

# **BOROUGH OF BLOOMSBURY STORMWATER MANAGEMENT PLAN**

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Bloomsbury Borough Council

Mark Peck, Mayor

Carol Flink

Vicky Papics

Steve Ross

Marc Scheffel

Martha Tersigni

Dave Thomas

Prepared by:

Robert B. Zederbaum, PE, PP, CME

Borough Engineer



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# **Municipal Stormwater Management Plan**

## **Borough of Bloomsbury**

### **Introduction**

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Borough of Bloomsbury 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 new major development, defined as projects that disturb one or more acre of land. 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.

This plan addresses the review and update of existing ordinances, the Borough Master Plan and other planning documents to allow for project designs that include low impact development techniques. 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:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in the stormwater runoff from any new development;
- reduce soil erosion from any development or construction project or existing land use;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge, mitigate of recharge lost to development;
- 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, the Borough will adopt specific stormwater design and performance standards for new development. Future Ordinance revisions shall also propose stormwater management controls to address impacts from existing development. These Ordinances shall include preventative and corrective maintenance strategies to ensure long term effectiveness of stormwater management facilities, as well as outline safety standards for stormwater infrastructure to protect public safety.

## **Stormwater Discussion**

Land development can dramatically alter the hydrologic cycle (see Figure C-1) 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 the 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 of 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.

In addition to increase 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 the 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**

Bloomsbury Borough is small (approximately 0.93 sq. mile in size) and is compactly developed with a relatively dense, mixed use core and less dense residential neighborhoods away from the core. The Borough is bordered to the east by farmland within Bethlehem Township, to the north by the Musconetcong River and to the south by farmland within Bethlehem Township and low density residential development. Bloomsbury is totally within Watershed Management Areas (WMA01), upper Delaware. The Borough is located in one Hydrologic Unit Code (HUC) area, containing 620 acres within HUC14-02040105160060. The HUC 14 area is shown in Figure C-7. Population in 1980 was 864, in 1990 was 890 and in 2000 was 886, a 2.5% increase over 20 years, slightly decreasing from 1990 to 2000. The insignificant change in population has resulted in minimal demand for new development, having very little impact on increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. The Borough of Bloomsbury is also within the newly created Highlands Preservation area, which will significantly reduce future development from taking place. Figure C-2 illustrates the waterways in the Borough. Figure C-3 depicts the Borough boundary on the USGS Quadrangle maps.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the State's waterways. There are over 800 AMNET sites throughout the State of New Jersey, although there are no AMNET sites located within the Borough. The closest AMNET site to Bloomsbury is Northwest 01 Musconetcong River at Route 579 in Greenwich. These sites are sampled for benthic macro invertebrates 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 the benthic macro invertebrate community dynamics. The major river that borders the Borough to the north is the Musconetcong River. NJDEP has developed a Total Maximum Daily Load (TMDL) for pollutants in this waterway.

A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an 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 BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. For the list of 2004 Integrated List of Water Bodies – see Appendix B

The Borough has occasional flooding problems. Flooding occurs along the Musconetcong River, affecting properties with river frontage. The 100-year floodplain is shown in Figure C-10.

The Borough has a small amount of developable land. The existing land uses are shown in Figure C-6. The existing zoning is shown in Figure C-8.

Groundwater recharge rates for native soils in this area are generally between 13 and 16 inches annually, with portions in the 1 to 9 inch range. The average annual groundwater recharge rates are shown graphically in Figure C-4.

According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is 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 unconfined wells. The confined wells have a fifty foot radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations (see NJAC 7:10-11.7(b)1)."

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 (SWAP). 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 NJDEP SWAP.

As shown in Figure C-5, public supply wells are located in the Borough on the west side of Lehigh Avenue and at the water plant on Willow Avenue. The majority of the Borough is in either a Tier 1, 2, or 3 well head protection area.

In addition to the river and tributaries that run through and along the Borough, there are a few wetland areas. These wetland areas, shown in Figure C-9, provide flood storage, non-point pollutant removal and habitat for flora and fauna. Future Ordinances shall prioritize protection for wetlands and wetland buffers with future strategies implemented to improve stormwater runoff and discharge into these valuable environmentally sensitive areas.

### **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 stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The Ordinances will be submitted to the County for review and approval within 24 months of the effective date of the Stormwater Management Rules.

### **Plan Consistency**

The Borough is not within a Regional Stormwater Management Planning Area and therefore this plan does not need to be consistent with any Regional Stormwater Management Plans (RSWMPs). If any RSWMPs are developed in the future, this Municipal Stormwater Management Plan will be need to updated to be consistent. TMDLs have been developed for waters within the Borough which requires this plan needs to be consistent with the TDML.

The Borough of Bloomsbury is within the newly created highlands preservation area and as such will be required to be consistent with the Highlands Regional Master Plan.

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

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

### **Nonstructural Stormwater Management Strategies**

The Borough is presently reviewing its Master Plan and Ordinances and has identified several sections of the Borough's Land Use and Zoning Ordinance, known as the 1972 Zoning Ordinances of the Borough of Bloomsbury as revised, which require modification to incorporate non-structural stormwater management strategies. Ordinances under review include, but are not limited to the following:

Article IV – Section 2 - Master Plan

Article IV – Section 4 – Environmental Impact Statement

Article IV – Section 8 – Improvements and Design Standards  
Article XIV – Management Surface Water Runoff  
Article XVI – Program of Flood Damage Prevention

These specific Ordinances are identified for revision. Additional sections of the Borough's Ordinances and Regulations may also require updating when a full review is completed. New Ordinances will also need to be developed to address how the Borough will reduce fecal coliform loads to the river from all potential sources, including septic systems, geese and pet waste. In addition, the Borough should consider an educational program that would integrate non-point source pollution education into the school curriculum, including but not limited to cleaning and proper disposal of catch basin debris, as well as any potential opportunities for stream restoration projects within the Borough.

### **Land Use/Build-Out Analysis**

Due to the fact that the Borough is less than one square mile, a Land Use/Build-Out Analysis has not been conducted.

### **Mitigation Plan**

New Jersey's stormwater management regulations allow a municipality to grant a variance or exception from the stormwater management measure design and performance standards if the municipality has a Mitigation Plan in their Municipal Stormwater Management Plan. The purpose of the Mitigation Plan is to enable approval of an otherwise acceptable project that cannot achieve the stormwater management design and performance standards. By allowing the project applicant to provide equivalent stormwater mitigation in the same drainage area for the same standard (i.e. groundwater recharge, water quality, or water quantity) a variance can then be granted.

The Borough is presently preparing a list of specific project areas for mitigation and shall include same in the Mitigation Plan which will be prepared. Specifics within the Mitigation Plan shall allow the Borough of Bloomsbury to grant variances and/or exceptions from the stormwater management measure design and performance standards without the need for an applicant to apply to the County review agency for concurrence.

### **Mitigation Project Criteria:**

The municipality's criteria for an acceptable mitigation project are:

1. The mitigation project must be implemented in the HUC14 drainage area.
2. The mitigation project must provide an equivalent amount of mitigation for the stormwater design and performance standard for which the variance or exemption is being sought. For example, if a variance of the water quality standards is sought, then the mitigation must address water quality.
3. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual. Maintenance agreements shall include an enforcement provision.

### **Process for Selecting and Approving Mitigation Projects:**

Applicants for projects seeking a variance or exemption from the stormwater management design and performance standards are encouraged to discuss potential mitigation projects with the municipality early in the

development application process. The applicant for the project may propose a specific mitigation project that meets the criteria, or may select an appropriate project that meets the criteria from specific projects identified by the Borough.

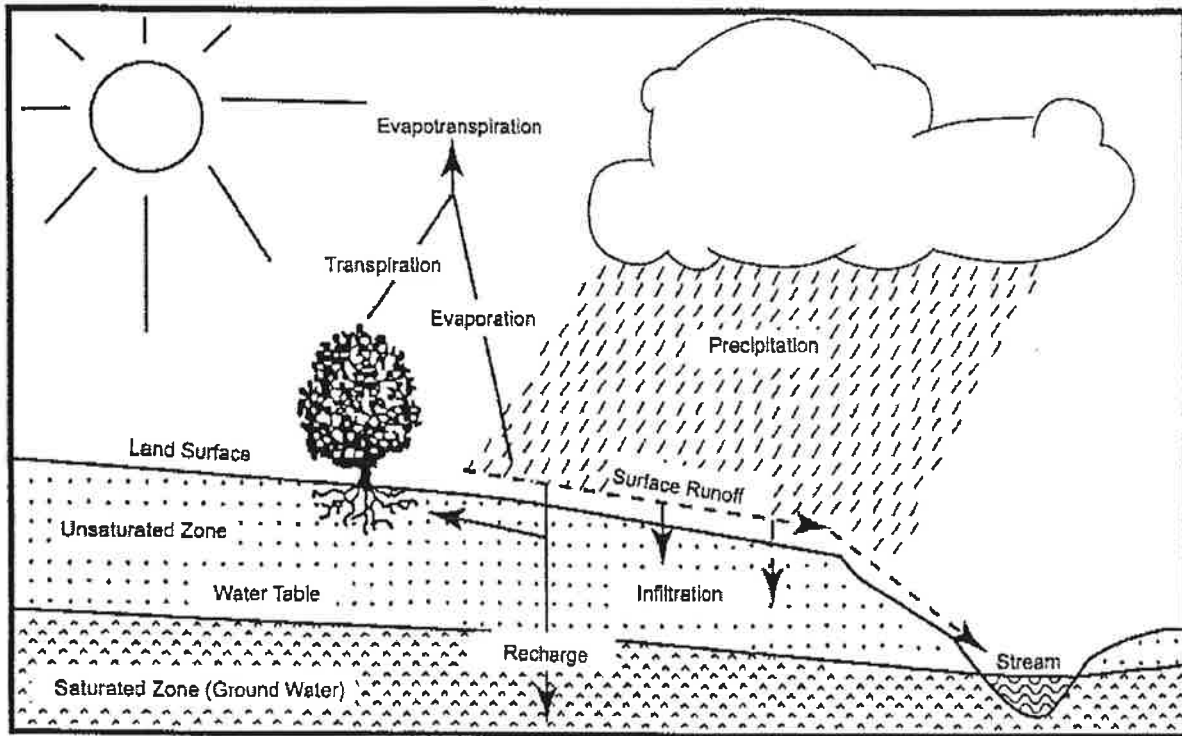
The municipality may allow a developer to provide funding or partial funding to the municipality for an environmental enhancement project that has been identified in a Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure. Mitigation projects could include public grounds, school grounds, roadside storm ditches, etc.

RBZ/cmp  
Bloomsbury municipal stormwater.doc



# APPENDIX A

Figure C-1: Groundwater Recharge in the Hydrologic Cycle

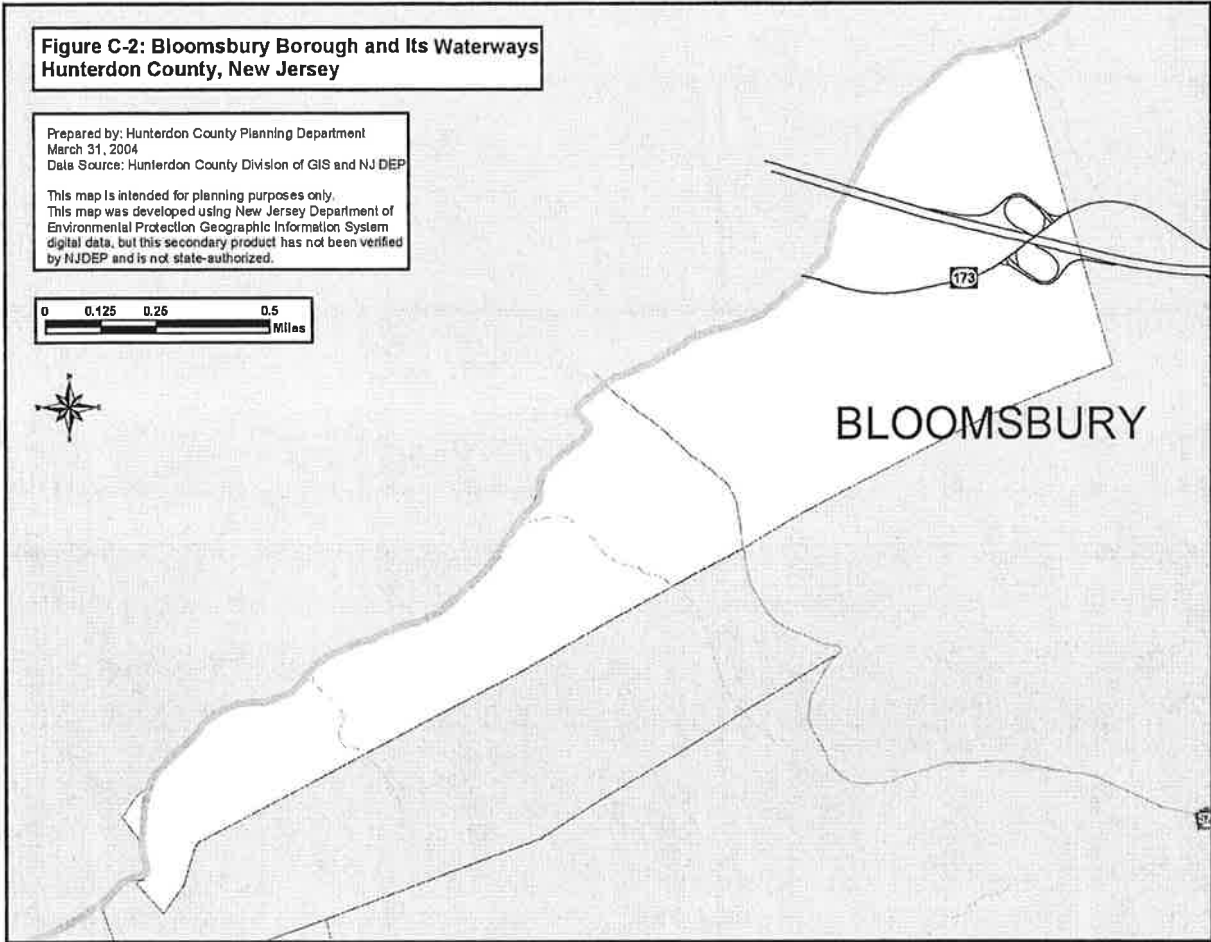
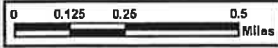


Source: New Jersey Geological Survey Report GSR-32.

**Figure C-2: Bloomsbury Borough and Its Waterways  
Hunterdon County, New Jersey**

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and NJ DEP

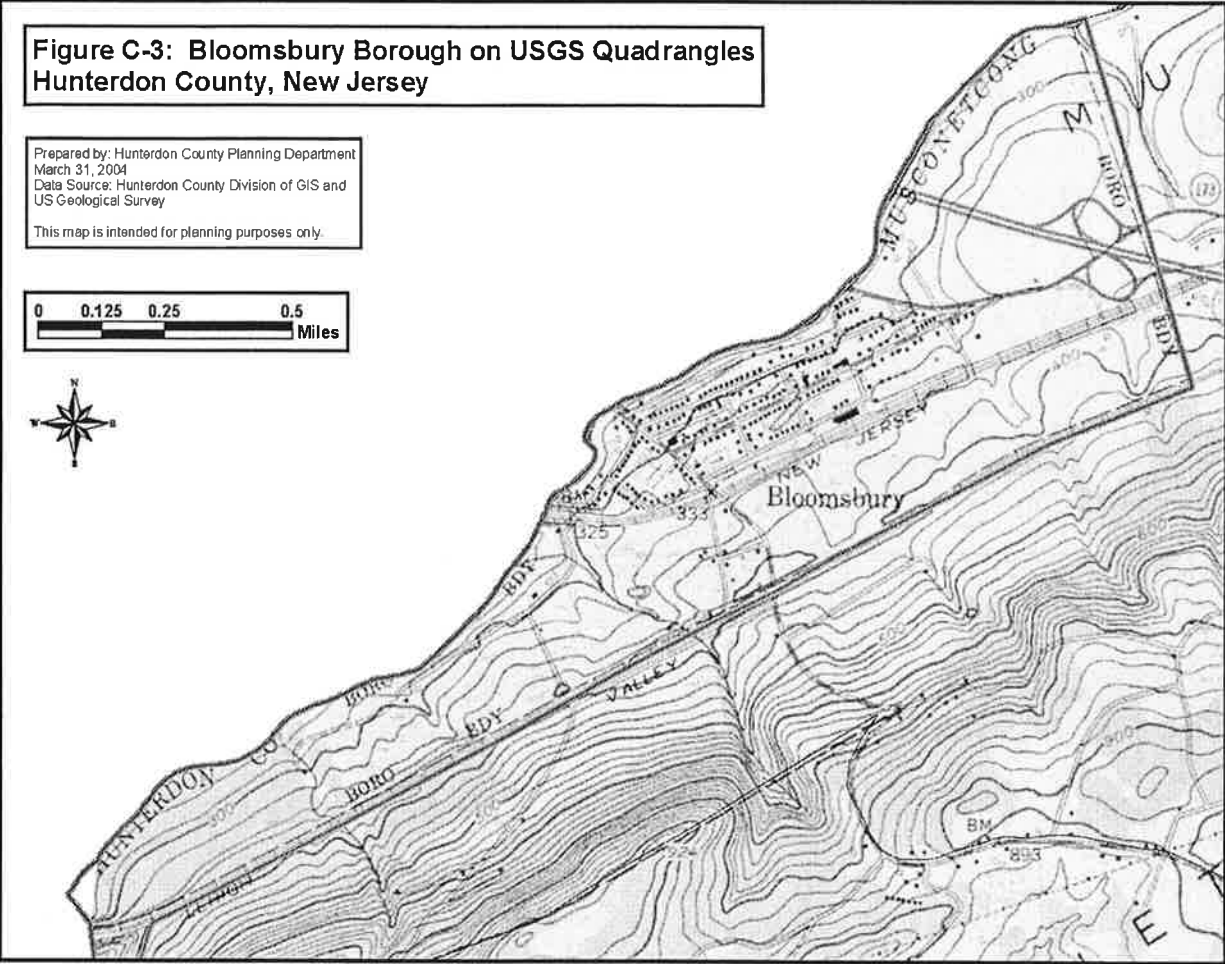
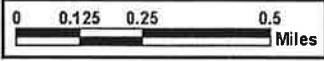
This map is intended for planning purposes only.  
This map was developed using New Jersey Department of  
Environmental Protection Geographic Information System  
digital data, but this secondary product has not been verified  
by NJDEP and is not state-authorized.



**Figure C-3: Bloomsbury Borough on USGS Quadrangles  
Hunterdon County, New Jersey**

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and  
US Geological Survey

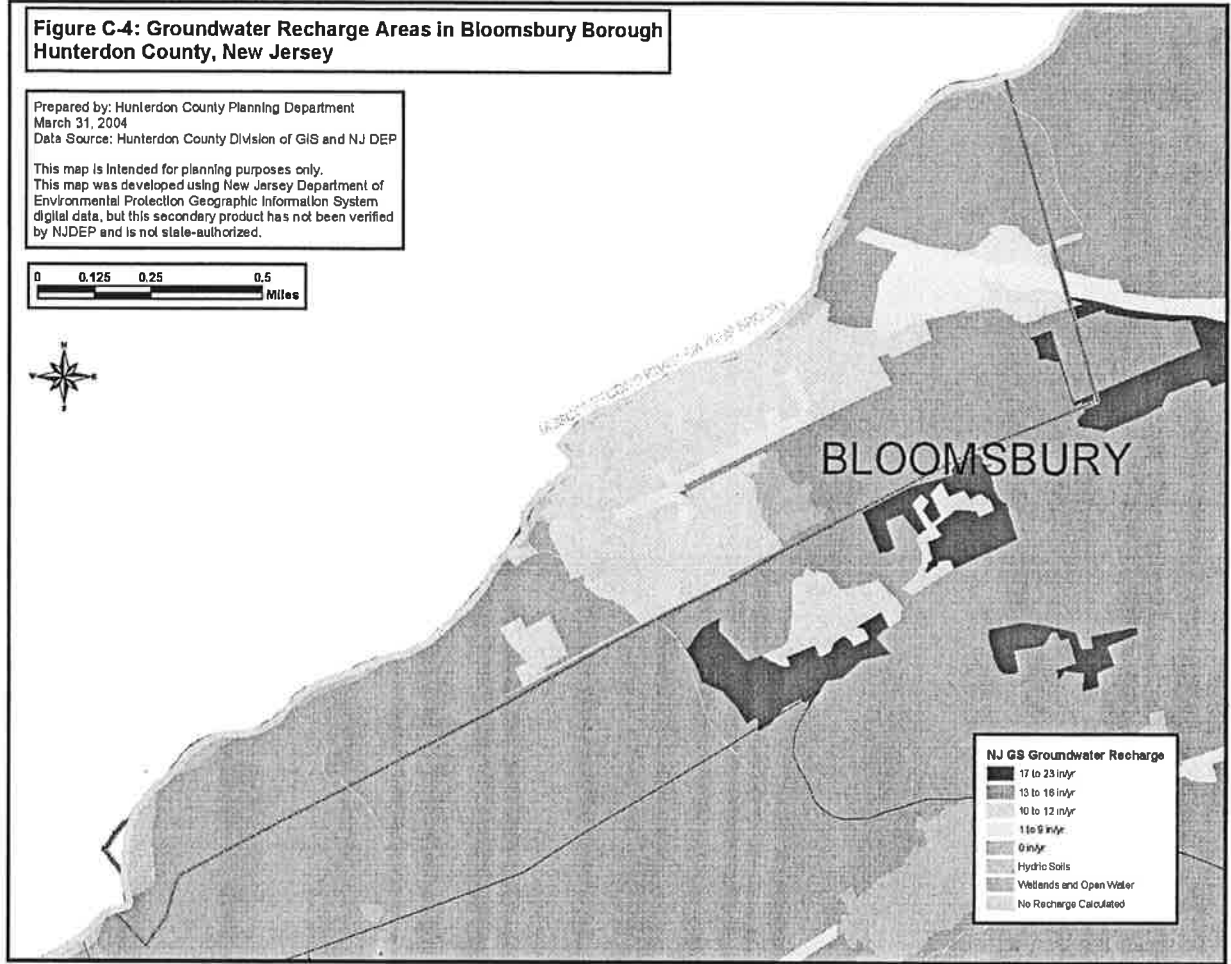
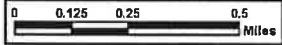
This map is intended for planning purposes only.



**Figure C-4: Groundwater Recharge Areas in Bloomsbury Borough  
Hunterdon County, New Jersey**

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and NJ DEP

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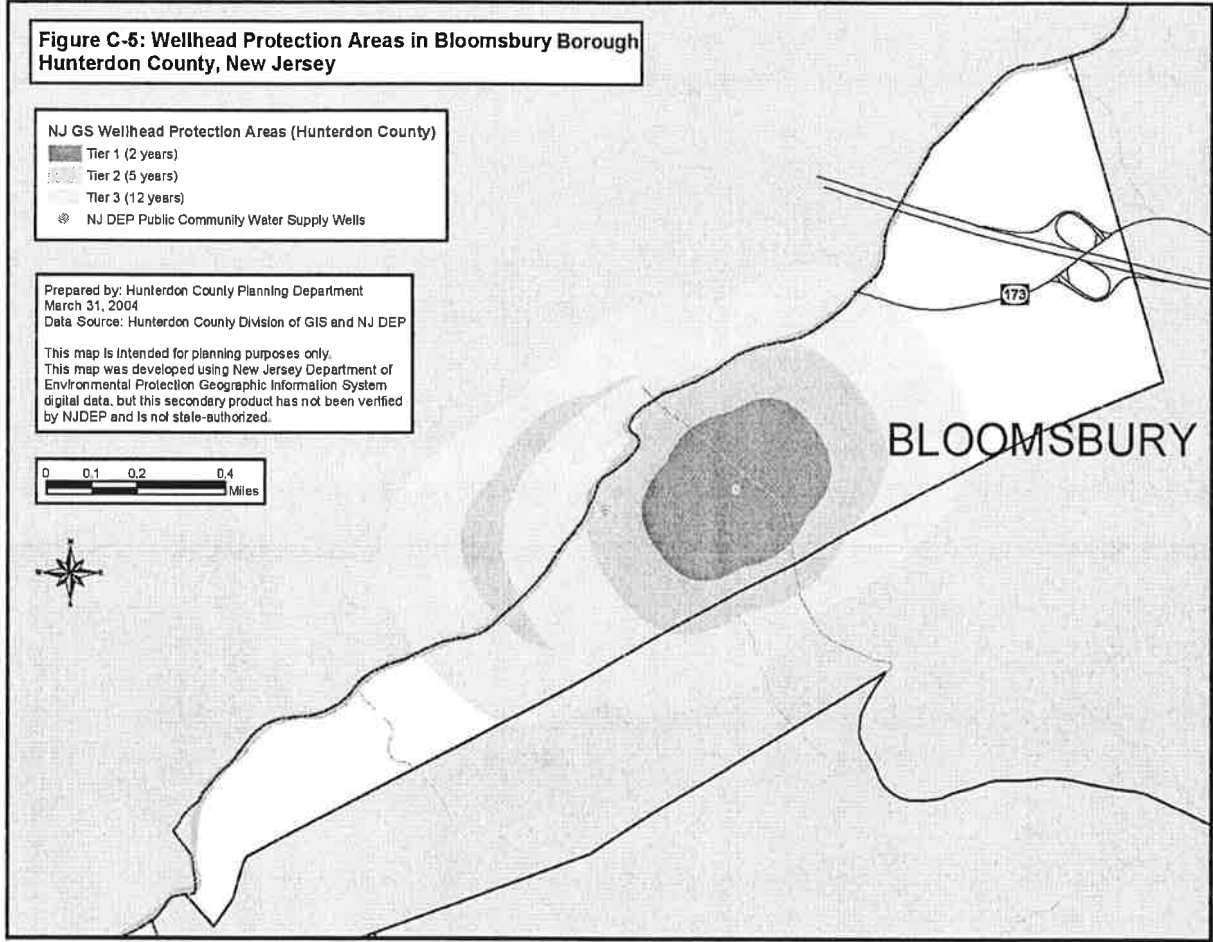
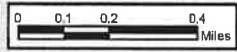
**Figure C-6: Wellhead Protection Areas in Bloomsbury Borough  
Hunterdon County, New Jersey**

**NJ GS Wellhead Protection Areas (Hunterdon County)**

- Tier 1 (2 years)
- Tier 2 (5 years)
- Tier 3 (12 years)
- ⊗ NJ DEP Public Community Water Supply Wells

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and NJ DEP

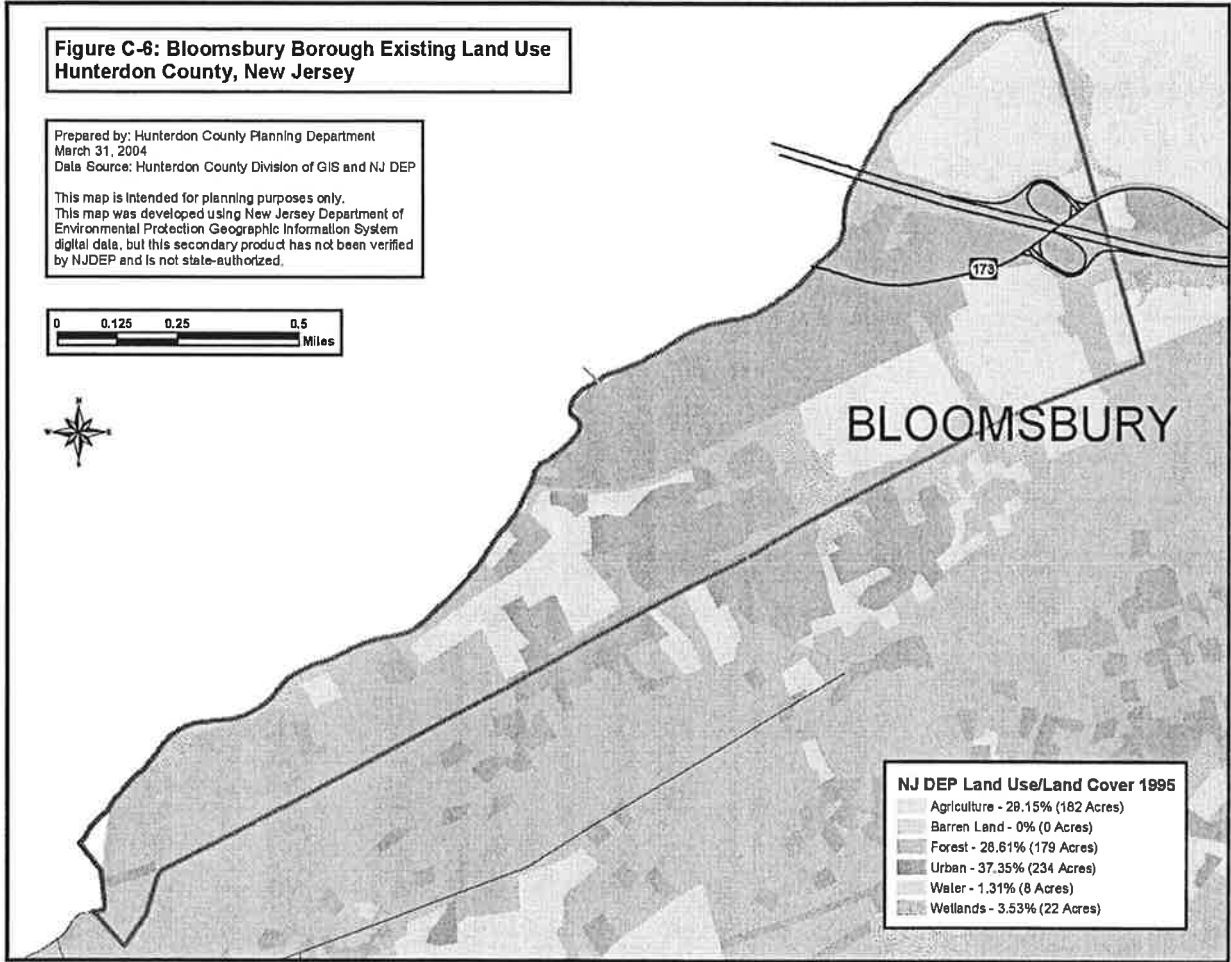
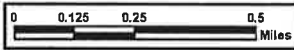
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**Figure C-6: Bloomsbury Borough Existing Land Use  
Hunterdon County, New Jersey**

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and NJ DEP

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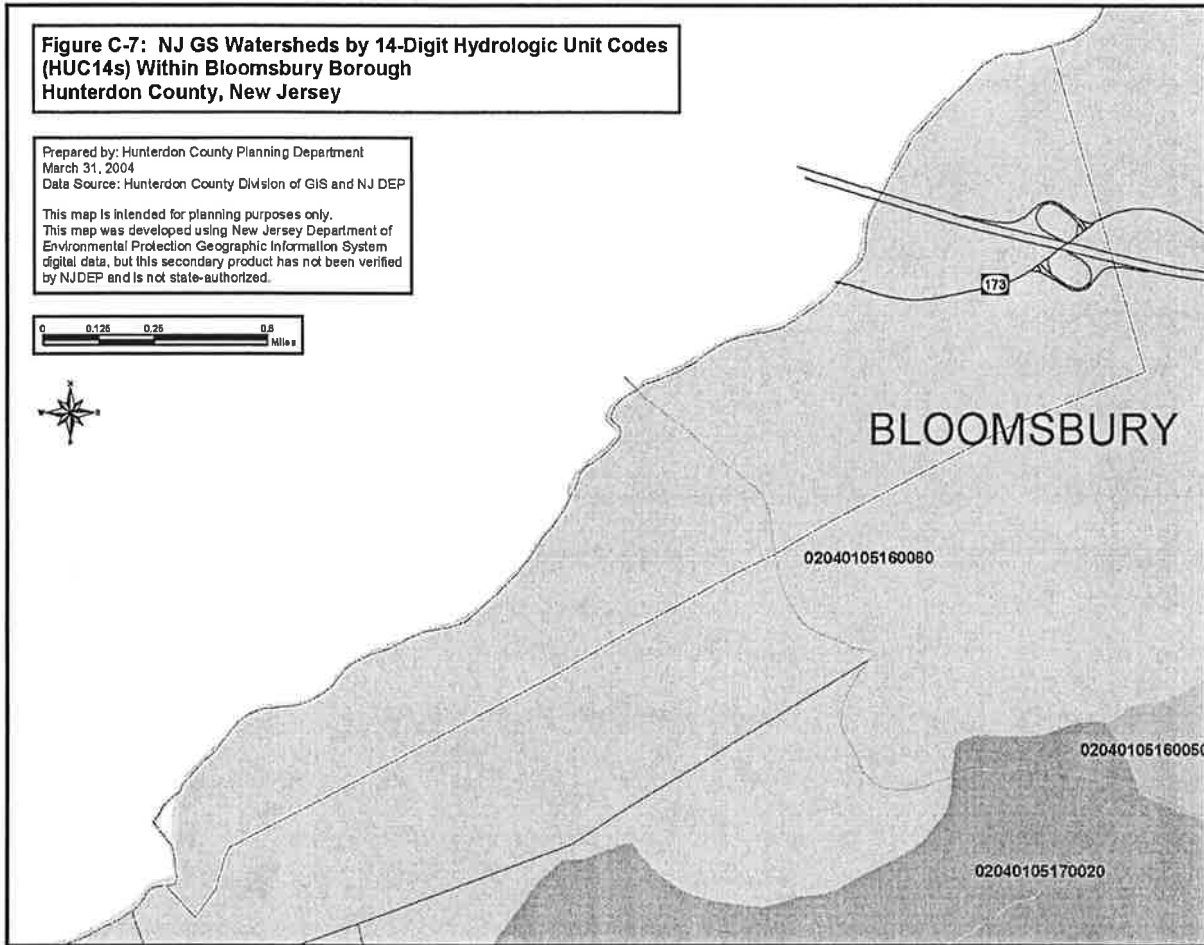
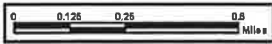


NJ DEP Land Use/Land Cover 1995	
Agriculture	- 29.15% (182 Acres)
Barren Land	- 0% (0 Acres)
Forest	- 28.81% (179 Acres)
Urban	- 37.35% (234 Acres)
Water	- 1.31% (8 Acres)
Wetlands	- 3.53% (22 Acres)

**Figure C-7: NJ GS Watersheds by 14-Digit Hydrologic Unit Codes (HUC14s) Within Bloomsbury Borough Hunterdon County, New Jersey**

Prepared by: Hunterdon County Planning Department  
March 31, 2004  
Data Source: Hunterdon County Division of GIS and NJ DEP

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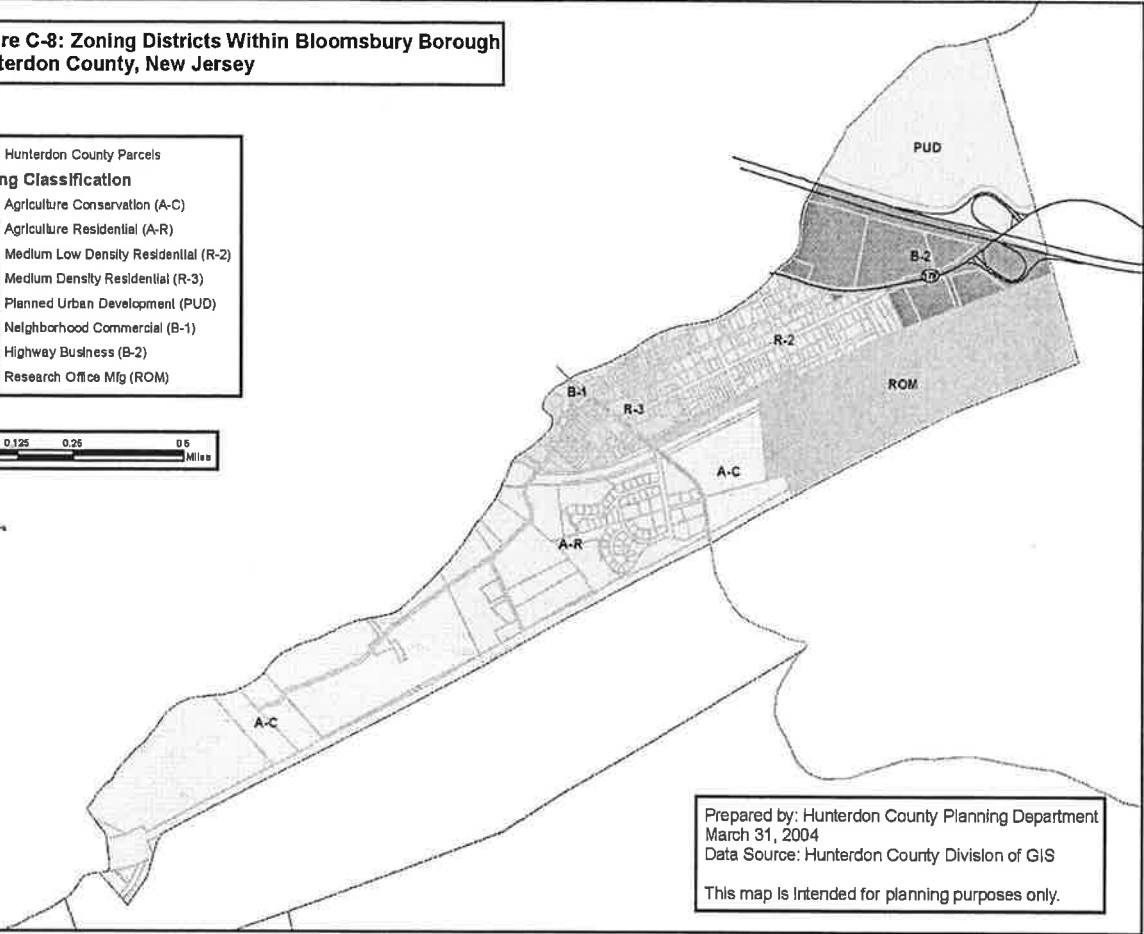
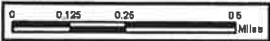


**Figure C-8: Zoning Districts Within Bloomsbury Borough  
Hunterdon County, New Jersey**

Hunterdon County Parcels

**Zoning Classification**

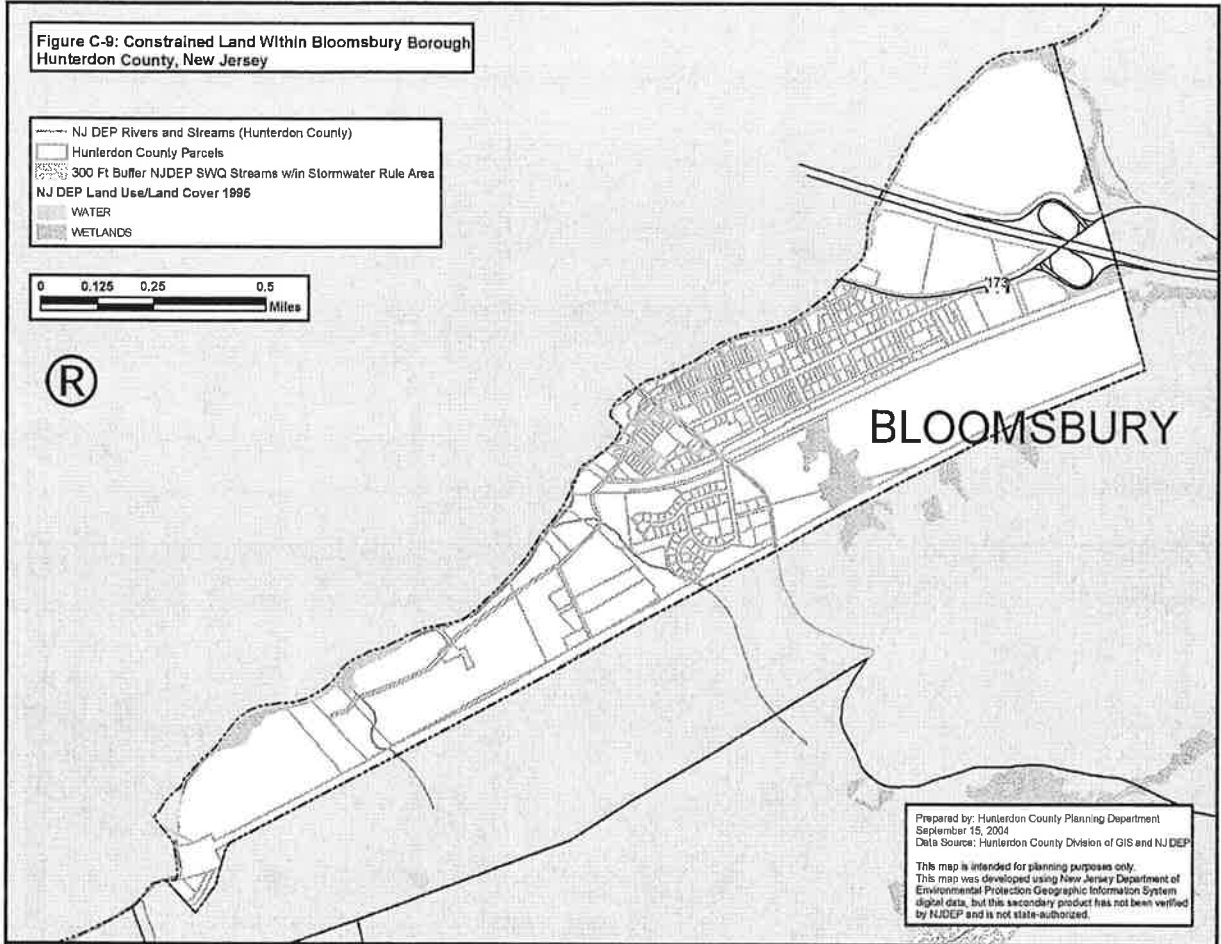
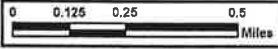
- Agriculture Conservation (A-C)
- Agriculture Residential (A-R)
- Medium Low Density Residential (R-2)
- Medium Density Residential (R-3)
- Planned Urban Development (PUD)
- Neighborhood Commercial (B-1)
- Highway Business (B-2)
- Research Office Mfg (ROM)



Prepared by: Hunterdon County Planning Department  
 March 31, 2004  
 Data Source: Hunterdon County Division of GIS  
 This map is intended for planning purposes only.

Figure C-9: Constrained Land Within Bloomsbury Borough  
Hunterdon County, New Jersey

- NJ DEP Rivers and Streams (Hunterdon County)
- Hunterdon County Parcels
- ▨ 300 Ft Buffer NJDEP SWQ Streams w/in Stormwater Rule Area
- NJ DEP Land Use/Land Cover 1996
- WATER
- WETLANDS

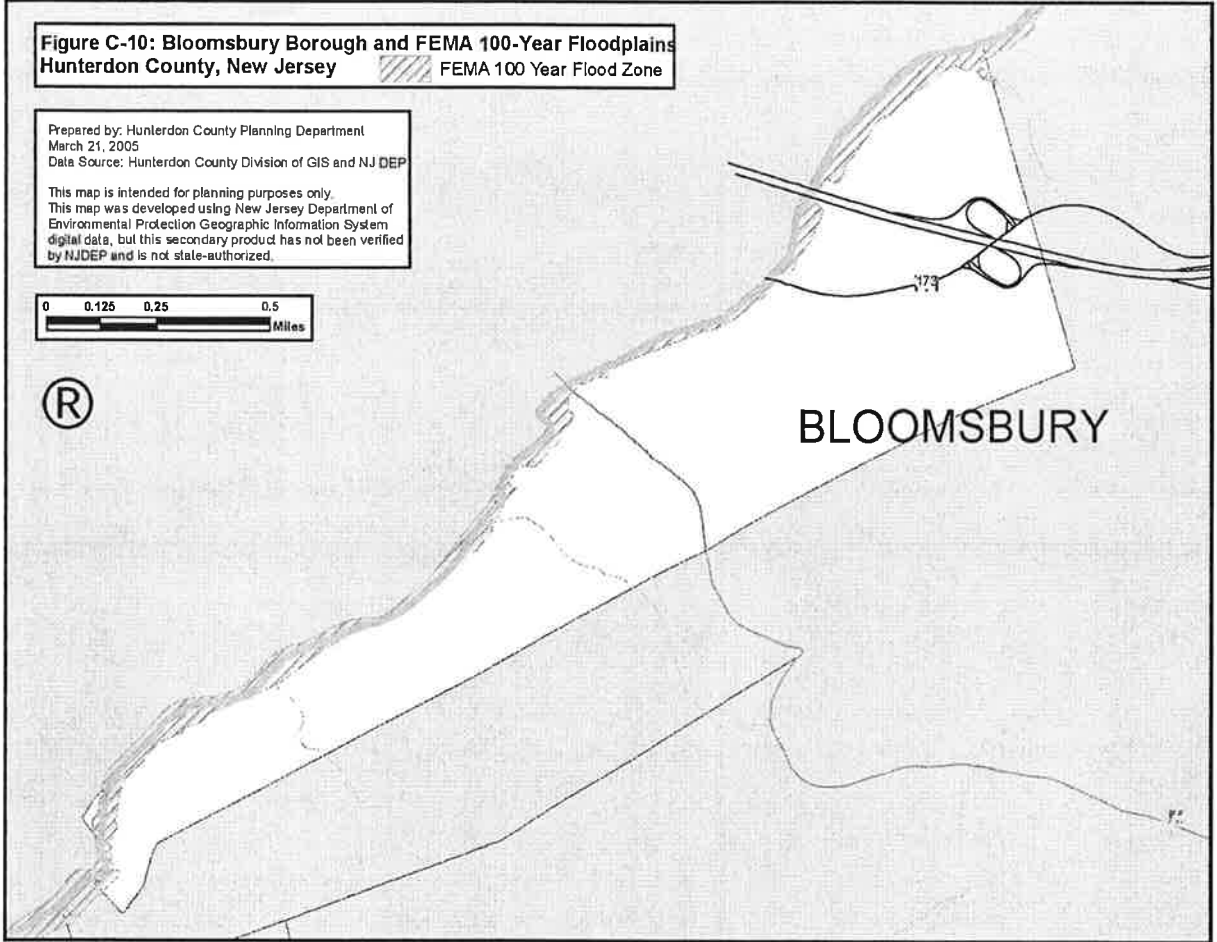
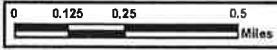


Prepared by: Hunterdon County Planning Department  
September 15, 2004  
Data Source: Hunterdon County Division of GIS and NJDEP  
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**Figure C-10: Bloomsbury Borough and FEMA 100-Year Floodplains  
Hunterdon County, New Jersey**  FEMA 100 Year Flood Zone

Prepared by: Hunterdon County Planning Department  
March 21, 2005  
Data Source: Hunterdon County Division of GIS and NJ DEP

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# APPENDIX B

**New Jersey's EPA Approved  
2004 Integrated List of Waterbodies**

<b>Sublist*</b>	<b>Wtrshd Region</b>	<b>WMA</b>	<b>Station Name/Waterbody</b>	<b>Site ID</b>	<b>Parameters</b>	<b>Data Source</b>
4	Northwest	01	Musconetcong River near Bloomsbury	01457000, EWQ0072, 1-MUS-4	Fecal Coliform	NJDEP/USGS Data, EWQ, Metal Recon
5	Northwest	01	Musconetcong River near Bloomsbury	01457000, EWQ0072, 1-MUS-4	pH	NJDEP/USGS Data, EWQ, Metal Recon
3	Northwest	01	Musconetcong River near Bloomsbury	01457000, EWQ0072, 1-MUS-4	Arsenic, Mercury	NJDEP/USGS Data, EWQ, Metal Recon
1	Northwest	01	Musconetcong River near Bloomsbury	01457000, EWQ0072, 1-MUS-4	Phosphorus, Temperature, Dissolved Oxygen, Nitrate, Dissolved Solids, Total Suspended Solids, Unionized Ammonia, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Zinc	NJDEP/USGS Data, EWQ, Metal Recon

<b>Sublist</b>	<b>Wtrshd Region</b>	<b>WMA</b>	<b>Station Name/Waterbody</b>	<b>Site ID</b>	<b>Parameters</b>	<b>Data Source</b>
5	Northwest	01	Musconetcong River at Riegelsville	01457400, DBRCNJ0025, 1-MUS-5	Phosphorus, Temperature, Total Suspended Solids	NJDEP/USGS Data, DRBC, Metal Recon
4	Northwest	01	Musconetcong River at Riegelsville	01457400, DBRCNJ0025, 1-MUS-5	Fecal Coliform	NJDEP/USGS Data, DRBC, Metal Recon
3	Northwest	01	Musconetcong River at Riegelsville	01457400, DBRCNJ0025, 1-MUS-5	Arsenic, Mercury	NJDEP/USGS Data, DRBC, Metal Recon
1	Northwest	01	Musconetcong River at Riegelsville	01457400, DBRCNJ0025, 1-MUS-5	pH, Dissolved Oxygen, Nitrate, Dissolved Solids, Unionized Ammonia, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Zinc	NJDEP/USGS Data, DRBC, Metal Recon

\*See Page 20 for Sublist definitions

**Sublist 1. Attaining the water quality standard and no use is threatened.** Threatened is defined as currently supporting uses but information suggests that such uses will not be met within the next two years. Waterways are listed in this sublist if there are data and information that meet the requirements of the State's assessment and listing methodology and support a determination that the water quality standard is attained and no use is threatened.

**Sublist 2. Attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.**

Waterways are listed in this sublist if there are data and information which meet the requirements of the State's assessment and listing methodology to support a determination that some, but not all, uses are attained and none are threatened. Attainment status of the remaining uses is unknown because there is insufficient or no data or information.

**Sublist 3. Insufficient or no data and information to determine if any designated use is attained.**

Waterways are listed on this sublist where the data or information to support an attainment determination for any use is not available, consistent with the requirements of the State's assessment and listing methodology. To assess the attainment status of these waterways, the State should obtain supplementary data and information, or schedule monitoring as needed.

This category also includes locations where there are sufficient data to make assessments, however, criteria or guidelines for making a use attainment assessment are currently not available.

**Sublist 4. Impaired or threatened for one or more designated uses but does not require the development of a TMDL.**

**4A. TMDL has been completed.** Waterways are listed on this sublist once all TMDL(s) have been developed and approved by USEPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of a waterway, the water will remain on sublist 5 until all TMDLs for each pollutant have been completed and approved by USEPA.

**4B. Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.** Consistent with the regulation under §§130.7(b)(i), (ii), and (iii), waterways are listed on this sublist where other pollution control requirements required by local, state or federal authority are stringent enough to attain any water quality standard applicable to such waters.

**4C. Impairment is not caused by a pollutant.** Waterways are listed on this sublist if the impairment is not caused by a pollutant but instead is due to factors such as habitat degradation, stream channeling, etc. States and territories should consider scheduling these waterways for monitoring to confirm that there continues to be no pollutant-caused impairment and to support water quality management actions necessary to address the cause(s) of the impairment.

**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.** This sublist constitutes the Section 303(d) list of waters impaired or threatened by a pollutant(s) for which one or more TMDL(s) are needed. A waterway should be listed on this sublist if it is determined, in accordance with the State's assessment and listing methodology, that a pollutant has caused, is suspected of causing, or is projected to cause an impairment. Where more than one pollutant is associated with the impairment of a single waterway, the waterway will remain on sublist 5 until TMDLs for all pollutants have been completed and approved by USEPA.