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DPW

BOROUGH OF LEONIA

STORMWATER MANAGEMENT PLAN

PREPARED FOR:
BOROUGH OF LEONIA
312 BROAD AVENUE
LEONIA, NEW JERSEY 07605

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June 2005
Revised September 2006

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 GOALS 2

3.0 STORMWATER DISCUSSION 3

4.0 BACKGROUND 5

4.1 BOROUGH CHARACTERISTICS 5
4.1.1 Population and Housing Trends 5
4.1.2 Land Use 5
4.1.3 Water and Sewer Service 6
4.1.4 State Development and Redevelopment Plan 6
4.1.5 Brownfields Sites and Known Contaminated Sites 7
4.2 WATERWAYS 7
4.3 STREAM CORRIDOR PROTECTION 12
4.4 FLOODING ISSUES 12
4.5 WELLHEAD PROTECTION AREAS 13

5.0 DESIGN AND PERFORMANCE STANDARDS 14

6.0 PLAN CONSISTENCY 15

7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES 16

7.1 CHAPTER 140: FLOOD DAMAGE PREVENTION 16
Section 140-15: Alteration of Watercourses 16
Section 140-16: Interpretation of FIRM Boundaries 17
Section 140-20: Zero Increase in Stormwater Runoff 17
Section 140-20A: Findings 17
Section 140-20C: Applicability 17
Section 140-20D through F 18
Section 140-20D: Stormwater Control Ordinance 18
7.2 CHAPTER 236: SITE PLAN REVIEW 18
Section 236-25: Information Required on Site Plans 18
Section 236-27: General Requirements 19
Section 236-28: Off-Street Parking Requirements 19
Section 236-31: Landscaping and Buffer Areas 19
Section 236-34: Street Improvements 20
7.3 CHAPTER 250: SUBDIVISION OF LAND 20
Section 250-43C: Easements, Preservation of Natural Features 20
7.4 CHAPTER 290, ARTICLES IV THROUGH XII: ZONING DISTRICTS 20
7.5 NEW ORDINANCES 21
Minimization of Turf Grass Lawn Areas 21
Unconnected Impervious Areas 21
Vegetated Open Channels 21
Steep Slopes 22
Buffer Zones 22

8.0 LAND USE / BUILD OUT ANALYSIS 23

9.0 MITIGATION PLANS 24

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LIST OF FIGURES

FIGURE 1: GROUNDWATER RECHARGE IN THE HYDROLOGIC CYCLE

FIGURE 2: BOROUGH AND ITS WATERWAYS

FIGURE 3: U.S.G.S. TOPOGRAPHIC MAP

FIGURE 4: GROUNDWATER RECHARGE AREAS

FIGURE 5: WELLHEAD PROTECTION AREAS

FIGURE 6: EXISTING LAND USE

FIGURE 7: HYDROLOGIC UNITS (HUC-14s)

FIGURE 8: ZONING MAP OF THE BOROUGH OF LEONIA

FIGURE 9: CONSTRAINED LAND

LIST OF APPENDICES

APPENDIX 1: STORMWATER CONTROL ORDINANCE

SECTION 1.0

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1.0 INTRODUCTION

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Leonia (Borough) to address stormwater-related impacts. The creation of this plan is required by the ***Municipal Stormwater Regulations*** (N.J.A.C. 7:14A-25) and contains all of the required elements described in the ***Stormwater Management Rules (Rules, N.J.A.C. 7:8)***. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, as defined within the ***Rules***. 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 baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

The Borough of Leonia has a combined total of significantly less than one square mile of vacant or agricultural land. Therefore, according to ***N.J.A.C. 7:8-4.2(c) 10***, a "build-out" analysis is not required. However, the plan addresses the review and update of existing ordinances, the Borough Master Plan, and other planning documents to provide guidance for future development to include low impact development techniques. The final component of this plan includes a mitigation plan to allow for variances or exemptions from the design and performance standards.

SECTION 2.0

2.0 GOALS

The goals of this MSWMP are to:

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

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

SECTION 3.0

3.0 STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site.

Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

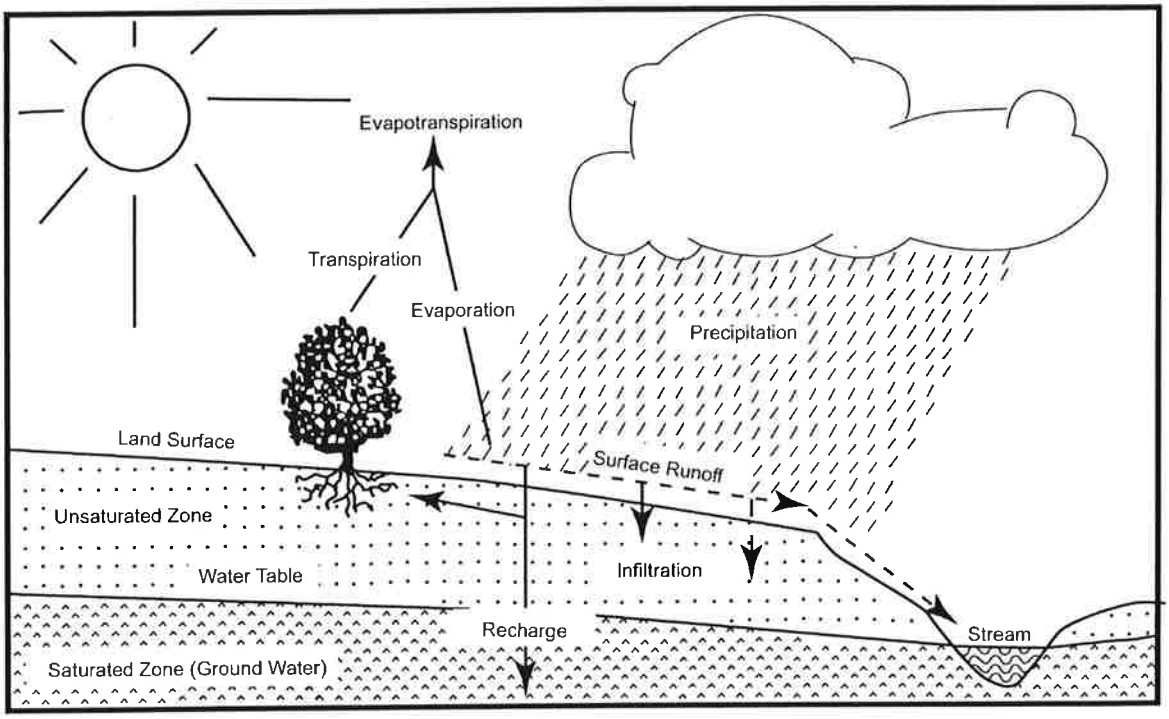


Figure 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

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

SECTION 4.0

4.0 BACKGROUND

4.1 BOROUGH CHARACTERISTICS

The Borough of Leonia comprises a 1.5 square mile area in Bergen County, New Jersey. Figure 3, USGS Topographic Map, depicts the Borough boundary on USGS quadrangle maps.

4.1.1 Population and Housing Trends

According to the ***2003 Bergen County Data Book***, prepared by the Bergen County Department of Planning and Economic Development, the population of the Borough has fluctuated over the years.

Year	*Population (persons)*
1970	*8,847*
1980	*8,027*
1990	*8,365*
2000	*8,914*

However, while the population has fluctuated, the number of housing units has steadily increased over the years.

Year	*Housing units*
1970	*3,040*
1980	*3,159*
1990	*3,337*
2000	*3,343*

4.1.2 Land Use

According to the ***2002 Master Plan***, Leonia is a fully developed municipality with almost 100% of its land area developed or set aside as permanent recreation/open space use. Specifically,

79% of Borough is comprised of single-family residential neighborhoods and commercial districts. The remaining 21% is designated as Overpeck County Park. Furthermore, according to ***Drawing LU of the Master Plan***, Existing Land Use and Zoning, there is no agricultural land and few vacant parcels in the Borough. The specific acreage of vacant land in the Borough is not quantified in the ***2002 Master Plan***.

4.1.3 Water and Sewer Service

Water service throughout the entire Borough is provided by United Water New Jersey.

Sewer service throughout the Borough is provided by Bergen County Utilities Authority. Septic tanks are still utilized by two (2) residences in the area of Grand Avenue. The Borough does not provide sewer service in the area of the residences; however, the owners were granted permission by the Borough to connect to the Palisades Park sewer system. At this time, neither of the owners have chosen to connect their homes to the Palisades Park sewer system.

4.1.4 State Development and Redevelopment Plan

The purpose of the ***State Development and Redevelopment Plan (State Plan)*** is to coordinate planning activities and establish State-wide planning objectives in the areas of land use, housing, economic development, transportation, natural resource conservation, agriculture and farmland retention, recreation, urban and suburban redevelopment, historic preservation, public facilities and services, and intergovernmental coordination. The ***State Plan*** designates planning areas that share common conditions with regard to development and environmental features:

- Areas for Growth: Metropolitan Planning Areas (PA-1), Suburban Planning Areas (PA-2) and Designated Centers in any planning area.
- Areas for Limited Growth: Fringe Planning Areas (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5). In these planning areas, planning should promote a balance of conservation and limited growth—environmental constraints affect development and preservation is encouraged in large contiguous tracts.

- Areas for Conservation: Fringe Planning Area (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5).

Approximately 80% of the Borough is located in the Metropolitan Planning Area (PA-1). The remainder of the Borough, comprised of Overpeck County Park, is located in an area designated for Parks and Natural Areas. Parks and Natural Areas represent a public investment specifically for resource preservation and the provision of recreational opportunities.

4.1.5 Brownfield's Sites and Known Contaminated Sites

A brownfield is defined under NJ state law (***N.J.S.A. 58:10B-23.d***) as "any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant." According to both the United States Environmental Protection Agency (USEPA) and New Jersey Department of Environmental Protection (NJDEP) brownfields websites, there are no brownfields in the Borough. Additionally, the Borough has not identified any brownfields.

The ***Known Contaminated Sites in New Jersey report (2001 Edition)*** is a municipal listing of sites where contamination of soil and/or ground water is confirmed at levels greater than the applicable cleanup criteria or standards. Remedial activities are underway or required at the sites with an on-site source(s) of contamination and at locations where the source(s) of contamination is unknown. Sites with completed remedial work that require engineering and/or institutional controls have reporting measures in place to ensure the effectiveness of past actions, and some include maintenance and/or monitoring. There are seven (7) sites in the Borough with on-site sources of contamination on the ***Known Contaminated Sites report***.

4.2 WATERWAYS

The following waterways are located in or immediately adjacent to the Borough:

- Overpeck Creek
- Moore's Creek
- Flat Rock Brook

Figure 2, Borough and its Waterways, illustrates the waterways in the Borough.

Underground streams are located throughout the Borough. The area of the former Golf Course, depicted on the U.S.G.S. Topographic Map (Figure 3), is particularly affected by underground streams. No information regarding historically piped streams is available.

The Borough is not conducting any work in or around any of the waterways. All of the waterways are located within Overpeck County Park, which is under the jurisdiction of the County of Bergen. Information regarding work in or around the waterways of Overpeck County Park can be obtained from the County of Bergen.

The Borough of Leonia is located within the Hackensack, Hudson and Pascack Watershed Management Area (WMA #5). A Watershed Management Area is subdivided into smaller drainage area units which are defined as HUC-14s. The term "HUC-14" is from the hydrologic unit code system developed by the United States Geological Service for delineating and identifying drainage areas. The system starts with the largest possible drainage areas and progressively smaller subdivisions of the drainage area are delineated and numbered in a nested fashion. A drainage area with a hydrologic unit code (HUC) designation with 14 numbers, or HUC-14, is one of several sub-watersheds of a larger watershed. There is one (1) HUC-14 within the Borough:

- 02030103180040 – Overpeck Creek

Figure 7, Hydrologic Units (HUC-14s), illustrates the HUC-14s within the Borough.

Special water resource protection areas are those areas within 300 feet of Category One (C-1) waters and their immediate tributaries. C-1 waters are waters that receive special protection under the ***Surface Water Quality Standards*** because of their clarity, color, scenic setting or other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). In addition, the special water resource protection area is required adjacent to those waters that drain to the C-1 water within the limits of the associated sub-watershed (HUC-14).

The special water resource protection area is intended as a buffer between development and these special waters in order to protect both water quality and the attributes for which the waters have been designated. The NJDEP has determined that a buffer of 300 feet is necessary to achieve the intended goals. The watercourses within the Borough are not categorized as Category One (C-1) by the NJDEP.

The following table summarizes the watercourse information:

Name of Watercourse	***HUC-14***	***Classification***
Overpeck Creek	*02030103180040 (Overpeck Creek)*	*FW2-NT / SE2 (C-2)*
Moore's Creek	*02030103180040 (Overpeck Creek)*	*FW2-NT / SE2 (C-2)*
Flat Rock Brook	*02030103180040 (Overpeck Creek)*	*FW2-NT / SE2 (C-2)*

Legend:
FW2 – General surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands waters.
NT (non trout) – means fresh waters that have not been designated in ***NJAC 7:9B-1.15(b) through (h)*** as trout production or trout maintenance waters.
SE2 – General surface water classification applied to saline waters of estuaries, where the designated uses are maintenance, migration and propagation of the natural and established biota; migration of diadromous fish; maintenance of wildlife; secondary contact recreation; and any other reasonable uses.
C-2 (Category Two) – Those waters not designated as Category One.

The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

There do not appear to be any AMNET testing sites in Leonia. Classifications for the Overpeck Creek were available from an AMNET site in Englewood. No data were available for Overpeck

Lake, Moore's Creek, and/or Flat Rock Brook. The following is the watercourse with its AMNET testing location and classification:

- Overpeck Creek at Dean Drive in Englewood - Moderately Impaired

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. The ***New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List)*** is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. The ***Integrated List*** is composed of the following five (5) Sublists:

- Sublist 1: Attaining the water quality standard and no use is threatened.
- Sublist 2: Attaining some of the designated uses; no use is threatened; and insufficient or no data is available to determine if the remaining uses are attained or threatened.
- Sublist 3: Insufficient or no data and information to determine if any designated use is threatened.
- Sublist 4: Impaired or threatened for one or more designated uses but does not require the development of a Total Maximum Daily Load (TMDL).
- Sublist 5: The water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require a New Jersey Pollutant Discharge Elimination System (NJPDES) permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment

plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other Best Management Practices (BMPs).

The following are the watercourses with their locations, sublists, and sublist constituents:

- Overpeck Creek at Dean Drive in Englewood
  This section is on Sublist 3 for benthic macroinvertebrates.
- Overpeck Lake (this waterbody is locally known as Overpeck Creek)
  This waterbody is on Sublist 4 for Phosphorus.

No data were available for Moore's Creek and/or Flat Rock Brook. A TMDL for phosphorus to address Overpeck Lake was approved by USEPA on September 17, 2003. However, TMDLs alone will not restore eutrophication. A Lake Characterization Plan will be established in conjunction with the Department which will be used to address over fertilization and sedimentation in the watershed that drains to the Overpeck Lake. NJDEP requested proposals in June, 2006 and is making funding available for the development of a Lake Characterization Plan for Overpeck Lake as well as other eutrophic lakes. The implementation plan therefore calls for the collection of additional monitoring data to develop a Lake Characterization Plan for each lake. The plan will consider in-lake measures that need to be taken to supplement the nutrient reduction measures required by the TMDL. In addition, the plans will consider the ecology of the lake and adjust the eutrophication indicator target as necessary to protect the designated uses. Non point sources carried in stormwater will be addressed through the NJPDES Stormwater Program and the Borough's Stormwater Pollution Prevention Program which include public education efforts and enforcing Ordinances. In order to achieve the TMDL, the Borough will enforce erosion control and stormwater management measures through its Stormwater Ordinance. The Borough has also amended its buffering requirements to require the use of native vegetation which requires less fertilization and watering. Additionally, the Borough could require certain projects through its mitigation plan criteria that could include the following improvements to Overpeck Lake: re-routing of stormwater to discharge to watersheds below the Lake, dredging to remove nutrient laden sediments, removal of outfalls and planting of riparian buffers with native vegetation. However, the granting of approval for these types of projects must be coordinated with the County of Bergen who owns the Park and Lake.

4.3 Stream Corridor Protection

It should be noted that all of the Borough's waterways are currently located within Overpeck County Park. Therefore, the Borough's stream corridors are surrounded and protected by open spaces. Stream corridor protection is consistent with the ***State Development and Redevelopment Plan***.

4.4 Flooding Issues

Flooding regularly occurs in the following two (2) areas:

- Grand Avenue
- The intersection of Fort Lee Road and Oaktree Place. Specifically, the flooding is caused by discharge from one (1) sump pump associated with a residence on Fort Lee Road.

Both Grand Avenue and Fort Lee Road are County roadways; therefore, no actions have been taken by the Borough to mitigate flooding in these areas. However, the Borough indicated that the County actively works to improve drainage along Grand Avenue. Specifically, the Borough has recently entered into an agreement with the County allowing the County to increase the size of the drainage pipes along Grand Avenue.

Additionally, the County is in the early phases of a roadway improvement project for Fort Lee Road and Broad Avenue. The sump pump on Fort Lee Road will be tied into the storm system as part of the roadway improvement.

Please refer to Figure 4, Groundwater Recharge Areas.

4.5 Wellhead Protection Areas

Public community water systems either pipe water for human consumption to at least 15 service connections used by year-round residents, or regularly serve at least 25 year-round residents (e.g. municipality or subdivision). No mapped public community water supply wells or wellhead protection areas are located in the Borough of Leonia.

Figure 5, Wellhead Protection Areas, depicts the absence of wells and wellhead protection areas in the Borough.

One (1) private potable water well is located at the residence at 175 Hillcrest Avenue. This well is still in use and serves only the residence at 175 Hillcrest Avenue.

It should be noted that the County of Bergen adopted a Wellhead Protection Ordinance in 1998 which addresses public non-community water systems. A non-community water system is a public water system that pipes water for human consumption to at least 15 service connections used by individuals other than year-round residents for at least 60 days a year, or serves 25 or more people at least 60 days a year (e.g. schools or factories). According to the ***Bergen County Wellhead Protection Ordinance***, maps delineating the wellhead protection areas, prepared by the Bergen County Department of Health Services (BCDHS) and dated September 26, 1997, are on file and maintained by the BCDHS, Bergen County Clerk, and Borough Clerk's Office.

SECTION 5.0

5.0 DESIGN AND PERFORMANCE STANDARDS

The Borough will adopt the design and performance standards for stormwater management measures as presented in ***N.J.A.C. 7:8-5*** to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the ***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***. Where existing stormwater management language is included in the Borough Ordinance, same should be revised to be incorporated into the new MSWMP.

During construction, Borough inspectors will perform periodic inspections of the construction of the project to ensure that the stormwater management measures are constructed and function as designed. The Borough will ensure long term operation and maintenance of BMPs by requiring preventative and corrective maintenance (including replacement) to be carried out as outlined in the Maintenance Plan prepared by the design engineer. The Borough's Stormwater Ordinance specifies that if the stormwater facility is in need of maintenance or repair, the Borough will notify the responsible party in writing. That person shall have fourteen (14) days to make the maintenance or repair. If the responsible party refuses, the Borough may make the repair or conduct the maintenance and bill that party. Penalties may be enforced by the Borough for non compliance in accordance with Chapter 236-47 of the Borough ordinance.

SECTION 6.0

6.0 PLAN CONSISTENCY

Bergen County is currently creating a County Stormwater Management Plan that should be complete in 2005. This MSWMP will be updated as necessary to be consistent with the County Stormwater Management Plan. A phosphorus TMDL has been developed for the waters of Overpeck Lake. This plan is consistent with the approved TMDL for Overpeck Lake. In order to achieve the TMDL, the Borough will enforce erosion control and stormwater management measures through its Stormwater Ordinance. The Borough has also amended its buffering requirements to require the use of native vegetation which requires less fertilization and watering. Additionally, the Borough could require certain projects through its mitigation plan criteria that could include the following improvements to Overpeck Lake: re-routing of stormwater to discharge to watersheds below the Lake, dredging to remove nutrient laden sediments, removal of outfalls and planting of riparian buffers with native vegetation. If any additional Regional Storm Water Management Plans or additional TMDLs are developed in the future, this MSWMP will be updated to be consistent.

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

Section 236-24 of the Borough's Ordinance requires that any application for development, including a subdivision, site plan, conditional use, zoning variance, planned development or building permit application for two or more single-family dwellings, in which 5,000 square feet or more of surface area of land is to be disturbed to accommodate construction, shall require an approved soil erosion and sedimentation control plan from the New Jersey Soil Conservation District. During construction, Borough inspectors will perform periodic inspection of on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

SECTION 7.0

7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The Borough has reviewed the ***Master Plan*** and ***Development Regulations***, and has provided a list of the sections in the Borough ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

Chapters 118 (Environmental Impact Statements), 140 (Flood Damage Prevention), 236 (Site Plan Review), 250 (Subdivision of Land), and 290 (Zoning) of the Borough Code were reviewed with regard to incorporating nonstructural stormwater management strategies. Several changes were made to these Chapters to incorporate these strategies.

7.1 CHAPTER 140: FLOOD DAMAGE PREVENTION

Section 140-15: Alteration of Watercourses

Section 140-15 discusses alteration of watercourses. The ordinance states that when alteration of a watercourse is proposed, the Construction Official shall:

1.) Notify adjacent communities and the state coordinating agency prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration, and,

2.) Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood carrying capacity is not diminished.

Section 140-15 is inconsistent with the NJDEP ***Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)***. Therefore, this ordinance should be amended to state: "Alteration of watercourses is prohibited except where necessary to control existing flooding and or erosion which threatens life or property or in cases in which the New Jersey Department of Environmental Protection (NJDEP) determines that the effects of channelization are offset by the resulting restoration or improvement of the natural characteristics of the nearby environment. Any alteration to a watercourse requires an NJDEP-issued permit."

Additionally, the ordinance should be amended to state: "The NJDEP *Flood Hazard Area Control Act Rules* (N.J.A.C. 7:13) contains detailed regulations regarding development in and maintenance of the flood plain and the watercourses that create them. All flood plain and watercourse activities must comply with the NJDEP regulations."

Section 140-16: Interpretation of FIRM Boundaries

Section 140-16 states that the Construction Official shall also make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazard, for example, where there appears to be a conflict between a mapped boundary and actual field conditions. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation.

Section 140-16 is inconsistent with State regulations. Therefore, this section should be amended to state: "In areas where there appears to be a conflict between a mapped boundary and actual field conditions, the flood elevation shall be established by a New Jersey Licensed Land Surveyor based on the Flood Insurance Rate Map (FIRM) flood elevations."

Section 140-20: Zero Increase in Stormwater Runoff

The following sections within 140-20 represent the bulk of the changes to be in compliance with the *Rules*.

Section 140-20A: Findings

Item 3 of this section should be revised to read "Stormwater runoff created by development not subject to Planning Board review or not considered major development per section 140-20D is currently unregulated." Item 4 should be eliminated.

Section 140-20C: Applicability

The first paragraph of this section should read: "Developments and improvements meeting the definition of major development as provided under Section 140-20D, Stormwater Control Ordinance, shall comply with the requirements of that section. For developments and improvements that do not meet the definition of major development as provided under Section

140-20D, Stormwater Control Ordinance, shall result in zero increase in stormwater runoff. Design shall be based on the USDA Natural Resource 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 the Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

The second paragraph of this section should read: "This section shall include but not be limited to:

1. All applications for building permits for construction of a one- or two-family residence, or involving the tearing down of an existing one- or two-family residence;
2. All applications for building permits for enlargement or addition to an existing one- or two-family residence;
3. Any application whereby additional impervious area is being added, of the grade of the property is being altered or modified, or which involves soil movement including, but not limited to, porches, decks, driveways, retaining walls, swimming pools, etc.

Section 140-20D through F

These sections should be removed and replaced with the following Stormwater Control Ordinance.

Section 140-20D: Stormwater Control Ordinance

The Stormwater Control Ordinance, provided in Appendix 1, should be inserted into this section in its entirety.

7.2 CHAPTER 236: SITE PLAN REVIEW

Section 236-25: Information Required on Site Plans

Section 236-25B (15) requires that the location of existing rock outcrops, high points, watercourses, depressions, ponds, marshes, wooded areas and other significant existing

features, including previous flood elevations of watercourses, where available, be depicted on the plan. Language should be added to this section to include wetlands and floodplains.

Section 236-27: General Requirements

Section 236-27 discusses buffering requirements. This section states that buffering, where required, shall be located around the perimeter of the site to minimize headlights of vehicles, noise, light from structures, movement of people and vehicles and to shield activities from adjacent properties. Buffering may consist of fencing, evergreens, shrubs, bushes, deciduous trees or combinations thereof to achieve these objectives. Language of this section should be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species, to the maximum extent practicable before utilizing walls or berms. Additionally, language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

Section 236-28: Off-Street Parking Requirements

Parking area design standards mandate that parking stalls shall have a minimum area of 200 square feet, exclusive of aisles, and shall measure 10 feet in width and 20 feet in length. This section should be amended to allow for parking stalls 9 feet in width and 18 feet in length. This section also indicates that all off-street parking areas shall have concrete curbs or Belgium blocks. This section should be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage applicants to allow for the discharge of impervious areas into landscaped areas for stormwater management. Additionally, this section should be amended to allow and encourage the use of parking decks and shared parking.

Section 236-31: Landscaping and Buffer Areas

Section 236-31A (10) states that in parking areas, at least 5% of the parking area should be landscaped. The landscaping should be located in protected areas, along walkways, center islands and at the end of bays. In narrow islands, low spreading plants such as creeping juniper, English ivy, myrtle or pachysandra should be considered. This section should be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage

applicants to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, language should be added to allow for use of bioretention islands within landscaped areas or natural vegetated swales designed for the water quality design storm, with overflow for larger storm events into storm sewers.

Section 236-34: Street Improvements

Section 236-34 addresses sidewalk construction materials. The ordinance states that sidewalks shall be constructed of concrete, quarry tile or other similar material. This section should be amended to allow the use of pervious material.

7.3 Chapter 250: Subdivision of Land

Section 250-43C: Easements, Preservation of Natural Features

Section 250-43C, requires that natural features such as trees, brooks, hilltops and views shall be preserved whenever possible in designating any subdivision containing such features. Additionally, the ordinance states that no trees four inches or larger in diameter shall be removed from the subdivided plot, unless the same shall interfere with the construction of a building or buildings or utilities and unless approval for such removal is received from the approving authority. This section should be amended to add steep slopes and to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

7.4 Chapter 290, Articles IV through XII: Zoning Districts

The Borough has five (7) types of residential districts. Five (5) of the districts have a maximum percent impervious surface allocation, ranging from 65 percent in the four (4) single family districts to 85 percent in the affordable housing district. The two (2) multi-family districts indicate that at least 15% of the gross site area must be common open space, but there is no maximum percent impervious surface allocation. The Borough has five (5) types of non-residential districts. Four (4) of these districts has a maximum percent impervious surface allocation, ranging from 30 percent in the Parkland District to 65 percent in the Office Building district. There is no maximum percent impervious surface allocation for the Business zone. The Borough should consider creating a maximum allowable percent impervious surface for the Business zone.

The Borough Code should be amended to add maximum building coverage allocations to the remaining four (4) business zones. Additionally, the Code should be revised to state that applicants must satisfy the percent impervious requirements as well as comply with the ***Design and Performance Standards for Stormwater Management Measures (N.J.A.C. 7:8-5)***.

7.5 New Ordinances

Minimization of Turf Grass Lawn Areas

In order to minimize turf grass lawn areas, a new ordinance should be established to discourage the enlargement of existing turf lawn areas without proper justification.

Unconnected Impervious Areas

Disconnection of impervious areas can occur in both low density development and high density commercial development, provided sufficient vegetated area is available to accept dispersed stormwater flows. Areas for disconnection include parking lot or cul-de-sac islands, lawn areas and other vegetated areas.

Applicants should be required to disconnect impervious surfaces, where practical, to promote pollutant removal and groundwater recharge.

Vegetated Open Channels

The use of vegetated channels, rather than the standard concrete curb and gutter configuration, can decrease flow velocity, and allow for stormwater filtration and re-infiltration.

Section 5.3(b)8 of the ***Rules*** indicates that nonstructural stormwater management strategies incorporated into site design shall provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas. The Borough has no existing ordinances regarding the use of vegetated open channels. Therefore, a new ordinance should be adopted to encourage the use of vegetated open channel conveyance instead of the standard curb and gutter design where practical. One design option is for vegetated channels that convey smaller storm events, and provide an overflow into a storm sewer for larger storm events.

Steep Slopes

Policy Statement 11 of the ***Master Plan*** states that "the Borough seeks to encourage development which is sensitive to the community's particular physical characteristics and preserves the Borough's sensitive environmental elements. In particular, the Borough seeks to limit development to that which preserves steeply sloped areas (defined to include any slope of minimally fifteen percent grade) and discourage development in order to preserve and protect the natural features in the Borough." Section 4.3 of the Master Plan further discusses that the most significant slopes are located in the eastern section of the Borough where the residential neighborhoods east of Glenwood Avenue are characterized by slopes of 15% or greater. There are also several lots along Grand Avenue which have slopes in excess of 15%. The Borough should consider implementing a steep slope ordinance to further control development in areas characterized by steep slopes.

Buffer Zones

Policy Statement 12 of the ***Master Plan*** states that "the Borough recognizes the need to reinforce the delineation of boundaries separating residential and non-residential uses. Appropriate buffer/screening devices are to be encouraged to separate incompatible land uses in order to minimize adverse impacts on residential and other properties. This should be accomplished primarily within the framework of appropriate open space buffer widths containing suitable planting elements (incorporating such elements as multiple rows of plant material, planting clusters, etc. as a means to provide suitable buffer protection), with supplemental aesthetically pleasing fencing when appropriate. The Borough should consider implementing an ordinance to further encourage and enforce this Policy Statement.

SECTION 8.0

8.0 LAND USE / BUILD OUT ANALYSIS

The Borough of Leonia is a fully developed municipality with almost 100% of its land area developed or set aside as permanent recreation/open space. Therefore, there is significantly less than one square mile of developable land in the Borough and a "build-out" analysis is not required.

Figure 6, Existing Land Use, illustrates the existing land use in the Borough based on the Land Use Plan contained in the Master Plan. (The Land Use Plan was prepared by Burgis Associates, April 2002). Figure 8, Zoning Map of the Borough of Leonia, depicts the current zoning districts. Figure 9, Constrained Land, illustrates the constrained lands within the Borough.

SECTION 9.0

9.0 MITIGATION PLANS

This mitigation plan is provided for a proposed development or redevelopment projects that seek a variance or exemption from the Borough Stormwater Management Plan or the ***Rules***. Approval of the option to utilize a mitigation plan and choice of mitigation plan shall be under the sole discretion of the Borough agency providing review, i.e. Board of Adjustment, Planning Board, Borough Council and the Borough Engineer.

Any relief from this MSWMP or the ***Rules*** via a mitigation plan option shall utilize an option to provide equal or greater, quantifiable benefit than the specific relief being sought. For example, if a relief for stormwater quality is sought for a particular project, the necessary amount of stormwater quality improvements shall be accomplished via the mitigation plan. Calculations shall be provided indicating the parameter of relief being sought along with equal or greater benefit via the mitigation plan option. These calculations shall be reviewed and approved by the Borough Engineer.

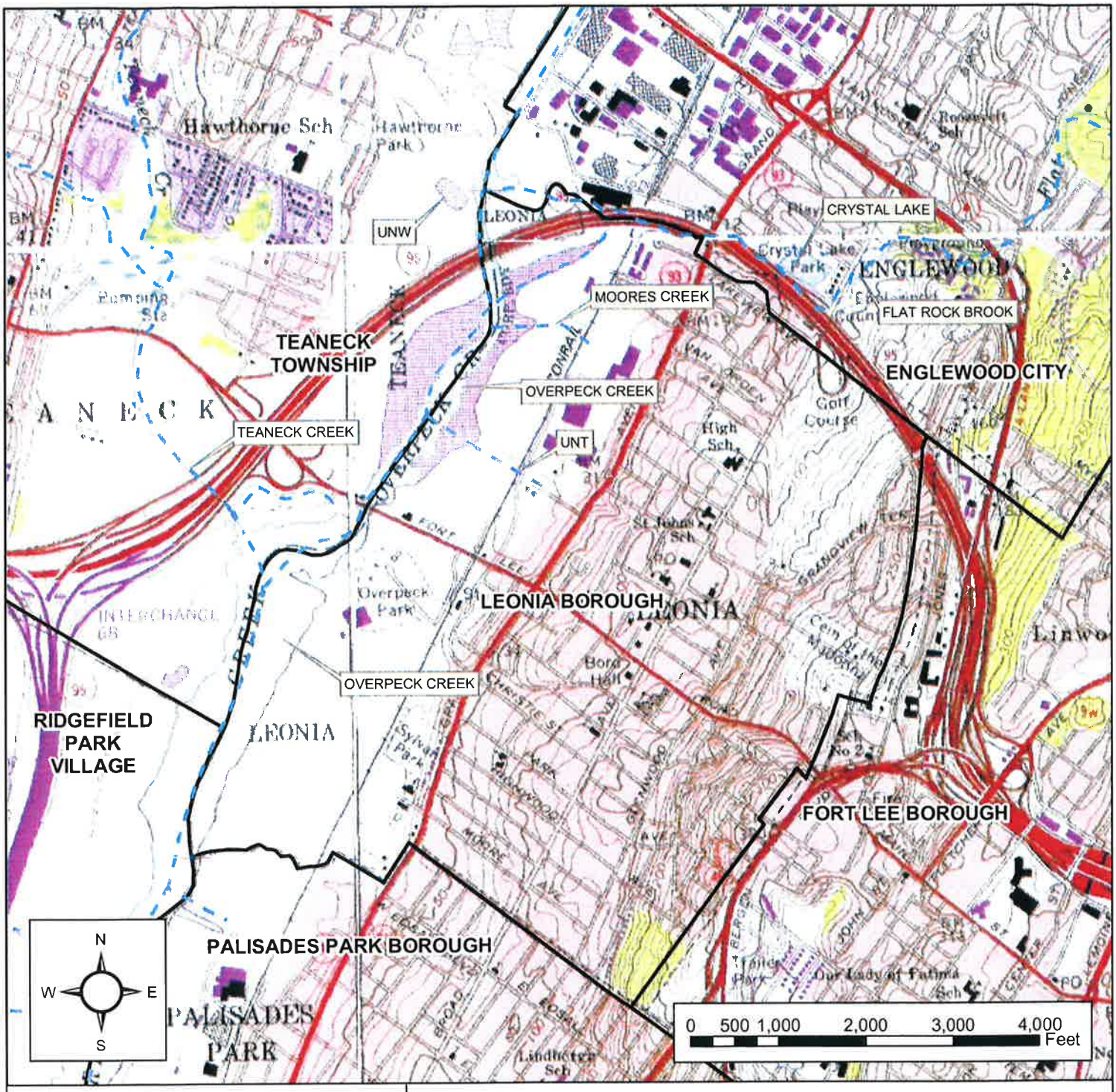
In general, the mitigation project must be implemented in the same drainage area as the proposed development. The applicant must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP ***Stormwater BMP Manual.***

If a suitable site cannot be located in the same drainage area as the proposed development, a mitigation project may be selected that is not within the same drainage area but does provide an equal relief.

As a third option, in the case of mitigation plan options that do not address the variance or relief sought, the applicant may create a new mitigation option or provide a cash contribution to the Borough of Leonia which will be used by the Borough for Borough-wide drainage improvements and stormwater management improvement planning. The amount of the contribution shall be based on the relief being sought, the applicant's opinion on the cost impacts to meet this Plan and the ***Rules***, and the discretion of the Borough agency providing review, i.e. Board of Adjustment, Planning Board, Borough Council and the Borough Engineer.

No mitigation options are available at this time.

FIGURES



BOROUGH AND ITS WATERWAYS

Legend:

- Municipal Boundary
- Streams
- Lakes

Sources:
1 - NJDEP digital GIS data & Soil Survey of Bergen County New Jersey (March, 1995).
2 - U.S.G.S. 7.5 Minute Series Quadrangles: Hackensack (1955 Photorev. 1981), Yonkers NY-NJ (1966 Photorev. 1979), Weehawken (1967 Photorev. 1981) & Central Park NY-NJ (1966 Photorev. 1979)

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

PMK Group
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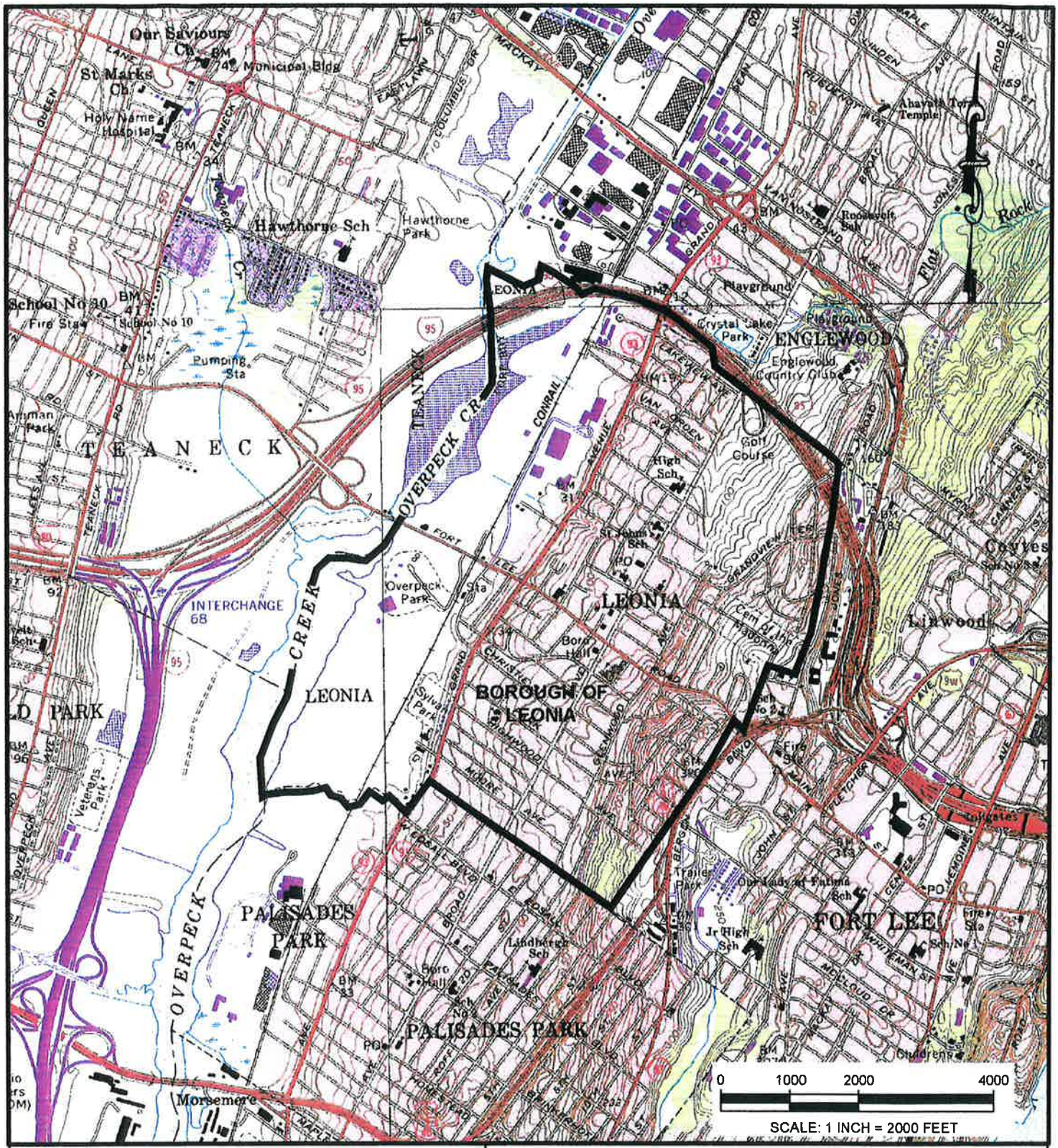
CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: KEF	Date: 10/4/06
Checked By: KMD	Scale: NTS
Project No. 061590-09	Figure 2



SOURCE: U.S.G.S. 7.5 MINUTE SERIES
YONKERS, CENTRAL PARK (1966 REV. 1979),
HACKENSACK (1955 REV. 1981)
& WEEHAWKEN (1967 REV. 1981) QUADRANGLES
NEW JERSEY – NEW YORK

USGS TOPOGRAPHIC MAP

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

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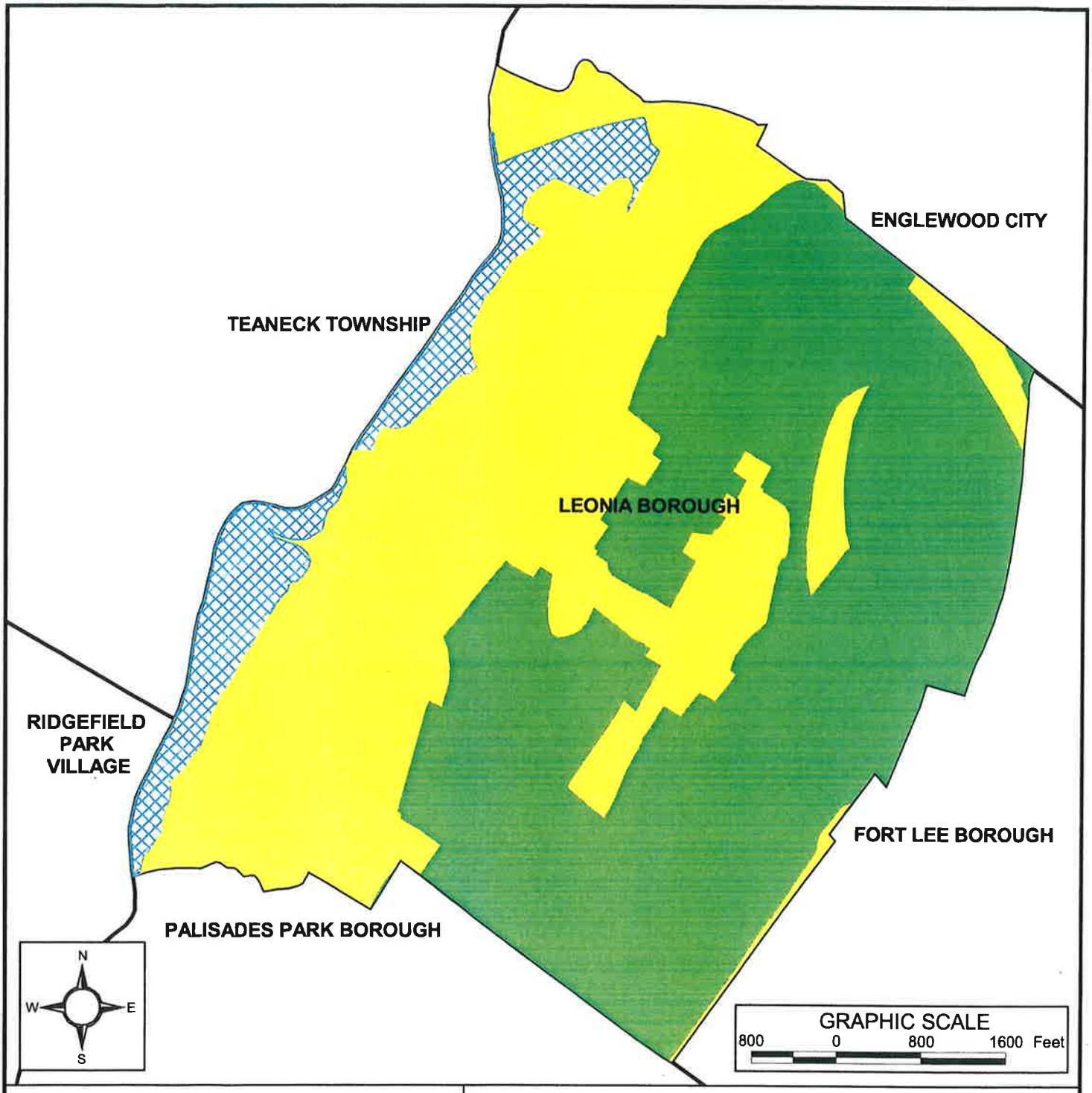
DRAWN BY:	TS	DATE:	4/11/05
CHECKED BY:	DS	SCALE:	1"=2000'
PROJECT NO:	046498-03	PLATE NO.	3



GROUNDWATER RECHARGE AREAS

LEGEND

- Municipal Boundary
- 8 to 12 in/yr
- 0 in/yr
- Wetlands & Open Water

SOURCE:
NJDEP digital GIS data.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

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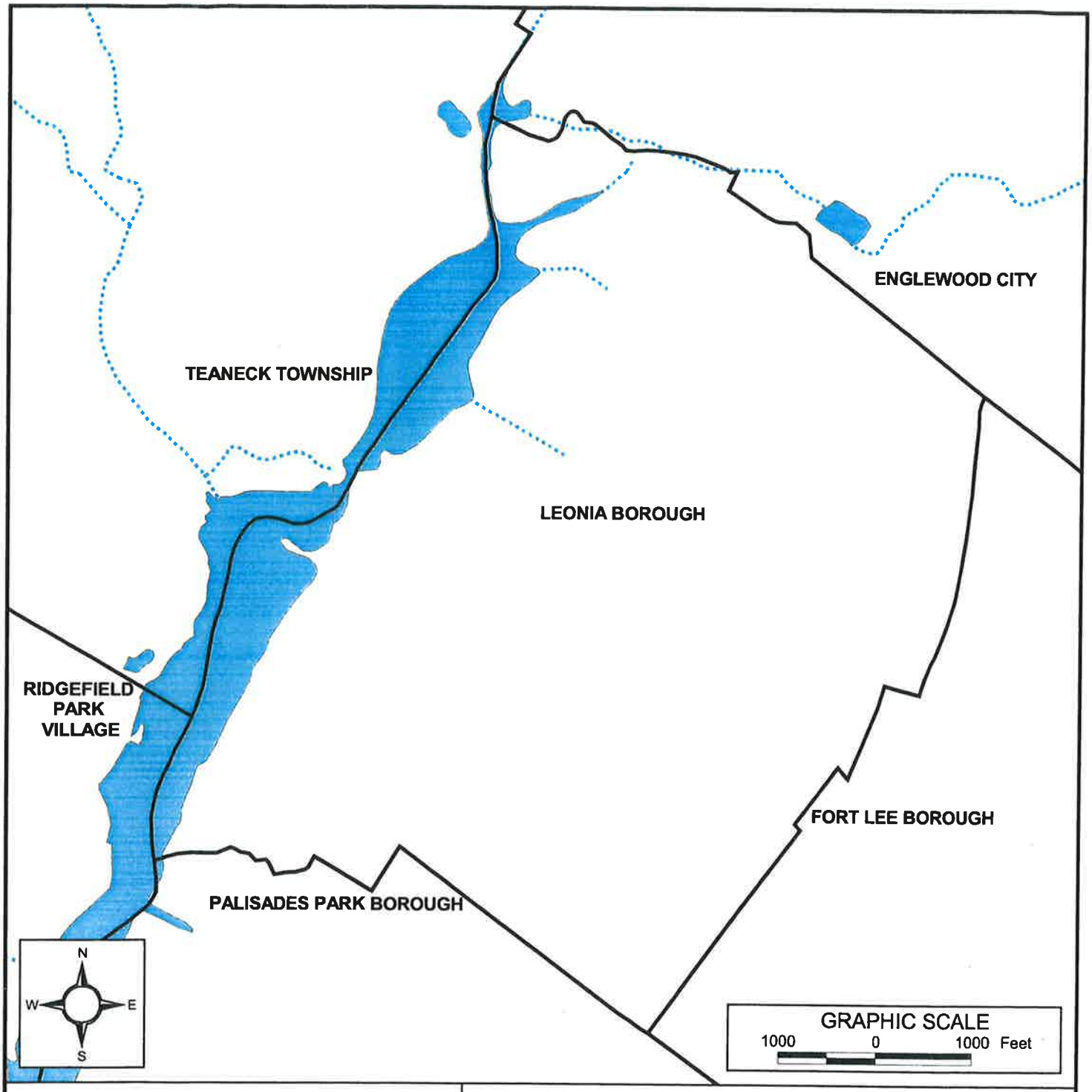
CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/11/05
Checked By: DS	Scale: As Noted
Project No. 046498-03	Figure 4



WELLHEAD PROTECTION AREAS

Legend:

- Municipal Boundary
- Streams
- Lakes

THERE ARE NO MAPPED WELLS OR WELLHEAD PROTECTION AREAS IN THE BOROUGH OF LEONIA

SOURCE:
NJDEP digital GIS data.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

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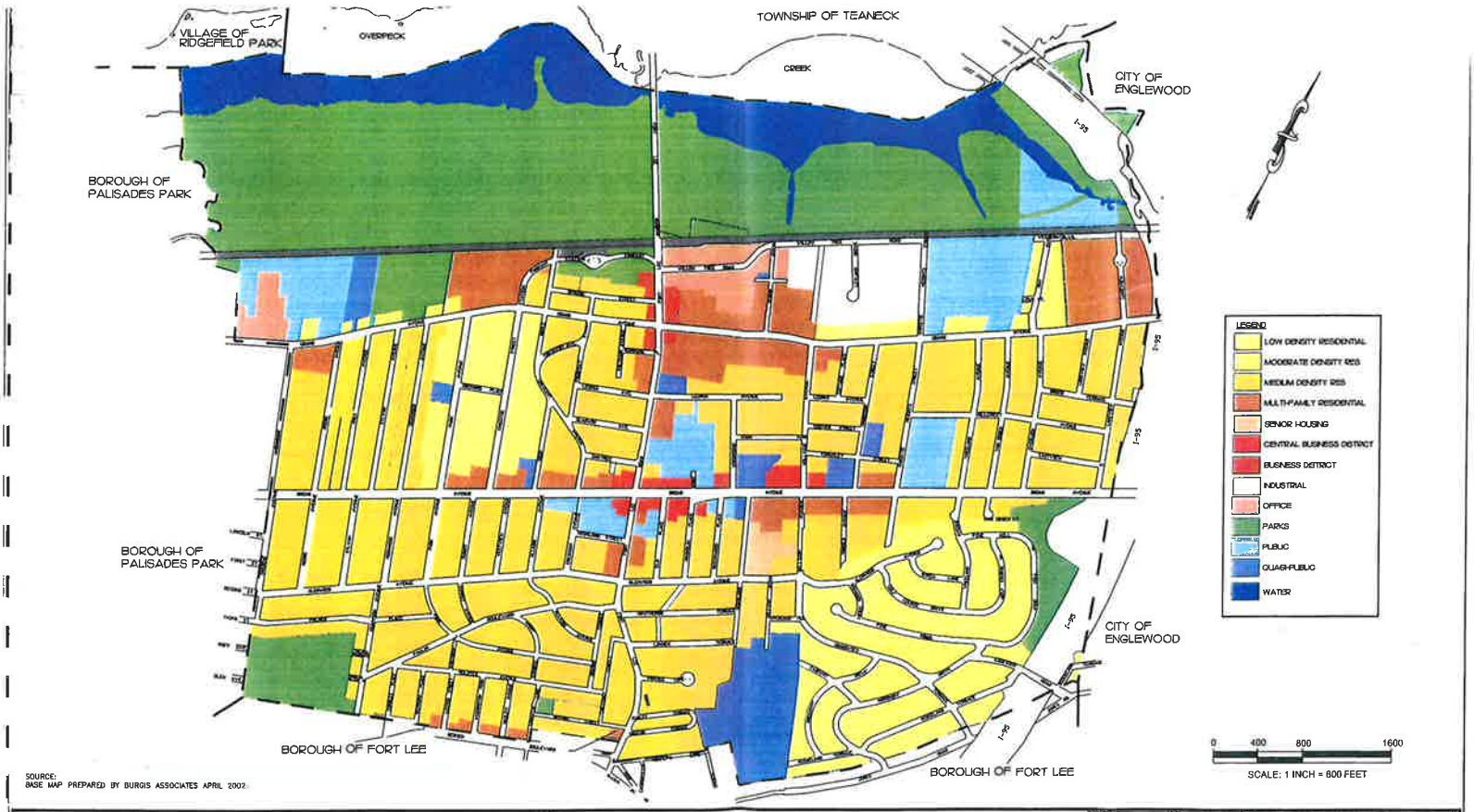
CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/11/05
Checked By: DS	Scale: As Noted
Project No. 046498-03	Figure 5

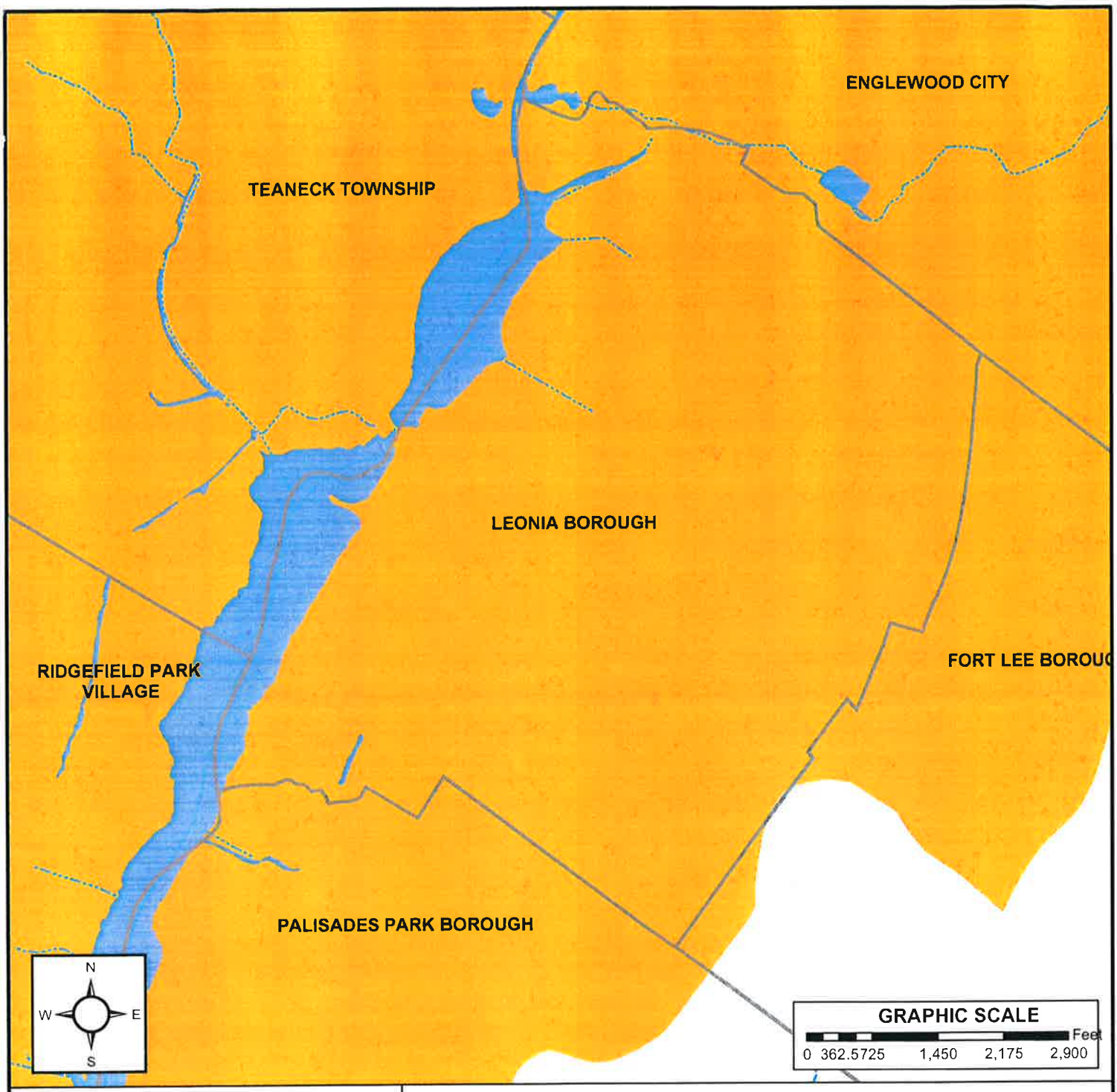


SOURCE:
BASE MAP PREPARED BY BURGIS ASSOCIATES APRIL 2002.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

LAND USE MAP

DRAWN BY: TS	DATE: 4/11/05	PMK Group
CHECKED BY: DS	SCALE: 1"=800'	
PROJECT NO: 046498-03	PLATE NO: 6	65 Jackson Drive, Cranford, New Jersey 07016 (908) 497-9300 * Fax: (908) 497-9134 * www.PMKGroup.com
PROFESSIONAL ENGINEER	LIC. NO	
DATE:	CERTIFICATE OF AUTHORIZATION #24GA28029600	



HYDROLOGIC UNITS (HUC14)

Legend:

- Municipal Boundaries
- Streams
- Lakes
- 02030103180040

NOTE- HUC 02030103180040 encompasses entire Borough of Leonia.

Source:
NJDEP digital GIS data.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: WAW	Date: 10/16/06
Checked By: KMD	Scale: As shown
Project No. 061590-09	Figure 7

SOURCE:
BERGEN COUNTY BOROUGH OF LEONIA ORDINANCE,
PREPARED BY K ALBERT ASSOCIATES PROFESSIONAL ENGINEERS &
PROFESSIONAL PLANNERS, DATED JULY 6, 1992, ENGLEWOOD, NJ.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

ZONING MAP

PMK Group
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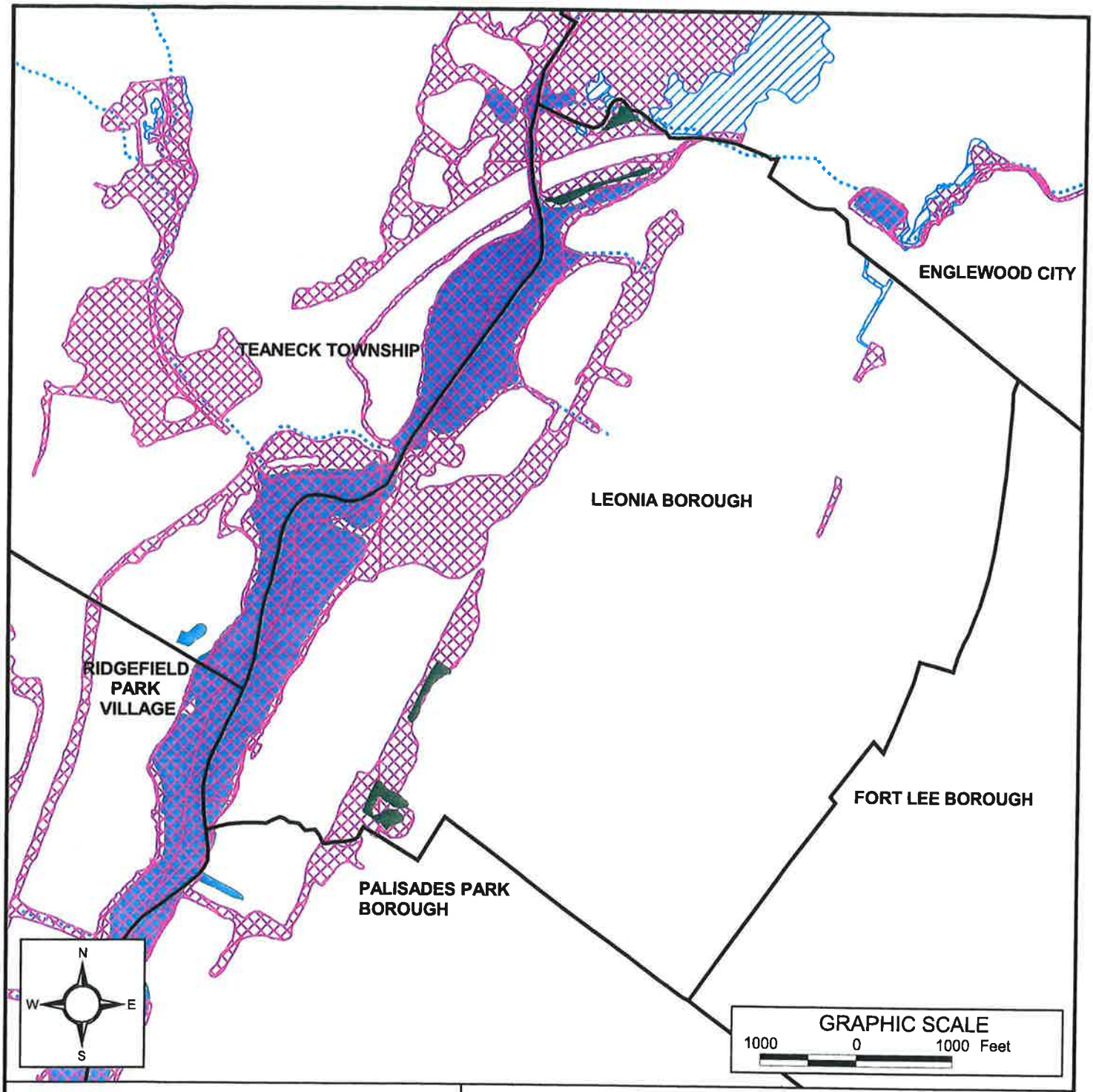
CERTIFICATE OF AUTHORIZATION #24GA28028000

DRAWN BY:	TS	DATE:	4/11/05
CHECKED BY:	DS	SCALE:	1"= 1000'
PROJECT NO:	046498-03	PLATE NO.	8



CONSTRAINED LAND

Legend:

- MUNICIPAL BOUNDARY
- STREAMS
- LAKES
- 100-YEAR FLOOD PLAIN
- 500- YEAR FLOOD PLAIN
- WETLAND AREAS

SOURCE:
NJDEP digital GIS data.

BOROUGH OF LEONIA
312 BROAD AVENUE
BERGEN COUNTY, NEW JERSEY

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CERTIFICATE OF AUTHORIZATION #24GA28028000

Drawn By: TS	Date: 4/11/05
Checked By: DS	Scale: As Noted
Project No. 046498-03	Figure 9

APPENDIX 1

APPROVED STORMWATER CONTROL ORDINANCE AND MEETING AGENDA MEMORIALIZING ORDINANCE ADOPTION

Appendix 1: Stormwater Control Ordinance

The following shall be inserted in its entirety:

Section 1: Scope and Purpose

A. Policy Statement

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

B. Purpose

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

C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
   a. Non-residential major developments; and
   b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
2. This ordinance shall also be applicable to all major developments undertaken by the Borough of Leonia.

D. Compatibility with Other Permit and Ordinance Requirements

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

Section 2: Definitions

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

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

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

"Compaction" means the increase in soil bulk density.

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

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

A county planning agency; or

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

"Urban Redevelopment Area" is defined as previously developed portions of areas:
(1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
(2) Designated as CAFRA Centers, Cores or Nodes;
(3) Designated as Urban Enterprise Zones; and
(4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

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

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

Section 3: General Standards

A. Design and Performance Standards for Stormwater Management Measures

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

Section 4: Stormwater Management Requirements for Major Development

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

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

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

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

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

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

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

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

c. This standard does not apply:

(1) Where the review agency determines that this standard would cause inadequate hydraulic performance that could

not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

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

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

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

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

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

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

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

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

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

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

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

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

(a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater

management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or

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

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

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

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

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

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

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors

for stormwater runoff calculations at Section 5, complete one of the following:

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

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

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

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

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

G. Stormwater Runoff Quality Standards

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

Table 1: Water Quality Design Storm Distribution

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

60	*0.6250*

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
3. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

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

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

Table 2: TSS Removal Rates for BMPs

Best Management Practice	*TSS Percent Removal Rate*
Bioretention Systems	*90*
Constructed Stormwater Wetland	*90*
Infiltration Structure	*40-60*
Extended Detention Basin	*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 to the Applicant: The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the

safety standards in Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.

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

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

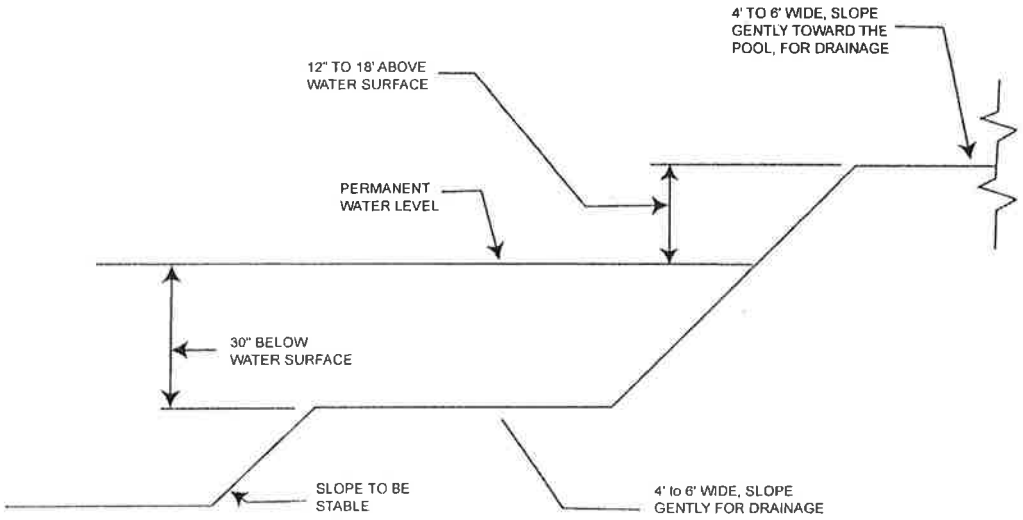
c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

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

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

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

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 Borough Engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.C.6 of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the

applicant to obtain and its absence will not materially affect the review process.

Section 10: Maintenance and Repair

A. Applicability

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

B. General Maintenance

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

8. The person responsible for maintenance identified under Section 10.B.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 10.B.6 and 10.B.7 above.
9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
10. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.
11. A two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53 shall be posted for the maintenance of the stormwater facilities.
12. 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.)

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.