanied by a cross section of the infiltration BMP and surrounding topography and the mound analysis shall extend out to the point(s) at which the mound intersects with the preexisting maximum water table elevation.

m) The applicant shall demonstrate that stormwater infiltration BMPs meet the seventy-two (72) hour drain time requirement established in Section 5.B.1 of this ordinance.

D. Pretreatment measures for infiltration BMPs. By reducing incoming velocities and capturing coarser sediments, pretreatment can extend the functional life and increase the pollutant removal capability of infiltration measures. Therefore, the installation of pretreatment measures is recommended for all development sites. Pretreatment measures may include, but are not limited to, the following:

1. Vegetative filter strips;
2. Bioretention systems. Used in conjunction with a bioretention system, the infiltration basin takes the place of the standard underdrain;
3. Sand filters;
4. Grassed swales; and
5. Detention basins.

E. Collection and Conveyance.

1. Bicycle-safe inlet grates. Site development plans that incorporate site design features that help to prevent discharge of trash and debris from drainage systems 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.

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:

i. 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

ii. A different grate, if each individual clear space in that grate has an area of no more than seven (7) square inches, or is no greater than one half (0.5) inch 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) square inches, or be no greater than two (2) inches across the smallest dimension.

c) This standard does not apply:

i. 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;

ii. Where flows from the water quality design storm as specified in Section 3 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 (4 and 5/8) inches long and one and one-half (1.5) inches wide (this option does not apply for outfall netting facilities); or

(b) A bar screen having a bar spacing of one-half (0.5) inch.

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

iv. Where the NJDEP 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.

2. Catch basins. Catch basins are storm drain inlets with or without sumps. Catch basins may provide pretreatment for other stormwater BMPs by capturing large sediments. The sediment and pollutant removal efficiency of catch basins depends on the size of the sump and the performance of routine maintenance to retain the available sediment storage space in the sump. Where catch basins with sumps are proposed, the minimum two feet separation between the bottom of the sump and seasonally high water table shall be provided.

3. Open or perforated conveyance piping. Where adequate separation to the seasonal high water table exists, stormwater from the development site may be conveyed to a stormwater basin via a system of perforated pipes. These pipes may be made of PVC or corrugated polyethylene and are available with perforations of varying size and spacing. Perforated pipe specifications shall be certified by a Professional Engineer. A Professional Engineer shall certify that perforated conveyance piping will not act to intercept the seasonal high water table and convey groundwater to the stormwater basin. All open or perforated stormwater conveyance systems shall be installed with a minimum separation of two (2) feet from the seasonal high water table.

Section 12. Additional Sources for Technical Guidance.

B. NJDEP Technical Guidance Sources.

1. New Jersey BMP Manual. Available from the Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418, Trenton, New Jersey 08625; or online at http://www.njstormwater.org.
2. NJDEP Stormwater Management Facilities Maintenance Manual. Available from the Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418, Trenton, New Jersey 08625; or online at http://njedl.rutgers.edu/ftp/PDFs/1188.pdf.

C. Additional Guidance Sources.

1. New Jersey Pinelands Commission, PO Box 7, 15 Springfield Road, New Lisbon, New Jersey 08064; Phone: 609-894-7300; Website: http://www.state.nj.us/pinelands.
2. State Soil Conservation Committee Standards for Soil Erosion and Sediment Control in New Jersey. Available from all State Soil Conservation Districts, including Burlington County Soil Conservation District, Tiffany Square, Suite 100, 1289 Route 38, Hainesport, New Jersey 08036; Phone: 609-267-7410; Fax: 609-267-3347; Website: http://bscd.org.
3. State Soil Conservation Districts. The local Soil Conservation District is the Burlington County Soil Conservation District, Tiffany Square, Suite 100, 1289 Route 38, Hainesport, New Jersey 08036; Phone: 609-267-7410; Fax: 609-267-3347; Website: http://bscd.org.
4. New Jersey Department of Transportation, PO Box 600, Trenton, NJ 08625-0600; Phone: 609-530-3536; Website: http://www.state.nj.us/transportation.

Non Pinelands Area

Stormwater Control Ordinance for Pemberton Township

Prepared for
Pemberton Township
500 Pemberton-Browns Mills Road
Pemberton, New Jersey 08068-1539

March 15, 2005
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ARH File #32-06002

SECTION 1: 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 measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading 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.

C. **Applicability**

This ordinance shall be applicable to any site plan or subdivision that requires preliminary or final site plan review.

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued 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: 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 this section. To the maximum extent feasible, 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. Such alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in this subchapter.

3. For site improvements regulated under the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21, the RSIS shall apply in addition to this section except to the extent the RSIS are superseded by this section or alternative standards applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

SECTION 3: 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.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's 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 at Sections 3.F and 3.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 at Sections 3.F and 3.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 3.F and 3.G to the maximum extent practicable;

3. The applicant demonstrates that, in order to meet the requirements at Sections 3.F and 3.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 for requirements of Sections 3.F and 3.G that were not achievable on-site.

E. **Nonstructural Stormwater Management Strategies**

1. To the maximum extent practicable, the standards in 3.F and 3.G shall be met by incorporating nonstructural stormwater management strategies at 3.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 3.E.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 measures 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. These source controls include, but are not limited to:

      1) Site design features that help to prevent accumulation of trash and debris in drainage systems;

      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 3.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 3.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 (noncurb-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 3.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 3.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 3.F and 3.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 measures is available in the New Jersey Stormwater Best Management Practices Manual. The manual is available on the Department of Environmental Protection's stormwater web page at http://www.njstormwater.org.

F. **Erosion Control, Groundwater Recharge and Runoff Quantity Standards**

1. This section 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 4, either:

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

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

2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment" area, or 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, which 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 4, complete **one** of the following:

1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2, 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 2, 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 12 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 6, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 6. 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% 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 % Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 5.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% 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 3.F and 3.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 6.

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. 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% TSS post-construction removal rate**;

3) Temperature shall be addressed to ensure no impact on 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 3.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. This subsection 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 effective date of the Stormwater Management Rules, provided that the construction begins on or before five years from effective date of the Stormwater Management Rules.

SECTION 4: 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 4.A.1.a and the Rational and Modified Rational Methods at Section 4.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 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 5: 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 7.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 7.

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 this subchapter.

C. 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.

SECTION 6: 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, 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 7: 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 subchapter applies to any new stormwater management basin.

B. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins.

C. 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 subsection, 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 7.D a freestanding outlet structure may be exempted from this requirement.

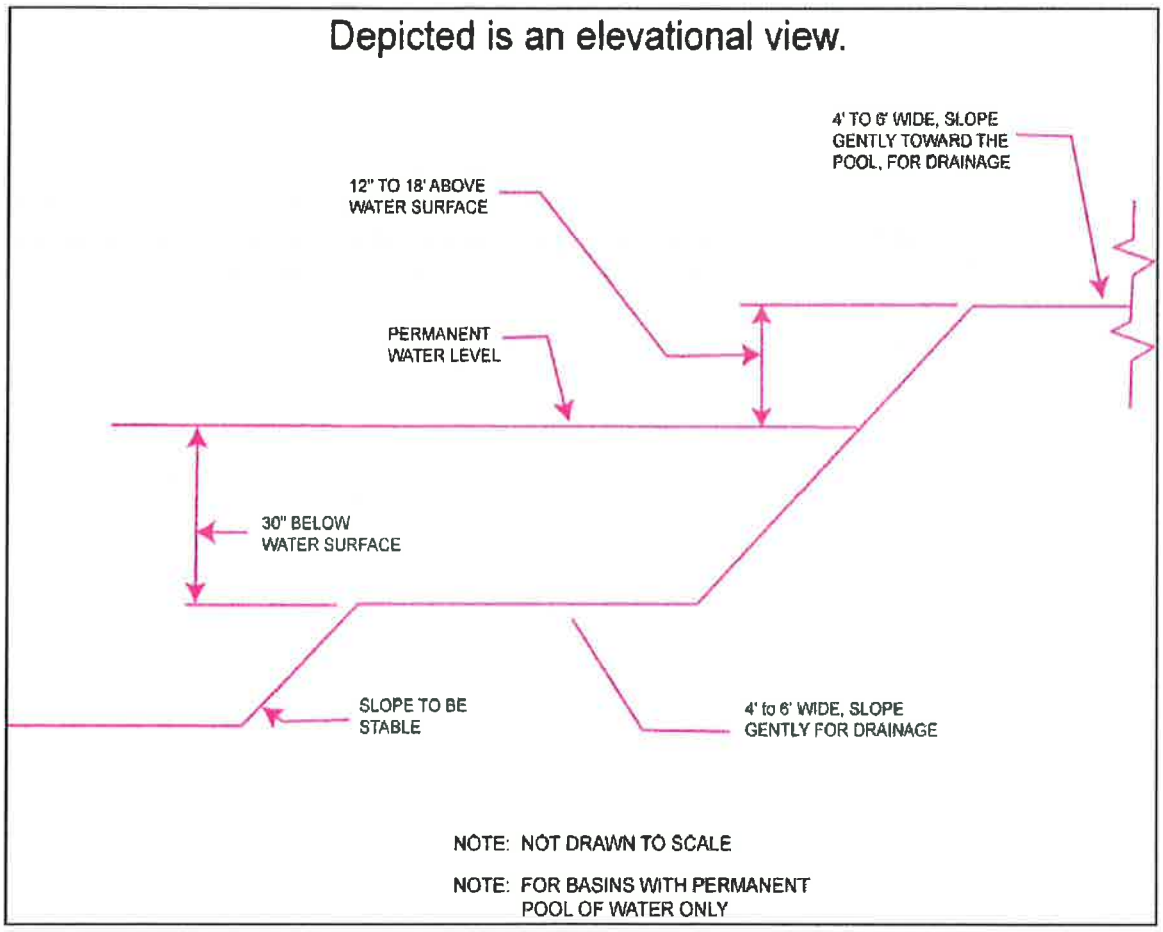
b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two 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 7.E 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.

D. **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.

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



SECTION 8: 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 8.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 **(3)** copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 8.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 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 2foot 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 1 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 2 through 5 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 3 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 soil types 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 9.

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 8.C.1 through 8.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 9: MAINTENANCE AND REPAIR

A. Applicability

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Section 9.B and 9.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 9.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 9.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 9.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 9.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 9.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 9.B.6 and 9.B.7 above.

9. The requirements of Sections 9.B.3 and 9.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, 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. 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.

C. 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 a fine of not less than one hundred dollars ($100.00) but not more than one thousand dollars ($1,000.00) and/or sentencing to a period of not more than ninety (90) days in jail. Every continuous day that a violation takes place shall be considered a separate occurrence.

SECTION 10: EFFECTIVE DATE

This ordinance shall take effect upon the approval by the county review agency, or sixty (60) days after submission to the county review agency if they fail to act.

SECTION 11: SEVERABILITY

If the provisions of any article, 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 article, section, subsection, paragraph, subdivision, or clause of this ordinance.

SECTION 12: 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.

"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, 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 water body or to a particular point along a receiving water body.

"Environmentally constrained area" means the following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. 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.

"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 that seeps into the soil from precipitation.

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. 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. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. are also considered "major development."

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

"Node" means an area designated by the State Planning Commission concentrating facilities and activities that 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, or political subdivision of this State and any state, interstate or federal agency.

"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.

"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.