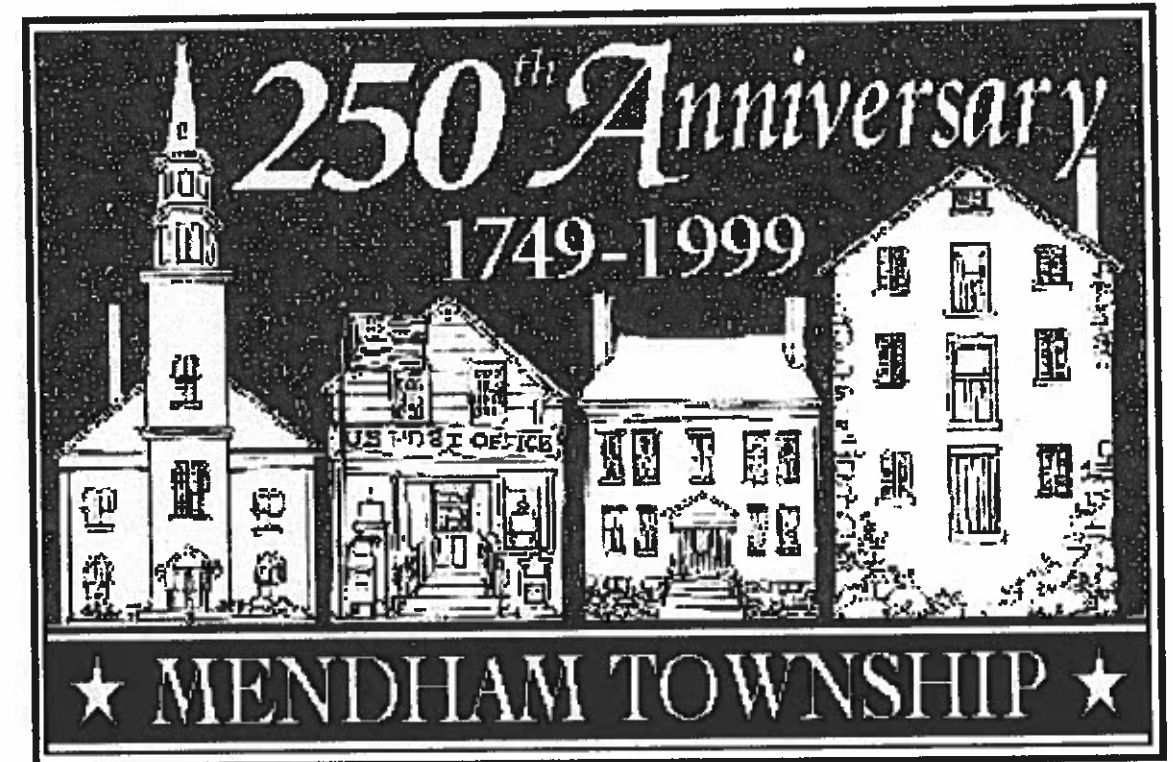


# STORMWATER MANAGEMENT PLAN

MARCH 2005



## PROTECTING OUR NATURAL RESOURCES

This Stormwater Management Plan Was Prepared Under  
NJDEP Municipal Stormwater Management Grant WQ04-409

By

Connolly Environmental, Inc.

GIS Mapping Performed by Maser Consulting, Inc.

And Assistance From The Mendham Township Environmental Commission.

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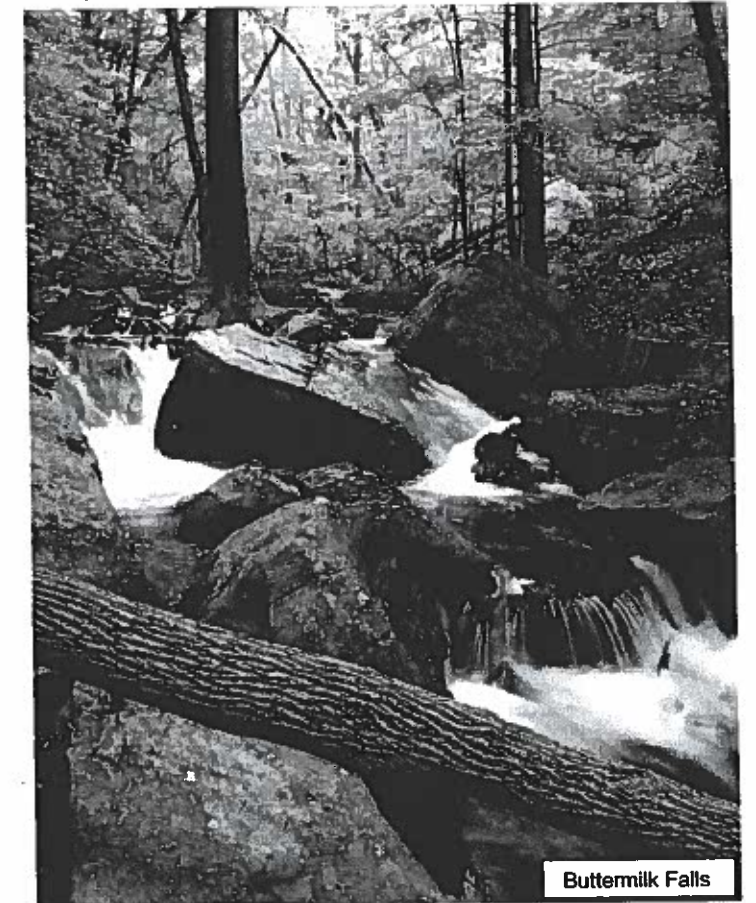
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## Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Mendham 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 baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A "build-out" analysis has been included in this plan based upon existing zoning and land available for development. The 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. 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.



Buttermilk Falls



## Goals

The goals of this MSWMP are to:

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

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. 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 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 infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its

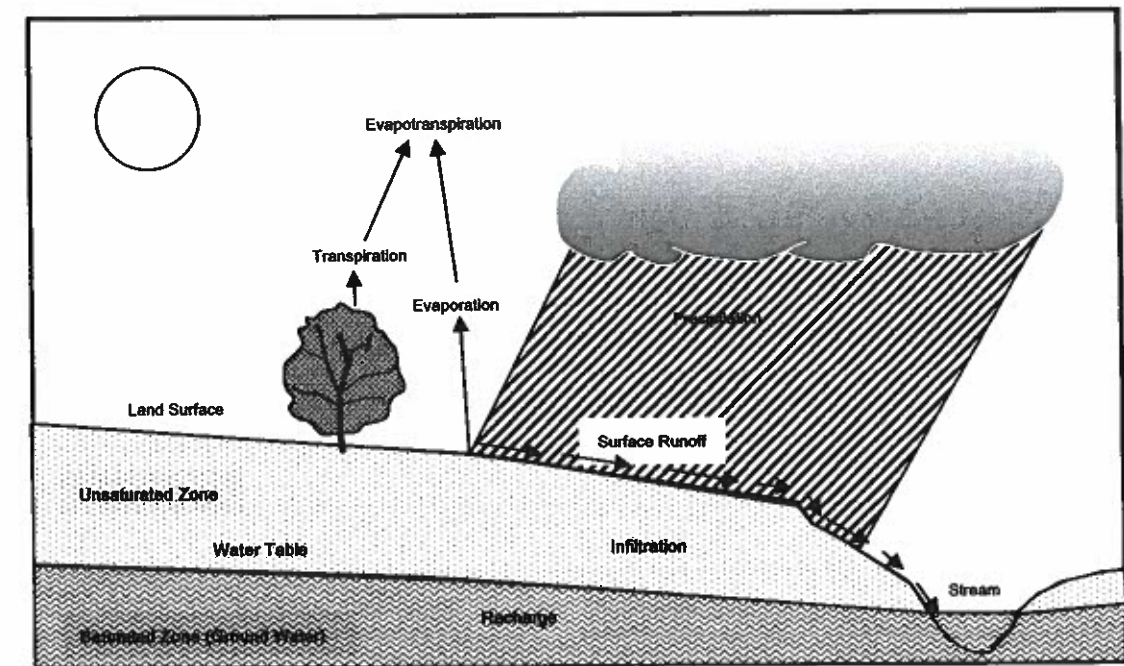


Whippany River, Washington Valley

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



Figure C 1. Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32

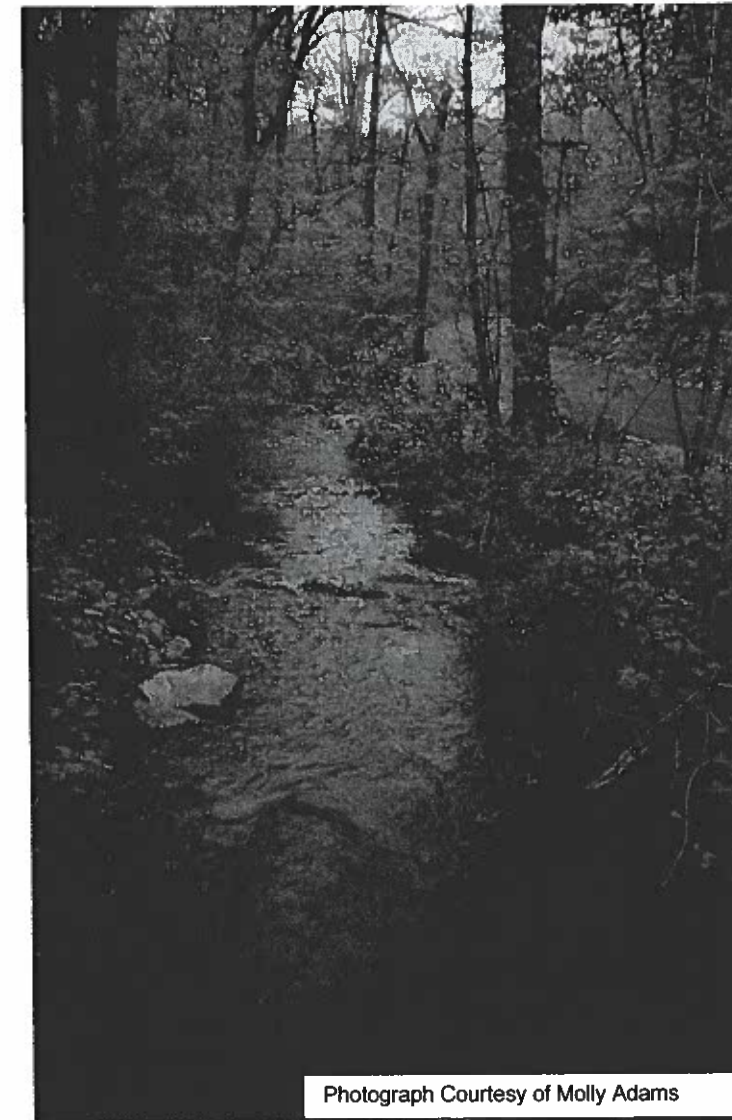
In addition to increases in runoff peaks, runoff volume, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate 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

Mendham Township encompasses 17.91 square mile area in Morris County, New Jersey. In recent years, the Township has been under significant development pressure. The population of the Township has increased from 4,488 in 1980, to, 4537 in 1990, to 5,400 in 2000. 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. Figure C-2 illustrates the waterways in the Township. Figure C-3 depicts the Township boundary on the USGS quadrangle maps.



Photograph Courtesy of Molly Adams

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. 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. Three major river systems originate in the Township,

the Whippany River, the Passaic River and the Raritan River.

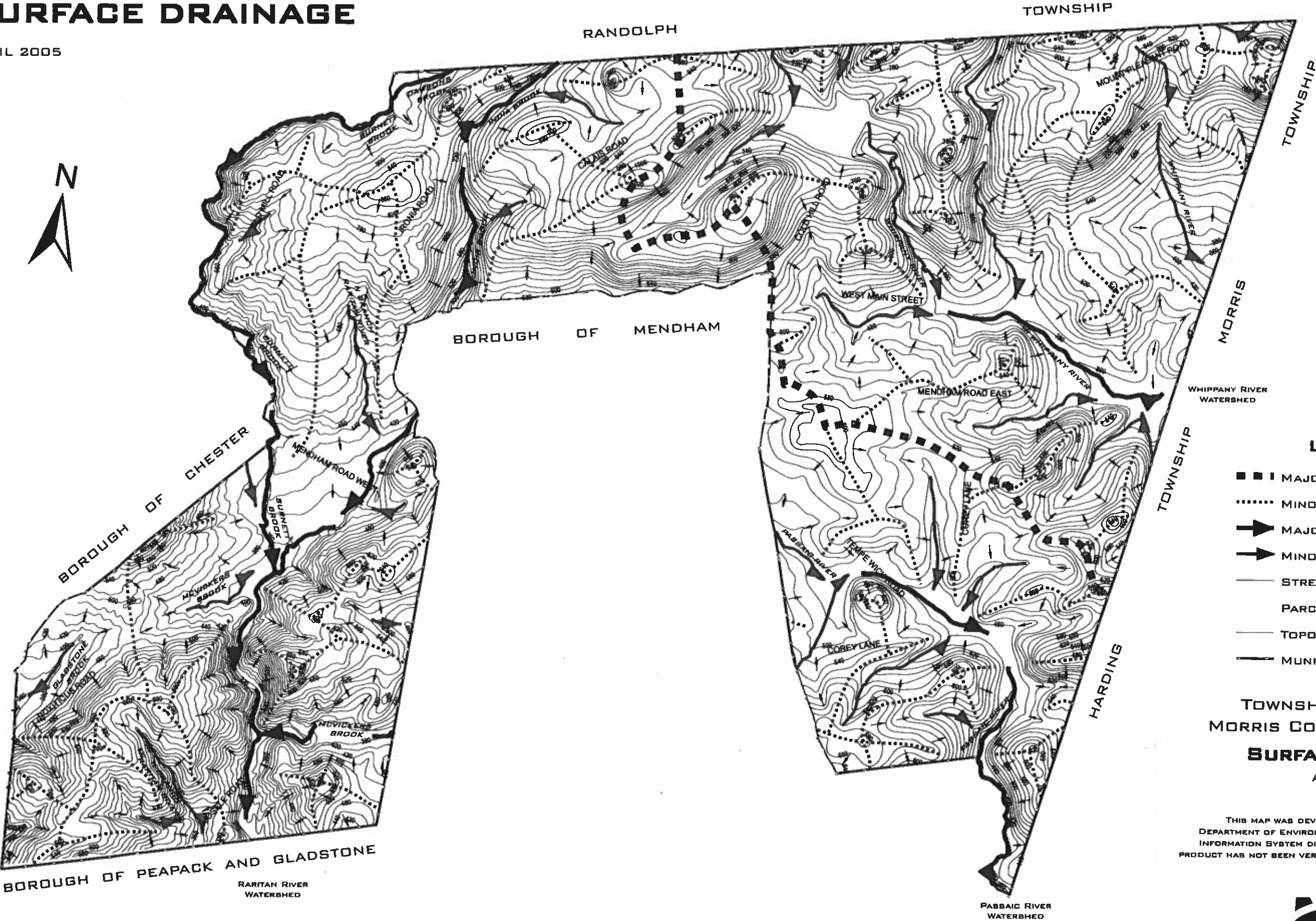


*Figure C 2. Surface Drainage*



# SURFACE DRAINAGE

APRIL 2005



## LEGEND

- ■ ■ MAJOR DRAINAGE DIVIDE
- ..... MINOR DRAINAGE DIVIDE
- ➔ MAJOR STREAMS
- ➔ MINOR STREAMS
- STREAM FLOW ARROWS
- PARCEL LOTS
- TOPOGRAPHY
- MUNICIPAL BOUNDARY

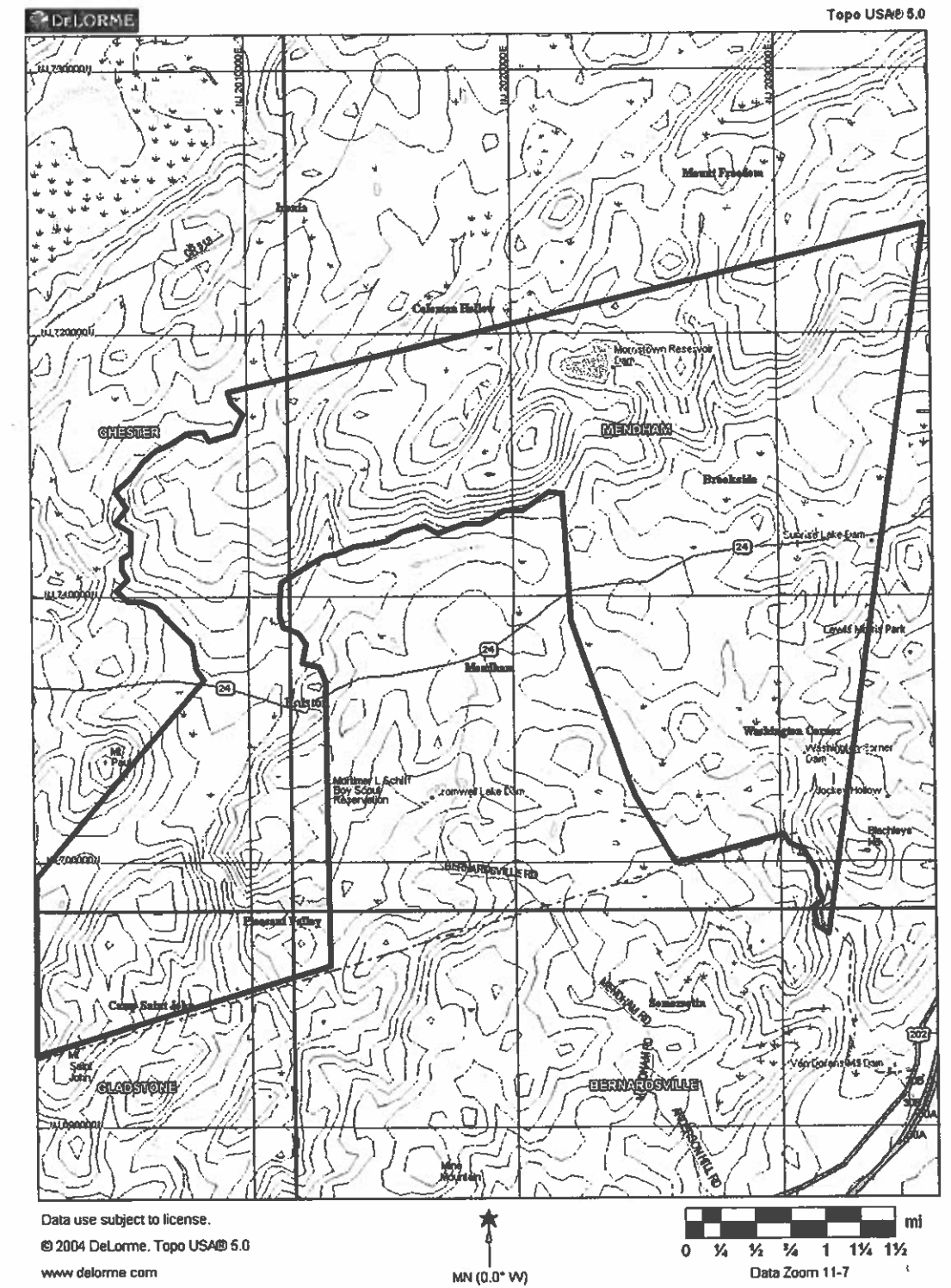
TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY  
**SURFACE DRAINAGE**  
APRIL 2005

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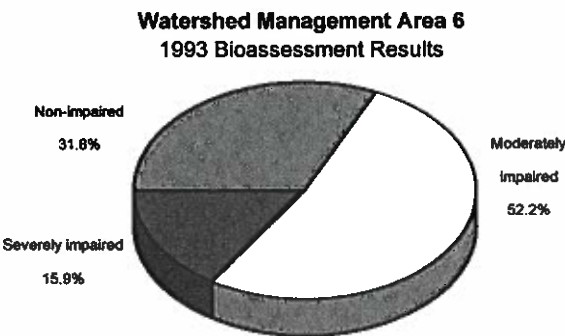
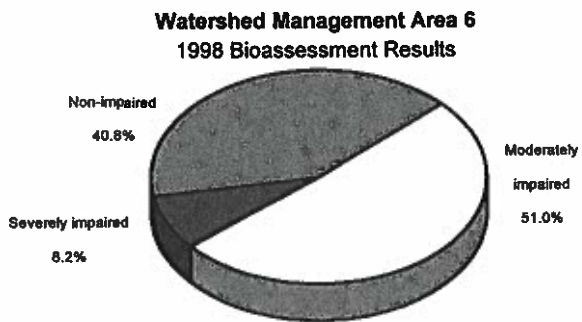
**Figure C 3. USGS Mapping**





**Surface Water Quality**

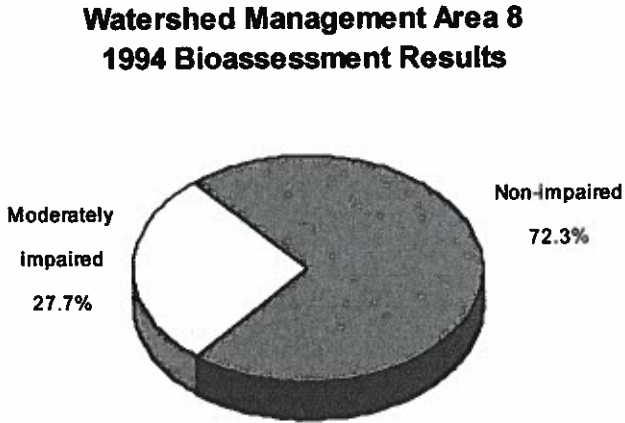
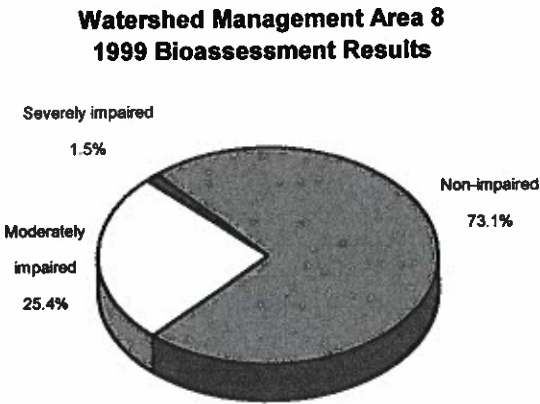
Watershed Management Area #6 includes forty-nine AMNET sites in the upper Passaic, Whippany, Rockaway and Dead River watersheds. The chart to the right shows that 40.8% of the sites were non-impaired, the majority of sites (51%) were moderately impaired, and the remaining sites (8.2%) were rated as severely impaired. A significant improvement was seen at twelve sites, and a significant decline, at four sites. The chart on the left depicts the results of the same sites sampled during the 1993 survey for comparison. The number of non-impaired sites is considerably increased over that of the earlier sampling, while the number of severely impaired sites is reduced by a similar percentage, and the



proportion of moderately impaired sites remains fairly constant. The trend for both NJIS and habitat scores is relatively constant, with both at suboptimal levels. Abnormalities in chironomid larvae were found to be chronic at one site, while four additional sites, although not chronic at this time, exhibited significant levels of abnormalities in chironomid larvae only.



Watershed Management Area #8 includes both the North and South branches of the Raritan River and their tributaries, with a total of 67 AMNET sites sampled currently, and 3). The chart to the right shows that the majority (49 or 73.1%) of sites in WMA #8 were rated non-impaired; 17 or 25.4% were rated as moderately impaired, and only one site (1.5%) was rated as severely impaired. Figure 9 depicts the results of the earlier (1994) survey for comparison. In WMA #8, the habitat trend remains fairly constant at near optimum levels throughout; NJIS scores, in the non-impaired range throughout, increase somewhat from northwest to southeast, from the South Branch to North Branch sub-basins. Thus, while there may be some localized degradation from agricultural or residential sources, stream biotic integrity in WMA #8 is generally quite favorable. Only three sites (4.5% of sites sampled), exhibited significant numbers of chironomid abnormalities in the current data.



The ten tributaries that flow through the Township to these major rivers are also unimpaired based on AMNET data. In addition to the AMNET data, the NJDEP and other

regulatory agencies collect water quality chemical data on the streams in the state. These data show that the instream total phosphorus concentrations and fecal coliform concentrations of the Upper Raritan River, Whippany River and Upper Passaic River rarely exceed the state's criteria.

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. Sub-list 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

As the imperviousness increases in the Township, the peak and volumes of stream flows also increase. The increased amount of water can result in stream bank erosion, which results in unstable areas at roadway/bridge crossings, and degraded stream habitats. The low imperviousness of the Township has preserved groundwater recharge, maintaining base flows in streams



during dry weather periods. Low base flows can have a negative impact on instream habitat during the summer months. A map of the groundwater recharge areas are shown in Figure C-4. Wellhead protection areas, also required as part of the MSWMP, are shown in Figure C-5.



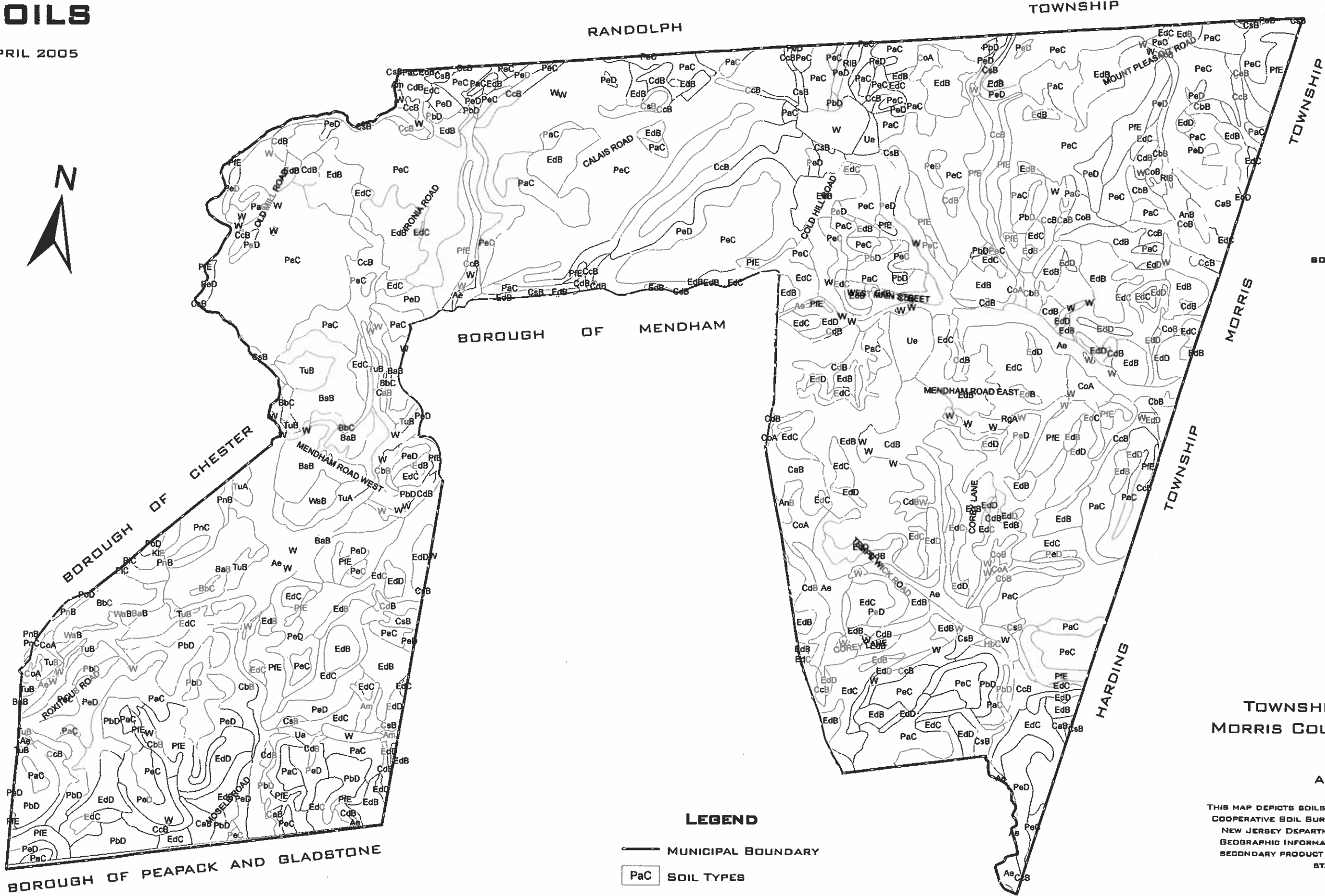
Figure C 4. Soils





# SOILS

APRIL 2005



SOIL TYPE	ADREAGE
AE	454.10
AM	14.75
ANB	20.83
SAB	335.01
BBC	101.77
CdB	734.72
CoB	515.29
CoA	103.72
CdB	95.24
CdB	210.16
EdB	1448.85
EdC	1189.25
EdD	476.81
HBC	4.61
KLE	15.96
PAC	988.21
PbD	384.93
PeC	2382.18
PeD	902.50
PfE	537.09
PLC	1.42
PNB	40.88
PNC	45.21
PdD	5.46
RGA	29.05
RLB	21.01
TUA	68.23
TuB	118.23
UA	7.81
UE	61.93
W	118.96
WAB	53.65

## TOWNSHIP OF MENDHAM MORRIS COUNTY, NEW JERSEY

### SOILS

APRIL 2005

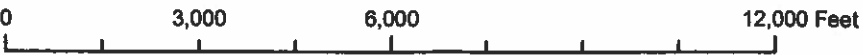
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#### LEGEND

— MUNICIPAL BOUNDARY

PaC SOIL TYPES

PARCEL LOTS





**Figure C 5. Soil Families**



# SOILS

APRIL 2005



## LEGEND

- MUNICIPAL BOUNDARY
- PARCEL LOTS
- PARENT SOILS
  - ALLUVIAL
  - ANNANDALE
  - BARTLEY
  - CALIFON SERIES
  - CALIFON VARIANT
  - COKEBURY
  - EDNEYVILLE
  - HIBERNIA
  - KLINESVILLE
  - PARKER
  - PARKER EOREYVILLE
  - PATTENBURG
  - PENN
  - PENN-KLINESVILLE
  - RIDGEBURY
  - TURBOTVILLE
  - URBAN LAND
  - WASHINGTON

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY

## SOILS

APRIL 2005

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0 3,000 6,000 12,000 Feet





**Table 1. Groundwater Recharge Capability**

<b>Soil Family</b>	<b>Acreage</b>	<b>Recharge Inches Per Year</b>	<b>Recharge Cubic Feet Per Year</b>
Alluvial Land	468.85	0.00	0
Annandale	20.83	16.30	1,235,704
Bartley	436.87	16.40	25,987,922
Califon	1250.01	16.40	74,347,532
Cokesbury	409.12	0.00	0
Edneyville	3114.91	20.20	228,121,213
Hibernia	4.61	17.00	283,939
Kliensville	15.96	18.10	1,051,372
Parker	4657.82	19.60	331,310,038
Pattensburg	538.51	20.10	39,315,740
Penn	91.55	17.30	5,750,910
Ridgebury	50.06	0.00	0
Turbotville	186.46	16.70	11,316,929
Urban	69.74	0.00	0
Washington	172.61	20.00	12,558,115
<b>Total</b>	<b>11487.91</b>	<b>17.50</b>	<b>731,279,414</b>



*Figure C 6. Wellhead Protection Areas of Mendham Township*





# TOPOGRAPHY

APRIL 2005



## LEGEND

- PARCEL LOTS
- TOPOGRAPHY
- MUNICIPAL BOUNDARY
- WELLHEAD PROTECTION AREAS
- TIER
  - 2 YEAR
  - 5 YEAR
  - 12 YEAR

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY  
**TOPOGRAPHY**  
APRIL 2005

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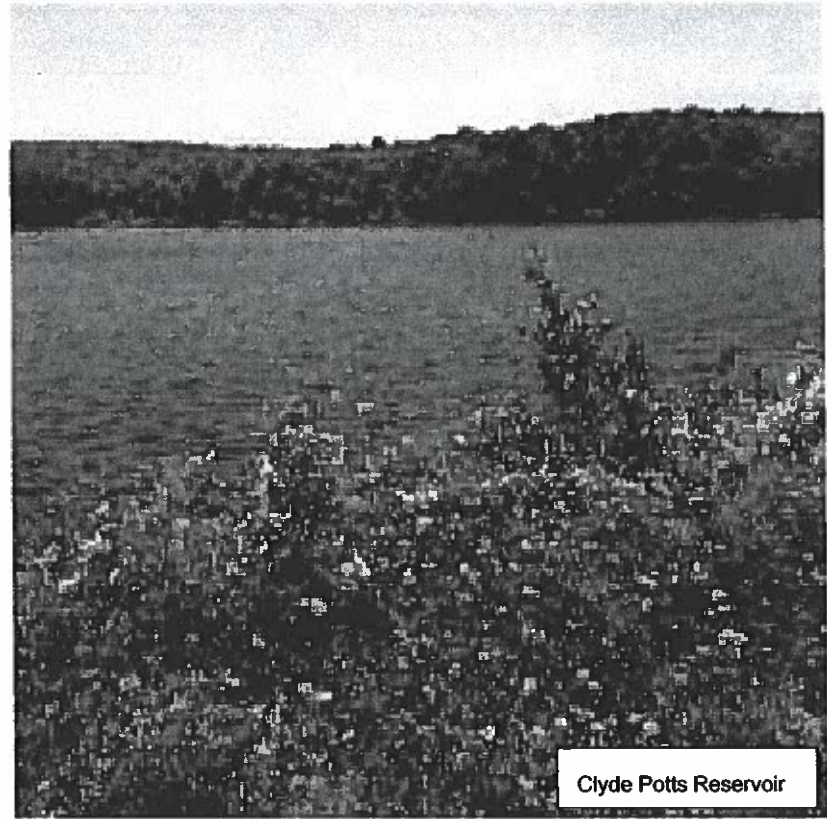




**Design and Performance Standards**

Mendham 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.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.



**Plan Consistency**

Mendham Township is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Township; therefore this plan does neither need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs

are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

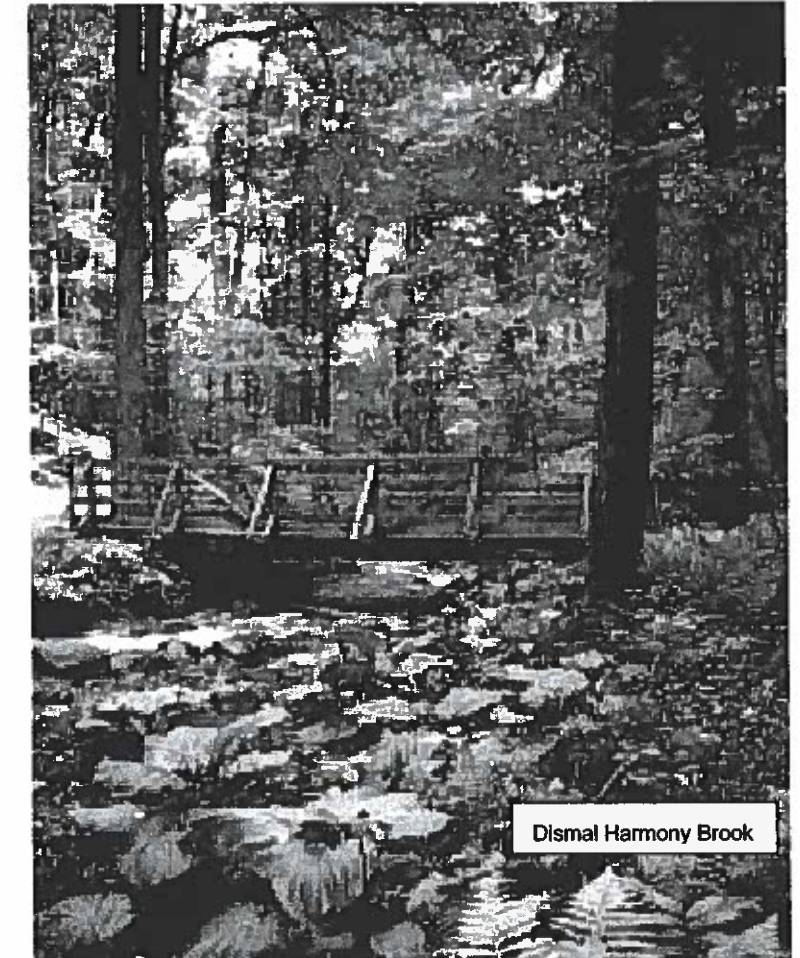
The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be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



The Township's proposed 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 Morris County 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 10 Streets and Roads**

##### **Section 10-4 Specifications**

##### **Subsection 10-4.6 Clearing**

This subsection limits the extent of clearing to a maximum of five (5) feet beyond that which is required for grading and construction. The 2000 Master Plan Revision sets forth the goals of minimizing roadway width from the traditional 24 to 30 feet to 18 feet reflecting the rural nature of the community.



#### **Subsection 10-4.9 Drainage**

This subsection requires that drainage systems comply with accepted sizing standards (RSIS) and with Chapter 16 (Subdivision & Site Plan) and Chapter 18(Flood Hazard Control) of the Township's Ordinance.

#### **Subsection 10-4.10 Curbs**

This subsection sets forth for the requirements for curbs along roads. Generally curbing will only be required along Regional Arterial Roadways and Arterial Collector Roadways. All other new roads will comply with RSIS standards. Roadways without curbs are encouraged to provide for sheet flow off of impervious surfaces and utilization of roadside bioretention swales for water quality enhancement.

#### **Chapter 16 Subdivision and Site Plan**

##### **Subsection 16-10.2.u. Street Storm Drainage & Water Control**

The subsection requires separate seepage pits for all roof top runoff for all new construction. This section requires change to provide for groundwater recharge requirements of the Stormwater Management Rules

##### **Subsection 16-10.8 Protection of Critical Areas**

This subsection limits disturbance and vegetation removal on areas defined as Steep Slopes in the Township's Ordinance.

##### **Subsection 16-10.9 On-site Stormwater Management**

This subsection requires use of stormwater BMP's and requires that the rate of runoff be no greater than the pre-development rate of runoff and volume of runoff be reduced to predevelopment volumes as much as practicable. This section requires change to comply with the RSIS standards.

##### **Subsection 16-10.10 Public Use and Service Areas**

This subsection allows the Planning Board to impose Conservation Easements on environmentally sensitive areas including: wetlands, wetland transition areas, flood hazard areas, riparian corridors and steep slopes.

#### **Chapter 17 Environmental Impact Statement**

This chapter requires an Environmental Impact Statement for all land development in the Township and with respect to surface water protection and stormwater requires that non-point source pollution in stormwater runoff be reduced to the maximum extent possible, requires that developers demonstrate that antidegradation policies that apply to Category 1 waters are applied throughout the Township and requires that nitrate loading in groundwater as a



result of development activities will not adversely impact groundwater nitrate concentrations.

#### **Chapter 19 Soil Erosion and Sediment Control**

This Chapter requires strict compliance with the Standards for Soil Erosion and Sediment Control in New Jersey.

#### **Chapter 21 Zoning**

This chapter has been changed to reflect the principals and goals of the 2000 Master Plan Revision. The changes incorporated into the new Zone Plan reflect the concerns with overuse and protection of groundwater resources with the intent to limit the total population of the Township to supportable levels.

#### **Chapter 23 Tree Conservation**

This chapter limits removal of trees on private property in furtherance of the goals stated in the 2000 Master Plan Revisions.

#### **Chapter 24 Unimproved Lot Ordinance**

This chapter requires that development of unimproved lots comply with all requirements of the Land Use Ordinance including Chapters 16, 18 and 19.

#### **Chapter 24 A Environmental Permit**

This chapter requires protection of environmentally sensitive and critical areas in all construction permit applications. Conservation easements can be required when deemed prudent for the protection of wetlands, wetland transition areas, steep slopes and riparian corridors.



North Branch Raritan River – Roxiticus Valley



**Land Use/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 forest lands, the build-out of these two 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.



*Figure C 7. Mendham Township Existing land Use*



# EXISTING LAND USE

APRIL 2005



## Legend

- MUNICIPAL BOUNDARY
- PARCEL LOTS
- AGRICULTURE
- BARREN LAND
- FOREST
- URBAN
- WATER
- WETLANDS

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY  
EXISTING LAND USE  
APRIL 2005

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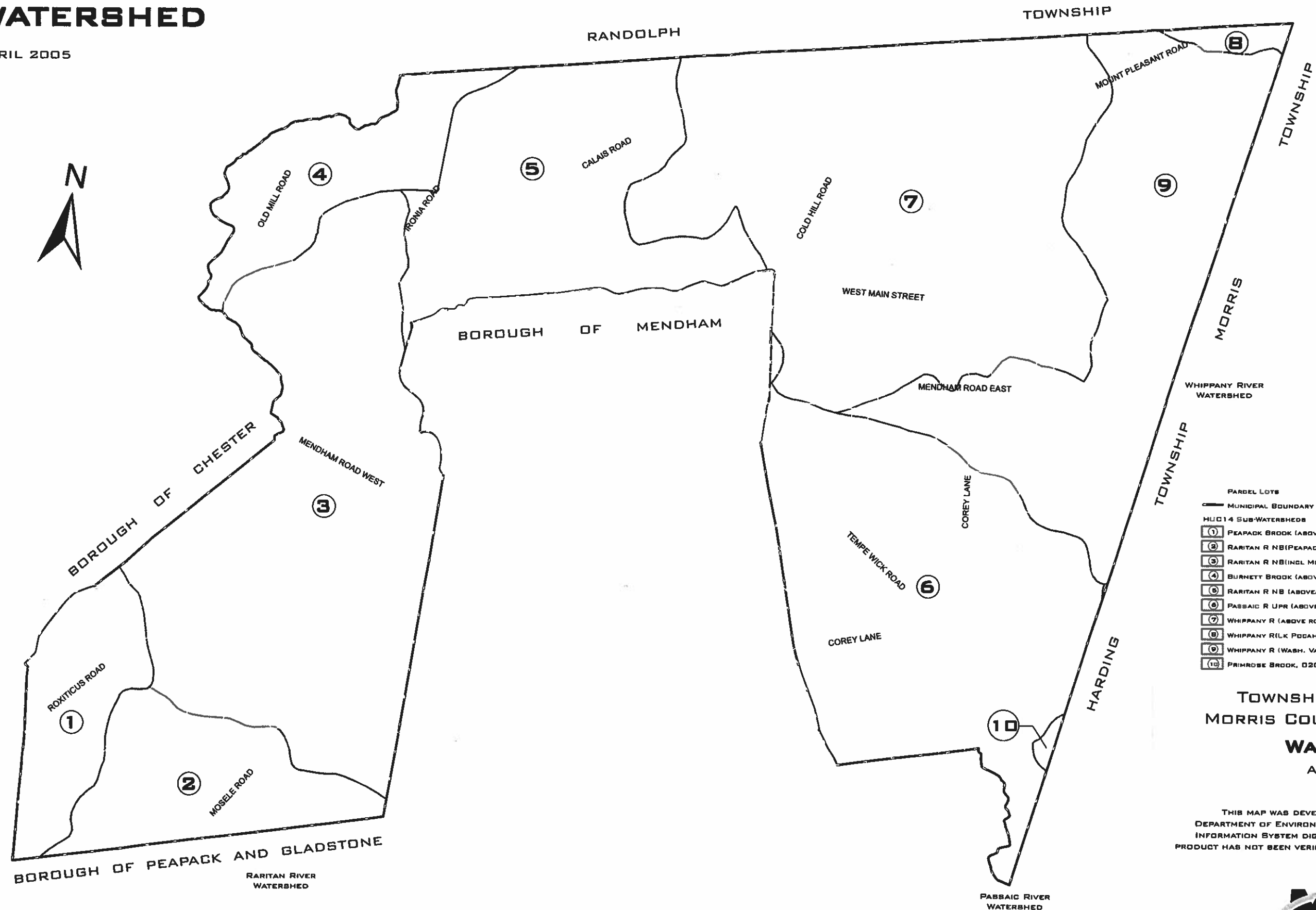
**Figure C 8. Hydrologic Units within Mendham Township**





# WATERSHED

APRIL 2005



## LEGEND

- PARCEL LOTS
- MUNICIPAL BOUNDARY
- HUC14 SUB-WATERSHEDS
- ① PEAPACK BROOK (ABOVE/INCL GLADSTONE BK), 02030105060050
- ② RARITAN R NB (PEAPACK BK TO MCVICKERS BK), 02030105060040
- ③ RARITAN R NB (INCL MCVICKERS TO INDIA BK), 02030105060030
- ④ BURNETT BROOK (ABOVE OLD MILL RD), 02030105060020
- ⑤ RARITAN R NB (ABOVE/INCL INDIA BK), 02030105060010
- ⑥ PASSAIC R UPR (ABOVE OSBORN MILLS), 02030103010010
- ⑦ WHIPPANY R (ABOVE ROAD AT 740 33M), 02030103020010
- ⑧ WHIPPANY R (L.K. POCAMONTAS TO WASH VAL RD), 02030103020040
- ⑨ WHIPPANY R (WASH. VALLEY RD TO 740 33M), 02030103020020
- ⑩ PRIMROSE BROOK, 02030103010020

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY  
**WATERSHED**  
APRIL 2005

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Table 2. HUC-14 Su-Watersheds in Mendham Township

Sub-Watersheds (HUC14)		Sub-Watershed ID	Hydrologic Unit Code (14 digit)	Watershed Name	Watershed ID	Watershed Management Area	Management Area ID	Water Region	Water Region II
1	Peapack Brook (above/incl Gladstone Bk)	08CA05	20301050600050	Raritan River North Branch (above Lamington)	08CA	North & South	8	Raritan	2
1	Raritan River North Branch (Peapack Bk to McVickers)	08CA04	20301050600040	Raritan River North Branch (above Lamington)	08CA	North & South	8	Raritan	2
1	Raritan River North Branch (incl McVickers to India Bk)	08CA03	20301050600030	Raritan River North Branch (above Lamington)	08CA	North & South	8	Raritan	2
1	Burnett Brook (above Old Mill Rd)	08CA02	20301050600020	Raritan River North Branch (above Lamington)	08CA	North & South	8	Raritan	2
1	Raritan River North Branch (above/incl India Bk)	08CA01	20301050600010	Raritan River NB (above Lamington)	08CA	North & South	8	Raritan	2
1	Passaic River Upper (above Osborn Mills)	06AA01	2030103010010	Passaic River Upper (above Pine Brook bridge)	06AA	Upper Passaic,	6	Northeast	1
1	Whippany River (above road at 74d 33m)	06BA01	2030103020010	Whippany River	06BA	Upper Passaic,	6	Northeast	1
1	Whippany River (Lake Pocahontas to Washington)	06BA04	2030103020040	Whippany River	06BA	Upper Passaic,	6	Northeast	1
1	Whippany River (Washington Valley)	06BA02	2030103020020	Whippany River	06BA	Upper Passaic,	6	Northeast	1
1	Primrose Brook	06AA02	2030103010020	Passaic River Upper (above Pine Brook bridge)	06AA	Upper Passaic, Whippany and Rockaway	6	Northeast	1



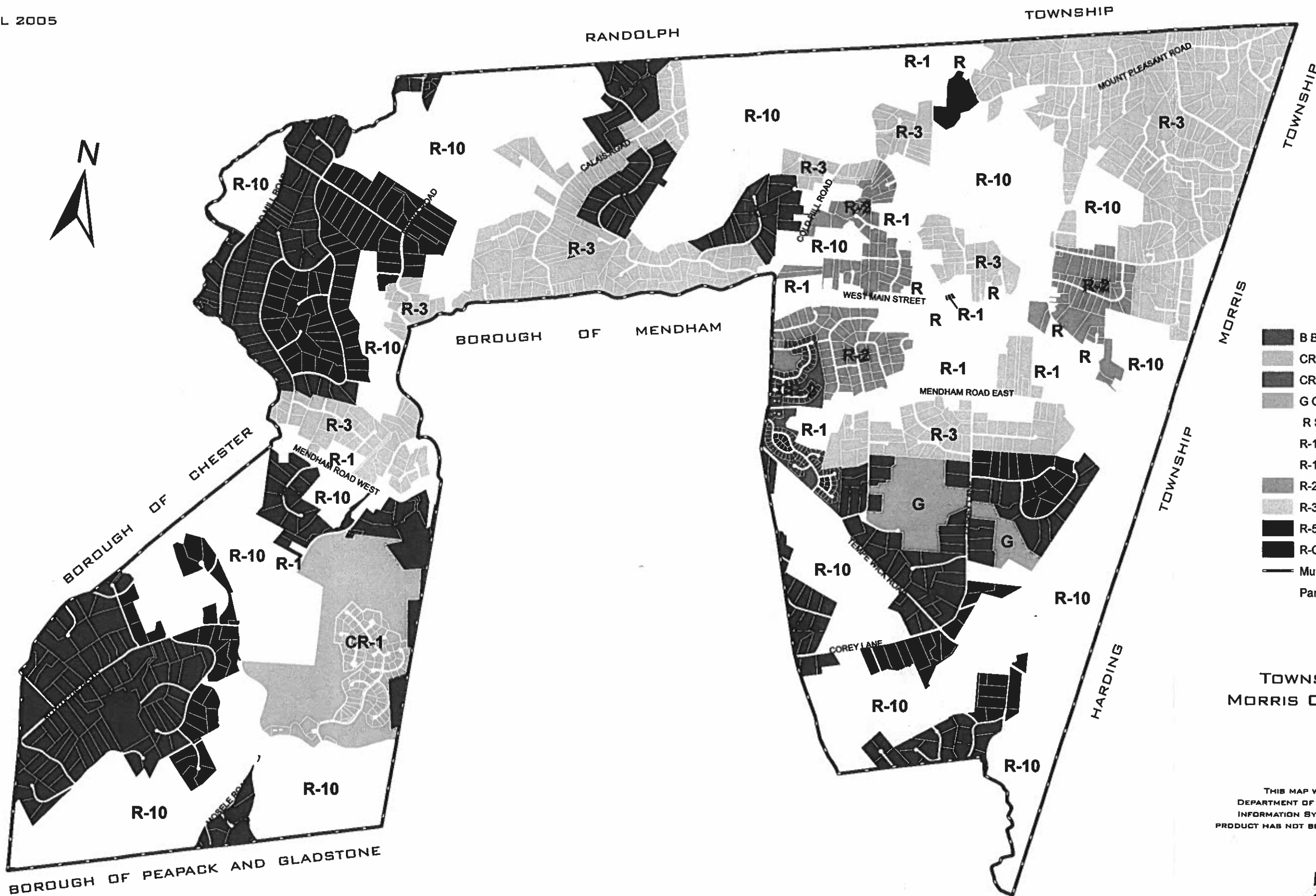
**Figure C 9. Zone Plan**





# ZONING

APRIL 2005



## Legend

- B Business Zone
- CR-1 Single-Family Residential Zone
- CR-2 Single-Family Residential Zone
- G Golf Club Zone
- R Single-Family Residential Zone
- R-1 Single-Family Residential Zone
- R-10 Single-Family Residential Zone
- R-2 Single-Family Residential Zone
- R-3 Single-Family Residential Zone
- R-5 Single-Family Residential Zone
- R-C Single-Family Residential Zone
- Municipal Boundary
- Parcel Lots

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY

ZONING MAP  
APRIL 2005

THIS MAP WAS DEVELOPED USING NEW JERSEY  
DEPARTMENT OF ENVIRONMENTAL PROTECTION GEOGRAPHIC  
INFORMATION SYSTEM DIGITAL DATA, BUT THE SECONDARY  
PRODUCT HAS NOT BEEN VERIFIED AND IS NOT STATE-AUTHORIZED.





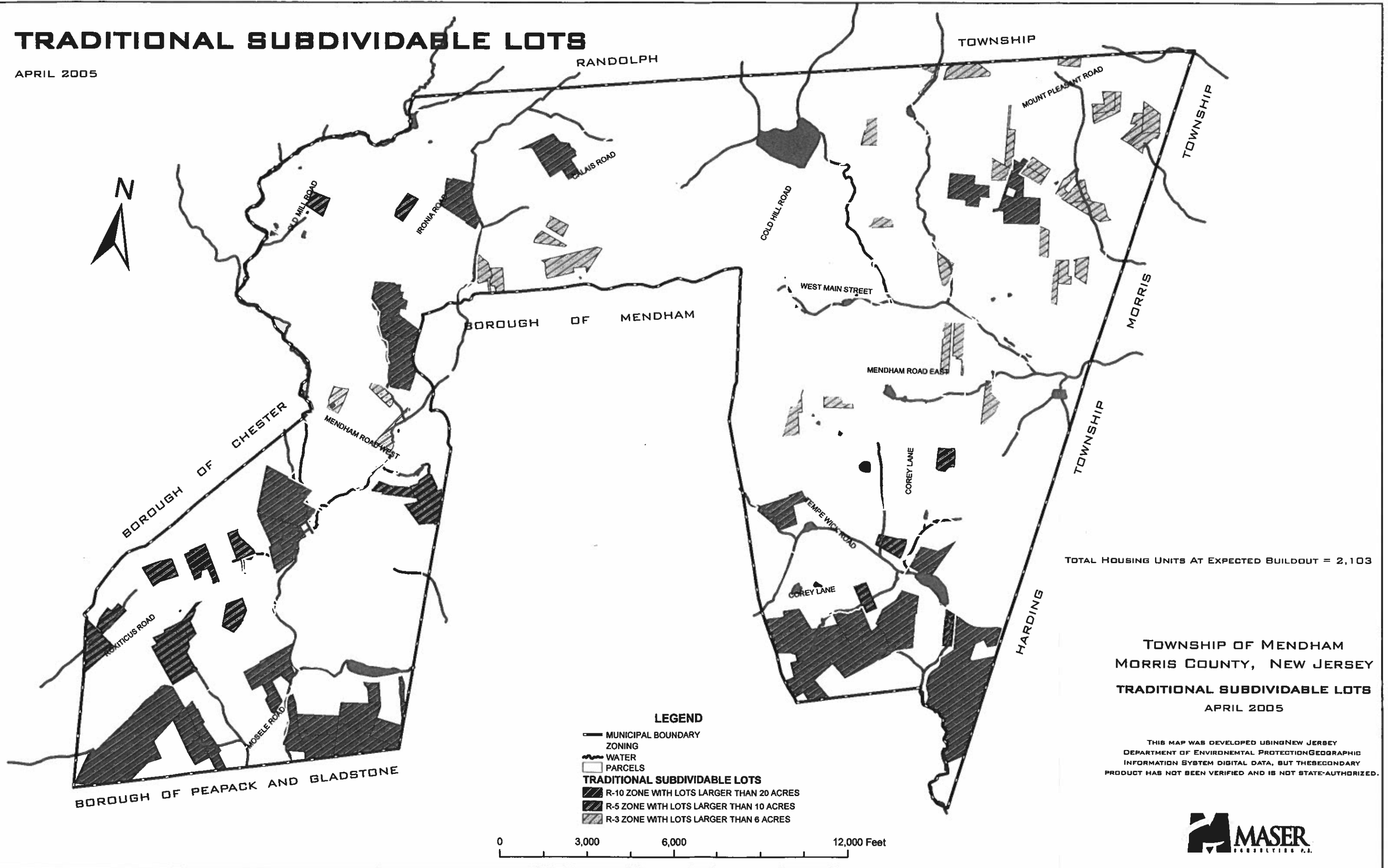
*Figure C 10. Traditional Sub-dividable Lots*





# TRADITIONAL SUBDIVIDABLE LOTS

APRIL 2005





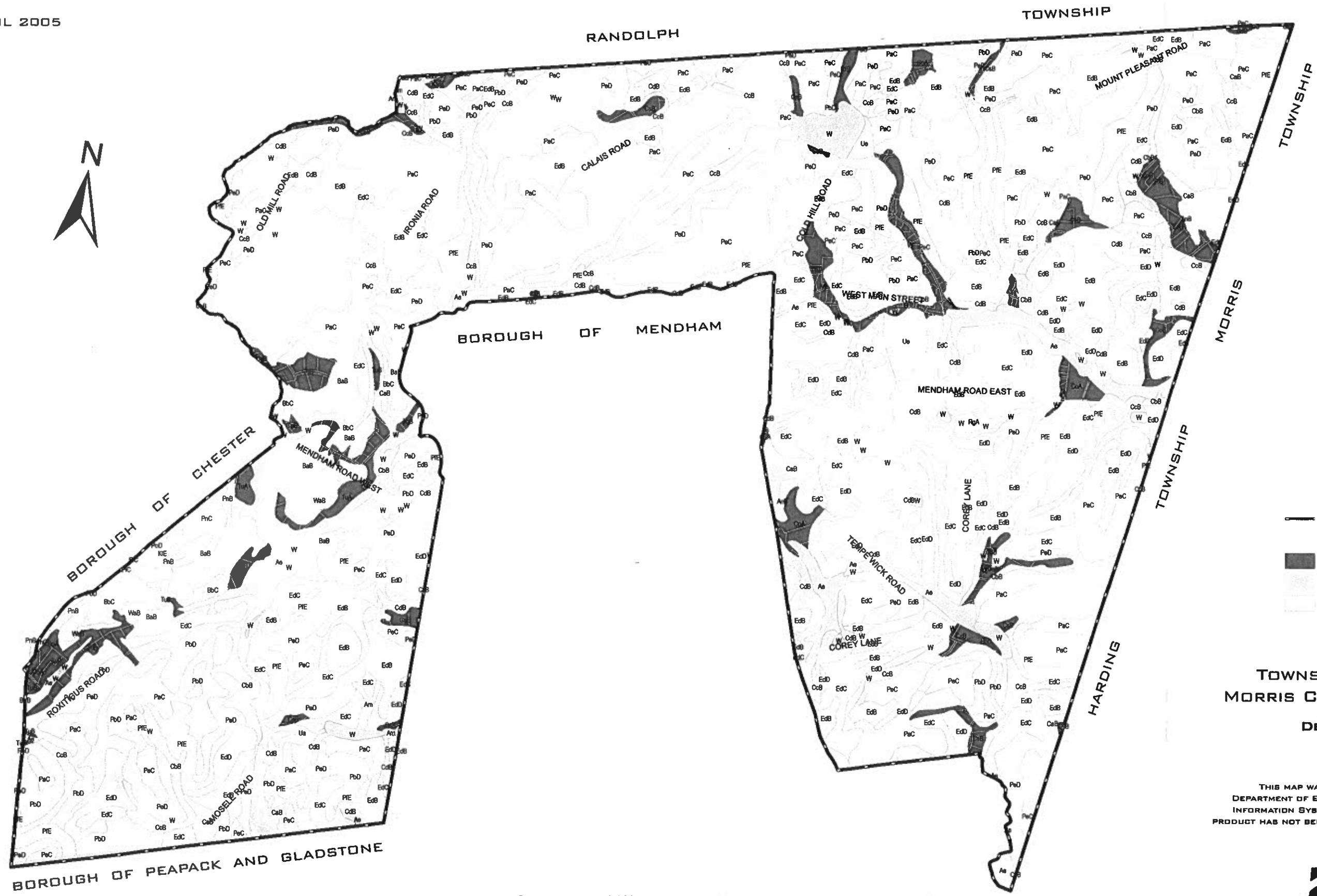
*Figure C 11. Mendham Township Wetlands & Areas of High Water Table*





# DEPTH TO WATER

APRIL 2005



- Legend**
- MUNICIPAL BOUNDARY
  - PARCEL LOTS
  - LESS THAN 1 1/2 FEET
  - WETLANDS
  - SOILS

TOWNSHIP OF MENDHAM  
MORRIS COUNTY, NEW JERSEY

DEPTH TO WATER  
APRIL 2005

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0 3,000 6,000 12,000 Feet





Table 3. Build-Out Calculations

Map ID	HUC14	Zoning	Total Area (Acres)	Existing Average Impervious Per Lot (ac.)	Existing Dwellings	Existing Impervious (%)	Existing Impervious Area	Wetlands, Water Area & Open Space (Acres)	Developable Area (Acres)	Total Possible Dwellings	Build Out Impervious (Acres)	Build Out Impervious (%)
	2030105060050	R-5	381	0.30	44	3.46%	13.20	8	373	48	14.40	3.78%
		R-10	73	0.38	0	0.00%	0.00	0	73	0	0.00	0.00%
2	2030105060040	R-5	166	0.30	18	3.26%	5.40	4	162	24	7.20	4.34%
		R-10	447	0.38	5	0.42%	1.88	20	427	28	10.54	2.36%
3	2030105060030	R	7	0.14	13	27.57%	1.82	0	6	13	1.82	27.57%
		R-1	82	0.13	54	8.81%	7.24	1	81	58	7.77	9.46%
		R-3	82	0.18	43	9.42%	7.74	71	11	47	8.46	10.30%
		R-5	788	0.30	124	4.72%	37.20	50	739	131	39.30	4.99%
		R-10	700	0.38	15	0.81%	5.65	197	502	28	10.54	1.51%
		CR-1	445	0.16	86	3.10%	13.76	335	110	86	13.76	3.10%
4	2030105060020	R-5	270	0.31	52	5.97%	16.12	5	264	52	16.12	5.97%
		R-10	265	0.38	10	1.42%	3.76	107	158	10	3.76	1.42%
5	2030105060010	R-3	512	0.18	123	4.33%	22.14	13	499	130	23.40	4.57%
		R-5	230	0.30	33	4.30%	9.90	12	218	33	9.90	4.30%
		R-10	433	0.38	4	0.35%	1.51	318	115	8	3.01	0.70%
6	2030103010010	R-3	71	0.18	16	4.08%	2.88	2	69	21	3.78	5.36%
		R-5	572	0.30	86	4.51%	25.80	83	488	88	26.40	4.62%
		R-10	952	0.38	13	0.51%	4.89	584	369	44	16.57	1.74%
		CR-2	67	0.14	80	16.83%	11.20	17	50	80	11.20	16.83%
		G	161	0.31	1	0.19%	0.31	161	0	1	0.31	0.19%
7	2030103020010	R	140	0.14	203	20.31%	28.42	8	132	234	32.76	23.41%
		R-1	299	0.13	208	9.32%	27.87	9	290	245	32.83	10.96%
		R-2	373	0.17	147	6.70%	24.99	26	347	170	28.90	7.75%
		R-3	445	0.18	104	4.21%	18.72	8	437	117	21.06	4.74%
		R-5	103	0.30	16	4.64%	4.80	4	99	16	4.80	4.64%
		R-10	1,136	0.38	1	0.03%	0.38	1107	29	3	1.13	0.10%
		CR-2	45	0.14	46	14.38%	6.44	19	25	46	6.44	14.38%
		B	1	0.10	3	29.29%	0.30	0	1	3	0.30	29.29%
8	2030103020040	R-3	54	0.18	15	5.02%	2.70	0	54	15	2.70	5.02%
9	2030103020020	R-2	54	0.17	23	7.25%	3.91	3	51	27	4.59	8.52%
		R-3	844	0.18	198	4.22%	35.64	52	791	218	39.24	4.65%
10	2030103010020	R-10	489	0.38	1	0.08%	0.38	431	58	4	1.51	0.31%
		R-10	17	0.38	0	0.00%	0.00	17	0	0	0.00	0.00%
- Total			10,701			3.24%	346.94				404.50	3.78%



Table 4. Nonpoint Source Pollutant Loads by Land Cover At Build Out

Land Cover	Pollutant	Nonpoint Source Pollution Loading (lbs/acre/year)	Land Area	Annual Pollutant Load (Lbs/Year)
High/Medium Density Residential	Phosphorous Load	1.4	1231.52	1,724.128
	Nitrogen Load	15	1231.52	1,8472.8
	Suspended Solids Load	140	1231.52	172,412.8
Low Density/Rural Residential	Phosphorous Load	0.6	9846.79	5,908.074
	Nitrogen Load	5	9846.79	4,233.95
	Suspended Solids Load	100	9846.79	984,679
Commercial	Phosphorous Load	2.1	0	0
	Nitrogen Load	22	0	0
	Suspended Solids Load	200	0	0
Open Space/Wetlands/Water	Phosphorous Load	0.1	3631.81	363.181
	Nitrogen Load	3	3631.81	10,895.43
	Suspended Solids Load	40	3631.81	145,272.4
Total Phosphorous Source Load				7,995.383
Total Nitrogen Source Load				78,602.18
Total Suspended Solids Source Load				1,302,364.2

\* Source: NJDEP Stormwater and Nonpoint Source Pollution Best Management



**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. A hierarchy of options is being developed in cooperation with Mendham Township's headwaters watershed river system associations.

**Mitigation Project Criteria**

The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

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. 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.



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