

**Municipal Stormwater Management Plan
Master Plan Element**
for the:
Borough of South Plainfield
Middlesex County, New Jersey



prepared by:
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NON STRUCTURAL STORMWATER STRATEGIES (NJAC 7:8-5.3)

1. **Has the applicant identified the Nonstructural Stormwater Strategies which are incorporated into Project and where they are located on the plans?**

If "YES" go to Question #2, If "NO" go to Question #3.

2. **Have the strategies been integrated into the design to the maximum extent practicable?**

This can be determined if the applicant has submitted a completed Nonstructural Strategies Point System (NSPS) spreadsheet or completed Low Impact Development (LID) Checklist. Has the Applicant submitted the NSPS spreadsheet or completed LID Checklist? If yes, skip to question #4 or #5. If no, the application is incomplete because we cannot determine if the applicant has satisfied the "maximum extent practicable" requirement at this time. Please resubmit at your earliest convenience with the NSPS spreadsheet or completed LID Checklist.

3. **Has the applicant submitted justification to why none of the nine strategies can be incorporated into the site design (environmental, engineering, safety reasons)?**

Has the applicant provided written justification as to why the site design cannot incorporate any of the *nine* nonstructural stormwater management strategies? If sufficient justification has not been submitted describing why the strategies could not be used, the application is incomplete at this time.

4. **If the applicant submitted the NSPS spreadsheet, does it indicate that "Proposed Nonstructural Measures are Adequate"?**

If yes, the applicant should be asked to briefly describe what nonstructural stormwater strategies have been used to meet the requirement. Then go to Question #6.

If no, the application is incomplete at this time.

5. **If the applicant submitted the LID Checklist, does it indicate that "Proposed Nonstructural Measures are Adequate"?**

If yes, the applicant should be asked to briefly describe what nonstructural stormwater strategies have been used to meet the requirement. Then go to Question #6.

If no, the application is incomplete at this time.

6. **Has the applicant satisfied the deed restriction requirement for land that contains nonstructural management strategies?**

If yes, the application is acceptable.

If no, the application is incomplete at this time. It can be deemed acceptable contingent upon obtaining the appropriate deed restrictions.

GENERAL STORMWATER RUNOFF CALCULATION QUESTIONS

- 1. Has the applicant demonstrated that the pre-construction conditions have been unchanged for at least the last five years?**
If yes, go to Question #3. If no, go to Question #2.
- 2. Has the applicant used wooded land use, good hydrologic condition in their pre-construction condition for stormwater runoff calculations?**
If yes, go to Question #3. If no, application is incomplete at this time.
- 3. Has the applicant calculated runoff from disconnected impervious cover, connected impervious cover, and pervious cover independently?**
If yes, go to Question #4. If no, application is incomplete at this time.
- 4. Has the applicant demonstrated compliance with the design and performance standards established under the Soil Erosion and Sediment Control Act?**
If yes, go to next section. If no, application is incomplete at this time.

WATER QUALITY (NJAC 7:8-5.5)

- 1. Has the applicant used stormwater management measures to maintain or improve water quality?**
If yes, go to Question #2. If no, application is incomplete at this time.
- 2. Has the applicant used the recommended NJ Best Management Practices to reduce the post-construction total suspended solids (TSS) load by 80%?**
If yes, go to Question #3. If no, application is incomplete at this time.
- 3. Has the applicant used the NJDEP approved protocols in calculating the pollutant load reductions?**
If yes, go to Question #4. If no, application is incomplete at this time.
- 4. Has the applicant used the NJDEP TSS Removal Rates from Table 2 of the regulations in calculating the pollutant load reductions?**
If yes, go to Question #6. If no, go to Question #5.
- 5. Has the applicant provided the sufficient documentation demonstrating the capability of these alternative removal rates and methods of calculating removal rates to achieve the required TSS pollutant load reduction?**
If yes, go to Question #9. If no, application is incomplete at this time.
- 6. Is the applicant using infiltration systems to achieve the required TSS pollutant load reductions?**
If yes, go to Question #7. If no, go to Question #9.
- 7. Does the infiltration system satisfy the design standards for the minimum depth to Seasonal High Water Table (SHWT), infiltration rates, and 72-hour drain time?**
If yes, go to Question #8. If no, application is incomplete at this time.
- 8. Has the applicant followed the soil testing criteria as outlined in the NJDEP BMP Manual to collect information for the design of the infiltration system?**
If yes, go to Question #9. If no, application is incomplete at this time.
- 9. Have manufactured treatment devices (MTDs) been used to meet the water quality requirement?**
If yes, go to Question #10. If no, go to Question #12.
- 10. Have these devices' pollutant removal rates been: 1) verified by NJCAT and 2) certified by NJDEP?**
If yes, go to Question #11. If no, application is incomplete at this time.
- 11. Are these devices being proposed as off-line devices?**
If yes, go to Question #12. If no, application is incomplete at this time unless the Department has issued a letter to indicate that the device can be used as an on-line water quality device.
- 12. Are there special water resource protection areas that the developed site discharges to?**
If yes, go to Question #13. If no, go to the next section.
- 13. Has the applicant demonstrated compliance with the NJDEP requirements for the preservation and maintenance of these special water resource protection areas?**
If yes, go to next section. If no, application is incomplete at this time.

GROUNDWATER RECHARGE (NJAC 7:8-5.4(a)2) see also NJGS CSR-2 – guidance document

- 1. Does the groundwater recharge requirement apply to this project?**
If no, continue with Question #2. If yes, continue to Question #3.
- 2. Has the applicant provide the require information to justify that they are exempt from this requirement?**
If yes, skip groundwater recharge requirement, applicant is exempt from meeting this requirement. If no, the application is incomplete.
- 3. Has the applicant demonstrated that the site and its stormwater management measures maintain 100% of the annual average pre-construction groundwater recharge volume?**
If no, go to Question #4. If yes, go to Question #5.
- 4. Has the applicant demonstrated that the increase of stormwater runoff volume from pre- to post-construction condition for the 2-year storm is infiltrated?**
If no, application is incomplete at this time. If yes, go to Question #5.
- 5. Have the recharge calculations been performed in accordance with the NJDEP requirements outlined in the stormwater management regulations?**
NJDEP has provided a spreadsheet for completing these calculations.
If no, application is incomplete at this time. If yes, go to Question #6.
- 6. Has the applicant demonstrated that the proposed infiltration stormwater management practices avoid adverse hydraulic impacts?**
If no, application is incomplete at this time. If yes, go to next section.

WATER QUANTITY (NJAC 7.8-5.4(a)3)

1. Has the applicant calculated stormwater runoff using NJDEP approved assumptions and factors?

These assumptions and factors can be found in the regulations under section NJAC 7:8-5.6. The Township Engineer or Review Engineer should be able to verify that the calculations were done correctly.

If yes, go to Question #2. If no, application is incomplete at this time.

2. Has the applicant calculated the pre and post-construction peak runoff for the 2-year, 10-year, and 100-year storm events?

If yes, has the applicant demonstrated compliance with ONE of the following requirements?

- a. Has the applicant submitted adequate hydrologic and hydraulic analyses demonstrating the post-construction runoff hydrographs (2-yr, 10-yr, and 100-yr) do not exceed the corresponding pre-construction hydrographs?
- b. Has the applicant submitted adequate hydrologic and hydraulic analyses demonstrating that there is no increase as compared to the pre-construction condition in the peak runoff rates leaving the site (2-yr, 10-yr, and 100-yr) and that the increase volume or change in timing will not increase flood damage at or downstream of the project site.
- c. Has the applicant submitted adequate hydrologic and hydraulic analyses demonstrating that the post-construction peak runoff rates (2-yr, 10-yr, and 100-yr) are 50%, 75%, and 80% respectively of the pre-construction runoff rates.

If the applicant has NOT demonstrated compliance with one of the requirements outlined above, the application is incomplete at this time.

STRUCTURAL/MAINTENANCE

- 1. Have all structural stormwater measures complied with minimum outlet orifice requirements?**
A minimum 2.5" diameter is required.
If yes, go to Question #2. If no, application is incomplete at this time.
- 2. Has the applicant provided a maintenance plan for all stormwater management measures?**
If yes, go to Question #3. If no, application is incomplete at this time.
- 3. Does the maintenance plan include: tasks, schedules, cost estimates, and contact information for the responsible party?**
If yes, go to Question #4. If no, application is incomplete at this time .
- 4. If maintenance is identified as being required by an entity other than the developer is there a copy of agreement included with the application?**
If yes, go to the next section. If no, application is incomplete at this time.

SAFETY

- 1. Are safety standards included in the Engineering Report?**
If no, application is incomplete at this time.
- 2. Has the trash rack on all outlet structures been designed in accordance with NJDEP requirements?**
The average velocity is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocities greater than 2.5 feet per second are unacceptable.
If yes, go to Question #3. If no, application is incomplete at this time.
- 3. Has the overflow grate in the outlet structure been designed in accordance with NJDEP requirements?**
The perpendicular live loading on the grate must withstand 300 lbs per square foot. The overflow grate spacing should be not greater than 2 inches across the smallest dimension.
If no, application is incomplete at this time.

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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for South Plainfield Borough ("The Municipality") to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for major development, generally defined as projects that disturb one or more acre of land or increase impervious cover by quarter ($\frac{1}{4}$) acre. These standards are intended to minimize the adverse impact of stormwater runoff on water quality, water quantity and the loss of groundwater recharge that provides base-flow in receiving water bodies.

The plan addresses long-term operation and maintenance measures for existing and future stormwater facilities. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

- promote public education
- 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. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See *Figure 1: Groundwater Recharge in 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 a habitat from which some species cannot recover.

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.

Background

Borough Demographics

The Borough encompasses an 8.39 square mile area in Middlesex County, New Jersey (see *Figure 2: South Plainfield Vicinity Map*). According to U.S. Census data, the Borough population has increased approximately 6.4% from 20,489 persons in 1990, to 21,810 persons in 2000.

Consequently, the population density has increased from 2,451 persons per square mile of land area in 1990 to 2,610 persons per square mile of land area in 2000. This increase in population density has resulted in considerable development and has affected waterway systems and their function(s). See *Figure 3: Existing Land Use* for the Borough's current land use and existing land area that has been developed.

Figure 4: Zoning Districts displays the existing zoning districts and dictates the extent to which the existing undeveloped land can be developed. Most water features are abutting residential and environmentally sensitive/recreation zoning districts. The Lehigh Valley Rail line divides the Borough into two sectors, north and south. The northern portion of the Borough, contains most residential zoning ranging from but not limited to R-7.5, R-10, R-15, R1-2, and SC-1 districts. The southern portion of the Borough contains predominately industrial zoning, such as mixed-use development, industrial, and business districts.

Borough Water Features

There are five (5) water features within the Borough, four (4) named streams and one (1) lake. The five (5) water features are as follows:

- Bound Brook
- Cedar Brook
- Ambrose Brook
- East Branch of the Middle Brook
- Spring Lake

There are no Category One waterways located within the Borough or in its vicinity. Please see *Figure 5: Borough Waterways* for relative location of waterways within the Borough. *Figure 6: Boundary on USGS Quadrangle* depicts the Borough boundary on the USGS quadrangle maps and provides a spatial representation of the Borough in relation to the surrounding areas.

Future Developable Land

As presented in *Figure 7: Developable and Un-developable Land*, there are 0.25 square miles of future developable land within the Borough, which is based upon information provided by the New Jersey Department of Environmental Protection (NJDEP) 1995/97 Land Use data and the Borough of South Plainfield. The area of future developable land is less than one square mile; therefore, the Borough will not be required to reevaluate the Master Plan or provide future non-point source pollution loads assuming full build-out analysis, in accordance with N.J.A.C. 7:8-4.3(a).

Existing Water Quality Issues

Ambient Biomonitoring Network (AMNET) Study

Changes in the landscape caused by development have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. It is necessary to monitor the health of waterways and determine methods to mitigate pollution where encountered. Studies, programs and networks have been developed to document the health of waterways, such as the Ambient Biomonitoring Network (AMNET) established by the NJDEP.

There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by the NJDEP on a five-year cycle, and the ratio of pollution tolerant to the pollution sensitive benthic macroinvertebrates are examined to classify water quality. Based upon AMNET analysis criteria, streams are classified as non-impaired, moderately impaired, or severely impaired. 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.

The Raritan Region AMNET study analyzed assessment locations pertinent to the Borough's streams. There is one (1) AMNET assessment site located within the municipality and one (1) related sites located outside the Borough borders. Based on the AMNET site data, one (1) site, AN0424B on Bound Brook, is classified *severely impaired*. The other remaining assessment location, AN0425A on Ambrose Brook, is classified moderately impaired. See *Table 1: South Plainfield Borough AMNET Site Classifications* for a categorized list of AMNET assessment locations and their respective classification.

Table 1: South Plainfield Borough AMNET Site Classifications

Non-Impaired	Moderately Impaired	Severely Impaired
<i>None reported</i>	• AN0425A	• AN0424B

Several AMNET site locations were tested for benthic macroinvertebrates abnormalities. Samples taken from specified AMNET assessment stations were examined for physical abnormalities via visual inspection. Morphological abnormalities are noted in the AMNET study since they may signify the possibility of stressful conditions or contaminants in the existing ecological environment, which, in turn, has affected their development. A site is identified as exhibiting significant or chronic macroinvertebrate abnormalities when greater than five percent (5%) of the taxa observed are deformed.

Sites identified with chronic macroinvertebrate abnormalities indicate that deformities were encountered during the most recent and previous site assessments. Significant macroinvertebrate abnormalities indicate that taxa deformities were only encountered during the most recent site inspection. No abnormalities were observed the three (3) sites examined. See *Appendix B* for the above referenced AMNET data. See *Figure 9A: Water Quality Assessment Site Locations* for the location of all AMNET sites analyzed.

New Jersey Integrated Water Quality Monitoring and Assessment Report

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on streams within 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, 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.

Waterways are categorized into Sublists, ranging from Sublist 1, which indicates a healthy functioning waterway, to Sublist 5, which indicates an unhealthy waterway not meeting its intended use. Sublist 1 waterways attain water quality standards and none of the designated uses are threatened. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more Total Maximum Daily Loads (TMDLs) are needed. Waterways are placed on Sublist 3 because there is insufficient data or the guidelines/criteria to conduct a use attainment assessment is unavailable; therefore, it cannot be determined if a designated use is threatened. Sublist 4 waterways are those impaired or threatened for one or more uses, but not require the development of a TMDL, or a TMDL has been developed and water quality being attained.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without exceeding water quality standards or interfering with the ability to use a waterbody for one or more of its

storm events, these stormwater drainage features do not have adequate capacity, thereby causing backwater effects and flooding upstream. See *Figure 14: FEMA Flood Prone Map Flood Data* per the National Flood Insurance Program (NFIP) issued September 1996.

The following are areas of concern regarding water quantity:

- (1) Oxford Avenue to Woodland Avenue from Old Raritan Road to Hendricks Boulevard West,
- (2) East Crescent Parkway from Holly Avenue to Oxford Avenue,
- (3) Oxford Avenue from East Crescent Parkway to Clark Avenue and
- (4) Park Avenue from Clark Avenue to East Fairview Avenue

These roadways and intersections flood because of insufficient drainage systems. The existing drainage systems lack capacity causing backwater effects and flooding along the road surfaces. Although, the Borough has approved plans to replace portion of the stormwater drainage system along these roadways to increase system capacity and alleviate flooding.

The Borough's stormwater drainage features may have been designed for much different hydrologic conditions (i.e., less impervious area) than presently exist in the Borough and upstream of the Borough. As the impervious coverage increased, the peak flows and runoff volumes of the stream also increased. The increased amount of water resulted in stream bank erosion, which resulted in unstable areas at roadway/bridge crossings, degraded stream habitats and caused chronic flooding. The high impervious coverage of the Borough has significantly decreased groundwater recharge; hence, decreasing base flows in the streams during dry weather periods. Lower base flows can have a negative impact on stream habitat during the summer months. A map of the groundwater recharge areas is provided; see *Figure 11: Groundwater Recharge Areas*.

Hydrologic Unit Code 14 (HUC14)

Watersheds are defined by the United States Geological Survey (USGS). The most basic defined watershed area or hydrologic unit is a unique defined feature having a minimum size of 3,000 acres. The base hydrologic unit is given a unique hydrologic unit code (HUC) fourteen (14) digits long; hence, the terminology Hydrologic Unit Code 14 (HUC14). The hydrologic unit network is

hierarchical. HUCs are combined to identify larger watershed areas such as HUC11, HUC8, HUC6, HUC4, watershed management areas (WMAs), watershed regions and so on.

There are six (6) HUC-14 areas within the Borough. Five (5) of the Borough's largest HUC-14s fall within WMA 9 (Lower Raritan, South River & Lawrence Brook WMA). The smallest HUC-14 area within in the Township falls within WMA 7 (Arthur Kill WMA). The entire Borough is located within the Raritan watershed region. See *Figure 8: Hydrologic Unit Codes 14 (HUC14)* for the boundaries of the Borough's HUC14 and WMA boundaries.

Borough Features

There are multiple wellhead protection areas throughout the northern portion of the Borough. There are three (3) tiers associated with each wellhead protection area. Tiers 1 through 3, delineate the extent of ground water captured by a pump at a specified rate calculated over 2, 5 and 12-year periods, respectively. Wellhead protection areas are delineated by the NJDEP Source Water Protection Program (SWAP) and acted upon in response to the Safe Drinking Water Act Amendments of 1986 and 1996. Please see *Figure 12: Wellhead Protection Areas* for wellhead protection area locations.

A map of the wetlands and other constrained land is displayed in *Figure 13: Wetlands and Water Land Uses Constrained Land*. A soil map of the Borough is provided and references the latest Soil Survey Geographical (SSURGO) Database; see *Figure 14: Soil Survey Geographical (SSURGO) Database*.

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, via the Stormwater Control Ordinance, to minimize the adverse impact of stormwater runoff on water quality, water quantity and loss of groundwater recharge in receiving waterbodies for residential and commercial site development. Generally,

projects meeting the definition of a major development are required to meet the regulations stated under N.J.A.C. 7:8-5. Said regulations address erosion control, groundwater recharge, runoff quantity standards, stormwater runoff quality standards, standards for calculating stormwater runoff and groundwater recharge, structural stormwater management standards, and maintenance requirements, as stated above. The major development must meet the established design and performance standards set forth in the Soil Erosion and Sediment Control Act.

Low Impact Development (LID) Techniques

The N.J.A.C. 7:8: Stormwater Management regulations promote stormwater management measures for major developments that minimize the adverse impact of stormwater runoff on water quantity, water quality and the loss of groundwater recharge to receiving waterbodies. In N.J.A.C. 7:8-5.3 and Chapter 2 of the *New Jersey Stormwater Best Management Practices (BMP) Manual 2004* stormwater management design techniques are focused on non-structural stormwater management strategies. Non-structural Stormwater Management Strategies, Low Impact Development (LIDs) techniques, are enumerated as follows:

1. "Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;" (N.J.A.C. 7:8-5.3(b)1.)

i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function, specific legal and/or procedural measures to ensure areas remain preserved in the future and, reestablish wooded and forested areas that were disturbed

2. "Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;" (N.J.A.C. 7:8-5.3(b)2.)

i.e., use vegetative filters and buffers, promote sheet flow over vegetated areas, use level and/or curb cuts at appropriate locations, utilize the minimum pavement widths, vegetate/landscape islands, utilize pervious materials at appropriate locations and locate parking underground or beneath buildings

3. "Maximize the protection of natural drainage features and vegetation;" (N.J.A.C. 7:8-5.3(b)3.)

i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function

and take specific legal and/or procedural measures to ensure areas remain preserved in the future

4. "Minimize the decrease in the pre-construction "time of concentration;" (N.J.A.C. 7:8-5.3(b)4.)

i.e., increase sheet flow, disconnect impervious areas, use vegetative stormwater conveyance systems and dense vegetation at appropriate locations, utilize natural features and reduce slopes

5. "Minimize land disturbance including clearing and grading;" (N.J.A.C. 7:8-5.3(b)5.)

i.e., preserve forested areas, riparian corridors and high groundwater or aquifer recharge capabilities and any other natural area with significant hydrologic function and reduce lawn areas

6. "Minimize soil compaction;" (N.J.A.C. 7:8-5.3(b)6.)

i.e., use light weight equipment during construction and minimize disturbed land areas

7. "Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;" (N.J.A.C. 7:8-5.3(b)7.)

i.e., use of native plants will result in lower fertilizer and water needs, will promote infiltration characteristics similar to those of natural area, attract native wildlife and provide better habits

8. "Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas;" (N.J.A.C. 7:8-5.3(b)8.)

i.e., use vegetated channels and swales at appropriate locations to increase surface roughness and decrease flow velocities and ensure vegetative conveyance systems are tolerant to higher frequency storms

9. "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."

(N.J.A.C. 7:8-5.3(b)9.)

i.e., provide trash receptacles, litter fences, require regular sweepings, provide "pet waste stations," provide storm drain inlets and trash wracks, utilize berms and secondary containment systems (This section is more specifically geared towards commercial and industrial areas or areas with high residential population densities.)

The applicant submitting for review must address the nonstructural stormwater management strategies utilized in the proposed design. If these strategies are not incorporated into the design, the applicant must state reasons for contention. All nonstructural stormwater management strategies

must be incorporated to the "maximum extent practical." An applicant should demonstrate the design has exhausted all measures to implement the nonstructural strategies prior to the use of the structural methods.

"...nonstructural LID-BMPs are to be given preference over structural BMPs. Where it is not possible to fully comply with the Stormwater Management Rules solely with nonstructural LID-BMPs, they should then be used in conjunction with LID and standard structural BMPs to meet the Rules' requirements." (NJ Stormwater BMP Manual 2004, page 2-3)

NJAC 7:8-5.3(a) states:

"To the maximum extent practical, the standards in NJAC 7:8-5.4 and 5.5 shall be met by incorporating nonstructural stormwater management strategies at NJAC 7:8-5.3 into the design. The persons submitting an application for review shall identify the nonstructural strategies 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 strategies identified in (b) below [NJAC 7:8-5.3(b)] into the design of a particular project, the applicant shall identify the strategy and provide basis for the contention."

See Appendix A of the *NJ Stormwater BMP Manual 2004* for Low Impact Development Checklists provided by the NJDEP.

Stormwater Management Regulations Overview

Groundwater Recharge Requirements

Major developments must meet one of two standards for groundwater recharge, per N.J.A.C.

7:8-5.4(a)2.:

- (1) maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site, or
- (2) infiltrate the increase in the stormwater runoff volume from pre-construction to post-construction for the two-year storm.

Stormwater Quality Requirements

For water quality (N.J.A.C. 7:8-5.5), stormwater management measures shall be designed to reduce the post-construction load of *total suspended solids (TSS)* in the stormwater runoff generated

by the water quality design storm by *eighty-percent (80%)* of the anticipated load from the major development.

Stormwater Quantity Requirements

To control stormwater runoff quantity impacts (N.J.A.C. 7:8-5.4 3.), a major development must meet one of three design standards:

- (1) demonstrate at no point in time that the post-construction runoff hydrograph exceeds the pre-construction runoff hydrograph,
- (2) demonstrate there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2, 10 and 100-year storm event and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site, or
- (3) demonstrate 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 runoff rates.

However, for stormwater water runoff quantity requirement enumerated in (3) above, stream encroachment standards (N.J.A.C. 7:13-2.8) will require for the 100-year storm event seventy-five percent (75%) of the pre-construction peak runoff rates.

Maintenance, Safety and Ordinances

The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. These sections address long-term operation and maintenance measures for existing and future stormwater facilities.

The Stormwater Control Ordinance must be submitted to the county for review and approval within 24 months of the effective date of the Stormwater Management Rules, April 2006.

The following ordinances must be adopted by the Borough and meet the minimum requirements set forth in the Tier A Municipal Stormwater General Permit (NJ0141852). If these ordinances already exist then they must be reviewed and updated where necessary.

Those ordinances are as follows, but are not limited to:

1. *Pet Waste Ordinance* – will require owners and keepers to immediately and properly dispose of their pet's solid waste and will require information provided by NJDEP to be distributed with pet licenses regarding said ordinance;
2. *Litter Ordinance* – will meet the minimum standards set forth in the State Litter Statue (N.J.S.A. 13:1E-99.3);
3. *Improper Disposal of Waste Ordinance* – will prohibit spilling, dumping or disposing of any materials other than stormwater into the municipal separate storm sewer system;
4. *Wildlife Feeding Ordinance* – will prohibit feeding of non-confined wildlife in any public park or property owned/operated by the municipality;
5. *Illicit Connection Ordinance* – will prohibit illicit connections to the municipal separate storm sewer system.

During construction, Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. Operation and Maintenance Manuals will be required for BMPs to ensure long-term maintenance strategies.

Plan Consistency

Regional Stormwater Management Plan (RSWMP)

The Borough is currently within the Green Brook Flood Control Project area as issued by the United States Army Corp of Engineers. If at any time a RSWMP is adopted and subject area is within the Borough, the Borough will revise this MSWMP to be consistent with the RSWMP.

Total Maximum Daily Loads (TMDL)

At this time, the Borough has two (2) approved TMDLs for fecal coliform both approved as of September 2003. The United States Environmental Protection Agency (EPA) has recommended a TMDL be established for Cedar Brook for biological impairments. Accordingly, this Municipal

Stormwater Management Plan will be updated to be consistent if additional TMDLs are adopted. See *Appendix D* for the EPA TMDL report sheets noting the established and recommendation for TMDLs.

Residential Site Improvement Standards (RSIS)

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

Freehold Soil Conservation District

The Borough's Stormwater Control Ordinance will require all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, the Freehold Soil Conservation District will observe on-site soil erosion and sediment control measures and report any inconsistencies to the contractor and Borough as necessary.

Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. However, approval of variances or exemptions from N.J.A.C. 7:8 are a last resort and all non-structural and structural BMPs should be explored prior to a variance or exemption being granted. Non-structural BMPs are highly recommended and shall be the initial design technique utilized. It is up to the discretion of the Borough Engineer, Board and professionals to ensure all BMP options are explored prior to granting a variance or exemption. The Borough Engineer shall be consulted to determine

availability of mitigation projects. All mitigation projects are subject to approval of the Borough Engineer, Governing Body and Borough Planning and/or Zoning Board.

Mitigation Project Criteria

The mitigation project must be implemented within the same drainage area as the proposed development. If a suitable site cannot be located in the same drainage area as the proposed development, the mitigation project may provide mitigation that is equivalent to the impacts for which the variance or exemption is sought and addresses the same issue in adjacent drainage areas. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property, which does not currently meet the design and performance standards as outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJ Stormwater BMP Manual.

The Borough Engineer must be contacted to obtain a list of potential mitigation projects to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the mitigation projects shall be obtained from the Borough Engineer. The Borough maintains the right to update the mitigation project list and is not held accountable for time frames or to construct any of the mitigation projects or potential mitigation projects addressing groundwater recharge, water quality and water quantity.

Mitigation projects are environmental enhancement projects that provide groundwater recharge, control flooding or control nonpoint source pollution. The Borough Engineer shall be contacted for availability, description and any other necessary information pertaining to mitigation projects.

Mitigation projects are subject to the approval of the Borough Engineer, Governing Body and Borough Planning and/or Zoning Board. Each project is approved upon an individual basis considering the extent of the variance, waiver or exception granted. Mitigation projects may require

cooperation with outside agencies such as the Soil Conservation District, Mosquito Commission, Army Corp of Engineers, NJDEP, etc.

The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a MSWMP, or towards the development of a RSWMP. Funding quantities are subject to the approval of the Borough Engineer, Governing Body and Borough Planning and/or Zoning Board. Funding quantities will include costs or partial costs, including those associated with purchasing a property or easement for mitigation, and those associated with the long-term maintenance requirements of the mitigation measure.

References

Bureau of Freshwater and Biological Monitoring. Ambient Biomonitoring Network Watershed Management Areas 7, 8, 9 and 10. State of New Jersey: NJDEP, June 2000.

Water Assessment Team. New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report (305(b) and Monitoring and Assessment Report (305(b) and 303(d)) State of New Jersey: NJDEP, June 2004.

New Jersey Dept. of Environmental Protection. TMDLs for Fecal Coliform to Address 48 Streams in the Raritan Water Region. 2003. Division of Watershed Management: 25 Jan. 2005. <http://www.nj.gov/dep/watershedmgt/tmdl>

U.S. Environmental Protection Agency. TMDLs- 2002 Section 303(d) List Fact Sheet for NEW JERSEY. 2003. USEPA: 25 Jan. 2005. http://oaspub.epa.gov/waters/state_rept.control

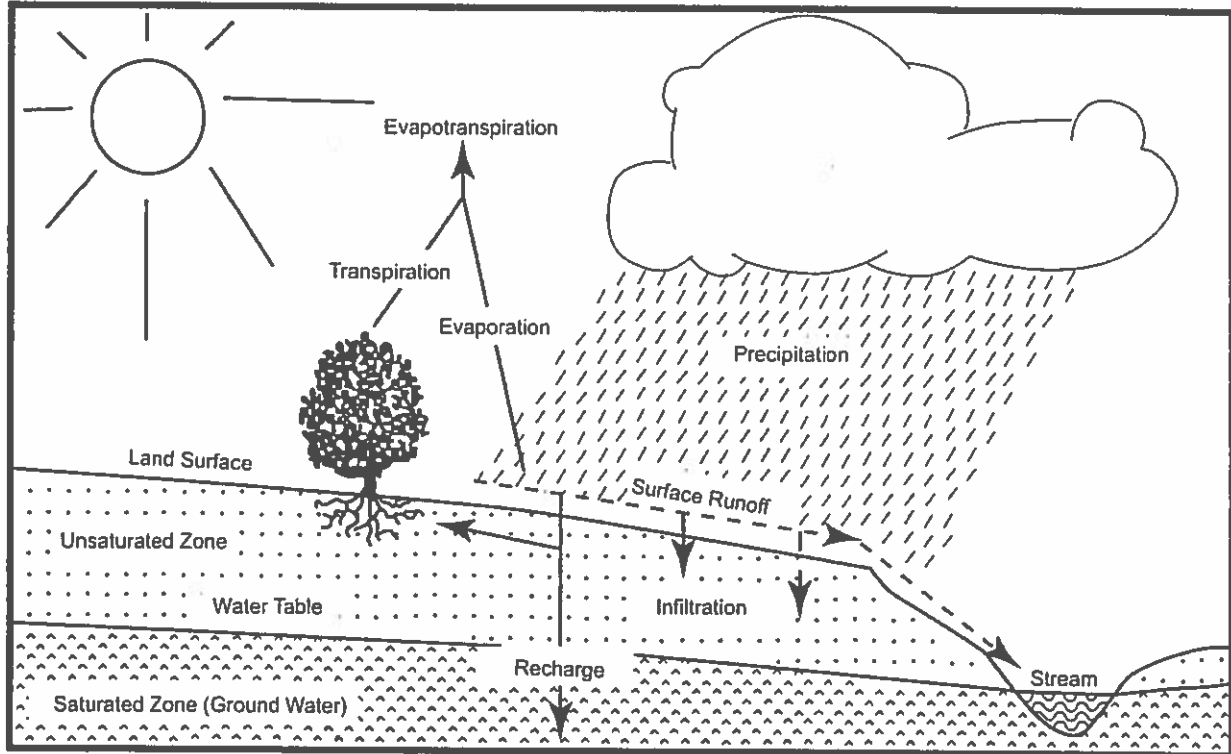
APPENDICES

APPENDIX A

Appendix of Figures

Figures 1 thru 14

Figure 1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

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

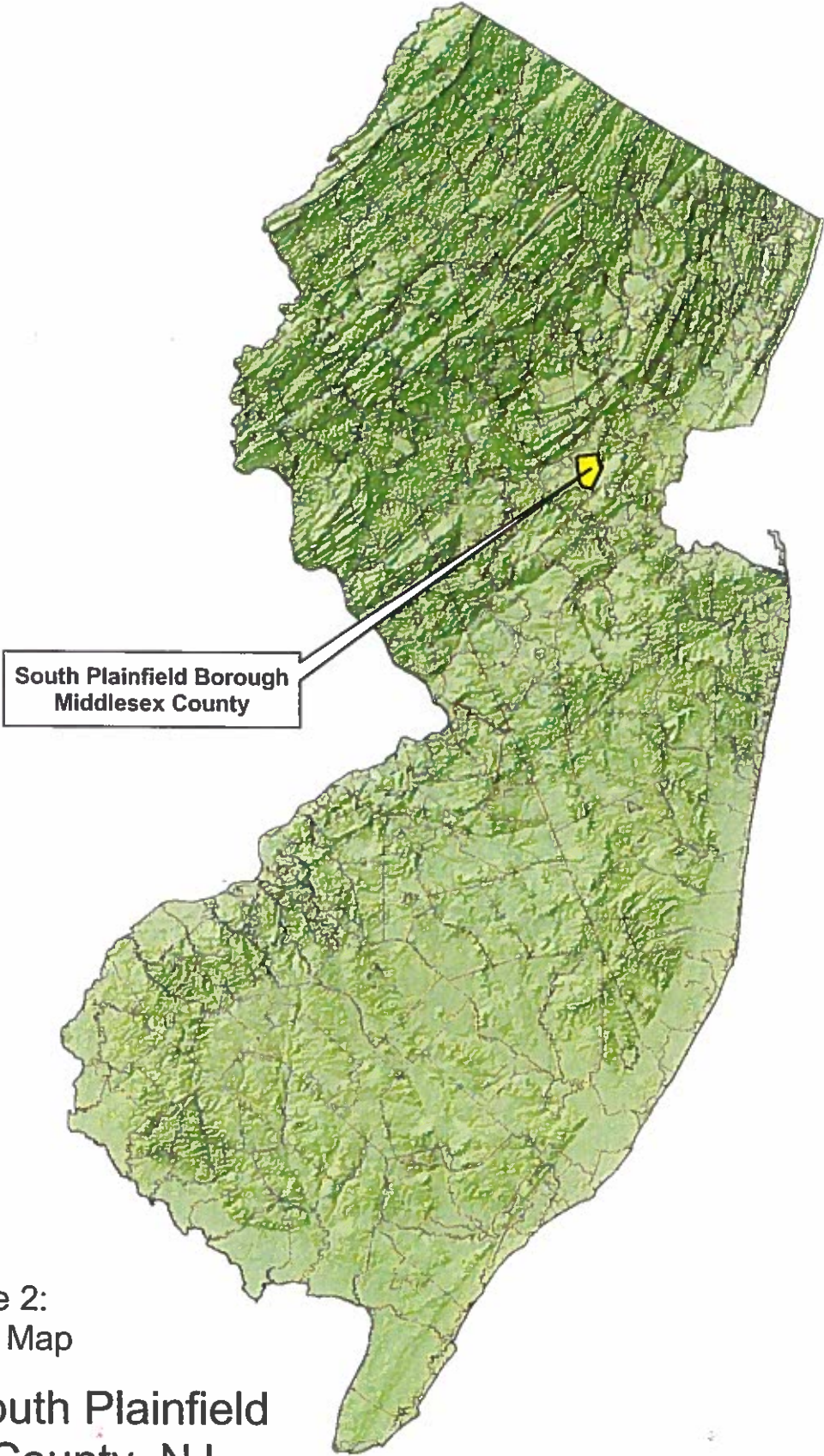
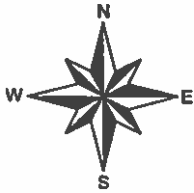
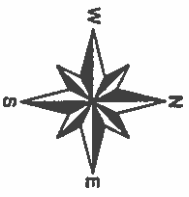


Figure 2:
Vicinity Map

**Borough of South Plainfield
Middlesex County, NJ**



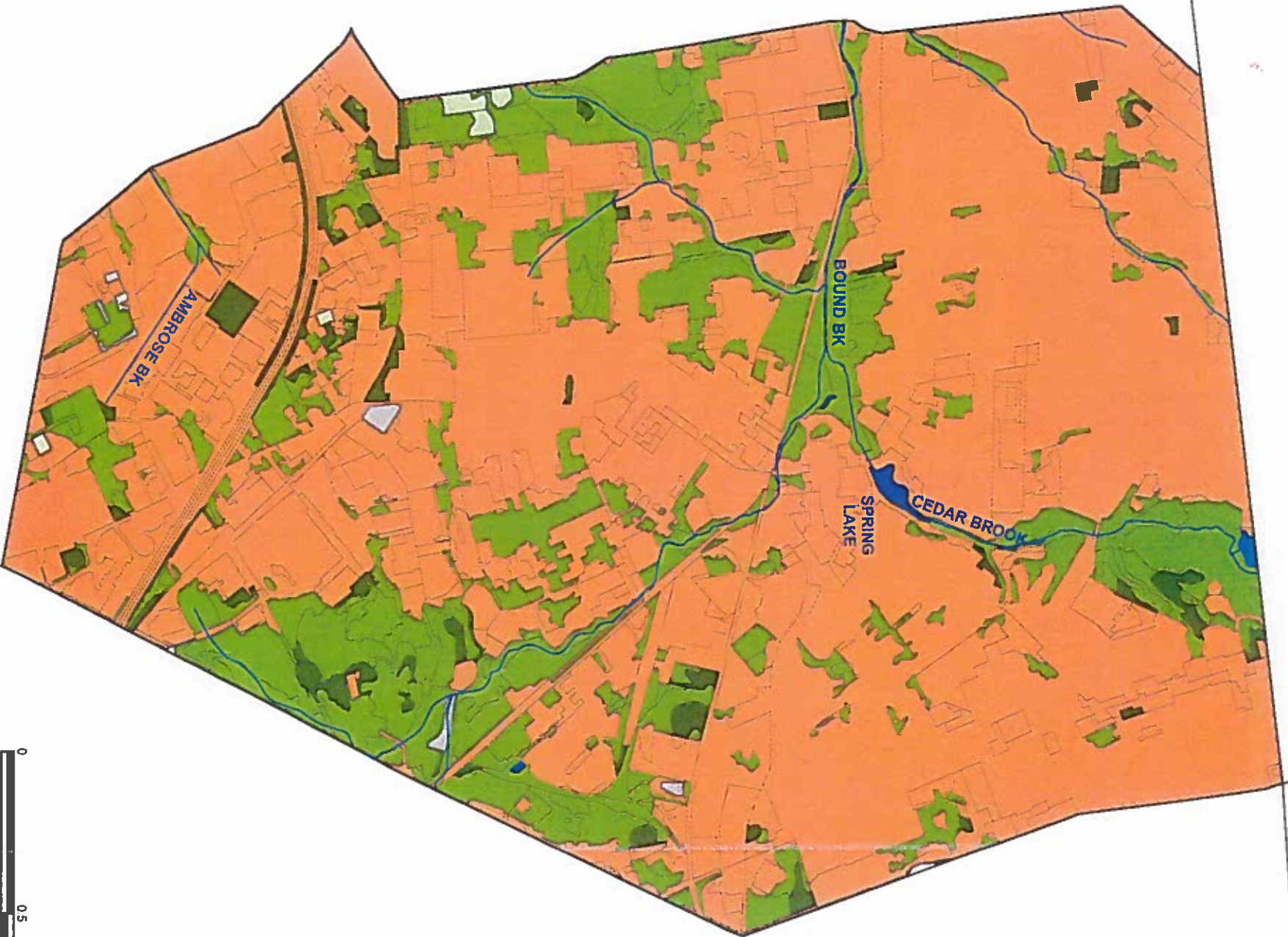


PLAINFIELD CITY

SCOTCH PLAINS

PISCATAWAY

EDISON



LEGEND

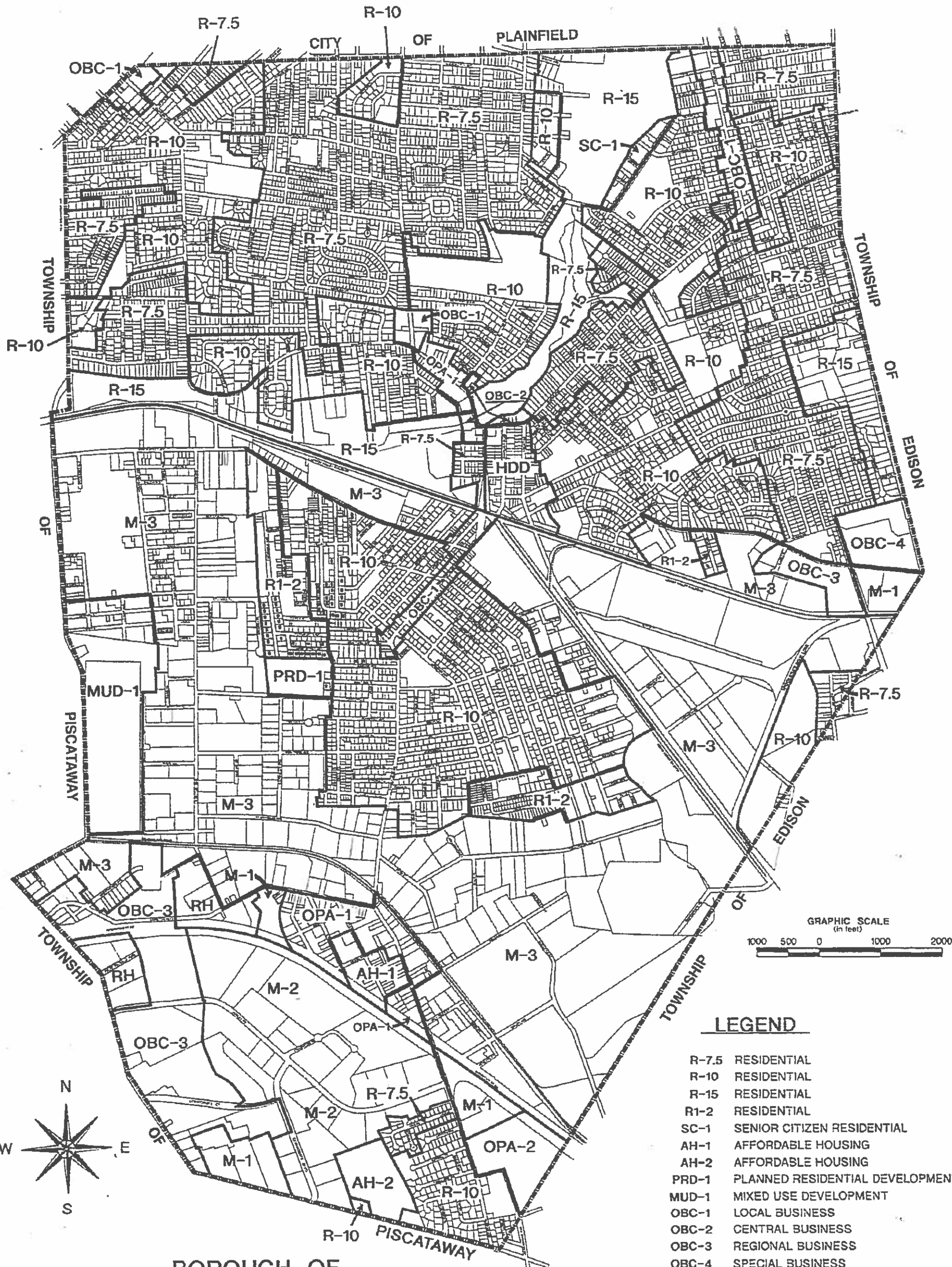
SOUTH PLAINFIELD LAND USE

- LAND USE (1995/97) —
- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS
- SOUTH PLAINFIELD STREAMS

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, this secondary product has not been verified by NJDEP and is not state authorized. The 1995/97 Land Use/Land Cover polygon shapefiles for New Jersey's Watershed Management Areas have been created by comparing the 1986 LULC layers from the NJDEP GIS database to the 1995/97 color infrared digital imagery, and delineating areas of change. In addition, an impervious surface (IS) code has been assigned to each polygon. All polygons retain the original 1986 land use code, as well as being given a 1995/97 land use code so that change analysis can be done directly from these data sets.

Figure 3:
Existing Land Use

South Plainfield Borough
Middlesex County, NJ



BOROUGH OF
SOUTH PLAINFIELD
ZONING MAP

ADOPTED: July 13, 2000

Borough of South Plainfield
 Middlesex County, New Jersey

Prepared By:
THP, Inc.
 CONSULTING PLANNERS
 40 Brunswick Woods Drive
 East Brunswick, New Jersey

ISSUED: APRIL 23, 2001

LEGEND

- R-7.5 RESIDENTIAL
- R-10 RESIDENTIAL
- R-15 RESIDENTIAL
- R1-2 RESIDENTIAL
- SC-1 SENIOR CITIZEN RESIDENTIAL
- AH-1 AFFORDABLE HOUSING
- AH-2 AFFORDABLE HOUSING
- PRD-1 PLANNED RESIDENTIAL DEVELOPMENT
- MUD-1 MIXED USE DEVELOPMENT
- OBC-1 LOCAL BUSINESS
- OBC-2 CENTRAL BUSINESS
- OBC-3 REGIONAL BUSINESS
- OBC-4 SPECIAL BUSINESS
- OPA-1 PROFESSIONAL OFFICE
- OPA-2 PROFESSIONAL OFFICE & RESEARCH
- M-1 INDUSTRIAL
- M-2 INDUSTRIAL
- M-3 INDUSTRIAL
- HDD HISTORIC DOWNTOWN DISTRICT
- RH REGIONAL HOSPITALITY

Figure 4: Zoning Districts
 Borough of South Plainfield

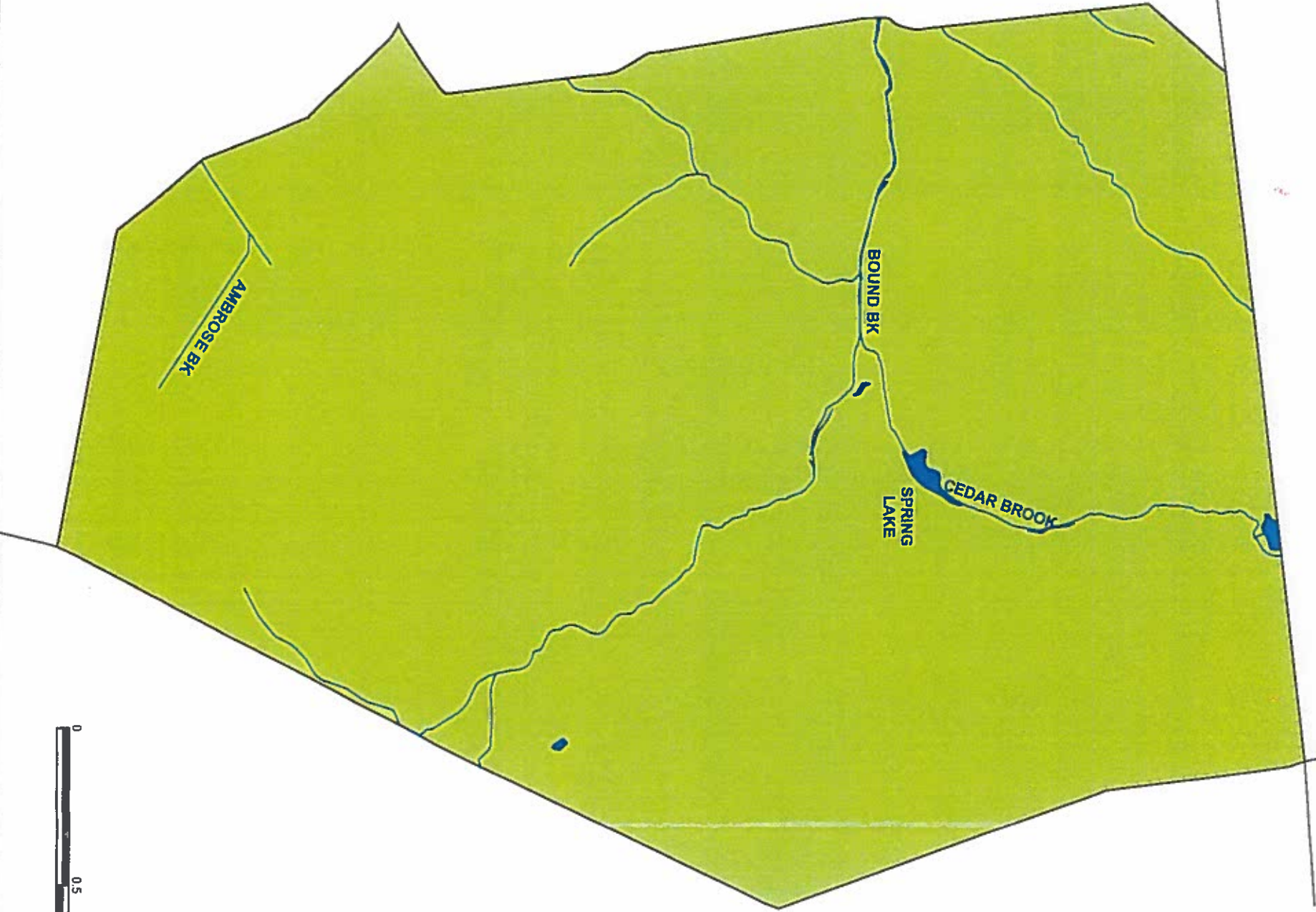


PLAINFIELD CITY

SCOTCH PLAINS

PISCATAWAY

EDISON



- LEGEND**
- SOUTH_PLAINFIELD_LAKES
 - ~ SOUTH_PLAINFIELD_STREAMS
 - SOUTH_PLAINFIELD_BOUNDARY

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data. This secondary product has not been verified by NJDEP and is not state authorized. The hydrography stream (network) line shapefiles for New Jersey counties were generated as line ArcInfo coverages from USGS 1:24,000 Digital Line Graph (DLG) files, with subsequent editing and updating. Each Lakes shapefile contains all the open water areas for that county as of 1986. Open water areas such as lakes, ponds, tidal waters, reservoirs, bays, etc., are included. Each file was created by reselecting the water series out of its LULC (land use/land cover) shapefile. The following reselect was performed on LULC in ArcView to create this shapefile: land, use greater than 5000 and land, use less than 6000 (the numeric codes refer to the Anderson classification system, and represent all codes that refer to bodies of water). Non-open water wetlands polygons can be found in the county's "Wetlands" shapefile and the streams in its "Streams" shapefile. The ArcInfo coverages have been converted to ArcView shapefiles for distribution.



Figure 5: Borough Waterways
South Plainfield Borough
Middlesex County, NJ



South Plainfield Borough
Middlesex County, NJ

Figure 6: Borough Boundary
on USGS Quadrangles



PLAINFIELD CITY

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- LEGEND**
- Future Developable Land - 0.2541 Sq. Miles
 - Developed / Re-developable Land - 6.2963 Sq. Miles
 - Preserved / Un-developable Land - 1.8412 Sq. Miles

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, this secondary product has not been verified by NJDEP and is not state authorized. Areas calculated utilizing the New Jersey Department of Environmental Protection Geographic Information System's 1995/97 Land use/Land cover polygon shapefiles for New Jersey's Watershed Management Areas.

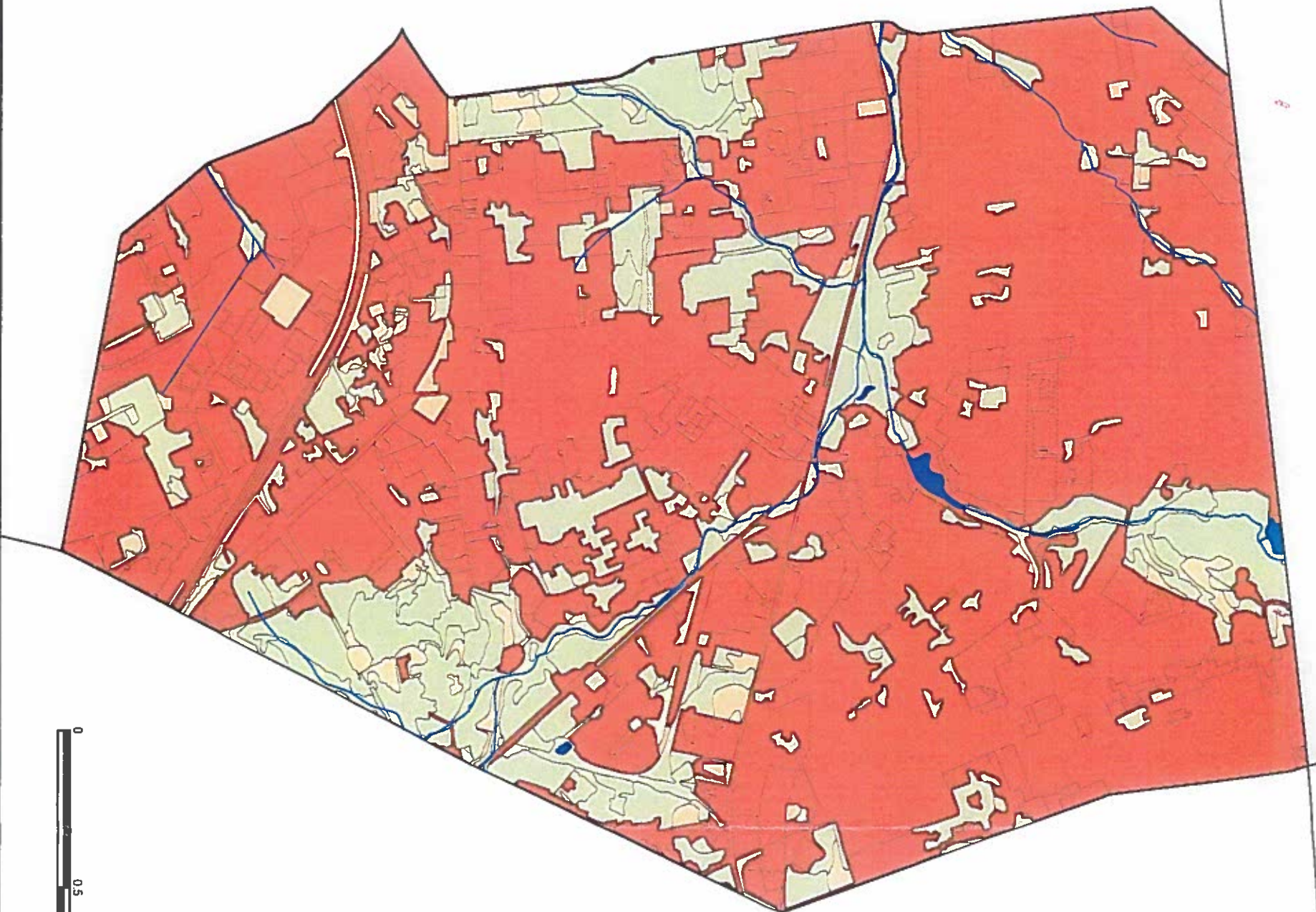
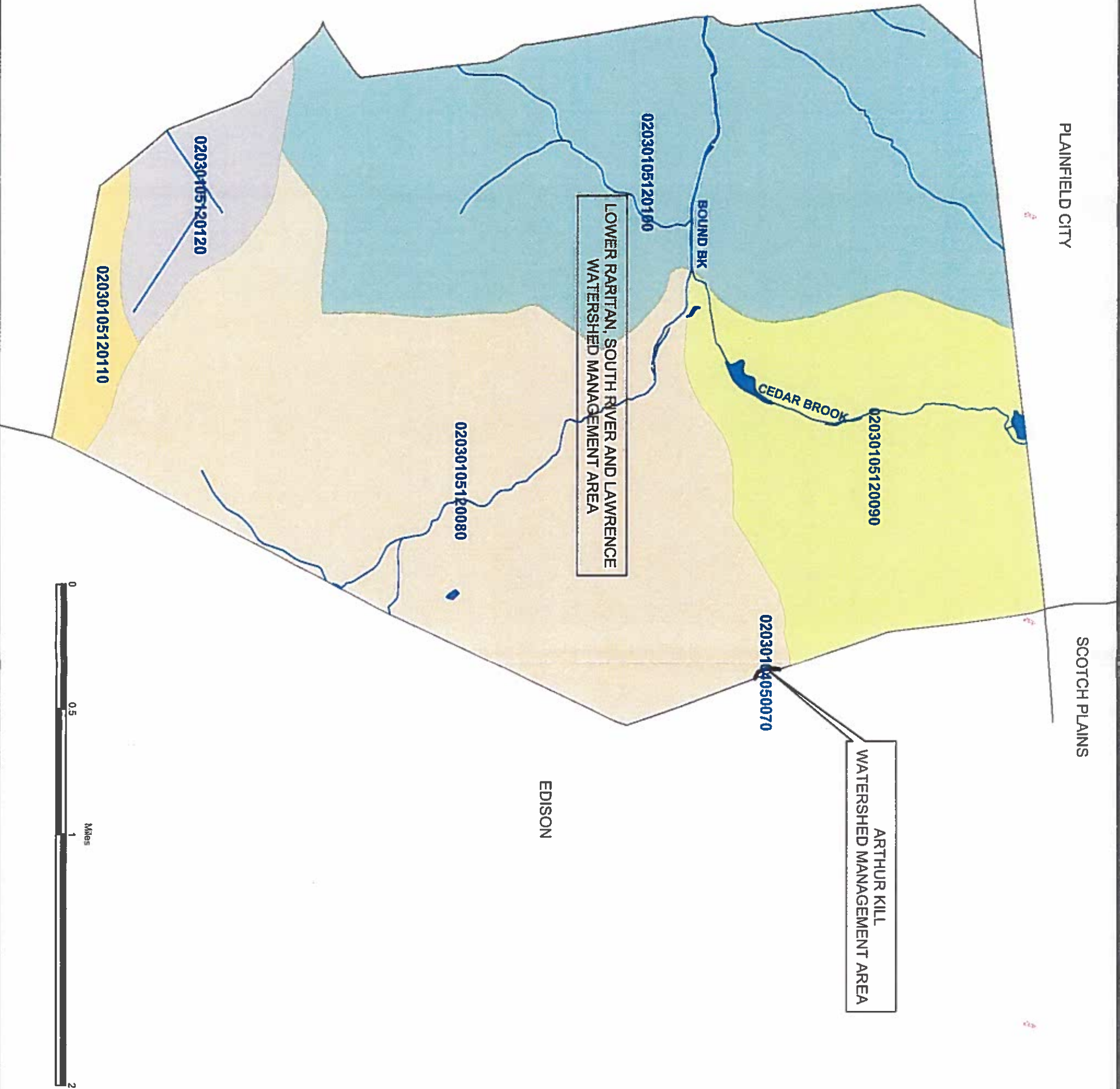
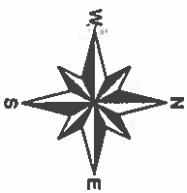


Figure 7:
Developable and
Un-developable Land
South Plainfield Borough
Middlesex County, NJ



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LOWER RARITAN, SOUTH RIVER AND LAWRENCE WATERSHED MANAGEMENT AREA

ARTHUR KILL WATERSHED MANAGEMENT AREA

LEGEND

HUC14

- 02030104050070
- 02030105120080
- 02030105120090
- 02030105120100
- 02030105120110
- 02030105120120

- WATERSHED MANAGEMENT AREA BOUNDARY
- SOUTH PLAINFIELD STREAMS
- SOUTH_PLAINFIELD_LAKES

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data. This secondary product has not been verified by NJDEP and is not state authorized. Watersheds (DEPHUC14) are delineated from 1:24,000-scale (7.5-minute) USGS quadrangles. The delineations have been developed for general purpose use by USGS District staff over the past 20 years. Arc and polygon attributes have been included in the coverage with basin names and ranks of divides, and 14-digit hydrologic unit codes. The New Jersey state boundary as originally defined in the USGS source coverage does not match that used by the NJDEP. Therefore the coverage was edited by the NJ Geological Survey to remove the USGS state boundary and insert the NJDEP state boundary, thus resolving most potential clipping errors. Database publication date: 2000

Figure 8:
Hydrologic Unit Code
(HUC 14)
South Plainfield Borough
Middlesex County, NJ

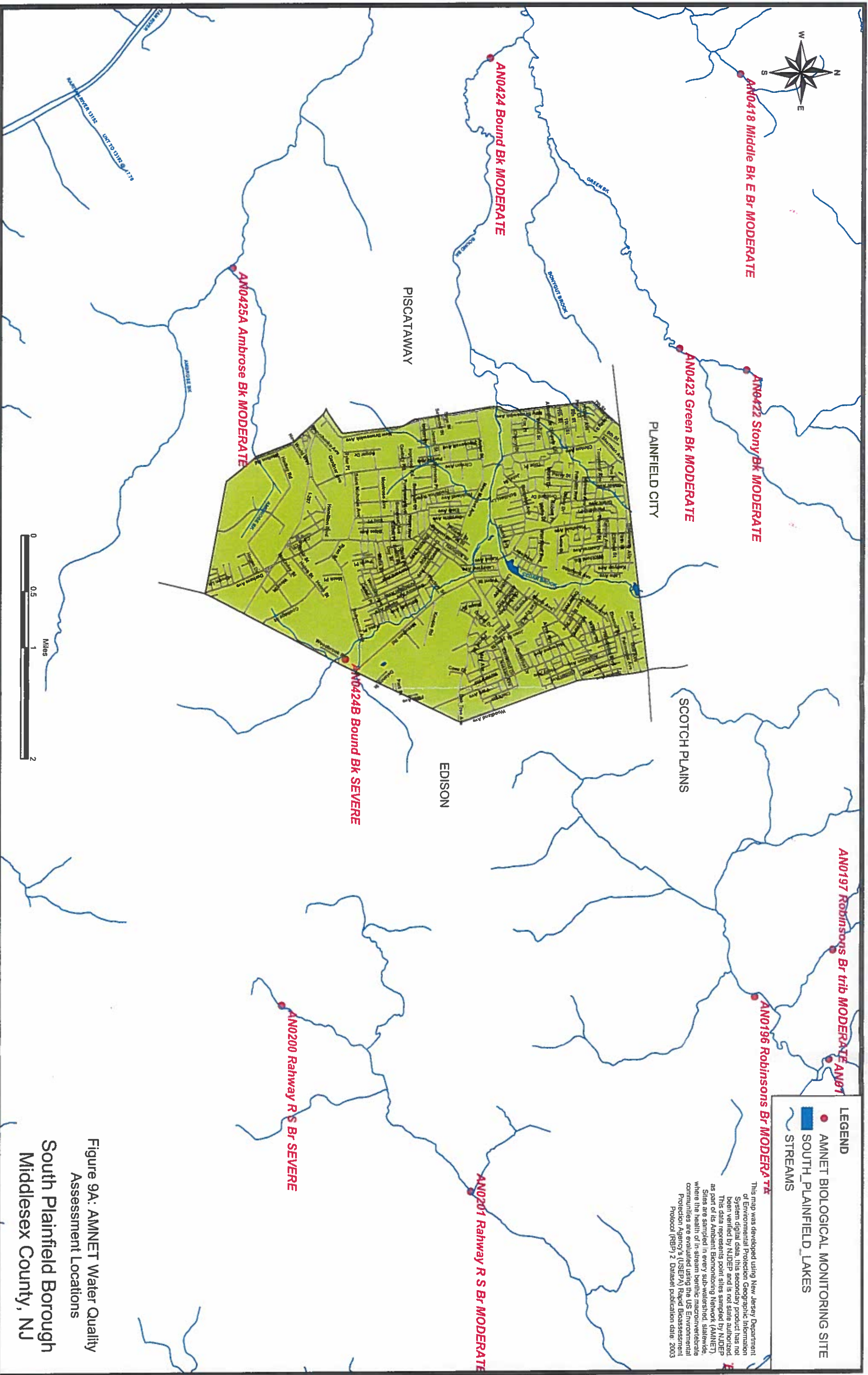
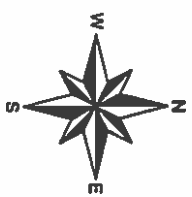


Figure 9A: AMNET Water Quality Assessment Locations South Plainfield Borough Middlesex County, NJ

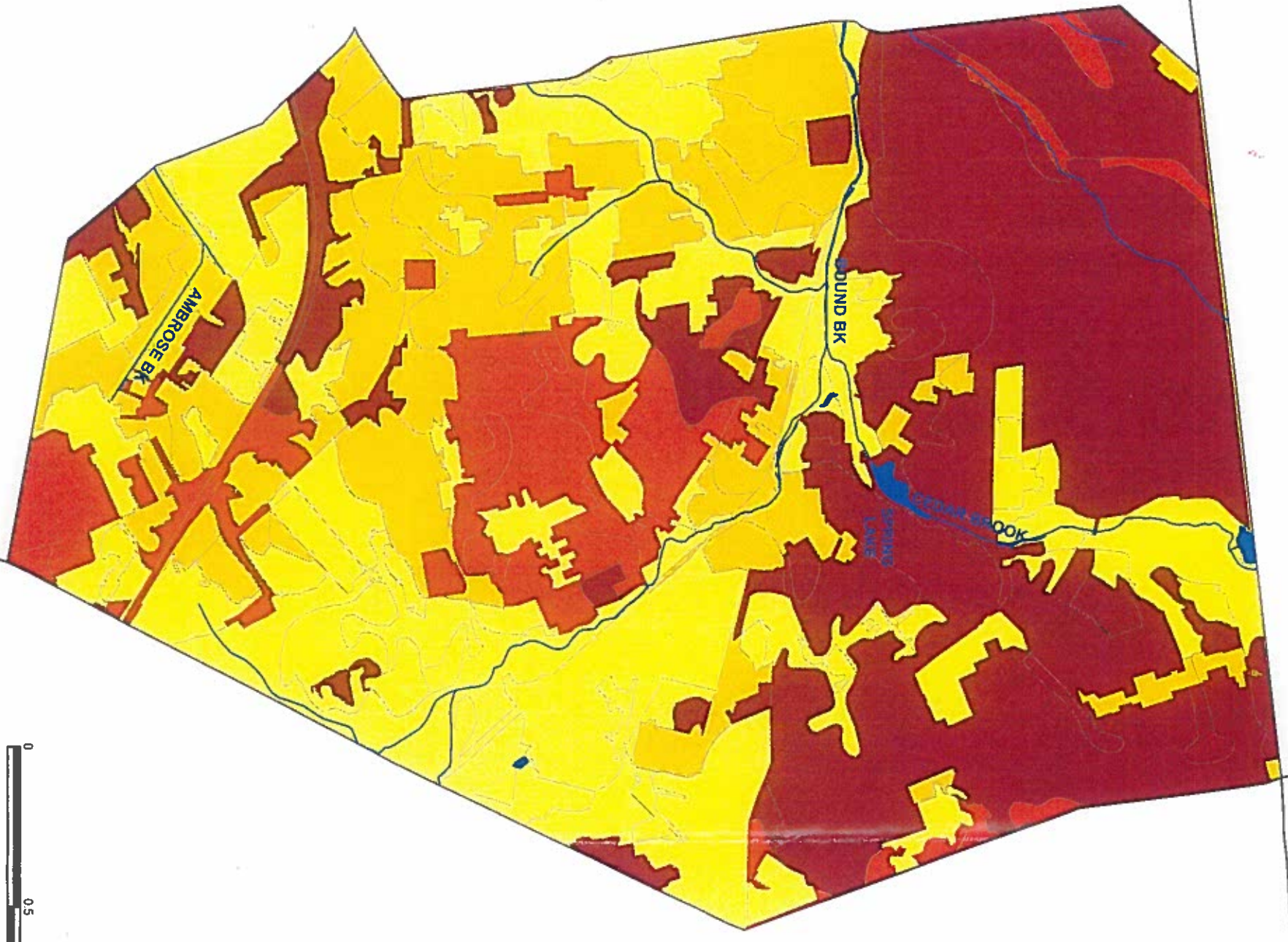


PLAINFIELD CITY

SCOTCH PLAINS

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EDISON



LEGEND

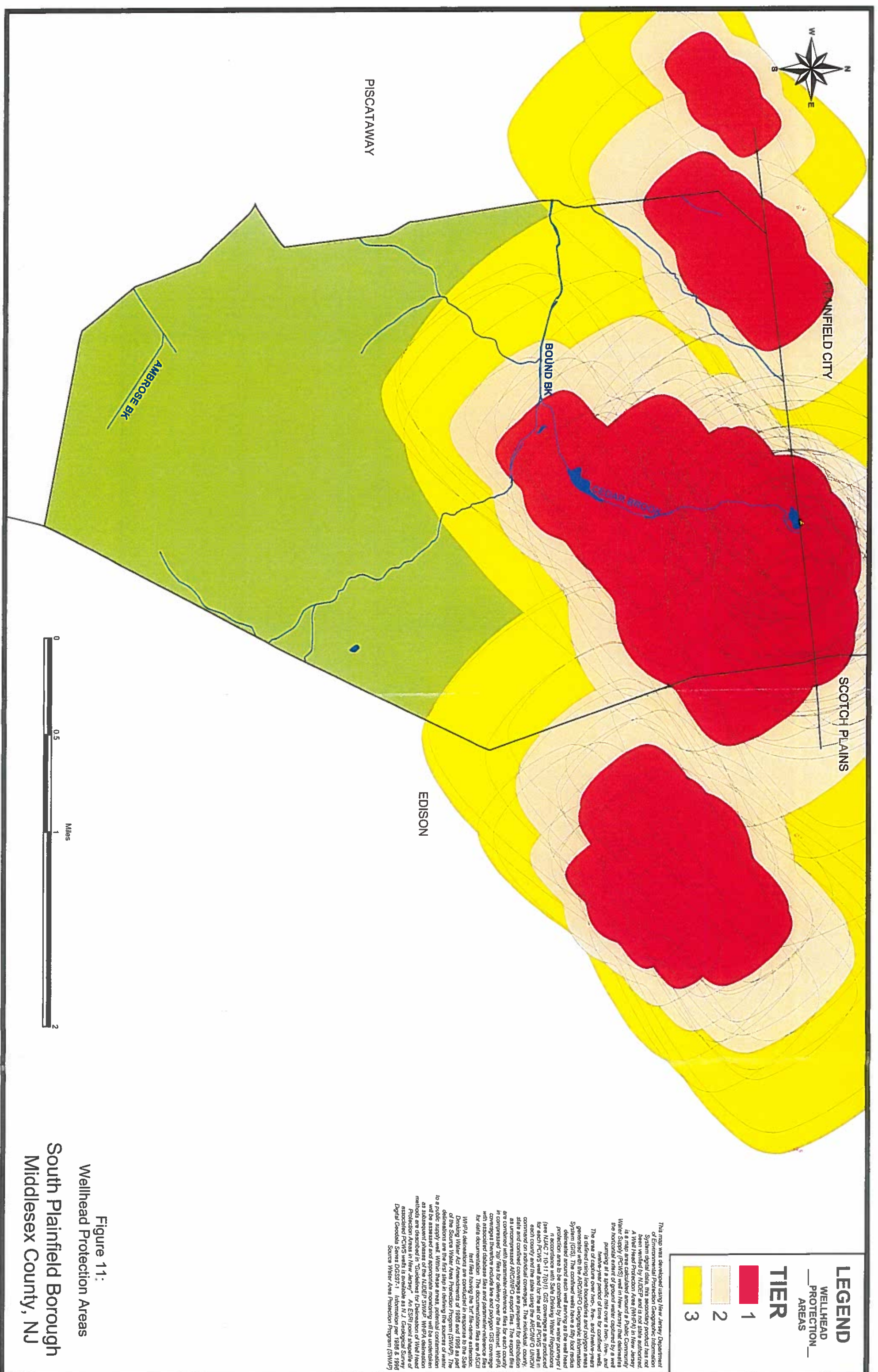
Groundwater Recharge (inches per year)

- 0.00
- 0.01 - 4.00
- 4.01 - 8.00
- 8.01 - 12.00
- 12.01 - 16.41

SOUTH PLAINFIELD STREAMS
 SOUTH PLAINFIELD LAKES

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data. This secondary product has not been verified by NJDEP and is not state authorized. Groundwater recharge (GWR) is defined as the water that infiltrates the ground and reaches the water table regardless of the underlying geology. It supports aquifer recharge, stream baseflow and wetlands. It is estimated in New Jersey using the methodology outlined in NJ Geological Survey Report GSR-32, "A Method of Evaluating Ground-Water Recharge Areas in New Jersey" by E. G. Charles and others (1993). Application of this method using the ArcInfo geographic information system (GIS) produced 19' county and 20' watershed management area (WMA) ground-water recharge, GIS coverages. The county recharge coverages were created by overlaying three coverages: 1) soils, 2) land use and land cover (LULC), and 3) municipalities. These three coverages provided the following attributes: soil series names, land-use and land-cover categories, and climate factors, respectively. These data were then used to calculate ground-water recharge values using the following equation for each area in the coverage: ground-water recharge = (recharge factor x climate factor) x recharge constant. Information derived from the NJDEP 1995/97 Land Use/Land Cover coverage.

Figure 10:
Groundwater Recharge Areas
South Plainfield Borough
Middlesex County, NJ

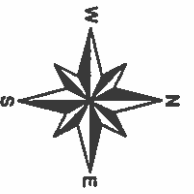


LEGEND	
	TIER 1
	TIER 2
	TIER 3

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data. This secondary product has not been field checked and is not intended for use in a legal proceeding. A Well Head Protection Area (WHPA) is the watershed of a well. A map area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two-, five-, and twelve-year period of time for confined wells. The area of capture over two-, five-, and twelve-years is defined using line boundaries and polygon areas generated with the ARCMIO Geographic Information System (GIS). The combined wells have a 100-foot radius delineated around each well serving as the well head protection boundary. The boundary is defined in accordance with State Drinking Water Regulations (see NJAC 7:10-11.7(b)(1)). GIS coverages are produced for each PCWS well and for the set of all PCWS wells in each county and the state using the ARCMIO UNION command on individual coverages. The individual county, state and confined coverages are prepared for distribution as uncompressed ARCMIO export files. The export files are compressed zip files for delivery over the Internet. WHPA coverages include the end polygon GIS coverage polygons and the associated metadata files. The metadata files include the date of publication, the data source, the data description, the data projection, the data format files having the "ter" file-name extension. WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAPP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the WHPA SWAPP. WHPA delineation methods are described in Guidelines for Delineation of Well Head Protection Areas (WHPA) and in the State Department of Environmental Protection's Well Head Protection Areas (WHPA) Manual. Information per 1086 & 1996 Source Water Area Protection Program (SWAPP)

Figure 11:
Wellhead Protection Areas

South Plainfield Borough
Middlesex County, NJ

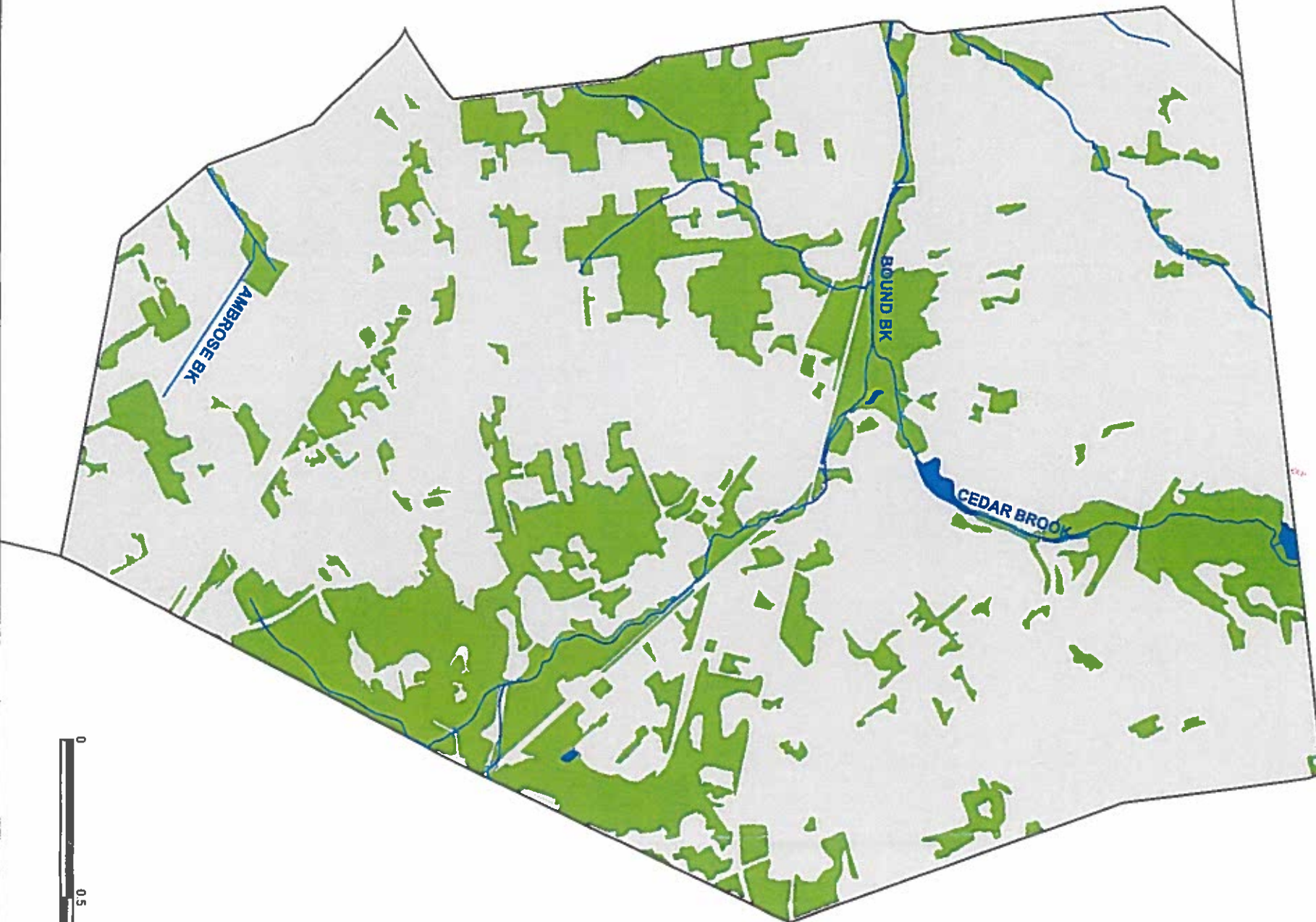


PLAINFIELD CITY

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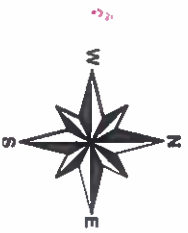


- LEGEND**
-  SOUTH PLAINFIELD LAKES
 -  SOUTH PLAINFIELD STREAMS
 -  SOUTH PLAINFIELD WETLANDS

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data. This secondary product has not been verified by NJDEP and is not state authorized. This is a graphical representation of this county's wetlands data and it contains all the tidal and non-tidal wetlands as of 1986. It was created by reselecting wetlands out of this county's 1986 LULC (land use/land cover) data. This was done so that this new data would contain both tidal and non-tidal wetlands. The 1986 land use/land cover information was developed one of the fundamental data sets needed for environmental analysis and GIS mapping based on a department wide needs assessment. The FWW theme was mapped to fulfill a requirement of the Freshwater Wetlands Act of 1987 (Refer to metadata for FWW). The FWW data was subsequently integrated into the existing 1986 land use/land cover to produce this county's LULC theme Tidal (estuarine) wetlands were not mapped as part of NJDEP's FWW mapping. These polygons were delineated as part of the 1986 land use/land cover mapping. This county's wetlands and LULC polygons are intended to serve as a resource for analysis rather than regulatory delineations. The NJDEP may change the framework based on more in depth analysis and field inspection for regulatory purposes. This illustration per 1986 LULC & NJDEP data. Information updated by NJDEP accordingly.



Figure 12:
Wetlands and Water Land Uses
Constrained Land
South Plainfield Borough
Middlesex County, NJ

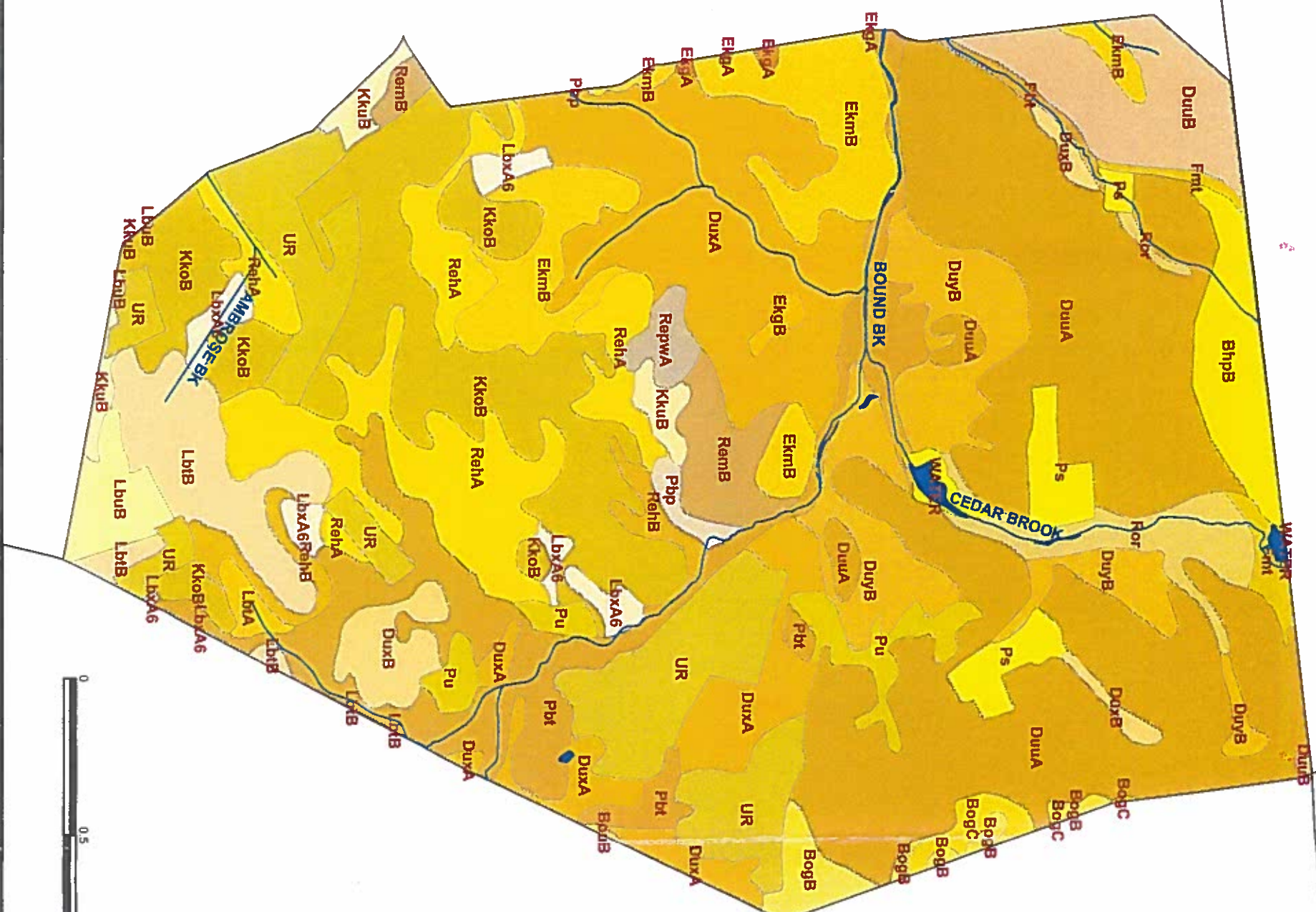


PLAINFIELD CITY

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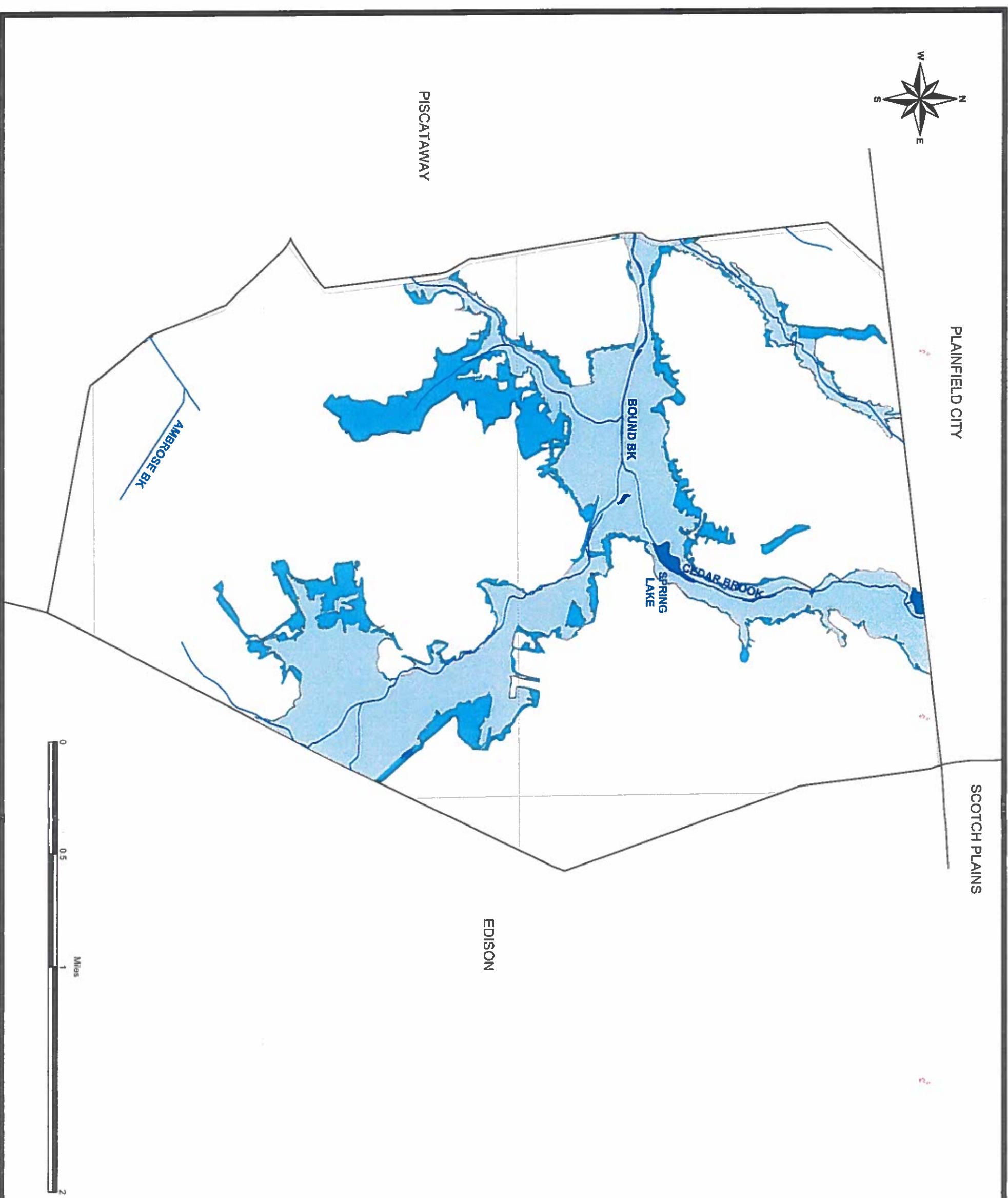
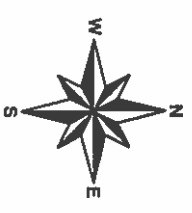
EDISON



LEGEND
SOUTH PLAINFIELD STREAMS
SOUTH_PLAINFIELD_LAKES

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, this secondary product has not been verified by NJDEP and is not state authorized. The SSURGO soils layer was developed by the Natural Resources Conservation Service (NRCS), of the US Department of Agriculture, as part of the National Cooperative Soil Survey. The data are from the Soil Survey Geographic (SSURGO) database developed and maintained by the NRCS. This data set consists of georeferenced digital map data and computerized attribute data. All soil delineations and coding were performed by NRCS soil scientists. The NJDEP was responsible only for converting the original data to the ARCVIEW shapefiles in New Jersey State Plane Foot, NAD83, that are presented here. The New Jersey NRCS webpage (<http://www.nj.nrcs.usda.gov>) should be referenced for questions concerning the data. Data publication date: 2004.

Figure 13:
Soil Survey Geographic (SSURGO) Database
South Plainfield Borough
Middlesex County, NJ



- LEGEND**
- ZONE**
 - A
 - AE
 - X
 - X500
 - SOUTH_PLAINFIELD_LAKES
 - SOUTH_PLAINFIELD_STREAMS
 - SOUTH_PLAINFIELD_BOUNDARY

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, this secondary product has not been verified by NJDEP and is not state authorized. The hydrography stream (network) line shapefiles for New Jersey counties were generated as line Archio coverages from USGS 1:24,000 Digital Line Graph (DLG) files, with subsequent editing and updating. Each Lakes shapefile contains all the open water areas for that county as of 1986. Open water areas such as lakes, ponds, tidal waters, reservoirs, bays, etc., are included. Each file was created by resampling the water series out of its LULC (land use/land cover) shapefile. The following resample was performed on LULC in ArcView to create this shapefile: land_use greater than 5000 and land_use less than 6000 (the numeric codes refer to the Anderson classification system, and represent all codes that refer to bodies of water). Non-open water wetlands polygons can be found in the county's "Wetlands" shapefile and the streams in its "Streams" shapefile. The Archio coverages have been converted to ArcView shapefiles for distribution.

Figure 14: Flood Prone Map
(FEMA / FIRM Q3 Flood Data)
South Plainfield Borough
Middlesex County, NJ

APPENDIX B

1999 Ambient Biomonitoring Network (AMNET): Raritan Region

Benthic Macroinvertebrate Report Data

Station: AN0425A
 Ambrose Brook, Behmer Rd., Piscataway Twp., Middlesex County
 Plainfield USGS Quadrangle
 Date Sampled: 02/23/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Gammaridae	4	34
Tubificidae	10	16
Elmidae	4	14
Hydropsychidae	4	13
Nematoda	6	7
Chironomidae	6	4
Corbiculidae	8	2
Naididae	7	2
Plumatellidae	7	2
BloodRed Chironomidae	8	1
Coenagrionidae	9	1
Planorbidae	6	1
Physidae	7	1
Sphaeriidae	8	1
Tipulidae	3	1

Statistical Analysis

Number of Taxa: 15
 Total Number of Individuals: 100
 % Contribution of Dominant Family: 34.00 % (Gammaridae)
 Family Biotic Index: 5.55
 Scraper/Filterer Collector Ratio: 0.89
 Shredder/Total Ratio: 0.01
 E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
 % EPT: 13.00
 EPT/C: 2.60
 NJIS Rating: 18
 Biological Condition: Moderately Impaired
 Habitat Analysis: 102
 Deficiency(s) noted:
 - Paucity of Clean Water Organisms -

Observations

Streamwater: Slightly Turbid...Flow: Slow...Width/Depth (ft): 10/1
 Substrate: Gravel/Sand...StreamBank Vegetation/Stability: Trees. Vines/Poor
 Canopy: Mostly Open...Other: Suburban; Storm sewers
 Trash, Geese; Water temp. 0.7C / pH 8.0SU / DO 15.7mg/L / Cond. 390umhos

Station: AN0424B
Bound Brook, Woodbrook Rd., S. Plainfield, Middlesex County
Plainfield USGS Quadrangle
Date Sampled: 02/23/99

Family	Family Tolerance Value (FTV)	Number of Individuals
Tubificidae	10	45
Gammaridae	4	37
Asellidae	8	9
Chironomidae	6	6
Lumbriculidae	8	2
Sphaeriidae	8	2
Hydropsychidae	4	1
Coenagrionidae	9	1
Lumbricidae	10	1
Notonectidae	9	1

Statistical Analysis

Number of Taxa: 10
Total Number of Individuals: 105
% Contribution of Dominant Family: 42.86 % (Tubificidae)
Family Biotic Index: 7.33
Scraper/Filterer Collector Ratio: 0.00
Shredder/Total Ratio: 0.09
E+P+T (Ephemeroptera, Plecoptera, Trichoptera): 1
% EPT: 0.95
EPT/C: 0.17
NJIS Rating: 6
Biological Condition: Severely Impaired
Habitat Analysis: 98
Deficiency(s) noted:
- Significant Organic Pollution - Paucity of Clean Water Organisms -

Observations

Streamwater: Turbid....Flow: Slow....Width/Depth (ft): 12/2
Substrate: Mud, Silt....StreamBank Vegetation/Stability: Trees, Vines, Grasses/Fair
Canopy: Partly Open....Other: Forested; Trash, Car parts
Color of water - Brown; Water temp. 1.9C / pH 7.9SU / DO 14.5mg/L / Cond. 556umhos

APPENDIX C

2004 Integrated Water Quality Monitoring & Assessment Report

Integrated List Report Data

New Jersey's
2004 Integrated List of Waterbodies

Sublist	Wtrshd Region	WMA	Station Name/Waterbody	Site ID	Parameters	Data Source
3	Raritan	09	Ambrose Brook at Behmer Rd in Piscataway	AN0425A	Benthic Macroinvertebrates	NJDEP AMNET
5	Raritan	09	Bound Brook at Woodbrook Rd in South Plainfield	AN0424B	Benthic Macroinvertebrates	NJDEP AMNET

APPENDIX D

Total Maximum Daily Load Documentation

TMDL Report Data



U.S. Environmental Protection Agency

Total Maximum Daily Loads

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Listed Water Information

CYCLE : 2002

Click [here](#) to see metadata for this report.

Cycle: 2002 State: NJ List ID: NJ-10BB-CEDAR_BROOK
 Waterbody Name: CEDAR BROOK
 State Basin Name: 13 ATLANTIC COAST
 Listed Water Map Link: [MAP 303\(d\)](#)

Comments:
 POSSIBLE TOXICITY

State List IDs:

Cycle	State List ID
2002	AN0424A

State Impairments:

State Impairment	Parent Impairment	Priority	Rank	Targeted Flag	Anticipated TMDL Submittal
BIOLOGY MODERATELY IMPAIRED	BIOLOGICAL CRITERIA	LOW		N	DEC-31-2003

Potential Sources of Impairment:

There were no potential sources reported to EPA by the state.

Total Maximum Daily Load (TMDL) Information:

There were no TMDLs reported to EPA by the state.

Watershed Information:

Watershed Name	Watershed States
RARITAN	NEW JERSEY



U.S. Environmental Protection Agency

Total Maximum Daily Loads

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Detailed TMDL Report

TMDL Document Information

TMDL ID: 10595

TMDL Name: BOUND BROOK AT MIDDLESEX

TMDL Status: APPROVED/ESTABLISHED

EPA Lead: No

Lead State: NJ

Actual Establishment Date: 09/23/2003

Comments: UNITS ARE PERCENT REDUCTION OF THE AMBIENT CONCENTRATION GEOMETRIC MEAN; PERCENTAGE OF THE TARGET CONCENTRATION OF 68 CFU/100 ML.

No TMDL Documents have been uploaded for this TMDL.

TMDL Pollutants

Pollutant: FECAL COLIFORM

TMDL Type: NONPOINT SOURCE

Total Waste Load Allocation:

Load Allocation: 92

Margin Of Safety: 36

Implicit Margin Of Safety: N

Units for Total Waste Load Allocation, Load Allocation, and Margin of Safety: PERCENT

TMDL End Point: FECAL COLIFORM LEVELS SHALL NOT EXCEED A GEOMETRIC AVERAGE OF 200 CFU/100 ML NOR SHOULD MORE THAN 10 PERCENT OF THE TOTAL SAMPLES TAKEN DURING ANY 30-DAY PERIOD EXCEED 400 CFU/100 ML IN FW2 WATERS

Listed Water Impairments for FECAL COLIFORM					
Click on the underlined List ID for a Listed Water Information Report. Click on the underlined "MAP 303(d)" literal for a map of the Listed Water.					
List ID	State List ID	Waterbody Name	Listed Water Map	Cycle	Impairment
<u>NJ_09-0002</u> BOUND BROOK	01403900	BOUND BROOK	No Spatial Data	2002	FECAL COLIFORM

TMDL Methods

Method Name	Method Description
LOAD CURVE	LOAD CURVE

[Click here](#) to see metadata for this report.

[Water](#) | [Wetlands, Oceans & Watersheds](#) | [Watershed Protection](#)



U.S. Environmental Protection Agency

Total Maximum Daily Loads

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Detailed TMDL Report

TMDL Document Information

TMDL ID: 10597

TMDL Name: BOUND BROOK AT ROUTE 28 AT MIDDLESEX

TMDL Status: APPROVED/ESTABLISHED

EPA Lead: No

Lead State: NJ

Actual Establishment Date: 09/23/2003

Comments: UNITS ARE PERCENT REDUCTION OF THE AMBIENT CONCENTRATION GEOMETRIC MEAN; PERCENTAGE OF THE TARGET CONCENTRATION OF 68 CFU/100 ML.

No TMDL Documents have been uploaded for this TMDL.

TMDL Pollutants

Pollutant: FECAL COLIFORM

TMDL Type: NONPOINT SOURCE

Total Waste Load Allocation:

Load Allocation: 97

Margin Of Safety: 43

Implicit Margin Of Safety: N

Units for Total Waste Load Allocation, Load Allocation, and Margin of Safety: PERCENT

TMDL End Point: FECAL COLIFORM LEVELS SHALL NOT EXCEED A GEOMETRIC AVERAGE OF 200 CFU/100 ML NOR SHOULD MORE THAN 10 PERCENT OF THE TOTAL SAMPLES TAKEN DURING ANY 30-DAY PERIOD EXCEED 400 CFU/100 ML IN FW2 WATERS

Listed Water Impairments for FECAL COLIFORM					
Click on the underlined List ID for a Listed Water Information Report. Click on the underlined "MAP 303(d)" literal for a map of the Listed Water.					
List ID	State List ID	Waterbody Name	Listed Water Map	Cycle	Impairment
NJ_09-0003 BOUND_BROOK	01403385	BOUND BROOK	No Spatial Data	2002	FECAL COLIFORM

TMDL Methods

Method Name	Method Description
LOAD CURVE	LOAD CURVE

Click [here](#) to see metadata for this report.