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MUNICIPAL STORMWATER MANAGEMENT PLAN

East Amwell Township

Hunterdon County, New Jersey

Completed March 16 2005

Public Hearing April 20, 2005



Neshanic River east of Manners Road

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Adopted pursuant to N.J.A.C. 7:8
Stormwater Management Regulations



Stony Brook at Snyderstown

East Amwell Township Stormwater
Committee Members:

Andrea Bonette, Chairperson
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1.0 Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for East Amwell Township ("the Township") to address stormwater-related impacts. Municipal Stormwater Regulation N.J.A.C. 7:14A-25 requires the creation of this plan. The plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The State of New Jersey adopted these new regulations at the direction of the U.S. Environmental Protection Agency (EPA).

The-EPA mandated that all states enact regulations to address the negative impacts of stormwater runoff on the Nation's streams and water resources. This is discussed further in Section 3.8 of this plan. The Plan addresses groundwater recharge, stormwater quantity and quality impacts by incorporating stormwater design and performance standards for new major developments, defined as projects that disturb one or more acres of land or increase impervious surface by one-quarter acre or more. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

A "land use/build-out" analysis prepared by Hunterdon County Planning Board and a pollutant loading analysis prepared for the Township by a professional environmental consultant Princeton Hydro has been included in this plan based upon existing zoning and land available for development. The plan also reviews existing ordinances, the Township Master Plan, and other planning documents, and outlines how the Township's Stormwater Control Ordinance will bring these ordinances into compliance with N.J.A.C. 7:8 to encourage project designs that include low-impact development techniques. Long-term operation and maintenance measures for existing and future stormwater facilities will also be addressed.

The final component of this plan is a mitigation strategy that is to be followed in the event that a variance or exemption of the design and performance standards is granted. The minimum lot sizes and amount of land available for new development in the-Township provide space for recharge, reduction in peak flow and minimization of pollutant loading. The Township has over a third of its land permanently preserved and is predominantly rural. Relatively little development is anticipated in the future. Therefore, most development sites should be able to comply with the regulations without variances and/or waivers from the municipality's stormwater management ordinances. In those rare instances where this cannot be accomplished, a mitigation plan is included in this Plan. As part of the mitigation section of the stormwater plan, stormwater management measures are recommended at suggested mitigation sites to lessen the negative impacts of existing development on the Townships' streams and water resources.

2.0 Plan Goals

The goals of this municipal stormwater management plan are to:

1. Reduce flood damage, including damage to life, property, and natural resources such as streams and their riparian areas
 - a. to protect headwaters and streams in the Sourland Mountain region and the fragile ecosystem of the Sourland Mountain region and the waterways downstream through maintenance of large contiguous tracts of forest.
 - b. to protect flood plains and riparian areas so that they can absorb floodwaters and prevent flood damage.
2. Minimize, to the extent practicable, any increase in stormwater runoff from any new development, by limiting impervious surfaces and by retaining precipitation on site through promoting infiltration and recharge, thus sustaining aquifer levels.
3. Reduce soil erosion from any development or construction project through natural land and soil conservation and the conservation and establishment of vegetation, particularly native species. Soils should be kept intact by minimizing soil disturbance and maintaining large contiguous tracts of forest with an intact and diverse woodland understory.
4. Avoid exceeding the capacity of existing and proposed culverts and bridges, and other in-stream activities, by inhibiting increases in stormwater runoff volume and velocity and by avoiding flooding from new development.
5. Maintain groundwater recharge through promoting groundwater infiltration and natural vegetative cover, including the maintenance of large contiguous tracts of forest and woodland understory. Vegetated land, particularly intact forest, facilitates infiltration of rainfall through the soil mantle to groundwater.
6. Prevent, to the greatest extent feasible, an increase in nonpoint source pollution from land disturbance activities associated with new development by requiring conservation of land and natural vegetation through conservation-based development-design, including the maintenance of large, contiguous tracts of forest with an intact and diverse woodland understory and healthy, stable soils.
7. Maintain the integrity of stream channels, starting with headwaters, for their biological functions as well as for the transport of flows through protection and restoration of riparian areas for habitat along stream corridors, headwaters, wetlands, vernal ponds, and lakes.

8. Minimize pollutants in stormwater runoff and improve water quality from new and existing development / to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the State V to protect public health S to safeguard fish and aquatic life S to preserve and protect scenic and ecological values / to enhance the domestic, municipal, recreational, commercial, and other uses of water / to conserve the natural landscape for habitat s to maintain large contiguous tracts of forest and their understory in order to reduce pollution to streams and their associated ecosystems.
9. Protect public safety through the proper design, operation and maintenance of stormwater systems and outlets.
10. Explore and encourage methods to control the deer population.

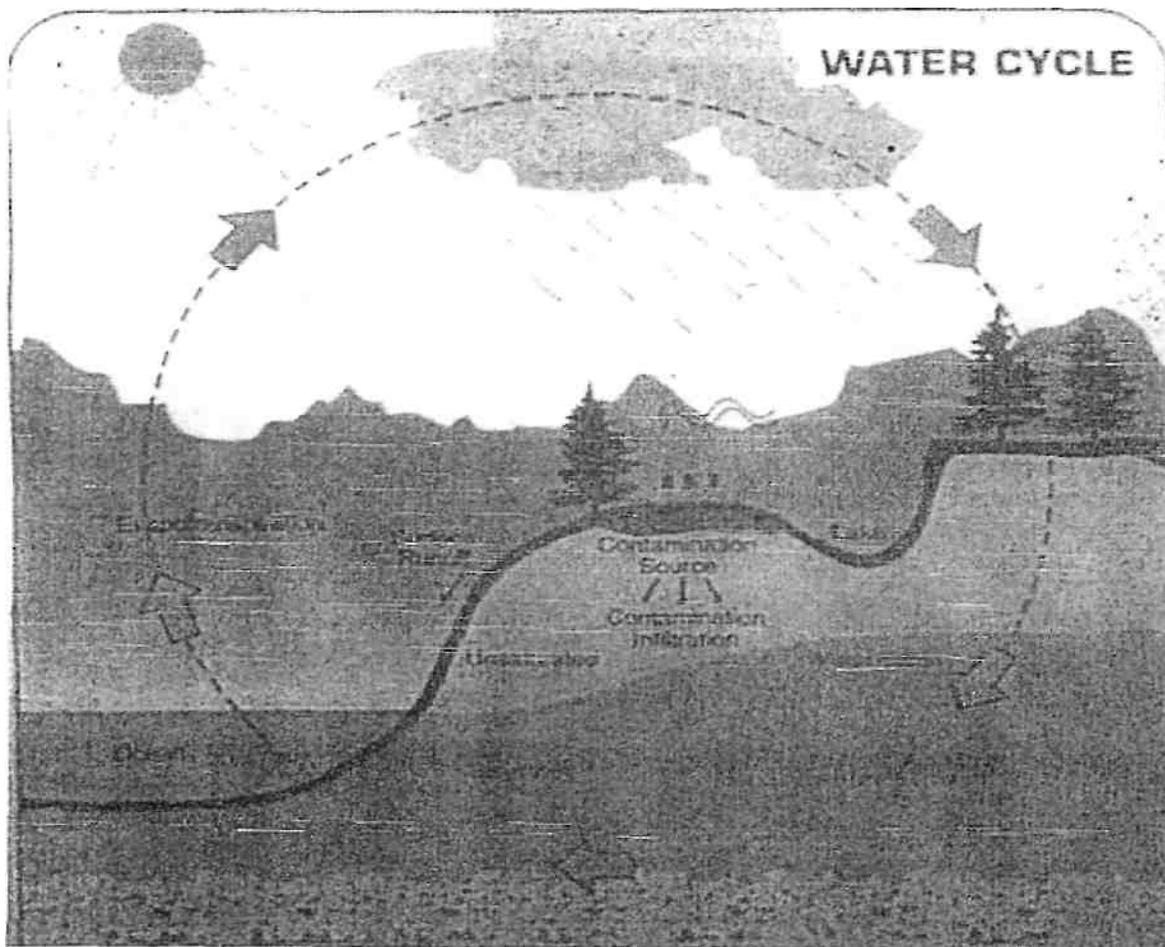


Neshanic River

3.0 Stormwater Discussion

3.1 *The Natural Hydrologic Cycle*

The hydrologic cycle describes how water is naturally processed and renewed. As precipitation falls from the sky on undisturbed natural land, it is intercepted by vegetation. Some precipitation naturally runs off to a body of water. But, prior to development, most of that rainfall is infiltrated through the soil mantle where a portion is taken up by the roots of vegetation and transpired back to the atmosphere (known as "evapotranspiration") and a portion is recharged to the aquifer below. The recharged groundwater eventually feeds the base flow of the nearest water system (i.e., stream, pond, wetland).



The Natural Hydrologic Cycle or "Water Cycle"

3.2 *Impacts of Development*

Development of land removes natural vegetation and can result in re-grading of the land surface, which may then be covered with lawn and/or other highly impervious surfaces, reducing its ability to soak up precipitation and to process it through the hydrologic cycle. Compaction of soil, significant alteration of the natural land contours, the installation of storm sewers, buildings, parking lots, and roadways all reduce or destroy soil porosity, causing increased quantity and velocity of stormwater runoff.

The result is the rapid runoff of stormwater to the nearest waterway, which increases peak flows, carries pollutants and sediment, erodes stream banks and beds and alters stream channels. Downstream flooding increases; stream structure is altered, and water quality is harmed. This interruption of the natural hydrologic cycle reduces groundwater recharge, which in turn reduces aquifer levels that feed wells and the base flow of streams and dependent wetlands and vernal pools. These negative impacts harm natural habitats and the flora and fauna species that depend upon them. This can also have significant negative impacts on the availability and quality of drinking water.

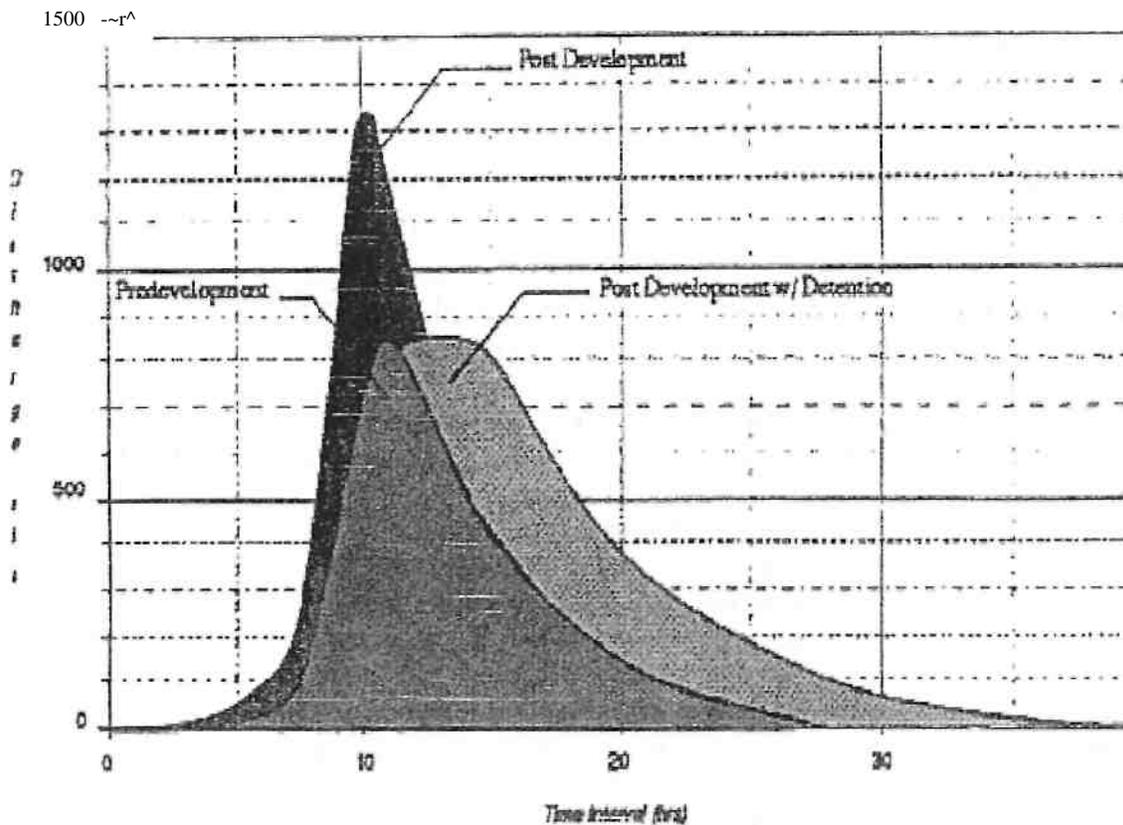
3.3 *Outdated Stormwater Basin Approach*

Conventional stormwater systems that have accompanied larger development projects to date usually employ detention basins. These were required by regulations put in place about 30 years ago in response to flooding from new developments. Those regulations required installation of detention basins and other structures that would control the peak rate of stormwater runoff. While at the time a step ahead, the detention basin approach fell far short of what is necessary, effectively, to reduce and manage runoff and protect natural resources. Detention basins do not allow infiltration or retention of precipitation; they collect water from the developed site and only hold stormwater runoff for a limited time before discharging it to the nearest waterway. They are designed to control the peak rate of runoff only, not to reduce the total volume from the development. These shortcomings of the detention basin approach led to these new state stormwater regulations. These regulations replace the reliance on detention basins with non-structural best management practices (BMP) to fulfill the federal requirement for the reduction of nonpoint source pollution and other negative stormwater impacts.

3.4 *Disruption of Hydrologic Cycle*

The detention basin approach to managing stormwater runoff perpetuates the disruption of the hydrologic cycle. Because detention basins do not allow infiltration of stormwater from the developed site, more runoff volume enters the stream than the amount the natural land contributed, as shown in the hydrograph below. This means that the detention basin controls the peak rate of runoff but does not reduce the total volume. The balance of the hydrologic cycle is disrupted because this added volume is removed from the natural circulation patterns of the drainage area; it is forced into the stream rather than infiltrated on the land.

Stonswmer Runoff Hydrograph; ;sa latest



Cahill Associates, "Stormwater Management Systems", 1993.

Hypothetical hydrograph illustrating increased volume from stormwater runoff

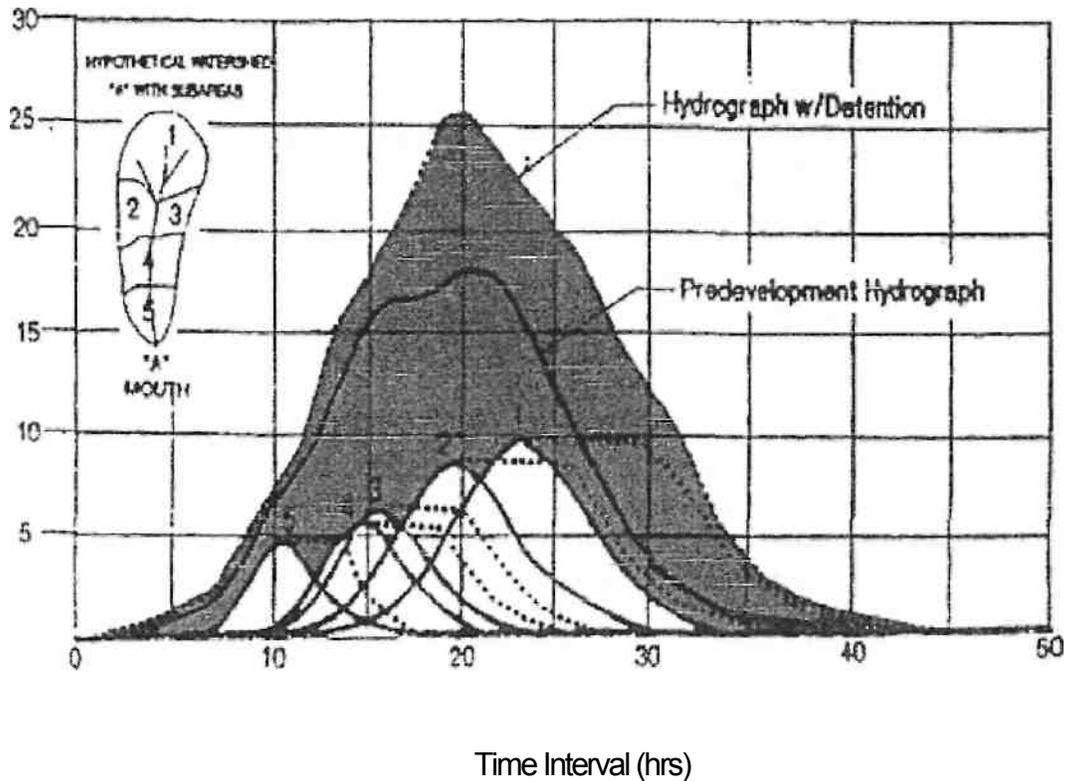
Key: Y axis: Discharge cfs - discharge measured as cubic feet per second X
axis: Time interval (hrs) - time interval measured in hours

3.5 The Impacts of Outdated Approaches

This added volume of runoff that results from development is stored in the detention basin, and when it is released increases the duration of flood flows. This results in increased stream erosion, stream bank erosion, silting, water quality degradation and adverse ecological impacts. In addition, the increased volume of stormwater represents lost infiltration and reduction of aquifer recharge and stream base flow. Impervious surfaces from development and detention basins also can raise the temperature of the temporarily stored water, causing thermal pollution to the receiving stream and harming fish and aquatic life that are temperature-sensitive.

The cumulative effect of many stormwater basins in a watershed can magnify the severity of the increase in flood flows, causing more frequent flooding and causing floodwaters to go where they have not gone before. The hydrologic (related to the

distribution and circulation of water) and hydraulic (the impacts of the force of moving water) changes that result from the introduction of many basins in one drainage area can substantially change the timing of storm flows in the receiving stream. This cumulative flooding impact is illustrated in the hydrograph below.



Brandywine Conservancy and DNREC, "Conservation Design for Stormwater Management", 1997.

Hypothetical hydrograph illustrating cumulative effect of stormwater runoff discharges from detention basins in a hypothetical watershed

Key: Y axis: Discharge cfs - discharge measured as cubic feet per second X axis: Time interval (hrs) - time interval measured in hours

3.6 Development Impacts

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge caused by development, new pollutant loadings are introduced by development. A myriad of pollutants from lawns, motor vehicles, and everyday human activity collects on roads, on impervious surfaces and on cleared areas. These pollutants, which include pesticides, fertilizers, metals, bacteria and pathogens, hydrocarbons/oils/grease, animal wastes, suspended solids, salts and de-icing chemicals, are transported to streams with storm events. Stormwater also indelibly changes the natural flow regime of a stream, impacting stream structure and adapted species of flora and fauna.

3.7 The Bottom Line

Development's typical land grading, increased impervious surfaces, and structures significantly change the natural lay of the land, disturb and compact soils, remove vegetation, fragment forests, remove protective streamside vegetation and alter streams and wetlands. The natural hydrologic cycle is disrupted. Outdated stormwater systems have been proven unable to prevent these negative impacts. Nonpoint source pollution and destructive hydrologic impacts to the Township's streams and water bodies will continue to increase unless a new approach to stormwater management is adopted.

3.8 The Township's NJPDES Permit

The Clean Water Act was enacted in 1972 with many amendments over the last 30 years. The law uses a variety of tools (regulatory and nonregulatory) to reduce pollution to our waterways. The broad goal of the statute is to maintain and restore the integrity of the nation's waters so that they are "fishable and swimmable". In 1990, the U. S. Environmental Protection Agency (EPA) required larger storm sewer systems (serving a population of 100,000 or more), industrial dischargers, and construction sites of over 5 acres, to develop stormwater plans to reduce pollution from stormwater runoff under the National Pollution Discharge Elimination System (NPDES) Phase 1 program.

EPA studies show that nonpoint source pollution is the number one cause of water quality impairment in the U.S., accounting for the pollution of about 40% of all waters surveyed, despite the NPDES Phase 1 program. The EPA then adopted National Pollutant Discharge Elimination System (NPDES) Phase 2 regulations in 1999, in order to address continuing nonpoint source pollution problems that were not addressed by NPDES Phase 1.

NPDES Phase 2 requires action by each State to meet stormwater pollution reduction and management goals. New Jersey has complied by adopting changes to the New Jersey Pollutant Discharge Elimination System (NJPDES) rules (N.J.A.C. 7:14A) in February 2004 to address communities with small storm sewer systems (communities less than 100,000 persons and construction sites of one acre and greater) that carry non-point source pollution to waterways.

As a low-density community, the Township was issued a NJPDES Tier B Municipal Stormwater General-Permit under NJPDES Phase 2, attached as Appendix A. Included in the permit are Statewide Basic Requirements (SBR) for each Tier B municipality, attached as Appendix B. As discussed in Section 1.0, the NJPDES rule requires the creation and implementation of this stormwater plan by April 2005, which was created by a Township-appointed Stormwater Committee and adopted by the Planning Board and Township Committee, as one of the SBRs.

One SBR is the development of a Local Public Education Program starting in April 2005. Attached, as Appendix C, is the Township's Education Plan and informational handouts.

Another SBR-is the marking of storm drains to raise watershed impact awareness. The Stormwater Management Coordinator (SMC) has proposed a medallion labeling program for all storm drains with labels that read "Do Not Dump: Drains to Waterway". Labeling will begin April 2005. See Appendix D.

The remaining SBRs are the responsibility of the Township. The SMC is responsible for overseeing compliance with the NJPDES permit and fulfillment of the SBRs for the Township. The Stormwater Management Coordinator, who is appointed by the Township Committee, is also responsible for preparing an annual report certifying the Township's compliance. It is recommended that the Township Engineer be appointed as the SMC annually.

4.0 Background: East Amwell Township

4.1 The Township

East Amwell Township encompasses twenty-eight square miles in Hunterdon County, New Jersey. Unlike other municipalities in Hunterdon County, East Amwell has not incurred a great deal of development, averaging about ten new single family homes per year for the last decade. The 1990 Census figures show 1249 single-family detached dwelling units (SFD), and a total of 1542 housing units; 2000 figures show 1378 SFDs and a total of 1624 units. The 1990 census records 4332 residents in East Amwell; the 2000 census indicates a total population of 4455, of whom 3328 were over eighteen years of age.

The Township remains a predominantly rural community. Over 6,200 of its 18,000 acres are permanently preserved through farmland preservation, Green Acres acquisitions, and other types of conservation easements. This number is likely to increase-significantly in the next decade, because the Township has an active Farmland and Open Space Preservation Committee and residents who overwhelmingly have voted to support preservation purchases with their tax dollars.

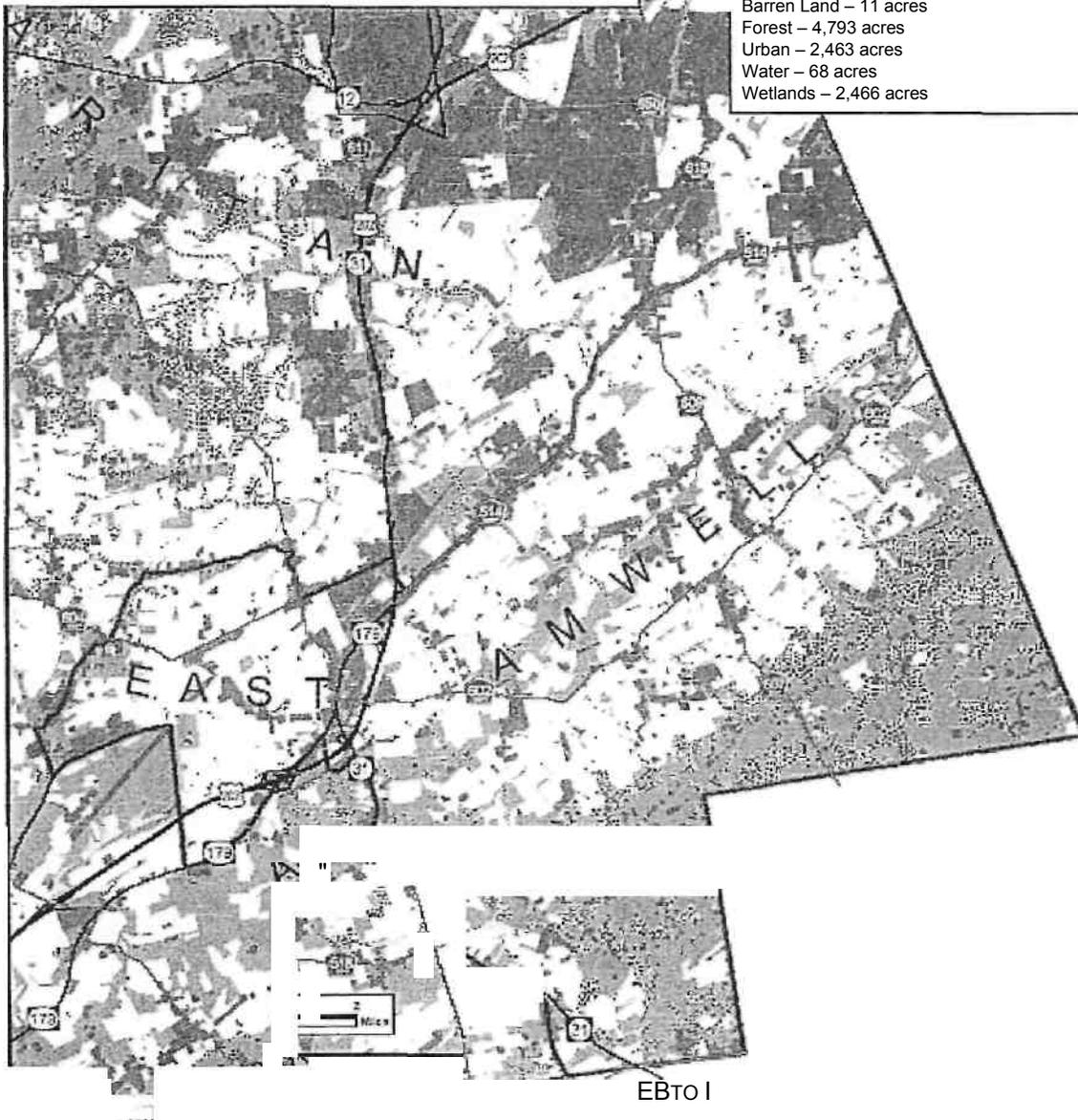
Additionally, the Township has zoning regulations (Open Lands Ratio/Clustering) that encourage preservation of agriculturally viable tracts in the Amwell Valley Agricultural District, comprising about 11,000 acres. The Sourland Mountain District comprising about 6000 acres has zoning requirements promoting conservation of environmentally sensitive features.

Figure C-3 shows the Township boundaries on USGS Quadrangles, and Figure C-8 indicates the above-mentioned zoning districts. Figure C-6 shows NJDEP 1995 figures for Land Use/Land Cover. Agriculture- 46%; Forest- 26%; Urban-13%; and Wetlands-14%. Because of slow development, these percentages probably have not changed very much. Figure C-9 shows constrained land within the Township.

Figure C-3: East Amwell Township on USGS Quadrangles
 Hunterdon County, New Jersey



Figure C-6: East Amwell Township Existing Land Use
Hunterdon County, New Jersey



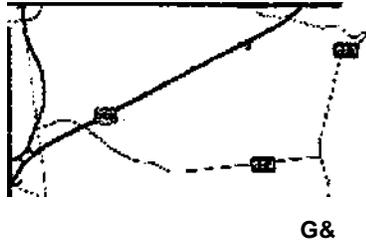
Prepared by Hunterdon County Planning Dept. March 31, 2004

Data Source: Hunterdon County Division of GIS and NJ DEP

The map is intended for planning purposes only; it was developed using NJ DEP GIS digital data, but this secondary product has not been verified by the NJ DEP and is not state-authorized.

**Figure C-8: Zoning Districts Within East Amwell Township
Hunterdon County, New Jersey**

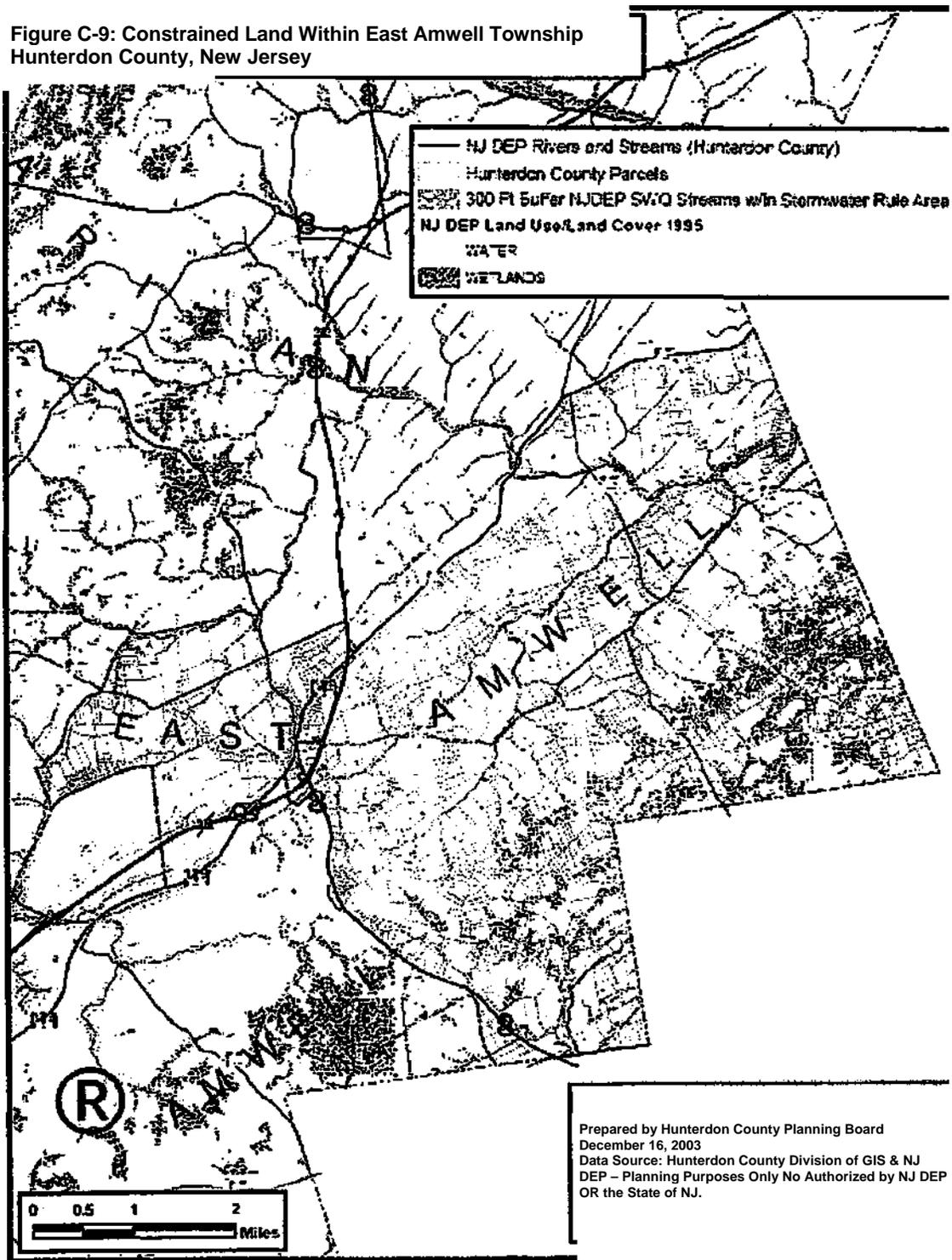
- Hunterdon County Parcels
- Zoning Classification**
- Sourland Mountain (SMD)
 - Amwell Valley Agricultural (AVD)
 - Residential (R)
 - Village(V)
 - Local Business (LB)
 - Highway & Office (HO)



Prepared by: Hunterdon County Planning Department
March 31, 2004 Planning Purposes Only

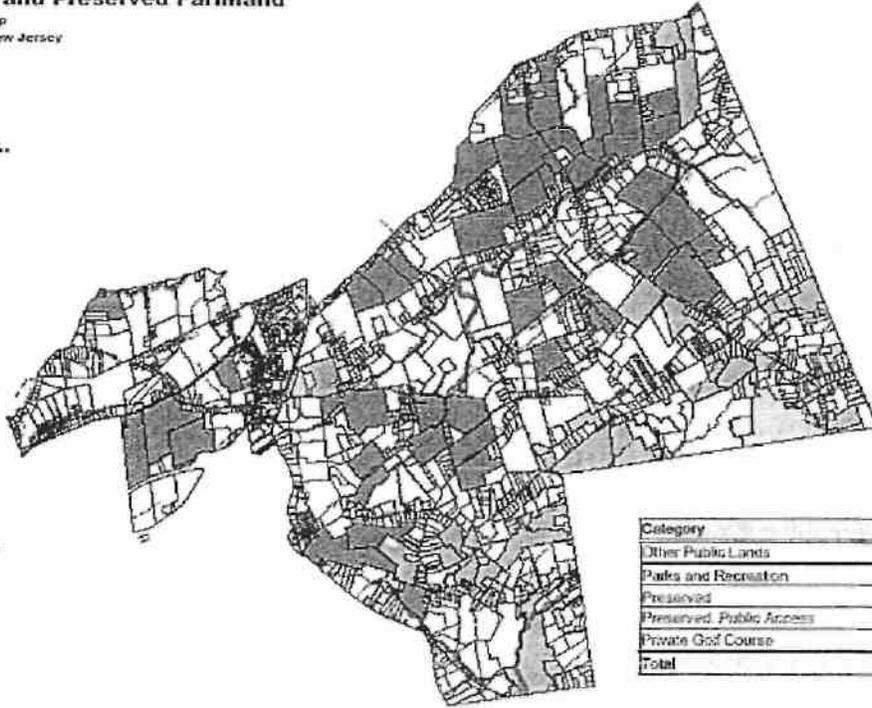


Figure C-9: Constrained Land Within East Amwell Township
 Hunterdon County, New Jersey



Open Space and Preserved Farmland*

East Amwell Township
Hudson County, New Jersey
12/2005/06



Legend

- Preserved, Public Access
 - Preserved
 - Parks and Recreation
 - Other Public Lands
 - Private Golf Course
- Data Source:
Hudson County Board of GIS
Hudson County Planning Board
Bancroft Associates, Inc.
- B A N C R O F T**

Category	Acres
Other Public Lands	258.41
Parks and Recreation	530.88
Preserved	3,510.15
Preserved, Public Access	1,575.45
Private Golf Course	302.53
Total	6,177.22

4.2 Stream Quality

AMNET DATA

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the State. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS). The score is based on a number of biometrics related to benthic macro-invertebrate community dynamics. The higher the score, the healthier is the biological life. Non-impaired is 24-30, moderately impaired is 9-21 and severely impaired is 0-6.

According to NJ AMNET Study data (www.state.nj.us/dep/wmm/bfbm) there are four stations included in the NJ Ambient Biomonitoring Network in the Township. Presented here below are the results of the most recent AMNET report (1998-99) for these stations; a map showing the location of the stations is attached as Appendix E. New data is expected in 2005-2006.

AN0333 is located at the point where the Neshanic River enters East Amwell Township from Raritan Township. The Neshanic River at Everitt Road (USGS Gauge) is classified as moderately impaired and has a NJIS score of 12, a negative change of 6 points from a NJIS score of 18 in 1993/94.

AN0334 is located on Back Brook at Wertsville Road (Rt. 602). It is classified as moderately impaired and has a NJIS score of 18, a positive change of 3 points from a NJIS score of 15 in 1993/94. It is also noted in Table 3 of the AMNET report that this station shows 3 non-chironomids with abnormalities in 1998/99, while no abnormalities were shown in 1993/94. This is not considered a significant level of abnormalities but it shows that there are now some abnormalities, showing deformities in a species of macro-invertebrate, an indication of a possible problem with the health of the stream habitat.

AN0335 is located on Back Brook at Manners Road (Rt. 609). It is classified as moderately impaired and has a NJIS score of 12, a negative change of 9 points from a NJIS score of 21 in 1993/94.

AN0336 is located on Furmans Brook, off Back Brook Road (Welisewitz Road). It is classified as non-impaired and has a NJIS score of 27, a positive change of 13 points from a NJIS score of 15 in 1993/94.

OTHER DATA RESULTS FOR TOWNSHIP STREAMS: NJ's Integrated List

In addition to NJDEP's AMNET, NJDEP and other regulatory agencies collect water quality chemical data on streams in the state.

New Jersey's 2002 Integrated List, "Sublist 5 with Priority Ranking", ranks sites as high, medium and low priority for restoration purposes, with high priority meaning that NJDEP considers it a high priority to restore the stream's water quality. The List shows that the Neshanic River near Reaville is "impaired for non-attainment" (does not meet water quality standards) for the following parameters: phosphorus (P), fecal coliform (FC), pH, total suspended solids (TSS), copper, and lead. This site has a "high" priority ranking for FC and nitrate and a "medium" priority ranking for total phosphorus (TP), pH, and TSS. Back Brook at Route 609 (Manners Road) just above its confluence with the Neshanic River is also "non-attaining for aquatic life" with a "low" priority ranking.

These streams are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for each documented pollutant for each waterway. A TMDL is the amount of a specific pollutant that can be accepted by a water body without violating water quality standards, or interfering with the ability to use the water body for one or more of its designated uses. The allowable load is allocated to the various sources of pollution, such as wastewater or a storm sewer that is permitted under the New Jersey Pollution Discharge Elimination System (NJPDES). The allowable load is also allocated to nonpoint source pollution such as stormwater runoff from residential

properties or farmland. Reserve capacity is often calculated into the TMDL, as is a margin of safety. An implementation plan is required to be developed to identify the sources that will need to reduce their pollutant inputs; designated allocations are assigned for each pollutant source. Implementation includes more effective stormwater treatment and prevention, employment of best management practices (BMPs) for various land uses, the adoption of ordinances to reduce pollution, and other methods of improving water quality.

TMDLs have not been developed yet for the above listed stream reaches (sections of the Neshanic River and Back Brook) by NJDEP. These streams, along with their tributaries, flow to the South Branch Raritan River and drain the majority of the Township.

Also on New Jersey's 2002 Integrated List, "Sublist 5 with Priority Ranking" is a segment of Stony Brook at Linvale Road in the Township. This stream reach does not meet standards for aquatic life and has been assigned a "low" priority ranking by NJDEP. No TMDL has been developed by NJDEP for this stream segment.

The Neshanic River travels through the northeastern portion of the Township in a southeasterly direction starting at the Hollywood Bridge near Reaville on the northern border, exiting the Township on the eastern border. The Back Brook is a major tributary to the Neshanic River. The headwaters of Branch Back Brook originate on the east side of Route 179/202 south of the Village of Ringoes and the stream becomes a first order stream as it flows in a northeasterly direction where it flows into Back Brook. There are smaller tributaries such as Furmans Brook in the eastern portion of the Township, the Third Neshanic River, and several unnamed tributaries to this stream system, all of which drain eventually to the Raritan Watershed.

The remainder of the streams in the Township drain either to the Stony Brook-Millstone River (Cat Tail Brook, Stony Brook, Beden Brook, and their tributaries in the Sourland Mountain area) in the southern portion of the Township or to the Delaware River (Alexhauken Creek and its tributaries) in the farthest western portion of the Township. There are several ponds and lakes in the Township. The only publicly accessible lake is Amwell Lake, which is in the Amwell Lake Wildlife Management Area and is located on Stony Brook to the east of Route 31.

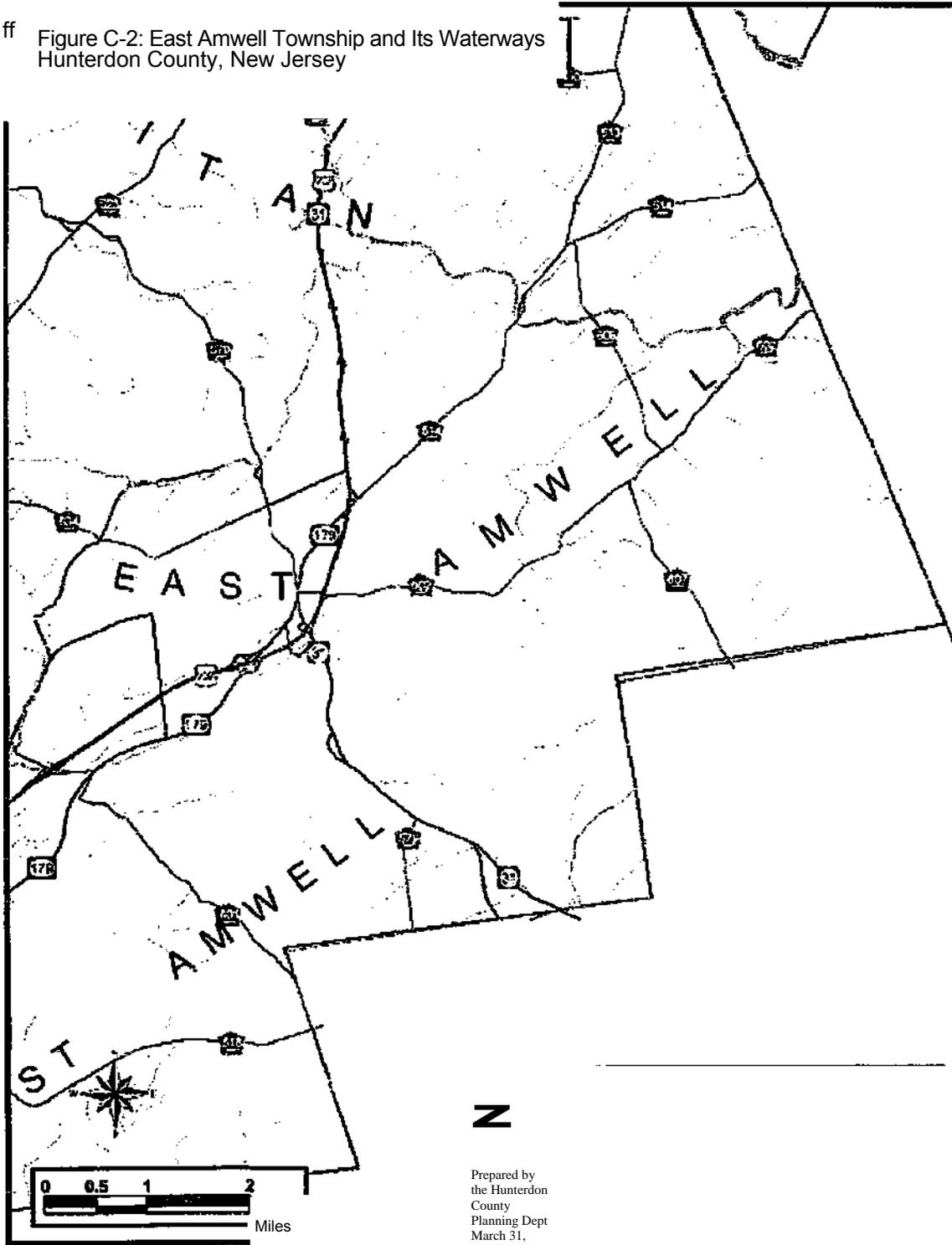
None of these stream reaches or water bodies in the Township is listed as impaired by NJDEP. The Alexhauken Creek is listed as Trout Maintenance Category One (TM C-1) in the New Jersey Surface Water Quality Standards because of high quality, trout maintenance and valuable ecological resources. The Alexhauken Creek drains less than 1/5 of the Township. Amwell Lake and Stony Brook and its tributaries within the Amwell Lake Wildlife Management Area are classified as Non-Trout Category One (NT C-1). The streams that flow to the Stony Brook-Millstone River from the Sourland Mountain have been publicly nominated for C-1 status but no rulemaking on the proposals has been issued by NJDEP yet. Figure C-2 follows and maps the locations of the streams and water bodies in the Township. Figure C-3 shows the surface water

quality classifications assigned to these waterways by NJDEP. (NJDEP N.J.A.C. 7:9B. Surface Water Quality Standards, as documented in Appendix E).



Amwell Lake in Amwell Lake Wildlife Management Area

ff Figure C-2: East Amwell Township and Its Waterways
Hunterdon County, New Jersey

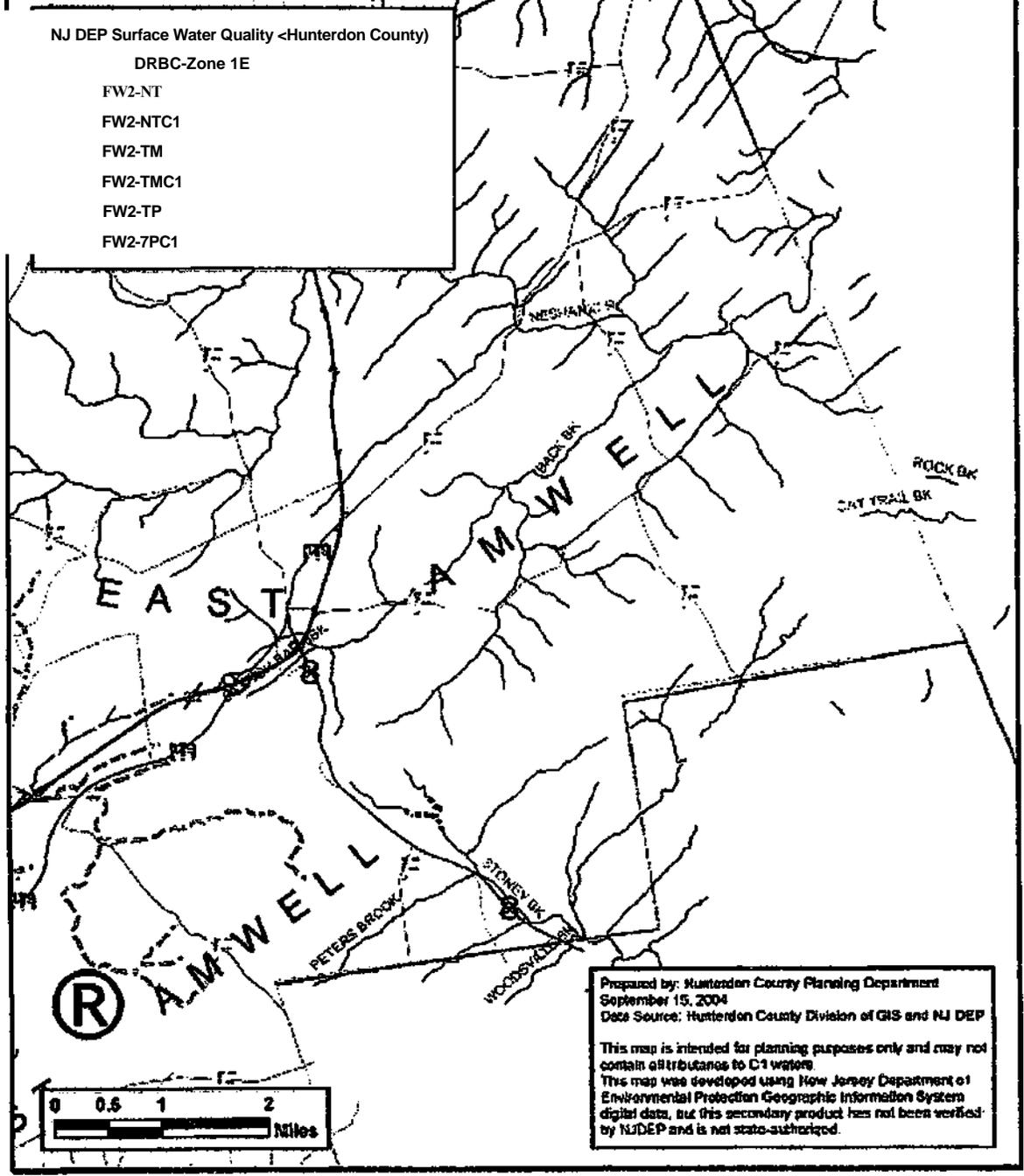


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Prepared by
the Hunterdon
County
Planning Dept
March 31,
2004

Planning
Purposes Only

Figure C-2(A): East Amwell Township and its Waterways by Surface Water Quality Classification Hunterdon County, New Jersey



4.3 Flooding

There are no consistently flooded areas in the Township - except for inundation of natural floodplains - although-localized flooding does occur. The Neshanic River backed up due to an ice jam on Cider Mill Road Bridge in the Township in 1996, causing flooding up the Back Brook tributary on Welisewitz Road, east of and near the intersection with Manners Road. Also, during Hurricane Floyd in 1999, a 100-year plus storm event, the Neshanic River and Back Brook overflowed their banks. These large storm events caused the flooding and evacuation of several homes along Welisewitz Road for several days.

Floodwaters occasionally inundate some roadways in the Township, such as when a tributary to the Neshanic River overflows onto an easterly section of Wertsville Road, in the eastern portion of the Township. In heavy storm events the intersection of Manners Road and Welisewitz Road (including the stream side lands of a nursery) is occasionally inundated when the Back Brook overflows.

All of these flood events can cause high stream flow velocities, stream bank and stream bottom scouring (disrupting biological and aquatic life), sedimentation of the stream and erosion.

In 1981, the Federal Emergency Management Agency mapped 100-year floodplains along the Neshanic River and its tributaries, Stony Brook, tributaries to the Third Neshanic River, a tributary to the Neshanic River located to the east of Back Brook, and Back Brook. The widest floodplains are located mainly along the Neshanic River and Back Brook in the northeastern and central portion of the Township, and along the Stony Brook and its tributaries in the southern portion of the Township.

Well Head Protection

The Township does not have any municipally owned or operated wells. The entire township is served by privately owned individual wells. The Township does have wells that are classified as community non-public wells at businesses, churches and schools. Water quality protection efforts are carried out through planning and development regulations and Board of Health ordinances.

Figure C-4 shows a map of groundwater recharge areas in the Township. Please note that a specific hydrogeologic study conducted for the Sourland Mountain geologic area by the Township ("Groundwater Resource Evaluation Sourland Mountain and Stony Brook Districts", prepared by Demicco and Associates, Inc., August 2002) provides more detailed recharge figures than the data supplied by Hunterdon County in Figure C-4. Figure C-5 shows that there are no wellhead protection areas in the Township.

**Figure C-4: Groundwater Recharge Areas in East Amwell Township
Hunterdon County, New Jersey**

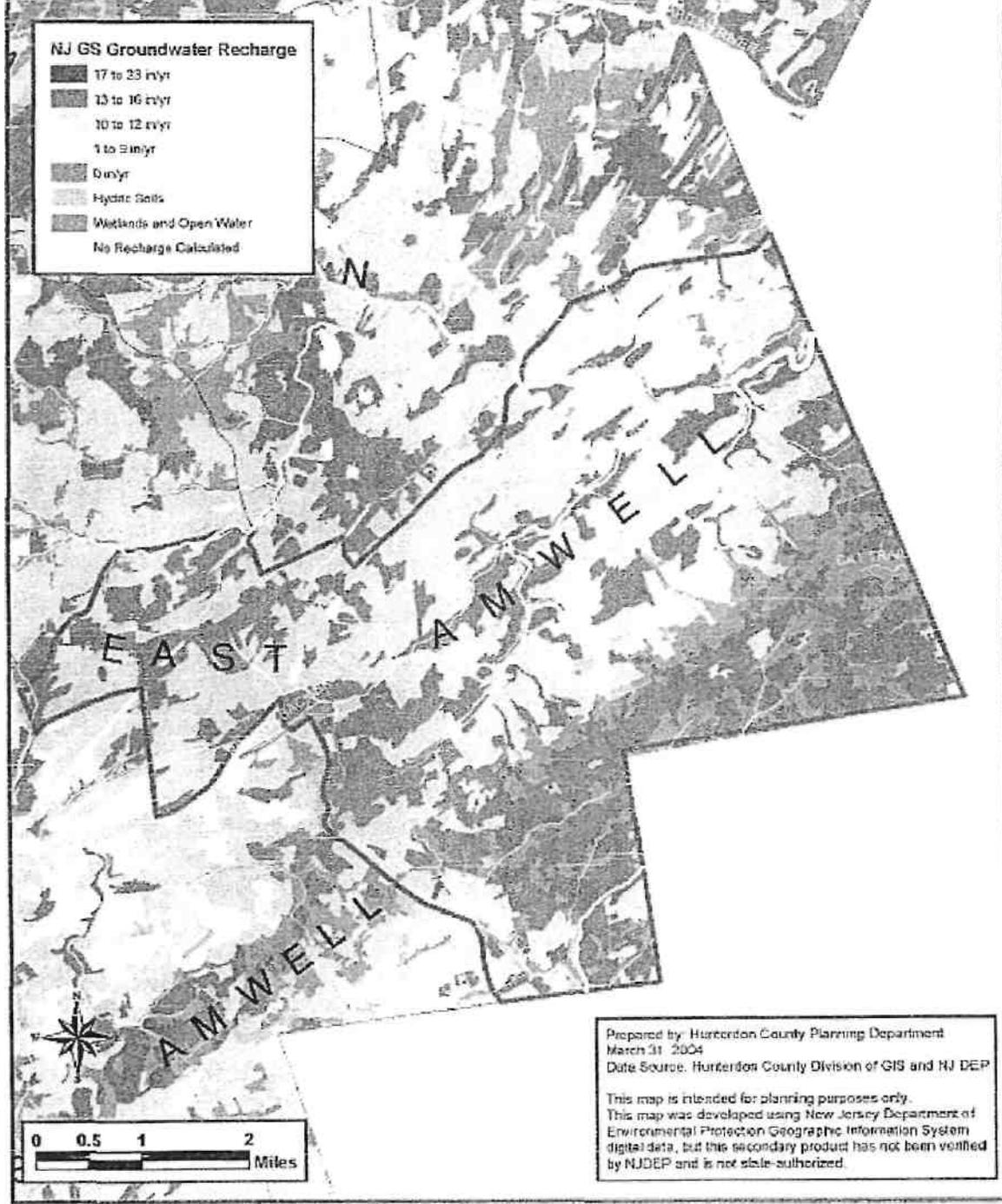
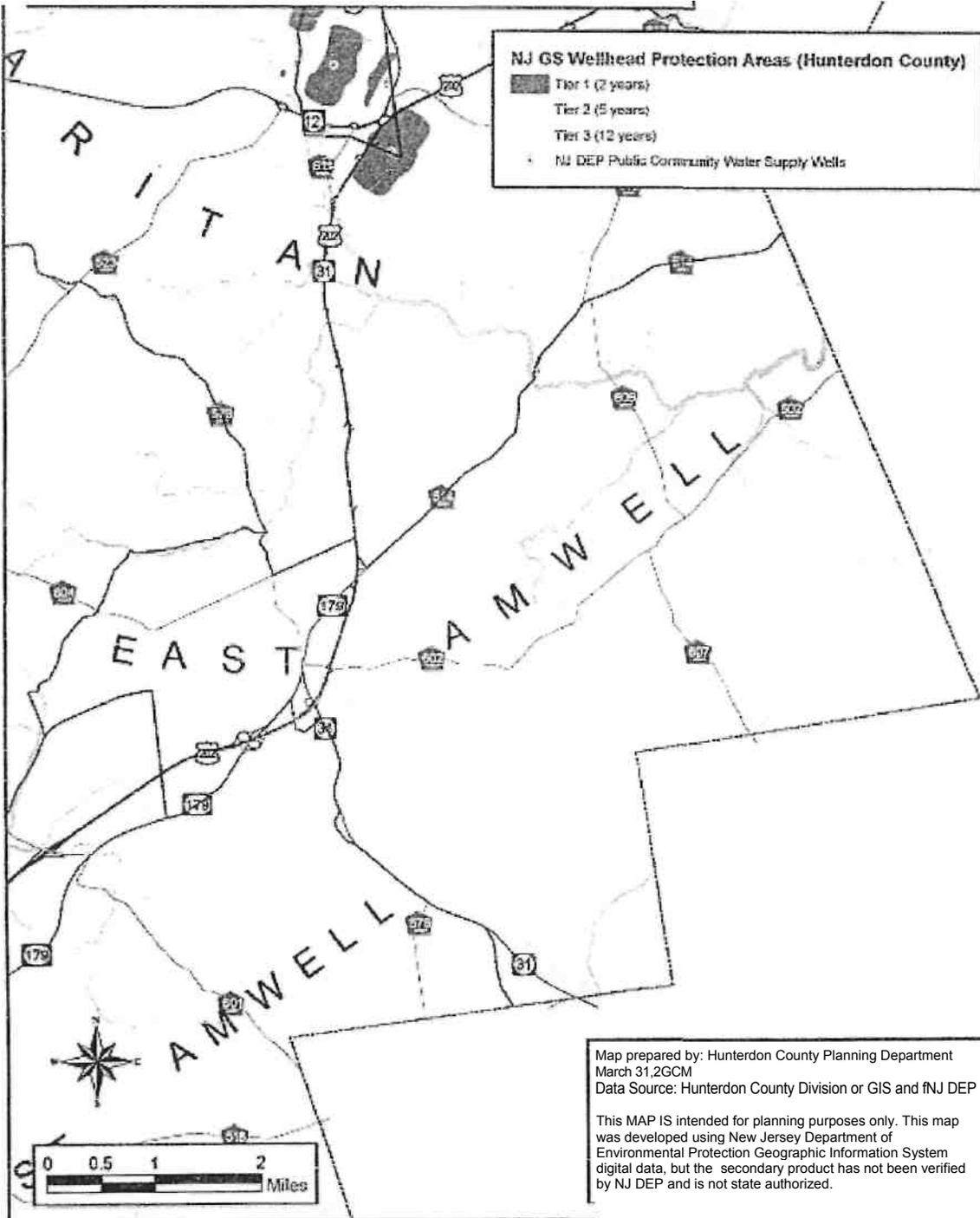


Figure C-5: Wellhead Protection Areas in East Amwell Township
Hunterdon County, New Jersey

7



5.0 Design and Performance Standards

With increased development in the coming years, even if it occurs slowly, the Township expects increased stormwater runoff that will require management and prevention through more effective design and performance standards. The Township considers this step towards better management strategies essential in order to prevent nonpoint source pollution and hydrologic changes that would degrade Township streams and well water supply. The Township 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 impacts of stormwater runoff on water quality and water quantity.

The plan goals outlined in Section 2.0 will be met through the adoption of a Municipal Stormwater Control Ordinance by the Township, as per N.J.A.C. 7:8-4. The Municipal Stormwater Control Ordinance will be submitted to Hunterdon County for review and approval by April 2006. Attached, as Appendix F, is the Model Stormwater Ordinance for Municipalities from NJDEP, which the Township will use to develop its Municipal Stormwater Control Ordinance.

The Ordinance will be coordinated with the "Watershed Protection Plan for the Alexhauken Creek Watershed", which was approved by NJDEP under a Section 319(h) grant in March 2005. The Plan will apply to that portion of the Township that drains to the Alexhauken Creek, as described in Section 4.2. East Amwell Township has a representative serving on the Steering Committee for this project. The Plan will be completed in approximately 3 years.

The design and performance standards in the ordinance will 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.

In order to insure compliance with these standards, the Township SMC will observe the construction of new projects to ensure that the stormwater measures are constructed and function as designed.



Back Brook

6.0 Plan Consistency

A Regional Stormwater Management Plan (RSWMP) is being developed for the Sourland Mountain Region of the Township and adjacent Townships. However, this regional plan will not be completed until June 30, 2006, which is after the adoption of the municipal plan (April 2005) and the municipal stormwater ordinance (April 2006). It is anticipated that the Sourland Mountain RSWMP will be an amendment to this plan.

The "Watershed Protection Plan for the Alexhauken Creek Watershed" as described in Section 5 will be completed in 2008. It is expected that the Alexhauken Plan will recommend amendments to this Plan.

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

The Township's Stormwater Control Ordinance(s) will require all new development and redevelopment also to comply with New Jersey's Soil Erosion and Control Standards.

During construction, the Township SMC will monitor on-site soil erosion and sediment control measures and report any inconsistencies to the Hunterdon County Soil Conservation District.



Unionville Cemetery

7.0 Nonstructural Stormwater Management Strategies

New Jersey adopted new Stormwater Management Regulations in tandem with the NJPDES rule in February 2004 (N.J.A.C. 7:8). The regulations address the harmful impacts of stormwater runoff from new and existing development as discussed in Section 1.0.

The Stormwater Management Regulations employ best management practices that emphasize the benefits of nonstructural preventive stormwater management approaches. Best Management Practices will be employed using NJDEP's Best Management Practices (BMP) Manual for guidance. The BMP Manual is available at www.nistormwater.org.

The Township has reviewed its Master Plan and ordinances, and has provided a list of the ordinance sections in the Land Management Ordinance and Township Code that are to be modified to incorporate nonstructural stormwater management strategies. Each recommended modification is based on requirements of the new Stormwater Management Regulations as enumerated in NJDEP's Model Stormwater Management Plan.

Ordinances that apply to the Sourland Mountain District will emphasize preservation of natural intact and diverse forest and forested ecosystems such as stormwater BMPs that employ bioretention, vegetated infiltration trenches, etc. The forested areas of the Sourland Mountain and the woodland located in other areas of the Township will be well suited for conservation design using vegetative stormwater BMPs and forest retention practices. Agricultural areas of the Township will also employ these non-structural BMPs but may not contain as many intact natural features which can serve as natural stormwater systems through conservation and preservation strategies.

Listed here are the Ordinances identified for revision. Once the ordinance texts are developed by the Township Planning Board and the Township's Municipal Stormwater Committee, they will be submitted to the Hunterdon County Planning Board, for review and approval, meeting time deadlines. A copy will be submitted to NJDEP at the same time.



Tributary to Neshanic River

Township Code and Land Management Ordinance Review

Township Code Chapters 81 (Flood Damage Prevention), 92 (Land Management), 117 (Soil Erosion and Sediment Control), 123 (Streets and Sidewalks), 129 (Tree Harvesting), and 163 (Nuisances), were reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes are recommended within these Chapters to incorporate new strategies. These recommendations include the following:

Chapter 81: Flood Damage Prevention

Chapter 81, which applies to all identified areas of special flood hazards, specifies procedures for development in such areas, and prerequisites for the granting of variances.

This section will be amended to require nonstructural best management practices for flood damage prevention such as the use of natural vegetated swales in lieu of inlets and pipes. It is not anticipated that procedural details for construction in these environmentally sensitive areas will be amended.

Code Section 92-46, Buffers

This section applies to major subdivisions and major site plans. It requires a professional landscape plan, including a performance/maintenance guarantee, protection of existing plantings, and a discussion of special requirements for slope

plantings. It requires use of hardy plants, native tree species, and the protection of natural wood tracts; it limits land disturbances for new construction. *This section will be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language will be added to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these sources. This section will also be amended to apply to all "major development" as defined in the Stormwater regulations, N.J.A.C. 7:8-1.2. ('development' that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more...")*

Code Section 92-50, Drainage

Section 92-50 currently specifies: "The overall drainage plan shall consider ways in which groundwater recharge can be encouraged... in the interests of maximizing the utilization of the renewable resource of water." In addition, there are provisions for detention facilities, "no net loss" runoff, and specific standards for the design and maintenance of drainage systems.

This section will be amended to encourage the use of natural vegetated swales and other BMPs in lieu of inlets, pipes, and detention basins. The Municipal Engineer is primarily responsible for enforcement of this section during Board review, and his advice will be followed.

Code Section 92-51, Driveways

This section: 1) requires a permit if drainage from a driveway is altered, 2) prohibits any runoff onto public roadways, and 3) has a prohibition on silt, debris, etc. entering road gutters, catch basins, inlets or drainpipes.

Language will be added to require use of best management practices such as the use of natural vegetated swales in lieu of inlets and pipes.

Code Section 92-62, Off-tract Improvements

This section deals with the developer's financial and structural obligations, pursuant to the Municipal Land Use Law, if his project diverts runoff off-site.

Language shall be added to require that off-tract and off-site stormwater management- and drainage improvements must conform to the "Design and Performance Standards" described in East Amwell Township's Land Management Ordinance (Chapter 92 of the Code).

Code Section 92-63, Off-Street Parking

This section requires that all curbing conform to an overall drainage plan approved by the Municipal Engineer. The design standards for each zoning district specify that parking facilities must conform to Section 92-63. Furthermore, the Sourland Mountain District ordinance (see Section 92-89) requires measures to retain recharge of precipitation on-site to the greatest extent possible.

Language will be added to require best management practices and to encourage the use of natural vegetated swales for the water quality design storm, with overflow for larger storm-events handled by structural and nonstructural methods where necessary. Section 92-63 will also be amended to encourage pervious paving, as described in the NJDEP BMP Manual, to be used in areas with proper soils and rock substrata and where there is sufficient depth that can be achieved between the pervious pavement system and the water table. This pervious pavement will be utilized to provide overflow parking, smaller parking stalls, and shared parking. New design standards for curbing and parking areas, as specified by NJAC 7:8-5 shall be adopted.

Code Section 92-73, Soil Erosion and Sediment Control

This section requires that all major site plans and major subdivisions shall incorporate soil erosion and sediment control programs which minimize runoff by retaining water on-site wherever possible.

Language shall be added to extend these erosion and control programs to "major development" as defined in the stormwater management regulations, N.J.A.C. &:8-1.2. This section will also be amended to add a recommendation for general design principles: the retention of natural vegetation and the use of various environmental, nonstructural techniques to minimize runoff. (See also Chapter 117 below.)

Code Section 92-74, Streets

This section requires an adequate drainage system to be provided in order for the Township to accept a new street (See Model Section 77-82, Streets). *This section does not address new stormwater goals and must be revised in accordance with Stormwater Regulations, NJAC 7:8-5 and the Residential Site Improvement Standards (RSIS).*

Code Section 92-81, Golf Courses

This section requires that golf courses limit clearing of woodlands and utilize buffered setbacks from watercourses and runoff collection ponds. *It is probable that no further locations in the Township could meet the strict requirements for construction of a golf course, obviating the need for additional attention to stormwater details. If a new golf course is proposed, various non-structural and design techniques shall be used to minimize run-off, prevent erosion, improve water quality and promote vegetative plantings, within the framework of Township review.*

Code Section 92-89, Sourland Mountain District

This section's Design Standards restrict clearing to no more than 30,000 square feet, require a vegetative conservation buffer along the road frontage and side lot lines, and require the implementation of measures to mitigate reduced recharge following construction.

Language shall be added to ensure that leaf litter, fallen trees, forest understory, and other beneficial aspects of the forest are maintained in addition to living trees. Clarification is also needed regarding enforcement, inspection, and penalties for violations of this ordinance—in keeping with the intent of the Stormwater regulations. (See proposal below for a Township-wide "Shade Tree Ordinance," as recommended in the Model Ordinance prepared by NJDEP.) Stormwater BMPs will focus on bioretention, naturally vegetated stormwater systems and conservation design techniques that focus on preservation of intact forest and their ecosystems, forested wetlands, and other unique ecological features of the Sourlands.

Section 92-91, Open Lands Ratio (Cluster development) in the Amwell Valley Agricultural-District

This section includes a prohibition of any activity on deed-restricted lands which would be detrimental to drainage, water conservation, flood control, erosion control, or oil conservation. The duster option requires that 75% of the tract be designated as open lands; at least 65% of designated open lands shall be "unconstrained." *The Township is awaiting its first cluster development application for subdivision under this ordinance. Thus, aspects of this ordinance, such as enforcing drainage, water conservation, etc. requirements may have to be re-visited after the Township has experience with monitoring such deed restrictions. Language should also be added to encourage vegetative plantings in appropriate locations on the deed-restricted land, to be determined on a site-specific basis so as not to interfere with agricultural activities.*

Code Chapter 92, Article VII: General Area, Yard, Bulk Regulations and Zoning Districts

Several changes have been made to zoning bulk requirements since 1999. The Township has three (3) types of residential districts (Amwell Valley Agricultural District, Sourland Mountain and Residential), one mixed use residential and small-town business district (Village), and two types of commercial districts, which are very small in area (Highway Office and Local Business). Each district has a maximum percent of lot and/or impervious coverage—ranging from 5%-3%-1% in the Sourland Mountain District to 50% in the Local Business District. These percentages were based on the environmental sensitivity of the area, the size of lots and the need for existing uses to be able to function in their intended capacity.

Although each district has a maximum allowable impervious cover/lot cover requirement, the Code shall be amended to remind developers that satisfying the coverage requirements does not relieve them of satisfying the Stormwater Management regulations. Changes in the impervious coverage/lot coverage limits that may be made in the future, must consider the effect of recharge, pollutant loading and peak flow. Locations with higher impervious coverage limits should be encouraged to implement non-structural design techniques. The Township should also adopt a new ordinance, as recommended by NJDEP, concerning protection of existing "shade trees" throughout the Township and encourage the plantings and re-plantings of trees that may be removed.

Chapter 117, Soil Erosion and Sediment-Control

This Chapter delineates the requirements and applicability for a certified soil erosion and sediment control plan to be approved by HCSCD. *This section shall be updated-in conformance with Stormwater Management regulations, including application to all "major development,"as therein defined.*

Chapter 118, Soil Protection

This Chapter addresses prohibitions on removing topsoil and boulders, stripping of vegetation, and grading, all of which could contribute to soil erosion. *This ordinance shall be amended to discourage removal of topsoil, blasting to alter rock formations, stripping of vegetation and re-grading; amendments should also encourage protection of natural, non-invasive vegetation, new plantings of native vegetative cover and other nonstructural anti-erosion measures.*

Chapter 120, Solid Waste

This chapter discusses recycling procedures and also encourages residents to allow leaves to degrade naturally on the property on which they are generated. *Language shall be added to specify placement of waste materials so they cannot be transferred off the lot by precipitation, wind or evaporation. Collection areas for natural debris shall also be designated.*

Chapter 123, Street and Sidewalks

This Chapter requires utilities to restore lands that they have disturbed during excavation, and specifies the techniques to be used. *This chapter should be amended to incorporate stormwater management goals, by replacing curbs with vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.*

Chapter 129, Tree Harvesting

This ordinance, while currently applicable to "commercial" tree harvesting, is under review. *Language should be added to minimize land disturbance, retain undergrowth and leaf litter, as a nonstructural stormwater management strategy, as well as control the amount of actual tree removal and techniques used. This ordinance should also encourage the protection of streams, wetlands, vernal pools and all other water bodies. Specific types of land/forest restoration should be delineated, to encourage protection of natural landscapes.*

Chapter 163, Nuisances (Board of Health Ordinance)

This chapter prohibits pollution, or any condition that potentially may cause pollution, or any waters in the Township, if such pollution may in turn cause injury to the health, comfort, or property of inhabitants.

Specific referral to stormwater management regulations will be recommended to the Board of Health for adoption.

Conclusion

East Amwell Township shall revise its existing ordinances in accordance with the requirements of the New Jersey Stormwater Management Regulations, N.J.A.C. Chapter 8. Environmental protections contained in existing ordinances will be expanded in order to promote recharge, manage peak flow from stormwater and reduce the pollutant load. A new ordinance, to protect and encourage shade trees throughout the Township, will be adopted.

Amendments to existing ordinances will protect environmentally-sensitive features of all lands throughout the Township—in order to protect and improve water quality and quantity for its residents and those downstream. Township officials will develop programs and policies to protect the Township's streams, waterways and groundwater resources. Ordinances will specify the continuing review and inspection necessary to ensure compliance with stormwater management regulations after "development" has been completed.



Headwater Stream, Sourland Mountain

8.0 Land Use/Build-Out Analysis and Pollutant Loading **(prepared by Princeton Hydro, Inc.)**

An important, required-component of Municipal Stormwater Management Plans (MSWMP) is a build-out analysis. A build-out analysis is a projection of maximum allowable development permitted by law according to current land uses and utilizing current zoning and land use regulations. The projected build-out is then used as a tool to evaluate future land use and development patterns. As such, MSWMPs are required to quantify anticipated pollutant loading within each USGS defined hydrologic unit code (HUC14), or subwatershed, based on the build-out.

Various models are used to calculate pollutant loads of waterbodies or loads generated within a specific watershed. Princeton Hydro, Inc. was hired by the Township to prepare this build-out analysis and pollutant loading analysis. Princeton Hydro developed and utilized a Unit Areal Loading model (UAL) similar to that recommended for use by the USEPA to evaluate contaminant loads generated within the HUC14 watersheds in the Township. The UAL is a pollutant-loading model based upon land use/land cover (LU/LC) to quantify annual loading of any number of pollutants. This type of model is based on the selection of pollutant loading coefficients, which are specific to the identified LU/LC of an area. These loading coefficients describe a pollutant load mass generated per unit area of land for one year described in English units as pounds/acre/year (lbs/ac/yr). The pollutant load for a specific contaminant is calculated by multiplying the loading coefficient for that contaminant by the land area of the LU/LC being investigated. Total phosphorus (TP), total nitrogen (TN), and total suspended sediments (TSS) were chosen as the contaminants for modeling based on generalized impacts to receiving bodies associated with developed or developing lands.

While UAL models are simple in concept, the database compilation methodology employed in this UAL was somewhat complex and drew information from various sources. A two-tiered dataset was used to calculate projected loadings utilizing the UAL model, including the build-out analysis distributed by Hunterdon County Planning Board (HCPB) and NJDEP published LU/LC data.

The build-out analysis used for modeling was initially developed by HCPB as part of the Cross-Acceptance Report, which is the public review phase of the State Development and Redevelopment Plan. This build-out analysis was completed to portray a realistic picture of potential development within the county by assessing tax parcels most likely to develop. The determination of development was based on a variety of tax codes that highlighted agricultural, developed, and vacant lands likely to be developed or redeveloped in the future (Table 1). Upon gross selection of tax parcels, all constraining factors were identified and removed from primary selection of properties. All non-buildable and preserved farmland and open space properties were removed, as were environmentally constrained sections which includes lands with slopes greater than or equal to 20%, wetlands with a 50-foot buffer, and Category One streams with 300-foot buffers. After this, parcels were then divided by minimum lot sizes as per municipal zoning and land use regulations to calculate allowable development units or

developable lots per parcel: Build-out was then assumed as the development of all developable lots.

All parcels not identified by the listed tax classes and all environmentally constrained lands, as defined above, were analyzed using LU/LC data. LU7LC is a published GIS layer developed by NJDEP by interpretation of the 1995/1997 false color infrared aerial photography of the state. LU/LC identification is based on a modified Anderson classification scheme.

The UAL model differentially treated land identified within the build-out analysis and all other land within East Amwell Township. Pollutant loading for land outside of the build-out analysis was calculated by simply multiplying LU/LC area in acres by the associated loading coefficient. Loading coefficients used in this analysis were identified in the New Jersey Stormwater BMP Manual (Table 3-1, Pollutant Loads by Land Cover, NJSW BMP Manual, April 2004), which are generalized statewide models based on published literature values (Table 2). Individual loads for each LU/LC class were summed to calculate total loads; this process was utilized within each identified HUC14 subwatershed. This method assumes that these lands are either non-buildable or currently reached build-out, thus LU/LC should remain constant over time with no potential to develop further under current zoning ordinance. To calculate pollutant loads within the build-out analysis, classification of allowable development units was necessary to correctly apply loading coefficients. This was accomplished by utilizing minimum lots sizes stated in zoning regulation and validating this information with Anderson LU/LC classification definitions and BMP manual coefficients. Thus stated, any calculated development units less than or equal to 21,780 ft² were assumed to be High/Medium Density Residential (HMDR) LU/LC, while any lots larger than that were assumed to be Low Density/Rural Residential (LDRR) land use types. Accordingly, build-out pollutant loads were calculated by multiplying land area of both classification types (HMDR or LDRR) by the appropriate loading coefficients; this process was repeated for each HUC.14 subwatershed. These two results were then added individually by HUC14 subwatershed and modeled pollutant to calculate overall nutrient and sediment loads.

The HCPB build-out analysis for the Township calculated a total of 3057.01 acres of land within the township, which is approximately 16.7% of total municipal acreage (Table 3), were suitable for further development according to the existing zoning laws. Of this potential "build-out" land, the predominant land cover was Low Density/Rural Residential, while only 7.13 acres were identified as High/Medium Density Residential. In contrast, non-buildable lands, which include lands that are fully developed, preserved as farmland or open space, or constrained by steep slopes, wetlands, or streambank buffers, account for 15230.92 acres within the township. The Township has a municipal area of 18287.93 acres, encompassing parts of ten (10) HUC14 sub-watersheds in three (3) watershed management areas (WMA) including North and South Branch Raritan, Millstone, and Central Delaware (Table 4). The build-out analysis identified developable tax parcels in nine of HUC14 sub-watersheds.

A full build-out of developable lands in the Township is expected to contribute 1,839.9 pounds of TP, 15,356.4 pounds of TN, and 305,701.1 pounds of TSS annually. In contrast, land within the township not identified by the build-out analysis accounted for 10,599.9 pounds of TP, 98,667.3 pounds of TN, and 2,401,009.5 pounds of TSS annually. In general, continued development of township lands will contribute significant loads of TP, TN, and TSS, however when rated as a percent contribution each of the modeled contaminants contributes less to the total municipal load than percent area of the build-out. In other words- land uses outside the build-out analysis area contribute greater loads per unit area than do build-out parcels, assuming residential development as the end use.

Analysis of loading on a HUC14 subwatershed basis is important in quantifying loads in specific WMAs and identifying those subwatersheds that will be most impacted by build-out of developable land. Drainage in the Township is primarily directed to North and South Branch Raritan WMA, with a much smaller contribution to both the Millstone and Central Delaware. Three HUC14 subwatersheds were identified as being potentially most impacted by build-out when analyzed by percent contribution: Headquarters Tributary (Third Neshanic River) 02030105030030, Neshanic River (below FNR/SNR confluence) 02030105030060, and Rock Brook (above Camp Meeting Road) 02030105110060. All of these subwatersheds will be significantly developed upon build-out, and in particular will contribute large nutrient and sediment loads, especially phosphorus. In absolute terms, the Neshanic River and Back Brook 02030105030050 will have the most new development in total acres and contribute the largest contaminant loads.

Table 1**Tax Codes used for Build-Out Analysis**

1, 3B, 1/3B, 2/3B, 3AB, 4A/3B, 4B/3B, &-4C/3B

Real Property Tax Classes

Class	Description
1	Vacant Land
2	Residential
3A	Farm/Regular Value
3B	Farm/Qualified
4A	Commercial
4B	industrial
4C	Apartments

Table 2

Land Cover Coefficients per NJ Stormwater BMP Manual

Land Cover	Minimum Lot Size (square feet)	TP (lbs/ac/year)	TN (lbs/ac/year)	TSS (lbs/ac/year)
High, Medium Density Residential	<21, 780	1.4	15	140
Low Density, Rural Residential	> 21,780	0.6	5	100
Commercial		2.1	22	200
industrial		1.5	16	200
Urban, Mixed Urban, Other		1.0	10	120
Agriculture		1.3	10	300
Forest, Water, Wetlands		0.1	3	40
Barrenland/Transitional Area		0.5	5	60

Table 3

Build-Out of Developable Land					
HUC14	Acres	TP	TN	TSS	
02030105030030	476.19	285.72	2380.97	47619.37	
02030105030050	949.22	575.24	4817.43	94922.47	
02030105030060	1082.33	649.40	5411.64	108232.77	
02030105090010	214.52	128.71	1072.60	21452.06	
02030105090020	101.83	61.10	509.15	10183.00	
02030105110040	0.51	0.31	2.56	51.24	
02030105110060	55.61	33.36	278.04	5560.77	
02040105210010	49.31	29.58	246.54	4930.81	
02040105210020	127.49	76.49	637.43	12748.59	
Total	3057.01	1839.91	15356.36	305701.08	

Non-Developable Land, based on current Land Use / Land Cover

HUC14	Area	TP	TN	TSS	
02030105030030	490.59	402.10	3450.22	88950.32	
02030105030050	6075.71	4975.75	43883.51	1098593.88	
02030105030060	4027.62	3313.98	28999.38	752896.34	
02030105040010	7.28	9.08	72.13	1985.31	
02030105090010	1433.89	797.12	8104.79	186658.21	
02030105090020	1715.85	441.36	6740.69	116248.80	
02030105110040	392.02	52.87	1234.18	17502.39	
02030105110060	481.99	80.16	1597.32	24035.87	
02040105210010	257.18	295.48	2426.63	64980.25	
02040105210020	348.77	231.98	2158.43	49158.14	
Total	15230.92	10599.88	98667.28	2401009.49	

Total

HUC14	Area	TP	TN	TSS	
02030105030030	966.78	687.81	5831.19	136569.69	
02030105030050	7024.94	5550.99	48700.94	1193516.35	
02030105030060	5109.95	3963.37	34411.02	861129.11	
02030105040010	7.28	9.08	72.13	1985.31	
02030105090010	1648.41	925.83	9177.39	208110.26	
02030105090020	1817.68	502.46	7249.84	126431.80	
02030105110040	392.53	53.18	1236.74	17553.63	
02030105110060	537.60	113.53	1875.36	29596.64	
02040105210010	306.49	325.06	2673.17	69911.06	
02040105210020	476.25	308.47	2795.86	61906.73	
East Amwell	18287.93	12439.79	114023.65	2706710.56	

Build-Out Projected Land-Cover

	Acres	TP	TN	TSS
Land Cover				
High, Medium Density Residential	7.13	9.98	106.96	713.08
<u>Low Density, Rural Residential</u>	3049.88	1829.93	15249.40	304988.00

Table 4

HUC14 Subwatershed Summary

WMA Name	HUC14	SWName
North and South Branch Raritan	02030105030030	Headquarters trib (Third Neshanic River)
North and South Branch Raritan	02030105030050	Back Brook
North and South Branch Raritan	02030105030060	Neshanic River (below FNR / SNR confl)
North and South Branch Raritan	02030105040010	Raritan R SB(Pleasant Run-Three Bridges)
Millstone	02030105090010	Stony Bk (above 74d 49m 15s)
Millstone	02030105090020	Stony Bk (74d 48m 10s to 74d 49m 15s)
Millstone	02030105110040	Beden Brook (above Province Line Rd)
Millstone	02030105110060	Rock Brook (above Camp Meeting Ave)
Central Delaware	02040105210010	Alexauken Ck (above 74d 55m)
Central Delaware	02040105210020	<u>Alexauken Ck (below 74d 55m to 11BA06)</u>

Contribution of Build-Out to Total Load of HUC14 Subwatershed

HUC14	Acres	TP	TSS	
02030105030030	49.26	41.5	40.83	34.87
02030105030050	13.51	10.36	9.89	7.95
02030105030060	21.18	16.38	15.73	12.57
02030105040010	0.00	0.00	0.00	0.00
02030105090010	13.01	13.90	11.69	10.31
02030105090020	5.60	12.16	7.02	8.05
02030105110040	0.13	0.58	0.21	0.29
02030105110060	10.34	29.39	14.83	18.79
02040105210010	16.09	9.10	9.22	7.05
02040105210020	26.77	24.80	22.80	20.59

9.0 Mitigation

Municipalities are empowered to require full compliance with New Jersey's Stormwater Management regulations. The Township will make every effort to work with applicants to successfully meet all provisions of the stormwater ordinances. The Township is committed to ensuring that development projects protect the water supply and water quality of the Township's water resources for the use of present and future generations. The Township carries the burden of having the headwaters for several water sources within its borders and must assist those downstream in maintaining reasonable water quantity and quality as well.

The Township's projected development is very low compared to neighboring municipalities. Sufficient large parcels of vacant and partially developed land exist, thus making it likely that adequate natural land area can be used for recharge, reduction in peak flow and minimization of pollutant loading. The existing zoning requirements, minimum lot sizes, Open Lands Ratio/Cluster development option and other zoning tools will help major residential development projects meet the stormwater ordinances without waivers or variances.

With a very small amount of land zoned for commercial districts located within the Township, it is likely that most non-residential development will include re-development, or will occur on larger-sized lots. Small re-development projects (under one acre) are not expected to generate significant stormwater quality and quantity impacts. It is very unlikely that site constraints on larger lots would prohibit compliance with the stormwater ordinances.

Before mitigation is considered, every reasonable step will be taken to avoid the need for a variance or waiver. An example of this would be the requirement by the Township for the purchase of adjoining property in order to enable compliance and avoid the need for a waiver or variance.

In instances where an applicant has demonstrated to the Planning Board that it is not possible to comply with the stormwater ordinances, mitigation will be required according to the following mitigation plan. This mitigation plan is provided for any proposed development that is granted a variance or exemption from the stormwater management design and performance standards. In order to consider application of these mitigation techniques, a developer must demonstrate that it is impossible to comply with the State Stormwater Management Regulations.

The hierarchy of options (to be required in sequential order) that will be considered for an individual mitigation plan includes:

1. The mitigation project must be implemented in the same HUC 14 as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in

the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. Or failing that: 2. If a suitable site cannot be located in the same HUG 14 as the proposed development, as discussed in option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the exemption is sought, but addresses the same issue. For example, if a variance is given because the 80 percent TSS standard is not met, the project may address water quality impacts due to fecal impairment.

Projects that will be considered as mitigation sites will be:

1. Renovation/redesign of existing detention facilities in the Township with BMPs
2. Stream restoration and riparian area restoration projects where water quality and quantity problems are known to exist as identified in Section 4.2. Examples include: Branch Back Brook east of Rte 202, Stony Brook at Linvale Rd, Neshanic River as it enters the Township near Reaville, Back Brook at Rte 609.
3. Natural re-vegetation of publicly and/or municipally owned open space such Welisewitz Road and Clawson Parks.
4. Forest protection and restoration projects, including conservation purchase of natural resource and environmentally sensitive areas such as the Sourland Mountain region and open grasslands.
5. Best management practices to be installed on publicly or municipally owned property and facilities such as Clawson Park, the Township athletic fields, the municipal maintenance/equipment yard, the municipal building parking lot, Amwell Lake and Sourland Mountain Preserve.

Evidence of water quality and quantity problems that do need addressing in the township are stream degradation and habitat degradation, which can most effectively be repaired through the activities described above. The Township will work to prepare a list of specific project sites.

As an alternative, the municipality may choose to allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project such as the purchase of environmentally sensitive lands identified in the Township's Open Space Plan. Funding could also go towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. Maintenance requirements including schedules and costs will be built into all Developer's Agreements for mitigation projects. All projects must receive prior approval from the Township Engineer, the Township SMC, the Planning Board and/or Zoning Board of Adjustment.

10.0 Definitions

"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:

1. A county planning agency; or
2. A county water resources 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 on agricultural land, 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. 4:1 C-1 et seq.

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

"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 area" means an area or feature which is of significant environmental value, including but not limited to: stream corridors^ natural heritage priority sites; habitats 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.

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

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

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

"Lead planning agency" means one or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

"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 which are not organized in a compact form.

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

"Person" means any individual, corporation, company, partnership, firm, association, 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. §§20.11 et seq.), thermal waste or wrecked or discarded equipment, rock, sand; cellar dirt, industrial, municipal, agricultural, and construction waste or runoff or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

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

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

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

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

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

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

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

"Stormwater runoff" means water flow on the surface of the ground or into 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 nonstormwater discharges into stormwater conveyances.

"Stormwater management planning agency" means a public body authorized by legislation to prepare stormwater management plans.

"Stormwater management planning area" means the geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

"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.

Appendices



Appendix A

**NJPDES Permit NJG015-1-581 Final:
Tier B Municipal Stormwater General Permit**



Bureau of Nonpoint Pollution Control
Division of Water Quality
PO Box 029, Trenton

Phono: (609) 633-7021
Fax: (609)984-7147

AUTHORIZATION TO DISCHARGE

R10 -Tier B Municipal Stormwater General Permit

Facility Name

EAST AMWELL

TWP.

1070 Route
202/31,
Ringoos, NJ
08551

PI ID#:
190297

NJPDES #

Type of Activity: Stormwater Discharge General Permit Authorization

East Amwell Township

1070 Route 2092/31

Ringoos, NJ 08551

Issuance Date:

Effective

Date:

04/01/2004

Expiration Date:

02/26/2009

NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Permit Number: NJD141861
P J. IDS S0577

Rnal: Tier B Municipal Stormwater Master General Permit

Permittee:
Division of Water Quality
401 E. State Street,
Trenton, NJ 08625

Co-Permittee:

Property Owner:

Location Of Activity;
NJPDES Master General Permit Program
Interest
401 E State Street
Trenton. New Jersey 08625

) Authorizations Covered Under This Approval
R10 –Tier B Municipal Stormwater General
Permit

<u>Issuance Date</u>	<u>Effective Date</u>	<u>Expiration Date</u>
02/02/2004	03/03/2004	02/28/2009

By Authority of;
Commissioner's Office

DEP AUTHORIZATION
Barry Chalofsky, P.P., Chief
Bureau of Non-point Pollution Control
Division of Water Quality

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Bureau of Nonpoint Pollution Control
Division of Water Quality-
P.O. Box 029
Trenton, N.J. 08625-0029
Tel: 609-633-7021 /FAX: 609-984-2147
www.state.nj.us/dep/dwq/nonpoint

DECISION

ULV AUG 12 2005

EAST AMWELL TOWNSHIP

Teresa R. Stahl, Municipal Clerk East Amwell Township 1070 Route 202
Ringoos, NJ 08551

Re: Notice of Final Permit Decision
R10 -Tier B Municipal Stormwater General Permit NJPDES Permit No.
NJ0141861

Dear Stormwater Program Coordinator:

Enclosed is the **final modification** of the Tier B Municipal Stormwater General Permit NJ0141861 (Tier B Permit) effective September 1, 2005. The final permit modification has been issued in accordance with N.J.A.C. 7:14A. A separate notice, pursuant to N.J.A.C. 7:14A-15.15, was sent to your municipality's mayor.

Please note that the permit modification was in part proposed as a result of discussions with municipalities, the New Jersey State League of Municipalities and other stakeholders to address a number of concerns. This final permit modification further clarifies, develops, and simplifies certain aspects of the Tier B Permit to better protect water quality and to assist municipalities in complying with the permit's conditions.

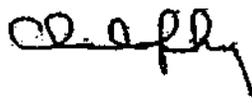
The final modification of the Tier B Permit:

- authorizes flows from washing fire fighting vehicles;
- extends the deadline for Pinelands municipalities to adopt a municipal stormwater management plan, and improves consistency with Pinelands Comprehensive Management Plan;
- adds a requirement that "conditionally approved" and "disapproved" municipal stormwater plans and ordinances be resubmitted to the county review agency within a specified timeframe;
- authorizes the discharge of equipment and vehicle washing from municipal operations until February 28, 2009. After February 28, 2009 Tier B Municipalities shall have no unpermitted discharge of equipment and vehicle wash wastewater. Acceptable methods of handling of equipment and vehicle wash wastewater include:
 - installing a vehicle wash reclaim system;
 - capturing and hauling the wastewater for proper disposal;
 - connecting to sanitary sewer (where applicable and approved by local authorities);
 - ceasing the activity; or
 - applying for and obtaining a separate NJPDES permit.

4"*

Thank you for your continued support of the Department's Clean Water Initiative. If you have questions or comments regarding the modification please contact Bruce Friedman, Supervisor, Municipal Stormwater Regulation Program, or your Case Manager at (609) 633-7021.

Sincerely,

A handwritten signature in black ink, appearing to read "Barry Chalofsky". The signature is written in a cursive style with a horizontal line underneath the main text.

Barry Chalofsky, P.P., Chief Bureau of
Nonpoint Pollution Control

Enclosure:

Tier B Municipal Stormwater General Permit (NJ0141861)

C: Water Compliance and Enforcement Regional Office

Tier B Municipal Stormwater General Permit (NJ0141861)

Major Modification

Effective Date of Permit Modification: September 1,2005

PART I NARRATIVE REQUIREMENTS:

A. Authorization Under this Permit 1.

Permit Area

- a. This permit applies to all areas of the State of New Jersey.

Eligibility

- a. This permit may authorize all new and existing stormwater discharges to surface water and groundwater from small municipal separate storm sewer systems (MS4s) owned or operated by municipalities assigned to Tier B under NJ.A.C. 7:14A-25.3(a)2 (Tier B Municipalities), except as provided in A.5 below.
- b. After the Effective Date of Permit Authorization (EDPA), the permit authorizes the following new and existing non-stormwater discharges from small MS4s owned or operated by Tier B Municipalities except if identified by the municipality as a significant contributor of pollutants to or from the MS4. If any of the following discharges are identified as a significant contributor, the Tier B Municipality shall contact the Department so appropriate actions may be taken:
 - i. Water line flushing and discharges from potable water sources
 - ii. Uncontaminated ground water (e.g., infiltration, crawl space or basement sump pumps, foundation or footing drains, rising ground waters)
 - iii. Air conditioning condensate
 - iv. Irrigation water (including landscape and lawn watering runoff)
 - v. Flows from springs, riparian habitats and wetlands, water reservoir discharges and diverted stream flows
 - vi. Residential car washing water, and residential swimming pool discharges
 - vii. Sidewalk, driveway and street wash water
 - viii. Flows from fire fighting activities including the washing of fire fighting vehicles
 - ix. Existing discharges of equipment and vehicle wash water from municipal maintenance yard operations until February 28, 2009. After February 28, 2009 Tier B Municipalities shall have no unpermitted discharge of equipment and vehicle Wash wastewater to the waters of the State pursuant to N.J.A.C. 7:14A-2.1(d). Acceptable methods of handling of equipment and vehicle wash wastewater include:
 - installing a vehicle wash reclaim system;
 - capturing and hauling the wastewater for proper disposal;

- connecting to sanitary sewer (where applicable and approved by local authorities);
 - ceasing the activity; or
 - applying for and obtaining a separate NJPDES permit
- x. Flows from rinsing of the following equipment with clean water:
- Beach maintenance equipment immediately following their use for their intended purposes; and
 - Equipment used in the application of salt and de-icing materials immediately following salt and de-icing material applications. Prior to rinsing with clean water, all residual salt and de-icing materials must be removed from equipment and vehicles to the maximum extent practicable using dry cleaning methods (e.g., shoveling and sweeping). Recovered materials are to be returned to storage for reuse or properly discarded.

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

3. Authorization

- a. In order to obtain authorization under this permit (except for automatic renewal of authorization under A.4 below) a complete Request for Authorization (RFA) shall be submitted in accordance with the requirements of this permit. Upon review of the RFA, the Department may, in accordance with N.J.A.C. 7:14A-6.13, either:
- i. Issue notification of authorization under this permit, in which case, authorization is deemed effective the first day of the following month of the date of the notification of authorization;
 - ii. Deny authorization under this permit and require submittal of an application for an individual permit; or
 - iii. Deny authorization under this permit and require submittal of an RFA for another general permit.
- b. For discharges from a small MS4 authorized by this permit, the Tier B Municipality is exempt from N.J.A.C. 7:14A-6.2(a)2. This exemption means that the discharge of any pollutant not specifically regulated in the NJPDES permit or listed and quantified in the NJPDES application or RFA shall not constitute a violation of the permit
- c. Authorization under this permit shall cease to be effective under N.J.A.C. 7:14A-6.13(f), (h), (j) and (o), where applicable.

4. Automatic Renewal of Authorization

- a. Authorization under this permit will be automatically renewed when this general permit is reissued as provided by N.J.A.C. 7:14A-6.13(d)9 and 25.8(c) so long as the discharge authorized under the general permit continues to be eligible. The Department shall issue a notice of renewed authorization to the Tier B Municipality:

- b. If the Tier B Municipality is aware of any information in the most recently submitted RFA that is no longer true, accurate, and/or complete, the Tier B Municipality shall provide the correct information to the Department within 90 days of the effective renewal authorization notice.

5. Stormwater Discharges Not Authorized

- a. This permit does not authorize "stormwater discharge associated with industrial activity" as defined in N. J. A.C. 7:14A-1.2. Types of facilities that a Tier B Municipality may operate and that are considered to be engaging in "industrial activity" include but are not limited to certain landfills and recycling facilities, certain transportation facilities (including certain local passenger transit and air transportation facilities), certain facilities handling domestic sewage or sewage sludge, steam electric power generating facilities, and construction activity that disturbs five acres or more (see N.J.A.C. 7:14A-1.2 for the full definition of "stormwater discharge associated with industrial activity"). Any municipality that operates an industrial facility with such a discharge must submit a separate request-for authorization (RFA) or individual permit application for that discharge. An RFA submitted for the Tier B Municipal Stormwater General Permit does not qualify as an RFA for such a discharge.
 - i. Deadlines to apply for a NJPDES permit for "stormwater discharge associated with industrial activity" are set forth in N.J.A.C. 7:14A-24.4(a)1. If such a discharge is from a facility (other than an airport, power/plant, or uncontrolled sanitary landfill) that is owned or operated by a municipality with a population of less than 100,000, the municipality shall submit the RFA or individual permit application by March 3, 2004. If such a discharge is from any other industrial facility, N J.A.C. 7:14A-24.4(a) 1 specifies earlier deadlines to apply. •
- b. This permit does not authorize "stormwater discharge associated with small construction activity" as defined in N.J.A.C. 7:14A-1.2. In general, this is the discharge to surface water of stormwater from construction activity that disturbs at least one but less than five acres (see N.J.A.C. 7:14A-1.2 for the full definition). Any municipality that operates a construction site with such a discharge must submit a separate RFA or individual permit application for that discharge. An RFA submitted for the Tier B Municipal Stormwater General Permit does not qualify as an RFA for such a discharge.
- c. This permit does not authorize any stormwater discharge that is authorized under another NJPDES permit. A municipality does not have to implement measures contained in this NJPDES permit for stormwater discharges at facilities owned or operated by that municipality that are regulated under a separate NJPDES stormwater permit authorizing those discharges.
- d. This permit does not authorize stormwater discharges from projects or activities that conflict with an adopted areawide or Statewide WQM plan.

B. Requests for Authorization Requirements

1. Deadline for Requesting Authorization for an Existing Discharge

- a. An RFA for the existing discharges from the small MS4 owned or operated by a Tier B Municipality must be submitted to the Department on or before March 3, 2004, except as provided below.

- i. If a municipality receives notice from the Department that it has been reassigned from Tier A to Tier B, the deadline to submit an RFA is-90 days after the receipt of that notice.
- ii. The Department may, in its discretion, accept an RFA submitted after the foregoing deadline; however, the municipality may still be held liable for violating the deadline to apply in accordance with N.J.A.C. 7:14A-25.8 and for discharging pollutants without a valid NJPDES permit in accordance with N.J.A.C. 7:14A-2.1(d).

2. Deadline for Requesting Authorization for a New Discharge

- a. An RFA for discharges from a new small MS4 owned or operated by a Tier B Municipality must be submitted to the Department at least ninety (90) days prior to the operation of the new MS4 system.
 - i. A Tier B. Municipality that already has authorization to discharge from a small MS4 under the Tier B Municipal Stormwater Permit does not need to submit an additional RFA for the expansion of an existing small MS4.
 - ii. A new small MS4 is a small MS4 that did not exist on March 3, 2004 and results in a new discharge to surface or ground waters of the State.

3. Requesting Authorization

- a. A separate RFA shall be submitted by each Tier B Municipality applying for authorization under this permit
- b. A single RFA is required for the entire stormwater discharge from the small MS4 owned or operated by and located within a single municipality. Multiple RFAs are not required for multiple municipal operations (e.g., municipally owned and operated maintenance facilities, garages, and/or offices).

4. Contents of the Request for Authorization

- a. A completed RFA shall include all of the following information regarding the Tier B Municipality and shall be completed using the Department's RFA form:
 - i. The name of the municipality that owns and operates the small MS4, county it is located in, and the address of the main municipal office (e.g., city hall, town hall, or municipal building).
 - ii. The name and mailing address of the Municipal Stormwater_Program Coordinator who will submit any reports or certifications required by the permit and to whom the Department shall send all correspondence concerning the permit.
 - iii. A certification acknowledging the best management practices, measurable goals, and other requirements specified in the permit.
 - iv. A map showing the boundaries of any "combined sewer area" that a Tier B Municipality wants to exclude from the Stormwater Program under Part I, Section E. A "combined sewer area" is an area that is excluded because all stormwater discharges that are from that area (and operated by the municipality) are discharges to combined (or sanitary) sewer systems.

- v. Additional information may be required by the Department to be included as part of the RFA if the Department determines that such additional information (including other data, reports, specifications, plans, permits, or other information) is reasonably necessary to determine whether to authorize the discharge under this permit

5. Where to Submit

- a. A completed and signed RFA shall be submitted to the Department at the address specified on the Department's RFA form.

C. Definitions

1. The following definitions apply to this permit.

- a. "EDP A" means Effective Date of Permit Authorization.
- b. "MS4" means a municipal separate storm sewer system.
- c. "Municipality" means a "municipality" as defined in the Municipal Land Use Law at N.J.S.A. 40:55D-5, that is, any city, borough, town, township, or village.
- d. "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):
 - i. Owned or operated by the United States, an interstate agency, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface water or groundwater;
 - ii. Designed and used for collecting or conveying stormwater;
 - iii. Which is not a combined sewer;
 - iv. Which is not part of a POTW; and
 - v. Which is not either of the following:
 - A separate storm sewer(s) that is at an industrial facility, and that collects or conveys stormwater discharges associated with industrial activity that occurs at that facility; or
 - A separate storm sewer(s) that is at a construction site, and that collects or conveys stormwater discharges associated with small construction activity that occurs at that site.
- e. "Small municipal separate storm sewer system" or "small MS4" means all municipal separate storm sewers (other than "large" or "medium" municipal separate storm sewer systems as defined in N.J.A.C. 7:14A-1.2) that are:
 - i. Owned or operated by municipalities described under N.J.A.C. 7:14A-25.1 (b);
 - ii. Owned or operated by county, State, interstate, or Federal agencies, and located at public complexes as described under N.J.A.C. 7:14A-25.2(a)2;

- iii. Owned or operated by county, State, interstate, Federal, or other agencies, and located at highways and other thoroughfares as described under N.J.A.C. 7:14A-25.2(a)3; or
- iv. Owned or operated by county, State, interstate, Federal, or other agencies, and receive special designation under N.J.A.C. 7: 14A-25.2(a)4.
- f. "Solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids.
- g. "Stormwater" means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, is captured by separate storm sewers or other sewerage or drainage facilities, or is conveyed by snow removal equipment.

D. Special Conditions

1. Sharing of Responsibilities

- a. A Tier B Municipality may share with one or more other entities (for example, a watershed association or another municipality) the responsibility for implementing any of the Statewide Basic Requirements (SBRs), or Additional Measures (AMs) required by this permit pursuant to N.J.A.C. 7:14A-25.8(e).
- b. The Tier B Municipality is responsible for compliance with this permit if the other entity fails to implement the measures), or components) thereof. In the annual reports the municipality must submit under Part I, Section H.2, the municipality shall specify that it is relying on another entity to satisfy some of the Tier B Municipality's NJPDES permit obligations.
- c. If the municipality is relying on another entity regulated under the NJPDES permit program to satisfy all of that Tier B Municipality's NJPDES permit obligations, including that municipality's obligation to file these annual reports, the municipality shall notify the Department of this reliance in writing.

E. Stormwater Program

1. Stormwater Program

- a. Tier B municipalities are required to develop, implement, and enforce a stormwater program that must include the SBRs that are listed in Part I, Section F and the AMs, if any, required by Part I, Section G.1 of the permit
- b. For any projects or activities which the municipality contracts out to private contractors after the EDPA, the awarded contract must contain conditions that the contractor must conduct such projects or activities in such a manner that is in compliance with the municipality's stormwater program and this permit's conditions. The municipality is responsible for any violations of this permit resulting from a contractor's noncompliance.

F. Statewide Basic Requirements (SBRs)

1. Stormwater quality issues related to new development, redevelopment and existing development are to be addressed through the implementation of the following Statewide Basic Requirements (SBRs). The permit specifies the BMPs that will be implemented for those SBRs.

- a. Additional information is provided and each of the SBRs and related BMPs are described in more detail in the Department's Tier B Municipal Stormwater Permit Guidance Document.

2. Post-Construction Stormwater Management in New Development and Redevelopment

- a. Minimum Standard - To prevent or minimize water quality impacts, the Tier B Municipality shall develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects (including projects operated by the municipality itself) that disturb one acre or more, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the municipality's small MS4. The municipality shall in its post-construction program:
 - i. Adopt and reexamine a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) in accordance with N.J.A.C. 7:8-4.
 - ii. Adopt and implement a municipal stormwater control ordinance or ordinances in accordance with N.J.A.C. 7:8-4. The ordinance(s) will control stormwater from non-residential development and redevelopment projects.
 - iii. Ensure that any residential development and redevelopment projects that are subject to the Residential Site Improvement Standards for stormwater management (N.J.A.C. 5:21-7) comply with those standards (including any exception, waiver, or special area standard that was approved under N.J.A.C. 5:21-3).
 - iv. Where necessary to implement the municipal stormwater management plan, the municipal stormwater control ordinance(s) will also:
 - Control aspects of residential development and redevelopment projects that are not pre-empted by the Residential Site Improvement Standards; and
 - Set forth special area standards approved by the Site Improvement Advisory Board for residential development or redevelopment projects under NJ.A.C. 5:21-3.5.
 - v. Ensure adequate long-term operation and maintenance of BMPs.
 - vi. This post-construction program shall also require compliance with standards set forth in Attachment A of the permit to control passage of solid* and floatable materials through storm drain inlets.
 - vii. This post-construction program shall require compliance with the applicable design and performance standards established under NJ.A;C. 7:S formajor development, unless:
 - Those standards do not apply because of a variance or exemption, granted under N.J.A.C. 7:8; or
 - Alternative standards are applicable under an adopted areawide or Statewide Water Quality Management Plan adopted in accordance with N.J.A.C. 7:15.
- b. Measurable Goal — Tier B Municipalities shall certify annually that they have developed, implemented, and are actively enforcing a program to address stormwater runoff from new development and redevelopment projects that discharge into the Tier B Municipality's small MS4 in accordance with the minimum standard.

c. Implementation

- i. Upon the effective date of permit authorization, Tier B Municipalities shall-for new development and redevelopment projects:

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

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

- ii. Within 12 months from the effective date of permit authorization, Tier B Municipalities shall:

- Adopt a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) in accordance with N.J.A.C. 7:8-4 except as provided in iii below;
- Comply with the standards set forth in Attachment A of the permit to control passage of solid and floatable materials through storm drain inlets for storm drain inlets the municipality installs within the Tier B Municipality's small MS4.

- iii. Within 3 months from the date the Department provides a draft model "Pinelands" Municipal Stormwater Control Ordinance, Tier B Municipalities within the Pinelands Area as defined by N.J.S.A. 13:18A-11 shall adopt a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) pursuant to the Stormwater Management Rules (N.J.A.C. 7:8-4) for those areas of the municipality within the Pinelands Area.

Tier B Municipalities partially within the Pinelands Area shall adopt a municipal stormwater management plan (or adopt amendments to an existing municipal stormwater management plan) pursuant to the Stormwater Management Rules (N.J.A.C. 7:8-4) within 12 months from the effective date of permit authorization for those areas of the municipality not within the Pinelands Area.

- iv. Within 12 months from the adoption of the municipal stormwater management plan, Tier B Municipalities shall adopt a stormwater control ordinance(s) to implement that plan, and shall submit the adopted municipal stormwater management plan and ordinance(s) to the appropriate county review agency for approval pursuant to N.J.A.C. 7:8-4.4 (and, where N.J.A.C. 7:50-3 is applicable, to the Pinelands Commission for certification).

- If a county review agency conditionally approves the adopted municipal stormwater management plan and ordinance(s) the Tier B Municipality shall, within 180 days of the conditional approval, adopt the amendments to the

municipal stormwater management plan and ordinance(s) specified by the county review agency and resubmit the amended municipal stormwater management plan_and ordinances).

- If a county review agency disapproves the adopted municipal stormwater management plan and ordinance(s) the Tier B Municipality shall, within 180 days of the disapproval, resubmit an amended municipal stormwater management plan and ordinance(s) to the county review agency.
- If the Pinelands Commission disapproves or conditionally certifies the adopted municipal stormwater management plan and ordinances) the Tier B Municipality shall submit its modified plan and ordinance(s) to the Pinelands Commission-in accordance with N. J.A.C. 7:50-3.
- v. Tier B Municipalities shall enforce stormwater control ordinance(s) when approved by the county review agency (and, where N.J.A.C. 7:50-3 is applicable, certified by the Pinelands Commission) or shall enforce stormwater control ordinance(s) when conditionally approved by the county review agency upon adoption by the municipality of the amendments specified by the county review agency (and, where N.J.A.C. 7:50-3 is applicable, certified by the Pinelands Commission).in accordance with NJ.A.C. 7:8-4.
- vi. Within 24 months from the effective date of permit authorization Tier B Municipalities shall:
 - Ensure adequate long-term operation and maintenance of BMPs on property not owned or operated by the municipality;
 - Enforce, through the stormwater control ordinance(s) or a separate ordinance, compliance with the standards set forth in Attachment A of the permit to control passage of solid and floatable materials through storm drain inlets for storm drain inlets not installed by. the Tier B Municipality.

3. Local Public Education

a. Local Public Education Program

- i. Minimum Standard - The Local Public Education Program shall ensure that the annual mailing of the informational brochure and the annual educational event are conducted as required below. The Annual Report and Certification shall summarize how the Tier B Municipality distributed educational information and how the educational activities, including the educational event, will be conducted to satisfy this minimum standard. The following SBR and/or BMP topics shall be included in the Local Public Education Program:
 - Stormwater/Nonpoint Source Education - impact of stormwater discharges on surface and ground waters of the State and steps that the public can take to reduce pollutants in stormwater runoff
 - Storm Drain Inlet Labeling - hazards of dumping materials into the storm drain, and fact that storm drains are usually connected to water bodies and do not receive

treatment

- Fertilizer/Pesticide Education -proper application, storage and disposal of pesticides and fertilizers, and the benefits of using native or well adapted vegetation that requires little or no fertilization.
- Waste Disposal Education - identification, proper handling and proper disposal of wastes (including the locations of hazardous waste collection facilities in the area) and the hazards associated with illicit connections and improper disposal of waste.

Tier B Municipalities shall provide for the duplication and annual mailing (or other means of delivery) to all residents and businesses within the municipality of the informational brochure provided by the Department. The informational brochure covers all the topics above. The Department may periodically provide the Tier B Municipality with an updated brochure for duplication and distribution.

As part of this program, Tier B Municipalities shall also conduct each year, at minimum, one education effort in the form of an "event" An event may be an activity established primarily to satisfy this requirement or may be part of a bigger existing event such as municipal festivals, county fairs, or an Earth Day, Arbor Day or 4th of July celebration. During this event, the informational brochure shall also be made available to the public.

- ii. Measurable Goal - Tier B Municipalities shall certify annually that that they have met the Local Public Education Program minimum standard and shall provide the date(s) of the annual mailing (or other means of delivery) and annual event, including a description of the event.
- iii. Implementation - Within 12 months from the effective date of permit authorization, Tier B Municipalities shall have developed and begun implementing the Local Public Education Program minimum standard.

b. Storm Drain Inlet Labeling

- i. Minimum Standard - Tier B Municipalities shall establish a storm drain inlet labeling program and label all storm drain inlets that are along municipal streets with sidewalks, and all storm drain inlets within plazas, parking areas, or maintenance yards that are operated by the municipality. The program shall establish a schedule for labeling, develop a long term maintenance plan, and when possible, coordinate efforts with watershed groups and volunteer organizations.
- ii. Measurable Goal - Tier B Municipalities shall certify annually that a storm drain inlet labeling program has been developed or is being implemented, and shall identify the number of storm drain inlets labeled within the year.
- iii. Implementation - Within 12 months from the effective date of permit authorization, Tier B Municipalities shall develop a labeling program for the storm drain inlets identified in the minimum standard. Tier B Municipalities must either:
 - Label a minimum of 50% of the storm drain inlets within 36 months from the EDPA; and label all remaining storm drain inlets 6n or before 60 months from EDPA; or

Divide the municipality into two sectors for the purposes of storm drain inlet labeling. Prepare a map of the two sectors. Label the storm, drain inlets in one sector within 36 months from the EDPA; and label all remaining storm drain inlets on or before 60 months from EDPA.

G. Additional and Other Measures

1. Additional Measures

- a. Additional Measures (AMs) are non-numeric or numeric effluent limitations that are expressly required to be included in the stormwater program by an adopted areawide or Statewide Water Quality Management Plan (WQM plan). AMs may modify or be in addition to SBRs. AMs may be required by a TMDL approved or established by USEPA, a regional stormwater management plan, or other elements of adopted areawide or Statewide WQM plans.
- b. The Department will provide written notice of the adoption of an AM to each Tier B Municipality whose stormwater program will be affected, and will list each adopted AM in the permit by making a minor modification to the permit. The AMs, other than numeric effluent limitations, will specify the BMPs that must be implemented and the measurable goals for each BMP. The AMs will also specify time periods for implementation.

2. Other Stormwater Control Measures

- a. Tier B Municipalities may also implement other stormwater control measures as allowed by statute. These activities are outside the scope of the Tier B stormwater program.

H. Deadlines and Certifications

1. Statewide Basic Requirements

- a. Each SBR contained in Part I, Section F of the permit has a specific implementation schedule based on the effective date of permit authorization. Each SBR shall be implemented in accordance with that schedule. Tier B Municipalities shall certify in the Annual Report and Certification the status of the implementation of each SBR and the date implementation was completed, as appropriate.

2. Annual Report and Certification

- a. Tier B Municipalities shall complete an Annual Report (on a form provided by the Department) summarizing the status of compliance with this permit including measurable goals and the status of the implementation of each SBR contained in Part I, Section F of the permit. This report shall include a certification that the municipality is in compliance with this permit, except for any incidents of noncompliance. Any incidents of noncompliance with permit conditions shall be identified in the Annual Report and Certification. A copy of each Annual Report and Certification shall be kept at a central location and shall be made available to the Department for inspection.
 - i. If there are incidents of noncompliance, the report shall identify the steps being taken to remedy the noncompliance and to prevent such incidents from recurring.

- ii. The Annual Report and Certification shall be signed and dated by the Tier B Municipality, and shall be maintained for a period of at least five years. This period may be extended by written request of the Department at any time.
- b. The Annual Report and Certification shall be submitted to the Department pursuant to the following submittal schedule:
 - i. Submit an Annual Report and Certification: on or before July 1, 2005 and every 12 months thereafter.

I. Standard Conditions

1. The following general conditions are incorporated by reference. The Tier B Municipality is required to comply with the regulations, which were in effect as of the March 3, 2004.

- a. General Permits NJ.AX. 7:14A-6.13
- 0. Penalties for Violations N.J.A.C. 7:14-8.1 et seq.
- c. Incorporation by Reference N.J.A.C. 7:14A-2.3
- d. Toxic Pollutants NJ.A.C. 7:14A-6.2(a)4i
- e. Duty to Comply N.J.A.C. 7:14A-6.2(a) 1 & 4
- f. Duty to Mitigate N.J.A.C. 7:14A-6.2(a)5 & 11
- g. Inspection and Entry N.J.A.C. 7:14A-2.11(e)
- h. Enforcement Action NJ.A.C. 7:14A-2.9
- i. Duty to Reapply NJ.A.C. 7:14A-4.2(e)3
- j. Signatory Requirements for Applications and Reports N.J.A.C. 7:14A-4.9
- L Effect of Permit/Other Laws NJ.A.C. 7:14A-6.2(a)6 & 7 & 2.9(c)
- l. Severability NJ.A.C. 7:14A-2.2
- m. Administrative Continuation of Permits NJ.A.C. 7:14A-2.8
- n. Permit Actions NJ.A.C. 7:14A-2.7(c)
- o. Reopener Clause NJ.A.C. 7:14A-6.2(a) 10, 16.4(b) & 25.7(b)
- p. Permit Duration and Renewal N.J.A.C. 7:14A-2.7(a) & (b)
- q. Consolidation of Permit Process N.J.A.C. 7:14A-15.5
- r. Confidentiality NJ.A.C. 7:14A-18.2 & 2.11(g)
- s. Fee Schedule N.J.A.C. 7:14A-3.1
- t. UIC Corrective Action N.J.A.C. 7:14A-8.4
- u. Additional Conditions Applicable to UIC Permits NJ.A.C. 7:14A-8.9
- v. UIC Operating Criteria NJ.A.C. 7:14A-8.16

2. Operation And Maintenance

- a. Need to Halt or Reduce not a Defense N.J.A.C. 7:14A-2.9(b)
- b. Proper Operation and Maintenance NJ.A.C. 7:14A-6.12

3. Monitoring And Records

- a. Monitoring NJ.A.C. 7:14A-6.5
- b. Recordkeeping NJ.A.C. 7:14A-6.6
- c. Signatory Requirements for Monitoring Reports NJ.A.C. 7:14A-6.9

4. Reporting Requirements

- a. Planned Changes N.J.A.C. 7:14A-6.7
- b. Reporting of Monitoring Results NJ.A.C. 7:14A-6.8
- c. Noncompliance Reporting NJ.A.C. 7:14A-6.10 & 6.8(h)
- d. Hotline/Two Hour & Twenty-four Hour Reporting N.J.A.C. 7:14A-6.10(c) & (d)

- e. Written Reporting N.J.A.C. 7:14A-6.10(e) & (f) & 6.8(h)
- f. Duty to Provide Information N.J.A.C. 7:14A-2.11, 6.2(a)14 & 18.1
- g. Compliance Schedules NJ.A.C. 7:14A-6.4
- h. Transfer NJ.A.C. 7:14A-6.2(a)8 & 16.2

5. Copies of the NJPDES rules may be purchased by contacting West Group, St. Paul, Minnesota, 1-800-808-WEST.

J. Additional Conditions

1. Agency and Public Review

- a. The Tier B municipality shall keep records required by this general permit for at least five years from the date of the record. The municipality shall submit these records to the Department if requested.
- b. Upon review by an authorized representative, the Department may notify the Tier B Municipality at any time that the stormwater program does not meet one or more of the minimum requirements. Within 30 days after receiving such notification (unless otherwise specified by the Department), the stormwater program shall be revised to adequately address all deficiencies, and written certification of such revisions shall be submitted to the Department.
- c. Tier B Municipalities shall make records required by this permit available to the public at reasonable times during regular business hours (see N.J.A.C. 7:14A-18 for confidentiality provisions).

2. Other Laws

- a. In accordance with N.J.A.C. 7:14A-6.2(a)7, this permit does not authorize any infringement of State or local law or regulations, including, but not limited to the Pinelands rules (N.J.A.C. 7:50), N.J.A.C. 7:1E (Department rules entitled "Discharges of Petroleum and other Hazardous Substances"), the New Jersey Register of Historic Places Rules (N.J.A.C. 7:4), and all other Department rules. No discharge of hazardous substances (as defined in N.J.A.C. 7:1E-1.6) resulting from an onsite spill shall be deemed to be "pursuant to and in compliance with [this] permit" within the meaning of the Spill Compensation and Control Act at N.J.S.A. 58:10-23.11c.

3. Operations and Maintenance Manual

- a. In accordance with N.J.A.C. 7:14A-6.12(c), for a discharge authorized by this permit, the Tier B Municipality is exempt from the requirement to prepare an operations and maintenance manual.

Attachment A DESIGN STANDARD - STORM.DRAJN INLETS

This standard applies to storm drain inlets installed as part of new development and redevelopment projects (public or private) that disturb one acre or more. For exemptions to this standard see "Exemptions" below.

Grates in Pavement or Other Ground Surfaces

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).
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.

(In regard to whether the different grate must also be bicycle safe, the Residential Site Improvement Standards include requirements for bicycle-safe grates.)

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.

Curb-Openings; Inlets (Including Curb-Opening Inlets in Combination Inlets)

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.

Exemptions

Hydraulic Performance Exemptions

1. New Development and Redevelopment Projects - 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. Retrofitting of existing storm drain inlets - Where the review agency determines that this standard would cause inadequate hydraulic performance.

Alternative Device Exemptions

1. Where flows from the water quality design storm as specified in N.J.A.C. 7:8 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.
2. 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 N.J.A.C. 7:8.

Note - The preceding exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle-safe grates in new residential development (N.J.A.C. 5:21-4.18(b)2 and 7.4(a)).

Historic Places Exemption

Where the Department 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.

Appendix B

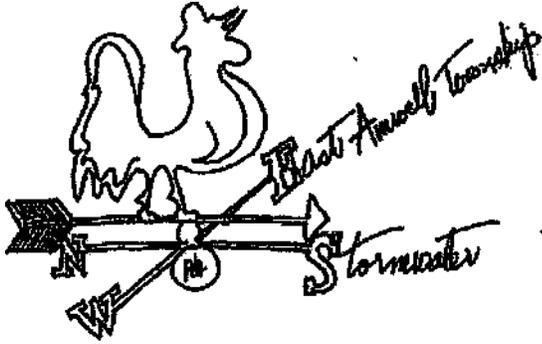
NJDEP's Summary of Statewide Basic Requirements (SBRs)
Tier B Municipal Stormwater Permit

**NJPDES Municipal Stormwater Regulation Program
Summary of Statewide-Basic Requirements (SBRs)
Tier-B Municipal-Stormwater Permit (NJ0141861) (Please
refer to final permit for details on SBRs)**

Statewide Basic Requirement	Minimum Standard	Implementation Schedule
Post-Construction Stormwater Management in New Development and Redevelopment		
Stormwater Management Plan	Adopt stormwater management (SWM) plan in accordance with NJ.A.C. 7:8-4.	12 months from effective date of permit authorization (EDPA)
Stormwater Management Plan (for Pinelands municipalities)	Adopt stormwater management (SWM) plan in accordance with NJ.A.C. 7:8-4.	Complete 3 months from date Department provides draft "Pinelands" ordinance
Stormwater Control Ordinance	Adopt and implement stormwater control ordinance in accordance with NJ.A.C. 7:8-4. Resubmit "conditionally approved" and "disapproved" municipal stormwater plans and ordinances to the county review agency.	Adopt ordinance 12 months from SWM plan adoption Resubmit 180 days from initial decision
Residential Site improvement Standards	Ensure compliance with Residential Site Improvement Standards for stormwater management (N.J.A.C. 5:21-7), including any exception, waiver, or special area standard approved under NJ.A.C. 5:21-3.	Upon EDPA
BMP Operation and Maintenance	Ensure adequate long-term operation and maintenance of BMPs.	EDPA for BMPs on municipal property, 24 months for BMPs elsewhere
Storm Drain Inlets	New storm drain inlets must meet the design standards specified in Attachment A of the permit.	12 months from EDPA if municipally installed. Otherwise 24 months from EDPA
Local Public Education		
Local Public Education Program	Copy and distribute educational brochure provided by the Department annually to residents and businesses, and conduct a yearly educational "event". Have brochures available at this event	Start 12 months from EDPA
Storm Drain Labeling	Label all municipal storm drain inlets that are next to sidewalks, or within plazas, parking areas or maintenance yards. Coordinate efforts with watershed groups and volunteer organizations.	Within 60 months from j EDPA
Annual Report and Certification		
Annual Report and Certification	Summarize the status of compliance with permit 2005 and every 12 months thereafter	1 On or before July 1,

Appendix C

East Amwell Township Public Education Program
with informational handouts



East Amwell Township Municipal Stormwater Management Plan **Local Public Education Program**

Following is a one-page sheet entitled Local Public Education Approved Activities and Point totals. This document was prepared by the NJ DEP. The Township must complete enough of the listed activities to total 10 points per year.

Local Public Education Approved Activities & Points

Tier B. Municipalities shall conduct educational activities that total a minimum of 10 points annually. Each approved activity is listed below with an assigned point value.

- School Presentations: Present educational classes/assemblies to local elementary, middle, and/or high school classes. (1 Point per visit/Maximum of 5 points per year)
- Website: Maintain a stormwater related page on the municipal website and include a link to www.cleanwaternj.org (1 point)
- Stormwater Display – Present a stormwater related display and materials at any municipal event (e.g., Earth Day, town picnic) or maintain a display at the municipal building. (2 points)
- Giveaway – Distribute an item with a stormwater related message (e.g., refrigerator magnets, temporary tattoos, bookmarks, coloring books, and pens or pencils). Municipality must purchase a minimum number of the item equal to 10% of the municipal population. (2 points)
- Citizen Stormwater Advisory Committee: Establish a subcommittee to the Environmental Commission to identify, coordinate and implement stormwater related programs. (2 points)
- Utilize Department Materials: Use Department created stormwater education materials, which can be found on www.cleanwaternj.org to publish an ad in a newspaper that serves the municipality; broadcast a radio or television commercial on a local radio or municipal public service channel; produce a billboard or sign which can be displayed on a bus, bus stop shelter, or at a recreation field (outfield sign). (2 points each/maximum of 4 points per year)
- Poster Contest – Organize a poster contest with a local school district. Poster themes shall have an appropriate stormwater message. Posters are to be displayed at buildings within the municipality, such as town hall, library, or school. (2 points)
- Stormwater Training for Elected Municipal Officials: Conduct a program for all elected municipal officials which educates them on the Stormwater Management Rules (N.J.A.C. 7:8), Tier B Permit and what steps the municipality has already taken to minimize stormwater pollution. (3 points)

- Mural: Facilitate the planning and painting of a stormwater pollution themed mural at a local downtown/commercial area. (3 points)
- Mailing: Distribute any of the Department's educational brochures, tip cards, or a municipality produced equivalent (e.g., calendar, recycling schedule) to every resident and business in the municipality. (3 points)
- Partnership Agreement/Local Event: Identify and enter into a partnership agreement with a local group such as a watershed organization, Riverkeeper, school, youth/faith based group and/or other non-profit to carry out a minimum of two (2) watershed stewardship/education activities (e.g., litter march, stream/beach cleanup). (3 points)
- Educational Activity: Educational activity concerning pet waste, littering, improper disposal of waste, wildlife feeding, yard waste, illicit connections, refuse containers. (5 points)

East Amwell Township's Stormwater Series

A series of educational handouts addressing various nonpoint source pollution issues and the steps that residents can take to reduce pollutants in stormwater runoff. Information will cover practices that residents can use as part of their everyday activities. The emphasis will be on integrating improved practices that prevent pollution and stormwater runoff into normal routines. The information will be presented in a user-friendly way and will emphasize how to accomplish the goal of reducing nonpoint source pollution efficiently and with little cost.

Educational Handouts include:

General Stormwater Education

- o NJDEP's general informational stormwater brochure
- o Best Management Practices for the home:
 - Rain garden/Recharge Garden
 - Rain Barrel
 - Let it Rot! Composting in your yard
 - Forest Stewardship
 - "Save your Soil" Soil erosion repair in the yard

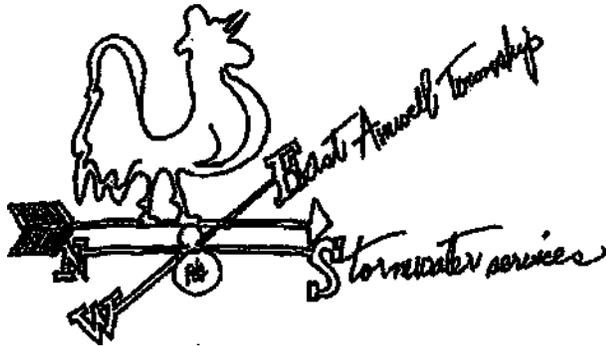
Fertilizer/Pesticide and stormwater runoff prevention

- o Gardening with Native Plants
- o Safe chemical use

Waste Disposal Education

- o Good Housekeeping

- De-icers: Try a low-salt-diet
- Waste Not: Car fluid recycling
- Make a Clean Sweep: Driveway sweeping
- o Hunterdon County Hazardous Waste Disposal Brochure
- o Scoop it up!: Pet Waste Cleanup
- o Remodeling clean up



Backyard Composting

What is compost? Compost is decomposed organic matter, made from kitchen scraps, leaves, yard trimmings, grass clippings, and other organic materials. These ingredients of the compost pile work with air and water to allow bacteria to aerobically decompose these foods, turning waste into a natural fertilizer. Yard and kitchen waste typically make up about 20% of household garbage; making it into compost recycles that waste and provides "black gold" for your yard and garden. Not only are you improving the growing environment for your plants and trees, you are also using a safe product that will not, like some fertilizers, cause pollution in runoff.

How to make compost. Composting is easy. It can be as simple as tossing your clippings and leaves into a heap and letting nature take its course. Stretching chicken wire in a square around 4 posts and adding yard waste will provide you with an easy way to reduce waste and, while a slow process, will eventually yield useable compost. This is considered "cold" composting.

"Hot" composting requires a little more effort but is faster and rewarding. Make a mix of green and brown materials, adding enough water to keep it damp. Green ingredients include kitchen waste, eggshells, coffee grounds, manure, garden refuse, green grass - items high in nitrogen. Brown ingredients are woody materials, straw, sawdust, dry leaves, shredded paper, wood ash, cotton/wool/silk scraps - items high in carbon. Stir or turn the pile about once a month. The pile will heat up and the bacteria will break it down. If it keeps a temperature of about 130 to 160 degrees, it will be done in about 9 months. If you don't manage it as closely, you will still have finished compost after 12-16 months.

For more specific instructions, consult "The Rodale Book of Composting", Rodale Press, or go to www.epa.gov/owow/watershed/outreach/documents/

To use your compost, sift out what hasn't been digested and sprinkle the rest on your yard and garden. This remarkable soil amendment will enrich your soil and make your plants thrive.



A compost bin can be purchased at your local garden supply store or you can make your own. If you have quantities of manure from horses or livestock, composting your manure is an important farm management practice. For guidance, contact the Hunterdon County Soil Conservation District and/or the Natural Resources Conservation Service at 908-788-9466.

Caution. It is important to not let your compost become a nuisance. Offensive odors, pests, and the spread of plant disease or invasive plants are not difficult to avoid by following a few simple rules. Thoughtful location and neatness of your compost pile go along way.

Most important, what you add to your pile is key: pet wastes and kitty litter may carry harmful bacteria; meat and dairy products may smell as they rot and may attract pests; diseased plants may harbor insects or disease-carrying organisms that are not killed by the compost; toxic chemicals are not broken down efficiently; and invasive roots (such as crabgrass) and weed seeds may survive composting.

What **NOT** to use in your compost:

- Pet wastes

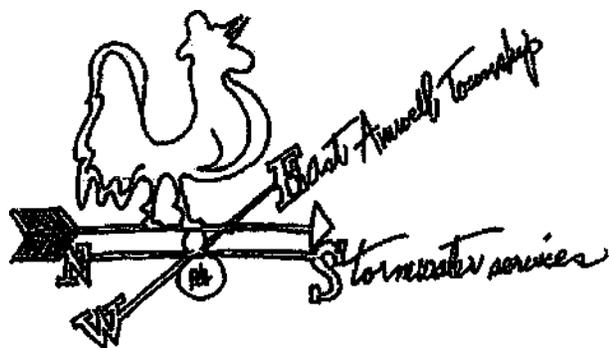
- Meat, fish, fats and dairy products

- Insect-infested or diseased plants

- Materials contaminated by synthetic chemicals or treated with herbicides, pesticides or insecticides

- Diseased or insect infested plants

- Invasive plants or plant parts; weeds with mature seeds.



Forest Stewardship

What is a forest? A forest is more than a collection of trees. It is an ecosystem that is made up of interconnected plant communities, species of flora and fauna and inorganic natural features. The complex web of a forest starts with the geology underfoot - the rock and soil types and the aquifer beneath. The soil on the upper layer above bedrock here in East Amwell supports a variety of grasses, ferns, herbaceous plants, shrubs, and trees. It is the large trees, the understory trees and shrubs, the sub-shrubs, ferns, woodland grasses and the seasonal plants such as spring ephemerals that make up the forest flora ecosystem. In order to have a healthy intact forest, these elements all need each other and rely on each other for shared habitat.

The organic litter layer found in forests is teeming with life such as fungi that aid in the breakdown of organics in the soil, making nutrients available to the roots of plants. The humus and organic soil layer is the food source for all woodland vegetation, especially important in thin and rocky soils. This makes it very important not to smother the forest floor with mulch, significantly alter the natural lay of the land, or remove native vegetation from under trees. The natural forest relies on a breathing, dynamic naturally vegetated soil layer in order to absorb rain, chemically process natural elements and help convert detritus into food. Preserving the natural forest allows this complex ecosystem to continue to function.

What does a forest do? A forest is nature's stormwater best management practice. A forest naturally prevents stormwater runoff. The leaves of trees absorb the energy of falling rain; the forest helps maintain the absorbency and porosity of the soil through its humus. Trees and vegetation take up rainfall through roots, acting like a pump. The forest prevents erosion by holding soil in place and slows down runoff, reducing its erosive force, allowing pollutants to settle out, and increasing the opportunity for infiltration. A forest also removes different types of pollutants associated with stormwater runoff including sediment, phosphorus, nitrogen, and metals.¹

¹ Bruce K. Ferguson, Stormwater Infiltration. CRC Press, 1994, p. 38; DNREC and Brandywine Conservancy, Conservation Design for Stormwater Management: A Design Approach to Reduce Stormwater Impacts from

The forest also provides critical habitat to many species of wildlife, including rare, threatened and endangered species. East Amwell's forests are filled with birds, both resident and migratory, and many reptiles, herps and small mammals that are dwindling elsewhere. All of these innate values of the forest are valuable resources that are very hard to replicate; forests are worth protecting in their natural state.

Succession forests and mature forests are dwindling quickly throughout the state and region. The Sourland Mountain in East Amwell is part of the largest contiguous forest in Central New Jersey and there are forests throughout the Township.

If you have forest on your property, you are very fortunate. By keeping contiguous forest intact, you can protect the natural resources that are dependent on it. This does not mean you cannot cut firewood or manage your woods through a woodlot management program. But it does mean that you should pay particular attention to preserving the forest ecosystem.

How to be a good steward.

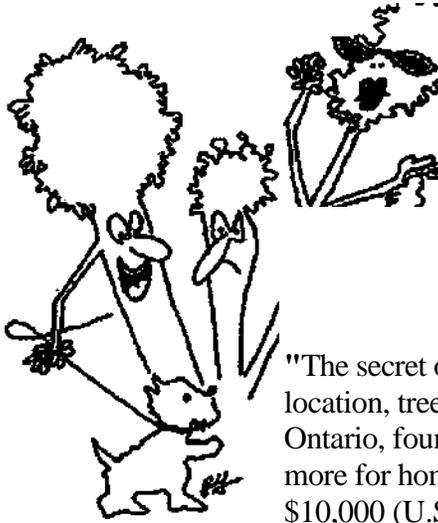
- Keep forest tracts connected; do not make cuts into the deep forest
- Maintain a variety of native vegetation species, native plant communities, and a variety of types and sizes of native trees.
- Do not remove understory plants, shrubs, and small trees; do not re-grade or smother the forest floor.
- Strive to eliminate non-native invasive species (see East Amwell's website for a list of many invasive non-native species of plants).
- Think of your forest as home to wildlife that need food, shelter, nesting sites, and other habitat features (for example, vultures need big boulders to nest; pileated woodpeckers need unbroken deep woods)
- Mature forests are particularly endangered and need special attention; consult a mature forest specialist.
- Keep streams and headwaters, wetlands and vernal pools buffered; don't drive through them or build near them.

How forests add to the value of your home.

In a survey conducted by the National Association of Home Builders, 43% of homebuyers paid a premium of up to \$3,000, 30% paid premiums of \$3,000 to \$5,000, and 27% paid premiums of over \$5,000 for homes with trees.²

Two regional economic surveys documented that conserving forests on residential and commercial sites enhanced property values by an average of 6 to 15% and increased the rate at which units were sold or leased."³

Land Development and Achieve Multiple Objectives Related to Land Use, September, 1997, p. 3-6 & 3-7; Pennsylvania Handbook of Best Management Practices for Developing Areas, Prepared by CH2MHILL, Spring 1998, p. 1-25 ² Cheryl Kollin, "Designing with Nature and Showing the Benefits", Land Development, National Association of Home Builders, Winter, 1997



"The secret of successful real estate may be 'location, location, trees.' Recent research by the University of Guelph, Ontario, found that people were willing to pay up to 15% more for homes with trees (red oaks in-this case). *We figure \$10,000 (U.S. \$6,750) a tree,' says Nathan Perkins, professor of landscape architecture. 'If you're willing to wait 15 years for it to mature'."

How to maintain your woods. Caring for your forestland is the work of good stewardship. In the simplest terms, this means, "letting your woods be". It also means watching out for them and managing them with consideration of their complex ecosystem and the life that depends on them. Should you need to restore some trees, the Natural Resources Conservation Service, Hunterdon County Extension Service, American Forests.com and local conservation organizations and native tree nurseries have good advice to offer about choosing new plantings. Chemical fertilizers, pesticides, and herbicides should be avoided and organic management practices employed.

If you are making supplemental plantings around your woodland home and outbuildings, consider a natural landscape rather than lawn (see East Amwell Stormwater Series "Gardening with Native Plants"). The requisite compaction of soil, shallow root length, and demand for water, sunshine and chemical applications, make lawn a poor choice for woodland areas. Lawn causes rain to run off rather than soak into the soil, increasing stormwater runoff and reducing groundwater recharge, lowering aquifer levels that feed your well and local headwaters. And any fertilizers or other chemicals you apply to your lawn are carried as pollutants to the nearest stream. This is particularly harmful in vulnerable headwaters and wetlands.

Native species of plants, shrubs, and trees are aesthetically pleasing in a woodland setting, reflecting the natural landscape rather than contrasting with it. Because many natives are not well known, they are not widely used. But, when properly selected, they tend to weather better than non-natives and are every bit as beautiful. And more local nurseries

³ Center for Watershed Protection, [Better Site Design: A Handbook for Changing Development Rules in Your Community](#), August, 1998 Citing two studies by Morales and Weyerhauser

are offering natives today. By utilizing native species you will be adding to the-indigenous forest, just as nature would. And you will be reaping the benefits with the enjoyment of living in a healthy forest, teaming with forest life.

New Jersey's Forest Stewardship Program: What is it and how can it help?

Here's what NJ Division of Parks and Forestry says⁴:

What is the Forest Stewardship Program? The Forest Stewardship Program (FSP) is a federally-funded forest management program designed by the US Forest Service and National Association of State Foresters. The program is intended to encourage management of private forestland for non-commodity benefits, such as wildlife, recreation, aesthetics and water quality as well as traditional commodities like timber and wood products. Forest Stewardship promotes long-term active management while emphasizing consideration of all the forest resources and benefits.

Who is eligible? Woodland owners with 5 acres or more of qualifying land. Qualifying land is rural land with existing woodland or other woody vegetation, or land suitable for such vegetation, owned privately for non-industrial purposes.

What are the general benefits of participation in FSP? Among the many benefits of participation are the availability of both technical and financial management assistance; environmentally responsible management of New Jersey's forest resources; active involvement in forest management; public recognition as a steward of the land; and the personal satisfaction of managing forest resources for present and future generations.

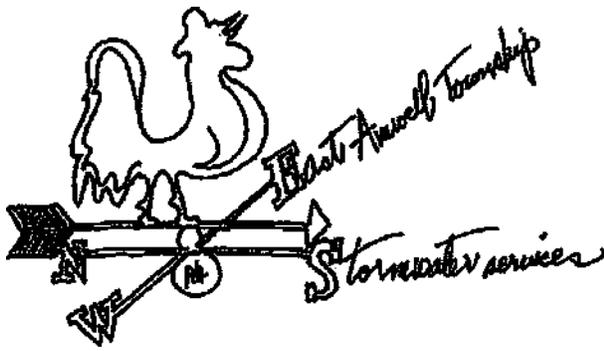
Is there financial revenue? Yes. There is a cost-sharing program available for tree planting, site preparation, tree shelters, and other practices and the cost of developing your Forest Management Program is 75% refundable.

How does enrollment affect my Farmland Assessment? it does not. **The** Farmland Assessment Program (FLA) and the Forest Stewardship Program (FSP) are separate. However, cost-share funds received through the FSP can, in most cases, be used as part of your income to meet your FLA requirements.

Contacts. N J Forest Service in Hunterdon County is located at 20 Route 23, Franklin, NJ; 973-827-1325; 973-827-0116 or visit website address below.

⁴'New Jersey Forest Stewardship Program", at www.state.nj.us/dep/parksandforests/forest/stw_inciprogram.

*



GARDENING WITH NATIVE PLANTS

The typical suburban lawn requires high maintenance and chemical treatment. The use of phosphorus and nitrogen in fertilizers often results in runoff of excess nutrients to the nearest waterway, causing nonpoint source pollution. Phosphorus stimulates the growth of algae in ponds and rivers that will crowd out other water plants and reduces oxygen for fish and other oxygen-dependent critters. The result is foul smelling slime and little or no aquatic or fish life. Pollutants can also seep into your well water.

Replacing lawn with perennials, shrubs and trees is a way to make a contribution to the natural landscape while eliminating a potential source of pollution. One of the greatest advantages of converting lawn into plants is that a landscape of mixed herbaceous plants, shrubs and trees allows the soil to sponge up precipitation which is then infiltrated to the groundwater and also taken up by vegetation, reducing the amount of stormwater runoff that leaves your property. And since plants and woody vegetation take up and process nutrients, you are helping to protect water quality in your local stream.

Give Natives a Try

When planning a natural landscape, consider using native species. Never use invasive imported varieties of plants such as purple loosestrife and Japanese barberry, which can escape and take over the habitat of native species, harming wildlife and ecosystems.

What is native? A native plant is defined as one that occurred within a specific area before settlement by Europeans. Plants native to East Amwell include: ferns and clubmosses; grasses, sedges, and rushes; flowering perennials, annuals, and biennials; and of course, woody trees, shrubs and vines. There are over 2,100 native plant species known for the region.

Why plant native? Native plants evolved in harmony with the local environment, and as a result need less care, use fewer resources and have a higher survival rate. They also provide diverse habitat for wildlife, attracting and providing food for a variety of birds, small mammals and amphibious creatures throughout the year. As a result, native plants ensure that our local ecosystems are more stable and more productive. The bonus is that natives are beautiful and make a lovely display when set well into a site.

How and Where to Plant Natives? Try to think of your yard around your home as an opening to be surrounded by planting beds or a green buffer. Consider the slope, the view, and the soil conditions. Try to picture shapes of beds or a greenbelt that buffer your central opening in a way that will catch rain, provide habitat, and allow you to enjoy the birds and butterflies that will come. Get to know the conditions on your property—the sun exposure, deep shade, windy spots, rocky shallows, springs and seeps. If you have an untouched corner or land nearby that is not landscaped, look to see what grows there. Have samples of your soil tested at the Hunterdon Agricultural Extension Center in Flemington. Then start picking plants.



If you want a more low-profile look, surround an area of lawn with sweeps of native grasses, groundcovers and flower beds, perhaps with some fence for native vines. If you go for a more relaxed look, consider plant communities. A plant community is a system of interrelated plants, a mix of native perennials, ferns, shrubs and trees landscaped as nature would place them. For instance, to plant a mini woods, study how the forest looks on the Sourland Mountain - tall trees, understory smaller species, woody perennials, ferns, herbaceous plants, and spring ephemerals.

Native plants along a stream create a buffer area. These buffer areas protect water quality through a natural filtration system that removes pollutants before they can enter our streams. A plant's woody stems and roots help to decrease flooding by slowing the velocity of rushing floodwaters. Mature root systems also help to stabilize streambanks by keeping the soil in place in the floodplain, helping to control erosion. Tree canopies shade the water and cool the temperature, which improves the aquatic habitat. Trees drop food and insects into the stream below, contributing to the overall stream ecosystem.

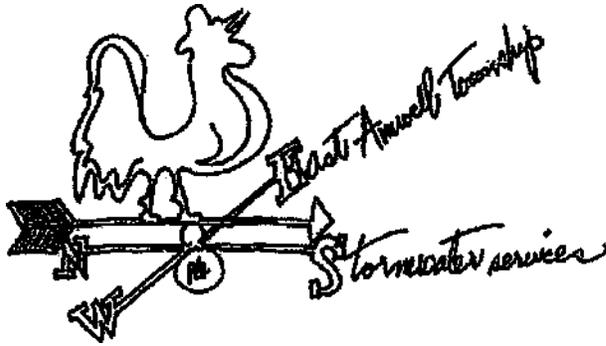
How to Care for Natural Landscapes

For the first three to five years, to ensure good survival of plants, your landscape should be watered, weeded and monitored closely. Plants that don't work out should be pulled and replaced, invasives removed before they take hold, weeds removed before they set seed. Management needs will decrease as plants mature: Chemical fertilizers, pesticides, and herbicides should be avoided and organic management practices employed.

Many local nurseries offer native plants and knowledgeable advice about how to use and care for native plants. As native species become more known, they are more widely available locally. For more information on native plant species and nurseries, contact the New Jersey Native Plant Society at www.npsnj.org

A forested buffer has ten to fourteen times the amount of runoff storage capacity than turf or grass.

Site Planning for Urban Stream Protection, by the Center for Watershed Protection, -co-published by the Metropolitan Washington Council of Governments, December 1995; and DNREC and Brandywine Conservancy, "Conservation Design for Stormwater Management; A Design Approach to Reduce Stormwater Impacts from Land Development and Achieve Multiple Objectives Related to Land Use", September, 1997, 2-23



Rain Barrel

What is it and why use it? A rain barrel is a container placed under your roof leader to catch gutter flows. A rain barrel allows you to retain some of the rain that would runoff your property, storing it to be recycled for water needs on site. This reduces the stormwater flows that leave your property, minimizing the impacts of that runoff such as erosion, sedimentation, flooding and streambank destabilization.

A rain barrel also allows you to conserve water and to water vegetation even in times of drought because you are recycling lost rain rather than drawing from wells or tap water. This is a painless way to conserve water at home. Water from your roof is clean - you can test for acidity to be sure the pH is appropriate for your plants.

How to Use. Place the barrel under the roof leader from your house, barn, or other structure. You can use one barrel or a series of barrels, depending on the size of your contributing roof area. The barrels are designed to overflow once full or can be hooked together with a hose line to store more volume. A long perforated hose can also be attached to the overflow valve, and then lain across gardens or lawn to maximize spread.

It is best to use a manufactured rain barrel or to make one according to specifications such as those provided on the reverse of this flyer. Manufactured rain barrels are quite attractive and are available for about \$125.00 and can be bought at garden centers or on the Internet and delivered to your door. Key safety features include a childproof cover that also blocks out breeding insects such as mosquitoes and a screen over the inlet to filter leaves and debris.

How to Maintain. A rain barrel is low maintenance, lightweight, and easy to install. Once in place, the screen needs to be cleared periodically. Generally

made of plastic, a rain barrel needs to be emptied and stored away for the winter months to avoid cracking. Cleaning is simply a matter of a yearly rinse.

About Downspouts. An alternative or supplemental practice to help roof runoff stay on site and recharge into the soil is the disconnection of your downspout from a hard surface or conveyance ditch. By allowing the downspout to empty onto a well-vegetated area with a spreader (could be a lawn or garden area), the roof runoff is recharged and stormwater runoff from your roof is prevented. Spreader are available at home and garden centers any many local hardware stores.

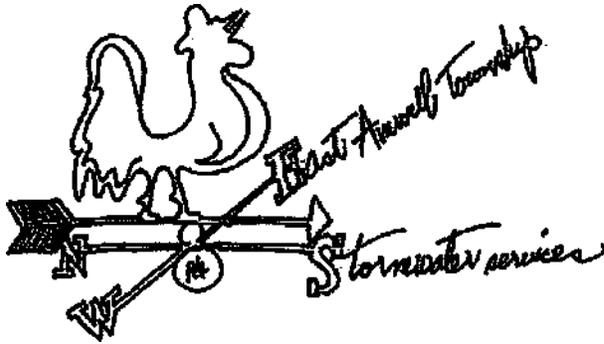


You Can Make Your Own Rain Barrel

If you want to invest some elbow grease, you can make your own rain barrel for a small cash investment. There are websites on the Internet that sell the components (\$39.95 for the barrel, \$19.95 for the spigot and other fittings or \$59.90 for the barrel and kit, plus shipping) or you can buy the pieces locally and put together a functional rain saver.

There are a few safety guidelines that should be followed:

- if you use a recycled barrel, use only a food-grade container to avoid water quality problems (available free from many food processors)
- the barrel needs a solid lid that locks on so children and animals cannot get into the container
- the barrel needs to be enclosed to prevent mosquitoes and other insects from breeding
- the barrel needs to have a screen over the inlet to filter out debris
- an overflow valve is needed to avoid flooding in the immediate area of the container
- the barrel needs to be set on stable level ground to avoid shifting



Rain Garden/Recharge Garden

What is it? A rain garden, also known as a recharge garden, is a small, vegetated plot with a strong emphasis on aesthetics. You can install a rain garden in your yard to capture and hold precipitation that is recharged to the soil and slowly taken up by plants. Roof leaders from your home, garage or barn can also be directed to the rain garden. This reduces the amount of runoff from your property, reducing stormwater impacts.

What and where to plant. The gardens need to be sited according to soil type, existing wetness, sunlight and other growing factors, tailored to the needs of the plants that are chosen, placed in your existing yard. Native species of plants are preferable since they can perform well after being established and, if properly chosen, will adapt to the garden with little maintenance. Showy native perennials such as cardinal flower (*lobelia cardinalis*) and butterfly weed (*asclepias tuberosa*) are tough plants that will also attract butterflies and hummingbirds and are readily available at local nurseries and native plant sales.

Why a Rain Garden? The birds, butterflies, and other beneficial insects will be attracted to the rain garden for the habitat, wildlife cover, and food it provides. The garden offers added value to the homeowner who benefits from the noise buffer and quality of life bonus. The enjoyment that comes from watching butterflies and birds or listening to toads on a spring evening, cannot be matched by the pipes and gutters that are usually the homeowner's piece of a stormwater system.

In stormwater best management practice language, a rain garden is a bioretention area. A bioretention area is a shallow depression combined with a mixture of sand and soils that are planted with native vegetation that absorb and filter runoff. The advantage of this low-tech version of a bioretention area is that they are inexpensive to install and maintain and can be retrofitted into an existing landscape. The individual nature of the garden allows for fine-tuning to fit your personal needs and aesthetics.

How to Maintain? The first step is correct siting of the rain garden. It needs to be placed where the rain will be captured, the slope and drainage of the property (a low spot or an area can be dug out and filled with a healthy soil and humus mixture) and on proximity to the rooftops that you want to drain. Carefully choose the plants so that plants that like wet feet (such as cardinal flower and swamp milkweed) will be in the moist soil and plants such as asters and butterfly weed will be in the drier edges. Occasional removal of invasive plants is required and should be done manually. Pesticides, herbicides, and artificial fertilizers should be avoided except for organic, non-toxic controls. Once your garden is established, it will be very low-maintenance and self-sustaining, providing years of enjoyment and runoff reduction benefits.



Getting started. A list of ideal plants for a rain garden follows. Plants should provide multiple benefits including habitat, diversity, color, floral display and workhorse toughness. For more information, go to NJ Native Plant Society [atwww.npsnj.org](http://www.npsnj.org). For wettest spots: Royal fern (*Osmunda regalis*)

Softstemmed bulrush (*Schoenoplectus tabernaemontani*) Tussock sedge (*Carex stricta*) Swamp milkweed (*Asclepias incarnata*)

Turtlehead (*Chelone glabra*) Rose mallow (*Hibiscus moscheutos*) Blue flag iris (*Iris versicolor*) Buttonbush

(*Cephalanthus occidentalis*) Swamp azalea (*Rhododendron viscosum*) For slightly wet areas: Cinnamon fern (*Osmunda*

cinnamomea) Sensitive fern (*Onoclea sensibilis*) Blue joint grass (*Calamagrostis canadensis*) Wool grass (*Scirpus cyperinus*) Joe-pye weed (*Eupatorium fistulosum*) Helianthus angustifolius (Swamp sunflower) Cardinal flower and blue lobelia (*Lobelia cardinalis* and *siphilitica*) Red Chokeberry (*Aronia arbutifolia*) Silky dogwood (*Cornus amomum*) High bush

blueberry (*Vaccinium corybosum*) For drained edges:

Interrupted fern (*Osmunda claytoniana*) Goldie's wood fern (*Dryopteris goldiana*) Little bluestem

grass (*Schizachyrium scoparium*) Indian grass (*Sorghastrum nutans*) Black-eyed susan

(*Rudbeckia hirta*) Coneflower (*Echinacea purpurea*) Goatsbeard (*Aruncus dioicus*)

Blue wood aster and smooth blue aster (*Aster cordifolius* and *laevis*) Butterfly weed (*Asclepius tuberosa*) Blue false indigo (*Baptisia australis*) Carolina allspice (*Calycanthus floridus*) Low bush

blueberry (*Vaccinium pallidum*)

Appendix D
Storm Drain Labeling Plan

Storm Drain Labeling Plan

The Township will label all of its drain inlets within 60 months of 4-01-04. Within 36 months of 4-01-04 the Township-will label 50% of the storm drain inlets.

The Township has inventoried and mapped all storm drain inlets and has researched labeling options. The Township Engineer has proposed labeling with a permanent medallion to be installed by the Township Road Department.

Copy of the proposed storm drain marker (Part: SDS) is attached with specifications.

Separate maps of Section 1 (the first 50% to be labeled) storm drain inlets and Section 2 (me-reniaining) storm drain inlets will be prepared.

/

Home

*Location &
Damage Prevention*

*Storm Drain P
Marking*

hint alt at ion

FAQ

News and Views

Request Literature

*Register for
Promotions*

Links

*Rep/Dim -i bitter
Opportunities*

Storm Drain Markers

Public education and outreach is part of the NPDES requirement. Storm drain marking is an established method of involving the public and increasing community awareness about non-point source pollution.

Unfortunately storm drain marking using spray painted stencils is messy, time consuming, and contradictory to the environmental message being presented (it eventually washes down the "protected" drain). It's also ultimately quite expensive as it must be re-done every couple of years.

Our storm drain marker is the only performance proven alternative available. It's available in Stock Titles or Custom manufactured to virtually any size, shape or number of colors.



See Our Storm Drain Markers

To see our stock markers and samples of our custom markers, click the marker.



Stock and Custom
Storm Drain Markers

Three Storm Drain Available

Marker Styles

GOOD The das Economark Curb Marker is made from a .030 clear polycarbonate (lexan) printed on the reverse side of the material. This protects the imprinted image from scratching. Double coated back to reduce see-through.

BETTER The das Standard Curb Marker is made from a .030 proprietary white plastic with UV inhibitors and a layering of materials for flexibility and impact resistance. The printing is on the face of the material which is then covered with a layer of UV clearcoating for UV and abrasion resistance. Our original. Introduced in 1983.

BEST The das Duracast Curb Marker is the same as the Standard with one additional feature. A polyurethane "dome" is applied to the face of the marker. This optically clear, self-healing, non-yellowing Duracast surface protects against mechanical and chemical abrasion.

The Duracast surface effectively doubles U.V. resistance as well. It is our most Durable marker.

das Manufacturing offers

- Free Design Service
- 12-Year Warranty

Inform the Public

das offers a variety of custom printed collateral items to support your marking program. Door hangers to inform the public, buttons, refrigerator door magnets, and sports bottles are all available for those hard-working volunteers.



[Home](#) | [Location & Damage Prevention](#) | [Storm Drain Markers](#) | [Installation](#)
[FAQ](#) | [News and Views](#) | [Request Literature](#) | [Register for Promotions](#)
[Links](#) | [Rep/Distributor Opportunities](#) | [Why das?](#)

das Manufacturing, Inc,
3610 Cinnamon Trace Drive • Valrico, FL 33594
800-549-6024 • 813-681-6024 • Fax: 813-681-5807
E-Mail: [sales\(g\),curbmarker.com](mailto:sales(g),curbmarker.com)

E-Mail Us Comments or Questions About Our Web Site: comments@curbmarker.com

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Return to Main Storm
Drain Markers Page

Stock Storm Drain Markers



Part: SDB



Part: SDO



Part: SDL



Part: SDR



Part: SDC



Part: SOW



Part: SDT



Part: SDS



Part: SDP



Part: ORD



Part: SDF



Part: SDG

Custom Storm Drain Markers



Appendix E

**New Jersey AMNET Study Data and
Applicable NJ Surface Water Quality Classifications**

State of New Jersey Christine Todd
Whitman, Governor

AMBIENT BIOMONITORING NETWORK

Watershed Management Areas 7, 8, 9, and 10

Raritan Region 1999 Benthic

Macroinvertebrate Data



New Jersey Department of Environmental Protection
Robert C. Shinn, JR., Commissioner

June 2000

Station: AN0334

Back Brook, Wertsville Rd. (Rt.602), East Amwell Twp., Hunterdon County

Hopewell USGS Quadrangle Date Sampled: 04/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	46
Gammaridae	4	16
Heptageniidae	4	10
Caenidae	7	6
Hydropsychidae	4	5
Elmidae	4	5
Simuliidae	6	4
Coenagrionidae	9	3
Pyralidae	5	1
Tubificidae	10	1
Hydrophilidae	5	1
Empididae	6	1
Ephemerellidae	1	1
Gomphidae	1	1
Naididae	7	1
Sphaeriidae	8	1
BloodRed Chironomidae	8	1
Psephenidae	4	1

Statistical Analysis

Number of Taxa: 18

Total Number of Individuals: 105 , Contribution of Dominant Family: 43.81 % (Chironomidae) Family Biotic Index: 5.41
Scraper/Filterer Collector Ratio: 1.10 Shredder/Total Ratio: 0.45

E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 4 %

EPT: 20.95 EPT/C: 0.47 NJIS Rating: 18

Biological Condition: Moderately Impaired

Habitat Analysis: 120 Deficiency(s) noted:

Observations

Streamwater: Clear .Flow: Moderate....Width/Depth (ft): 4-6/1-2

Substrate: Cobbles, Gravel/Sand, Silt....StreamBank Vegetation/Stability: Grasses/Poor

Canopy: Open.... Other: Agriculture - cropland & livestock; Storm sewer (ditch)

Waterfowl, Sampled dwnstr of bridge; Water temp. 11.3C / pH 7.3SU / DO 16.6mg/L / Cond.

326uhmos

Station: AN0335
 Back Brook, Manners Rd. (Rt. 609), East Amwell Twp., Hunterdon County
 Hopewell USGS Quadrangle
 Date Sampled: 04-/14/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Chironomidae	6	48
Lumbriculidae	8	18
Ephemerelellidae	1	12
Naididae	7	6
BloodRed Chironomidae	8	6
Elmidae	4	4
Muscidae	6	3
Hydrophilidae	5	2
Gammaridae	4	1

Statistical Analysis

Number of Taxa: 9
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 48.00 % (Chironomidae)
 Family Biotic Index: 5.82
 Scraper/Filterer Collector Ratio: 0.00
 Shredder/Total Ratio: 0.55
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 12.00
 EPT/C: 0.22
 NJIS Rating: 12
 Biological Condition: Moderately Impaired
 Habitat Analysis: 118
 Deficiency(s) noted:
 Paucity of Clean Water Organisms -

Observations

Streamwater: Clear--- Flow: Moderate ___ Width/Depth (ft): 12-15/1
 Substrate: Cobbles, Gravel/Sand--- StreamBank Vegetation/Stability: Mostly Grasses, some Trees & Shrubs/Fair
 Canopy: Mostly Open -- Other: Agriculture-cropland, Rural; Storm ditch
 Stream goes thru nursery, Minnows; Water temp. 9.0C / pH 7.8SU / DO 16.1mg/L / Cond. 210umhos

Station: AN0336

Furmans Brook, Off Back Brook Rd. (Welisewitz Rd.), East Amwell
Twp. Hopewell USGS Quadrangle Date- Sampled: 04/14/99

Hunterdon County

Family	Family Tolerance Value (FTV)	Number of Individuals
Nemouridae	2	43
Chironomidae	6	26
Psephenidae	4	8
Simuliidae	6	5
Caenidae	7	4
Empididae	6	4
Siphonuridae	7	3
Tipulidae	3	3
Ephemerellidae	1	2
Heptageniidae	4	2
Perlodidae	2	1
Lumbricidae	10	1
Elmidae	4	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 14

Total Number of Individuals: 104

% Contribution of Dominant Family: 41.35 % (Nemouridae)

Family Biotic Index: 4.02

Scraper/Filterer Collector Ratio: 2.00

Shredder/Total Ratio: 0.41 f ,+P+T
(Ephemeroptera, Plecoptera, Trichoptera): 6

% EPT: 52.88

EPT/C: 2.12

NJIS Rating: 27

Biological Condition: Nonimpaired

Habitat Analysis: 161

Deficiency(s) noted:

Observations

Streamwater: Clear Flow: Moderate Width/Depth (ft): 15-18/<1

Substrate: Cobbles, Gravel/Sand .StreamBank Vegetation/Stability: Trees, Shrubs/Fair

Canopy: Mostly Closed....Other: Agriculture-cropland, Rural; Sampled below confluence of streams

Fish observed; Water temp. 11.0C / pH7.8SU / DO 14.5mg/L / Cond. 149umhos

Station: AN0333

Neshanic River, Everitt Rd. (Usgs Gauge), East Amwell Twp,, Hunterdon County

Hopewell USGS Quadrangle

Date Sampled: 04/06/99

Family	Family Tolerance Value <FTV)	Number of Individuals
Chironomidae	6	52
Notonectidae	9	12
Corixidae	4	9
Hydrobiidae	8	8
e	6	6
Physidae	7	5
e	4	4
BloodRed Chironomidae	8	3
Glossiphoniidae	8	1
e	4	1
Limnephilidae	9	1
Coenagrionidae	8	1
Planorbidae	6	1
Elmidae	4	1
Tabanidae	6	1

Statistical Analysis

Number of Taxa: 15

Total Number of Individuals: 106

% Contribution of Dominant Family: 49.06 % Chironomidae)

Family Biotic Index: 6.38

Scraper/Filterer Collector Ratio: 2.50

Shredder/Total Ratio: 0.58

E+P+T (Ephemeroptera, Plecoptera, Trichoptera)

% EPT: 4.72

EPT/C: 0.09

NJIS Rating: 12

Biological Condition: Moderately Impaired

Habitat Analysis: 133

Deficiency(s) noted:

Paucity of Clean Water Organisms -

Observations

Streamwater: Clear....Flow: Slow....Width/Depth (ft): 45-50/1-2

Substrate: Cobbles, Gravel/Sand....StreamBank Vegetation/Stability: Trees, some
Shrubs/Fair

Canopy: Mostly Open.-Other: Agriculture - cropland, Rural; Trout stocked (trout
observed), Tadpoles, Minnows

Water Temp. 9.2C / pH 7.5SU / DO 16.9mg/L / Cond. 244umhos;

TABLE 1

BIOLOGICAL CRITERIA FOR SCREENING WATER QUALITY IN NEW JERSEY FRESHWATER STREAMS*

Scoring Criteria for Rapid Reassessments¹

Biometrics	6	3	0
Taxa Richness (total Families)	>10	10-5	4-0
E+P+T Index ² (EPT)	>5	5-3	2-0
Percent Dominance ³ (%CDF)	<40	40-60	>60
Percent EPT ⁴ (%EPT)	>35	35-10	<10
Modified Family Biotic Index ⁵ (FBI)	<5	5-7	>7

NOTE: The previous AMNET reports (1994-1996) contained incorrect number ranges for Modified Family Biotic Index. Using the incorrect numbers could lower the biological assessment on 9% of the sites evaluated. The numbers now presented were calculated using these ranges. No incorrect biological assessments exist in the previous reports.

Biological Assessment	Total Score
Non-impaired	24-30
Moderately Impaired	9-21
Severely Impaired	0-6

Attributes

Non-impaired: benthic community comparable to other undisturbed streams within the region; community characterized by a maximum taxa richness, balanced taxa groups, and good representation of intolerant individuals.

Moderately Impaired: macroinvertebrate richness reduced, in particular EPT taxa; reduced community balance and numbers of intolerant taxa.

Severely Impaired: benthic community dramatically different from those in less impaired situations; macroinvertebrates dominated by a few taxa, but with many individuals; only tolerant individuals present.

¹From Kurtenbach, 1991, based on RBPII protocols.

²Follows RBP Protocol II; using 100 organism subsample, family level taxonomy

³Ephemeroptera, Plecoptera, Trichoptera 4% contribution of the dominant family

⁵Including the hydrosychid family. Also known as the Hilsenboff Biotic Index

Table 2
 Comparative Scores / Ratings (see notes)
 Watershed Management Areas 7, 8,9, and 10

Station	NJ Impairment Score		Change in Rating	Habitat Score	Station	N J Impairment Score		Change in Rating	Habitat Score	Station	N J Impairment Score		Change in Rating	Habitat Score
	93/94	98/99				93/94	98/99				93/94	98/99		
192	12	15	/+	182	336	15	27	+	161	377	21	21	/	113
193	9	9	/	110	337	12	18	/+	135	378	15	9	/-	117
194	15	6	-	116	338	27	30	/+	146	379	24	18	/-	143
195	15	6	-	112	339	18	30	+	135	380	15	18	/+	174
196	6	12	+	97	340	30	21	+	102	381	18	6	-	93
197	15	15	/	128	341	21	27	+	124	382	15	21	/+	154
198	12	18	/+	133	342	24	30	/+	114	382B	15	15	/	120
199	15	15	/	114	343	30	21	.	96	382D	-	12	-	135
200	9	6	-	133	344	30	30	/	160	383	15	12	/-	133
201	3	12	+	107	344A	-	27	-	154	384	21	24	+	161
202X	12	-	-	-	345	27	30	/+	171	385	18	6	-	148
202	-	12	-	75	346	30	30	/	159	386	12	-	-	-
203	-	-	-	-	347	30	30	/	157	387	15	6	-	106
204X	0	-	-	-	348	30	30	/	192	388	12	15	/+	150
204	-	24	-	92	349	30	30	/	167	389	12	21	/+	145
310	9	15	/+	155	350	30	30	/	160	390	24	15	-	157
311	21	21	/	117	351	30	30	/	140	391	12	12	/	135
312	24	30	/+	148	352	15	6	-	147	392	12	21	/+	152
313	30	30	/	183	353	30	21	-	119	393	15	12	/-	173
314	30	30	/	166	354	27	30	/+	162	394	6	18	+	138
315	30	24	/-	148	355	12	24	+	122	395	18	15	/-	114
316	27	27	/	157	356	9	9	/	141	396	3	24	+	152
317	27	30	/+	169	357	9	27	+	129	397	12	9	/-	146
318	27	30	/+	166	358	27	27	/	185	398	15	21	/+	126
319	27	24	/-	144	359	30	30	/	181	399	12	18	/+	161
320	30	27	/-	164	360	27	30	/+	183	400	21	-	-	-
321	30	24	/-	164	361	30	30	/	174	401	12	15	/+	160
322	27	27	/	121	362	30	30	/	181	402	18	18	/	148
323	27	30	/+	170	363	27	30	/+	178	403	27	21	/-	133
324	12	9	/-	112	364	30	30	/	100	404	24	21	/-	150
325	27	30	/+	178	365	27	30	/+	133	405	15	3	-	89
325B	-	30	-	154	366	27	30	/+	137	406	15	15	/	104
326	30	18	-	143	367	30	30	/	165	407	15	21	/+	146
327	27	30	/+	168	368	18	21	/+	128	408	15	15	/	152
328	27	30	/+	161	369	27	27	/	111	409	21	18	/-	126
329	18	27	+	127	370	30	30	/	170	410	15	15	/	136
330	15	12	/-	138	371	21	18	/-	131	411	21	21	/	141
331	27	21	-	148	372	27	24	/-	96	412	9	12	/+	136
332	24	21	-	149	373	24	30	/+	140	413	18	6	-	116
333	18	12	/-	133	374	27	30	/+	154	414	15	15	/	160
334	15	18	/+	120	375	9	21	/+	147	415	18	15	/-	125
335	21	12	/-	118	376	15	9	/-	125	416	21	18	/-	132

NOTES:

Comparison of NJ impairment score with earlier study results:

- + indicates positive change in rating
- indicates negative change in rating
- / indicates no change in rating
- /+or/- indicates change in score, but not in rating (see Table 1)

<u>NJ Impairment Score</u>	<u>Value</u>	<u>Habitat Score</u>	<u>Value</u>
Non-Impaired	24-30	Optimal	160-200
Moderately Impaired	9-21	Sub-optimal	110-159
Severely Impaired	0-6	Marginal	60 -109
		Poor	<60

Sites 202X and 204X, sampled in 93/94, were relocated to 202 and 204 in 98/99

New Jersey AMNET Study — 1999 Raritan Region

Table 2 (continued)

Comparative Scores / Ratings (see notes)

Watershed Management Areas 7, 8, 9, and 10

Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score		Station	NJ Impairment Score		Change in Rating	Habitat Score
	93/94	98/99					93/94	98/99					93/94	98/99		
417	15	12	/-	151							-					
418	6	18	+	132												
419	21	27	/+	146												
420	24	30	/+	158												
421	6	15	+	HI												
422	9	15	/+	114												
423	18	9	/-	97												
424	9	12	/+	118												
424B	-	6	-	98												
425	12	15	/+	129												
425A	-	18	-	102												
426	18	15	/-	120												
427	12	18	/+	141												
428	18	24	+	161												
429	12	6	/-	131												
430	12	6	/-	124												
431	12	12	/	140												
432	21	15	/-	135												
433	15	21	/+	157												
434	21	15	/-	129												
435	12	12	/	113												
436	12	15	/+	151												
437	27	27	/	167												
438	15	27	+	140												
439	3	18	+	149												
440	12	21	/+	152												
441	6	9	+	143		1										
442	15	21	/+	154												
443	18	15	/-	146												
444	15	15	/	153												
445	9	12	/+	134												
446	18	15	/-	137												
447	6	6	/	153												
448	15	15	/	137												
449	9	6	/-	117												
450	9	21	/+	158												
451	9	12	/+	136												
452	6	15	+	84												
453	9	15	/+	182												
454	-	6	-	141												
455	-	15	-	173												

NOTES:

Comparison of NJ impairment score with earlier study results:

- indicates positive change in rating
- indicates negative change in rating
- / +/- indicates no change in rating
- indicates change in score, but not in rating (see Table 1)

NJ Impairment Score	Value	Habitat Score	Value
Non-Impaired	24 - 30	Optimal	160-200
Moderately Impaired	9-21	Sub-optimal	110-159
Severely Impaired	0-6	Marginal	60-109
		Poor	<60

Table 3

Abnormalities (see notes)

Watershed Management Areas 7, 8, 9, and 10

Station	1993/94	1998/99	Station	1993/94	1998/99	Station	1993/94	1998/99
193		1/15+1*	379		1/28			
194		+2	382	1/25	+2			
1%	4/7*		382B		+1			
197		1/3*	384 -	23/110*	2/21*			
202	2/37*	1/26	392		1/8*			
204		3/26*	393		1/44			
311	1/6*	+1						
312	1/6*		395		4/16*			
315		+1	401		2/52			
316	4/38*		403		2/44			
322		2/44	405	1/8*	3/31*			
324	1/16*		409		1/2*			
			410	10/27*				
325B		1/35	411		1/1*			
326	+2		414	3/26*				
330		5/82*	417		2/29*			
332	1/22	+1	418		1/14*			
334		+3	419		1/19			
337		+1	420		3/15*			
341	2/31*		424		2/3*			
343	3/15*	1/33	424B		+1			
348		1/10*	425A	1/20	+1			
350		1/26	426		+1			
351	2/18*		428		1/21			
352	1/1*		431		1/24			
353		1/38	438		4/12*			
356		+1	441	1/6*				
358		+1	445		3/25*			
359	+4		448		3/23*+1			
368	2/23*		449	2/43	3/48*			
372		2/29*	450	1/36	2/25*			
374	1/10*		451		+1			
375		1/22	452		1/17*			
376		3/15*						
377	3/47*							

NOTES:

chironomids with deformities / # chironomids examined

+ — indicates the number of non-chironomids having abnormalities.

* — indicates significant level $Q > 5\%$ although not statistically evaluated.

abnormalities considered chronic if they appear in both the 1993/1994 and the 1998/1999 columns.

(d) The surface water classifications in Table-2 are for waters of the Delaware River Basin:

TABLE 2

Waterbody	Classification
ALEXAUKEN CREEK (Lambertville) - Entire length, including all tributaries	FW2-TM(C1)
ALLAMUCHY CREEK (Allamuchy) - Entire length	FW2-NT(C1)
ALLAMUCHY POND (Allamuchy)	FW2-NT(C1)
ALLAMUCHY POND TRIBUTARIES (Allamuchy) - All tributaries that are located entirely within the boundaries of Allamuchy State Park and that flow into Allamuchy Pond	
ALLOWAY CREEK (Alloways) - Entire length ALMS HOUSE BROOK	FW1 FW2-NT/SE1
(Hampton) - Source to, but not including, County Farm Pond (Frankford) - County Farm Pond to Paulins Kill	
ANDOVER JUNCTION BROOK (Andover) - Entire length	FW2-TM FW2-NT
ASHROE LAKE (Stokes State Forest) ASHROE LAKE TRIBUTARIES (Stokes State Forest) - Tributary to the Lake from Deer Lake and portion of southernmost tributary to Ashroe Lake outside of the Stokes State Forest boundary (Stokes State Forest) - Southernmost tributary to the Lake from its source to the Stokes State Forest boundary	FW2-TM FW2-NT(C1)
ASSISCUNK CREEK (Columbus) - Headwaters to confluence with Barkers Brook, including all tributaries (Burlington) - Confluence with Barkers Brook to the Delaware River	FW2-TP(C1)
ASSUNPINK CREEK (Trenton) - Source to confluence with the Delaware River, except segments described separately below (Roosevelt) - Creek and those tributaries within the boundaries of the Assunpink Wildlife Management Area	FW1(tp)
	FW2-NT(C1)
	FW2-NT
	FW2-NT
	FW2-NT(C1)

(f) The surface water classifications in Table 4 are for waters of the Raritan River and Raritan Bay Basin:

TABLE 4

Waterbody	Classification
ALLERTON CREEK (Allerton) - Entire length	FW2-NT
AMBROSE BROOK (Piscataway) - Entire length	FW2-NT
AMWELL LAKE (Syndertown) ASSISCONG	FW2-NT(C1)
CREEK (Flemington) - Entire length BACK	FW2-NT
BROOK (Vanliew's Corners) - Entire length	FW2-NT
BALDWINS CREEK	
(Pennington) - Entire length, except segment described separately below (Baldwin) - Segment within the boundaries of Baldwin Lake Wildlife Management Area	FW2-NT
BARCLAY BROOK (Redshaw Corners) - Entire length BEAR	FW2-NT(C1)
BROOK (West Windsor) - Entire length BEAVER BROOK	FW2-NT
(Cokesbury) - Source to Reformatory Road bridge	FW2-NT
(Annandale) - Reformatory Rd. bridge to Beaver Ave., bridge (Annandale) - Beaver Ave. bridge downstream to the	FW2-TP(C1)
lower most 1-78 bridge (Clinton) - Lower most 1-78 bridge downstream to, the South Branch Raritan River BEDIEN	FW2-TM
BROOK (Montgomery) - Entire length BIG BROOK	FW2-TP(C1)
(Vanderberg) - Entire length BLACK BROOK (Polktown) -	
Entire length BLACK RIVER - See LAMINGTON RIVER	FW2-TM
BLACKBERRY CREEK	FW2-NT
(Oceanport) - Source to a line beginning on the easternmost extent of Gooseneck Point and bearing approximately 162 degrees True North to its terminus on the westernmost extent of an unnamed point of land in the vicinity of the western extent of Cayuga Ave. in Oceanport.	FW2-NT
(Oceanport) - Creek below the line described above BLUE	FW2-TP(C1)
BROOK (Mountainside) - Entire length BOULDER HILL	
BROOK (Tewksbury) - Entire length BOUND BROOK	
(Dunellen) - Entire length BRANCHPORT CREEK	
	SE1
	SE1(C1)
	FW2-NT
	FW2-TP(C1)
	FW2-NT

<p>(Rumson) - River southeast of the line described above, except segment described below (Monmouth Beach) - All water south and east of a line beginning on the northwestern most point of land on Raccoon Island (in the vicinity of the western extent of Highland Ave.) in Monmouth Beach, and bearing approximately 056 degrees T (True North) to the southernmost point of a small unnamed island, and then bearing approximately 091 degrees T (True North) to its terminus on the northernmost point of land located at the northern extent of Monmouth Parkway in Monmouth Beach and all waters south of a line beginning on the western shoreline (just east of Monmouth Parkway in Monmouth Beach) and bearing approximately 081 degrees T (True North), intersecting Channel Marker Flashing Red 4 and Channel Marker Flashing Red 2 and terminating on the eastern shoreline of the Galilee section of Monmouth Beach.</p>	<p>SE1(C1)</p>
<p>NESHANIC RIVER (Reaville) - Entire length</p>	<p>SE1</p>
<p>NORTON BROOK (Norton) - Entire length</p>	<p>FW2-NT</p>
<p>OAKDALE CREEK (Chester) - Entire length</p>	<p>FW2-TP(C1)</p>
<p>OAKEYS BROOK (Deans) - Entire length</p>	<p>FW2-TP(C1)</p>
<p>OCEANPORT CREEK</p>	<p>FW2-NT</p>
<p>(Fort Monmouth) - Source to a line beginning on the easternmost extent of Horseneck Point and bearing approximately 140 degrees T (True North) to its terminus on the westernmost extent of an unnamed point of land located at the westernmost extent of Monmouth Boulevard in Oceanport (Oceanport) - Creek downstream of line described above</p>	
<p>PARKERS CREEK</p>	<p>FW2-NT/SE1</p>
<p>(Fort Monmouth) - Source to a line beginning on the easternmost extent of Horseneck Point and bearing approximately 000 degrees T (True North) to its terminus on Breezy Point on the Little Silver side (north) side of the creek (Fort Monmouth) - Creek downstream of line described above</p>	<p>SE1(C1)</p>
<p>PEAPACK BROOK (Gladstone) - Entire length</p>	
<p>PETERS BROOK (Somerville) - Entire length</p>	<p>FW2-NT/SE1</p>
	<p>SE1(C1) FW2-TP(C1) FW2-NT</p>

RINEHART BROOK (Hacklebarney) - Entire length	FW2-TP(C1)
ROCK BROOK (Montgomery) - Entire length	FW2-NT
ROCKAWAY CREEK NORTH BRANCH	
(Mountainville) - Source to Rt. 523 bridge (Whitehouse) - Rt. 523 bridge to confluence with South Branch	FW2-TP(C1)
SOUTH BRANCH	
(Clinton) - Headwaters to Readington Township boundary including all tributaries (Clinton) - Readington Township boundary to Lake Cushetunk, including all tributaries (Whitehouse) - Lake Cushetunk to its confluence with main stem Rockaway Creek	FW2-TM
MAIN STEM (Whitehouse) - Confluence of North and South Branches to Lamington River	FW2-TP(C1)
ROCKY RUN - (Lebanon) - Entire length	FW2-TM(C1)
ROUND VALLEY RESERVOIR (Clinton)	FW2-TM
ROYCE BROOK (Manville) - Entire length	FW2-NT
SANDY HOOK BAY (Sandy Hook)	FW2-TP(C1)
SHREWSBURY RIVER (Little Silver) - Source to Rt. 36 highway bridge	FW2-TP(C1)
(Highlands) - Rt. 36 bridge to Sandy Hook Bay	FW2-NT
SIDNEY BROOK	SE1
(Grandin) - Headwaters to its confluence with the South Branch Raritan River, including all tributaries	SE1(C1) SE1
SIMONSON BROOK (Griggstown) - Entire length	
SIX MILE RUN (Franklin Church) - Entire length, except segment described below	
(Hillsborough) - Segment within the boundaries of Six Mile Run State Park	FW2-NT(C1)
SOUTH RIVER (Old Bridge) - Duhernal Lake to intake of the Sayreville Water Department	FW2-NT
(Sayreville) - Below the intake of the Sayreville Water Department	
SPOOKY BROOK (Bound Brook)	
SPRUCE RUN	FW2-NT
(Glen Gardner) - Source to, but not including, Spruce Run Reservoir	
(Clinton) - Spruce Run Reservoir dam to Raritan River, South Branch	FW2-NT(C1)
SPRUCE RUN RESERVOIR (Union) - Reservoir and tributaries	
STONY BROOK (Washington) - Entire length	FW2-NT
	SE1 FW2-NT
	FW2-TP(C1)
	FW2-TM
	FW2-TM(C1)
	FW2-TP(C1)

STONY BROOK

(Hopewell) - Entire length, except that segment described below (Snydertown) - Brook and tributaries within Amwell Lake Wildlife Management Area	FW2-NT
STONY BROOK (Watchung) - Entire length	FW2-NT(C1)
SUN VALLEY BROOK (Mt Olive) - Entire length	FW2-NT
SWIMMING RIVER RESERVOIR (Red Bank)	FW2-TP(C1)
SWIMMING RIVER (Red Bank) - Swimming River Reservoir dam to the Navesink River	FW2-NT(C1)
TANNERS BROOK (Washington) - Entire length	FW2-NT/SE1
TEETERTOWN BROOK (Lebanon) - Entire length	FW2-NT(C1)
TEN MILE RUN (Franklin) - Entire length	FW2-TP(C1)
TENNENT BROOK (Old Bridge) - Entire length	TEPEHEMUS BROOK
(Manalapan) - Entire length	FW2-NT
TOWN NECK CREEK (Little Silver) - Source to a line beginning on the easternmost extent of the unnamed point of land located just east of Paag Circle on the south bank of Town Neck Creek and bearing approximately 095 degrees True North and terminating on Silver Point (Little Silver) - Creek below line described below	FW2-NT
TROUT BROOK (Hacklebamey) - Entire length	
TURKEY BROOK (Mt. Olive) - Entire length	
TURTLEBACK BROOK (Middle Valley) - Entire length	FW2-NT/SE1
WALNUT BROOK (Flemington) - Entire length	SE1(C1)
WEAMACONK CREEK - See	FW2-TP(C1)
MATCHAPONIX BROOK	FW2-TP(C1)
WEMROCKBROOK (Millhurst) - Entire length, except that segment described below (Monmouth Battlefield State Park) - Those segments of the brook and its tributaries within the boundaries of Monmouth Battlefield State Park	FW2-NT
WEMROCK POND (Monmouth Battlefield State Park)	FW2-TM
WILLOUGHBY BROOK (Buffalo Hollow) - Entire length	
WILLOW BROOK (Holmdel) - Entire length	FW2-NT
YELLOW BROOK (Colts Neck) - Entire length	
	FW2-NT(C1)
	FW2-NT(C1)
	FW2-TP(C1)
	FW2-NT
	FW2-NT

Appendix F-1

NJDEP Model

Stormwater Control Ordinance for Municipalities

A P P E N D I X

Model Stormwater Control Ordinance for Municipalities

Important note: This sample ordinance is provided to assist municipalities in the development of municipal stormwater control ordinances and the incorporation of design and performance standards into municipal stormwater management plans. It is provided for information purposes only. It is important that current regulations are carefully reviewed before any portion of this draft ordinance is adopted.

This model ordinance does not include a section on fees. The Department expects that the review of development applications under this ordinance would be an integral part of the municipal review of subdivisions and site plans. As a result, the costs to municipalities of reviewing development applications under this ordinance can be defrayed by fees charged for review of subdivisions and site plans under N. J. S. A. 40:55D-8.b.

Notes are provided in italics throughout this model stormwater control ordinance, and are not intended to be adopted as part of the ordinance.

An editable Word version of this model ordinance is available at <http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm>.

Section 1: Scope and Purpose

A. Policy Statement

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

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

B. Purpose

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

C. Applicability

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

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

2. This ordinance shall also be applicable to all major developments undertaken by [insert *name of municipality*].

D. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the

responsibility to secure required permits or approvals for activities regulated by any other- applicable code,, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

Section 2: Definitions

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

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

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

"Compaction" means the increase in soil bulk, density.

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

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

A county planning agency; or

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

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

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

"Design engineer" means a person professionally qualified and duly licensed in New Jersey to perform engineering services

that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

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

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

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

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

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

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

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

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

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

village.

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

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

"Person" means any individual, corporation, company, partnership, firm, association, [*insert name of municipality*], or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 e.t seq.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- (2) Designated as CAFRA Centers, Cores or Nodes;
- (3) Designated as Urban Enterprise Zones; and
- (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

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

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

Section 3: General Standards

A. Design and Performance Standards for Stormwater Management Measures

1. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Section 4. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management" measures necessary to meet these standards shall be incorporated into the design.
2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

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

Section 4: Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlenbergi* (bog turtle) .

C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
2. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 4.F and 4.G to the maximum extent practicable;
3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.G, existing structures currently in use, such as homes and buildings, would need to be condemned; and
4. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.

E. Nonstructural Stormwater Management Strategies

1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.E into the design. The applicant shall identify the nonstructural

measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.

2. Nonstructural stormwater management strategies incorporated into site design shall:
 - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
 - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
 - c. Maximize the protection of natural drainage features and vegetation;
 - d. Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
 - e. Minimize land disturbance including clearing and grading;
 - f. Minimize soil compaction;
 - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
 - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
 - i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
 - (1) Site design features that help to prevent

accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;

- (2) Site design features that help to prevent discharge of trash and debris from drainage systems;
- (3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
- (4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

Site design features identified under Section 4.E.2.i.(2) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials"⁷ means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 4.E.3.C below.

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

- (1) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
- (2) A different grate, if each individual, clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates,

and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

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

c. This standard does not apply:

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

(2) Where flows from the water quality design storm as specified in Section 4.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

(a) A rectangular space four and five-eighths inches long and

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

(3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or

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

4. Any land area used as a nonstructural stormwater

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

5. Guidance for nonstructural stormwater management
strategies is available in the New Jersey Stormwater
Best Management
Practices Manual. The BMP Manual may be obtained from
the address identified in Section 7, or found on the
Department's website-at www.njstormwater.org.

F. Erosion Control, Groundwater Recharge and Runoff
Quantity Standards

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

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

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

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

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

(b) Demonstrate through hydrologic and
hydraulic analysis that the increase of

stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.

- (2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below.
- (3) The following types of stormwater shall not be recharged:
 - (a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
 - (b) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.
- (4) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or

seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.

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

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

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

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

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

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

G. Stormwater Runoff Quality Standards

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

Table 1: Water Quality Design Storm Distribution			
Time - Minutes	Cumulative Rainfall (Inches)	Time - Minutes	Cumulative; Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170

25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1..2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.

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

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

Where

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

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

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

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90

Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80

Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.F and 4.G.
6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.
7. In accordance with the definition of FW1 at N.J.A.C. 7: 9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
8. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

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

(1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided. (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

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

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

- (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
- (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
- (3) Temperature- shall be addressed to ensure no impact on the receiving waterway;
- (4) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent

practicable;

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

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

d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.G(8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

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

Section 5: Calculation of Stormwater Runoff and Groundwater Recharge

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

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

- a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 - Hydrology and Technical Release 55 - Urban Hydrology for Small Watersheds; or
 - b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture/ lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
 3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.
 4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 -Urban Hydrology for Small Watersheds and other methods may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.
- B. Groundwater recharge may be calculated in accordance with the following:
1. The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 6: Standards for Structural Stormwater Management Measures

- A. Standards for structural stormwater management measures are as follows:
1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).
 2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.
 3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable,

and-corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.

B. Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 4 of this ordinance.

C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 7: Sources for Technical Guidance

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

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

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

1. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;
2. The Rutgers Cooperative Extension Service, 732-932-9306; and
3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3 (a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

Section 8: Safety Standards for Stormwater Management Basins

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

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

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

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures.

Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

- a. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
 - b. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
 - c. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
 - d. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
2. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
- a. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - b. The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - c. The overflow grate shall be constructed, and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
3. For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
- a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a free-standing outlet structure may be exempted from this requirement.
 - b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges

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

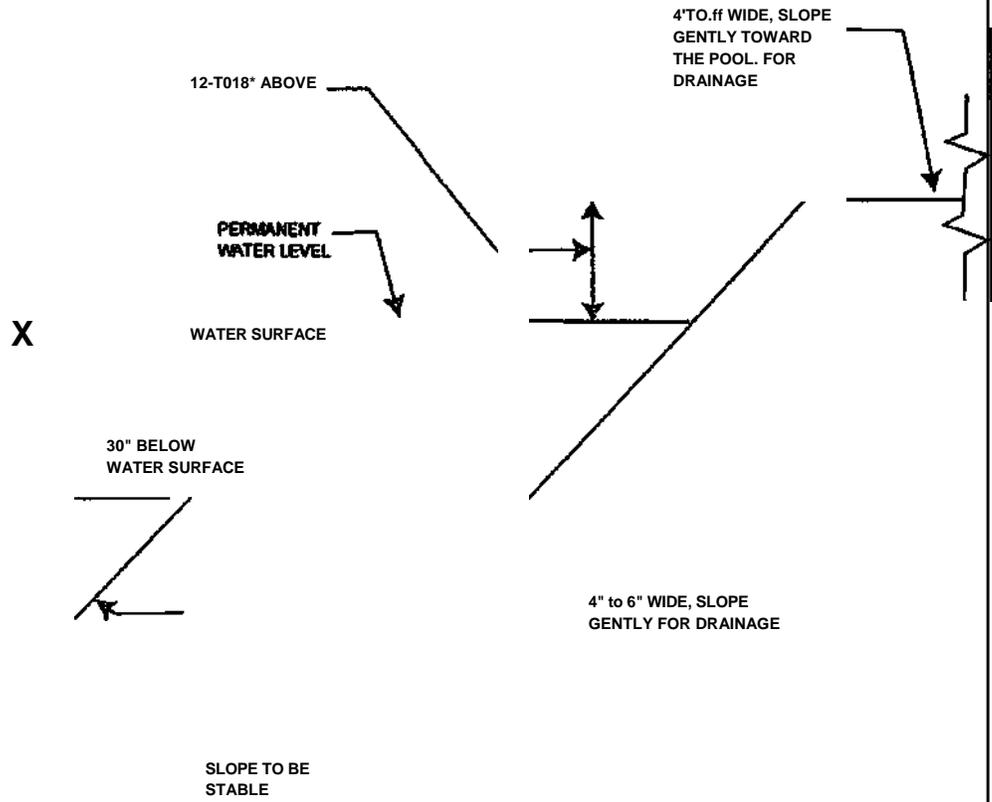
c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

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

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

Depicted is an elevations! view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

Section 9: Requirements for a Site Development Stormwater Plan

A. Submission of Site Development Stormwater Plan

1. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 9.C below as part of the submission of the applicant's application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
3. The applicant shall submit [*specify number*] copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 9.C of this ordinance.

B. Site Development Stormwater Plan Approval

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

C. Checklist Requirements

The following information shall be required:

1. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200" or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads,

bearing and distances of property lines, and significant natural and manmade- features not otherwise shown.

2. Environmental Site Analysis

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

3. Project Description and Site Plan(s)

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

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of: controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

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

- a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
- b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity

of each spillway.

6. Calculations

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design, storms specified in Section 4 of this ordinance.
- b. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 10.

8. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

Section 10: Maintenance and Repair

A. Applicability

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

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant- of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
4. If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow

and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

6. The person responsible for maintenance identified under Section 10.B.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
7. The person responsible for maintenance identified under Section 10.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
8. The person responsible for maintenance identified under Section 10.B.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 10.B.6 and 10.B.7 above.
9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

(Note: It may be appropriate to delete requirements in the maintenance and repair plan that are not applicable if the ordinance requires the facility to be dedicated to the municipality. If the municipality does not want to take this responsibility, the ordinance should require the posting of a two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53. Guidelines for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)

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

If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

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

Section 11: Penalties

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

Section 12: Effective Date

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

Section 13: Severability

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

Appendix F-2

East Amwell Township

Stormwater Control

Ordinance, as amended

**EAST AMWELL TOWNSHIP
ORDINANCE 06-19**

**AN AMENDMENT TO THE STORMWATER
MANAGEMENT ORDINANCE**

BE IT ORDAINED BY THE TOWNSHIP COMMITTEE OF THE TOWNSHIP OF EAST AMWELL THAT CHAPTER 122. STORMWATER MANAGEMENT ORDINANCE. BE REPEALED AND REPLACED IN ITS ENTIRETY WITH THE FOLLOWING:

Section 1: Scope and Purpose

1.1 Policy Statement

The United States Environmental Protection Agency (EPA) has mandated that all states enact regulations to address the negative impacts of stormwater runoff on the Nation's streams and water resources. The State of New Jersey adopted new stormwater management rules (NJAC 7:8) at the direction of the EPA. Under these state regulations, all municipalities in the State must implement these stormwater management rules through local ordinance(s) by April 2006. This ordinance is intended to implement these rules.

Stormwater management is the process of minimizing stormwater runoff and directing stormwater runoff to appropriate nonstructural and structural stormwater management measures so as to control flooding, recharge ground water and reduce pollution of water- resources. Transport of stormwater-related pollutants into local surface and ground waters can result in: the destruction of fish, wildlife, and habitats; threats to public health due to contaminated food and drinking water supplies; and losses of recreational and aesthetic values. Stormwater management shall occur with the understanding and acceptance of stormwater as a resource; low impact and non-structural measures shall be tailored to a site and applied wherever and to the extent feasible.

1.2 Purpose

The purpose of this ordinance is to establish minimum stormwater management requirements and controls for major development and to reduce the amount of non-point source pollution entering surface and ground waters. This ordinance guides new development in a manner that is proactive and minimizes harmful impacts to natural resources. Specifically, this ordinance shall:

- 1.2.1 Reduce flood damage to protect public health, life and property
- 1.2.2 Minimize increased stormwater runoff rates and volumes
- 1.2.3 Minimize the deterioration of existing structures that would result from increased rates of stormwater runoff
- 1.2.4 Induce water recharge into the ground wherever suitable infiltration, soil permeability, and favorable geological conditions exist
- 1.2.5 Prevent an increase in non-point source pollution
- 1.2.6 Maintain the integrity and stability of stream channels and buffers for their ecological functions, as well as for drainage, the conveyance of floodwater, and other purposes
- 1.2.7 Control and minimize soil erosion and the transport of sediment

- 1.2.8 Minimize public safety hazards at any stormwater detention facility constructed pursuant to subdivision or site plan approval
- 1.2.9 Maintain adequate base-flow and natural flow regimes in all streams and other surface water bodies to protect the aquatic ecosystem
- 1.2.10 Protect all surface water resources from degradation
- 1.2.11 Protect ground water resources from degradation and diminution; and
- 1.2.12 Ensure that any additional % acre of impervious surface, complies with this ordinance, as required by East Amwell Township's Tier B NJPDES permit

1.3 Applicability

- 1.3.1 This ordinance shall be applicable to Site plans and subdivisions, considered individually and/or cumulatively, as of the date of adoption of this ordinance, for the following major developments:
 - a) Non-residential major developments.
 - b) Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards (RSIS) at N. J.A.C. 5:21.
 - c) Any agricultural or horticultural development that meets the definition of "major development" under NJAC 7:8.
- 1.3.2 This ordinance shall also be applicable to all Major Developments undertaken by East Amwell Township and Hunterdon County.

1.4 Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable statute, 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 shall be construed to assure consistency with the requirements of New Jersey laws, and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and any existing or future municipal NJPDES Permits and any amendments or revisions thereto or re-issuance thereof. 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 his ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards, shall control.

Section 2: Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application with the objective of managing stormwater. The definitions below are the

same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2 and other State sources.

"Agricultural or horticultural development" means construction and/or 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.

"Best Management Practices" "BMP" means "New Jersey Stormwater Best Management Practices Manual," adopted by the New Jersey Department of Environmental Protection ("Department") originally in February 2004, as updated and revised. Consult www.njstormwater.org for this Manual and other pertinent information.

"Category One Waters" or "C-1 Waters" means those waters designated in the tables in NJAC 7:9B-1.15(c) through (h), for purposes of implementing the anti-degradation policies set forth in NJAC 7:9B-1.5(d), for protection from measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). As per NJAC 7:8-5.5 a three hundred (300) foot special water resource protection area ("buffer") is required on each side of all waters designated as C-1, measured perpendicular to the waterway from the top of 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.

"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:

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

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

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

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

"Development" means the division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure; any mining excavation or landfill; and any use or change in the use of any building or

other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Development Board (CADB) and the State Agriculture 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.

"Disturbance" means any activity including the clearing, excavating, storing, grading, filling or transportation of soil or any other activity that causes soil to be exposed to the danger of erosion.

"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 critical areas" means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitats 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 Departments Endangered and Non-game Species Program.

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

"Ground water" means a body of water below the surface of the land, in a zone of saturation where the spaces between the soil or geological materials are fully saturated with water.

"HUC-14" means a watershed as defined by the United States Geological Survey with a 14-digit identifier; a subwatershed.

"Impervious surface" means a surface that has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. Impervious surfaces include roofs; and roads, parking lots, drives, sidewalks and patios that are constructed of asphalt, concrete, gravel and/or stone.

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

"Major development" means any "development" that provides for ultimately disturbing one or more acres of land or that increases impervious surface by one-quarter acre or more.. (Note: "major development" for purposes of this ordinance is not identical to the definitions in the Municipal Land Use LaW or local zoning ordinances; see also Section 92-4 of the Code of East Amwell Township).

"Maximum Extent Feasible" means compliance with the specific objective to the greatest extent possible taking into account equitable considerations and competing factors, including but not limited to, environmental benefits, pollutant removal effectiveness, regulatory compliance, ability to implement given site-specific environmental conditions, cost and technical or engineering feasibility.

"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.

"Nonstructural Stormwater Management Techniques" means techniques that control or reduce stormwater runoff in the absence of stormwater structures (e.g., basins and piped conveyances),

such as minimizing site disturbance, preserving important site features including, but not limited to, natural vegetation, reducing and disconnecting impervious surface, minimizing slopes, utilizing native vegetation, minimizing turf grass lawns, increasing time of concentration and maintaining and enhancing natural drainage features and characteristics

"Nutrient" means a chemical substance and/or compound, such as nitrate or phosphate, organic materials, etc., which is essential to and promotes the development of organisms.

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

"Pollutant" means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive 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, cellar dirt, industrial, municipal, agricultural, residential, 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 non-hazardous pollutants.

"Recharge" means the amount of water from precipitation that infiltrates into the ground and is not evapo-transpired, i.e. evaporated or transpired.

"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.

"Solid and floatable materials" means sediment, debris, trash, and other floating or suspended solids.

"Special Resource Waters" means water bodies receiving special protections due to their drinking water status or role as high-quality habitat for Threatened and Endangered species or species of commercial or recreational importance. This includes waterways so designated through the NJ Stormwater Management Rules (N.J.A.C. 7:8) because of exceptional ecological significance, exceptional water supply significance, exceptional recreational significance, exceptional shellfish resource, or exceptional fisheries resource. Waters so designated are protected by a 300-foot buffer extending on either side of the waterway measured perpendicular from top-of-bank or center of channel for waterways lacking a defined top-of-bank; See Definition of "Category One", "C-1 waters."

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

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

^"Stormwater Coordinator" means the person(s) designated by the governing body to review all development applications for compliance with federal, state and local Stormwater Control and

Stormwater Management requirements. Usually, the Municipal Engineer will be designated as the Stormwater Coordinator.

"Stormwater runoff means stormwater flow on the surface 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.

"Structural Stormwater Techniques" means a stormwater management measure that involves control of concentrated stormwater runoff or infiltration such as stormwater basins, piped conveyance systems and manufactured stormwater devices, and can include various types of basins, filters, surfaces, and devices located on individual lots in a residential development or throughout a commercial, industrial, or institutional development site in areas not typically suited for larger, centralized structural facilities.

"Suspended Solids" or "SS" are all material carried by water that is not dissolved in it or gross matter floating on it, and "Total Suspended Solids" or "TSS" are the measure of all such suspended solids.

"Threatened and/or Endangered Species" means those species whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent extinction in New Jersey and those who may become endangered, if habitats begin to, or continue to, deteriorate. This definition includes protection of habitats of these species.

"Total Suspended Solids" or "TSS": See definition of "Suspended Solids"

"Vegetation" and/or "vegetated buffer" as used in this ordinance, means plant life and plant cover in soil. However, lawns are not permitted as vegetated cover for buffers because of excess run-off and potential for pollution from fertilizer and other lawn "care" products. A suggested list of native and non-invasive species appropriate for use for purposes of this ordinance, is attached as "Appendix A". This list is not exclusive.

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

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

Section 3: General Standards

3.1 Design and Performance Standards for Stormwater Management Measures

3.1.1 Stormwater management measures for all major developments that ultimately disturb one or more acres of land shall be developed to meet the:

- a) erosion control standards,
- b) groundwater recharge standards,
- c) stormwater runoff quantity standards, and
- d) stormwater runoff quality standards in Section 4.

Major residential developments that increase impervious surface by one quarter acre or more but do not ultimately disturb one or more acres of land must develop stormwater management measures to meet the stormwater runoff quantity standards in Section 4.

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, along with the feasible non-structural strategies

3.1.2 These standards apply only to new major development after February 2, 2004 and are intended to minimize the impact of stormwater runoff on quality and quantity of water in receiving water bodies and to maintain groundwater recharge.

3.1.3 These standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Section 4: Stormwater Management Requirements

4.1 The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.

4.2 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 muhlenbergi* (bog turtle).

4.3 The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and the stormwater runoff quality requirements of Sections 4.6 and 4.7.4.

4.3.1 The construction of an underground utility line provided that the disturbed areas are revegetated upon completion, in accordance with the suggested list, attached as Appendix A

- 4.3.2 The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent feasible; and
- 4.3.3 The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of eight (8) feet provided that the access is made of permeable material.

4.4 A waiver by the Planning Board, upon recommendation by the Stormwater Coordinator, from strict compliance from the applicable groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.6 and 4.7 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

- 4.4.1 The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means, and
- 4.4.2 The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 4.6 and 4.7 to the maximum extent feasible, and
- 4.4.3 The applicant demonstrates that, in order to meet the requirements of Sections 4.6 and 4.7, existing structures currently in use, such as homes and buildings, would need to be condemned, and
- 4.4.4 The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through purchase or condemnation lands not falling under D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.6 and 4.7 that were not achievable on-site.

4.5 Nonstructural Stormwater Management Strategies

- 4.5.1 To the maximum extent feasible the standards in Sections 4.6 and 4.7 shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.5 into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project by preparation of the NJDEP Nonstructural Strategies point System (NSPS) spreadsheet and, if further review of proposed nonstructural measures is necessary, the preparation of the NJDEP Low-Impact Checklist. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention, subject to approval by the Stormwater Coordinator. The applicant bears the burden of proving any lack of feasibility.
- 4.5.2 Nonstructural stormwater management strategies incorporated into site design shall:
 - a) Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss,

- b) Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces,
- c) Maximize the protection of natural drainage features and non-invasive vegetation,
- d) Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;
- e) Minimize land disturbance including clearing and grading,
- f) Minimize soil compaction,
- g) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides,
- h) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas,
- i) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls can include, but are not limited to:
 - i. site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.5.3 below,
 - ii. site design features that help to prevent discharge of trash and debris from drainage systems,
 - iii. site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
 - iv. when establishing vegetation after land disturbance, the application of fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., soil tests must be conducted on-site to determine the type and quantity of fertilizer required,

4.5.3 Site design features identified under Section 4.5.2.i.ii above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For exemptions to this standard see Section 4.5.3.c below.

- a) Design engineers shall use either of the following grates to collect stormwater from a 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), as amended; or

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

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

- b) When ever 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:

- i. Where the Planning Board, with the recommendation of the Stormwater Coordinator, determines that this standard would cause inadequate hydraulic performance that could not feasibly be corrected 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 4.7.1 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 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

- A bar screen having a bar spacing of 0.5 inches.

- iii. Where flows are conveyed through a trash rack that has parallel bars with one-inch (1ⁿ) spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or

- iv. 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 National, and/or N. J. Register listed historic property or district, within the meaning of the "Historic Places Rules".

4.5.4 Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.6 and 4.7 shall be dedicated to a government entity/ agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that the measure, or an equivalent stormwater management measure, approved by the Stormwater Coordinator, is maintained in perpetuity. The approved form to be used as a "conservation restriction" is attached as Appendix B, as approved by the Township

Attorney, and amended from time to time, as needed. To the greatest extent feasible, nonstructural stormwater management strategies shall be used and shall comply with those listed in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

4.6 Erosion Control, Groundwater Recharge and Runoff Quantity Standards

4.6.1 This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of all major development that ultimately disturb one or more acres of land. Major residential developments that increase impervious surface by one quarter acre or more, but do not ultimately disturb one or more acres of land, must only meet the minimum design and performance standards to control stormwater runoff quantity impacts in this subsection.

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:

i The design engineer and Stormwater Coordinator shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either.

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

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

ii The following types of stormwater shall not be recharged:

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, as amended; 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

Industrial stormwater exposed to "source material". "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing, or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source

materials include, but are not limited to, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

iii 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 surface ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.

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

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

ii Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-development 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, or

iii 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-development 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

Any application for a new agricultural development that meets the definition of major development at Section 2 shall be submitted to the Hunterdon County 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"⁰ 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.

4.7 Stormwater Runoff Quality Standards

4.7.1 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 for water quality control shall only be required at 1) nonresidential major development sites that create one quarter acre or more of additional impervious surface and 2) residential major development sites that both create one quarter acre or more of additional impervious surface and ultimately disturb one or more acres of land.

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		

4.7.2 For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMP designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMP 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.

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

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

Where

R = total TSS percent load removal from application of both BMP, 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 BMP	
Best Management Practice	TSS Percent Removal Rate
Bio-retention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80 •
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4.7.4 If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the sub-areas converge on site in

which case the removal rate can be demonstrated through a calculation using a weighted average.

- 4.7.5 Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.6 and 4.7.
- 4.7.6 Developers shall comply with the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7, or www.nistormwater.org. For development projects where differing standards may apply, the stricter requirement shall be followed.
- 4.7.7 In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- 4.7.8 Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
 - a) The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - i 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.
 - ii Encroachment within the designated special water resource protection area under Subsection (i) above shall only be allowed with the approval of the Stormwater Coordinator, where previous development or disturbance has occurred. 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 feasible. 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. as amended.

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

- i. Stabilization measures shall not be placed within 150 feet of the Category One waterway;
- ii. Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
- iii. Temperature shall be addressed to ensure no impact on the receiving waterway;
- iv. 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 feasible;
- v. A conceptual project design meeting shall be held with *the* appropriate Department staff and Hunterdon County Soil Conservation District staff to identify necessary stabilization measures, and
- vi. All encroachments proposed under this section shall be subject to review and approval by the Department, prior to local approval(s).

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 East Amwell Township through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.7.8 has been approved by the Department, 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 4.7.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 4.7.8.a.i above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway, subject to this subsection.

e) Paragraph 4.7.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

Section 5: Calculation of Stormwater Runoff and Groundwater Recharge

5.1 Stormwater runoff shall be calculated in accordance with the following:

5.1.1 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.
- 5.1.2 For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-development condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5. A. 1.b.
- 5.1.3 In computing pre-development 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-development stormwater runoff rates and volumes.
- 5.1.4 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.
- 5.1.5 In computing stormwater runoff rates, volumes, and/or hydrographs, appropriate runoff coefficients for gravel surfaces shall be used as referenced in this section.

5.2 Groundwater recharge may be calculated in accordance with the following:

- 5.2.1 The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.
- 5.2.2 In computing groundwater recharge and/or runoff volumes, appropriate coefficients for gravel surfaces shall be used as referenced in this section.

Section 6: Standards for Structural Stormwater Management Measures

6.1 Standards for structural stormwater management measures are as follows:

- 6.1.1 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.

- 6.1.2 Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.
- 6.1.3 Structural stormwater management measures shall be designed, sequenced, 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. 6:21-7.3, 7.4, and 7.5, as revised, shall be deemed to meet this requirement
- 6.1.4 At the intake to the outlet from the stonnwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
- 6.1.5 Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.
- 6.1.6 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 tail water in the design of structural stormwater management measures.

6.2 **Stormwater management measure** guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized, provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Section 4 of this ordinance.

6.3 **Manufactured treatment devices** may be used to meet the requirements of Section 4 of this ordinance, only when recommended by the Stormwater Coordinator, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department. Manufactured treatment devices may be used only where the maintenance plan required by Section 10 ensures that the manufactured device will be properly maintained for its functional lifespan and will be replaced as needed with management measures that are at least as effective as the original manufactured treatment device working in accordance with manufacturers' specifications.

Section 7: Sources for Technical Guidance

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

- 7.1.1 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: bio-retention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
 - 7.1.2 The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.
- 7.2 Additional **technical guidance for stormwater management measures** can be obtained from the following:
- 7.2.1 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, as amended. 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;
 - 7.2.2 The Rutgers Cooperative Extension Service, 732-932-9306; and
 - 7.2.3 The Hunterdon County Soil Conservation District listed in N.J.A.C. 2:90-1.3(a)4 as follows: 687 Pittstown Road, Suite #1, Frenchtown, NJ 08825 (908)-788-9466. The location, address, and telephone number of each Soil Conservation District may also be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.
 - 7.2.4 New Jersey Stormwater Best Management Practices Manual, and in the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual (June 1989), both as amended, available from NJDEP.

Section 8: Safety Standards for Stormwater Management Basins

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

8.2 Requirements for Trash Racks, Overflow Grates and Escape Provisions

8.2.1 A trash rack is a device designed to catch runoff-borne 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 be constructed primarily of bars aligned in the direction of flow with a maximum bar spacing of approximately half (%) the diameter or width of the hydraulic opening it is protecting. Transverse bars aligned perpendicular to flow should be sized and spaced as necessary for rack stability and strength
 - 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 based on 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/sq ft.
- 8.2.2 An overflow grate is designed to prevent obstruction of the opening in the top 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 be 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.
- 8.2.3 For purposes of this paragraph 3, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
- a) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.3 a free-standing outlet structure may be exempted from this requirement
 - b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.4 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.

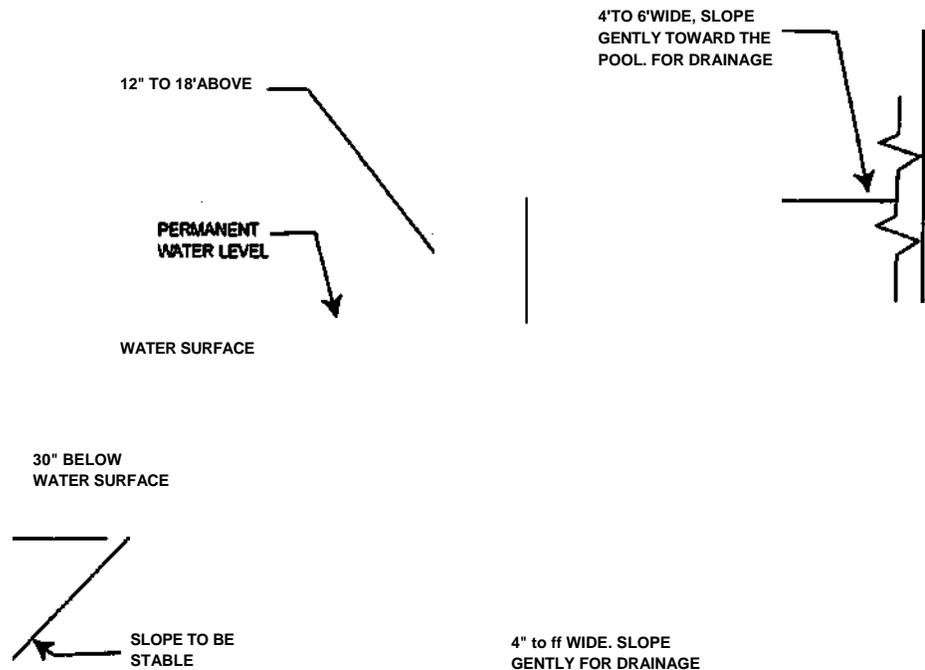
d) An emergency drawdown method for detention basins is required where the permanent pool will be more than two and one-half feet deep. This drawdown method must consider downstream or offsite stability at the outfall in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.

8.3 Variance or Exemption from Safety Standards

8.3.1 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.

8.4 Illustration of Safety Ledges in a New Stormwater Management Basin:

Depicted is an elevational view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

Section 9: Requirements for a Site Development Stormwater Plan

9.1 Submission of Site Development Stormwater Plan

9.1.1 Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the submission

requirements for the Site Development Stormwater Plan at Section 9.3 below as part of the submission of the applicant's application for subdivision or site plan approval.

- 9.1.2 The applicant shall demonstrate in the submission requirements that the project meets the standards set forth in this ordinance.
- 9.1.3 The applicant shall submit three (3) copies of the documents listed in the submission requirements checklist for site development stormwater plans in accordance with Section 9.3 of this ordinance.

9.2 Site Development Stormwater Plan Approval

The applicants Site Development Stormwater Plan shall be reviewed as a part of the subdivision or site plan review process and by the Stormwater Coordinator. The Stormwater Coordinator shall determine if all of the checklist requirements have been satisfied and if the project meets the standards set forth in this ordinance.

9.3 Submission Requirements

The following information shall be required:

9.3.1 Existing Conditions/ Topographic Base Map

The reviewing engineer and/or Stormwater Coordinator may require upstream tributary drainage system information as necessary. It is recommended that the map of the site be submitted which extends a minimum of 300 feet beyond the limits of the proposed development, at an appropriate scale, no less than 1"=200' or greater, showing 2-foot contour intervals. The map, as appropriate, shall indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearings and distances of property lines, and significant natural and manmade features not otherwise shown.

9.3.2 Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs shall be submitted. This description should include a discussion of soil conditions, slopes, wetlands, wetlands buffer, transition areas, 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

9.3.3 Project Description and Site Plan(s)

A map (or maps) at an appropriate scale, no less than 1" =200' of the existing conditions/ 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.

9.3.4 Stormwater Site Planning and Design Summary Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible. Refer to East Amwell's Municipal Stormwater Management Plan, as amended, for additional requirements.

9.3.5 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.

9.3.6 Calculations

- a) Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 4 of this ordinance, shall be provided to the Stormwater Coordinator.
- b) When the proposed stormwater management control measures (e.g., infiltration basins) depend on the hydrologic properties of soils, a soils report shall be submitted. This soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure. The municipality, through its Municipal Clerk and Stormwater Coordinator, shall be notified of site investigation activities and given the opportunity to have a witness, either prior to approval or as a condition of approval, as appropriate for the specific type of measure. Subsequent to approval of the major development, post-construction bulk soil density and infiltration testing shall be required for all infiltration measures that were used as justification for meeting the recharge standard, to ensure that they were properly constructed.

9.3.7 Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 10, and be approved by the Municipal Stormwater Coordinator..

Section 10: Maintenance and Repair

10.1 Applicability

- 10.1.1 Projects subject to review as in Section 1.3 of this ordinance shall comply with the requirements of Sections 10.2 and 10.3.

10.2 General Maintenance

- 10.2.1 The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development subject to review and approval of the Stormwater Coordinator. This plan shall be separate from all other documents, in a format suitable for recording in the County Clerk's Office* and designed for ongoing use by the site owners or operators in performing and documenting maintenance and repair, and by the municipality in ensuring implementation of the maintenance plan. The final maintenance plan shall be updated and provided to the municipality post-construction to include an evaluation based on the specifications of the initial maintenance plan and as-built conditions.
- 10.2.2 The maintenance plan shall contain specific preventive maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal and disposal; safety needs; identification of methods and disposal sites for materials removed during maintenance; maintenance requirements for created wetlands and other ecological systems; safety devices and systems; warranty and operational standards from the manufacturers of any manufactured treatment devices (See Section 6.3); and the name, address, and telephone number of the person or persons responsible for preventive and corrective maintenance (including replacement), using maintenance guidelines for stormwater management measures from sources listed in Section 7, the Municipal Stormwater Management Plan, Municipal Stormwater Pollution Prevention Plan and any relevant regional stormwater management plan. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for continuing 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.
- 10.2.3 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
- 10.2.4 If the person responsible for maintenance identified under Section 10.2.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.2.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
- 10.2.5 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 non-vegetated linings.

- 10.2.6 The person responsible for maintenance identified under Section 10.2.2 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.
- 10.2.7 The person responsible for maintenance identified under Section 10.2.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed. Such person shall report his findings to the Municipal Clerk annually, by February 1st of the following year.
- 10.2.8 The person responsible for maintenance identified under Section 10.2.2 above shall retain, submit annually to the municipality by February 1st of the following year, and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 10.2.6 and 10.2.7 above.
- 10.2.9 The requirements of Sections 10.2.3 and 10.2.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency. In the event that any stormwater control structure is not dedicated to the Township, the developer shall post a two-year maintenance guarantee in accordance with NJSA 40:55D-53, and provide any other maintenance measures as required by the Township, to ensure proper maintenance and functioning of the system. Guidelines are available from NJDEP, see Section 7.2.4.
- 10.2.10 In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, or if the annual report is not received by February 1st of the following year, 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 Stormwater Coordinator or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

10.3 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, or a sinking fund, in accordance with N. J.S.A. 40:55D-53.

10.4 The maintenance plan shall specifically provide a specific municipal right of access for inspection of measures, and for maintenance.

Section 11: Penalties

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to any one, or any multiple, of the following penalties:

- a. Stop work notice to be issued by the Stormwater Coordinator.
- b. Restoration of all damage or disturbance.
- c. Payment for any restoration performed by others, including the Township.
- d. Fine in the amount of \$100.00 per day for each day the violation continues.
- e. Imprisonment for a term not to exceed ninety (90) days.
- f. Community Service for a term not to exceed 90 days.

The Zoning Officer shall be considered the Enforcement Officer for this Ordinance.

Section 12: Effective Date

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

Section 13: Severability

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

By Order of the Township Committee,



Kurt Hoffman, Mayor

Teresa R. Stahl, RNC/CMC
Municipal Clerk

Introduced: July 20, 2006
Adopted: August 17, 2006

Native Plant Suggestions for MidAtlantic Region

It is important that native plants be purchased from reputable growers/nurseries that guarantee that plants are grown responsibly and are not harvested from the wild. Please do not attempt to transplant native plants from the wild yourself; native plant species and communities need to be protected where they are found. Native plants and the habitats they provide are threatened by changed land use. To learn more go to <http://www.npsnj.org/>

BOTANIC NAME	COMMONNAME	FAMILY NAME	FLOWER	BLOOM TIME	SUN LIGHT	MOISTURE	DISTINGUISHING CHARACTERISTICS	DEER RESISTANT
FERNS								
<i>Adiantum pedatum</i>	Maidenhair fern	Fern Family	N/A	N/A	>•	Average	Delicate light green with glossy black stem; 12-24"; likes neutral to lime soils	*
<i>A thyrhim fdix-femina</i>	Lady fern	Fern Family	N/A	N/A	»•	FACU	Light green fronds; 2-3'tall	
<i>Matteucia struthiopteris</i>	Ostrich fern	Wood Fern Family	N/A	N/A	0->	FACW	Huge fronds; extremely stately	*
<i>Onoclea sensibilis</i>	Sensitive fern	Wood Fem Family	N/A	N/A	0-0	FACW	Will form a complete cover; beautiful dried fertile fronds	
<i>Osnntnda cinnamomea</i>	Cinnamon fern	"Flowering" Fem Family	N/A	N/A	0-9	FACW	Cinnamon-colored fertile fronds	•k
<i>Osmunda regalis</i>	Royal fern	"Flowering" Fem Family	N/A	N/A	0-#	OBL	Fronds resemble locust leaves; beautiful when mature	
<i>Polystichum acrostochoides</i>	Christmas fern	Fem Family	N/A	N/A	>•	Average	Easy to grow; evergreen; 1-2'	*
<i>Thelyptens roveboracensis</i>	New York Fern	Fem Family	N/A	N/A	»•	FAC	Elliptic fronds, likes moist woods and wooded ravines, tough plant	
GRASSES								
<i>Andropogon gerardii</i>	Big bluestem	Grass Family	Purple seedhead	Aug - early Oct	0	FAC-	Tall (6-9 feet) clump-forming meadow grass	*
<i>Andropogon scoparias</i>	Little bluestem	Grass Family	Purplish	Aug - early Oct	0	FACU	Shorter than big bluestem; likes open woods, tough grass, nice perennial	
<i>Chasmanthium latifolium</i>	River oats	Grass Family	Flat seed head	Summer	0-1	Average	Ornamental; good for shade; seeds hang in clusters nice for dried flower arrangements; will self-sow	
<i>Muhlenbergia capillaris</i>	Pink Muhly Grass	Grass Family		Sep-Oct	0-1	FACU-	Short hairy type grass, purplish pink spikelets, good along river banks, endangered	

HERBACEOUS PERENNIALS								
<i>Amsonia hubrechtii</i>	Blue star	Dogbane Family	Blue	May - June	O	FACW	Native further south; very narrow leaves; 36" tall, 30" wide; Fall color	
<i>Aquilegia canadensis</i>	Columbine	Buttercup Family	Red-orange	Spring	»•	UPL	Commonly cultivated; spreads by seed; hummingbirds	
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	Arum Family	Green purple	Apr-Jun	»•	FACW-	Unusual flower; bright red berries; woodland plant	*
<i>Aruncus dioicas</i>	Goatsbeard	Rose Family	White	Jul-Aug	>•	FACU	Showy plumes; does well in filtered shade	*
<i>Asarum canadensis</i>	Wild ginger	Pipe Vine Family	Maroon	Apr-May	•	UPL	Herbal uses; shady groundcover	*
<i>Asclepias incarnata</i>	Swamp milkweed	Milkweed Family	Rose	July-Aug	0	OBL	Attracts butterflies; host plant for swallowtail and monarch butterflies	*
<i>Asclepias taberosa</i>	Butterfly weed	Milkweed Family	Orange	May-Sep	0-9	UPL	Attract butterflies; tolerates dry conditions; nice meadow plant	*
<i>Aster laevis</i>	Smooth blue aster	Aster Family	Violet blue	Aug-Sep	0->	UPL	Forms vase-shaped clumps; striking in late summer; survives drought; found in natural meadows	*
<i>Aster novi-belgii</i>	New York Aster	Aster Family	Light Blue	Sept	O	FACW	Showy and tough; tolerates drought; attracts butterflies	
<i>Baptisia australis</i>	Blue false indigo	Pea Family	Blue	Apr-May	0->	UPL	Slow to establish but forms large clumps; beautiful garden plant; good in a meadow	
<i>Campanula americana</i>	Tall bellflower	Bellflower family	Blue	Late Jul-Aug	»	FACU	Biennial or annual; likes moist woods, rocky wooded slopes, stream banks; 4 to 6'	
<i>Chelone glabra</i>	Turtlehead	Snap Dragon Family	White	Jul-Sep	0->	OBL	Tolerates wet; strong grower; herbal uses; attracts hummingbirds	
<i>Cimicifuga racemosa</i>	Black cohosh	Buttercup Family	White	Jun-July	>•	UPL	Wand-like white flowers; medicinal uses; 3-5'	
<i>Coreopsis lanceolata</i>	Tickseed	Aster Family	Yellow	May-Sep	0->	FACU	Native farther west; long-flowering; easy to grow	
<i>Dicentra eximia</i>	Wild bleeding heart	Fumitory Family	Pink	Jun-Sep	>•	UPL	Fem-like blue-green foliage; clusters of small pink flowers; likes part-shade woodland setting; 1'	*
<i>Dodecatheon meadia</i>	Shooting star	Primrose Family	Rosie lavender to white	Late April - May	>•	FACU	Endangered plant; basal rosette of leaves with flowers at tip of stem; beautiful Spring ephemeral; wooded slopes, bluffs, limestone	
<i>Echinacea paradoxa</i>	Yellow coneflower	Aster Family	Yellow	Jul-Sep	0	UPL	Midwestern native; attracts butterflies; tough perennial	
<i>Echinacea purpurea</i>	Coneflower	Aster Family	Purple	Jul-Sep	0	UPL	Colorful perennial; medicinal uses	
<i>Echinacea purpurea 'Swan'</i>	White coneflower	Aster Family	White	Jul-Sep	0	UPL	Showy white perennial; attracts butterflies	
<i>Eupatorium coelestinum</i>	Blue mistflower	Aster Family	Lavender-blue	Aug-Oct	0	FAC	Needs sandy soil or dry meadow; pretty flowers	*

<i>Eupatorium purpureum</i>	Joe-pye weed	Aster Family	Purple	July-Oct	1	FAC	Attracts beneficial insects; likes open woods and fields; herbal uses; 4' -6'	
<i>Eupatorium maculatum</i>	Spotted Joe-pye	Aster Family	Pinkish-purple	Jul-Sep	O-1	FACW	Likes wet meadows/ pond shores; 4'-6'	

HERBACEOUS PERENNIALS continued								
<i>Gaura lindheimeri</i>	Gaura	Evening Primrose Family	White-pink	July-early Oct	O	FACU	Up to 6' tall; impressive many-flowered terminal spike; moist meadow, floodplain	
<i>Geranium macalatum</i>	Wood geranium	Geranium Family	rose-pink	Apr-May	O-i	FACU	Spring loaded seed capsules catapult the seed away from the plan; flowers are pretty and prolific	*
<i>Heliopsis helianthoides</i>	Ox-eye or false sunflower	Aster Family	Yellow	Jun-Sep	O	Moist-average	Good for meadows and floodplains; striking	
<i>Hepatica acittiloba</i>	Liverleaf	Buttercup Family	Whitish	early April-May	!•	UPL	Likes upland woods, slopes; growth is tufted; low growing	
<i>Heuchera americana</i>	Alum root	Saxifrage Family	silver-bluish	Jul-Aug	O-«	UPL	Semi-evergreen foliage; beautiful fall color	
<i>Hibiscus moscheutos</i>	Rose mallow	Mallow Family	Pink, rose, white	Aug-Sep	O	OBL	Tolerates standing water, very showy flower	*
<i>Hydrastis canadensis</i>	Goldenseal	Buttercup Family	Greenish-white	April - early June	»•	Moist-Average	Endangered plant due to over collecting; 6" - 12" tall; medicinal; red berry	
<i>Iris cristata</i>	Dwarf crested iris	Iris Family	Blue	Apr-May	O->	UPL	Spreads by rhizomes; short plant can be a groundcover	
<i>Iris versicolor</i>	Blue flag iris	Iris Family	Blue	May-Jun	O-l	OBL	Wetlands and buffers; showy flowers	*
<i>Liatris spicata</i>	Blazing star	Aster Family	Violet	Jul-Sep	O	FAC+	Forms a dense clump over time; beautiful tall flower spikes	*
<i>Lobelia cardinalis</i>	Cardinal flower	Bell Flower Family	Scarlet	Jul-Sep	0-9	FACW+	Long bloom time; attracts butterflies and hummingbirds	
<i>Lobelia siphilitica</i>	Blue lobelia	Bell Flower Family	Blue	Jul-Oct	O-l	FACW+	Long bloom time; attracts hummingbirds	
<i>Lonicera semprens</i>	Trumpet honeysuckle	Honeysuckle Family	Red with yellow	May-Jun	O	FACU	Our native vine; showy flowers; adaptable; attracts hummingbirds and butterflies	
<i>Mertensia virginica</i>	Virginia bluebells	Borage Family	Blue	Apr-May	O-l	FACW	Strong clump forming plan; heavenly blue/pink flowers; adaptable spring ephemeral	*
<i>Monarda didyma</i>	Bee-balm	Mint Family	Red	Jul-Aug	O	FAC+	Showy flower; aromatic; attracts butterflies; herbal uses; needs room to spread	
<i>Monarda fistulosa</i>	Wild bergamot	Mint Family	Pink-lavender	Jul-Aug	O	FAC+	Mildew resistant; needs room; tolerates drought; 2-3*	
<i>Monarda punctata</i>	Spotted bee balm	Mint Family	Yellow with pink	Jun-Sep	O	UPL	Long lasting flowers; tolerates drought; likes dry open sandy soil; 2', endangered plant	
<i>Panax quinquefolia</i>	American ginseng	Ginseng Family	Greenish white	May	•	UPL	Hard to Find native herb; medicinal; excessively collected; endangered species; low growing	

HERBACEOUS PERENNIALS continued								
<i>Penstemon digitalis</i>	Beard-tongue	Snapdragon Family	White	Jul-Aug	O	FAC	Attracts hummingbirds; gorgeous foliage and prolific flowers	
<i>Phlox divaricata</i>	Wild blue phlox	Phlox Family	Lilac	May-Jun	0-#	FACU	Aromatic; attracts butterflies; good spreader	
<i>Phlox paniculata</i>	Summer phlox	Phlox Family	Pink	Jul-Oct	0-#	FACU	Aromatic; showy flowers; attracts butterflies	
<i>Phlox stolonifera</i>	Creeping phlox	Phlox Family	Blue	Apr-May	»	UPL	Groundcover phlox; lush leaves, lots of flowers	
<i>Polemonium reptans</i>	Spreading Jacob's ladder	Phlox Family	Blue	Apr-Jul	0-#	FACU	Unusual flowers; slow spread; woods	
<i>Polygonatum biflorum</i>	Solomon's seal	Lily Family	Yellow	Apr-Jun	0-9	UPL	Not fussy; blue berries; herbal and edible uses	
<i>Rudbeckia fulgida</i>	Orange coneflower	Aster Family	Orange	Aug-Oct	0->	FAC	Bright flowers; 2-3 ft. tall; long bloom time; drought tolerant	
<i>Rudbeckia hirta</i>	Black eyed susan	Aster Family	Orange-yellow	May-Sept	O-O	FAC-	Bright flowers; long bloom time	
<i>Sanguinaria canadensis</i>	Bloodroot	Poppy Family	White	Mar-May	>•	UPL	Early white star-like flower; red sap; herbal uses; beautiful satiny foliage; woodland groundcover	
<i>Silene caroliniana</i>	Firepink	Pink Family	Red	Jul	0->	Average to dry	Brilliant red flower, unusual in nature; short-lived bloom; good for dry shade	
<i>Sisyrinchium angustifolium</i>	Blue-eyed grass	Iris Family	White	Jun-Jul	0->>	FACW	Tiny blue flowers above grassy foliage	*
<i>Solidago rugosa</i>	Wrinkle-leaf goldenrod	Aster Family	Yellow	Jul-Nov	0-#	FAC	Tough plant; attracts butterflies	*
<i>Stokesia laevis</i>	Stoke's Aster	Aster Family	Blue	Jul-Aug	0->	Average - moist	Nice dark green foliage; large flowers; bushy plant	
<i>Tiarella cordifolia</i>	Foamflower	Saxifrage Family	White	Apr-Jul	»•	FAC-	Attractive; long blooming wand-like flower	*
<i>Trillium erectum</i>	Wakerobin	Lily Family	Maroon	Apr-May	>•	Moist	Elegant woodland plant	
<i>Trillium grandiflorum</i>	Largeflowered	Lily Family	White	Apr-May	»•	Moist	Large flowers on beautiful woodland plant	
<i>Trillium luteum</i>	Yellow Trillium	Lily Family	Yellow	April-May	1•	Moist	Likes moist woods	

SHRUBS							
<i>Alnus rugosa</i>	Speckled alder	Birch Family		Mar-Apr	0	FACW	Multi-stemmed; high wildlife value; to 20'
<i>Arctostaphylos uva-ursi</i>	Bearberry	Heath Family	White	May	0	FAC	Prostrate evrgm shrub/groundcover; red berries; needs dry sandy soil or outcrop
<i>Aronia arbutifolia</i>	Red chokeberry	Rose Family	White-pink	May	»	FACW	Red berries; adaptable species
<i>Aronia primifolia</i>	Purple chokeberry	Rose Family	White	May	>	FACW	Berries; adaptable species
<i>Aronia melanocarpa</i>	Black chokeberry	Rose Family	White	Mar-Jul	1	FAC	Multi-stemmed; black berries; fall color
<i>Calycanthus floridus</i>	Carolina allspice	Strawberry-Shrub Family	Purplish brown	June	0->	Average	Fragrant unusual flowers; up to 9' tall; adaptable; found mostly in Virginia and south in wild
<i>Ceanothus americanus</i>	New Jersey Tea	Buckthorn Family	White	May-June	0->	AVERAGE	Compact 2'-3' shrub; tiny fragrant flowers; used as tea
<i>Cephalanthus occidentalis</i>	Buttonbush	Madder Family	White	Jun-Sep	0	OBL	Multi-stemmed; interesting fruit; tolerates inundation
<i>Clethra alnifolia</i>	Pepperbush	Clethra Family	White	Jul-Aug	1	FAC+	Fragrant white flowers; very adaptable plant
<i>Comptonia peregrina</i>	Sweet fern	Bayberry Family	White	Apr-May	0	UPL	Deciduous low shrub; ferny leaves; spikey inflorescence; dry
<i>Cornus amomum</i>	Silky dogwood	Dogwood Family	White	May-Jul	0	FACW	Flowers in summer; blue berries; multi-

							stemmed; very high wildlife value
<i>Fothergilla gardenii</i>			White	April-May	0->	AVERAGE	Fragrant pom pom flowers; 2*4' tall; great fall color.
<i>Fothergilla major</i>			White	April-May	0->	AVERAGE	Fragrant bottlebrush flowers; 4' tall; great fall color
<i>Hamamelis virginiana</i>	Vernal witch-hazel	Witch-hazel Family	Yellow	Sep-Nov	0-<<	FAC-	Yellow flowers; spider-like linear petals; medicinal uses
<i>Hamamelis vernalis</i>	Witch-hazel	Witch-hazel	Yellow	Sep-Nov	0-#	FAC-	Yellow flowers; very early
<i>Hydrangea quercifolia</i>	Oakleaf hydrangea	Hydrangea Family	White	Late June	0	FAC	Showy shrub, large white flower clusters
<i>Ilex glabra</i>	Inkberry holly	Holly Family	White	May	€->•	FAC+	Black fruits; evergreen shiny leaves
<i>Ilex verticillata</i>	Winterberry holly	Holly Family	White	May-June	»	FACW+	Showy berries in winter; high wildlife value
<i>Itea virginica "Little Henry"</i>	Virginia sweetspire	Gooseberry Family	White	May-June	1	OBL	Small deciduous shrub; showy fragrant flowers; needs wet & acid
<i>Lindera benzoin</i>	Spice bush	Laurel Family	Yellow	Mar-May	»-•	FACW-	Berries and foliage in fall; herbal uses; wildlife
<i>Myrica pensylvanica</i>	Northern bayberry	Bayberry Family	White	May	0-1	FAC	Med. semi-evergreen shrub; aromatic leaves, waxy berries; adaptable
<i>Physocarpus opulifolius</i>	Eastern ninebark	Rose Family	White	May-July	0->	FACW	Suckering deciduous shrub; exfoliating bark; streambanks
<i>Rhododendron viscosum</i>	Swamp azalea	Heath Family	White	Jun-Jul	0->	OBL	Fragrant sticky flowers; fast grower

<i>Rosa palustris</i>	Swamp rose	Rose Family	Pink	Jun-Oct	O	OBL	Tolerates inundation, very high wildlife value
<i>Rubus odoratus</i>	Purple flowering raspberry; thimbleberry	Rose Family	Purple-pink	May-Aug	1	Aver-moist	Pretty flowers with small red fruits; thrives in part shade
<i>Salix discolor</i>	Pussy willow	Willow Family	Silvery	Feb-Mar	0-#	FACW	Fast growing species; stabilizing plant
<i>Sambucus canadensis</i>	American elderberry	Honeysuckle Family	White	Jun-July	>	FACW-	Edible berries & flowers; multi-stemmed; high wildlife value
<i>Spiraea tomentosa</i>	Steeplebush	Rose Family	Pink	July-Sept	0	FACW	Deciduous shrub; showy panicle inflorescence; wet meadows
<i>Symphoricarpos orbiculatus</i>	Coralberry	Honeysuckle Family	Pinkish white	June	0->	UPL but can tolerate some wet	Spreads by suckers; dense shrub up to 2-5'; coral-red berries stay in winter
<i>Vaccinium corymbosum</i>	Highbush blueberry	Heath Family	White	May-Jun	>	FACW-	Multi-stemmed; edible berries; fall color; high wildlife value
<i>Viburnum dentatum</i>	Southern arrowwood	Honeysuckle Family	White	May-Jun	>	FAC	Very adaptable; high wildlife value; 10-15'
<i>Viburnum trilobum</i>	American cranberry bush	Honeysuckle Family	White	Late May	1	FAC	Bright red berries (not true cranberries); up to 10'- 15'tall
<i>Viburnum prunifolium</i>	Blackhaw viburnum	Honeysuckle Family	White	May	•	FACU	Good fall color; large shrub/small tree; up to 20'tall
TREES							
<i>Amelanchier arborea</i>	Shadbush; Downy serviceberry	Rose Family	White	Apr	>	FAC	Early spring flowers; delicious berries in summer
<i>Acer rubrum</i>	Red maple	Maple Family	Red	Mar-May	0->	FAC	Large tree; beautiful fall

							color; adaptable
<i>Betula lenta</i>	Sweet birch	Birch Family		Apr-May	O	FACU	Smooth dark bark; crushed twigs smell spicywintergreen good for streambanks; med. height
<i>Betula nigra</i>	River birch	Birch Family		Apr-May	O	FACW	Red-brown exfoliating bark; good for wet floodplains, swamps; med. height
<i>Betula populifolia</i>	Gray birch	Birch Family		Apr-May	O	FAC	White exfoliating bark with black markings; catkins; tolerates dry soils
<i>Carpinus caroliniana</i>	Ironwood, Hornbeam	Birch Family		Apr-May	>•	FAC	Smooth gray sinuous bark; good for moist woods and streambanks; small understory tree
<i>Cercis canadensis</i>	Eastern redbud	Caesalpiniaceae Family	Purple	April	1	UPL	Beautiful flowers in spring; fixes nitrogen; forest edge species
<i>Cornus florida</i>	Flowering dogwood	Dogwood Family	White bracts	Apr-Jun	O	FACU-	White bracts in spring; red berries; very high wildlife value
<i>Diospyros virginiana</i>	Persimmon	Ebony Family	Yellow-orange	May-Jun	0	FAC-	High wildlife
<i>Franklinia alatamaha</i>	Franklin tree		Creamy white	Jul-Sep	0	UPL	Magnificent rare tree; fragrant blooms; vibrant fall color; grows 20-30'
<i>Halesia Carolina</i>	Silverbell	Storax Family	White	May	0->	AVERAGE	Small tree; pure white hanging flowers; likes edge of woods

<i>Juniperis virginiana</i>	Eastern red cedar	Cypress Family			O-1	FACU	Med. height;
<i>Liriodendron tulipifera</i>	Tulip poplar	Magnolia Family	Green-orange	May	O	FACU	Very tall straight trunk; conelike fruit; 4-lobed distinctive leaves
<i>Magnolia virginiana</i>	Sweetbay magnolia	Magnolia Family	White	May-Jun	0->	FACW	Small semi-evergreen tree; showy fragrant flowers; wet/acid
<i>Oxydendrum arboreum</i>	Sourwood	Heath Family	White	Aug	O	UPL	Beautiful large tree
<i>Pinus echinata</i>	Shortleafpine	Pine Family			O	UPL	Tall evergreen; fire tolerant; dry sites; good timber tree
<i>Pinus rigida v nana</i>	Pigmy pine	Pine Family			O	FACU	Evergreen; long cones; likes dry acid soils; 10'
<i>Prunus serotina</i>	Black cherry	Rose Family	White	May-Jun	0->	FACU	Med. timber tree; black fruits; wide range
<i>Pinus virginiana</i>	Virginia pine	Pine Family			0-#	UPL	Evergreen shade tolerant; needs sandy loam and/or dry slopes
<i>Quercus coccinea</i>	Scarlet oak	Beech Family			O	UPL	Large tree with brilliant fall color; lots of acorns
<i>Quercus palustris</i>	Pin oak	Beech Family	Yellow	Apr-May	O	FACW	Common ornamental street tree; fall color; very high wildlife value
<i>Quercus phellos</i>	Willow oak	Beech Family			O	FAC+	Tall; likes moist woods; rare
<i>Salix nigra</i>	Black willow	Willow Family	Yellow	Apr-May	O	FACW+	Catkins; grows very fast
<i>Sorbus americana</i>	American mountain-ash	Rose Family	White	Apr-Jun	O	FACU	Hard to find shrubby tree; showy red fruit

ADDENDUM #1

To A PLAN TO ENSURE ADEQUATE LONG-TERM OPERATION AND MAINTENANCE OF BMPs LOCATED ON PROPERTY OWNED OR OPERATED BY THE TOWNSHIP OF EAST AMWELL, HUNTERDON COUNTY, NEW JERSEY

1.1 Background:

This plan was prepared to satisfy the Statewide Basic Requirement (SBR) for East Amwell Township's NJPDES Municipal Stormwater Regulation Program for Tier B Municipalities. In order to comply with the NJDEP regulations, this plan must be implemented and followed. This plan applies to all stormwater BMPs located on property owned or operated by East Amwell Township regardless of the date they were constructed.

1.2 Location of BMPs:

As of this writing, there are only two BMPs located on land owned by the Township of East Amwell. Both are extended detention basins and both are located in Clawson Park, Rt. 179, Block 14, Lot 15. Should other BMPs be constructed on municipal property, they should be added to this plan.

1.3 Periodic Inspection:

The Township Stormwater Coordinator shall perform an on-site inspection of the BMPs once per year between March 1 and April 1. If the inspection reveals a problem with the BMP, the Stormwater Coordinator shall inform the Department of Public Works and the Governing Body in writing. The Governing Body shall then take whatever action it deems necessary.

The Department of Public Works shall inspect the BMP's in accordance with 1.5 Long Term Operation and Maintenance below.

1.4 Basic Operation of the Basin and Components:

The two basins are grassed and each contains inlet pipes, a concrete outlet structure, an outlet pipe, and an emergency spillway. The basins were designed to hold a specific volume of stormwater for a specific amount of time. Each basin has one outlet structure. The outlet structure was designed to release the water in the basin in a slow and controlled fashion. The outlet structures can be easily identified because they are constructed of concrete and resemble concrete boxes, with various size openings on the top and sides. The structures protrude above the bottom of the basin, near the utility easement. They each have a metal trash rack (to keep debris out) and a casting on top to allow stormwater to spill into the structure during very high water.

An emergency spillway is provided to give the stormwater a safe (and stable) place to spill out of the basin in the event the outlet structure becomes clogged or the storm is so intense that there is not enough volume within the basin to hold the stormwater. The elevation (grade) of the emergency spillway must not be altered from the design elevation.

1.5 Long Term Operation and Maintenance:

The Township Department of Public Works is responsible for cutting the grass during the growing season. They are also responsible for keeping the outlet structures clean and clear of grass, sticks, leaves and other debris that might cover the components of the structures and result in reducing or obstructing the flow of stormwater into the outlet structure.

The following items should be checked on a monthly basis (and before and after a major rain storm):

- Inlet pipe, headwall and rip-rap aprons -
 - o Check for erosion around headwall and pipe. Repair as necessary.
 - o Check for cracking of concrete headwall and/or joint between headwall and inlet pipe. Repair as necessary.
 - o Check for erosion around rip-rap apron. Rip-rap may have to be replaced or cleaned and reset on occasion.
- Detention Basin
 - o Remove any debris that might occupy volume or clog the outlet structure
- Outlet Structure(s), including trash racks and top casting -
 - o Clean debris from trash rack and outlet structure.
 - o Remove debris that might be washed into structure during rain event.
- Outlet pipe(s) (carries flow out of Outlet Structure) -
 - o Check for erosion at open end of pipe and surrounding downstream area. Repair as necessary.
- Emergency Spill -
 - o Check for erosion before and after major storms. The Spillway area must be erosion free and earth must be stable and well vegetated to function properly.

In the event a problem is found that cannot be handled by the Department of Public Works in a timely manner, the Director of Public Works shall inform the Township Administrator, Township Engineer and Stormwater Coordinator immediately.

1.6 Record Keeping:

The Stormwater Coordinator shall keep a record of the dates his/her yearly inspections. The record should include the date of the inspections, the conditions found, the name of the person conducting the inspection, and any maintenance performed. The record should be kept in the Stormwater Coordinator's Block and Lot file. A copy shall be sent to the Department of Public Works and Township Clerk.

The Director of the Department of Public Works shall keep a record of his department's periodic inspections. The record should include the date of the inspections, the

conditions found, the name of the person conducting the inspection, and any maintenance performed. The record should be kept in the Department of Public Works' file. A copy shall be sent to the Stormwater Coordinator and Township Clerk.

ADDENDUM #1

2.0 A PLAN TO ENSURE ADEQUATE LONG-TERM OPERATION AND MAINTENANCE OF BMPs LOCATED ON PROPERTY NOT OWNED OR OPERATED BY THE TOWNSHIP OF EAST AMWELL, HUNTERDON COUNTY, NEW JERSEY

2.1 Background:

This plan was prepared to satisfy the Statewide Basic Requirement (SBR) for East Amwell Township's NJPDES Municipal Stormwater Regulation Program for Tier B Municipalities. In order to comply with the NJDEP regulations, this plan must be implemented and followed. This plan applies to all stormwater BMPs located on property not owned or operated by the Township of East Amwell that were approved on or after February 2, 2004.

In accordance with NJDEP regulations, the Township is not responsible for ensuring adequate long term operation and maintenance (O&M) for BMP's approved before 2.2.04.¹ However, the Township should encourage the party responsible for the O&M to properly operate and maintain the BMP.

In accordance with NJDEP regulations, the Township is responsible for ensuring adequate long term O&M for BMP's approved on or after 2.2.04.²

2.2 Location of BMPs:

As of this writing the known BMPs located on property not owned or operated by the Township of East Amwell are listed on the attached spreadsheet. As additional BMPs are constructed, they should be added to the spreadsheet.

2.3 Periodic Inspections:

Where reasonably feasible, the Township Stormwater Coordinator will perform a cursory inspection of the BMPs listed on the attached spreadsheet (regardless of the date approved or constructed). At a minimum the inspection will be performed once per year between March 1 and April 1. If the inspection reveals a problem with the BMP, the Township Stormwater Coordinator will inform the Governing Body in writing. The Governing Body shall then take whatever action it deems necessary. In the case of BMP's approved before 2.2.04, the Governing Body should encourage the party responsible for the O&M to properly operate and maintain the BMP.

2.4 Long Term Operation and Maintenance:

Chapter 122-10 of the East Amwell Township Code requires that all BMP's approved on or after 2.4.04 include a written plan to ensure proper long term operation and maintenance. The plan must be approved and updated in accordance with 122-10. The ordinance also requires that the person responsible for the maintenance submit a report

annually to the Municipal Clerk by February 1 of each year. (See 122-10 for additional details.) Prior to the yearly BMP inspection, the Stormwater Coordinator should confirm the yearly update was received by the Municipal Clerk. During the on-site inspection of the BMP, the Stormwater Coordinator shall review the required written operation maintenance plan and confirm that the requirements are being met.

2.5 Record Keeping:

The Stormwater Coordinator shall keep a record of the dates his/her yearly inspections. The record should include the date of the inspections, the conditions found, the name of the person conducting the inspection, and any maintenance performed. The record should be kept in the Stormwater Coordinator's Block and Lot file. A copy shall be sent to the Department of Public Works and Township Clerk.

^{1,2} Per NJDEP Case Manager Tara Wood 11.13.08 telecom with Township Engineer Dennis W. O'Neal, P.E., C.M.E.