

Stormwater Management Plan

For

**Hillsborough Township
Somerset County, New Jersey**

Prepared by:

**Mark E. Zelina
Township Engineer
Maser Consulting P.A.**

*Adopted by the Hillsborough Township
Planning Board on April 7, 2005*

HBT-113

TABLE OF CONTENTS

	<u>Page</u>
Introduction.....	1
MSWMP Goals.....	1
Stormwater Discussion.....	2
Background.....	3
Design and Performance Standards.....	6
Nonstructural Stormwater Management Strategies.....	7
Land Use/Build-Outs Analysis.....	10
Mitigation Plans.....	10
Recommended Implementing Stormwater Control Ordinances.....	11

List of Tables

Table C-1	Build-Out Calculations
Table C-2	Pollutant Loads by Land Cover
Table C-3	Non-Point Source Loads at Build-Out for HUC14s

List of Figures

Figure 1	Hydrologic Cycle
Figure 2	Streams and Rivers
Figure 3	USGS Map
Figure 4	HUC14 Drainage Areas
Figure 5	100-Year Frequency Floodplain
Figure 6	Land use/Land Cover
Figure 7	Zoning
Figure 8	Aerial Photo and Parcel Lines
Figure 9	Average Annual Groundwater Recharge Rates
Figure 10	Well Head Protection Areas
Figure 11	Wetlands

Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Hillsborough Township (“the Township”) 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 base flow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

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

MSWMP Goals

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase in stormwater runoff from any new development;
- Reduce soil erosion from any development or construction project;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Maintain groundwater recharge
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater 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. Preventive 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) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration, which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

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.

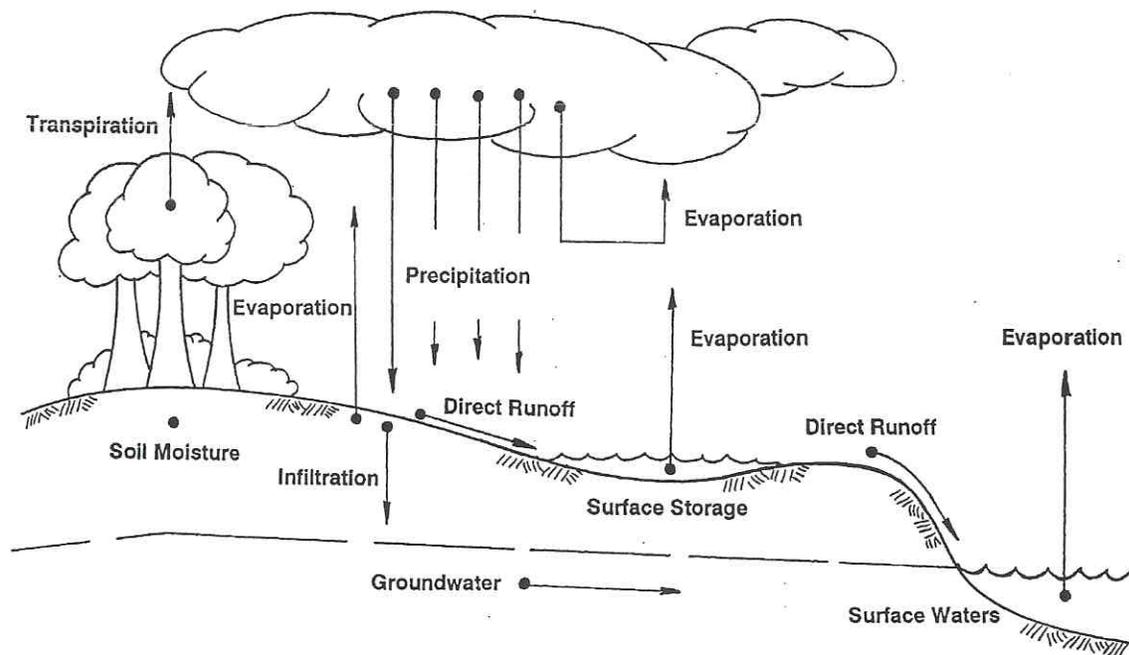


Figure 1 – Hydrologic Cycle

Background

The Township encompasses 54.7 square miles in the southwestern part of Somerset County, New Jersey. In terms of land use the Township is divided from north to south into separate intensities of land use. The more densely populated residential developments are located along the eastern portion of the municipality with significant areas of forested and agricultural lands located to the west. According to the 2000 census, the Township has 36,634 residents. The population rose approximately 27 percent since the 1990 census. This population increase is more than the overall state and county increases of approximately 9 and 24 percent respectively over the same period. This population increase has resulted in considerable demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Stream and rivers within the Township are shown in Figure 2 and the topography of the Township is shown in Figure 3.

The Township is situated along the east side of the South Branch Raritan River, the south side of the Raritan River and the west side of the Millstone River in the Raritan Basin. It is located in Watershed Management Areas (WMA) 8, 9 and 10. The Township contains portions of Hydrologic Unit Code (HUC) areas for fifteen (15) areas. These HUC14 areas are shown in Figure 4.

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 New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are

classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

Based on the AMNET data, the water bodies bordering the Township are moderately impaired. The closest AMNET site is located on the Millstone River at Blackwells Mills Rd in Hillsborough. There are also AMNET sites upstream on the Raritan River at Neshanic Station.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. If these data show that the instream pollutant concentrations exceed the state's criteria then the river is an impaired waterway and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants.

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 BMP's.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDL's are needed.

The following waters are listed on Sublist 5 (August 9, 2004):

- Neshanic River at Hillsborough, Benthic Macroinvertebrates (AN0337- NJDEP AMNET) Low Priority for TMDL.
- Raritan River at Manville, Phosphorus (01400500- NJDEP USGS DATA) Medium Priority for TMDL.
- Rock Brook at Zion, Fecal Coliform (01401560- NJDEP USGS DATA) High Priority for TMDL.
- S. Branch Raritan River

In addition to water quality problems, the Township has occasional flooding problems. Flooding occurs on the Raritan River and on the Millstone River. Flooding on the Raritan River only affects properties on the north side of the Township. While flooding along the Millstone River affects properties along the eastern side of the Township. The 100-year floodplain, shown in Figure 5, depicts the Raritan River, Millstone River, Neshanic River, Pike Run, Royce Brook, and the Duke Brook floodplains.

In addition to water quality problems, the Township has exhibited water quantity problems including flooding and stream bank erosion. Many of the culverts associated with road crossings in the Township are undersized. During severe storm events, these undersized culverts do not have adequate capacity, thereby causing a backwater effect and flooding upstream.

In conjunction with the USGS, Somerset County operates a flood information system for its 21 municipalities. The Somerset County Flood Information System (SCFIS) consists of a network of stream and precipitation gages throughout the County. Information from these gages is automatically transmitted to a central location via telephone, radio and satellite. The information is then processed and appropriate actions are taken. These actions include notifying municipal police, fire and emergency management personnel with flood potential and water level information.

There are several SCFIS stream and precipitation gauges near Hillsborough Township. There are three precipitation gages in the North Princeton Developmental Center (Montgomery Twp.), in the Sourland Mountain Preserve (East of Long Hill Rd. and South of Zion Rd.) and on Amwell Road just west of Route 206. The Township has stream gages on the following streams:

NB RARITAN R AT SOUTH BRANCH NJ
RARITAN RIVER AT MANVILLE NJ
MILLSTONE RIVER AT GRIGGSTOWN NJ
MILLSTONE RIVER AT BLACKWELLS MILLS NJ

Information from these stream gages is available on the United States Geological Survey (USGS) web site in real time (<http://waterdata.usgs.gov/nj/nwis>).

The Township has a significant amount of developable land. The existing land use, based on 1995/1997 aerial photography, is shown in Figure 6. The existing zoning is shown in Figure 7. A current aerial photo with parcel lot lines overlain on it is shown in Figure 8. The Township is partly within the State Plan Designation PA1 Metropolitan Planning Area where infiltration requirements are not applicable. Groundwater recharge rates for native soils in this area are generally between 1 and 19 inches annually. The average annual groundwater recharge rates are shown graphically in Figure 9.

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 10, a portion of the Township is in a tier 3 wellhead protection area. This area is located in the northwest portion of the municipality along the Raritan River and adjacent to the Borough of Manville.

In addition to the rivers and streams that run through and along the Township, there are a number of wetland areas. These wetland areas, shown in Figure 11, provide flood storage, nonpoint pollutant removal and habitat for flora and fauna.

Design and Performance Standards

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse 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 month of the effective date of the Stormwater Management Rules.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area and no TMDL's have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDL's. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Township is within the Raritan Basin and much information on the basin and about its characteristics has been developed as part of the Raritan Plan. Additional information

concerning this plan can be found at: <http://www.raritanbasin.org>. The Township supports the Raritan Plan.

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

The Township'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, Township 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 Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 24 months of the effective date of the Stormwater Management Rules. A copy will be sent to the Department of Environmental Protection at the time of submission.

Chapter 188 of the Township Code, entitled "**Land Use and Development**", was reviewed in regard to incorporating non-structural stormwater management strategies. Several changes are recommended to **Article IV** of this chapter, entitled "**Design and Performance Standards**" to incorporate these strategies.

Section 188-38: Buffers requires buffer areas along all lot and street lines separating residential uses from arterial and collector streets, separating a nonresidential use from either a residential use or residential zoning district line, and along all street lines where loading and storage areas can be seen from the street. The landscape requirements for these buffer areas in the existing section do not recommend the use of native vegetation. The language of this section should be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species. Additionally, language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. This section currently requires the preservation of natural wood tracts and limits land disturbance for new construction.

Section 188-40: Cluster Development - Cluster Development provides for a cluster development option to preserve land for public and agricultural purposes, to prevent development on environmentally sensitive areas, and to aid in reducing the cost of providing streets, utilities and services in residential developments. This cluster option is

an excellent tool for reducing impervious roads and driveways. The option allows for smaller lots with smaller front and side yard setbacks than traditional development options. It also minimizes the disturbance of large tracts of land, which is a key nonstructural stormwater management strategy. As it appears in Section 188-98(D)10e1 of the ordinance, the cluster option should be amended to require that more than 20% of the total tract be preserved as common open space for residential area. The cluster option does require that 25 percent of the green or common area be landscaped with trees and/or shrubs. This language should be amended to promote the use of native vegetation, which requires less fertilization and watering than non-native ornamental plants. Although the cluster option requires public concrete sidewalks to be installed along all streets, the option requires paths in open space to be mulched or stone to decrease the impervious area.

188-42. Curbs and Gutters requires that concrete curb and gutter, concrete curb, or Belgian block curb be installed along every street within and fronting on a development. This section was amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

Section 188-43: Drainage, Watercourses and Flood Hazard Areas requires that all streets be provided with inlets and pipes where the same are necessary for proper drainage. This section should be amended to encourage the used of natural vegetated swales in lieu of inlets and pipes.

Section 188-64: Natural Features requires that natural features, such as trees, brooks, swamps, hilltops, and views, be preserved whenever possible, and that care be taken to preserve selected trees to enhance soil stability and landscaped treatment of the area. This section should be amended to expand trees to forested areas, to ensure that leaf litter and other beneficial aspects of the forest are maintained in addition to the trees.

Section 188-66. Nonconforming uses, structures or lots: requires a variance for existing single-family homes proposing additions that exceed the maximum percent impervious. The homeowner must mitigate the impact of the additional impervious surfaces unless the stormwater management plan for the development provided for these increases in impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in Chapter 262. A detailed description of how to develop a mitigation plan will be part of this document.

Section 188-67 Off-site and off-tract improvements describes essential off-site and off-tract improvements. Language should be added to this section to require that any off-site and off-tract stormwater management and drainage improvements must conform to the “Design and Performance Standards” described in this plan and provided in Chapter 262 of the Township Code.

Section 188-68. Off-street parking and loading details off-street parking and loading requirements. All parking lots with more than 10 spaces and all loading areas are required to have concrete or Belgian block curbing around the perimeter of the parking and loading areas. This section also requires that concrete or Belgian block curbing be installed around all landscaped areas within the parking lot or loading areas. This section should be amended to allow for flush curb with curb stop, or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, language should be added to allow for use of natural vegetated swales for the water quality design storm, with overflow for larger storm events into storm sewers. This section also provides guidance on minimum parking space requirements. These requirements are based on the number of dwelling units and/or gross floor area. The section allows a developer to demonstrate that fewer spaces would be required, provided area is set aside for additional spaces if necessary. This section should be amended to allow pervious paving to be used in areas to provide overflow parking, vertical parking structures, smaller parking stalls, and shared parking.

Section 188-81: Sidewalks describe sidewalk requirements for the Township. Although sidewalks are not required along all streets, the Township can require them in areas where the probable volume of pedestrian traffic, the development's location in relation to other populated areas and high vehicular traffic, pedestrian access to bus stops, schools, parks, and other public places, and the general type of improvement intended indicate the advisability of providing a pedestrian way. Sidewalks are to be a minimum of four feet wide and constructed of concrete. Language should be added to this section to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate that provide a durable and safe surface.

188-84. Soil erosion and sediment control: Soil Erosion and Sediment Control addresses soil erosion and sediment control by referencing Chapter 251, the Township's Soil Erosion and Sediment Control Ordinance. This ordinance requires developers to comply with the New Jersey Soil Erosion and Sediment Control Standards and outlines some general design principles, including: whenever possible, retain and protect natural vegetation; minimize and retain water runoff to facilitate groundwater recharge; and, install diversions, sediment basins, and similar required structures prior to any on-site grading or disturbance.

Section 188-86 Stormwater Runoff addresses stormwater runoff by referencing Chapter 262, the Township's Surface Water Management Ordinance, which shall be updated to include all requirements outlined in N.J.A.C. 7:8-5. These changes were presented earlier in this Municipal Stormwater Management Plan.

Several changes should be made to Article V of the Township Code entitled "Districts and Standards." The Township has 11 types of residential districts. Each district has a maximum percent impervious surface allocation, ranging from 5 percent for the MZ

District, which has a minimum lot size of five acres (utilizing the Lot Size Averaging Option) for detached single-family homes, to 40 percent for the AM and RCA Districts, which have a minimum lot size of 7,000 square feet for cluster single-family homes. The Township has 12 types of nonresidential districts. Each of these districts has a maximum percent impervious surface allocation, ranging from 30 percent for the HOO District to 60 percent for the I-1 District. Although each zone has a maximum allowable percent impervious surface, the Township Code should be amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures contained in Chapter 262 – Surface Water Runoff. The Township should evaluate the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. The Township should also evaluate the maximum percent of disturbance for each zone, for those areas identified as natural features in Section 188-64. Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer should mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge as described in Chapter 262. A detailed description of how to develop a mitigation plan is included in this Municipal Stormwater Management Plan.

Land Use/Build-Out Analysis

Since the Township of Hillsborough has a combined total of more than one square mile of vacant lands, the Township is required to do a build-out analysis. A detailed land use analysis for the Township was conducted. Figure C-6 illustrates the existing land use in the Township based on 1995/97 GIS information from NJDEP. Figure C-7 illustrates the HUC14s within the Township. The Township zoning map is shown in Figure C-8. Figure C-9 illustrates the constrained lands within the Township. The build-out calculations for impervious cover are shown in Table C-1. As expected when developing agricultural and forestlands, the build-out of these HUC14s will result in a significant increase in impervious surfaces.

Table C-2 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table C-3.

Mitigation Plans

Applicants for development will be expected to mitigate the impacts of development on stormwater at their own site or other sites within the subject watershed that it controls. No variances and exemptions from the standards shall be granted.

It should also be noted that there is little or no land area within the Township at strategic downstream locations and owned by the municipality or other governmental agencies that would even allow for a flood control or water quality enhancement project if mitigation were to be allowed in the plan by the municipality. The lack of available lands for such purposes can be seen from the Aerial photo Map provided in Figure 8. It is more practical for any new development to provide on-site stormwater facilities rather than implementing a municipal system that would disrupt the existing built environment.

Recommended Implementing Stormwater Control Ordinances

The Township will implement the following ordinances:

- Illicit Connection Ordinance
- Improper Waste Disposal Ordinance
- Litter Ordinance
- Pet Waste Ordinance
- Wildlife Feeding Ordinance
- Yard Waste Ordinance
- The Stormwater Control Ordinance will be implemented in accordance with NJAC 7:8-4.

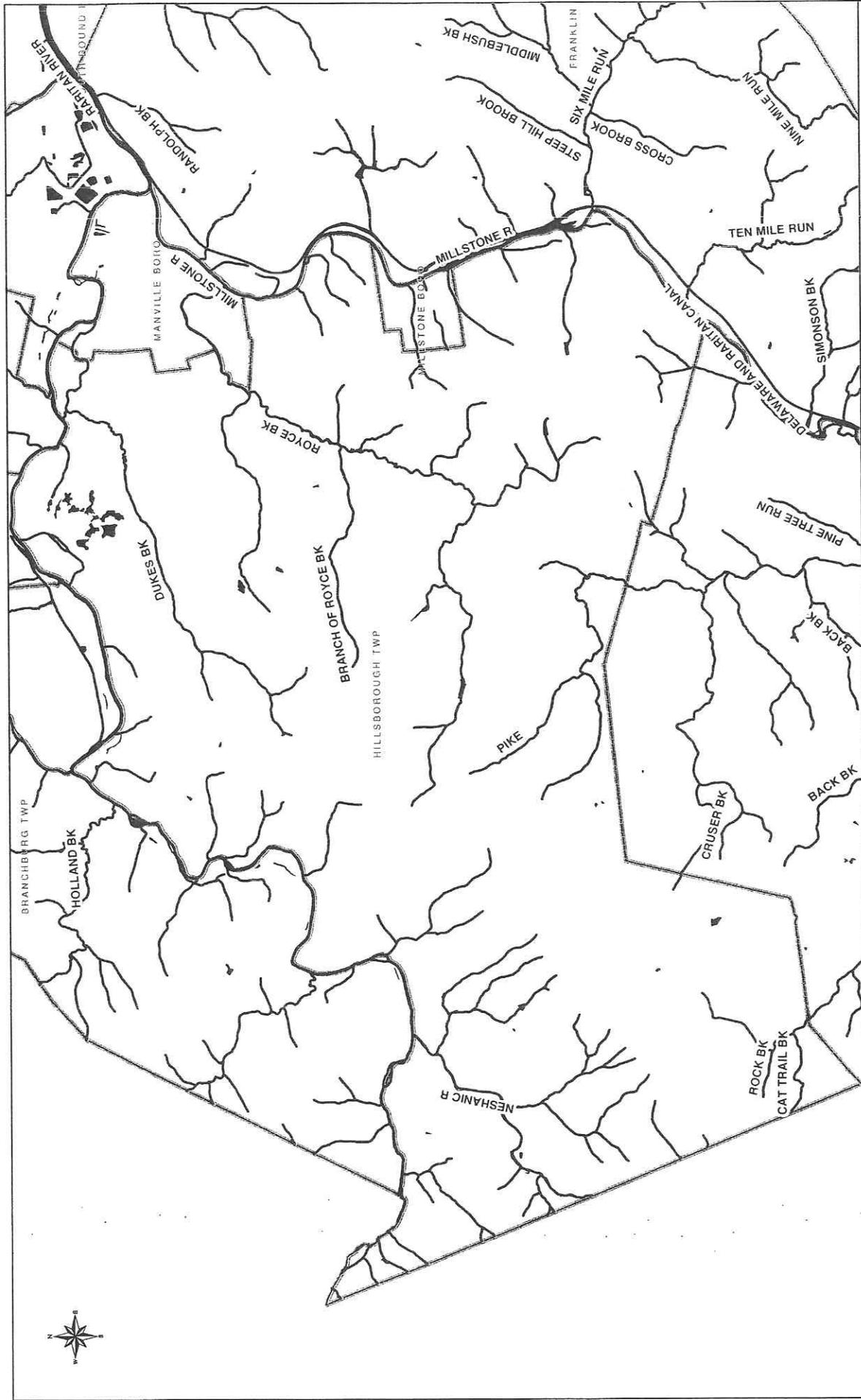
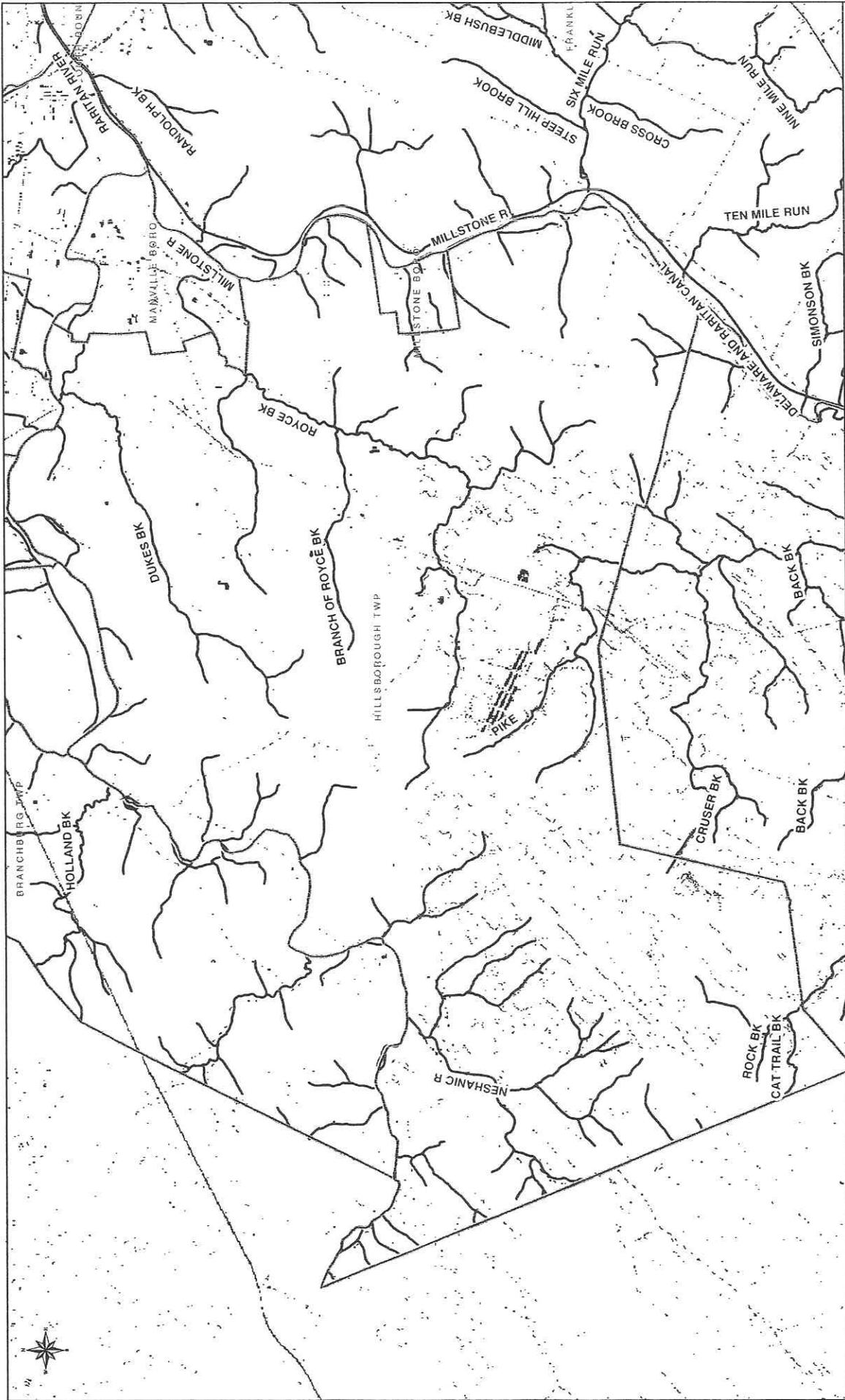


Figure 2

Hillsborough Twp. Waterways

0 2,500 5,000 10,000 Feet
 Prepared By: Somerset County, May 2004
 Provided through the Information System Digital Data, GIS Information
 Product from Somerset County GISD 2003 05 08 09:00:00 AM



**Hillsborough Twp.
USGS Quadrangle Map**

Figure 3

0 2,500 5,000 10,000 Feet
 Prepared By: Somerset County, May 2004
 This map is a reproduction of a USGS quadrangle map. It is not a substitute for a field visit. The accuracy of the information shown on this map is not guaranteed by USGS. For more information, please contact the USGS at 1225 National Center, Reston, VA 20192.



Figure 5

Hillsborough Twp.
100-Year Frequency Flood Plain

0 2,500 5,000 10,000 Feet

Prepared by: Somerset County, May 2004
 This map was developed using the latest available data. The information
 product has been verified by NCEM and is not state-certified.



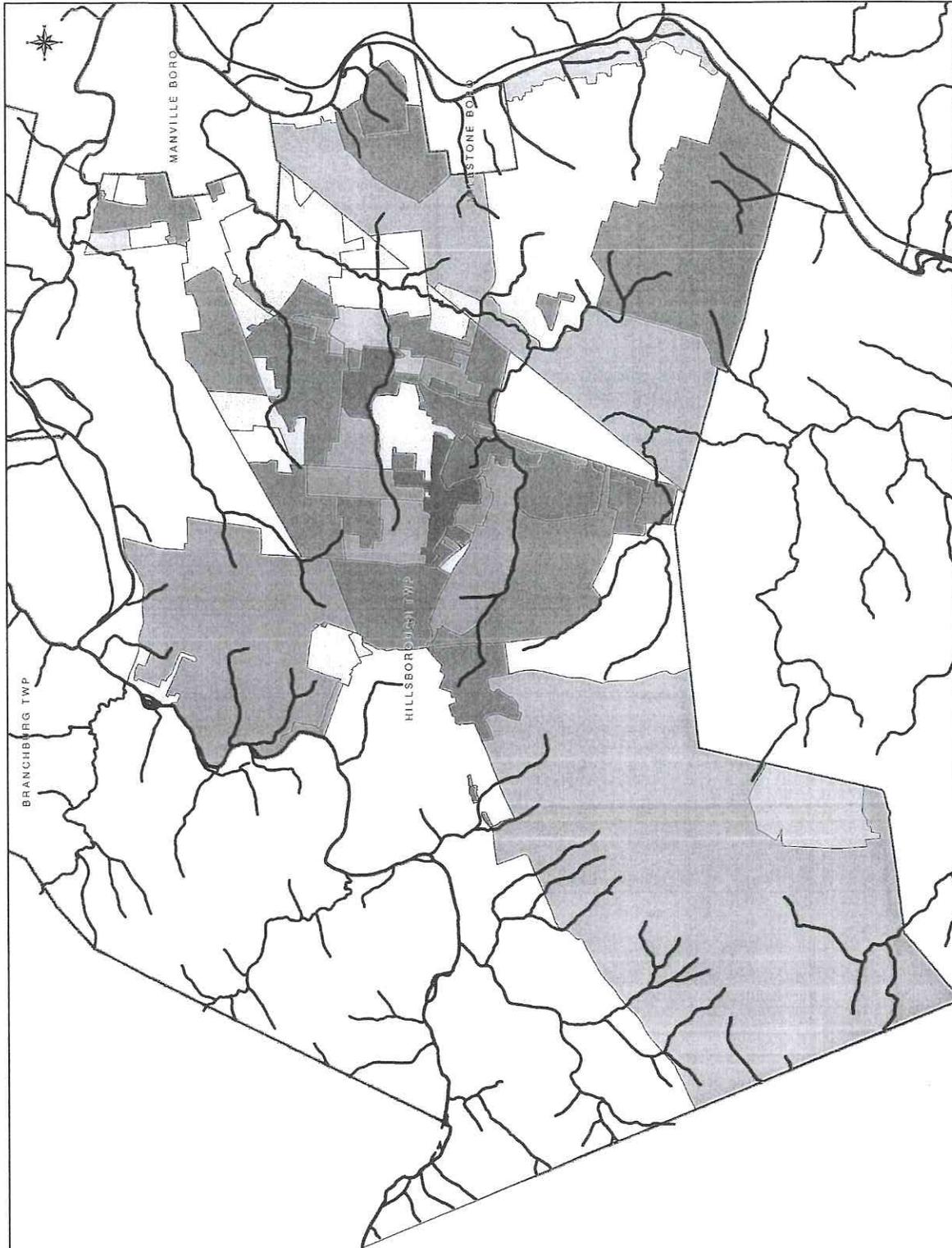
Legend	
	Municipal Boundaries
	Streams
Land Use	
	AGRICULTURE
	BARREN LAND
	FOREST
	URBAN, ATHLETIC FIELDS (SCHOOLS)
	URBAN, COMMERCIAL/SERVICES
	URBAN, INDUSTRIAL
	URBAN, MIXED URBAN OR BUILT-UP LAND
	URBAN, RECREATIONAL LAND
	URBAN, RESIDENTIAL, HIGH DENSITY, MULTIPLE DWELLING
	URBAN, RESIDENTIAL, RURAL, SINGLE UNIT
	URBAN, RESIDENTIAL, SINGLE UNIT, LOW DENSITY
	URBAN, RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
	URBAN, TRANSPORTATION/COMMUNICATIONS/UTILITIES
	WATER
	WETLANDS

0 2,500 5,000 10,000 Feet

Prepared By: Somerset County, May 2004
 This map was developed using the Jersey Department of Environmental Protection's modernized land use data and is not for sale.

Hillsborough Twp.
Existing Land Use

Figure 6



Legend

- Streams and Rivers.
- ▭ Municipal Boundaries

Zone Description

- Affordable Housing
- Central Residential
- Corporate Development Zone
- Economic Development
- General Industrial, Office and Research
- Home Occupation Office
- Light Industrial
- Mining
- Mountain / Valley Preservation
- Office
- Office / Research
- Office Light Commercial
- Planned Development
- Quarry
- Regional Contribution Area
- Residential
- Residential / Agricultural
- Residential 1
- Retail Commercial
- Rural / Agricultural
- Rural / Suburban
- Town Center



Prepared By: Somerset County, May, 2004
 Project: Comprehensive Zoning Ordinance for the County
 Project Number: 2003-001

**Hillsborough Twp.
Zoning**

Figure 7



0 2,500 5,000 10,000 Feet

Prepared By: Somerset County, May 2004
This map was developed using the Aerial Photography of Environmental
Processes, and is not intended to be used for any other purpose.

Hillsborough Twp.
Aerial Photo with Parcels

Figure 8



**Hillsborough Twp.
Groundwater Recharge**

0 2,500 5,000 10,000 Feet

Prepared By: Somerset County, May 2004
 This map was prepared by the Somerset County Office of Planning and Economic Development. The data used in this map was provided by the Somerset County Office of Planning and Economic Development. The accuracy of the data has not been verified by USGS and is not intended for use as a navigational aid.

Figure 9

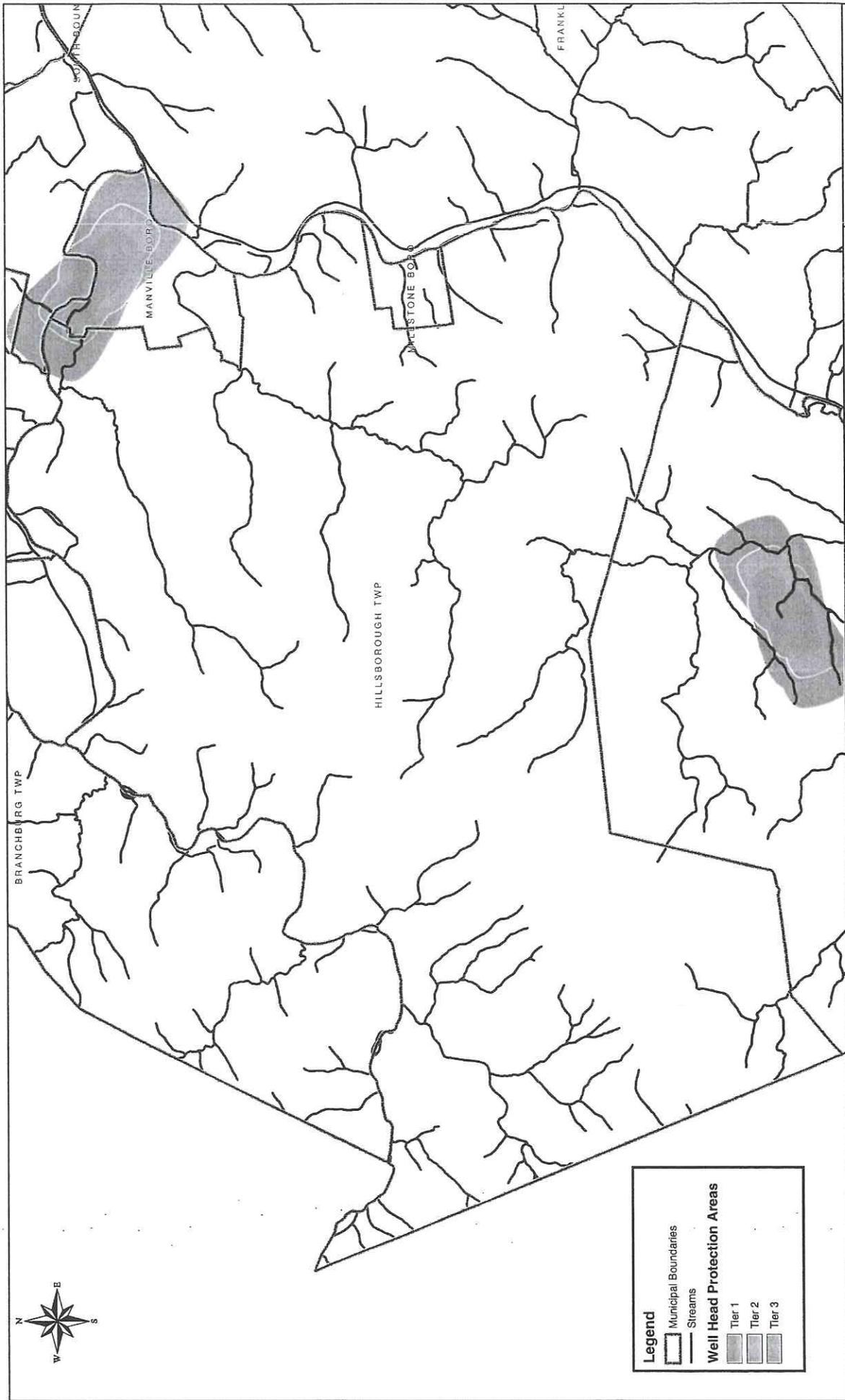


Figure 10

Hillsborough Twp.
Well Head Protection Areas

0 2,500 5,000 10,000 Feet
 Prepared By: Somerset County, May 2004
 This map was developed by the New Jersey Department of Environmental Protection for use by the Hillsborough Township and is not to be used for any other purpose.

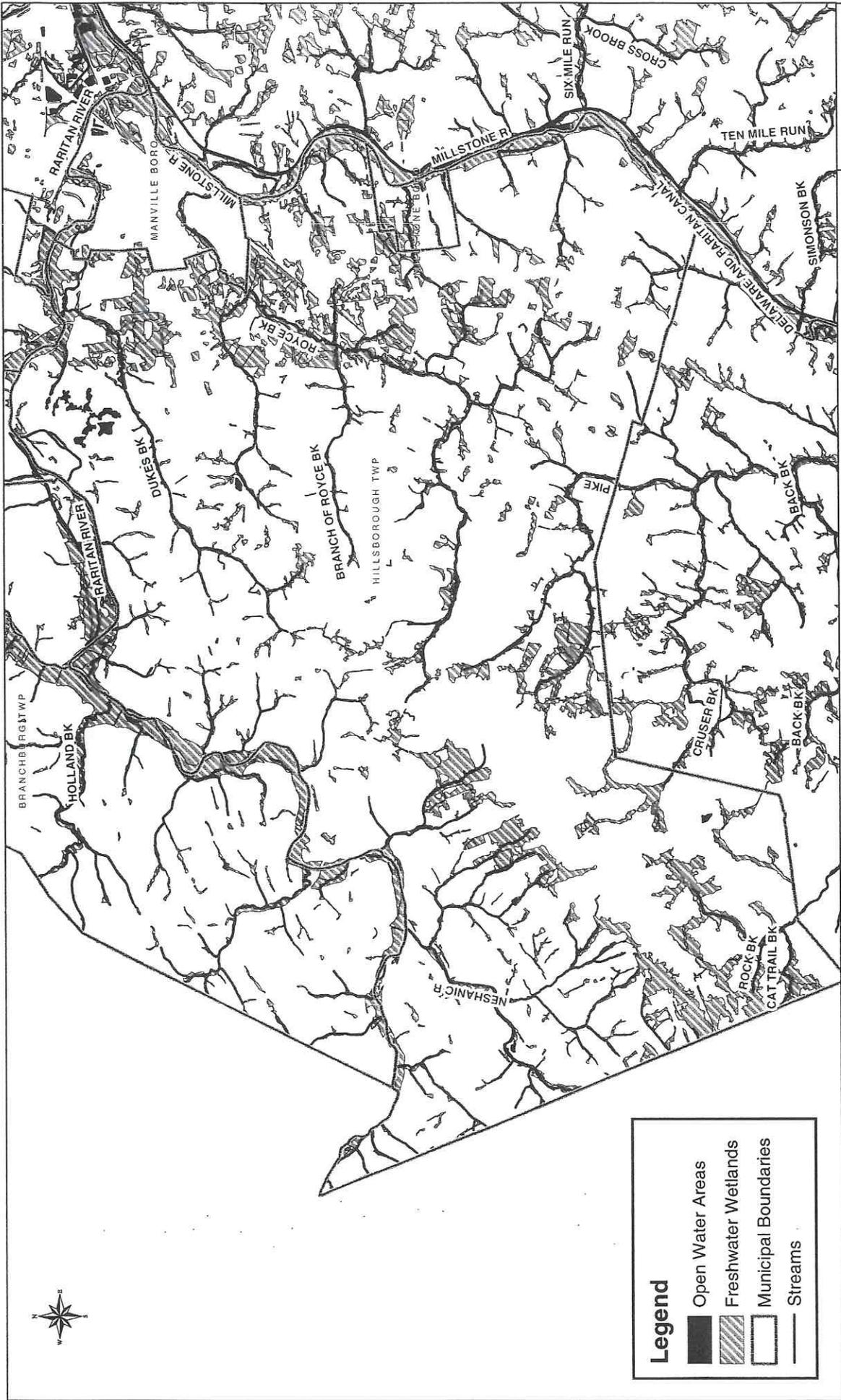


Figure 11

**Hillsborough Twp.
Wetlands and Water**

Legend

-  Open Water Areas
-  Freshwater Wetlands
-  Municipal Boundaries
-  Streams



Prepared By: Somerset County, May 2004
 This map was developed using the data provided by the Department of Environmental
 Protection. The data was provided by the DEP. It is not a guarantee of accuracy.

Table C-1: Build-Out Calculations

<u>HUC14</u>	<u>Zone</u>	<u>Total Area (Ac.)</u>	<u>Wetlands Area (Ac.)</u>	<u>Developable Area (Ac.)</u>	<u>Allowable imperv. (%)</u>	<u>Build-Out imperv. (Ac.)</u>
02030105030060	AG AGRICULTURAL	2,099.37	320.65	1,778.73	5%	88.94
	MZ MOUNTAIN CONSERVATION	2,713.44	787.93	1,925.51	5%	96.28
Totals		4,812.82	1,108.58	3,704.24		185.21
02030105040010	AG AGRICULTURAL	2,011.92	399.28	1,612.65	5%	80.63
	C1 RETAIL COMMERCIAL	5.93	0.00	5.93	45%	2.67
	C1 RETAIL COMMERCIAL	2.39	0.15	2.24	45%	1.01
	MZ MOUNTAIN CONSERVATION	595.84	140.24	455.60	5%	22.78
Totals		2,616.08	539.67	2,076.41		107.09
02030105040040	AG AGRICULTURAL	115.49	91.29	24.20	5%	1.21
	AG AGRICULTURAL	844.74	180.48	664.25	5%	33.21
	CR CENTRAL RESIDENTIAL	68.99	19.00	49.99	30%	15.00
	CR CENTRAL RESIDENTIAL	113.07	6.56	106.51	30%	31.95
	I1 LIGHT INDUSTRIAL	9.71	1.39	8.32	60%	4.99
	R RESIDENTIAL	33.91	4.39	29.52	15%	4.43
	R1 RESIDENTIAL 1	41.07	8.39	32.67	20%	6.53
	RS RURAL/SUBURBAN	1,195.54	255.88	939.66	10%	93.97
Totals		2,422.51	567.39	1,855.12		191.29
02030105080020	AG AGRICULTURAL	1,501.17	766.18	734.99	5%	36.75
	RS RURAL/SUBURBAN	248.09	22.01	226.07	10%	22.61
Totals		1,749.26	788.20	961.07		59.36
02030105080030	AG AGRICULTURAL	1,487.78	500.03	987.75	5%	49.39
	C1 RETAIL COMMERCIAL	1.10	0.00	1.10	45%	0.50
	C1 RETAIL COMMERCIAL	1.45	0.00	1.45	45%	0.65
	CR CENTRAL RESIDENTIAL	27.20	0.00	27.20	30%	8.16
	ED ECONOMIC DEVELOPMENT	107.67	22.63	85.04	60%	51.03
	ED ECONOMIC DEVELOPMENT	138.45	43.55	94.90	60%	56.94
	HOO HOME OCCUPATION/OFFICE HIS	1.46	0.00	1.46	30%	0.44
	HOO HOME OCCUPATION/OFFICE HIS	2.17	0.18	1.99	30%	0.60
	I1 LIGHT INDUSTRIAL	8.59	6.16	2.43	60%	1.46
	I1 LIGHT INDUSTRIAL	3.50	0.00	3.50	60%	2.10
	I2 LIGHT INDUSTRIAL	1.86	0.00	1.86	60%	1.12
	I2 LIGHT INDUSTRIAL	20.11	13.83	6.27	60%	3.76
	I3 LIGHT INDUSTRIAL	52.84	37.68	15.16	60%	9.09
	O2 OFFICE	45.88	12.19	33.69	50%	16.85
	R RESIDENTIAL	28.95	14.66	14.29	15%	2.14
	R RESIDENTIAL	152.96	46.04	106.92	15%	16.04
	R RESIDENTIAL	203.31	66.94	136.36	15%	20.45
	RCA REGIONAL CONTRIBUTION AREA	50.44	12.33	38.12	20%	7.62
RS RURAL/SUBURBAN	728.24	38.39	689.85	10%	68.98	
Totals		3,063.96	814.61	2,249.35		317.32
02030105110060	MZ MOUNTAIN CONSERVATION	1,901.57	565.78	1,335.78	5%	112.47
	Q QUARRY	123.64	15.49	108.14	5%	5.41
Totals		2,025.20	581.27	1,443.93		117.87

HUC14	Zone	Total Area (Ac.)	Wetlands Area (Ac.)	Developable Area (Ac.)	Allowable Imperv. (%)	Build-Out Imperv. (Ac.)
02030105110080	AG AGRICULTURAL	896.69	308.84	587.84	5%	29.39
	AG AGRICULTURAL	16.35	0.70	15.65	5%	0.78
	C1 RETAIL COMMERCIAL	5.63	0.43	5.21	45%	2.34
	C1 RETAIL COMMERCIAL	20.67	4.54	16.12	45%	7.26
	CDZ CORPORATE DEVELOPMENT ZO	456.36	78.05	378.30	60%	226.98
	ED ECONOMIC DEVELOPMENT	443.20	16.87	426.33	60%	255.80
	ED ECONOMIC DEVELOPMENT	80.43	34.34	46.09	60%	27.65
	GI GENERAL INDUSTRIAL OFFICE &	155.28	17.44	137.85	50%	68.92
	HOO HOME OCCUPATION/OFFICE HIS	0.79	0.00	0.79	30%	0.24
	MZ MOUNTAIN CONSERVATION	766.58	76.45	690.13	5%	34.51
	R RESIDENTIAL	71.13	17.59	53.54	15%	8.03
	R RESIDENTIAL	56.57	17.14	39.43	15%	5.91
R RESIDENTIAL	105.90	12.59	93.31	15%	14.00	
Totals		3,075.57	584.98	2,490.59		681.82
02030105110090	MZ MOUNTAIN CONSERVATION	561.97	119.99	441.97	5%	22.10
	Q QUARRY	249.29	21.17	228.13	5%	11.41
Totals		811.26	141.16	670.10		33.51
02030105110100	CDZ CORPORATE DEVELOPMENT ZO	171.73	14.59	157.15	60%	94.29
	MZ MOUNTAIN CONSERVATION	39.94	0.31	39.64	5%	1.98
	Q QUARRY	128.71	16.63	112.08	5%	5.60
	R RESIDENTIAL	296.46	58.41	238.05	15%	35.71
Totals		636.85	89.93	546.91		137.58
02030105110110	MVH MILLSTONE VALLEY HISTORIC ZO	97.37	54.42	42.95	5%	2.15
	R RESIDENTIAL	867.45	185.53	681.92	15%	102.29
	RA RESIDENTIAL/AGRICULTURE	211.10	20.44	190.66	10%	19.07
Totals		1,175.92	260.39	915.53		123.50
02030105110140	CDZ CORPORATE DEVELOPMENT ZO	229.65	77.68	151.97		0.00
	MVH MILLSTONE VALLEY HISTORIC ZO	243.20	131.91	111.29	5%	5.56
	O5 OFFICE/RESEARCH	25.76	16.73	9.02	50%	4.51
	R RESIDENTIAL	43.30	1.33	41.98	15%	6.30
	RA RESIDENTIAL/AGRICULTURE	1,249.10	203.80	1,045.30	10%	104.53
Totals		1,791.02	431.45	1,359.56		120.90
02030105110150	AG AGRICULTURAL	263.06	41.55	221.51	5%	11.08
	C1 RETAIL COMMERCIAL	104.90	13.71	91.19	45%	41.04
	C1 RETAIL COMMERCIAL	2.56	0.84	1.72	45%	0.78
	CDZ CORPORATE DEVELOPMENT ZO	869.62	198.21	671.41	60%	402.85
	CR CENTRAL RESIDENTIAL	35.09	0.08	35.02	30%	10.50
	CR CENTRAL RESIDENTIAL	80.23	24.68	55.55	30%	16.66
	CR CENTRAL RESIDENTIAL	1.22	0.00	1.22	30%	0.37
	ED ECONOMIC DEVELOPMENT	332.44	84.47	247.97	60%	148.78
	GI GENERAL INDUSTRIAL OFFICE &	313.98	48.19	265.79	50%	132.89
	HOO HOME OCCUPATION/OFFICE HIS	4.18	0.00	4.18	30%	1.25
	HOO HOME OCCUPATION/OFFICE HIS	42.85	0.68	42.17	30%	12.65
	HOO HOME OCCUPATION/OFFICE HIS	58.38	2.64	55.74	30%	16.72
	HOO HOME OCCUPATION/OFFICE HIS	67.67	12.02	55.65	30%	16.69
	HOO HOME OCCUPATION/OFFICE HIS	34.37	0.87	33.50	30%	10.05
	HOO HOME OCCUPATION/OFFICE HIS	0.73	0.00	0.73	30%	0.22
	I1 LIGHT INDUSTRIAL	5.53	0.00	5.53	60%	3.32
	M MINING	160.79	65.71	95.08	5%	4.75

<u>HUC14</u>	<u>Zone</u>	<u>Total Area (Ac.)</u>	<u>Wetlands Area (Ac.)</u>	<u>Developable Area (Ac.)</u>	<u>Allowable Imperv. (%)</u>	<u>Build-Out Imperv. (Ac.)</u>
	MZ MOUNTAIN CONSERVATION	103.59	30.39	73.20	5%	3.66
	PD PLANNED DEVELOPMENT	190.93	3.29	187.64	60%	112.59
	PR PROFESSIONAL/RETAIL	16.63	0.00	16.63	25%	4.16
	R RESIDENTIAL	188.75	16.65	172.10	15%	25.82
	R RESIDENTIAL	242.61	25.67	216.94	15%	32.54
	R RESIDENTIAL	6.70	2.58	4.13	15%	0.62
	R RESIDENTIAL	288.70	72.13	216.58	15%	32.49
	R RESIDENTIAL	231.99	38.28	193.71	15%	29.06
	R RESIDENTIAL	36.31	0.00	36.31	15%	5.45
	R RESIDENTIAL	580.40	182.89	397.51	15%	59.63
	R1 RESIDENTIAL 1	467.60	136.63	330.97	20%	66.19
	RA RESIDENTIAL/AGRICULTURE	45.53	21.05	24.49	10%	2.45
	RA RESIDENTIAL/AGRICULTURE	694.00	209.76	484.25	10%	48.42
	TC TOWN CENTER	17.58	0.00	17.58	40%	7.03
	TC TOWN CENTER	152.99	12.99	140.00	40%	56.00
Totals		5,641.98	1,245.96	4,396.02		1,305.63
02030105110160	AG AGRICULTURAL	65.41	6.69	58.73	5%	2.94
	C1 RETAIL COMMERCIAL	29.03	6.66	22.37	45%	10.07
	C1 RETAIL COMMERCIAL	44.45	0.32	44.14	45%	19.86
	CDZ CORPORATE DEVELOPMENT ZO	268.87	74.81	194.06	60%	116.43
	CR CENTRAL RESIDENTIAL	217.00	11.96	205.04	30%	61.51
	ED ECONOMIC DEVELOPMENT	255.62	21.55	234.07	60%	140.44
	ED ECONOMIC DEVELOPMENT	177.19	58.23	118.96	60%	71.37
	GI GENERAL INDUSTRIAL OFFICE &	105.71	24.21	81.50	50%	40.75
	HOO HOME OCCUPATION/OFFICE HIS	28.50	12.30	16.19	30%	4.86
	HOO HOME OCCUPATION/OFFICE HIS	8.34	2.42	5.92	30%	1.78
	HOO HOME OCCUPATION/OFFICE HIS	2.89	0.00	2.89	30%	0.87
	HOO HOME OCCUPATION/OFFICE HIS	31.02	2.94	28.08	30%	8.42
	HOO HOME OCCUPATION/OFFICE HIS	27.16	0.72	26.43	30%	7.93
	I1 LIGHT INDUSTRIAL	280.12	70.73	209.39	60%	125.64
	I1 LIGHT INDUSTRIAL	37.68	29.98	7.70	60%	4.62
	I1 LIGHT INDUSTRIAL	86.66	41.26	45.39	60%	27.24
	I2 LIGHT INDUSTRIAL	209.73	24.89	184.83	60%	110.90
	M MINING	324.54	189.09	135.45	5%	6.77
	O2 OFFICE	119.47	21.56	97.91	50%	48.96
	O2 OFFICE	25.95	5.23	20.71	50%	10.36
	O5 OFFICE/RESEARCH	12.41	5.97	6.43	50%	3.22
	OLC OFFICE LIGHT COMMERCIAL	13.75	0.00	13.75	45%	6.19
	PD PLANNED DEVELOPMENT	170.43	36.66	133.77	60%	80.26
	PD PLANNED DEVELOPMENT	29.57	0.00	29.57	60%	17.74
	R RESIDENTIAL	11.40	3.92	7.47	15%	1.12
	R RESIDENTIAL	465.17	43.78	421.39	15%	63.21
	R RESIDENTIAL	69.61	7.92	61.69	15%	9.25
	R RESIDENTIAL	80.57	15.66	64.91	15%	9.74
	R RESIDENTIAL	13.67	0.49	13.18	15%	1.98
	R RESIDENTIAL	384.82	69.71	315.11	15%	47.27
	R RESIDENTIAL	83.91	23.66	60.26	15%	9.04
	R RESIDENTIAL	28.79	20.30	8.49	15%	1.27
	R1 RESIDENTIAL 1	141.20	20.75	120.45	20%	24.09

<u>HUC14</u>	<u>Zone</u>	Total Area (Ac.)	Wetlands Area (Ac.)	Developable Area (Ac.)	Allowable Imperv. (%)	Build-Out Imperv. (Ac.)
	RA RESIDENTIAL/AGRICULTURE	145.44	89.23	56.20	10%	5.62
	RA RESIDENTIAL/AGRICULTURE	65.02	41.60	23.41	10%	2.34
	RA RESIDENTIAL/AGRICULTURE	1.67	0.43	1.24	10%	0.12
	RA RESIDENTIAL/AGRICULTURE	1.28	0.40	0.88	10%	0.09
	RA RESIDENTIAL/AGRICULTURE	177.87	87.67	90.20	10%	9.02
	RA RESIDENTIAL/AGRICULTURE	5.09	4.78	0.31	10%	0.03
	RC RETIREMENT COMMUNITY	56.03	51.92	4.12	70%	2.88
	TC TOWN CENTER	17.59	0.00	17.59	40%	7.03
	TC TOWN CENTER	26.65	0.35	26.30	40%	10.52
Totals		4,347.25	1,130.77	3,216.48		1,133.74
02030105110170	CDZ CORPORATE DEVELOPMENT ZO	243.79	55.85	187.93	60%	112.76
	O5 OFFICE/RESEARCH	255.93	83.68	172.26	50%	86.13
	R RESIDENTIAL	156.04	9.81	146.22	15%	21.93
	RA RESIDENTIAL/AGRICULTURE	256.83	161.12	95.71	10%	9.57
Totals		912.59	310.47	602.13		230.39

 Assumed value based on similar zoning

Table C-2: Pollutant Loads by Land Cover

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

Source: NJDEP Stormwater BMP Manual 2004.

Table C-3: Non-Point Source Loads at Build-Out

HUC14	Zone	Zoning Build-out	Developable		TP (lb/acre/yr)	IN (lb/acre/yr)	IN (lb/acre/yr)	ISS (lb/acre/yr)	ISS (lb/yr)
			(acres)	(lb/acre/yr)					
02030105030060	AG AGRICULTURAL	AGRICULTURE	1,779	1.3	2,312	10	17,787	300	533,619
	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	1,926	0.6	1,155	5	9,628	100	192,551
Totals			3,704		3,468		27,415		726,169
02030105040010	AG AGRICULTURAL	AGRICULTURE	1,613	1.3	2,096	10	16,126	300	483,794
	C1 RETAIL COMMERCIAL	COMMERCIAL	6	2.1	12	22	130	200	1,186
	C1 RETAIL COMMERCIAL	COMMERCIAL	2	2.1	5	22	49	200	447
	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	456	0.6	273	5	2,278	100	45,560
	Totals			2,076		2,387		18,584	
02030105040040	AG AGRICULTURAL	AGRICULTURE	24	1.3	31	10	242	300	7,260
	AG AGRICULTURAL	AGRICULTURE	664	1.3	864	10	6,643	300	199,276
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	50	0.6	30	5	250	100	4,999
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	107	0.6	64	5	533	100	10,651
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	8	1.5	12	16	133	200	1,663
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	30	0.6	18	5	148	100	2,952
	R1 RESIDENTIAL 1	LOW DENSITY RESIDENTIAL	33	0.6	20	5	163	100	3,267
	RS RURAL/SUBURBAN	RURAL RESIDENTIAL	940	0.6	564	5	4,698	100	93,966
Totals			1,855		1,602		12,809		324,034
02030105080020	AG AGRICULTURAL	AGRICULTURE	735	1.3	955	10	7,350	300	220,498
	RS RURAL/SUBURBAN	RURAL RESIDENTIAL	226	0.6	136	5	1,130	100	22,607
Totals			961		1,091		8,480		243,105
02030105080030	AG AGRICULTURAL	AGRICULTURE	988	1.3	1,284	10	9,878	300	296,325
	C1 RETAIL COMMERCIAL	COMMERCIAL	1	2.1	2	22	24	200	220
	C1 RETAIL COMMERCIAL	COMMERCIAL	1	2.1	3	22	32	200	289
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	27	0.6	16	5	136	100	2,720
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	85	2.1	179	22	1,871	200	17,009
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	95	2.1	199	22	2,088	200	18,980
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	1	0.6	1	5	7	100	146
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	2	0.6	1	5	10	100	199
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	2	1.5	4	16	39	200	487
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	3	1.5	5	16	56	200	700
	I2 LIGHT INDUSTRIAL	INDUSTRIAL	2	1.5	3	16	30	200	372
	I2 LIGHT INDUSTRIAL	INDUSTRIAL	6	1.5	9	16	100	200	1,255

HUC14	Zone	Zoning Build-out	Developable (acres)	IP (lb/acre/yr)	IP (lb/acre/yr)	IN (lb/acre/yr)	IN (lb/acre/yr)	TSS (lb/acre/yr)	TSS (lb/yr)
02030105080030	I3 LIGHT INDUSTRIAL	INDUSTRIAL	15	1.5	23	16	242	200	3,031
	O2 OFFICE	COMMERCIAL	34	2.1	71	22	741	200	6,739
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	14	0.6	9	5	71	100	1,429
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	107	0.6	64	5	535	100	10,692
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	136	0.6	82	5	682	100	13,636
	RCA REGIONAL CONTRIBUTION AREA	COMMERCIAL	38	2.1	80	22	839	200	7,623
	RS RURAL/SUBURBAN	RURAL RESIDENTIAL	690	0.6	414	5	3,449	100	68,985
Totals			2,249		2,449		20,830		450,838
02030105110060	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	1,336	0.6	801	5	6,679	100	133,578
	Q QUARRY	INDUSTRIAL	108	1.5	162	16	1,730	200	21,629
Totals			1,444		964		8,409		155,207
02030105110080	AG AGRICULTURAL	AGRICULTURE	588	1.3	764	10	5,878	300	176,353
	AG AGRICULTURAL	AGRICULTURE	16	1.3	20	10	157	300	4,696
	C1 RETAIL COMMERCIAL	COMMERCIAL	5	2.1	11	22	115	200	1,041
	C1 RETAIL COMMERCIAL	COMMERCIAL	16	2.1	34	22	355	200	3,225
	CDZ CORPORATE DEVELOPMENT ZONING	COMMERCIAL	378	2.1	794	22	8,323	200	75,661
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	426	2.1	895	22	9,379	200	85,266
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	46	2.1	97	22	1,014	200	9,218
	GI GENERAL INDUSTRIAL OFFICE & BUSINESS	INDUSTRIAL	138	1.5	207	16	2,206	200	27,569
	HOO HOME OCCUPATION/OFFICE HISTORIC	LOW DENSITY RESIDENTIAL	1	0.6	0	5	4	100	79
	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	690	0.6	414	10	6,901	100	69,013
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	54	0.6	32	5	268	100	5,354
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	39	0.6	24	5	197	100	3,943
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	93	0.6	56	5	0	100	9,331
Totals			2,491		3,349		34,796		470,749
02030105110090	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	442	0.6	265	5	2,210	100	44,197
	Q QUARRY	INDUSTRIAL	228	1.5	342	16	0	200	45,625
Totals			670		6,510		65,652		849,230
02030105110100	CDZ CORPORATE DEVELOPMENT ZONING	COMMERCIAL	157	2.1	330	22	3,457	200	31,429
	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	40	0.6	24	5	198	100	3,964
	Q QUARRY	INDUSTRIAL	112	1.5	168	16	1,793	200	22,416
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	238	0.6	143	5	0	100	23,805
Totals			547		665		5,449		81,614

HUC14	Zone	Zoning	Developable			IN	IN	ISS	
			(acres)	(lb/acre/yr)	(lb/acre/yr)				(lb/acre/yr)
		Build-out							
02030105110110	MVH MILLSTONE VALLEY HISTORIC ZONE	LOW DENSITY RESIDENTIAL	43	0.6	26	5	215	100	4,295
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	682	0.6	409	5	3,410	100	68,192
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	191	1.3	248	10	0	100	19,086
Totals			916		683		3,624		91,553
02030105110140	CDZ CORPORATE DEVELOPMENT ZONE	COMMERCIAL	152	2.1	319	22	3,343	200	30,394
	MVH MILLSTONE VALLEY HISTORIC ZONE	LOW DENSITY RESIDENTIAL	111	0.6	67	5	556	100	11,129
	O5 OFFICE/RESEARCH	COMMERCIAL	9	2.1	19	22	199	200	1,805
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	42	0.6	25	5	210	100	4,198
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	1,045	1.3	1,359	10	0	100	104,530
Totals			1,360		1,789		4,308		152,056
02030105110150	AG AGRICULTURAL	AGRICULTURE	222	1.3	288	10	2,215	300	66,454
	C1 RETAIL COMMERCIAL	COMMERCIAL	91	2.1	192	22	2,006	200	18,239
	C1 RETAIL COMMERCIAL	COMMERCIAL	2	2.1	4	22	38	200	345
	CDZ CORPORATE DEVELOPMENT ZONE	COMMERCIAL	671	2.1	1,410	22	14,771	200	134,283
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	35	0.6	21	5	175	100	3,502
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	56	0.6	33	5	278	100	5,555
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	1	0.6	1	5	6	100	122
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	248	2.1	521	22	5,455	200	49,595
	GI GENERAL INDUSTRIAL OFFICE &	INDUSTRIAL	266	1.5	399	16	4,253	200	53,158
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	4	0.6	3	5	21	100	418
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	42	0.6	25	5	211	100	4,217
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	56	0.6	33	5	279	100	5,574
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	56	0.6	33	5	278	100	5,565
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	34	0.6	20	5	168	100	3,350
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	1	0.6	0	5	4	100	73
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	6	1.5	8	16	88	200	1,106
	M MINING	INDUSTRIAL	95	1.5	143	16	1,521	200	19,016
	MZ MOUNTAIN CONSERVATION	RURAL RESIDENTIAL	73	0.6	44	5	366	100	7,320
	PD PLANNED DEVELOPMENT	COMMERCIAL	188	2.1	394	22	4,128	200	37,529
	PR PROFESSIONAL/RETAIL	COMMERCIAL	17	2.1	35	22	366	200	3,327
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	172	0.6	103	5	861	100	17,210	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	217	0.6	130	5	1,085	100	21,694	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	4	0.6	2	5	21	100	413	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	217	0.6	130	5	1,083	100	21,658	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	194	0.6	116	5	969	100	19,371	

HUC14	Zone	Zoning Build-out	Developable (acres)	IP (lb/acre/yr)	TP (lb/yr)	IN (lb/acre/yr)	TN (lb/acre/yr)	ISS (lb/acre/yr)	ISS (lb/yr)
02030105110150	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	36	0.6	22	5	182	100	3,631
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	398	0.6	239	5	1,988	100	39,751
	R1 RESIDENTIAL 1	LOW DENSITY RESIDENTIAL	331	0.6	199	5	1,655	100	33,097
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	24	1.3	32	10	245	100	2,449
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	484	1.3	630	10	4,842	100	48,425
	TC TOWN CENTER	MIXED URBAN	18	1.0	18	10	176	120	2,109
	TC TOWN CENTER	MIXED URBAN	140	1.0	140	10	0	120	16,800
	Totals		4,396		5,366		49,732		645,354
02030105110160	AG AGRICULTURAL	AGRICULTURE	59	1.3	76	10	587	300	17,618
	C1 RETAIL COMMERCIAL	COMMERCIAL	22	2.1	47	22	492	200	4,474
	C1 RETAIL COMMERCIAL	COMMERCIAL	44	2.1	93	22	971	200	8,827
	CDZ CORPORATE DEVELOPMENT ZONE	COMMERCIAL	194	2.1	408	22	4,269	200	38,811
	CR CENTRAL RESIDENTIAL	LOW DENSITY RESIDENTIAL	205	0.6	123	5	1,025	100	20,504
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	234	2.1	492	22	5,150	200	46,814
	ED ECONOMIC DEVELOPMENT	COMMERCIAL	119	2.1	250	22	2,617	200	23,791
	GI GENERAL INDUSTRIAL OFFICE &	INDUSTRIAL	82	1.5	122	16	1,304	200	16,301
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	16	0.6	10	5	81	100	1,619
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	6	0.6	4	5	30	100	592
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	3	0.6	2	5	14	100	289
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	28	0.6	17	5	140	100	2,808
	HOO HOME OCCUPATION/OFFICE HIS	LOW DENSITY RESIDENTIAL	26	0.6	16	5	132	100	2,643
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	209	1.5	314	16	3,350	200	41,879
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	8	1.5	12	16	123	200	1,540
	I1 LIGHT INDUSTRIAL	INDUSTRIAL	45	1.5	68	16	726	200	9,079
	I2 LIGHT INDUSTRIAL	INDUSTRIAL	185	1.5	277	16	2,957	200	36,967
	M MINING	INDUSTRIAL	135	1.5	203	16	2,167	200	27,089
	O2 OFFICE	COMMERCIAL	98	2.1	206	22	2,154	200	19,583
	O2 OFFICE	COMMERCIAL	21	2.1	43	22	456	200	4,143
O5 OFFICE/RESEARCH	COMMERCIAL	6	2.1	14	22	142	200	1,286	
OLC OFFICE LIGHT COMMERCIAL	COMMERCIAL	14	2.1	29	22	303	200	2,751	
PD PLANNED DEVELOPMENT		134	1.4	187	15	2,007	140	18,727	
PD PLANNED DEVELOPMENT		30	1.4	41	15	444	140	4,140	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	7	0.6	4	5	37	100	747	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	421	0.6	253	5	2,107	100	42,139	
R RESIDENTIAL	LOW DENSITY RESIDENTIAL	62	0.6	37	5	308	100	6,169	

HUC14	Zone	Zoning Build-out	Developable (acres)			IP (lb/acre/yr)	IP (lb/yr)	IN (lb/acre/yr)	IN (lb/yr)	ISS (lb/acre/yr)	ISS (lb/yr)
			Developable (acres)	IP (lb/acre/yr)	IP (lb/yr)						
02030105110160	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	65	0.6	39	5	325	100	6,491		
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	13	0.6	8	5	66	100	1,318		
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	315	0.6	189	5	1,576	100	31,511		
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	60	0.6	36	5	301	5	301		
	R RESIDENTIAL	LOW DENSITY RESIDENTIAL	8	0.6	5	5	42	100	849		
	R1 RESIDENTIAL 1	LOW DENSITY RESIDENTIAL	120	0.6	72	5	602	100	12,045		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	56	1.3	73	10	562	100	5,620		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	23	1.3	30	10	234	100	2,341		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	1	1.3	2	10	12	100	124		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	1	1.3	1	10	9	100	88		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	90	1.3	117	10	902	100	9,020		
	RA RESIDENTIAL/AGRICULTURE	AGRICULTURE	0	1.3	0	10	3	100	31		
	RC RETIREMENT COMMUNITY	LOW DENSITY RESIDENTIAL	4	0.6	2	5	21	100	412		
	TC TOWN CENTER	MIXED URBAN	18	1.0	18	10	176	120	2,110		
	TC TOWN CENTER	MIXED URBAN	26	1.0	26	10	0	120	3,156		
	Totals			3,216		3,890		38,338		459,130	
	02030105110170	CDZ CORPORATE DEVELOPMENT ZONE	COMMERCIAL	188	2.1	395	22	4,135	200	37,587	
O5 OFFICE/RESEARCH		COMMERCIAL	172	2.1	362	22	3,790	200	34,452		
R RESIDENTIAL		LOW DENSITY RESIDENTIAL	146	0.6	88	5	731	5	731		
RA RESIDENTIAL/AGRICULTURE		AGRICULTURE	96	1.3	124	10	0	100	9,571		
Totals			602		969		8,655		82,341		

TOTAL 23,271 31,291 268,744 4,803,237