Environmental Resource Inventory

Update – 2013

for

Borough of Peapack & Gladstone

County of Somerset

Compiled by

The Land Conservancy of New Jersey
An accredited land trust

with

Borough of Peapack & Gladstone Environmental Commission

May 2013

ENVIRONMENTAL RESOURCE INVENTORY UPDATE - 2013

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County of Somerset

Prepared for:

Borough of Peapack & Gladstone Environmental Commission

Prepared May 1, 2013 by:

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The original document was appropriately signed and sealed in accordance with Chapter 41, Title 13 of the State Board of Professional Planners.

Adopted by the Borough of Peapack & Gladstone Land Use Board on May 1, 2013

ENVIRONMENTAL RESOURCE INVENTORY UPDATE - 2013

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Borough of Peapack & Gladstone
County of Somerset

Produced by:

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Richard Imossi - Vice Chair
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Scott Callahan
Gian Palo Caminiti
Peter Costales
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Nickolas Baldwin - Alternate 2

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William Horton - Mayor
Anthony Suriano - Council Representative

Borough Staff and Committees:
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John Smith, Chair, Historic Preservation Commission

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   Source for *Appendices B, C and D*: 1989 Somerset County Cultural Resources Survey excerpted from the Borough of Peapack & Gladstone 1996 Master Plan Historic Preservation Plan Element

E. Documentation provided by Susan R. Rubright, Member, Park Manor Peapack L.L.C. regarding Blue Line Stream – Block 8, Lot 19. Letter dated April 2, 2013.

F. Letter Confirming ERI Update Compatibility with Borough Master Plan (Richard T. Coppola, June 7, 2013)

Notes:

The information and maps presented in this report are intended for preliminary review and cannot substitute for on-site testing and evaulations. The maps for the *Environmental Resource Inventory Update* were developed using NJDEP Geographic Information System digital data.

All photographs taken in the Borough of Peapack & Gladstone.

EXECUTIVE SUMMARY

The Borough of Peapack & Gladstone consists of two villages surrounded by a scenic countryside of rolling hills and farmland. Two pristine waterways – North Branch of the Raritan River and Peapack Brook – are major natural assets. In the late 1800s, the beauty of the landscape attracted wealthy New York City business leaders, who moved their families to this more healthful, attractive region connected to the city by railway and primitive, but passable roadways.

The Borough is located in northern Somerset County and at the southern extremity of the New Jersey Highlands, which provides drinking water for millions of residents in northern New Jersey and New York City. The forests, wetlands and waterways of this environmentally sensitive region provide habitat for threatened and endangered flora and fauna. Numerous open spaces offer public access to the natural environment, and historic sites add interest to the villages of Peapack and Gladstone and the surrounding countryside.

The *2013 Environmental Resource Inventory (ERI) Update* is based on available data from federal and state resources, as well as municipal planning documents and other resources. This report provides an update to the Borough's *2005 Environmental Resources Inventory*.

Ensuring the high quality of life for the residents of the Borough of Peapack & Gladstone is a driving force behind this *Environmental Resource Inventory Update*. Documentation of the natural resource base – the geology, geography, topography hydrology (including water quality, wetlands and flood zones), vegetation and wildlife – will convey the scope and condition of the resources upon which the Borough relies. Chapters on air, climate, historic resources, public infrastructure, and contaminated sites will provide insight into the status of these contributors to the environmental health and viability of the Borough. Maps and charts included within this *Update* also help to detail the environmental resource base of the community. This document, in combination with the *2011 Open Space and Recreation Plan Update* and *2010 Comprehensive Farmland Preservation Plan Update,* serves as a guide for the Borough's future growth and preservation.

In 2010 the Borough of Peapack & Gladstone began to work towards certification through the Sustainable Jersey program. The submittal of an updated *Environmental Resource Inventory* will help the Borough work toward the goal of being certified as a sustainable community. New Jersey is the first state in the nation to have a comprehensive sustainability program for communities that links certification with strong state and private financial incentives, and a fully resourced program of technical support and training. The Borough's Green Team is spearheading the effort toward certification.

GEOLOGY

Physiographic Provinces

New Jersey's landscape is divided into four distinct regions, each characterized by unique geologic processes and landforms, known as physiographic provinces. Physiographic provinces classify landscapes based on terrain texture, rock type, and geologic structure and history. These attributes play an important role in determining the natural resources of an area. In New Jersey, beginning in the northwest and proceeding to the southeast, these provinces are identified as the Valley and Ridge, Highlands, Piedmont, and Coastal Plain Provinces. The Borough of Peapack & Gladstone is located in the Highlands Province, located primarily within the eastern half of the Borough, and the Piedmont Province, located predominantly in the western half.

The Highlands Province occupies an area of approximately 980 square miles to the east of the Valley and Ridge Province and comprises approximately one-eighth of the state. It is generally characterized as a mountainous belt ranging between 10 to 25 miles wide. The rugged topography of the Highlands consists of a series of discontinuous rounded ridges separated by deep, narrow valleys. The Highlands is composed mainly of highly metamorphosed igneous and sedimentary rocks dating from more than a billion years ago. These rocks are relatively resistant to erosion and result in the steep slopes and mountains common in the Highlands. Also found in the Highlands are small areas of slightly younger (about 540 to 900 million years old) metasedimentary rocks and diabase dikes. (*NJGS Information Circular, Physiographic Provinces of New Jersey)*

The Piedmont Province covers 1,600 square miles, which is roughly 20% of the state. This province is mostly underlain with "slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous rocks of Jurassic age." (*New Jersey Geological Survey, Information Circular – Geologic Mapping in New Jersey)* The Piedmont Province's surface is generally low rolling hills marked with sudden, steep ridges, which extend across the state and includes the palisades area in the east.

NJ Physiographic Provinces (Map 1 in the *Maps* section*)* shows the Highlands and Piedmont regions in the Borough of Peapack & Gladstone and the demarcation line between the two provinces. Within the Borough, 57% of the land mass (2,116 acres) is located within the Piedmont and 43% (1,581 acres) is located within the Highlands Physiographic Province.

Bedrock Geology

The geology of the Borough of Peapack & Gladstone can be classified into two layers: bedrock geology and surficial geology. Bedrock geology is the consolidated, underlying rock that extends deep into the earth's crust, and surficial geology is the unconsolidated sedimentary materials overlaying bedrock formations, and which are the parent materials for soils. The properties of these layers "determine the physical extent of aquifers and the chemical quality of the water they yield. They also control how groundwater recharges

and moves through the aquifers, how contaminants seep into and move through soil and groundwater, and where natural hazards like radon, sinkholes, and seismic instability may occur. Finally, these properties establish where geologic resources such as sand, gravel, peat, clay, quarry rock, and mineral ores are located. Geologic properties also determine the suitability of an area for the use of septic systems, the management of storm water and surface runoff, and the stability of foundations for buildings, bridges, tunnels, and other structures". *(New Jersey Geological Survey, Information Circular – Geologic Mapping in New Jersey)*

The underlying bedrock geology of the Borough of Peapack & Gladstone changes significantly between the Highlands and Piedmont Provinces. The *Bedrock Geology* map *(Map 2 in the Maps section)* depicts the distribution of bedrock types within the Borough and *Table 1* shows the frequency of occurrence. The predominant bedrock types are the Hornblende Granite (Ybh) (1,373 acres or 37% of the Borough), the Passaic Formation Conglomerate and Sandstone Facies (JTrspc) (978 acres, 27% of the Borough), and the Leithsville Formation (Cl) (512 acres, 14% of the Borough).[1] The border of the Highlands Province and the Piedmont Province are visible in the borders between the major bedrock geologies in the Borough. Where the combination of the Passaic Formation Conglomerate and Sandstone Facies (JTrpsc) and Hardyston Quartzite (Ch) formations meet the Hornblende Granite (Ybh) formation marks the borders between the Highlands and Piedmont Provinces. Also running along some of these borders, in an east to west direction, are the known fault lines in the Borough of Peapack & Gladstone (shown on *Map 2 – Bedrock Geology*)

Table 1. Bedrock Geology for the Borough of Peapack & Gladstone

Abbreviation	Geologic Name	Lithology	Acres	Percent
OCa	Allentown Dolomite	dolomite, and less abundant quartzite and shale	92.73	2.5%
Ya	Amphibolite	amphibolite, fine- to medium-grained	8.88	0.2%
Yb	Biotite-Quartz-Feldspar Gneiss	gneiss, fine- to coarse-grained	76.95	2.1%
Yd	Diorite	diorite	3.74	0.1%
Ch	Hardyston Quartzite	conglomeratic sandstone, quartzite, and dolomitic sandstone	332.28	9.0%
Ybh	Hornblende Granite	granite, medium- to coarse-grained	1,372.67	37.1%
Jd	Jurassic Diabase	diabase, medium- to coarse-grained	17.87	0.5%
Cl	Leithsville Formation	dolomite, dolomitic sandstone, siltstone, and shale	512.16	13.9%
Yba	Microperthite Alaskite	granite, medium- to coarse-grained	8.99	0.2%

[1] *The ArcGIS mapping software calculates the acreages for the municipality based upon the specific dataset being utilized and this can vary slightly for each individual analysis.*

Table 1. Bedrock Geology for the Borough of Peapack & Gladstone				
Abbreviation	**Geologic Name**	**Lithology**	**Acres**	**Percent**
JTrpsc	Passaic Formation Conglomerate and Sandstone facies	conglomeratic sandstone	977.80	26.5%
JTrpcq	Passaic Formation Quatzite-clast Conglomerate facies	quartzite conglomerate, sandstone	198.95	5.4%
Yk	Potassic Feldspar Gneiss	gneiss, fine- to medium-grained	60.37	1.6%
Yp	Pyroxene Gneiss	gneiss, fine- to medium-grained	33.00	0.9%
		Total:	**3,696.39**	**100.0%**

Source: NJDEP

Surficial Geology

Surficial geology is the unconsolidated materials overlaying bedrock formations. These formations are the parent material for agronomic (capable of supporting agriculture) soils and also affect the movement of groundwater and are capable of containing aquifers (*NJDEP, DGS10-2 Surficial Geology of New Jersey*). *Table 2* details the surficial geology of the Borough of Peapack & Gladstone, showing that the majority of the Borough (45%, or 1,660 acres) is covered in Weathered Gneiss (Qwg). The Weathered Gneiss also roughly delineates the borders of the Highlands Province as it is situated within the Borough, where it meets both the Weathered Carbonate Rock formation (Qwcb) and the Weathered Shale, Mudstone, and Sandstone formation (Qws). The *Surface Geology* map *(Map 3 in the Maps section)* depicts the surficial geology features in the Borough of Peapack & Gladstone.

Table 2. Surficial Geology for the Borough of Peapack & Gladstone					
Abbreviation	**Geologic Name**	**Lithology**	**Age**	**Acres**	**Percent**
Qaf	Alluvial Fan Deposits	Sand, silt, pebble-to-cobble gravel; reddish brown, yellowish brown to brown. As much as 40 feet thick.	Holocene and late Pleistocene, locally middle Pleistocene	22.01	1%
Qal	Alluvium	Sand, gravel, silt, minor clay and peat; reddish brown, yellowish brown, brown, gray. As much as 20 feet thick.	Holocene and late Pleistocene	290.55	8%
Qcal	Alluvium And Colluvium	Interbedded alluvium as in unit Qal & colluvium as in units Qcg, Qcb, Qcd, Qcs, Qcc, Qccb, and Qcl. As much as 20 feet thick.	Holocene and late Pleistocene	58.58	2%
Qcg	Gneiss Colluvium	Silty sand to sandy silt with gneiss fragments; yellow, yellowish brown, reddish yellow. As much as 70 feet thick.	Pleistocene	57.88	2%
Qpt	Pre-Illinoian Till	Clayey sandy silt to sandy silty clay with few to some pebbles & cobbles & very few boulders; reddish yellow, yellowish brown, reddish brown. As much as 30 feet thick.	Late Pliocene-early Pleistocene	42.81	1%

Table 2. Surficial Geology for the Borough of Peapack & Gladstone					
Abbreviation	**Geologic Name**	**Lithology**	**Age**	**Acres**	**Percent**
Qwcb	Weathered Carbonate Rock	Clayey silty sand to silty clay with fragments of carbonate rock, chert, and shale; red, reddish yellow, yellow. As much as 300 feet thick; thickness varies greatly over short distances.	Pleistocene	519.60	14%
Qwg	Weathered Gneiss	Silty clayey sand to sandy clayey silt with gneiss fragments; brown, yellowish brown, red, white. As much as 100 feet thick.	Pleistocene	1,660.47	45%
Qws	Weathered Shale, Mudstone, And Sandstone	Silty sand to silty clay with shale, mudstone, or sandstone fragments; reddish brown, yellow, light gray. As much as 10 feet thick on shale and mudstone, 30 feet thick on sandstone.	Pleistocene	1,023.19	28%
			Total:	**3,675.09**	**100%**

Source: NJDEP

GEOGRAPHY AND TOPOGRAPHY

Topography and Steep Slope

The Borough of Peapack & Gladstone is characterized by continuous changes in elevation, with the low and high elevation areas all being located in contiguous areas, forming rolling hills and valleys. *(Topography, Map 4 in the Maps Section)* The lowest point in the Borough of Peapack & Gladstone lies in the valley where the Peapack Brook is located, lying at 160 feet in elevation. The lower elevation sections of the Borough are located along the two river valleys of the Peapack Brook and the North Branch of the Raritan River. Conversely, the highest point is located at the peak of Mount Saint John in the northern end of the Borough at 640 feet. The areas of higher elevation are located along the hills and mountains which extend southward into the Borough between the Peapack Brook and the North Branch of the Raritan River.

Limiting the disturbance of steep slopes is important in preventing soil loss, erosion, excessive stormwater runoff, and the degradation of surface water; as well as maintaining the natural topography and drainage patterns of the land. Disturbing the natural vegetation, topography and drainage patterns of steep slopes often increases the amount and speed of runoff, and can cause erosion, soil creep, slumping (sections of soil shifting down and outward on the slope), and landslides. The combination of unstable slopes and greater runoff means that more water and sediment (silt) enter streams during precipitation events. Increases in water volume entering streams can lead to, or exacerbate, flooding downstream. In addition, an increase in the volume entering streams through runoff means less water is percolating through the soil and back into the groundwater to replenish drinking water supplies or provide base flow for streams during drier periods. The increased water runoff also carries larger loads of sediment compared to pre-development conditions. Excess sediments in streams can harm aquatic life, accelerate the filling of ponds and wetlands, and decrease a stream's aesthetic appearance.

The *Slopes* map *(Map 5 in the Maps Section)* maps the land in the Borough according to percentage of slope. Nearly 12% of the Borough has slopes greater than 25% and more than 33% of the Borough has slopes greater than 15%.

The *Severely and Moderately Constrained Slopes* map (*Map 6 in the Maps Section)* identifies areas that meet the New Jersey Highlands Council definitions for severely constrained slopes and moderately constrained slopes as follows:

- Severely Constrained Slopes: all lands with slopes of 20% or greater and lands within Riparian Areas with slopes of 10% and greater
- Moderately Constrained Slopes: all non-Riparian Area lands having a slope of 15% to less than 20% which are forested

25.97% (960 acres) of land in Peapack & Gladstone is categorized as severely constrained slopes and 4.34% (160 acres) is categorized as moderately constrained slopes.

Carbonate Rock (Karst) Topography

Carbonate rock is highly soluble and forms the basis for high yielding aquifers. Carbonate aquifers are often known as karst aquifers, referencing the distinctive topographic features that result upon the dissolution of portions of this bedrock. Carbonate rock in the Borough are mapped on *Map 7 – Carbonate Rock Area* and include Allentown Dolomite (OCa) and the Leithsville Formation (Cl).

SOILS

Soils Overview

Soils play a critical role in the environment. They support an area's vegetation, absorb rainwater, and provide habitat. The physical and chemical properties of soils reflect a large number of variables, including the parent material (bedrock), climate, vegetative cover, animal activities, slopes and drainage patterns, and time. New Jersey's fairly complex bedrock geology, history of glaciations, abundant precipitation, and patterns of human use have led to complex patterns of soil distribution (*NJGS Information Circular, Geologic Mapping in New Jersey*).

Soil Classifications

The official Soil Survey for Somerset County was updated in 2010 by the Natural Resources Conservation Service (NRCS), an agency of the United Sates Department of Agriculture (USDA). The soils maps and tables in this *Environmental Resource Inventory Update* are based on the data from that official survey.

The NRCS Soil Survey plots soils by map units. The Soil Survey names each map unit based on the characteristics of the dominant soils within that unit. These *map unit names* identify the soils by both their *soil series* classification(s), and by characteristics that differentiate them from other soil groupings in the same series.

Each map unit name has an associated abbreviation that offers a shorthand version of the naming/classification system. This abbreviation system identifies the soil types by steepness, stoniness and frequency of flooding as follows:

- Capital letters at the end of the abbreviation indicate the slope phase, with "A" being less steep and "E" being steeper.
- The small letters "a," "b" or "c" following these capital letters indicate the degree of stoniness: stony, very stony, and extremely stony, respectively.
- The small letter "t" at the end of an abbreviation indicates "frequently flooded" and "r" signifies "rarely flooded."

The Soil Survey also categorizes each map unit as one of four *map unit types*: Consociations, complexes, associations and undifferentiated groups.

Consociations (Cn) are named for the *dominant soil.* In a consociation, delineated areas use a single name from the dominant component in the map unit. Dissimilar components are minor in extent.

Complexes (Cx) and ***associations (An)*** consist of two or more *dissimilar* components that occur in a regularly repeating pattern. The total amount of other dissimilar components is minor in extent. The major components of an association can be separated at the scale of

mapping, while the major components of a complex cannot. Complexes often make up one of the major components of an association.

Undifferentiated Groups are made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and."

The *Soil Series* map (*Map 8 in the Maps section*) depicts the distribution of soils within the Borough of Peapack & Gladstone by *soil series* and *map unit name*. *Table 3* identifies the different soil types found in the Borough as well as a short description of each.

Table 3. Soils in the Borough of Peapack & Gladstone

Abbreviation	Map Unit (MU) Name	MU Kind	Acres	Percent
AbrB	Abbottstown silt loam, 2 to 6 percent slopes	Consociation	5.75	0.2%
ArnB	Arendtsville gravelly loam, 2 to 6 percent slopes	Consociation	254.11	6.9%
ArnC	Arendtsville gravelly loam, 6 to 12 percent slopes	Consociation	205.61	5.6%
BacC	Bartley gravelly loam, 8 to 15 percent slopes	Consociation	107.56	2.9%
BabC	Bartley loam, 3 to 15 percent slopes	Consociation	215.81	5.8%
BabB	Bartley loam, 3 to 8 percent slopes	Consociation	1.03	0.0%
BhnB	Birdsboro silt loam, 2 to 6 percent slopes	Consociation	40.16	1.1%
BhnC	Birdsboro silt loam, 6 to 12 percent slopes	Consociation	7.15	0.2%
BoyAt	Bowmansville silt loam, 0 to 2 percent slopes, frequently flooded	Consociation	46.03	1.2%
CanBb	Califon gravelly loam, 0 to 8 percent slopes, very stony	Consociation	6.57	0.2%
CanB	Califon gravelly loam, 3 to 8 percent slopes	Consociation	21.08	0.6%
CakB	Califon loam, 3 to 8 percent slopes	Consociation	4.33	0.1%
FNAT	Fluvaquents and Udifluvents, 0 to 3 percent slopes, frequently flooded	Consociation	178.10	4.8%
FmhAt	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	Consociation	52.80	1.4%
GkaoD	Gladstone gravelly loam, 15 to 25 percent slopes	Consociation	107.85	2.9%
GkaoB	Gladstone gravelly loam, 3 to 8 percent slopes	Consociation	289.04	7.8%
GkaoC	Gladstone gravelly loam, 8 to 15 percent slopes	Consociation	288.53	7.8%
KkoD	Klinesville channery loam, 12 to 18 percent slopes	Consociation	34.46	0.9%
KkoE	Klinesville channery loam, 18 to 35 percent slopes	Consociation	2.64	0.1%

Table 3. Soils in the Borough of Peapack & Gladstone				
Abbreviation	**Map Unit (MU) Name**	**MU Kind**	**Acres**	**Percent**
KkoC	Klinesville channery loam, 6 to 12 percent slopes	Consociation	5.90	0.2%
LbtB	Lansdowne silt loam, 2 to 6 percent slopes	Consociation	0.24	0.0%
MenB	Meckesville moderately well drained gravelly loam, 2 to 6 percent slopes	Consociation	80.57	2.2%
MenC	Meckesville moderately well drained gravelly loam, 6 to 12 percent slopes	Consociation	57.68	1.6%
NehEb	Neshaminy silt loam, 18 to 35 percent slopes, very stony	Consociation	9.61	0.3%
NehC	Neshaminy silt loam, 6 to 12 percent slopes	Consociation	2.91	0.1%
NemDb	Neshaminy-Mount Lucas silt loams, 12 to 18 percent slopes, very stony	Complex	5.76	0.2%
NotB	Norton loam, 2 to 6 percent slopes	Consociation	23.48	0.6%
PaoC	Parker gravelly sandy loam, 3 to 15 percent slopes	Consociation	4.42	0.1%
PapD	Parker very gravelly sandy loam, 15 to 25 percent slopes	Consociation	50.64	1.4%
PapFg	Parker very gravelly sandy loam, 25 to 45 percent slopes, rocky	Consociation	112.14	3.0%
PapC	Parker very gravelly sandy loam, 3 to 15 percent slopes	Consociation	142.30	3.8%
PauCc	Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony	Complex	59.61	1.6%
PauDc	Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony	Complex	78.16	2.1%
PauDb	Parker-Gladstone complex, 15 to 25 percent slopes, very stony	Complex	415.65	11.2%
PawE	Parker-Rock outcrop complex, 25 to 45 percent slopes	Complex	51.56	1.4%
PdtD	Pattenburg gravelly loam, 12 to 18 percent slopes	Consociation	167.63	4.5%
PdtC	Pattenburg gravelly loam, 6 to 12 percent slopes	Consociation	190.31	5.1%
PeoB	Penn channery silt loam, 2 to 6 percent slopes	Consociation	15.90	0.4%
PeoC	Penn channery silt loam, 6 to 12 percent slopes	Consociation	21.73	0.6%
PenB	Penn silt loam, 2 to 6 percent slopes	Consociation	19.38	0.5%
PgmD	Penn-Klinesville channery silt loams, 12 to 18 percent slopes	Complex	20.93	0.6%
QY	Quarry	Consociation	10.25	0.3%
RarAr	Raritan silt loam, 0 to 3 percent slopes, rarely flooded	Consociation	8.05	0.2%
RerB7	Reaville deep variant channery silt loam, 0 to 6 percent slopes	Consociation	5.02	0.1%
RehB	Reaville silt loam, 2 to 6 percent slopes	Consociation	2.75	0.1%
RorAt	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	Consociation	50.68	1.4%
UCFAT	Udifluvents and Udepts, 0 to 3 percent slopes, frequently flooded	Undifferentiated group	192.56	5.2%
WATER	Water	Consociation	21.96	0.6%
		Total:	**3,696.39**	**100.0%**

The soil types were grouped together in different soil series, based on common characteristics and predominance in the Borough in the *Soil Series* map (*Map 8 in the Maps section*). *Table 4* documents the grouped soil series.

Table 4. Soil Series of the Borough of Peapack & Gladstone

Series Name	Acres	Percent
Abbottstown Soil Series	5.75	0.2%
Arendtsville Soil Series	459.71	12.4%
Bartley Gravelly Loam Series	107.56	2.9%
Bartley Loam Series	216.84	5.9%
Birdsboro Soil Series	47.32	1.3%
Bowmansville Soil Series	46.03	1.2%
Califon Gravelly Loam, Very Stony Series	6.57	0.2%
Califon Gravelly Loam Series	21.08	0.6%
Califon Loam Series	4.33	0.1%
Fluvaquents and Udifluvents Series	178.10	4.8%
Fluvaquents Series	52.80	1.4%
Gladstone Gravelly Loam Series	685.43	18.5%
Klinesville Soil Series	43.00	1.2%
Lansdowne Soil Series	0.24	0.0%
Meckesville Soil Series	138.25	3.7%
Neshaminy Silt Loam Series	12.52	0.3%
Neshaminy-Mount Lucas Silt Loams Series	5.76	0.2%
Norton Soil Series	23.48	0.6%
Parker Gravelly Sandy Loam Series	4.42	0.1%
Parker Soil Series	305.09	8.3%
Parker-Gladstone Complex Soil Series	553.42	15.0%
Parker-Rock Outcrop Series	51.56	1.4%
Pattenburg Gravelly Loam Series	357.94	9.7%
Penn Channery Silt Loam Series	37.63	1.0%
Penn Silt Loam Series	19.38	0.5%
Penn-Klinesville Soil Series	20.93	0.6%
Quarry Soil Series	10.25	0.3%
Raritan Silt Loam Series	8.05	0.2%
Reaville Soil Series	5.02	0.1%
Reaville Silt Loam Series	2.75	0.1%
Rowland Soil Series	50.68	1.4%
Udifluvents and Udepts Series	192.56	5.2%
Water	21.96	0.6%
Total:	**3,696.39**	**100.0%**

The soil series of the Borough of Peapack & Gladstone cover a range of types, including loam soils, which are conducive to plant growth including agriculture, and gravelly to stony soils, which promote high drainage. The following are descriptions of the major soil series in the Borough of Peapack & Gladstone, abstracted from the *NRCS Soil Survey*:

Abbottstown - The Abbottstown series consists of deep and very deep, somewhat poorly drained soils in acid red shale, siltstone and sandstone. They are usually located on concave upland slopes of 0 to 15 percent grade.

Arendtsville - The Arendtsville series consists of very deep, well drained soils formed in materials weathered from a fanglomerate of quartzite, sandstone, aporhyolite, and other rocks held together in a red sandy matrix. It is found on slopes that range from 2 to 40 percent with moderate to moderately rapid permeability.

Bartley - The Bartley series consists of very deep, moderately well drained soils that formed in glacial drift (pre-Wisconsin Age) or colluvium and underlying residuum derived mainly from limestone and granitic gneiss. They occur on broad, nearly level to strongly sloping till plains and in heads of drains, with slopes ranging from 0 to 15 percent.

Birdsboro - The Birdsboro series consists of very deep, well drained, and moderately well drained soils. The soils formed in old alluvial deposits derived from red sandstone, shale, and siltstone. They are found on terraces and alluvial fans with convex slopes of 0 to 15 percent.

Bowmansville - The Bowmansville series consists of very deep, poorly and somewhat poorly drained soils. They formed in recent alluvial deposits derived from upland soil materials weathered from dolerite or basalt. They are found on floodplains with smooth slopes of 0 to 3 percent.

Califon - Califon series consists of very deep, moderately well or somewhat poorly drained soils formed either in old till or on driftless landscapes in the Northern Piedmont in colluvium formed from granitic gneiss on upland flats or on concave slope positions.

Fluvaquents - Fluvaquents are a family of soil series that feature poorly to very poorly drained soils formed in human-transported materials or on excavated landscapes, deposited on riverbanks, tidal mudflats, or other areas of waterborne soil transport. Repeated deposition of material limits development on fluvaquent soils.

Udifluvents - Udifluvents are moderately well drained to excessively drained soils which formed on flood plains and gravel bars near perennial streams and rivers. This series is subject to flooding during heavy rains. Soils in these areas are variable. These soils are poorly suited to cultivated crops, hay and pasture because of the hazard of flooding

Gladstone - The Gladstone series consists of very deep well drained soils formed in residuum and colluvium from granitic gneiss. This series occurs on upland divides and rolling foothills of the Highlands section of Appalachian province, the Reading Prong section of the New England province, and the Gettysburg-Newark Lowland and the Piedmont Upland sections of the Northern Piedmont province.

Klinesville - The Klinesville series consists of shallow, somewhat excessively drained soils formed in residuum and derived from red shale, siltstone, slate, and fine-grained sandstone. They are commonly located on dissected uplands with slopes ranging from 3 to 80 percent.

Lansdowne - The Lansdowne series consists of deep and very deep, moderately well drained and somewhat poorly drained soils on upland areas. They are formed in old, red glacial till and the underlying residuum weathered from red shale, siltstone or fine-grained sandstone on slopes of 0 to 6 percent.

Meckesville - The Meckesville series consists of very deep well drained soils formed in colluvium, glacial till, or congeliturbate from red acid sandstone, siltstone and shale. They are on the concave sideslopes of upland ridges with slopes ranging from 0 to 60 percent. The permeability of this series is moderately slow.

Neshaminy - The Neshaminy series consists of deep and very deep, well drained soils formed in materials weathered from diabase and other dark colored basic rocks found on slopes ranging from 0 to 70 percent in grade.

Mount Lucas - The Mount Lucas series consists of deep and very deep, moderately well and somewhat poorly drained soils formed in material weathered from diabase and other dark colored basic rocks on slopes that range from 0 to 25 percent grade.

Norton - The Norton series consists of deep well drained soils on uplands. They are formed in fine textured red till or colluviums with slope ranges from 0 to 20 percent in grade. Norton soils are very slowly permeable.

Parker - The Parker series consists of very deep, somewhat excessively drained soils that formed in residuum derived from granitic gneiss bedrock. They occur on gently sloping to very steep slopes of ridges and hills on a range from 3 to 70 percent grade.

Pattenburg - The Pattenburg series consists of deep and very deep, well drained soils on uplands. They formed in residuum and were weathered from reddish quartzose conglomerate or fanglomerate and are found on slopes of 2 to 45 percent grade.

Penn - The Penn series consists of moderately deep, well drained soils formed in residuum weathered from noncalcareous reddish shale, siltstone, and fine-grained sandstone normally of Triassic age. Slopes range from 0 to 60 percent.

Raritan - The Raritan series consists of very deep, moderately well or somewhat poorly drained soils formed in sediments from red noncalcareous shale, siltstone, and sandstone. Slopes range from 0 to 15 percent.

Reaville - The Reaville series consists of moderately deep, moderately well and somewhat poorly drained soils formed in residuum weathered from red Triassic, interbedded shale, siltstone, and fine-grained sandstone. Slopes range from 0 to 15 percent.

Rowland - The Rowland series consists of very deep, moderately well and somewhat poorly drained soils formed in alluvial sediments weathered from red and brown shale, sandstone, and conglomerate, with slopes that range from 0 to 3 percent.

Complete soil series descriptions can be found on the NRCS site at:
http://soils.usda.gov/technical/classification/osd/index.html.

Soil Characteristics

Soils can be identified by their suitability for agricultural use (prime farmland, farmland of statewide importance, and farmland of unique importance). The *NRCS Soil Survey* deems multiple soils in the Borough of Peapack & Gladstone suitable for agricultural use. Soils can also be categorized by their susceptibility to erosion, the natural process by which wind, moving water, ice and gravitational forces cause soil and particulate materials to be displaced. There are no soils categorized as highly erodible or potentially erodible in the Borough of Peapack & Gladstone.

Agricultural Soils

The NRCS defines agriculatural soils as those that "… identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. This identification is useful in the management and maintenance of the resource base that supports the productive capacity of American agriculture." (*NRCS Technical Reference 2013).* The survey ranks agricultural soils in three categories, Prime Farmland Soil, Farmland of Statewide Importance, and Farmland of Local Importance. Only the first two rankings are found within the Borough of Peapack & Gladstone. (*2010 Borough of Peapack and Gladstone Comprehensive Farmland Preservation Plan*)

Prime Farmland – Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding.

Farmlands of Statewide Importance - Farmlands of statewide importance include those soils in land capability Class II and III that do not meet the criteria as Prime Farmland. These soils are nearly Prime Farmland and economically produce high yields of crops when treated and managed according to acceptable farming methods; some may produce yields as high as Prime Farmland if conditions are favorable.

The *NRCS Soil Survey* for Somerset County reveals within the Borough of Peapack & Gladstone, prime farmland soils are represented by the Arendtsville, Bartley, Birdsboro, Califon, Gladstone, Meckesville, Norton, Penn, and Raritan series. These series cover 757 acres, or 20.5% of the total area within the Borough. Farmland of statewide

importance is included in the Abbottstown, Arendtsville, Bartley, Birdsboro, Bowmansville, Gladstone, Lansdowne, Meckesville, Neshaminy, Parker, Pattenburg, Penn, and Reaville series. These soils cover 1,162 acres, representing 31.4% of the total area in the Borough.

CLIMATE

Prevailing Air Currents in New Jersey

According to the Office of the New Jersey State Climatologist (ONJSC) at Rutgers University, a "broad, undulating flow from west to east" dominates atmospheric circulation in the middle latitudes of North America, including New Jersey. "These 'prevailing westerlies' shift north and south and vary in strength during the course of the year, exerting a major influence on the weather throughout the State." Current information on wind direction and speed can be obtained through the New Jersey Weather & Climate Network (NJWxnet). (*http://climate.rutgers.edu/njwxnet/index.php*)

Climate Zone

New Jersey is divided into five climate zones, with the Borough of Peapack & Gladstone lying in the Northern Zone. According to the ONJSC publication "The Climate of New Jersey," the Northern Climate Zone usually has the shortest growing season, about 155 days. The average date for the last killing spring frost is May, and the first frost in the fall occurs around October 7. These dates vary from year to year and from place to place. Valley locations may have killing frost in mid-September and as late as mid-June. The average number of freeze free days in the northern Highlands is 163. Snow may fall from about October 15 to April 30, and annual snowfall averages 40 to 50 inches. The ONJSC reports a historic average annual snowfall of 36 inches at the Long Valley weather station near Peapack & Gladstone, for the period 1930 to 2004. In addition,

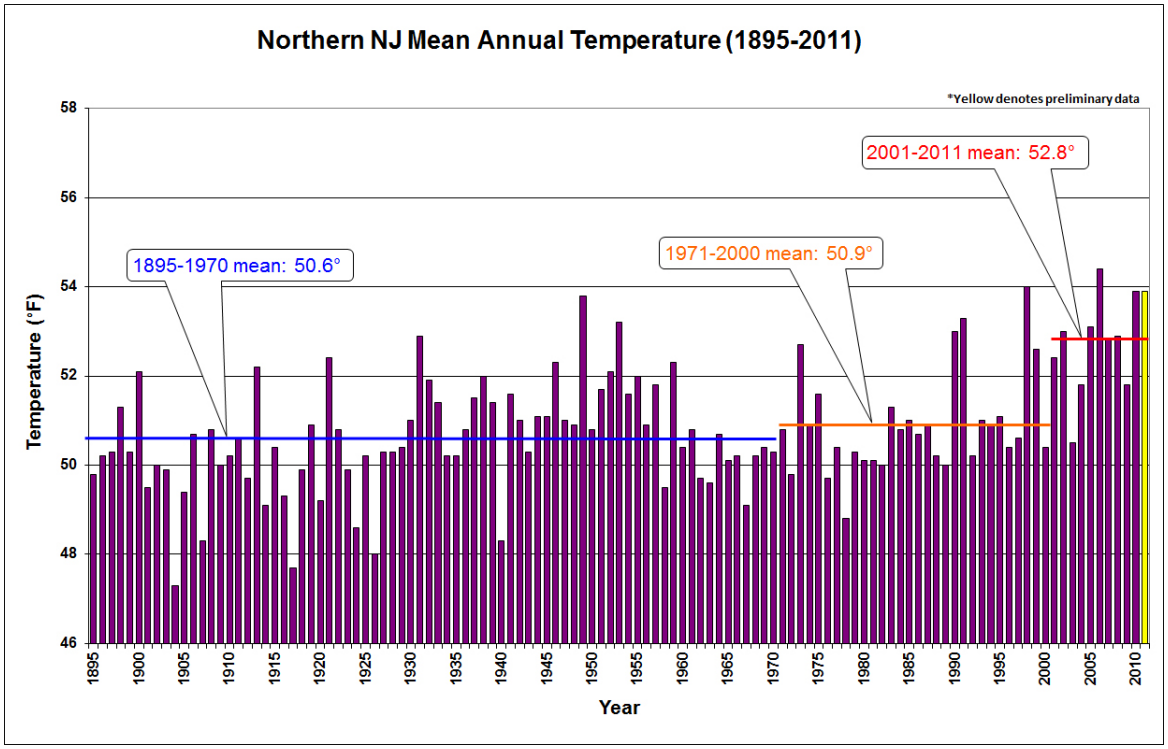
> "The highlands and mountains in this area play a role in making the climate of the Northern Zone different from the rest of the state. For instance, following a cold frontal passage, air forced to rise over the mountains, produces clouds, and even precipitation, while the rest of the state observes clear skies." (*ONJSC)*

During the warm season, thunderstorms, many of them "spawned" in Pennsylvania and New York State, are responsible for most of the rainfall. They average 25 to 30 a year and often reach maximum development in the evening. Tropical cyclones are less frequent in Peapack & Gladstone and other inland areas than along the coast. Tornadoes are infrequent and generally weak. *(ONJSC)*

Temperature and Precipitation

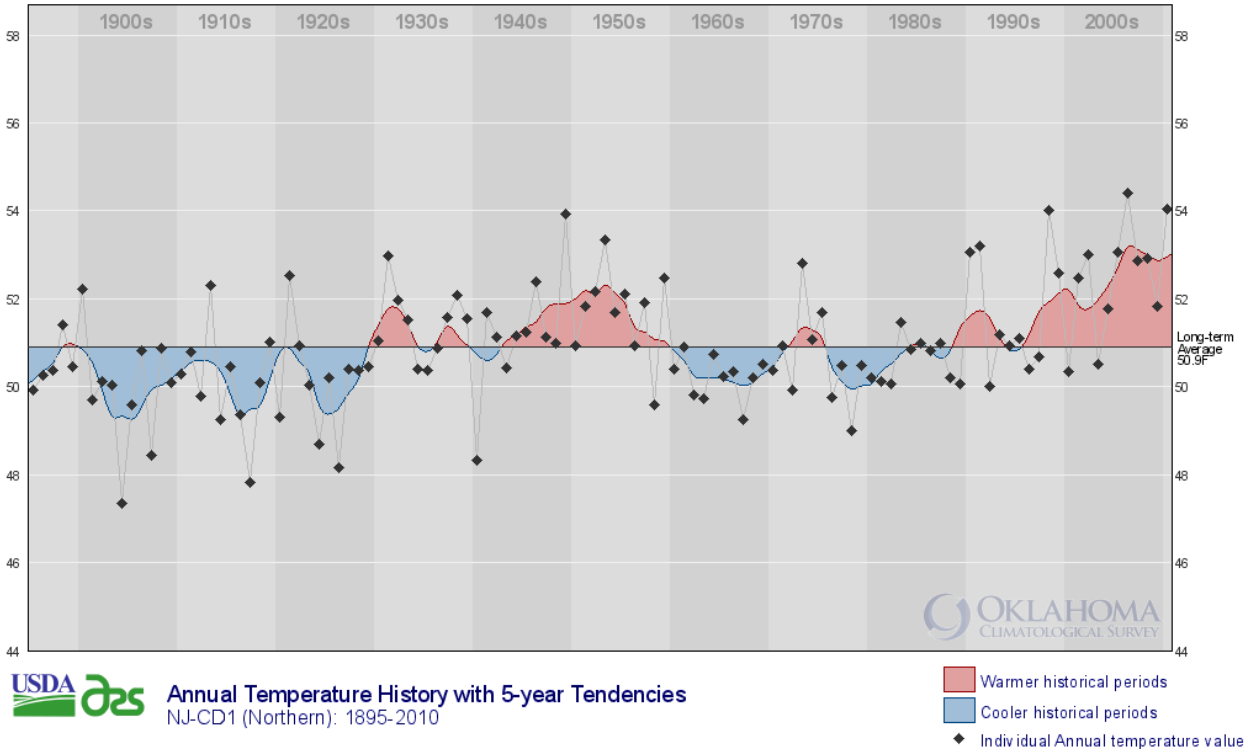
The ONJSC maintains temperature and precipitation data from monitoring stations around the state. Some of these records go back as far as the 1890s. The ONJSC has compiled a northern New Jersey regional report, with values calculated from an average of monthly temperatures recorded at stations throughout the region. The graphs below show an overall upward trend in mean temperature between 1895 and 2011 (*Figure 1 below)* and indicate that in the last several decades, this region is both warmer and wetter (*Figure 3*) than in the preceding historic periods. The long-term temperature average is 50.9^{o}F (*Figure 2*) and the long-term mean total precipitation is 46.51 inches (*Figure 4*) for the period 1895-2010.

Figure 1. Northern NJ Mean Annual Temperature (1895-2011)



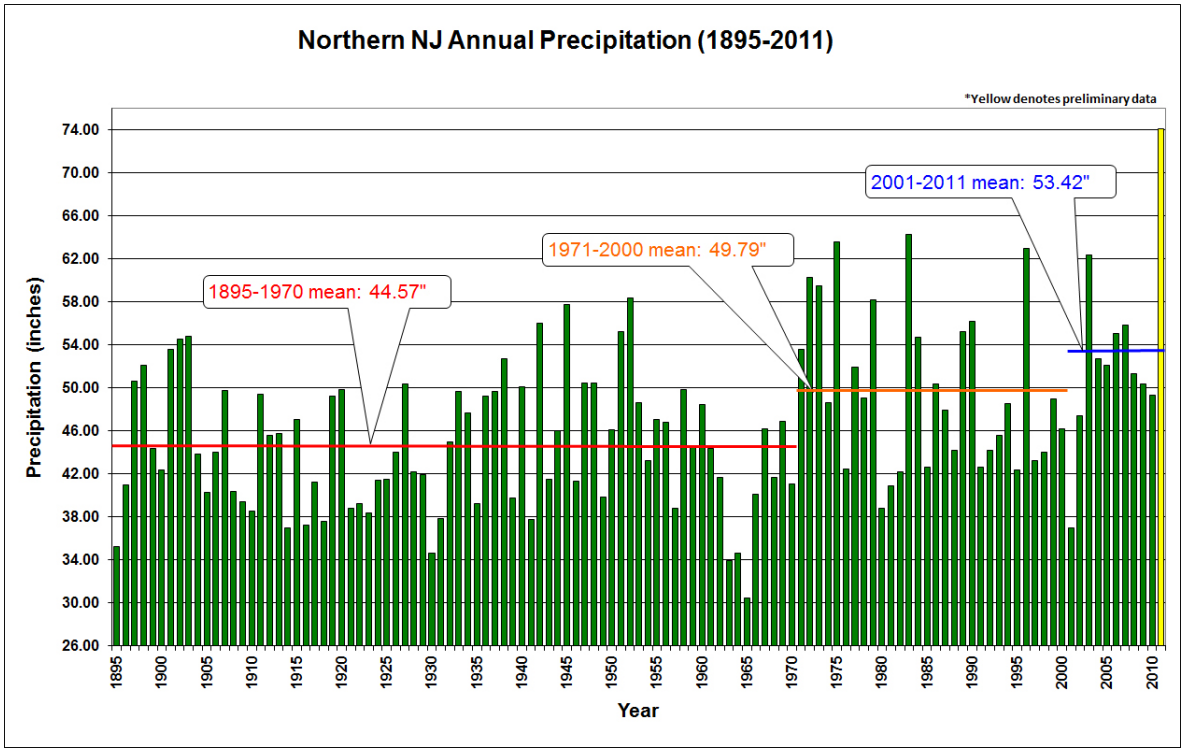
Source: ONJSC

Figure 2. Northern NJ Annual Temperature History (1895-2010)



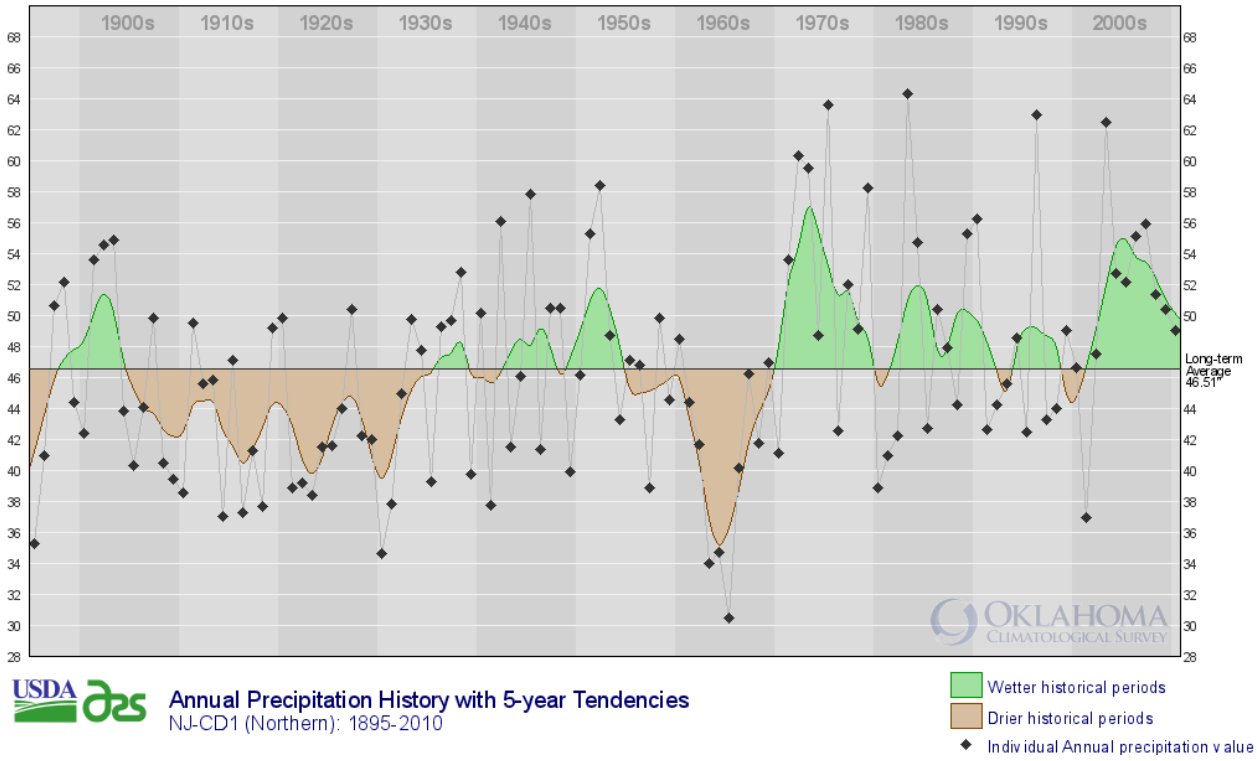
Source: ONJSC/Courtesy of Oklahoma Climatological Survey

Figure 3. Northern NJ Mean Annual Precipitation (1895-2011)



Source: ONJSC

Figure 4. Northern NJ Annual Precipitation History



Source: ONJSC/Courtesy of the Oklahoma Climatological Survey

Local Weather

As a public service, the ONJSC offers a network of weather reporting stations (NJWxnet) that provide hourly and 24-hour averaging data. The closest reporting stations at the time of publication were in Somerville and Basking Ridge. *Table 5* shows typical 24-hour reporting from the Basking Ridge station.

Table 5. Daily Weather Tracking NJ Weather & Climate Network (NJWxNet)
Basking Ridge Station December 4, 2012

Time	*Temp*	*Wind chill*	*Dew point*	*Relative humidity*	*Pres-sure*	*Precip*	*Wind sp*	*Wind dir*	*Winds pmax*	*Windsp maxdir*
1:00	37	37	35	94	30.18	0	0	E	0	NNW
2:00	38	38	36	94	30.18	0	0	ENE	0	E
3:00	39	39	37	94	30.18	0	0	WNW	0	ENE
4:00	40	40	39	94	30.18	0	0	S	0	WNW
5:00	41	41	40	94	30.18	0	0	NE	0	S
6:00	42	42	40	94	30.18	0.02	0	E	0	NE
7:00	42	42	41	94	30.18	0.03	0	SW	0	E
8:00	43	43	41	94	30.18	0.01	0	SE	0	SW
9:00	44	44	43	94	30.18	0	0	WSW	0	SE
10:00	46	46	45	94	30.18	0	0	E	0	WSW
11:00	49	49	47	94	30.18	0	0	S	3	ESE
12:00	55	55	50	82	30.15	0	0	SSE	3	SE
13:00	60	60	51	71	30.12	0	0	S	3	NNE
14:00	63	63	51	65	30.09	0	2	E	3	N
15:00	66	66	52	60	30.06	0	0	SW	3	ENE
16:00	62	62	51	66	30.06	0	0	S	9	S
17:00	59	59	50	73	30.03	0	0	W	8	WSW
18:00	50	50	46	88	30.03	0	0	NNW	3	WSW
19:00	47	47	44	91	30	0	0	N	0	NNW
20:00	44	44	42	92	30	0	0	SE	0	N
21:00	42	42	41	93	29.97	0	0	WNW	6	S
22:00	42	42	40	93	29.94	0	0	SW	4	SW
23:00	51		49	94	29.94	0	4	SW	8	SSW
12/5 0:00	55		49	83	29.91	0	4	SW	9	SW
Average	***48***		***44***	***87***	***30.1***	***-***	***0***	***-***	***3***	***SSW***
Total						***0.06***				

Source: NJWxNet

The Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) is a nationwide network of volunteers trained to observe and record precipitation and snow

cover on a daily basis. This program has been in effect since 2008 and is another source for daily precipitation and snowfall mapping for northern New Jersey. It is available at *http://climate.rutgers.edu/stateclim/?section=menu&%20target=CoCoRaHS.*

Local Historic Averages

Neither of the above networks provide long-term historic averages. These are available, however, from the ONJSC and the National Climatic Data Center. For temperature information three stations relatively close to Peapack & Gladstone are Somerville (10 miles), Long Valley (8 miles) and Plainfield (14 miles). *Table 6* shows the monthly and annual averages for maximum, median, minimum and mean temperatures for these three stations. Plainfield has the highest historical mean average temperature at 52.6, followed by Somerville at 51.6 and Long Valley at 49.1. Long Valley also has the lowest minimum average temperature at 45.1, which occurred in 1978, and Plainfield the highest maximum average temperature at 55.9, which occurred in 2002.

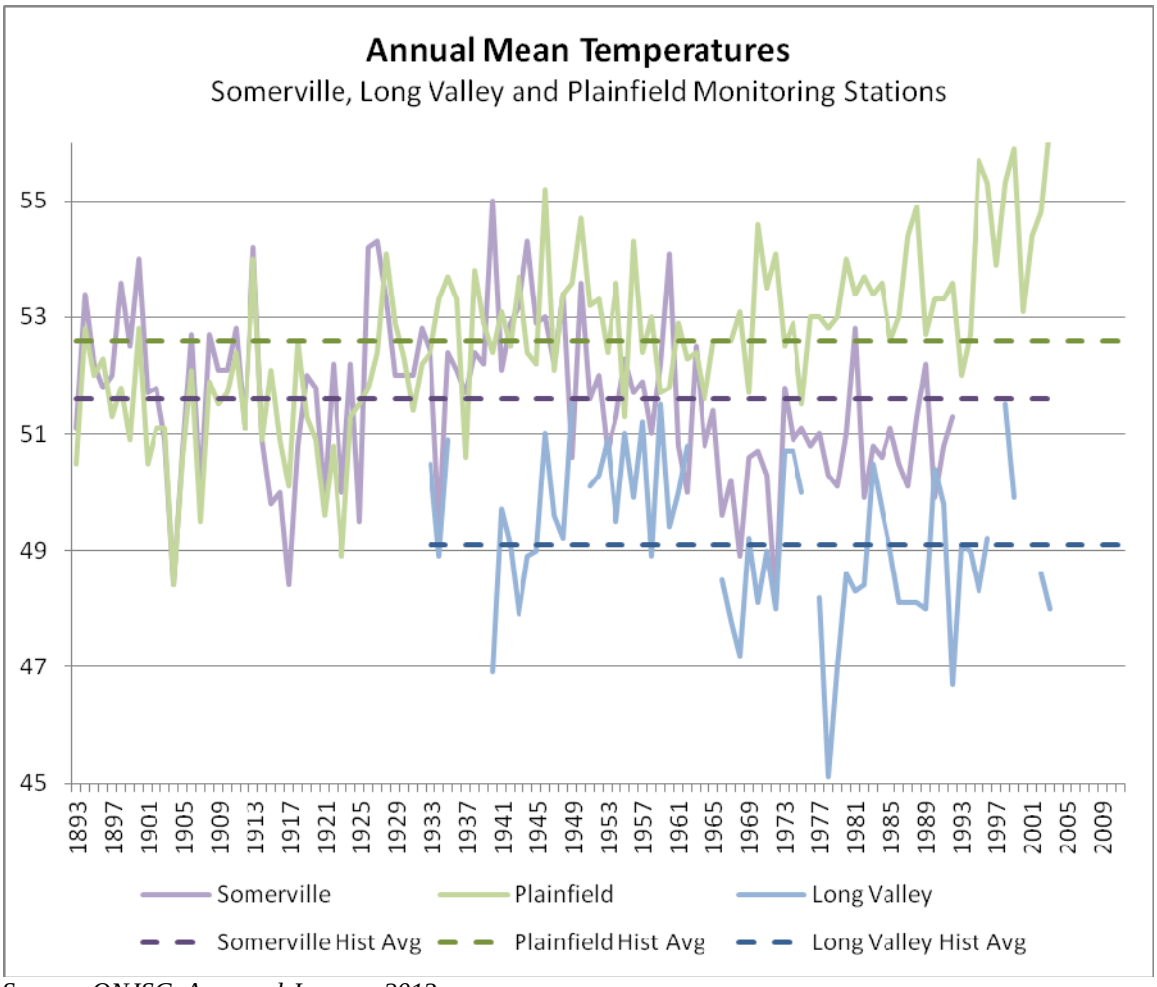
Table 6. Monthly and Annual Historical Temperature Averages

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Somerville 1893-2006													
Mean	29.2	30.5	39.3	49.9	60.3	69.0	74.0	72.3	65.3	54.0	43.3	32.7	**51.6**
Median	29.4	30.8	39.3	50.0	60.6	69.1	73.9	72.0	65.2	53.9	43.3	33.2	51.7
Max	42.0	38.5	50.5	58.3	66.2	75.0	79.8	77.7	72.2	60.9	50.4	40.2	55.0
Min	17.7	19.8	30.7	43.7	53.0	63.9	69.0	67.8	60.3	47.8	37.4	21.5	48.4
Long Valley 1930-2004													
Mean	27.0	28.8	36.8	47.9	57.7	66.2	70.9	69.2	62.0	51.3	41.5	31.0	**49.1**
Median	27.3	28.8	37.4	48.2	57.8	66.3	70.9	69.0	62.0	51.3	41.5	31.3	49.1
Max	37.3	37.3	45.8	53.4	63.2	71.4	77.1	74.4	68.7	56.9	46.7	38.3	51.5
Min	17.8	15.8	29.2	42.0	51.2	60.4	66.5	63.9	57.1	44.6	36.1	19.6	45.1
Plainfield 1893-2007													
Mean	30.5	31.8	40.5	50.8	61.0	69.8	74.7	73.0	66.2	54.9	44.3	34.0	**52.6**
Median	30.8	32.0	40.3	50.4	60.8	69.9	74.6	72.8	66.0	54.7	44.3	34.3	52.6
Max	41.4	39.9	52.0	57.1	67.4	75.1	80.7	79.6	72.4	61.0	51.1	42.9	55.9
Min	21.0	17.3	31.7	44.9	53.9	63.4	70.7	66.6	60.6	46.5	36.9	21.7	48.4

Source: NJ State Climatologist, Rutgers University. Accessed January 2013.

Figure 5 plots the mean temperatures by year, along with the mean averages for each station as stated in the table above. Breaks in the annual mean temperature lines are due to gaps in the data. Minimum temperature reporting can be distorted by incomplete data for several days or even months in any given year.

Figure 5. Annual Mean Temperatures



Source: ONJSC. Accessed January 2013.

Table 7 shows historic averages for total precipitation, including the liquid equivalent of snowfall, at three monitoring stations within 3 to 15 miles of Peapack & Gladstone. The mean annual average for all three stations (Pottersville 52.74, Long Valley, 51.18, Plainfield 48.77) are all higher than the long-term average of 46.51 inches for all of northern New Jersey as shown in *Figure 4* above.

Table 7. All Precipitation* (inches) Historic Averages

	Jan	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Annual***
Pottersville 1968-2011													
Mean	3.86	2.89	4.13	4.57	4.88	5.06	5.11	4.66	5.01	4.44	4.3	4.22	**52.74**
Median	3.5	2.79	4.23	4.49	4.54	4.33	4.81	4.28	4.25	4.06	4.21	3.94	50.74
Max	12.87	7.03	7.87	9.51	10.8	15.53	17.11	13.77	12.99	14.33	10.32	9.65	73.17
Min	0.61	0.63	1.12	0.84	0.92	0.7	0.39	0.37	0.98	0.8	0.63	0.33	38.59
Long Valley 1930-2003													
Mean	3.62	3.07	4.12	4.17	4.46	4.28	4.98	4.82	4.31	3.8	4.3	3.92	**51.18**

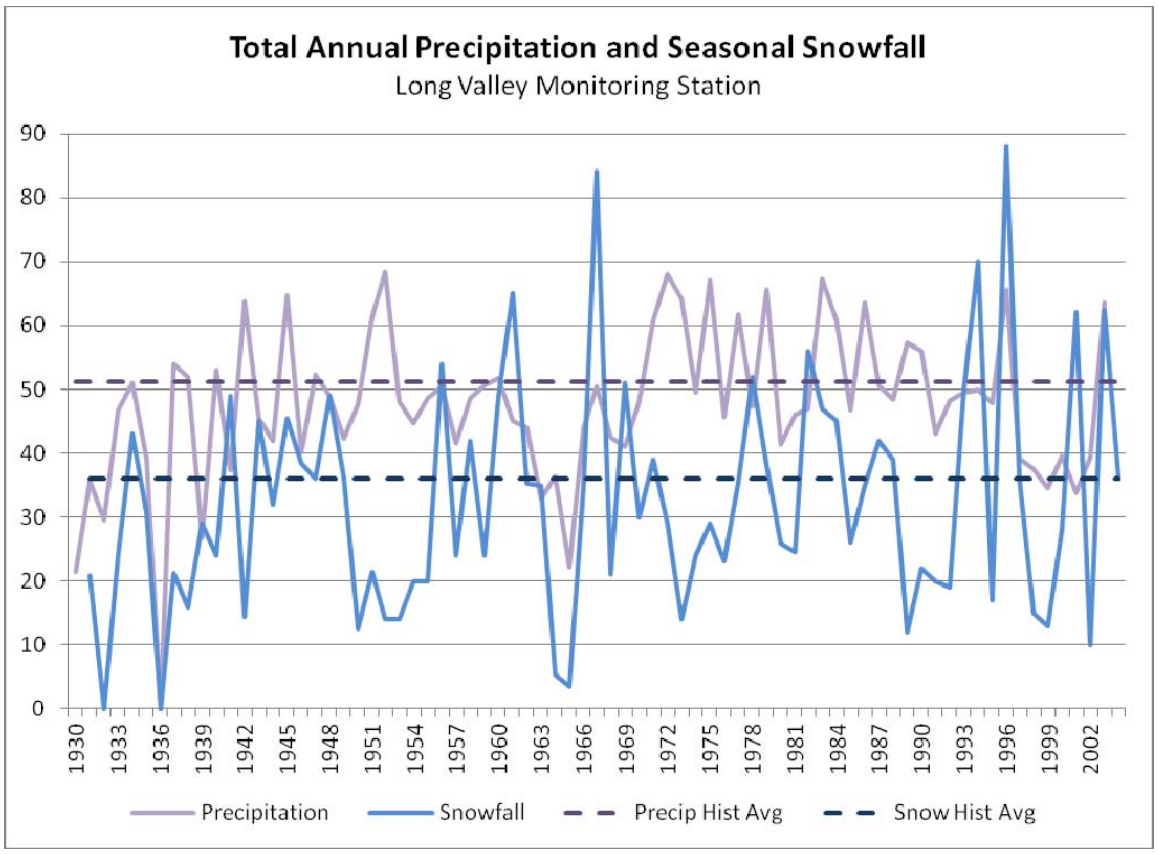
Table 7. All Precipitation* (inches) Historic Averages													
	Jan	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Annual***
Median	3.04	3.01	3.92	3.93	4.08	3.89	4.12	4.29	3.56	3.35	4.09	3.47	48.65
Max	12.37	6.01	8.64	11.43	10.69	14.52	12.56	15.5	11.72	10	12.46	9.64	68.32
Min	0.67	0.8	1.62	0.78	0.65	0.22	0.83	0.77	0.39	0.4	0.4	0.53	32.88
Plainfield 1893-2007													
Mean	3.62	3.30	4.07	3.84	4.10	3.99	5.20	4.75	4.36	3.82	3.63	3.82	**48.77**
Median	3.38	2.96	4.01	3.55	3.64	3.71	4.96	4.15	3.53	3.50	3.35	3.67	48.49
Max	8.48	7.65	8.77	9.13	9.27	10.39	14.27	15.64	14.20	14.05	9.51	9.89	72.99
Min	0.66	0.79	0.37	0.87	0.84	0.02	0.33	0.42	0.14	0.23	0.36	0.21	32.06
**All precipitation includes the liquid equivalent of snowfall.* *Source: NJ State Climatologist, Rutgers University. Accessed January 2013.*													

Table 8 shows the historic averages for snowfall at three monitoring stations within 3 to 15 miles of Peapack & Gladstone. Pottersville received the least snowfall and Long Valley the most.

Table 8. Snowfall (inches) Historic Averages													
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Season
Pottersville 1968-2011													
Mean	0.0	0.0	0.0	0.1	0.4	4.2	8.3	8.6	4.6	1.0	0.0	0.0	**27.1**
Median	0.0	0.0	0.0	0.0	0.0	3.4	6.2	5.5	3.0	0.0	0.0	0.0	25.5
Max	0.0	0.0	0.0	5.0	4.0	16.0	35.0	30.6	17.0	11.0	0.0	0.0	81.0
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8
Long Valley 1930-2003													
Mean	0.0	0.0	0.0	0.2	1.1	6.6	9.5	9.7	6.6	1.5	0.0	0.0	**36.0**
Median	0.0	0.0	0.0	0.0	0.0	5.0	7.8	7.5	5.0	0.0	0.0	0.0	35.3
Max	0.0	0.0	0.0	5.0	13.0	30.0	32.0	28.0	27.0	17.0	0.0	0.0	88.0
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0
Plainfield 1892-1998													
Mean	0.0	0.0	0.0	0.0	1.1	6.0	8.4	9.7	5.4	0.8	0.0	0.0	**29.9**
Median	0.0	0.0	0.0	0.0	0.0	4.0	6.8	7.6	4.5	0.0	0.0	0.0	27.3
Max	0.0	0.0	0.0	2.0	17.2	25.9	33.6	32.9	23.1	14.0	0.0	0.0	67.1
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	4.0
Source: NJ State Climatologist, Rutgers University. Accessed January 2013.													

For the periods shown in the tables above, Pottersville received the most total precipitation but Long Valley experienced the most snowfall. *Figure 6* shows the annual precipitation and snowfall by year for the Long Valley station, along with the historical average for each category. Generally, the extreme low points for both precipitation and snowfall are a result of incomplete or missing data for several months in the reporting year.

Figure 6. Long Valley Monitoring Station Precipitation and Snowfall



Source: ONJSC, Rutgers University. Accessed January 2013.

Comparison of Current Normals with Historic Averages

Table 9 compares the historic averages for temperature and precipitation over the period for which data has been collected with current normals (averages for the 30-year period 1981-2010). The following monitoring stations with available current normals were used in the table below: Canoe Brook (approximately [apx.] 16 miles), Flemington (apx. 18 miles) and Plainfield (apx. 14 miles). At two out of three stations, the current normals for temperature are higher than the historic average, and at all three stations, the current normals for precipitation are higher than the historic averages.

Table 9. Historic Average / Current Normal Comparison Monitoring Stations Near Peapack & Gladstone Annual Basis

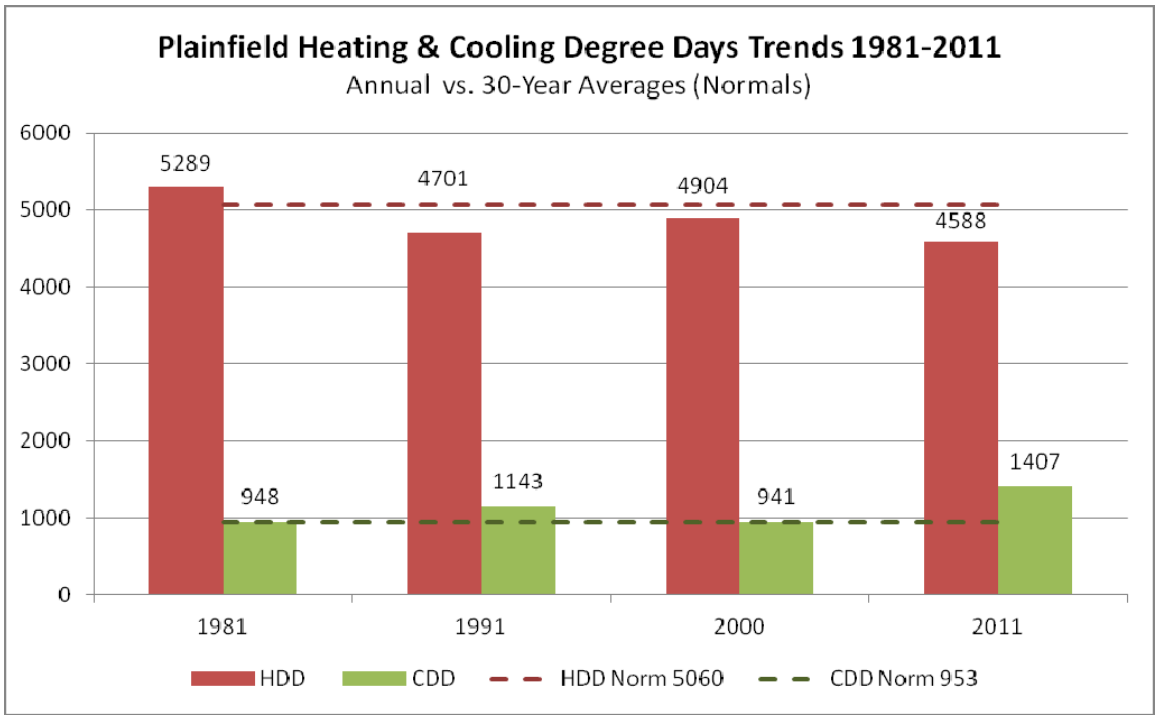
	Historic Average*	Current Normal*	Difference
Maximum Temperature (°F)			
Canoe Brook	62.4	63.6	1.2
Flemington	63.2	62.3	-0.9
Plainfield	62.9	64.1	1.2
Minimum Temperature (°F)			
Canoe Brook	39.5	40.1	0.6
Flemington	40.7	40.5	-0.2

Table 9. Historic Average / Current Normal Comparison Monitoring Stations Near Peapack & Gladstone Annual Basis			
	Historic Average*	Current Normal*	Difference
Plainfield	42.3	43.8	1.5
Mean Temperature (°F)			
Canoe Brook	51.0	51.8	0.8
Flemington	52.0	51.4	-0.6
Plainfield	52.6	53.9	1.3
Precipitation (Inches)			
Canoe Brook	49.56	50.79	1.23
Flemington	46.44	50.38	3.94
Plainfield	48.77	49.01	0.24

* *Historic average start dates vary by station:*
Flemington 1898; Canoe Brook 1931; Plainfield 1893;
Current normals = 30- year average for period 1981-2010
Source: ONJSC

Figure 7 shows annual heating degree days (HDD) and cooling degree days (CDD) by five-year intervals for Plainfield, the closest station to Peapack reporting this data. The general trend is toward fewer heating degree days (the number of degrees the average daily temperature is below 65°F) and more cooling degree days (the number of degrees the average daily temperature is above 65 °F).

Figure 7. Plainfield Monitoring Station Heating & Cooling Degree Day Trends



Sources: ONJSC & NOAA National Climatic Data Center

Extreme Phenomena

Tropical Cyclones

According to the National Oceanic and Atmospheric Administration (NOAA), tropical cyclones are rotating, organized systems of clouds and thunderstorms that originate over tropical or subtropical waters. Tropical cyclones have four major levels, increasing in severity: tropical depression, tropical storm, hurricane and major hurricane. Storms may start out as major hurricanes and weaken in strength as they travel and hit landfall. The season generally runs from spring through fall, with most activity for the mid-Atlantic states occurring in August and September.

Tropical cyclones tend to bypass New Jersey due to its protective location slightly west of coastal outcrops to the south and north. When they do affect New Jersey, they are more apt to affect coastal areas, although a few have traveled inland.

Notable recent tropical cyclones are Hurricane Irene in August 2008 and Hurricane Sandy in October 2012. In Somerset County, the effects of Hurricane Sandy were much less costly than the damages from Hurricane Irene. Both storms, as well as the snowstorm of October 2011, resulted in significant damage from downed trees, including widespread and sustained power outages.

Other recent tropical cyclones affecting New Jersey:

- 2010 Tropical Storm Hanna took an inland track
- 2004 A number of tropical storms and depressions affected the East Coast but missed inland northern Jersey
- 2000 A tropical depression from hurricane Gordon affected coastal NJ
- 1999 Hurricane Floyd, downgraded to a tropical storm, dropped 13.34 inches of rain on Somerville, NJ and the Pottersville station recorded a total of 8.94 inches between September 16 and 17.
- 1999 Hurricane Bret clipped Jersey coast in September at tropical storm level
- 1996 Hurricane Josephine downgraded to tropical storm hit inland NJ in Oct
- 1994 A tropical depression traveled west and north of Jersey
- 1992 Tropical storm Earl traveled south and west of Jersey
- 1988 Tropical storm Chris traveled west to east through northern NJ
- 1985 Hurricane Gloria skirted the coast of NJ

Trend Comparison: For 2012, both the frequency and the accumulated energy (duration and strength) of tropical cyclones in the Atlantic Basin exceeded 1981-2010 averages. In October, there were five reported storms (two reaching hurricane status) against an

average of two. For the year, the accumulated cyclone energy exceeded the average by 30%. *(NOAA)*

Straight Line Winds

Straight line winds are another extreme phenomenon. These winds are produced by "the downward momentum in the downdraft region of a thunderstorm." They often occur when the air in the troposphere (the lowest level of the Earth's atmosphere) is dry, the storm has a fast forward motion and updrafts and downdrafts are strong. Straight line winds push debris in the same direction of the wind, as opposed to a tornado, in which debris is spread in a variety of directions. Any such winds that meet or exceed 58 miles per hours are classified by the National Weather Service as "severe." *(theweatherprediction.com)* In July 2012, three southern New Jersey counties affected by straight line winds were declared a major disaster area. *(FEMA)* As recently as July 2009, a straight line wind was noted in Somerset County, affecting parts of neighboring Bedminster Township, as reported on NJ.com.

Landslides

Landslides in New Jersey have generally occurred in the northern and central parts of the state and include slumps, debris flows, rockfalls and rockslides. They are not as common in New Jersey as in other parts of the country.

There are 233 reported landslides in the NJDEP database from as early as 1887 through June 2012. Six of these occurred in Somerset County, including a small rockfall along U.S. 206 in Peapack & Gladstone in January 2009. Nearly 10% (21) occurred during the heavy rains of hurricane Irene in August 2011, including a debris flow along I-287 in Bernards Township, in the same vicinity as slumps in 2000 and 2007, all triggered by heavy rain. A fourth Bernards Township slide was the result of quarrying activity in 1994. (*NJDEP)*

Earthquakes

The NJDEP maintains a database of recorded earthquakes in New Jersey totaling 178 as of November 2012. They occur more frequently along the fault lines in north central New Jersey than in other parts of the state. These earthquakes are generally minor in nature, often registering in the category of micro quakes. The strongest earthquake epicentered in New Jersey, with a magnitude of 5.3, occurred in 1783, just north of present-day Picatinny Arsenal, and along the Longwood Valley Fault. The strongest earthquakes felt in New Jersey had a magnitude of 8.0-8.8 and were epicentered in New Madrid, Missouri, and an earthquake epicentered in Virginia, was felt in New Jersey in August 2011. (NJDEP, LCSN)

In New Jersey damage from earthquakes is rare or minor. According to the United States Geological Survey (USGS), on a scale of 0-100%, the section of northern New Jersey where Peapack & Gladstone is located has a relatively low seismic hazard ranking of between 8-16%. The baseline for the hazard ranking is the levels of horizontal shaking that have a 2-in-100 chance of being exceeded in a 50-year period. Shaking is expressed as a percentage of the acceleration of a falling object due to gravity. Maps available from the USGS can "form the basis for seismic design provisions of building codes, insurance

rate structures, earthquake loss studies, retrofit priorities, and land-use planning." *(USGS Earthquakes Hazard Program)*

Earthquakes are measure by magnitude, intensity (level of shaking) and depth to hypocenter. Magnitude measures the relative size and the energy released (when one block or rock, e.g., along a fault line, slips over another, causing the ground to vibrate). *(USGS)* The magnitude scale begins at 0 and the highest magnitude ever recorded was 9.5. Of the 177 earthquakes recorded in the NJDEP database, 60% had a magnitude of 2 or under and only 2 occurrences had magnitudes greater than 4. Anything at a magnitude of 2 or below is considered a "microearthquake."

Table 10 summarizes the magnitude of earthquakes in New Jersey.

Table 10. Magnitude Summary for Earthquakes in New Jersey

Range	*Count*	*% of Total*
2 & under	107	60%
2.1-3.0	57	32%
3.1-4.0	11	6%
4.1-5.0	1	1%
>5.0	1	1%
Total	177	100%

Source: NJDEP

Generally, the intensity tracks with the magnitude of the earthquake, with a higher level intensity occurring at or near the epicenter of a higher magnitude earthquake. The intensity scale ranges from I to VIII or higher. Intensities of VI (felt by all, frightening but damage slight) or VII (damage negligible in buildings of good design and construction) are generally associated with a magnitude in the 5 range. Intensities of IV (felt by nearly everyone; some shaking, cracking of walls, standing cars rocked) or V (felt by everyone) are generally associated with magnitudes in the 4 range.

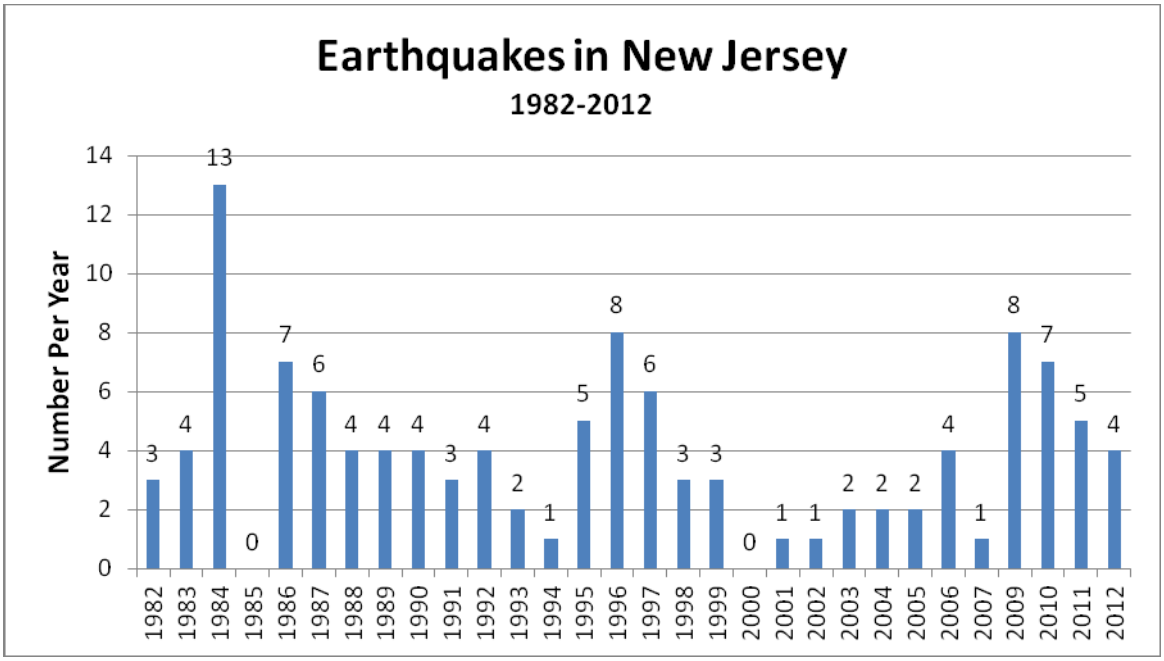
Another earthquake measurement is the depth below the surface at which the hypocenter occurs. The hypocenter is the point in the earth where the rupture starts, and the epicenter is the point at the earth's surface directly above the hypocenter. Depth levels are grouped as shallow, 0 - 70 km deep; intermediate, 70 - 300 km deep; and deep, 300 - 700 km deep. All earthquakes in New Jersey have a shallow depth to hypocenter, with the deepest recorded hypocenter at 25 km below surface for an earthquake occurrence near Sussex in northwestern New Jersey in 1969.

Figure 8 shows the frequency of earthquakes in New Jersey from 1982-2012. The highest annual count was 13 in 1984, and no earthquakes were reported in either 1985 or 2000.

Earthquakes epicentered in or around Peapack & Gladstone are listed in *Table 11* and the range of magnitudes is charted in *Figure 9*. Four earthquakes have been recorded with epicenters in or very near Peapack & Gladstone. They all occurred in February 2010 and ranged in magnitude from 1.2 to 2.6. The 2.6 magnitude quake occurred on February 21, 2010, with an epicenter near School Street and the municipal complex, followed a few

hours later by a 2.3 magnitude earthquake epicentered west of Fowler Road in Bedminster Township. The other two occurred near Mount St. John on February 5 and 7, 2010. The strongest earthquakes in the surrounding area occurred in 1979 in Bernardsville (3.1) and Chester (2.9). *(NJDEP)*

Figure 8. Earthquakes in New Jersey



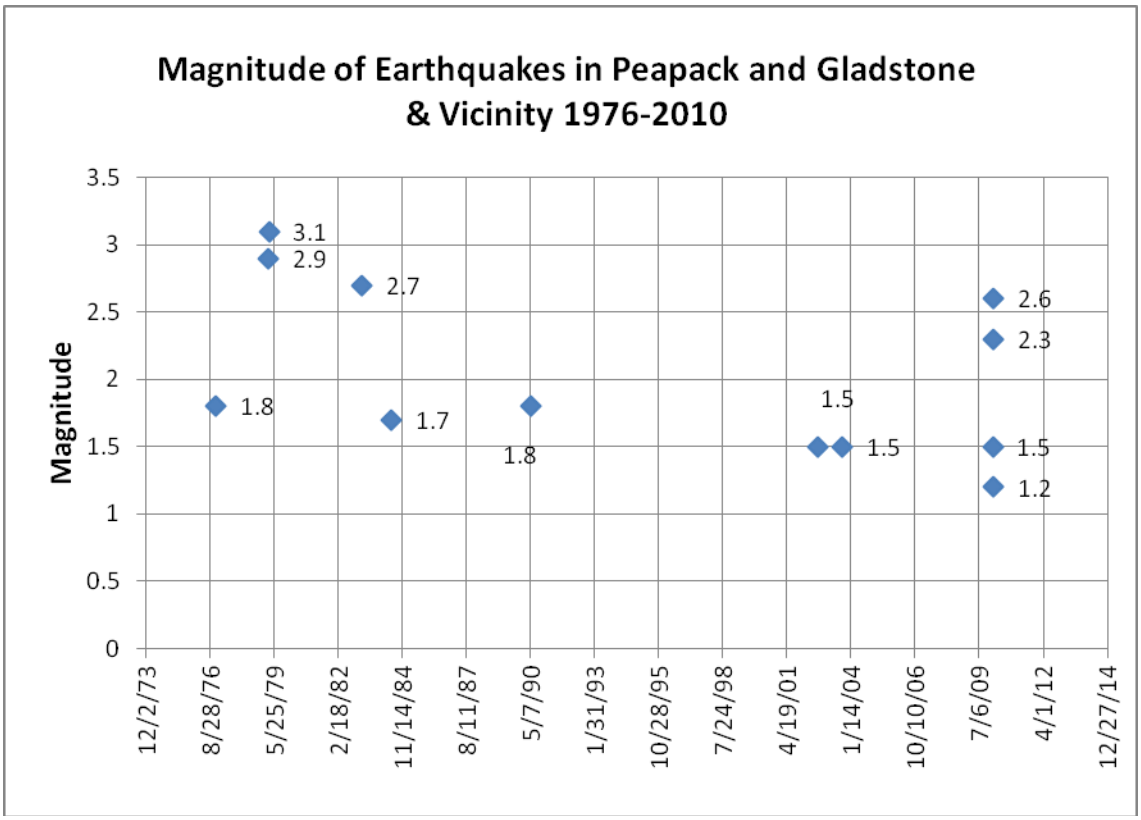
Source: NJDEP

Table 11. Earthquakes Epicentered in and Around Peapack & Gladstone 1783-2012

ID	*Date*	*Time*	*Lat-N*	*Long-W*	*Depth (km)*	*Magnitude*	*Location*
166	02/21/2010	17:31:57	40.714	74.680	5.00	2.3	Bedminster W of Fowler Rd.
165	02/21/2010	13:59:25	40.717	74.658	5.00	2.6	Peapack & Gladstone, near School St.
163	02/07/2010	2:52:48	40.734	74.658	2.00	1.2	Peapack & Gladstone near Mount St. John
162	02/05/2010	10:58:28	40.731	74.656	2.00	1.5	Peapack & Gladstone near Mount St. John
141	8/24/2003	9:21	40.775	74.511	1.00	1.5	6 km SW of Morris Plains
140	8/9/2002	14:59	40.620	74.630	3.80	1.5	5.4 km N of Somerville, NJ
101	5/10/1990	3:41	40.815	74.541	7.60	1.8	Mt. Freedom, NJ
69	6/6/1984	17:44	40.780	74.480	7.00	1.7	Near Morristown, NJ
62	2/19/1983	5:45	40.650	74.770	6.10	2.7	Oldwick, NJ
51	**3/10/1979**	**4:49**	**40.700**	**74.500**	**3.00**	**3.1**	**Bernardsville, NJ**

Table 11. Earthquakes Epicentered in and Around Peapack & Gladstone 1783-2012							
ID	*Date*	*Time*	*Lat-N*	*Long-W*	*Depth (km)*	*Magnitude*	*Location*
49	2/23/1979	10:23	40.800	74.810	13.00	2.9	Chester, NJ
36	12/5/1976	16:32	40.770	74.760	3.40	1.8	Schooley's Mountain, NJ
Source: NJDEP Division of Water Supply and Geoscience. New Jersey Geological and Water Survey. Digital Geodata Series. DGS04-1 Earthquakes Epicentered In New Jersey. Updated 11-5-2012. http://liberty.state.nj.us/dep/njgs/geodata/dgs04-1.htm							

Figure 9. Magnitude of Earthquakes in Peapack & Gladstone & Vicinity



Source: NJDEP

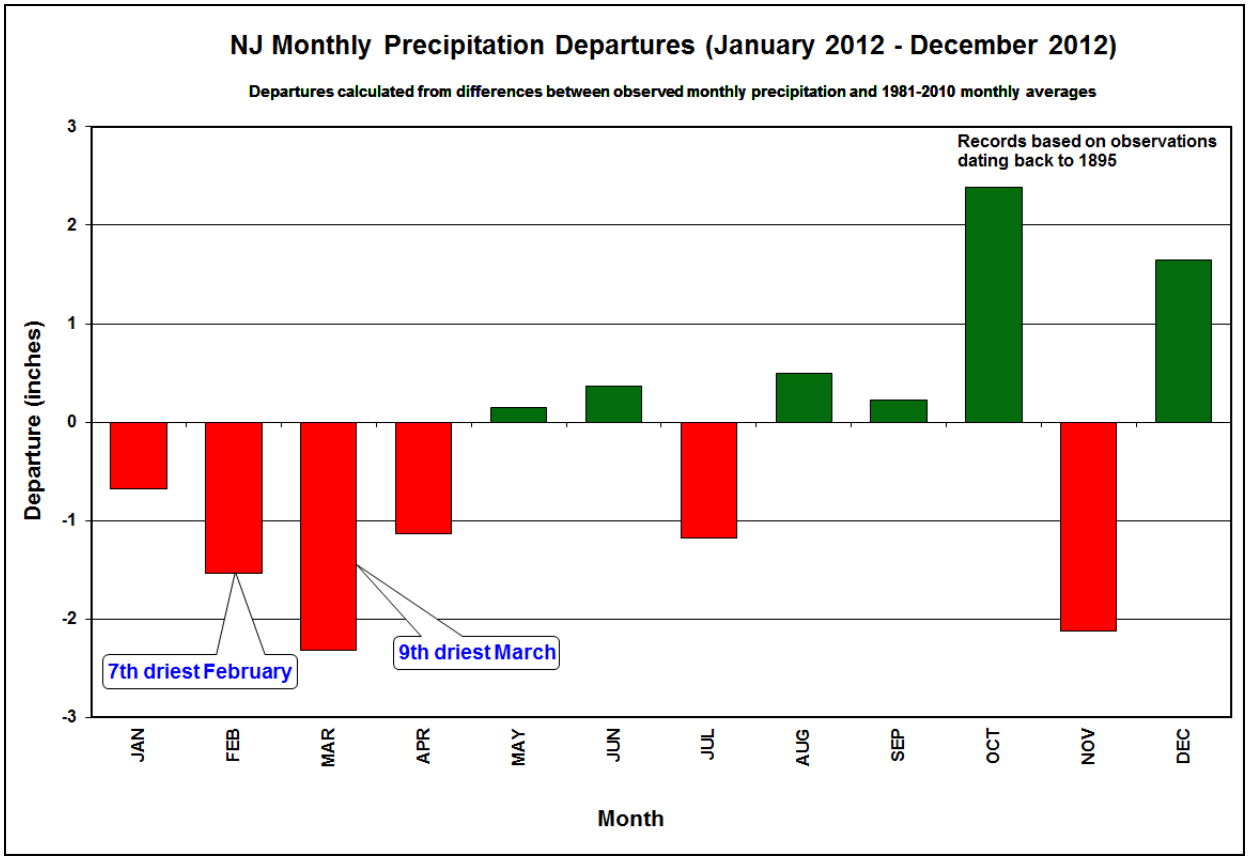
Climate Change

In 2007, the International Panel on Climate Change (IPCC) reported that increasing carbon dioxide (CO_2) emissions into the atmosphere, as a result of human activity, has warmed the Earth's surface by more than 1.3°F during the past century. The Union of Concerned Scientists has indicated that temperatures in the Northeast are likely to rise in winter and summer over the next several decades. Without a reduction in CO_2 and other greenhouse gas emissions (GHGs), average temperatures may rise by up to 14°F. Studies have predicted that by the end of this century the New York City region and cities such as Trenton could experience more than 20 days per summer with temperatures above 100°F.

This warming trend can have impacts on the health of humans and the environment. The predicted effects on humans include heat stress, increased particulates in the air we breathe and increased occurrences of insect-spread diseases such as West Nile virus in the winter season of northern climates. Ecosystem repercussions include changes to the water cycle, with the following potential consequences: loss of critical habitat, further stress on already threatened and endangered species; impacts on water supply and agriculture; more intense rain events; more frequent periods of extended dryness; and continued increases in fires, pest, disease pathogens, and invasive weed species. *(NJDEP)*

Figure 10 and *Figure 11* show monthly departures from current normals (monthly averages for the period 1981-2010) for precipitation and temperature. Generally, the winters were drier, the summer wetter and most months warmer than the current normals.

Figure 10. NJ Monthly Precipitation Departures 2012



Source: ONJSC

A greenhouse gas (GHG) is defined by the NJDEP as:

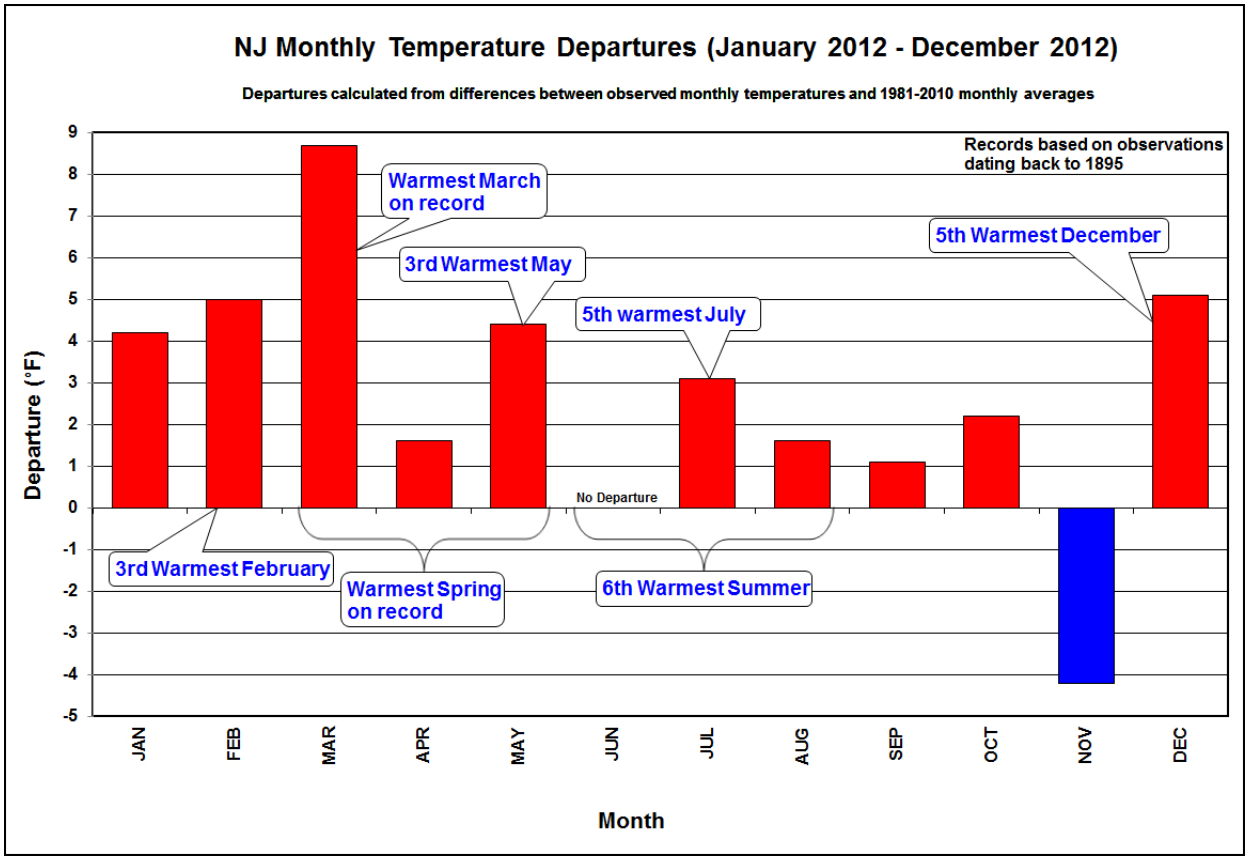
> "an atmospheric gas that slows the rate at which heat radiates into space, thus having a warming effect on the atmosphere. GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide, chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and some other halogenated gases."

To address the effects of GHGs, New Jersey enacted the Global Warming Response Act in 2007. This law requires:

- stabilization of statewide GHGs to 1990 levels by 2020; target: approximately 125.6 million metric tons of CO_2 equivalent (MMTCOe), and
- a further reduction to 80% below 2006 levels by 2050; target: approximately 25.5 MMTCOe.

According to the NJDEP, New Jersey must meet these limits in order to avoid the most damaging impacts of climate change. In 2009, the latest year for which major sector estimates are available, total estimated emissions had dropped to 112.1 MMTCOe.

Figure 11. NJ Monthly Temperature Departures 2012



Source: ONJSC

In December 2011, the state revised its *Energy Master Plan*, which is the strategic vision for the use, management, and development of energy in New Jersey over the next decade. Because fossil fuels such as coal, oil and natural gas are the largest sources of GHGs in the state, the *Energy Master Plan* serves as the platform for discussions about how New Jersey can meet the Global Warming Response Act's 2050 greenhouse gas limit. *(NJDEP)*

The transportation sector in New Jersey continues to be the major contributor to GHGs (47.3% in 2009) and vehicle miles traveled continue to increase while fuel efficiencies have leveled off. Electricity generation was the second largest contributor, at 23.5%, followed by residential at 15.2%, industrial at 10.6%, commercial at 10.8%. Highly warming gases, waste management and land clearing contributed another approximately 23%, while terrestrial carbon sequestration (forests absorbing carbon) provided an offset of -7.6%. The NJDEP predicts that major new initiatives and technologies will be required.

Of import for Peapack & Gladstone, which is largely residential in nature, a 2008 report states:

> "For the residential sector, emissions from direct fossil fuel use in 1990 were about 15.7 MMtCO2e, and are estimated to decrease to about 11.5 MMtCO2e by 2020. Emissions associated with natural gas consumption accounted for about 60% of total residential emissions in 1990, and are estimated to increase to 98% of total residential emissions by 2020" while petroleum (39.5 to 2%), coal and wood decrease. *(NJDEP)*

Clean Energy Initiatives

Solar

Using solar energy systems, which are considered low carbon technologies, can help reduce GHGs along with reducing dependence on non-renewable energy sources such as electricity generated by fossil fuel.

According to the 2011 *Somerset Energy Smart Progress Report*, as of June 30, 2011, three commercial facilities and four residential facilities in Peapack & Gladstone have solar installations for a total capacity of 220 kilowatts (kW), representing 10% of the capacity generated by Somerset County entities participating in rebate or renewable energy certificate programs.

In addition, Peapack & Gladstone is a participating location for the Somerset County Renewable Energy Power Purchase Agreement (PPA) Program Tranche 2, which began in 2011 and involves 32 local entity-public facilities. Estimates indicate that Tranche 2 facilities will generate 7 megawatts (mW) of solar renewable energy, which will offset approximately 26% of the current electric power usage at those facilities, resulting in aggregate cost savings of $684,291 in the first year, with savings expected to grow. In the Borough of Peapack & Gladstone, the PPA called for solar units with a capacity of 24.5kw to be installed on the roof of the municipal building/gymnasium at 1 School Street; however, the Borough has decided that such an installation would be infeasible

Wind Energy

Wind energy is a very low carbon technology but is not a likely option for Peapack & Gladstone. According to the National Renewable Energy Laboratory (NREL), "hilltops, ridge crests, mountain summits, large clearings, and other locations free of local obstruction to the wind are expected to be well exposed to the wind. In contrast, locations in narrow valleys and canyons, downwind of hills or obstructions, or in forested or urban

areas are likely to have poor wind exposure." The NREL mapping shows that the Peapack & Gladstone area, like most of New Jersey other than southern coastal areas, is identified as class 1, "generally not suitable."

Sustainable Jersey

The Sustainable Jersey program is a certification program that acknowledges communities that complete qualifying actions. Peapack & Gladstone is a participating community working toward certification. Among the qualifying actions that can be undertaken are Greenhouse Gas initiatives such as completing a municipal carbon footprint or inventory of all GHGs in municipal buildings, vehicles and operations; undertaking a community carbon footprint, which measures GHG emissions by residents, schools, businesses, and industries in a particular year; and creating a Climate Action Plan, consisting of strategies to lower GHGs.

New Jersey's Clean Energy Program (NJCEP), administered by the New Jersey Board of Public Utilities, offers a Direct Install program designed to cut energy costs for small to medium size facilities by replacing lighting, HVAC and other outdated operational equipment with energy efficiency alternatives; in 2013 the program pays 70% of the retrofit costs up to a maximum of $75,000. Two buildings in Peapack & Gladstone were listed on the schedule for the 2011 program year.

On an individual level, rebates on energy efficient alternatives for household appliances, heating, cooling and alternative energy systems are available through NJCEP.

AIR

Air Quality: National Clean Air Standards

In 1970, the federal government passed the Clean Air Act, setting standards to be met throughout the country. The Act was amended in 1990, with focus on four areas of pollution: acid rain, urban air pollution, toxic air emissions, and stratospheric ozone depletion. The amendment also introduced a permits program and strengthened enforcement.

Under the Act, it is the responsibility of the US Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common pollutants (ozone, carbon monoxide, sulfur dioxide, lead, nitrogen dioxide and fine particulates) and the responsibility of each state to develop State Implementation Plans (SIPs) to attain and maintain these standards. In New Jersey, that role is assigned to the NJ Department of Environmental Protection (NJDEP) Division of Air Quality (DAQ) and its Bureau of Air Monitoring (BAM), which monitors the State's ambient air monitoring network.

Regional / Local Statistics

The State uses the air quality data from its air monitoring network to determine which areas are in compliance with NAAQS as well as overall trends in air pollution levels. The NJDEP produces yearly reports but also provides real-time reporting through its Air Quality Index website (*www.njaqinow.net*). Although there are monitoring sites throughout the state, each site measures a limited set of pollutants; no one site tracks them all.

The six pollutants for which standards have been set by the EPA – ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, and lead – are known as *criteria pollutants* (see *Criteria Pollutants* below). Over the period 1990-2010, total emissions of these air pollutants have decreased by more than 41 percent nationally. *(USEPA)*

In New Jersey, according to the NJDEP DAQ website, air quality has improved significantly over the last 40 years since the first Earth Day, in 1970, but exceeds the current NAAQS standards for ozone throughout the state and for fine particulates in urban areas (13 counties). New Jersey has attained sulfur dioxide (except for a portion of Warren County), lead, carbon monoxide and nitrogen dioxide standards.

Additional air pollutants that may cause adverse health effects but are not criteria pollutants are referred to as Hazardous Air Pollutants (HAPs) or *air toxics* (see *Air Toxics* below). The NJDEP DAQ also regulates the emissions of HAPs. For many toxins the State has set its own standards, with stricter requirements than the EPA.

Criteria Pollutants

Each of the six criteria pollutants is discussed below. Information on national and state standards and localized air monitoring results (using those monitoring stations closest to

Peapack & Gladstone) are provided based on 2010 NJDEP reports, the latest available data at time of publication. In the discussions of the individual criteria pollutants, primary standards are those associated with health effects and secondary standards are based on "welfare" effects (e.g., damage to trees, crops and materials).

Ozone

Ozone (O_3) is defined by the NJDEP *2010 Ozone Summary* as a gas that consists of three oxygen atoms. In the upper atmosphere, where it occurs naturally, it offers protection from harmful ultraviolet rays. But at ground level it can have adverse health effects. Ground-level ozone is monitored from April through October because its formation, from nitrous oxide (NOx) and volatile organic compounds (VOCs), requires the presence of sunlight and heat. Hot, dry summers result in more ozone than cool, wet ones.

The EPA revised National Ambient Air Quality Standards (NAAQS) for ozone in 2008, having determined that the previous standard of 0.08 parts per million (ppm) maximum daily eight-hour average did not sufficiently protect public health. The revised standard of 0.075 parts per million (ppm) maximum daily 8-hour average went into effect on May 27, 2008. Attainment of the NAAQS is determined by taking the average of the fourth highest daily maximum 8-hour average concentration that is recorded each year for three years.

New Jersey standards are based on 1-hour averaging, with primary standards set at 0.12 ppm and secondary standards set at 0.08 ppm. They are not as stringent as the revised NAAQS.

To date, the effort to lower ozone concentrations has focused on reducing emissions of VOCs. However, improvements have leveled off in recent years, especially with respect to maximum 8-hour average concentrations. According to the NJDEP report, significant further improvements will require reductions in both VOCs and NOx. Levels of NOx in New Jersey are affected by emissions from upwind sources outside New Jersey.

Statewide, New Jersey is classified as a "moderate" ozone non-attainment area for NAAQS for the 2008-2010 period, with an overall score of 0.092 ppm. This score falls at the lowest end of the moderate category. The monitoring station in neighboring Chester reported 5 days above the standard in 2010 and matched the NAAQS standard for three-year averaging at.075 ppm, as shown in *Table 12.*

Table 12. Ozone – 2010
8-Hour Averages in Parts Per Million (ppm)
Standard: .075 ppm

Station	*Highest*	*2nd*	*3rd*	*4th*	*Avg. of 4th Highest 8-Hr Avgs 2008-2010*	*# Days with 8-Hr Avg Above .075ppm*
Chester	.094	.086	.078	.078	.075	5
State	.111	.083	.080	.080	.092	35

Source: NJDEP 2010 Ozone Summary

Sulfur Dioxide

NJDEP's *2010 Sulfur Dioxide Summary* defines SO_2 as "a heavy, colorless gas with a suffocating odor that easily dissolves in water to form sulfuric acid. SO_2 gases can be formed when fuels containing sulfur are burned, or when gasoline is extracted from oil." Most of the sulfur dioxide released into the air comes from electric utilities, followed by fossil fuel combustion, industrial processes, non-road equipment and on-road vehicles.

Sulfur dioxide reacts with other gases and particles in the air to form sulfates that can be harmful to people (particularly children, the elderly and asthmatics) and the environment. Sulfur dioxide reacting with other substances in the atmosphere forms acid rain, which damages forest, crops and aquatic environments and decays building materials.

There are several standards for monitoring SO_2, ranging from 1-hour to annual averaging. New Jersey's standards differ slightly from national standards, as shown in *Table 13.*

Table 13. National and New Jersey Ambient Air Quality Standards for Sulfur Dioxide
ppm = parts per million; ppb = parts per billion; ug/m3 = micrograms per cubic meter

Averaging Period	*Type*	*New Jersey*	*National*[a]
12 – month average	Primary	80 µg/m^3 (0.03 ppm)	0.03 ppm
12 – month average	Secondary	60 µg/m^3 (0.02 ppm)	---
24 – hour average	Primary	365 µg/m^3 (0.14 ppm)	0.14 ppm
24 – hour average	Secondary	260 µg/m^3 (0.10 ppm)	---
3 – hour average	Secondary	1300 µg/m^3 (0.5 ppm)	0.5 ppm
1 – hour average[b]	Primary	---	75 ppb

a – National standards are block averages rather than moving averages.
b – Final rule signed June 2, 2010 and effective on August 23, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hr average at each monitor within an area must not exceed 75 ppb.
Source: NJDEP 2010 Sulfur Dioxide Summary

Regulations requiring the use of low sulfur fuels in New Jersey have been effective in lowering SO_2 concentrations. No monitoring sites recorded exceedances of the primary or secondary SO_2 NAAQ standards during 2010. The last year an exceedance of the national SO_2 standards was recorded in the state was 1980. *Table 14* shows data for the monitoring site in nearby Chester, which illustrates that SO_2 levels in this area are well below the national standard limits.

Table 14. Sulfur Dioxide – 2010

National Standards in Parts per Billion (ppb) and Parts per Million (ppm)				
	75 ppb	0.50 ppm	0.14 ppm	0.03 ppm
Monitoring Site Data				
Monitoring Site	*3-Year Avg. 99th %-ile of Daily Max 1-Hour Avg. (ppb)*	*3-Hour Avg Max (ppm)*	*24-Hour Avg Max (ppm)*	*12-Month AvgMax (ppm)*
Chester	27	0.032	0.013	0.001

** Three-year data unavailable. Source: NJDEP 2010 Sulfur Dioxide Summary*

Carbon Monoxide

According to the NJDEP *2010 Carbon Monoxide Summary*, vehicles, construction equipment, boats and other engines are the predominant contributors of carbon monoxide (CO) emissions nationwide. Boilers, incinerators and forest fires also contribute. This colorless, odorless and poisonous gas is formed when carbon in fuels is not burned completely. Exposure most often causes headaches and nausea; the threat to health is most serious in people with cardiovascular disease.

Although there are no national secondary standards, New Jersey has set its secondary standards at the same level as primary standards and uses a different measuring metric than national standards (see *Table 15*. In addition, New Jersey standards are not to be exceeded more than once in any 12-month period.

Table 15. National and New Jersey Ambient Air Quality Standards for Carbon Monoxide
mg/m^3 = milligrams per cubic meter; ppm = parts per million

Averaging Period	*Type*	*New Jersey*	*National*
1-Hour	Primary	40 mg/m^3 (35 ppm)	35 ppm
1-Hour	Secondary	40 mg/m^3 (35 ppm)	----
8-Hour	Primary	10 mg/m^3 (9 ppm)	9 ppm
8-Hour	Secondary	10 mg/m^3 (9 ppm)	----

Source: NJDEP 2010 Carbon Monoxide Summary

According to the NJDEP report, "carbon monoxide levels have improved dramatically over the past 20 years. The last time the CO standard was exceeded in New Jersey was in January of 1995, and the entire state was officially declared as having attained the CO standard on August 23, 2002." Because on-road vehicle emissions from the major contributor to CO levels, there is a variation throughout the day, with the highest peaks around 7 to 8 am, and another, lower but more extended, rise between 4 and 8 pm.

In 2010, the closest CO monitoring station to Peapack & Gladstone was Morristown (see *Table 16*), which had the lowest numbers of any station in northern New Jersey. The East Orange station, approximately 23 miles away, had the highest 8-hour average concentration of any reporting station in the state. Most CO monitoring stations are in high traffic areas in northeastern New Jersey. All statistics are well below the national and state standards.

Table 16. Carbon Monoxide – 2010
1-Hour and 8-Hour Averages in Parts Per Million (ppm)
1-hour standard = 35 ppm; 8-hour standard = 9 ppm

Monitoring Sites	*Maximum 1-Hr Avg*	*2nd Highest 1-Hr Avg*	*Maximum 8-Hr Avg*	*2nd Highest 8-Hr Avg*
East Orange (c. 23 mi)	3.7	3.4	3.1	2.1
Morristown (c. 10 mi)	1.7	1.4	1.0	1.0

Source: NJDEP Carbon Monoxide Summary 2010

Nitrogen Dioxide

According to the NJDEP *2010 Nitrogen Dioxide Summary*, nitrogen dioxide (NO_2) is a reddish-brown, highly reactive gas that is formed in the air through the oxidation of nitric oxide (NO). When it reacts with other chemicals, it can form ozone, particulate matter and other contributors to acid rain and haze. Oxides of nitrogen (NO_x) are combinations of gases comprising mostly NO_2 and NO. They are emitted from fuel-related sources, which include vehicle exhaust, the burning of coal, natural gas and oil, industrial processes such as welding, and household gas stoves and heaters. NO is released into the atmosphere as NO_x but easily converts to NO_2.

NO_2 can aggravate or cause respiratory illness and prolonged exposure can permanently damage the lungs. Along with NO, it can irritate the eyes, nose, throat and lungs and cause nausea and tiredness. Both are found in tobacco smoke. The environmental effects of nitrogen oxides can include potential changes in the composition of some plants in wetland and terrestrial ecosystems, acidification of freshwater bodies, eutrophication of estuarine and coastal waters, increases in levels of toxins harmful to fish and other aquatic life, and visibility impairment.

The levels for the national and state standards are the same; however, national standards are based on calendar year averages, while state standards apply to any 12-month period. (*Table 17*) Because the bulk of NO_x emissions comes from vehicle exhaust, levels are highest during morning and afternoon rush hours. Levels are also higher in winter than in summer.

Table 17. National and New Jersey Ambient Air Quality Standards for Nitrogen Dioxide (NO_2)
Parts Per Million (ppm) and Micrograms Per Cubic Meter (μg/m^3)

Averaging Period	*Type*	*New Jersey*	*National*
12-month average	Primary	100 μg/m^3 (0.053 ppm)	
Annual average	Primary		0.053 ppm (100 μg/m^3)
12-month average	Secondary	100 μg/m^3 (0.053 ppm)	
Annual average	Secondary		0.053 ppm (100 μg/m^3)
1-hour average	Primary		0.100 ppm (190 μg/m^3)
Source: NJDEP 2010 Nitrogen Dioxide Summary			

NO_2 concentrations in New Jersey have fallen steadily from an average of 0.040 ppm in 1975 to 0.012 ppm in 2010. Neither the statewide nor the individual station averages have exceeded the health standard of 0.053 ppm, although the highest reporting stations in 1975 came close. Of the eight reporting stations for 2010, neighboring Chester reported the lowest levels for 2010 Average 98th Percentile Nitrogen Dioxide Concentration, at .035ppm, and for the 3-Year (2008-2010) Average, at .038ppm. Elizabeth Lab, the highest in both cases, is included for comparison as shown in *Table 18.*

Table 18. Nitrogen Dioxide (NO_2) and Nitric Oxide (NO) - 2010 Parts Per Million (ppm) National Standards: 1-Hour - 0.100 ppm; 12-Month - 0.053 ppm				
	Nitrogen Dioxide			*Nitric Oxide*
Monitoring Sites	*1-Hr Avg 2010 98th %-ile*	*1-Hr Avg 2008-2010 98th %-ile*	*12-Mo Avg*	*12-Mo Avg*
Chester	0.035	0.038	0.004	0.000
Elizabeth Lab (c. 23 mi)	0.071	0.073	0.022	0.021
Source: NJDEP 2010 Nitrogen Dioxide Summary				

Although NO_2 concentrations score well within the NAAQS, oxides of nitrogen continue to be of concern because of their role in the formation of other pollutants – particularly ozone and fine particles.

Particulate Matter

Particulate matter can be any manmade or natural particles found in the air, such as dust, dirt, smoke, sea salt and liquid droplets. At any size, these particles can affect the environment. The total of all particles, of whatever size, is referred to as "Total Suspended Particulates" (TSPs). Particles less than 10 micrometers in diameter (PM_{10}) are called "Inhalable Particulates" because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers ($PM_{2.5}$), called "Fine Particulates," are believed to pose the greatest health risk, particularly for children, the elderly, and individuals with heart and lung diseases, such as asthma.

NAAQs for both Inhalable Particulates (PM_{10}) and Fine Particulates ($PM_{2.5}$) are set at the same level for both primary (health) and secondary (environmental welfare) standards. Although the EPA abandoned standards for TSPs in favor of the smaller PM_{10} and $PM_{2.5}$ particulates, New Jersey still maintains TSP standards, as shown in *Table 19*.

Table 19. Particulate Matter – 2010 National and New Jersey AAQs Micrograms Per Cubic Meter ($\mu g/m^3$)			
	Averaging Period	*National*	*New Jersey*
Total Suspended Particulates (TSP)	12-Month Primary 12-Month Secondary 24-Month Primary 24-Month Secondary	--	75 $\mu g/m^3$ 60 $\mu g/m^3$ 260 $\mu g/m^3$ 150 $\mu g/m^3$
Inhalable Particulates (PM_{10})	Annual	50 $\mu g/m^3$	---
	24-Hr Avg	150 $\mu g/m^3$	---
Fine Particulates ($PM_{2.5}$)	Annual	15.0 $\mu g/m^3$	---
	24-Hr Avg	35 $\mu g/m^3$	---
Source: NJDEP 2010 Particulate Summary			

In 2010, four New Jersey air monitoring stations measured PM_{10}, 24 measured $PM_{2.5}$ and seven monitored what is known as smoke shade or the coefficient of haze (COH). Several

stations use the EPA sanctioned Federal Reference Method (FRM) sampling, based on a 24-hour period, but New Jersey also has additional monitors that continuously measure particulate concentrations (TEOMs), providing the real-time data that the FRM cannot. TEOM data is made available to the public via the Air Quality Index (*www.njaqinow.net*).

In 2010, all areas of the state were in attainment for Inhalable Particulates, PM_{10}. The closest of the four PM_{10} monitoring stations to Peapack & Gladstone was in Jersey City (c. 30 miles), where the highest daily concentration was 109 $\mu g/m^3$, versus the national standard of 150, and the annual mean was 29, versus the national standard of 50.

All sites met the annual standard for Fine Particulates, $PM_{2.5}$, but 10 sites, mostly in northern New Jersey, including Morristown, Paterson and Elizabeth Lab, exceeded the 24-hour standard of 35 $\mu g/m^3$. In addition, 10 northern New Jersey counties, including Somerset County, were designated as non-attainment not for their local results but "due to their potential $PM_{2.5}$ contribution to the Elizabeth Lab monitor and additional sites in New York City that recorded violations."

Further breaking down the fine particulate contribution to air pollution, four stations, including Chester and Elizabeth Lab, measure 39 components. Of these, the five highest contributors are organic carbon, sulfate, nitrate, elemental carbon and sulfur. Elizabeth Lab reported the highest concentrations of each of these five particulates. Both organic and elemental carbon are sourced primarily from motor vehicles, and Elizabeth Lab is located in a high traffic area. Chester scored lowest for elemental carbon and nitrate but was close to Elizabeth Lab for both sulfate and sulfur levels.

"Smoke shade" is an indirect measurement of particles in the atmosphere and is used for daily reporting in the Air Quality Index. Smoke shade is measured as a Coefficient of Haze (COH), with a benchmark set at 2.0. Readings above this level are deemed "Unhealthy for Sensitive Groups." The closest station, Morristown, reported levels below the benchmark, as did the highest reporting stations — Jersey City and Elizabeth Lab (see *Table 20*).

Table 20. Smoke Shade – 2010
Benchmark 2.0

Station	*Max Daily Avg.*	*2nd Highest Daily Avg.*	*Annual Mean*
Morristown* (c.10 mi)	0.58	0.54	0.17
Jersey City (c.30 mi)	1.15	1.10	0.35
Elizabeth Lab (c.23 mi)	1.12	0.99	0.32

**Morristown shut down at the end of 2010.*
Source: NJDEP

Lead

Lead is a hazard to the health of humans and the environment, whether the source is lead in the air, in paint on walls, in our water, or in our soils. When taken into the body, lead circulates via the blood and accumulates in the bones. It affects the oxygen carrying capacity of the blood and can negatively affect the nervous system, kidneys, immune system, reproductive, developmental and cardiovascular systems. It most commonly

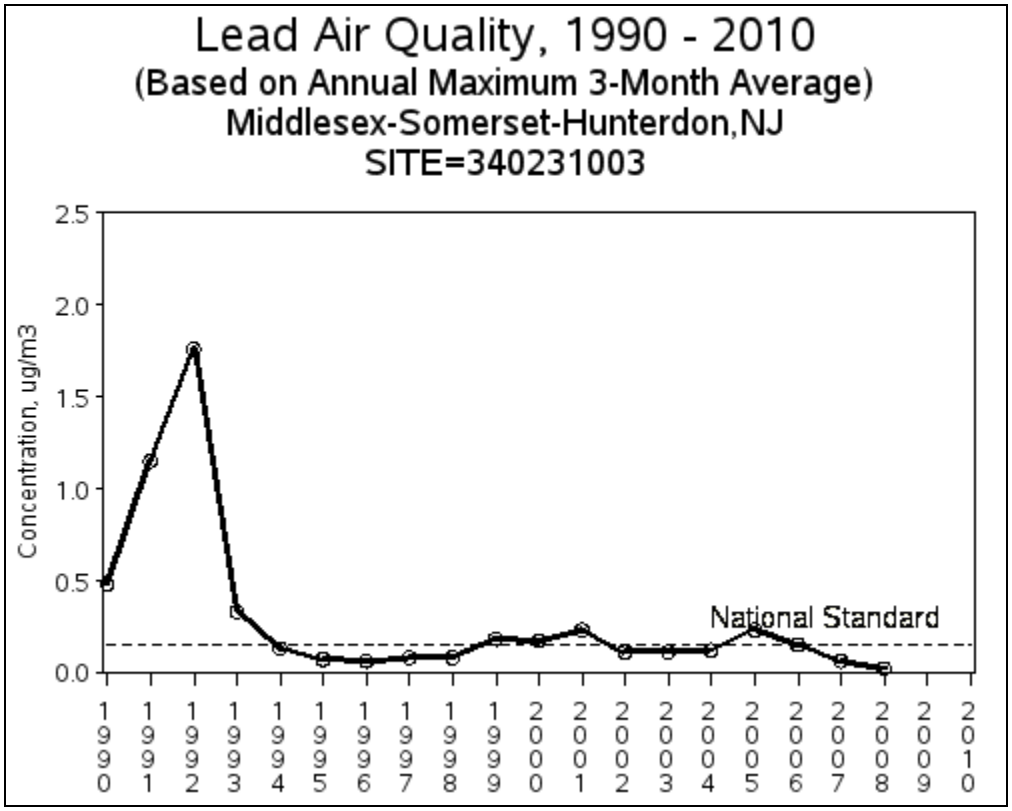
causes neurological effects in children and cardiovascular effects in adults. On a secondary level, lead from the air or water bodies may accumulate in soils and sediments, adversely affecting biodiversity.

According to the EPA, taking lead out of on-road motor vehicle gasoline has been the primary reason for a decline in lead in the air. Between 1980 and 2010 the EPA reported an 89% decrease in the national average. Contributors to lead in the air today include ore and metals processing and leaded aviation fuel. As of 2012, only two non-attainment areas are listed for lead in the country: one in Montana and one in Missouri. *(EPA)*

The NJDEP has data for New Jersey stations monitoring lead in the air from 1990 to 1995-96. Although some stations exceeded NAAQS levels in the early 1990s, all were below the standards by 1996. Although no stations reporting to the NJDEP BAM monitored lead in recent years, a monitoring site is proposed for Paterson. (NJDEP)

Data available from the EPA includes information for a monitoring site in New Brunswick (see *Figure 12*) that includes statistics through 2008, indicating that levels were close to or above the national standards in several years during the 1999-2006 period. The primary and secondary NAAQS for lead are presently set at 0.15 micrograms per cubic meter of air ($\mu g/m^3$) measured on a rolling three month average. *(EPA)*

Figure 12. Lead Air Quality 1990-2010



Source: USEPA

Air Toxics

Almost 200 air toxics have been identified on the list of Hazardous Air Pollutants (HAPs) maintained by the EPA. The EPA issues a National-Scale Air Toxics Assessment (NATA), which the NJDEP adapts to evaluate the types and amounts of air toxics people are exposed to in New Jersey. NJDEP compares the estimated NATA air concentrations to their chemical-specific health benchmarks and divides the modeled air concentration by the health benchmark to get a risk ratio. If the risk ratio for a specific chemical is greater than one, it may be of concern, increasing the risk for cancer or other negative health effects.

In 2005, NJDEP produced a county by county report on 22 air toxins, 21 of which are carcinogens and one of which, acrolein, is not. These toxins were considered to be of the greatest concern because their levels were predicted to exceed the health benchmarks in one or more counties. The list for Somerset County, comparing air concentrations to health benchmarks, is shown in *Table 21*.

Table 21. Somerset County Average 2005 NATA Modeled Air Concentrations Compared to Health Benchmarks

				% Contribution from				
Pollutant	*Modeled Air Concentration (ug/m3)*	*Health Benchmark (ug/m3)*	*Risk Ratio*	*Point Sources*	*Nonpoint Sources*	*On-road Mobile Sources*	*Nonroad Mobile Sources*	*Background / Secondary*
Acetaldehyde	1.8	0.45	**3.9**	0%	3%	4%	2%	91%*
Acrolein	0.044	*0.020*	***2.2***	<1%	17%	11%	11%	61%*
Arsenic Compounds	0.00043	0.00023	**1.8**	3%	7%	3%	4%	83%
Benzene	**0.99**	**0.13**	**7.6**	**<1%**	**10%**	**22%**	**13%**	**55%**
1,3-Butadiene	0.075	0.033	**2.3**	0%	<1%	29%	18%	53%
Cadmium Compounds	0.000086	0.00024	0.4	8%	29%	0%	<1%	63%
Carbon Tetrachloride	**0.61**	**0.067**	**9.1**	**0%**	**<1%**	**0%**	**0%**	**100%**
Chloroform	0.098	0.043	**2.3**	<1%	39%	0%	0%	61%
Chromium (hexavalent form)	0.00015	0.000083	**1.8**	24%	5%	4%	1%	66%
Cobalt Compounds	0.000029	0.00011	0.3	96%	4%	0%	0%	0%
1,4-Dichlorobenzene	0.088	0.091	0.9	<1%	47%	0%	0%	53%
1,3-Dichloropropene	0.079	0.25	0.3	0%	100%	0%	0%	0%
Diesel Particulate Matter	**0.55**	**0.0033**	**167**	**0%**	**0%**	**49%**	**51%**	**0%**
Ethylbenzene	0.19	0.4	0.5	1%	23%	40%	36%	0%
Ethylene Oxide	0.0088	0.011	0.8	2%	8%	0%	0%	90%
Formaldehyde	**1.9**	**0.077**	**24**	**<1%**	**2%**	**5%**	**5%**	**88%***
Methyl Chloride	**1.2**	0.56	**2.2**	<1%	<1%	0%	0%	100%
Naphthalene	0.089	0.029	**3.1**	1%	39%	20%	5%	35%
Nickel Compounds	0.00042	0.0021	0.2	39%	30%	4%	4%	23%
PAH/POM	0.0094	0.0072**	**1.3**	<1%	82%	6%	12%	0%
Perchloroethylene	0.13	0.17	0.7	<1%	48%	0%	0%	52%

Table 21. Somerset County Average 2005 NATA Modeled Air Concentrations Compared to Health Benchmarks								
1,1,2-Trichloroethane	1.4E-6	0.063	**2.0E-5**	66%	34%	0%	0%	0%

- *Chemicals with risk ratios greater than or equal to 1 are in **bold**. The four highest risks for Somerset County are highlighted in gray.*
- *Risk Ratios based on noncarcinogenic effects are in italics.*
- *The symbol ug/m^3 is micrograms per cubic meter, the amount (in micrograms) of a chemical in a cubic meter of air. This is also known as a concentration.*
- *For diesel particulate matter, on-road and nonroad concentrations include a model-estimated background concentration.*
- **Acetaldehyde, acrolein and formaldehyde concentration estimates include secondary formation, which is the process by which chemicals in the air are transformed into other chemicals.*
- ***PAH/POM is "polycyclic aromatic hydrocarbons/polycyclic organic matter." These define a broad class of compounds. The chemicals making up this class were broken up into 8 groups based on toxicity, and each group was assigned a cancer-weighted toxicity estimate. 0.0072 ug/m^3 is the health benchmark average across the 8 groups.*

Source: NJDEP

The four chemicals with the highest risk ratios in Somerset County are diesel particulate matter (167), formaldehyde (24), carbon tetrachloride (9.1) and benzene (7.6).

Diesel particulate matter, according to table above, poses the highest risk factor for Somerset County, with an overall ratio of 167 times the benchmark. Sussex County has the lowest cancer risk ratio (40) from diesel particulate matter and Hudson County the highest (925). In Somerset County, 49% of diesel particular matter comes from on-road mobile sources and 51% from non-road mobile sources.

Formaldehyde. Formaldehyde is mostly formed in the atmosphere from chemicals released from mobile and other sources and does not degrade quickly. In Somerset County, background and secondary formations account for 88% of sources. The Countywide ratio is 24 times the benchmark.

Carbon tetrachloride (CT). The entire state is at a risk ratio of 5-10 times benchmark, with Somerset County assessed at 9.1. While no longer used in New Jersey, CT has a long half-life and thus residual levels remain in the air. CT contributes significantly to ozone depletion and thus is being phased out nationally under the Clean Air Act Amendments.

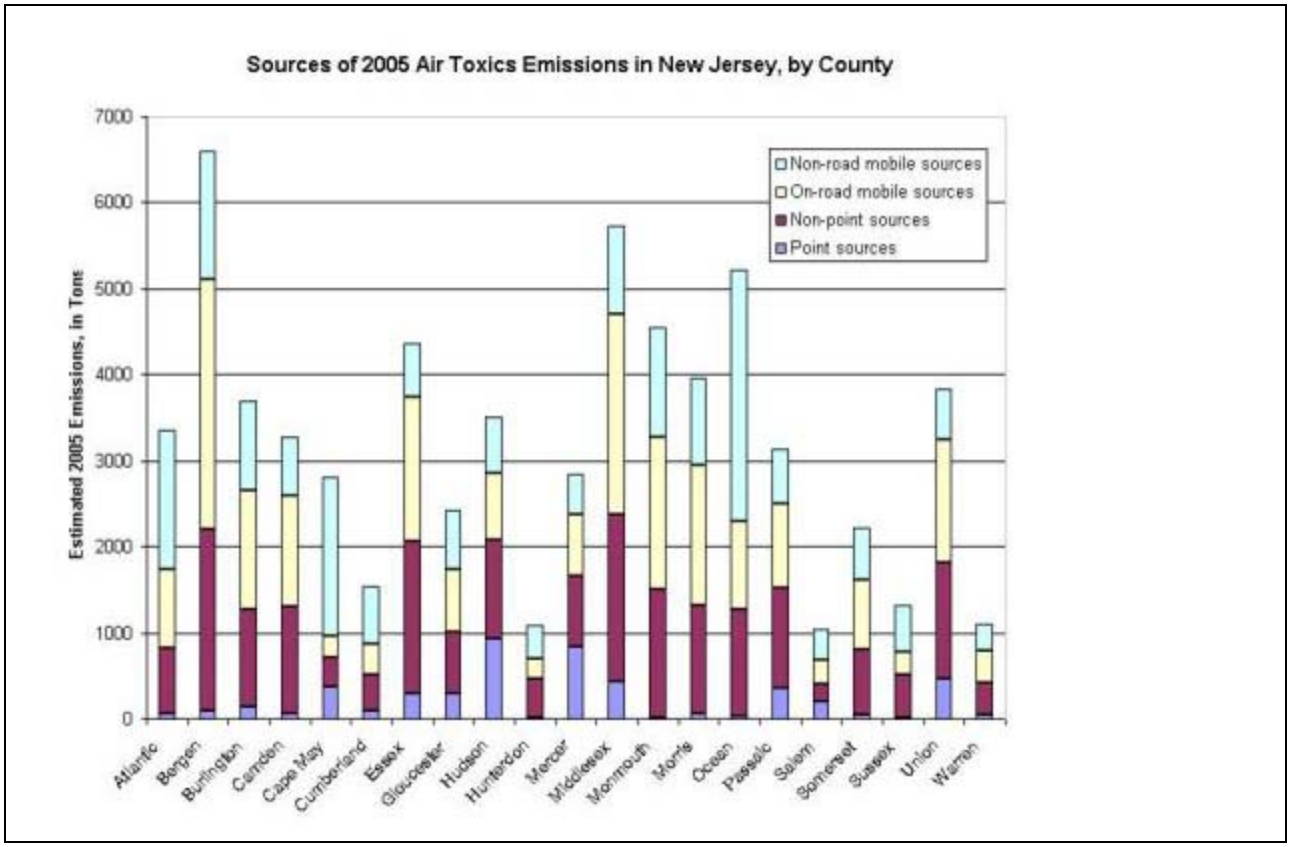
Benzene. Benzene is a component of gasoline and oil and is used industrially to make other chemicals, plastics and synthetic fibers. It is ranked in the top 20 chemicals for production volume in the U.S. The risk just to the north of Peapack & Gladstone, in southern Morris County, is 1-5 times benchmark, while the risk in Somerset County is 7.6 times benchmark. Primary sources are background concentrations (55%).and on-road mobile (22%).

On-road mobile sources of air toxics emissions are vehicles; non-road mobile sources may includes aircraft, trains, lawnmowers and leaf blowers, boats, dirt bikes and construction vehicles. Nonpoint sources of emission include heating, fuel and pesticide use, dry cleaners and consumer products, such as adhesives, sealants, paint, personal care and other household products. Point sources are identified by the NJDEP as "large facilities that emit a significant amount of air pollution during manufacturing, power

generation, heating, incineration, or other such activity" as well as "smaller facilities including those that are required to report their emissions under the federal Toxic Release Inventory program and the state's Community Right-To-Know program" (see *Contaminated Sites chapter of this ERI Update*).

Somerset County's emissions are relatively low compared to many other counties in the state and come mostly from on-road and non-point sources, followed by non-road mobile sources, with a very low contribution by point sources (see *Figure 13*).

Figure 13. Sources of 2005 Air Toxics Emissions in New Jersey, by County



Source: NJDEP

The final category of contributions to emissions is background and secondary sources. Background concentrations generally cannot be sourced to current, local emissions. The six air toxics that are of concern in this category for New Jersey are:

- Arsenic compounds
- Benzene
- 1,3-Butadiene
- Carbon tetrachloride
- Chloroform

- Methyl chloride

Secondary formation, or atmospheric transformation, refers to chemicals that have been transformed in the air from an air pollutant into another chemical, which may have a different level of toxicity. Four air toxics of concern in this category are the primary toxics acetaldehyde, formaldehyde, and acrolein and the decay of 1,3-butadiene to acrolein.

Radon

Radon is a naturally occurring radioactive gas. It is a byproduct of the decay of uranium and is found in soil at varying concentrations. Radon is a known health risk, causing lung cancer in smokers and non-smokers alike. Because it can accumulate in closed places such as houses, homeowners in high risk areas are encouraged to have their properties tested. Radon can also work its way into the water supply. The greatest risk of radon from drinking water is that it may escape into indoor air. Testing of drinking water supplies for uranium has been a recent development. If levels exceed the maximum set by the EPA for extended periods of time, kidney damage can occur.

Communities in Somerset County have been ranked at high or moderate risk for radon presence. The Borough of Peapack Gladstone is ranked Tier 1, or high risk for the presence of radon.

In addition, radon levels in many areas of Somerset County are above the EPA and NJDEP standards. The national average indoor radon level is 1.3 picocuries per liter (pCi/L, a measure of radioactivity); the average for Somerset County is 5 pCi/L. The national standards for acceptable range is 4 pC1/L or below. The NJDEP standard is 2 pCi/L.

Nonsmokers exposed to a 2 pCi/L level of radon over a lifetime have a 1 in 270 chance of developing lung cancer; at 4 pCi/L the odds are 1 in 135; smokers are at much greater risk, with odds of 1 in 52 and 1 in 26 respectively. (*National Academy of Sciences, Biological Effects of Ionizing Radiations, Sixth Report, 1998)* The EPA and the NJDEP recommend that mitigation measures be taken in homes where tests show levels at 4 pCi/L or above.

For more information on radon, visit *http://www.nj.gov/dep/rpp/radon/index.htm.*

Noise and Odors

Noise

The NJDEP, authorized by the Noise Control Act of 1971, N.J.A.C. 7:29, oversees noise control and abatement in New Jersey. The Office of Local Environmental Management (OLEM) works with County Health Departments and municipalities to monitor noise complaints and compliance. The NJDEP does not have a Noise Control Program, but the Noise Information website provides a list of contacts depending on the type of noise: aircraft, highway, commercial or industrial, or residential noise and nuisances. (NJDEP *http://www.state.nj.us/dep/enforcement/contact-noise.html*).

While noise can be a factor in many areas of New Jersey, it does not appear to be a major issue for Peapack & Gladstone. The NJDEP encourages municipalities to follow the Model Noise Ordinance available on the NJDEP website and maintains a list of municipal ordinances submitted to the NJDEP for review and approval. According to the NJDEP website, the Borough of Peapack & Gladstone has not submitted a noise ordinance to the State; however, Peapack & Gladstone Municipal Code restricts unnecessary noise as follows in *Chapter IV. Police Regulations*:

4-5.4 Noise.

a. No person shall make, continue or cause to be made or continued or suffer any animal under his or her control to make, continue or cause to be made any loud, disturbing, unnecessary or unusual sound or noise which does or is likely to annoy, disturb, injure or endanger the comfort, repose, health, peace or safety of others unless the making and continuing of the same be necessary for the protection or preservation of property or of the health, safety, life or limb of some person or persons.

b. Without limiting the generality of paragraph a. of this subsection, the following act(s) are hereby declared to be examples of loud, disturbing and unnecessary noise in violation of this subsection:

1. Radios, Television Sets, Musical Instruments, Sound Amplifiers. Using, operating, playing or permitting the use, operation or playing of any radio, television, phonograph, drum, musical instrument, sound amplifier or similar device which produces, reproduces or amplifies sound in such a manner as to disturb the peace, quiet and comfort of neighboring inhabitants or with louder volume than is necessary for convenient hearing for persons who are in the room, vehicle or chamber in which the machine or device is operated and who are voluntary listeners. It shall be prima facie evidence of a violation of this section if the sound is clearly audible at a distance of one hundred (100') feet from the building, structure or vehicle in which the sound originates or is located.

(Ord. No. 728 § 4-5.4; Ord. No. 975)

(Peapack & Gladstone Municipal Code)

Many other provisions underscore an awareness of the potential deleterious effects of noise and set standards for noise assessment, consider the need for buffering from noise, restrict construction hours and procedures. Acknowledging the rural character of the Borough, the code allows the noise (and odors) “inherently associated with agricultural uses.”

Odors

According to the NJDEP, “odor is an air contaminant and therefore may be considered air pollution if it is present in a way that unreasonably interferes with the enjoyment of life or property.” Guidelines for odor control are set forth in The Air Pollution Control Act: N.J.S.A. 26:2C-1 et seq. and N.J.A.C. 7:27-1.1 et seq.

Odor complaints can be reported to the Northeast regional field office at (973) 656-4444 or the NJDEP 24 hour toll-free environmental hotline at (877) 927-6337.

In the Peapack & Gladstone Borough municipal code, odor is considered a nuisance element akin to noise. Odors associated with agricultural uses are allowed under the Right to Farm ordinance, while restrictions against odors may be considered when reviewing development applications.

The municipal code also includes standards to be enforced for air pollution (23-48.c.1), particularly relating to smoke, solid particles and fly ash and odors. Regarding odors, the code states: "In any zone, no odorous material may be emitted into the atmosphere in quantities sufficient to be detected." This section also includes standards for wastes, radiation, vibration, glare, temperature change and fire and explosive hazards.

The Environmental Commission has the power to "to study and make recommendations concerning open space preservation, water resources management, air pollution control, solid waste management, noise control, soil and landscape protection, environmental appearance, marine resources and protection of flora and fauna. (Ord. No. 597 § 7; Ord. No. 843)

Meteorology and Pollution

Meteorology plays an important role in the distribution of pollution throughout the troposphere, the layer of the atmosphere closest to the earth's surface. Atmospheric processes such as wind speed and wind direction affect the transport and dispersion of air pollution. Weather phenomena, such as precipitation and solar radiation, influence chemical reactions and transformations in the atmosphere that affect air pollutants. By studying meteorological and air pollution data together, scientists and mathematicians have developed reasonably accurate models for predicting the fate of pollutants as they go through the stages of transport, dispersion, transformation and removal. The Elizabeth Lab meteorological station monitors wind speed and wind direction. The East Orange meteorological station monitors temperature and relative humidity. The Chester meteorological station and Newark firehouse monitor solar radiation. *(NJDEP DAQ)*

HYDROLOGY

The countryside within the Borough of Peapack & Gladstone consists of rolling, rounded hills bisected from the north to the south by two significant waterways, the North Branch of the Raritan River and the Peapack Brook. The headwaters of the North Branch flow through the Borough. The Peapack Brook flows into the Raritan River just beyond the southern terminus of the Borough.

Watersheds

"A watershed is a topographic area within which apparent surface water runoff drains into a specific point on a stream or to a water body such as a lake." *(EPA, Ecoregions and Watersheds, 1997)* The NJDEP has divided the state into Watershed Management Areas (WMAs). A watershed-based approach to natural resource management is considered by state and national agencies to be the most appropriate unit for managing complex environmental problems.

The Borough of Peapack & Gladstone lies within WMA 8 – North and South Branch Raritan (*NJDEP*). While the North Branch of the Raritan River is the main water body in this WMA, the Peapack Brook is a major water body in the Borough, flowing from the northern border with Chester Township, roughly following Mendham Road and Main Street to the southern border with Bedminster Township. Much of the developed areas of the Borough drains into the Peapack Brook. The North Branch of the Raritan River runs along the eastern border of the Borough. It is the water source for the Ravine Lake, which was created in 1899 for the Blairsden estate by damming water from the North Branch of the Raritan River.

Every WMA is composed of multiple watersheds and subwatersheds. The United States Geological Survey (USGS) has mapped and identified watersheds using a hierarchal numbering system. This system identifies watersheds using a hydrological unit code (HUC) consisting of up to 14 digits for the smallest watersheds. The HUC14 watersheds for the Borough of Peapack & Gladstone Borough are identified on the *Watersheds* map *(Map 9 in the Maps Section)* and listed in *Table 22*.

Table 22. HUC 14 Watersheds in the Borough of Peapack & Gladstone

Watershed	Acres	Percent
Raritan River North Branch: Peapack Brook (below Gladstone Brook) Watershed	2,147.86	58.1%
Raritan River North Branch: (Peapack Brook to McVickers Brook) Watershed	1,334.18	36.1%
Raritan River North Branch: Middle Brook Watershed	138.36	3.7%
Raritan River North Branch: Peapack Brook (above/including Gladstone Brook) Watershed	75.98	2.1%
Total:	**3,696.39**	**100.0%**

Source: NJDEP

Surface Water

Surface water is water that collects on the ground or in a stream, river, lake, wetland, or ocean. Major water bodies in the Borough of Peapack & Gladstone include Peapack Brook, the North Branch of the Raritan River, and Ravine Lake.

New Jersey's Surface Water Quality Standards (SWQS) (N. J. A. C. 7:9) classify Fresh Water 1 (FW1) as the highest level of classification, which is defined as:

> "those fresh waters, as designated in N.J.A.C. 7:9B-1.15(j), that are to be maintained in their natural state of quality (set aside for posterity) and not subjected to any manmade wastewater discharges or increases in runoff from anthropogenic activities. These waters are set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s)."

The general classification for the other fresh waters in the State is Fresh Water 2 (FW2). Further classifying these water bodies, the presence of trout in a stream means that the waters are relatively free of chemical or biological contaminants. A stream can be classified as Trout Production (TP), Trout Maintenance (TM) or Non-Trout (NT). Trout production waters are waters designated "for use by trout for spawning or nursery purposes during their first summer." Trout maintenance waters support trout throughout the year. Waters classified as Non-Trout (NT) do not support trout, either because of their physical nature or due to biological or chemical characteristics.

The rivers and streams of the Borough are of high ecological value and much of their lengths have been classified by the NJDEP as Category One (C1) waterways. These high quality waterways are protected from measurable changes in water quality characteristics as determined by their clarity, color, scenic setting, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). The C1 classification signifies the highest level of protection for a stream in New Jersey; among other regulations, no new development can occur within 300 feet of category one waterways.

The majority of the North Branch of the Raritan River and the entire Peapack Brook have been designated as Category One waterways. See *Surface Water Quality* map *(Map 10)* and *Table 23* for the surface water quality designations.

Table 23. Surface Water Quality Standards in the Borough of Peapack & Gladstone

Name	Category
Peapack Brook	Category One Water: Trout Production
Peapack Brook UNT*	Category One Water: Trout Production
North Branch Raritan River	Category One Water: Trout Production
North Branch Raritan River UNT*	Category One Water: Trout Production
Gladstone Brook	Category One Water: Trout Production
North Branch Raritan River UNT*	Non-Category One Water: Trout Production
North Branch Raritan River	Non-Category One Water: Trout Maintenance

Table 23. Surface Water Quality Standards in the Borough of Peapack & Gladstone	
Name	**Category**
North Branch Raritan River UNT*	Non-Category One Water: Trout Maintenance
Ravine Lake	Non-Category One Water: Non Trout
Middle Brook UNT*	Non-Category One Water: Non Trout
Uncoded Tributary **	Non-Category One Water: Non Trout

**UNT – Unnamed Tributary, this can represent multiple lengths of a single stream or river, each of which can be in multiple category designations*
*** Uncoded Tributary indicates an unnamed surface stream or river which lacks a designated name*
Source: NJDEP

The quality of surface waters can be affected by point sources and non-point sources of pollution as well as from erosion and sedimentation. Point source means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged (*Clean Water Act, 1972*). This includes discharges from sewage treatment plants and factories, stormwater runoff, illegal dumping, and malfunctioning underground storage tanks and septic systems. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.

A second type of water pollutants is termed non-point pollution which, as opposed to point source pollution, comes from many different sources. As rainfall or snowmelt moves over and through the ground, it picks up and carries natural and human-made pollutants (such as fertilizers, herbicides and motor oil) and deposits them into surface and groundwater.

The effects of pollutants on specific waterways can vary, but are manifested in drinking water supplies, recreation, fisheries, and wildlife. One of these effects is eutrophication. Eutrophication in freshwater systems is the addition of substances, either human-made or natural, to a water body, affecting the primary productivity of that water body. Substances such as nitrates and phosphates promote excessive algae and phytoplankton growth. These "blooms" can have negative effects on the ecosystem. These negative impacts include a clouding of the water, which limits sunlight, stopping the growth of plants deeper in the water. Additionally, eutrophication can lead to anoxia, a condition where a water body has depleted levels of oxygen, which is the result of the decomposition of dead phytoplankton.

Water quality can also be negatively impacted by sedimentation. Sedimentation is the transportation and deposition of eroded materials. Development near streams and on steep slopes reduces vegetation cover in these areas. This ground cover can typically absorb the impact of raindrops, and when it is removed, the soil becomes more susceptible to erosion. The eroded soil is then transported and deposited by runoff into surface waters, where it can contaminate water and increase its turbidity, effectively blocking sunlight to plant species and negatively affecting the ecosystem.

Groundwater Recharge Areas

Groundwater is the primary drinking and agricultural water source for the residents of New Jersey, and is a major source of drinking water for residents of the Borough of Peapack & Gladstone. Groundwater recharge is the process in which surface water, from lakes, streams, or rainwater runoff, flows or seeps downwards beneath the ground's surface, saturating soils or rocks. Groundwater is contained in porous rocks and sediments. Where such water-holding rocks or unconsolidated materials yield a usable quantity of water, it is called an aquifer, the source from which drinking water is drawn through wells. Protecting the land's capacity to recharge its aquifers, and limiting development to stay within the capacity of local water resources, is critical to maintaining our water supply.

Aquifer-recharge potential was calculated through the combination of a standardized statewide aquifer ranking system and the particular groundwater recharge coverage in Somerset County. Aquifer recharge or recharge to water-bearing geologic units is defined as the groundwater that reaches the water table in the uppermost geologic unit with a thickness of 50 feet or greater. Groundwater recharge potential is ranked by average annual infiltration. *Table 24* depicts the ranking system.

Table 24. Statewide Aquifer Rankings and Somerset County Groundwater Rankings

Aquifer Rank	*Median Well Yield (Gallons/Minute)*	*Groundwater Rank*	*Avg. Annual Infiltration (In/Yr)*
A	>500	A	17-21
B	>250-500	B	12-16
C	>100-250	C	9-11
D	25-100	D	1-8
E	<25	0	0

There are also hydric soils (L/L), wetlands and open water (W/W) and instances where no recharge is calculated (X/X).
Source: NJDEP NJGS

The composite aquifer/groundwater recharge potential rank highlights the multiple relationships between the groundwater-recharge area ranks (indicative of the infiltration rate) and the underlying water-table aquifer ranks (indicative of the aquifer's capacity to absorb, transmit and supply water). The combined ranking provides a guide to how well the system in any given area allows groundwater to reach and recharge the aquifer.

Table 25 and the *Aquifer Recharge Potential* (*Map 11* in the *Maps* section) show the aquifer recharge potential for areas of Peapack & Gladstone based on combining their groundwater and aquifer rankings. The first letter indicates the aquifer yield ranking and the second letter indicates the groundwater recharge ranking in descending order from the greatest combined potential to the least. The areas with the highest recharge potential are those with the lowest ranking number; thus, a ranking of 31 indicates a higher rate of potential recharge than a ranking of 98. The highest ranked aquifers in Peapack & Gladstone (level C) are 54% (2,029 acres) of the Borough. Wetlands and open water (W/W) cover 69 acres (2%) in the Borough.

Table 25. Aquifer Recharge Potential in the Borough of Peapack & Gladstone			
Aquifer/Groundwater Combined Rank	Numeric Rank	Acres	% of Township
C/A	31	785.04	21%
C/B	32	1,159.91	31%
C/D	34	83.78	2%
D/A	41	1,008.40	27%
D/B	42	459.06	12%
D/D	44	33.33	1%
L/L	97	97.79	3%
W/W	98	69.09	2%
	Total:	**3,696.39**	**100%**
Source: NJDEP			

Aquifer Identification

An aquifer is an underground formation of permeable rock or unconsolidated materials that can yield significant quantities of water to wells or springs. The rate of recharge is not the same for all aquifers, and that must be considered when pumping water from a well. Pumping too much water too fast draws down the level of water in the aquifer and eventually causes a well to yield less and less water and potentially run dry.

Aquifers are typically equated to the type of geologic formation in which they exist. Aquifers in New Jersey are classified as either bedrock or surficial. Bedrock aquifers consist of rock formations while surficial aquifers are formed from unconsolidated materials such as sand or gravel or glacial sediment. Bedrock aquifers in the Highlands contain water in fractures within the rock while surficial aquifers contain water primarily in the spaces between sand and gravel particles. All of the Borough of Peapack & Gladstone is serviced by bedrock aquifers. Of those bedrock aquifers, igneous and metamorphic rocks service 43% of the Borough (1,581 acres). Bedrock and surficial aquifers in the Borough of Peapack & Gladstone are shown on the *Bedrock Aquifer Rankings* map *(Map 12)* and detailed in *Table 26*.

Table 26. Bedrock Aquifers in the Borough of Peapack & Gladstone			
Geologic Name	**Rank**	**Acres**	**Percent**
Igneous and metamorphic rocks	D	1,580.47	42.8%
Jacksonburg Limestone, Kittatinny Supergroup, and Hardyston Quarzite	C-B	934.65	25.3%
Brunswick aquifer conglomerate	C	1,181.27	32.0%
	Total:	**3,696.39**	100.0%

Source: NJDEP

Public Water Supply and Wellhead Protection

The 1986 Federal Safe Drinking Water Act Amendments (*Section 1428, P.L. 93-523, 42 USC 300 et. Seq*) direct all states to develop a Well Head Protection Program (WHPP) Plan for both public community (CWS) and public non-community (NCWS) water-supply wells. A component of the WHPP is the delineating of Well Head Protection Areas. This delineation is the first step in defining the sources of water to a public water supply in order to prevent and clean up groundwater contamination.

Well Head Protection Areas (WPAs) are delineated for both public community and non-community wells. The delineations for these wells are the two, five, and twelve-year tiers. Each tier represents the horizontal extent of groundwater captured by a well pumping at a specific rate over those periods of time (NJDEP).

There are no public community wells in the Borough of Peapack & Gladstone, but there are two non-community water supply wells, located near the Matheny School property. The WPA for these wells is shown on the *Wellhead Protection Areas (Public Non-Community)* map (*Map 13*).

Riparian Zones

In order to better protect the public from the hazards of flooding, preserve the quality of surface waters, and protect wildlife and vegetation, the NJDEP has adopted Flood Hazard Area Control Act rules (N.J.A.C. 7:13) in order to incorporate more stringent standards for development in flood hazard areas and riparian zones. A riparian zone is land and vegetation within and adjacent to surface waters.

Activity within the regulated area of the flood hazard area and the riparian zone may be restricted if it includes or results in one or more of the following:

1. The alteration of topography through excavation, grading and/or placement of fill;
2. The clearing, cutting and/or removal of vegetation in a riparian zone;
3. The creation of impervious surface;
4. The storage of unsecured material;
5. The construction, reconstruction and/or enlargement of a structure; and
6. The conversion of a building into a private residence or a public building.

In most areas of New Jersey, Category 1 waters require a 300-foot buffer, while other surface waters, such as those classified as FW2-NT are subject only to a regulated 50-foot riparian zone, measured from the top of the bank, along both sides of all waters. The *Stream and Open Water Buffers* map (*Map 14*) shows the extent of buffers for the water bodies in the Borough of Peapack & Gladstone. All Category One waters have 300 foot buffers. The Non-Category One waters (Trout Production and Trout Maintenance) have 150 foot buffers and the Non-Category One and Non-Trout waters have a 50 foot buffer.

WETLANDS

Wetlands are important natural resources that contribute significantly to an area's social, economic, and environmental health. Among the services they provide are filtration of chemicals, pollutants, and sediments from water; flood control; critical habitat for wildlife; recreation and tourism. The NJDEP defines a freshwater wetland as "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation; provided, however, that the Department, in designating a wetland, shall use the three-parameter approach (that is, hydrology, soils and vegetation) enumerated in the 1989 Federal Manual." (*N.J.A.C. 7:7A)* NJDEP has adopted this manual as the technical basis for identifying and delineating wetlands. The NJDEP regulates virtually all activities in a wetland, including removing vegetation, filling, and placing obstructions. Depending on the environmental value of a particular wetland, there may also be a transition area, or buffer, around the wetland that will require a waiver issued by the NJDEP for any activity within that zone. For example, a wetland containing endangered species habitat would require a 150-foot wide transition area, whereas a small wetland in a ditch might not require any transition area at all. Most freshwater wetlands require a 50-foot transition area. Wetlands in New Jersey are classified into three different values; exceptional resource value, ordinary resource value, or intermediate resource value. The criteria for these classifications are described below.

Exceptional Resource Value Wetland

- Discharges into FW-1 water and FW-2 trout producing waters and their tributaries;
- Is a present habitat for threatened or endangered species; or
- Is a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat.

Ordinary Resource Value Wetland

- A freshwater wetland which does not exhibit any of the characteristics of a Exceptional Resource Value Wetland which is:
- An isolated wetland, as defined at *N.J.A.C. 7:7A-1.4*, which:
- Is smaller than 5,000 square feet; and
- Has the uses listed below covering more than 50% of the area within 50 feet of the wetland boundary. In calculating the area covered by a use, the Department will only consider a use that was legally existing in that location prior to July 1, 1988, or was permitted under this chapter since that date:

- Lawns
- Maintained landscaping
- Impervious surfaces
- Active railroad rights-of-way
- Graveled or stoned parking/storage areas and roads
- A drainage ditch
- A swale or
- A detention facility created by humans in an area that was upland at the time the facility was created regardless of the wetland resource classification of the wetland under these rules, or the classification of the body of water, as FW-1 or FW-2 trout production, to which it discharges.

Intermediate Resource Value Wetland

- A freshwater wetland of intermediate resource value is any wetland not defined as exceptional or ordinary.

According to the NJDEP 2007 Land Use/Land Cover data, there are 62 acres of wetlands within the Borough of Peapack & Gladstone, occupying 1.6% of the Borough. The large majority of these wetlands are located along either the Peapack Brook or the North Branch of the Raritan River. The *Wetlands* map *(Map 15)* shows the locations of all wetlands in the Borough. *Table 27* presents a summary of wetlands by type. The dominant type of wetland in the Borough is deciduous wooded wetlands, comprising 60% of the Borough's wetlands. Though this information is based on NJDEP mapped wetlands, unmapped wetlands, which are still subject to NJDEP regulation, may exist. Wetlands would require a professional delineation before a regulated activity could occur in or around these previously unmapped wetlands.

Table 27. Wetlands in the Borough of Peapack & Gladstone

Type	Acres	Percent
Deciduous Wooded Wetlands	37.36	60.1%
Herbaceous Wetlands	10.67	17.2%
Deciduous Scrub/Shrub Wetlands	7.07	11.4%
Agricultural Wetlands (Modified)	5.99	9.6%
Managed Wetland In Built-Up Maintained Rec Area	0.74	1.2%
Wetland Rights-Of-Way	0.28	0.4%
Total:	**62.11**	**100.0%**

Source: NJDEP

VEGETATION

Since 1986, the NJDEP has mapped land use within the state through their Land Use/Land Cover (LU/LC) data sets. Areas are delineated using color infrared images. The latest update of this data occurred in 2007. The NJDEP also maps critical habitat for imperiled and priority species through the Landscape Project, which is a pro-active, ecosystem-level approach to the long-term protection of these habitats, rare plant species, and ecological communities through the Natural Heritage Database.

Land Cover

The NJDEP identifies six LU/LC categories: agriculture, barren land, forest, urban, water, and wetlands. Forested area represents 42% of the Borough of Peapack & Gladstone land cover, providing critical habitat for wildlife. Agricultural land covers another 23% of the Borough. Urban land, which is land that has been developed for residential or commercial use, covers 32% of the Borough, while wetlands account for 2%. Land covered by water, including Ravine Lake stands at about 1% of the area of the Borough. Together, wetlands and streams provide riparian corridors providing a different, yet critical type of habitat for certain wildlife species, which are often protected by forested open space.

Table 28 shows the percentage of the Borough covered by each land cover type and the *Land Use/Land Cover* map shows their distribution throughout the Borough. *(Map 16)*

Table 28. Land Cover Type in the Borough of Peapack & Gladstone

Type	Acres	Percent
Forest	1,561.15	42.2%
Urban	1,176.65	31.8%
Agriculture	838.51	22.7%
Wetlands	62.11	1.7%
Water	51.70	1.4%
Barren Land	6.26	0.2%
Total:	**3,696.39**	**100.0%**

Source: NJDEP

Forest Types

According to the 2007 LULC data, 1,561 acres, or 42% of the Borough, is classified as forested, with 50% of those forested areas classified as deciduous forest with greater than 50% crown closure. The second most prevalent category is deciduous forest with 10-50% crown closure, followed by various types of mixed shrub and brush land. There are also sizable amounts of both coniferous and mixed forests, varying in size. (*Table 29*)

Table 29. Forest Types in the Borough of Peapack & Gladstone		
Forest Type	**Acres**	**Percent**
Deciduous Forest (>50% Crown Closure)	772.13	49.5%
Deciduous Forest (10-50% Crown Closure)	277.48	17.8%
Mixed Deciduous/Coniferous Brush/Shrubland	161.60	10.4%
Coniferous Brush/Shrubland	79.38	5.1%
Old Field (< 25% Brush Covered)	55.53	3.6%
Coniferous Forest (>50% Crown Closure)	49.29	3.2%
Mixed Forest (>50% Deciduous With >50% Crown Closure)	48.66	3.1%
Deciduous Brush/Shrubland	36.38	2.3%
Mixed Forest (>50% Coniferous With >50% Crown Closure)	33.74	2.2%
Mixed Forest (>50% Coniferous With 10-50% Crown Closure)	18.91	1.2%
Mixed Forest (>50% Deciduous With 10-50% Crown Closure)	12.81	0.8%
Coniferous Forest (10-50% Crown Closure)	9.81	0.6%
Plantation	5.41	0.3%
Total:	**1,561.15**	100.0%

Source: NJDEP

The following definitions set the classification parameters for the forest types:

Deciduous – This category includes forested lands that contain deciduous tree species. Deciduous trees are those species which lose their leaves at the end of the growing season. These trees remain leafless throughout the winter and sprout new leaves the following spring. The average height of the stand is at least 20 feet. A forest stand must have at least 75% canopy coverage from deciduous tree species to be placed in this category.

Deciduous > 50% Crown Closure
This category contains deciduous stands with crown closures greater than 50%. Crown closure is the percentage of a forest area occupied by the vertical projections of tree crowns. Crown closure percentages provide a reasonable estimate of stand density. The majority of the deciduous forests in New Jersey are in this category.

Deciduous, 10-50% Crown Closure
This category contains deciduous forest stands that have crown closure greater than 10%, but less than 50%.

Coniferous – This category includes forested lands that contain coniferous tree species. Coniferous species are those trees commonly known as evergreens. They do not lose their leaves (needless) at the end of the growing season but retain them through the year. Conifers can easily be distinguished from deciduous trees on wintertime color infrared photography because of their high infrared reflectance due to their leaf retention. The stand must be 20 feet high and must be stocked by at least 75% conifers to be labeled as a coniferous stand.

Coniferous, 10-50% Crown Closure
This category contains natural coniferous stands with crown closure > 10%, but less than 50%.

Mixed - When neither coniferous nor deciduous represents 75% or more of the forested area, it is classified as mixed forest. This category is further broken down according to which species is 50% or greater prevalent, coniferous or deciduous, and the extent of crown closure. Mixed forest of all types represents a very low percentage of the Borough of Peapack & Gladstone's land area.

Brush/Shrubland - When the vegetation is less than 20 feet high, the area is categorized as brush/shrubland. The following types have been identified in the Borough of Peapack & Gladstone:

Deciduous Brush/Shrubland
(>25% Brush Covered with Deciduous Species Predominant > 75%)
This category contains natural forested areas with deciduous species less than 20 feet in height. An area must have greater than 25% brush cover to be placed in this category. This category also contains inactive agricultural areas that have been grown over with brush.

There are photographic signature differences between brushland and the pole or saw-timber stage trees (Categories 4100, 4200, 4300). Besides the obvious height difference visible on stereo viewing, larger trees display much larger crown diameters than brushland areas.

Coniferous Brush/Shrubland
This category contains natural forested areas with coniferous species less than 20 feet high. This category is for natural areas; therefore, Christmas tree farms should be placed in the Nursery category (223).

Mixed Deciduous/Coniferous Brush/Shrubland
(>25% Brush Covered with Mixture of Deciduous Coniferous Species <75% of 1 Type)
This category contains natural forested areas less than 20 feet in height with a mixture of coniferous and deciduous trees.

Old Field (<25% Brush Covered)
This category includes open areas that have less than 25% brush cover. The predominant cover types are grasses, herbaceous species, tree seedlings and/or saplings. Old fields are distinguished from inactive farmland (2130) by the amount of brush cover. If a field contains few woody stems (<5%), it should be placed in the inactive farmland category. An area should be placed in the Old Field category if the amount of brush cover requires extensive brush removal before plowing. In some cases, it may not be established that the previous use was agricultural.

Plantation - This category contains conifer stands that have been artificially planted. These include stands planted for timber harvesting or aesthetics. Crown closure estimates will not be determined for plantations. Plantations appear as uniform blocks (usually rectangular) of conifers.

Other planted stands of conifers, such as Christmas tree farms, will not be included in this category but in the nursery category under Agriculture.

Vegetation

The State of New Jersey is home to a wide range of different ecosystems, some large and dominating, others less pronounced and more vulnerable to development. The NJDEP's New Jersey Natural Heritage Program identifies and maps areas that are considered unique ecosystems; these are known as Natural Heritage Priority Sites.At this time, no Natural Heritage Priority sites have been identified within Peapack & Gladstone.

In addition, the Natural Heritage Program maintains a database of rare and endangered plant species and ecological communities reported throughout New Jersey. A list of species recorded for Somerset County as of July 2008 is included in the *Appendices* of this *ERI Update*. A number of the species are ranked by the state as endangered and/or imperiled because of extreme rarity often due to habitat destruction. For a fee the Natural Heritage Program offers to search the database for records of rare or endangered species and natural communities on or near a site that is being considered for development or other modification. The Natural Heritage Program "provides the information in order to assist the requestor in preserving habitat for rare and endangered species and natural communities." (*NJDEP*)

WILDLIFE

Critical Habitat

Much of the Borough of Peapack & Gladstone is currently or may be able to provide habitat that is suitable for both federally and state listed threatened or endangered species. The Landscape Project (*Version 3.1 2012*) ranks patches of habitat using a numeric system (0 through 5), for the purpose of identifying habitat which may be suitable for threatened and endangered species. Habitat identified as Ranks 3 through 5 are considered environmentally significant by the NJDEP. The following is a description of each rank.

Rank 5 is assigned to species-specific patches containing one or more occurrences of wildlife listed as endangered and threatened pursuant to the Federal Endangered Species Act of 1973.

Rank 4 is assigned to species-specific patches with one or more occurrences of State endangered species.

Rank 3 is assigned to species-specific patches containing one or more occurrences of State threatened species.

Rank 2 is assigned to species-specific patches containing one or more occurrences of species considered to be species of special concern (this rank represents "rare species" of wildlife as defined in the *Highlands Water Protection and Planning Act* rules).

Rank 1 is assigned to species-specific patches that meet habitat-specific suitability requirements such as minimum size criteria for endangered, threatened or priority wildlife species, but that do not intersect with any confirmed occurrences of such species.

Rank 0 is assigned to species-specific patches that do not contain any species occurrences and do not meet any habitat-specific suitability requirements.

According to the *NJDEP Landscape Project* the Borough contains habitat patches of all ranks. The majority of the Borough (44%) has been identified as Rank 5, federal endangered species habitat, covering the eastern and northern sections of the Borough. There is also a large concentration of Rank 0, or no listed species habitat, at 33%, in the middle portion of the Borough. Patches of Ranks 1, 2, and 3 make up roughly equal portions of the Borough (9%, 7%, and 6%, respectively), with Rank 4 covering an extremely small portion of the Borough. The Rank 1 patches are located predominantly along the Peapack Brook, while Ranks 2 and 3 are found in the southwestern end of the Borough.

Table 30 presents a summary of habitat patches within the Borough and the *Patches of Endangered Species Habitats Identified by the Landscape Project 2012* map *(Map 17)* illustrates their distribution within the Borough.

Table 30. Critical Species Habitat in the Borough of Peapack & Gladstone		
Rank	**Acres**	**Percent**
0	1,225.98	33.2%
1	332.55	9.0%
2	273.21	7.4%
3	234.57	6.3%
4	2.44	0.1%
5	1,627.65	44.0%
Total:	**3,696.39**	**100.0%**

Source: NJDEP

Threatened and Endangered Species

The Borough of Peapack & Gladstone is home to a variety of wildlife including endangered and threatened species listed on both state and federal registers. The Indiana Bat, a federally listed endangered species, occupies the Borough's forests, caves and mines during its hibernation season (October through April). There is also the presence of the Bog Turtle, the other federally endangered species found in the Borough. There are two state listed endangered species that inhabit the Borough, those being the Red-Shouldered Hawk and the Bobcat. There are also three state threatened species, the Savannah Sparrow, Wood Turtle, and Barred Owl.

The Borough also serves as the home to seven other species, considered by the NJDEP as species of special concern. A full list of all species listed by the NJDEP Landscape Project can be found in *Table 31*.

Table 31. Threatened and Endangered Species in the Borough of Peapack & Gladstone				
Common Name	**Scientific Name**	**Class**	**Status**	**Landscape Project Rank**
Veery	*Catharus fuscescens*	Aves	Special Concern	2
Great Blue Heron	*Ardea herodias*	Aves	Special Concern	2
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Aves	Special Concern	2
Wood Thrush	*Hylocichla mustelina*	Aves	Special Concern	2
Cooper's Hawk	*Accipiter cooperii*	Aves	Special Concern	2
Eastern Box Turtle	*Terrapene carolina carolina*	Reptilia	Special Concern	2
Eastern Meadowlark	*Sturnella magna*	Aves	Special Concern	2
Savannah Sparrow	*Passerculus sandwichensis*	Aves	State Threatened	3
Wood Turtle	*Glyptemys insculpta*	Reptilia	State Threatened	3
Barred Owl	*Strix varia*	Aves	State Threatened	3
Bobcat	*Lynx rufus*	Mammalia	State Endangered	4

Table 31. Threatened and Endangered Species in the Borough of Peapack & Gladstone				
Common Name	**Scientific Name**	**Class**	**Status**	**Landscape Project Rank**
Red-shouldered Hawk	*Buteo lineatus*	Aves	State Endangered	4
Indiana Bat	*Myotis sodalis*	Mammalia	Federally Listed Endangered	5
Bog Turtle	*Glyptemys muhlenbergii*	Reptilia	Federally Listed Threatened	5

Source: NJDEP

LAND USE

The Borough of Peapack & Gladstone is a rural, residential community with much of its land, approximately 42%, identified as forest (NJDEP Land Use/Land Cover) and 32% identified as developed land (see *Table 28* on *page 56* for a breakdown of land cover types in the municipality).

In 2011 the Borough of Peapack & Gladstone completed an update to its *Open Space and Recreation Plan*. A detailed analysis of the 2011 tax assessor database on land use was completed and results are shown in *Table 32*. Farmland in the Borough includes farm assessed land that is tilled (agricultural per the NJDEP data) and forested. Preserved land also includes forested and agricultural land. The Borough has a very successful open space program and has preserved 25% of the municipal land base (*Public Lands, Preserved Lands, and Recreation* map*, Map 18*).

Table 32. Summary of Land Use in the Borough of Peapack & Gladstone

Land Use	Acres	Percent
Farmland	1,284.44	43%
Preserved	746.18	25%
Residential (>2 acres)	554.89	19%
Commercial (>2 acres)	146.52	5%
Public	118.12	4%
Schools, Charitable	77.89	3%
Undeveloped Land	63.38	2%
Total:	**2,991.42**[2]	**100%**

Source: Borough of Peapack & Gladstone Open Space and Recreation Plan Update (2011)

[2] The Open Space and Recreation Plan Update utilized a subset of the tax assessment data using the ArcGIS mapping. Acreages may vary from the ERI Update analysis.

HISTORIC AND CULTURAL FEATURES

History

A *Historic Preservation Plan Element* was part of the 1996 *Master Plan*. This element gave a brief overview of the history of Peapack & Gladstone, which is summarized below.

The first known inhabitants of this area were Native Americans known as Lenni-Lenape, part of the Iroquois nation, classified as Algonquin. According to John Smith, Chair of the Historic Preservation Commission, they lived here for almost 10,000 years before white settlers came. The next to settle here were farmers, who generally purchased land either from the Lenni-Lenape or from the holders of the Peapack Patent. This patent, which had been purchased from the Dutch in 1701, covered a large tract of land that included the present-day Townships of Bedminster and Bernards. The earliest deed reference for land purchased in the Borough is from 1708. According to Smith, by 1808 the village contained four houses and the Jeroleman and Van Doren Mills. By 1880 there were a hotel, two grist mills, a post office, two churches, four stores, three blacksmith shops, three wheelwrights, a distiller and several lime kilns.

Peapack was originally part of Bedminster Township (incorporated in 1749). In the 1890s, the residents of northern Peapack incorporated as the separate village of Gladstone in order to have their own post office. In 1912, the two villages seceded from Bedminster Township and incorporated as the Borough of Peapack & Gladstone.

One of the major support industries in Peapack for some time was the quarrying and processing of lime. Lime burning began in Peapack as early as 1794 but became a more extensive industry by 1830. Lime kilns processed lime for agricultural purposes and as an ingredient for making mortar. A historic marker denotes the site of a double lime kiln on Main Street.

By the last decade of the 1800s, two railroad lines served Peapack & Gladstone. The line still operating today was completed in 1890 as an extension of the existing line between Bernardsville and Hoboken. Originally known as the Passaic Valley & Peapack Railroad, it was sold to the Delaware Lackawanna & Western and eventually became part of the NJ Transit system. Both the line between Summit and Gladstone and the Gladstone station have been proposed for state and national register listing. The station was added to both registers in 1984.

The other line, the Rockaway Valley Railroad, ran between Whitehouse and Morristown through the northwestern portion of the Borough beginning around 1888. Peach freight made up the bulk of the rail line's business, although it also carried lime, coal and passengers. Rockabye Meadow, now public open space in the Borough, is named eponymously for the nickname given this line due to its unsteady ride over high terrain and steep grade: "Rock-a-Bye Baby." The line ceased operation around 1913.

The availability of rail service made the scenic Peapack & Gladstone region attractive to wealthy New Yorkers. Four large ***estates*** with holdings in Peapack & Gladstone were:

- Blairsden, originally a 423-acre estate extending from Main Street to Ravine Lake on the North Branch of the Raritan River and crowned by a 38-room Louis XIII-style mansion built by New York financier Clinton Ledyard Blair in 1903. After Blair's death in 1949, the land was divided up.

    - The property at the south end of Ravine Lake now owned by the Somerset Lake and Game Club contains the original entrance to the estate from Lake Road.

    - Dower Farm, a 30-acre farm preserved in 2010, was formed from a portion of the estate, including the landmark Blairsden rear entrance gate on Main Street in Peapack.

    - A portion of the property fronting Highland Avenue became property of the Matheny Medical and Educational Center.

    - The hilltop acres containing the mansion were bought by the Sisters of St. John the Baptist in 1950 and sold to The Foundation for Classical Architecture in 2002, which was said to be restoring the mansion and grounds. In 2012, ownership transferred to Blairsden Hall, LLC .

  More information on historic Blairsden is available from The Historical Society of Somerset Hills (*http://www.historicalsocietyofsomersethills.org/blairsden.php*)

- *Hamilton Farm*, created by New York financier James Cox Brady beginning in 1911 once totaled 5,000 acres and covered portions of three counties. The ornate stable, constructed of brick, concrete and steel, tile walls, terrazzo floors and brass fittings; became the permanent home of the U.S. Equestrian Team in 1961, and in 1978 the Georgian mansion (rebuilt in 1921) and surrounding land was purchased from the Brady family use as a corporate conference center. Today it is home to the private Hamilton Farm Golf Club.

- *Hillandale* was created in 1906 by a wealthy local businessman, George Mosle, who built the western portion of Mosle Road as a private driveway to Mosle Manor. The Sisters of St. John the Baptist purchased the estate in 1926 for use as a convent, orphanage; school and summer camp. In 2008 the Sisters sold the back two-thirds of the property to a consortium of public/nonprofit partners to be used as Mendham Township parkland now open to the public as the 120-acre Mosle Preserve. The remaining acreage, including the estate and school buildings, is still owned by the Sisters, with a portion located in Peapack & Gladstone.

- *Natirar* (see *Historic Districts* section below)

The book *A Journey Through Peapack and Gladstone,* by Jacqueline Tutton (c. 1993), the *Somerset County Cultural Resource Survey* (1989) and other historical publications are available at the Peapack & Gladstone Library.

Historic and Cultural Sites

Maintaining the rural character of Peapack & Gladstone is important to its residents, and this especially true for the village area. This is recognized in the zoning of this central area of town as Village Neighborhood (VN), by the suggestion of creating a village greenbelt, which has carried through several re-examinations of the *Master Plan*, and by a historic walking/driving tour mapped by Historic Preservation Commission Chair John Smith. The route of this walking tour is indicated on the *Greenway* map in the *Open Space and Recreation Plan Update – 2011*. In addition, several areas in Peapack & Gladstone have been proposed as historic districts, several of the estate mansions remain, archeological sites have been identified, and at least one working farm has been preserved.

Historic Properties.

The 1989 *Somerset County Cultural Resources Survey* listed 25 sites in the Borough of Peapack & Gladstone the County considered eligible for the National Register of Historic Places and located them on an Historic Sites Inventory map. The map and list, excerpted from the 1996 *Master Plan*, are included in this *ERI Update* as *Appendix 2 and Appendix 3)*. The list included several private residences, including Natirar (at the time owned by the King of Morocco), the mansion at Blairsden, a horse farm, a farmhouse, a bridge and two lime kilns. Most are concentrated in the village area of the Borough, but the horse farm is located on Holland Road. One residence and Smith Bridge are located along Branch Road, and the North Branch of the Raritan River, while Blairsden and Natirar occupy lands east and south of the village.

The *Historic Map & Walking Tour of Peapack & Gladstone Circa 1938* compiled by John C. Smith, Chair of the Historic Preservation Commission, in 2006 focuses on the village area of Peapack & Gladstone. The map (too large to include in this *ERI Update*) identifies many historic locations, including a mill race from the 1850s and several lime kilns, and provides brief descriptions and photos for 26 of the sites:

1. The Rockaway Valley Railroad (1890-1913) (see *History* above); today Rockabye Meadow Preserve eponymously bears the railroad's nickname

2. Stone Arch Bridge on Jackson Avenue, circa 1858 (replaced)

3. William Van Doren House, ca. 1814, SW corner of Main Street and Jackson Ave. (private residence)

4. Blacksmith Shop, 1836; this stone structure was combined with an adjacent building in 1972 (private residence)

5. Andrew Rarick Farmhouse, ca. 1840 / Gladstone Hotel ca. 1930, Pottersville Road and Main Street; now the Gladstone Tavern

6. **Gladstone Train Station**, ca. 1890-91; Main Street; ***on the national and state registers of historic places:*** NR 6/22/1984; SR 3/17/1984; the entire Gladstone branch line is also listed on the state register with SHPO opinion of eligibility (1978)

7. Tiger Family Stone Barn, 1829, across from train station

8. Garner F. Hill Feed Mill, 1910, adjacent to the railroad line (destroyed by fire in 1979)

9. The Boy Scout Cabin, 1934, Park Avenue; log cabin built with WPA funds sits on Borough-owned property across Park Avenue from the pond at Liberty Park

10. Liberty Park, 1920; established to honor war veterans. Includes several memorial markers (swimming in the pond was discontinued in the late 1930s because of pollution from development)

11. Lowrance Mill & Homestead, ca. 1670-1721; the oldest known structure in the Borough; original extent of property included a mill race and mill pond;

12. The Howard House, circa 1902/The Peapack Hotel, corner of Main and Holland Avenue; now the site of low-moderate income apartments.

13. Essex Hunt Club and Fox Hounds, 1913, between U.S. 206 and Fowler Road; now two private clubs: the Essex Fox Hounds, which runs hunts, and the Essex Hunt Club, a recreational club.

14. Union Cemetery, 1875, Mendham Road near Church Street; many graves were moved from other cemeteries to this spot.

15. United Methodist Church of Gladstone, 1839, Church Street and Jackson Avenue; originally built to face south, it was turned in 1860 to face due west.

16. Hillandale Estate and Mosle Parkway, 1906. Mosle Road/St. John's Drive; (see *Estates* above)

17. Peapack Reformed [Dutch] Church, 1848, 224 Main Street; after a fire destroyed the original structure the present structure replaced it in 1874.

18. Ellis Tiger Hardware Store, 1905, Mendham Road and Main Street; owner of a lumber yard along the railroad tracks in 1893, Tiger built the hardware store in 1905, then carved out a corner of it for the first branch of the Peapack & Gladstone bank, of which he was co-founder. It is now known as the Conover Corners Building.

19. St. Luke's Episcopal Church, 1905, 182 Main Street; notable ivy-covered façade.

20. St. Brigid Roman Catholic Church, 1938, 129 Main Street; inspired by the 16th-century stone churches of Ireland.

21. Perry-Todd Quarry. East of Main Street. Limestone quarry operational from 1749 through the 1950s.

22. Main Street Lime Kiln. The stonework of a double kiln is still visible on Main street north of Highland Avenue. (see *Lime Kiln*s section below)

23. Blairsden Estate, c. 1903. Highland Avenue (see *Estates* above); SHPO Opinion 8/8/2000; COE: 6/14/1993

24. Jeroleman Family Cemetery, Northeast corner of Highland Avenue and Main Street; private cemetery for family who settled in the area in 1808 and operated the mill across the street

25. Ludlow Meat Market Barn, c. 1870, razed in 1990

26. Maple Cottage and The Ladd Estate (see *Natirar Estate Historic District* below), c. 1895; cottage no longer stands, but served as the first location of the Kate Macy Ladd Convalescent Home

Historic Districts

The following have been proposed as historic districts:

Peapack Brook Rural Industrial Historic District. This district is predominantly in Bedminster Township between Old Dutch and Peapack Roads. The State Historic Preservation Office (SHPO) issued an Opinion of Eligibility in 1997. The historical marker reads:

> "The confluence of the Peapack Brook and the North Branch of the Raritan River became a rural industrial center during the 18th century, when a saw mill, grist mill, tannery, and bark mill were located nearby. The Peapack Brook Rural Industrial Historic District includes five houses, several farm outbuildings and mill structures that reflect the industrial and agricultural development of the area, ca. 1750-1900."

Natirar Estate Historic District. This district, which encompasses lands in Peapack, Far Hills and Bedminster Township is located along CR 512. The State Historic Preservation Office issued a Certificate of Eligibility (COE) in 2002. The country estate of Walter and Kate Macy Ladd beginning in 1905, subsequently owned by the King of Morocco, Natirar is now the property of the Somerset County Park Commission. The SHPO issued a Certificate of Eligibility (COE) 10/25/2002

The portion of Natirar in Bedminster Township overlays the Peapack Brook Rural Industrial Historic District and includes a grist mill, two cottages, a corn crib and a frame barn, among other buildings. It is currently closed to the public but restoration work is under way and a community garden may be located there.

The portion of Natirar in Peapack & Gladstone encompasses the main estate buildings, including the 40-room Ladd mansion, the grey barn complex, gatehouse and several other buildings. The mansion, once home to the Kate Macy Ladd convalescent center for women, stables and the surrounding 90 acres is now leased to a resort developer. The resort area also includes the 90 Acres Culinary Center, located in the Carriage House and Garage, and a farm. The County park area includes the grey barn complex, the gatehouse and acres of open land in both Peapack & Gladstone and Far Hills that provide an expansive and bucolic venue for public enjoyment along the North Branch of the Raritan River.

More information on Natirar is available on the Somerset County Park Commission website (*https://somersetcountyparks.org/parksFacilities/natirar/Natirar.html*)

As a result of the *Somerset County Cultural Resources Survey*, the following two districts were recommended by the Somerset County Cultural & Heritage Commission as proposed historic districts eligible for the National Register. (See the SCC&HC Proposed Historic Districts map, *Appendix 4,* and more detailed descriptions in the 1996 Master Plan Historic Preservation Plan Element.)

Peapack-Gladstone Historic District (Proposed). This district encompasses the village areas of Gladstone and Peapack from Church Street south to Railroad Avenue. Buildings date from the early 1700s to the late 1930s, with many from the 19th century.

Pleasant Valley (O-Wan-O-Massie) Historic District (Proposed). This district encompasses lands on both banks of the North Branch of the Raritan above Ravine Lake, including portions of properties along Branch Road in Peapack & Gladstone. It is rural in nature with meadows, woodlands, rural vistas, houses from the 18th and 19th centuries and outbuildings from the 19th and early 20th centuries.

Archeological Grids

According to the NJDEP *Archaeological Site Grid of New Jersey*, *Edition 2010*, three archeological cells are sited partially in Peapack & Gladstone. One straddles the North Branch of the Raritan River in the vicinity of the eastern portion of Natirar. The other two stretch from just west of U.S. 206 through the southern portion of Natirar. Each cell in the archeological grid is approximately ½ mile square. The grid protects the location of specific sites from destruction and vandalism while "alerting users of this data to the potential presence of archaeological resources in their area of interest." *(NJ Historic Preservation Office)*

The *Historic Map & Walking Tour of Peapack & Gladstone Circa 1938* compiled by John Smith, HPC Chair, denotes the lime kiln locations as archeological sites.

Bridges

- CR 512 Bridge over NJ Transit Gladstone Branch, MP 40.24; SHPO Opinion: 10/20/2010 (NJDEP HPO)
- North Branch Raritan River Bridge, NJ Transit Gladstone Branch over North Branch Raritan River, MP 40.21; SHPO Opinions: 1999 and 1997. Demolished (NJDEP HPO)
- Peapack Brook Bridge, NJ Transit Gladstone Line, MP 40.82 over Peapack Brook; SHPO Opinion 2/3/1999 (NJDEP HPO)
- Peapack Brook Bridge, NJ Transit Gladstone Line, MP 41.99 over Peapack Brook; SHPO Opinion 2/3/1999 9 (NJDEP HPO)
- Metal Truss Bridge over North Branch Raritan River, off Branch Road in the proposed Pleasant Valley Historic District (SCCRS; see Historic Sites Inventory map in *Appendix*)

Caves, Quarries and Lime Kilns

Caves and Quarries. A NJDEP publication, *Caves of New Jersey*, *Bulletin 70,* published in 1976 reported that four caves had been identified in the Peapack & Gladstone area, all associated with the Todd-Perry-Ferrante Quarry and all now closed. The first, thought to be perhaps the largest cave in New Jersey, was entered in 1901 by workmen at the quarry. The entrance has since been closed up and the location is now uncertain. Two more, one known to have contained snow-white flowstone, stalactites and reddish-brown draperies, were "quarried away." The fourth, discovered in 1958 and containing at least two fairly large rooms, was closed at the time the bulletin was published. The quarry was situated in Leithsville Formation carbonate rock area (see the *Bedrock Geology* section and the *Carbonate Rock* map within this *ERI Update*).

Lime Kilns. The lime kilns were used to process lime used for agricultural purposes and in making mortar. According to John Smith, Chair of the Historic Preservation Commission, by 1880 there were six perpetual lime kilns and nine "small hearth type" set kilns. On the *Historic Map & Walking Tour* he compiled of Peapack & Gladstone circa 1983, two lime kiln locations are sited on the east side of Main Street. A third is referenced by the Somerset County survey as located on the "west side of Peapack Creek [Brook] 0.1 mile west of 125 Main Street."

The stonework of the Main Street Kiln double kiln is still visible on the east side of Main Street north of Highland Avenue. A historical marker identifies it as Peapack-Gladstone Lime Kiln Park and indicates it was the site of "lime burning" operations 1749-1945. The property is now owned by The Historical Society of The Somerset Hills.

Scenic Corridors & Roadways

The 1992 *Somerset County Scenic Corridor and Roadway Study* proposed the designation of CR 512 as a scenic roadway and CR 647 and 671 as scenic corridors. *Making Connections*, the Somerset County 2011 Circulation Plan update, references this study, indicating that:

> "To preserve the rustic and scenic character of the County's Scenic Byways, all road construction and maintenance operations along scenic corridors should follow context sensitive design guidelines. This includes a reduced roadway width, as stipulated in the County's design standard for scenic roadways, and signage, striping, landscaping, etc. that do not detract from the historic, scenic, and natural character or aesthetics."

These roadways were mapped in the 1996 *Master Plan Historic Preservation Element* along with the following locally designated scenic roads:

- Mosle Road
- Willow Avenue
- Branch Road
- Fowler Road
- Holland Road

PUBLIC INFRASTRUCTURE

The public infrastructure of a municipality includes services such as local and regional roads and highways, mass transit opportunities and public sewer and water supply. Development potential in a municipality is often controlled not only but its zoning regulations but by its infrastructure's ability to support growth. A snapshot of a municipality's public infrastructure can help a municipality assess whether its goals and objectives for quality of life and sustainable growth are being achieved.

Transportation

Roadways

According to Peapack & Gladstone's 1996 *Master Plan Circulation Plan Element* and Somerset County's 2011 Circulation Plan Update, *Making Connections,* the Borough's road system can be broken down into the following classifications:

Major Arterial (carries large volumes of traffic at relative high speeds and may connect to the interstate highway network):

- U.S. 206: traverses the western portion of the Borough in a south to northwest direction entering at the Bedminster border (a few miles north of the junction of I-287 and I-78 in Bedminster) and exiting the Borough at the Pottersville Road intersection. *Making Connections* indicates that most of U.S. 206 in the Borough is very or severely congested.

Major Collector (provides bi-directional connection between local streets and the arterial system; connects residential developments with adjacent land uses):

- County Route (CR) 512 (Pottersville Road; Main Street): enters Peapack & Gladstone in the northwest corner as Pottersville Road and trends southeast to connect with Main Street, from which point it travels south into Far Hills Borough where it intersects U.S. 202.

Minor Collectors (provide bi-directional connection between local streets and the arterial system at lower volumes; connect residential developments with adjacent land uses, with or without the collector function):

- CR 647 (Mendham Road): travels south from the border with Chester Township to connect with CR 512 (Main Street).
- CR 661 (Holland Avenue): travels southwest/northeast between U.S. 206 and CR 512 (Main Street)
- CR 671 (Old Chester Road/Main Street): travels south from the border with Chester Township to intersect with CR 512 (Pottersville Road/Main Street).

- CR 628 (Jackson Avenue): a short 0.14 mile portion of Jackson Avenue that runs between CR 512 at the Pottersville Road/Main Street intersection and CR 647 (Mendham Road).

Local roads. The remaining roads in Peapack & Gladstone are classified as local roads. Many of these serve residential neighborhoods, but several roads travel eastward from Main Street, connecting the Borough with Mendham Township, Far Hills Borough and Bernardsville Borough (Mosle Road, Willow Avenue, Branch Road). To the west of U.S. 206, unimproved Fowler Road forms the border with Bedminster Township, traveling south from Pottersville Road to end at Holland Road, which heads eastward to connect with U.S. 206 in the southwest corner of the Borough.

In 1992, the *Somerset County Scenic Corridor and Roadway Study* proposed the designation of CR 512 as a scenic roadway and CR 647 and 671 as scenic corridors. *Making Connections* references this study, indicating that:

> "To preserve the rustic and scenic character of the County's Scenic Byways, all road construction and maintenance operations along scenic corridors should follow context sensitive design guidelines. This includes a reduced roadway width, as stipulated in the County's design standard for scenic roadways, and signage, striping, landscaping, etc. that do not detract from the historic, scenic, and natural character or aesthetics."

Mass Transit

Train. Daily passenger rail service is available on NJ Transit via the Morris & Essex Line Gladstone Branch. The line operates between Gladstone and New York Penn Station or Hoboken, with opportunities to change at Summit, Newark Broad Street and Secaucus Junction to other NJ Transit lines for service to other destinations, including Newark Liberty International Airport. Two stations are located within the Borough: one in Gladstone, which is the terminus of the branch, and one in Peapack. *(NJ Transit)*

At the Gladstone station, located on Main Street near Pottersville Road, there are four no-fee parking lots, with parking for 186 standard and 6 accessible spaces. Bicycle racks are available.

At the Peapack station, located on Holland Avenue between U.S. 206 and Main Street, there are two no-fee parking areas with a total of 54 spaces. Bicycle racks are available.

Bus. *Making Connections* indicates that NJ Transit does not provide bus service to the northern portion of Somerset County, and County shuttles have limited frequency. The Plan recommends adding bus service along the U.S. 206 corridor.

The closest bus service for Peapack residents is provided by Lakeland Bus Lines, which has weekday Route 78 service to the Port Authority Bus Terminal in New York City. The closest stop is at the Far Hills train station, although there are stops in Bedminster and Bernardsville as well.

Para-transit. Somerset County offers on demand curb to curb para-transit service for seniors (60 and older) and persons with disabilities (18 and older) who have no other

means of transportation, weekdays from 6 a.m. to 5:30 p.m. for transportation for medical and employment purposes and to and from senior centers. *(Somerset County)*

Peapack & Gladstone Borough offers transportation to seniors (55 and over) and disabled residents for shopping and medical needs. Normal operating schedule is Tuesday through Thursday. *(Peapack & Gladstone Borough Clerk)*

Bicycle & Pedestrian

Bicycle. *Making Connections* identifies 10 miles of dedicated bicycle lanes on the County roadway network, but none are in Peapack & Gladstone. Further, *Making Connections* notes that many of the 500 and 600 level County roadways are bicycle compatible and has mapped its analysis of which roads are compatible. In Peapack & Gladstone, Holland Avenue and Pottersville Road and the section of Main Street between the two train stations are considered bicycle compatible. Old Chester Road, Mendham Road and the section of Main Street below the Peapack train station are identified as non-bicycle compatible. Fortunately, several of the bicycle-compatible roadways are located where they can help link residents to municipal amenities and resources, such as parks and open space, transit facilities, libraries and other municipal facilities and eateries and other commercial businesses. *(Making Connections)*

Making Connections also notes that rural landscapes, such as along sections of Mosle, Branch, Willow and Fowler Roads, all local roads, provide opportunities for recreational cycling. The Peapack & Gladstone *Open Space and Recreation Plan Update – 2011* includes mapping of potential bicycle routes in the Borough.

Pedestrian. *Making Connections* indicates that there are sidewalks or paved paths along 27% of the County routes in Peapack & Gladstone. These are concentrated in the center of the Borough, along Jackson, Main, and Mendham roads and along Holland Avenue from Main Street to the Peapack train station. In addition, the *Greenway* map in the 2011 *Open Space and Recreation Plan Update* maps existing sidewalks or paved paths along Brook Hollow Road, Meadowbrook Road, the portion of Old Chester Road up to Meadowbrook Road, Brookside Drive and Church Street. Dewey Avenue, a local road, also has sidewalks.

This network of sidewalks offers pedestrian connectivity in the portion of the Borough where most community facilities are located, including train stations, the municipal complex, churches, and a number of commercial establishments. *Making Connections* indicates that many of the rural County routes [and other rural roadways] in Somerset County lack shoulders, “limiting the safe passage of pedestrians” and cyclists.

Water

The 1996 *Master Plan Utility Plan Element* mapped the water system service area in Peapack & Gladstone, which was “coterminous with” the then existing sewer service area. This area is located in the more densely populated village areas of the Borough. The service provider for the water service area is New Jersey American Water Company – Raritan System (PWSID #2004002), which serves communities in six counties. According to the company’s 2011 Annual Water Quality Report, the sources for this public community water system are:

> "98 wells, 7 surface water intakes, 1 purchased ground water source, and 1 purchased surface water source. Water is purchased from East Windsor MUA and Newark Water Co. Source water comes from Millstone River, Raritan River, Delaware & Raritan Canal and the following aquifers: Brunswick, Stockton, Basalt, Passaic and Glacial Drift."

According to the NJDEP Division of Water Supply & Geoscience Public Water System Deficit/Surplus report last updated on 10/11/2012, New Jersey American Water Company – Raritan System had a surplus of 961.034 million gallons per day (MGM) above its monthly limit and a 9518.335 million gallons per year (MGY) surplus above its yearly limit based on monthly data from July 2010 and yearly data from 2008.

Water needs in the remaining areas of the Borough are served by individual wells, including two public non-community wells that serve The Matheny Medical and Educational Center.

Wastewater

The Peapack & Gladstone sewer system was implemented in 1967 to eliminate failing septic systems in the older, densely developed village and business areas. Around 1996 the Borough eliminated its treatment plant and diverted sewage to Environmental Disposal Corporation (EDC). (1996 *Master Plan*). Presently, wastewater is treated at the EDC facility in Bedminster and discharged to surface water. There are two pumping stations in the southern portion of the Borough. (*Somerset County Proposed Future Wastewater Service Areas)*

The sewer service area as presented in the 1996 *Master Plan* has been amended several times. The Borough's Future Wastewater Service Areas (FWSAs) are determined as part of the Somerset County *Wastewater Management Plan*. An update to the FWSAs for the Upper Raritan and Northeast Water Quality Management Plan Area, including Peapack & Gladstone was adopted by the NJDEP on January 24, 2013.

According to the Somerset County *Wastewater Management Plan* website, the updated FWSAs "were developed in accordance with the requirements of the State Water Quality Management Planning Rules (N.J.A.C. 7:15-5.24) adopted by NJDEP in July 2008. These rules require the removal of undeveloped environmentally sensitive areas greater than 25 acres in size from the previously adopted Sewer Service Areas (SSAs), as well as publicly-owned open space greater than 10 acres in size."

The Somerset County Planning Board notes the following differences between the 2013 FWSAs and NJDEP's previously adopted FWSAs:

- Preserved farms, open space, parks and conservation areas (except for the portions of these areas served by sanitary sewers) are required by NJDEP to be excluded from Future Sewer Service Areas
- Undeveloped environmentally sensitive areas are required by NJDEP to be excluded from Future Sewer Service Areas

The *Utility Plan Element* of the 1996 *Master Plan* indicated that the sewer service area (SSA) for the Borough, according to the then effective 1993 Wastewater Management Plan (WMP) encompassed 1,354 acres, or 36% of the Borough. The 2011 WMP allowed for a total FWSA of 1,469 acres. The FWSA adopted in January 2013 is 1,163 acres. A total of 344 acres would be removed from the 2011 SSA and 38 acres added for a net reduction of 306 acres. The removed areas include 187 acres of preserved lands and 184 acres of environmentally sensitive lands (categories overlap). (See *Table 33* and *Figure 14* on *page 77*.)

Table 33. Change in Future Wastewater Service Area in Peapack & Gladstone

Total Acres In Previously Adopted FWSA (2011)	*Total Acres Removed From FWSA*	*Total Acres Added To FWSA*	*Total Net Acres In 2013 FWSA*	*Total Net Change In Acres In 2013 FWSA*
1469	344	38	1163	-306

Source: Somerset County Planning Division Wastewater Plan website. Accessed January 2013

Except for the Essex Hunt Club, which has its own permit to discharge to groundwater, areas of Peapack & Gladstone outside of the Borough's SSA are served by individual subsurface sewage disposal systems with capacities of 2,000 gallons per day or less.

Submission of the revised Future Wastewater Service Area boundaries for Somerset County to NJDEP completes Phase I of updating the WMP component of the WQM. "Phase II of the County's WMP submittal to NJDEP will be comprised of the future wastewater flows and water demand, treatment plant capacity solutions and maps and text associated with areas served by sanitary sewers. Phase III will address areas served by septic systems for which additional State policy and technical guidance is needed in order to proceed. Somerset County Planning Board is striving to complete the Phase II work and submit the results to the NJDEP for adoption in 2013." *(Somerset County Wastewater Management Plan website)*

Much of the SSA in Peapack & Gladstone overlays carbonate rock. According to the *Highlands Regional Master Plan*, "stormwater basins, septic system leaching fields, sewers, agricultural runoff, lawn runoff, underground pipelines, and soil disturbance may contribute contaminants directly to ground water through karst features. In addition to ground water concerns, communities in karst areas must contend with safety concerns as sinkholes can have damaging effects to large manmade objects."

In the Highlands Council 2008 *Utility Capacity Technical Report*, EDC had a permitted capacity of 2.1, a maximum discharge of 1.49 and available capacity of .61. This capacity is on a first-come basis, so there is no guarantee that additional capacity would be available in Peapack & Gladstone.

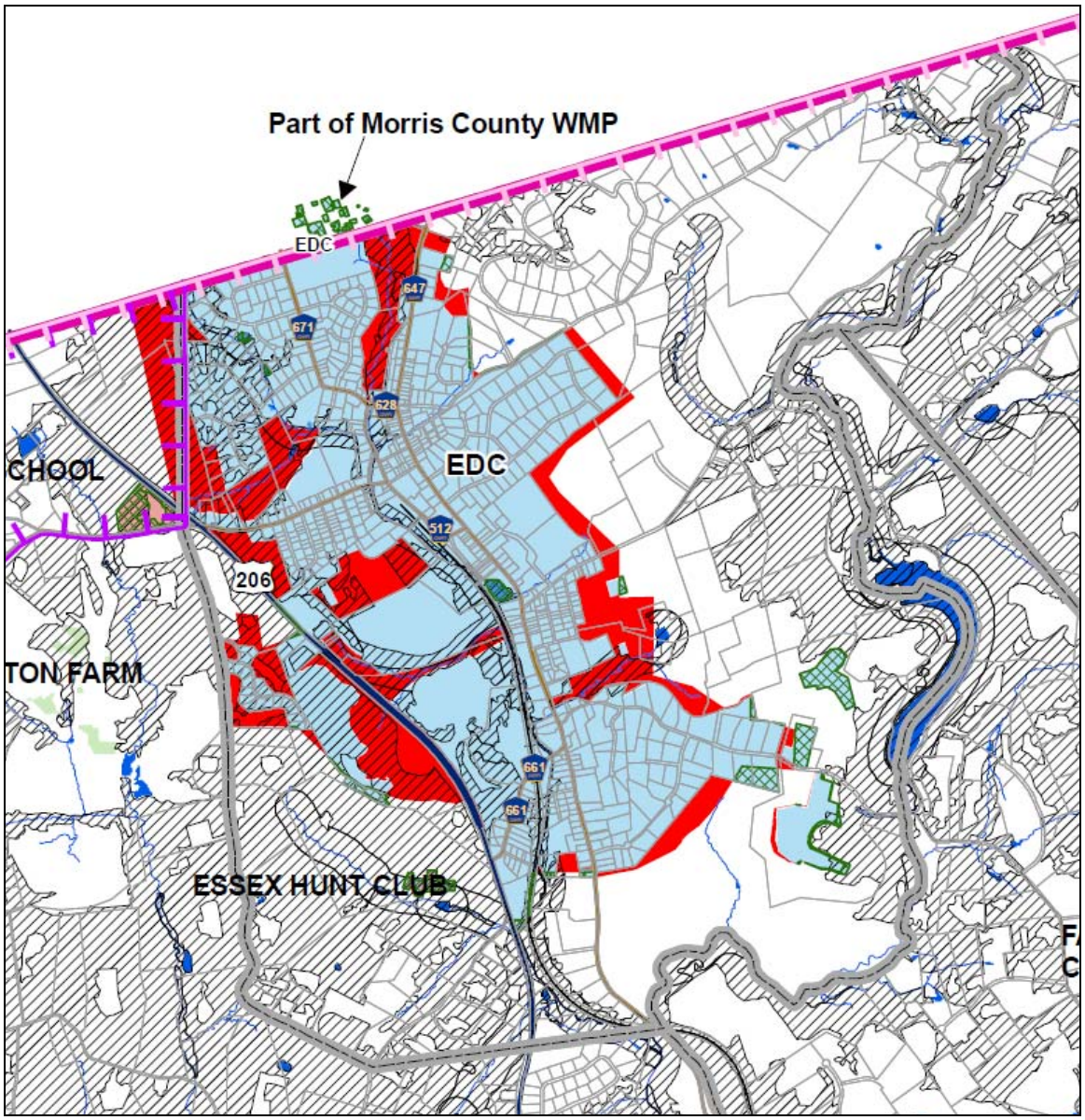
According to the *Sewage Flow Study* map in the Borough's 2005 *Housing Plan Element and Fair Share Plan*, there were three categories of land with development potential within the SSA effective in 2004:

- Sewered properties with development potential – to a large extent these properties remain in the proposed SSA; however, sections have been removed because they are environmentally sensitive

- Properties with approved development plans/flow commitment – a portion of one large property in this category has been removed from the SSA as environmentally sensitive

- Vacant land with development potential – all or portions of several of these properties have been removed from the proposed SSA due to having become public open space or preserved farmland or having been determined to be environmentally sensitive

Figure 14. Comparison of 2011 FWSA and 2013 Adopted FWSAs for Peapack & Gladstone



Legend:
Blue = proposed amended FWSA 2012
Red = areas removed from NJDEP Previously Adopted SSA (Version 201110).
Green cross-hatching = areas added to NJDEP previously adopted SSA (Version 201110).
Black diagonal lines = environmentally sensitive areas.
White areas = areas to be served by individual subsurface sewage disposal systems with planning flows 2,000 GPD or less – ISSDS.
Source: Somerset County Planning Division Wastewater Plan website. Accessed January 2013

FLOOD HAZARD/FLOOD PRONE AREAS

Federal, state and municipal governments provide oversight regarding areas prone to flooding through various acts, laws and ordinances. The intent is to minimize property damage and negative ecological effects by limiting development and protecting positive environmental influences in areas deemed subject to flooding.

At the federal level, the Federal Emergency Management Agency (FEMA) evaluates and maps Special Flood Hazard Areas (SFHAs) and other flood zones. Communities can opt to participate in the National Flood Insurance Program (NFIP), which requires mandatory flood insurance in areas mapped as SFHAs. An SFHA is defined as "an area that would be inundated by the flood having a one percent chance of being equaled or exceeded in any given year," also known as the base flood or 100-year-flood zone. To put it another way, in SFHAs there is a 26% chance of flooding over the term of a 30-year mortgage. NFIP mapping also includes information on 500-year flood zones, which have a 0.2% chance in a given year. *(FEMA)*

The Borough of Peapack & Gladstone is a participating community in the NFIP. The effective FEMA Flood Insurance Rate Map (FIRM) is from September 28, 2007. FIRM mapping is updated every few years and is first released as preliminary mapping open to public comment. Once that version of the mapping has been adopted as the effective mapping, property owners may still request a review if they believe their property has been incorrectly mapped. Maps can be viewed or purchased online and can be downloaded as pdfs or digital data (DFIRM). In May 2012, FEMA indicated that updated mapping for Peapack & Gladstone is underway.

The *FEMA Flood Zones* map (*Map 19* in the *Maps* section) uses the 2007 FEMA DFIRM (digital Flood Insurance Rate Map) data for Peapack & Gladstone. There are 277.5 acres of properties within Zone A/AE (the SFHA representing the 100-year flood zone) and 44.2 acres within Shaded Zone X (the area between the limits of the 100-year flood and the limits of the 500-year flood). Together, these flood zones represent 8.7% of the Borough's total area. They are located along the North Branch of the Raritan River, Peapack Brook and their tributaries. (*Table 34*)

Table 34. FEMA Flood Zones in Peapack & Gladstone

Flood Hazard	*Acres*	*% of Total Municipal Area*
100-year Flood (1% annual chance)	277.5	7.5%
500-year Flood (0.2% annual chance)	44.2	1.2%
Total Flood Zones	***321.7***	***8.7%***
Total Borough Acreage	3,696.4	

Source: FEMA DFIRM 2007

At the state level, New Jersey regulates flood prone areas through the New Jersey Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq., and its rules, adopted November 5,

2007. The Act recognizes the importance not only of avoiding building in unsafe places but also of preserving the vegetation that "is essential for maintaining bank stability and water quality." The rules set standards for development in flood hazard areas and adjacent to surface waters "in order to mitigate the adverse impacts to flooding and the environment that can be caused by such development." *(NJDEP Division of Land Use Regulation)* The State of New Jersey has adopted floodway limits on the North Branch Raritan River as part of the Statewide Program of Flood Hazard Area Delineation under authority of this Act. The FEMA 2007 floodway limits for Peapack Brook and the North Branch Raritan River are similar to the floodway limits adopted by the State of New Jersey.

According to the FEMA *Somerset County Flood Insurance Study*, effective September 28, 2007: "In the Borough of Peapack & Gladstone, inundation along the North Branch Raritan River is the most severe from the Borough corporate limits upstream for approximately 1.3 miles." Upstream, flooding is less severe due to Ravine Lake, a steeper channel and narrower valleys. Regulations to control the use and development of the floodways of the Raritan River were enacted in June 1975 by the New Jersey Water Policy and Supply Council. Flooding is widespread along Peapack Brook and its Tributary C, which enters Peapack & Gladstone from Chester Township in the northwest corner of the Borough and joins Peapack Brook just south of the junction of Old Chester Road with Main Street. Downstream of Park Avenue, the 100-year flood inundates a pocket behind the Erie-Lackawanna Railroad. A culvert at Peapack Brook Tributary D allows the flood waters to flow back into the stream. *(FEMA)*

On a local level, the following sections of the Peapack & Gladstone Municipal Code address flood hazards:

- Chapter XXIII Land Development. Article VIII. Flood Control Requirements.
- Chapter XXVI. Flood Damage Prevention.

Several other Land Development articles, such as Zoning, Site Plan Development and Sewers, make reference to the issue of floods and flood mitigation as well.

CONTAMINATED SITES AND RELEASES

Soil and groundwater contamination by pollutants is tracked by the state and federal governments at varying degrees of contamination or potential contamination, including Superfund sites, brownfields and other extensive or long-term remediation, point source facilities that require continuous monitoring (Toxics Release Inventory and Community Right to Know) and point source occurrences that are specific and limited (Known Contaminated Sites).

Long-Term Cleanup Programs: Superfund, Brownfields, RCRA

Superfund Sites/National Priorities List

The EPA's Superfund Program was established in 1980 under the Comprehensive Response, Compensation, and Liability Act (CERCLA) to locate, investigate and clean up hazardous waste sites throughout the United States. The EPA has established a National Priorities List (NPL) for cleanups and together with the state they oversee these NPL sites.

There are no Superfund NPL sites in Peapack & Gladstone.

There is one Superfund site nearby that is on the NPL. It is the Combe Fill South Landfill in Chester and Washington Townships. This site was added to the NPL in 1983 due to the presence of hazardous chemicals in the soil and groundwater. A remediation plan was created by the EPA and the state in 1986. Much of the remediation is already in place, but a long-term study of the deep aquifer is still ongoing.

RCRAs

Under the federal Resource Conservation and Recovery Act (RCRA) program, facilities that treat, store, or dispose of hazardous wastes are required to clean up environmental contaminants at their sites.

There are no RCRA sites in Peapack & Gladstone.

There is a RCRA site in nearby Chester Borough, which is under a Corrective Action Program (CAP): Simmonds Precision Company - Operative Industries, a manufacturing operation that ceased operations in 1996, but had discharged wastewater that included VOCs directly into adjacent wetlands and swamp.

Brownfields

A brownfield is "any former or current commercial or industrial site, currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant." (*Brownfield and Contaminated Site Remediation Act*, N.J.S.A. 58:10B-1 et seq.) The State of New Jersey encourages municipalities and counties to redevelop their brownfields as part of Smart Growth initiatives and the EPA offers grants and funding resources.

There are no brownfields in Peapack & Gladstone.

The only neighboring municipality that has brownfields listed in the State of New Jersey Brownfields SiteMart is Bernardsville Borough, which had 10 sites as of January 2013.

Pollution Prevention and Release Reports / Toxic Chemicals Release Inventory

Certain companies that manufacture, import, process or otherwise use toxic chemicals in quantities that exceed specified thresholds must annually report these releases or certify that these chemicals fall below specified thresholds. Approximately 500 New Jersey companies must file Toxic Chemicals Release Inventory (TRI) forms at the federal level and Pollution Prevention and Release Reports (PPRR) at the state level. One of these, Komline-Sanderson Engineering Corp, is located in Peapack and has reported involvement with from 1 to 3 chemicals in several of the years since the EPA began collecting this data in 1987. For 2009, 2010 and 2011, this company certified that its annual total involvement with chromium, manganese and nickel was below the 500 pound threshold requirement for reporting releases. There were no TRI reporting companies in neighboring municipalities. The largest release in Somerset County was 15,578 pounds of ammonia from a company in Bridgewater. The total reported releases in pounds for 2011 in Somerset County was 30,972.

Community Right to Know

The Community Right to Know (CRTK) program is responsible for collecting and disseminating data on hazardous substances produced, stored or used at companies in New Jersey. Companies or organizations storing certain hazardous substances in levels above specified threshold amounts are required by state and federal law to file annual reports. The NJDEP produces reports submitted by both active and non-active sites. The NJDEP data indicates that a number of previously reporting sites in Peapack & Gladstone have closed. By 2009, there were only two reporting sites, both schools, including Gill-St. Bernards, which reported a number of hazardous substances on site in 2009, including acetylene, diesel fuel, gasoline, hydrochloric acid and propane. The school was above threshold in previous years but below threshold for all substances in 2009 and therefore not required to report in future years unless their circumstances change. The NJDEP site showed no reports for Peapack & Gladstone in 2010 or 2011. Reports for 2012 are due by March 1, 2013. Neighboring Bernardsville and Far Hills Boroughs had a number of sites reporting in 2010 and 2011, including automotive, dry cleaning, construction and landscaping businesses. *(NJDEP)*

Known Contaminated Sites and Classification Exception Areas

The Known Contaminated Sites List (KCSL) for New Jersey includes those sites and properties within the state where contamination of soil or groundwater has been confirmed at levels equal to or greater than applicable standards.

Known Contaminated Sites may include:

- Active sites with known contamination; these sites can have one or more active cases with any number of pending and closed cases,
- Pending sites with confirmed contamination; these sites have no active cases, one or more pending cases, and any number of closed cases, and
- Closed sites with remediated contamination; sites in this category can have any number of closed cases, but have no active or pending cases.

These lists are produced by the NJDEP in response to the *Brownfield and Contaminated Site Remediation Act, N.J.S.A. 58:10-23.16-17,* which requires the preparation of a list of sites affected by hazardous substances. It also satisfies obligations under the New Jersey New Residential Construction Off-Site Conditions Disclosure Act (*N.J.S.A. 46:3C1 et seq.*). Sites included in the KCSL report can undergo a wide variety of remedial activities, ranging from relatively simple "cut and scrape" cleanups to highly complex cleanups. The sites with complex contamination issues can have several sources of contamination, which can affect both soil and groundwater at the same time.

The *Site Remediation Reform Act*, N.J.S.A. 58:10C-1 et seq. (SRRA), enacted in 2009, has helped to speed up the remediation process, "thus helping to decrease the threat of contamination to public health and safety and of the environment, and to quickly return underutilized properties to productive use." As of May 7, 2012, with limited exceptions, all remediations in the state of New Jersey, without regard to when remediation was initiated, proceed under the supervision of a Licensed Site Remediation Professional (LSRP), without NJDEP approval, following nine requirements set forth at N.J.S.A. 58:10B-1.3b(1) through (9).

In Peapack & Gladstone, the contamination at these sites most often involves heating oil from underground storage tanks (USTs) leaking into the soil and/or groundwater.

As of January 5, 2013, there were one homeowner and five non-homeowner active sites in Peapack & Gladstone. There were no pending sites. The actives sites were either level C1 or C2. C1 has the potential for groundwater contamination and the source of the contamination is known or identified but remediation requires no formal design. In the case of C2 sites, the source of contamination is known and a release may have occurred; remediation requires a formal design. Homeowners cases often involve heating oil from underground storage tanks (USTs) leaking into the soil and/or groundwater. Occurrences involving homeowner sites are generally minor in nature and often quickly remediated; therefore, the site is not listed here.

The five non-homeowner sites are listed in *Table 35* below and mapped on the *Known Contaminated Sites (Non-Homeowner)* map (*Map 20*).

Table 35. Active Sites (Non-Homeowner) With Confirmed Contamination in Peapack & Gladstone Borough As of January 5, 2013					
Site ID	*PI #*	*PI Name*	*Address*	*Home Owner*	*Level*
21948	000900	Clayton Amerman Inc	163 165 Main St	No	C2
46942	011097	Peapack Road Department Garage	5 Holland Ave	No	C2
13316	012557	Peapack Sunoco	28 Rt 206	No	C2
459289	579574	Pharmacia & Upjohn Company LLC*	158 Rt 206	No	C1
51482	017082	Route 512 Peapack Road	2 Main St	No	C1
6	Site Count				

**merged with Pfizer in 2003*
C1 remedial levels are associated with simple sites with one or two contaminants localized to soil and the immediate spill or discharge area.
C2 remedial levels are associated with more complicated contaminant discharges, multiple site spills and discharges, more than one contaminant, with both soil and groundwater impacted or threatened.
Source: NJDEP January 5, 2013 http://datamine2.state.nj.us/DEP_OPRA/OpraMain/get_long_report?

A new scoring system, called the Remedial Priority Scoring system, is being developed using computer modeling that will streamline the scoring and exclude certain minor categories. The RPS system was targeted for implementation in the fall of 2012. *(NJDEP)*

In some instances where groundwater quality standards for specific contaminants have been exceeded, the NJDEP designates a Classified Exception Area (CEA), where the designated aquifer uses are suspended for the term of the CEA, which may be a set number of years or indeterminate. The CEA may further be designated as a Well Restriction Area (WRA). A perimeter is established, which may cover multiple block and lot numbers beyond the original source property. There were no CEAs listed for Peapack & Gladstone in the NJDEP database as of January 30, 2012. Such properties would appear in the Known Contaminated Sites Report. Neighboring municipalities with CEA/WRAs are Bernardsville Borough (5) and Chester Borough (2).

CRITICAL SITES

The *Critical Sites* map (*Map 21*) showx the most environmentally sensitive areas within the Borough of Peapack & Gladstone. The included critical features include some of the most fragile natural resources in the Borough, and may be used as a reference guide for planning future development within those areas.

Faults – There are several faults located within the Borough of Peapack & Gladstone, which are small branches or extensions of the larger Ramapo Fault, running in a northeast to southwest direction. Faults in New Jersey, visible or otherwise, do not imply a specific hazard for seismic events. Seismic events along the east coast typically do not reach the surface, originating at least a few miles below the earth's surface.

Category One Waters – Category one waters are water bodies which have received the highest designation of quality in the state and are given special consideration in order to preserve their high level of water quality. The entire Peapack Brook, Gladstone Brook, and the majority of the North Branch of the Raritan River have been designated Category One waterways.

Special Flood Concern Areas – This layer is based on the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Areas (SFHA) mapping. An SFHA is defined as "an area that would be inundated by the flood having a 1% chance of being equaled or exceeded in any given year," also known as the base flood or 100-year flood zone. The mapping also includes information on 500-year flood zones, which have a 0.2% chance in a given year. (*FEMA*) There are 322 acres (8.7% of the Borough) located within the SFHA located along the North Branch of the Raritan River, Peapack Brook and their tributaries.

Steep Slopes (>15%) – Nearly 12% of the Borough has slopes greater than 25% and over 33% of the Borough has slopes greater than 15%. These slopes are generally located along or near the North Branch of the Raritan River, Peapack Brook, and their tributaries.

NJ Landscape Project Priority Habitat Areas (Rank 3, 4, 5) – These priority areas indicate locations where there have been observed occurrences of species listed as state or federal threatened or endangered species. These locations make up about 50% of the Borough, with Rank 5 (federally listed) being the largest portion, at 44% of the Borough.

High Aquifer Recharge Areas (C/A, C/B, and C/D) – High aquifer recharge areas are those areas which have a high infiltration rate of water into the aquifers below, making these areas highly suitable for transport of other materials, such as minerals and nutrients, as well as harmful substances like chemical pollutants. The transported materials often will then end up in nearby water bodies, affecting the quality of the effected water bodies. These high aquifer recharge areas are located mainly along the Peapack Brook.

Carbonate Rock Areas – Carbonate rock is highly soluble and forms the basis for higher yielding aquifers. Within the Borough, the carbonate rock areas extend southward from the northern border with Chester Township following the Peapack Brook and eastward along Willow Avenue.

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MAPS

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6. **Severe and Moderately Constrained Slopes**
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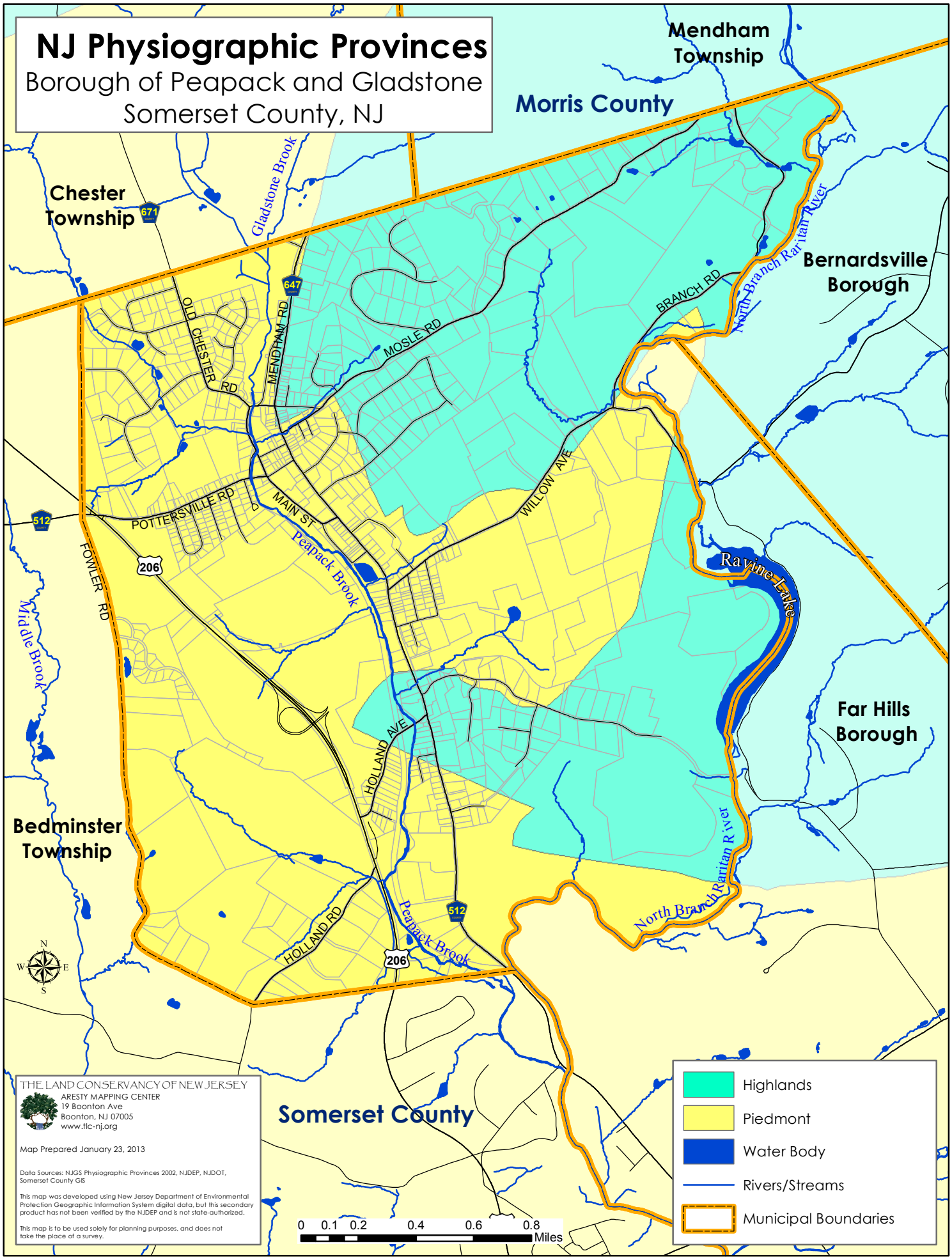
NJ Physiographic Provinces
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Gladstone Brook
Bernardsville Borough
North Branch Raritan River
BRANCH RD
MOSLE RD
MENDHAM RD
OLD CHESTER RD
647
671
512
206
POTTERSVILLE RD
MAIN ST
Peapack Brook
WILLOW AVE
Ravine Lake
FOWLER RD
Middle Brook
HOLLAND AVE
Far Hills Borough
Bedminster Township
North Branch Raritan River
HOLLAND RD
Peapack Brook
Somerset County
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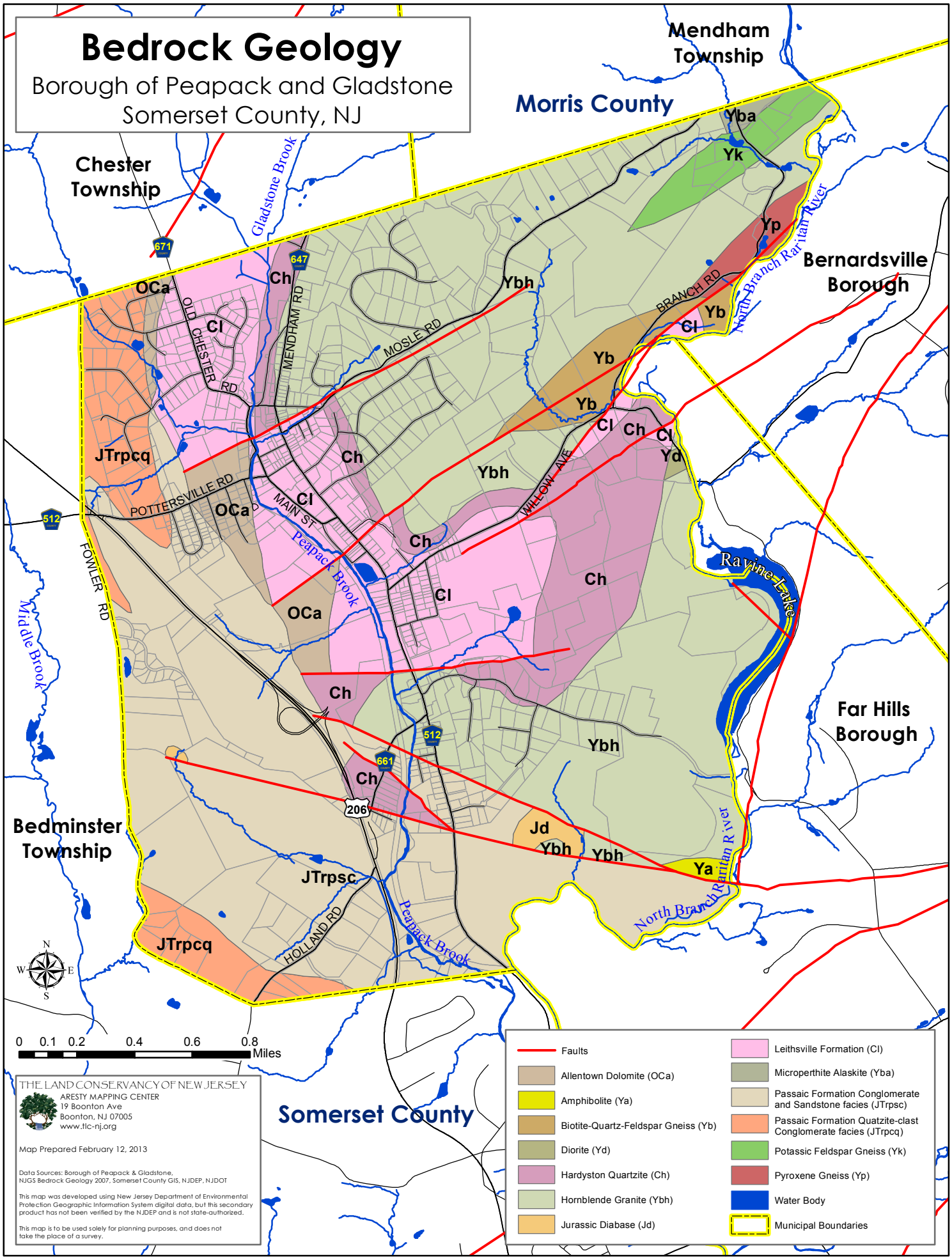
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared January 23, 2013
Data Sources: NJGS Physiographic Provinces 2002, NJDEP, NJDOT, Somerset County GIS
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.
0 0.1 0.2 0.4 0.6 0.8
Miles
Highlands
Piedmont
Water Body
Rivers/Streams
Municipal Boundaries

Bedrock Geology

Borough of Peapack and Gladstone
Somerset County, NJ



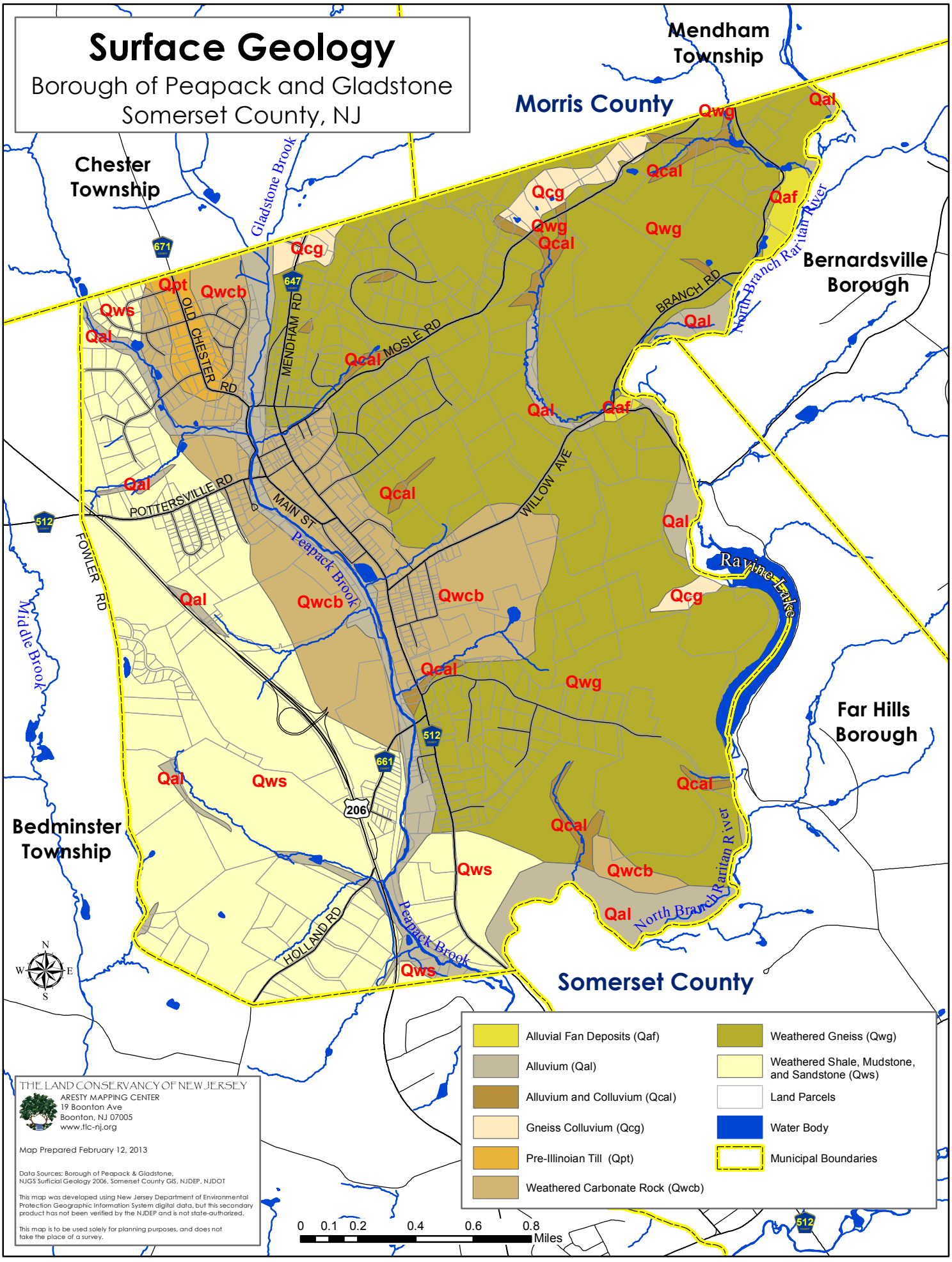
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: Borough of Peapack & Gladstone, NJGS Bedrock Geology 2007, Somerset County GIS, NJDEP, NJDOT

Surface Geology

Borough of Peapack and Gladstone
Somerset County, NJ



THE LAND CONSERVANCY OF NEW JERSEY
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www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: Borough of Peapack & Gladstone,
NJGS Surficial Geology 2006, Somerset County GIS, NJDEP, NJDOT

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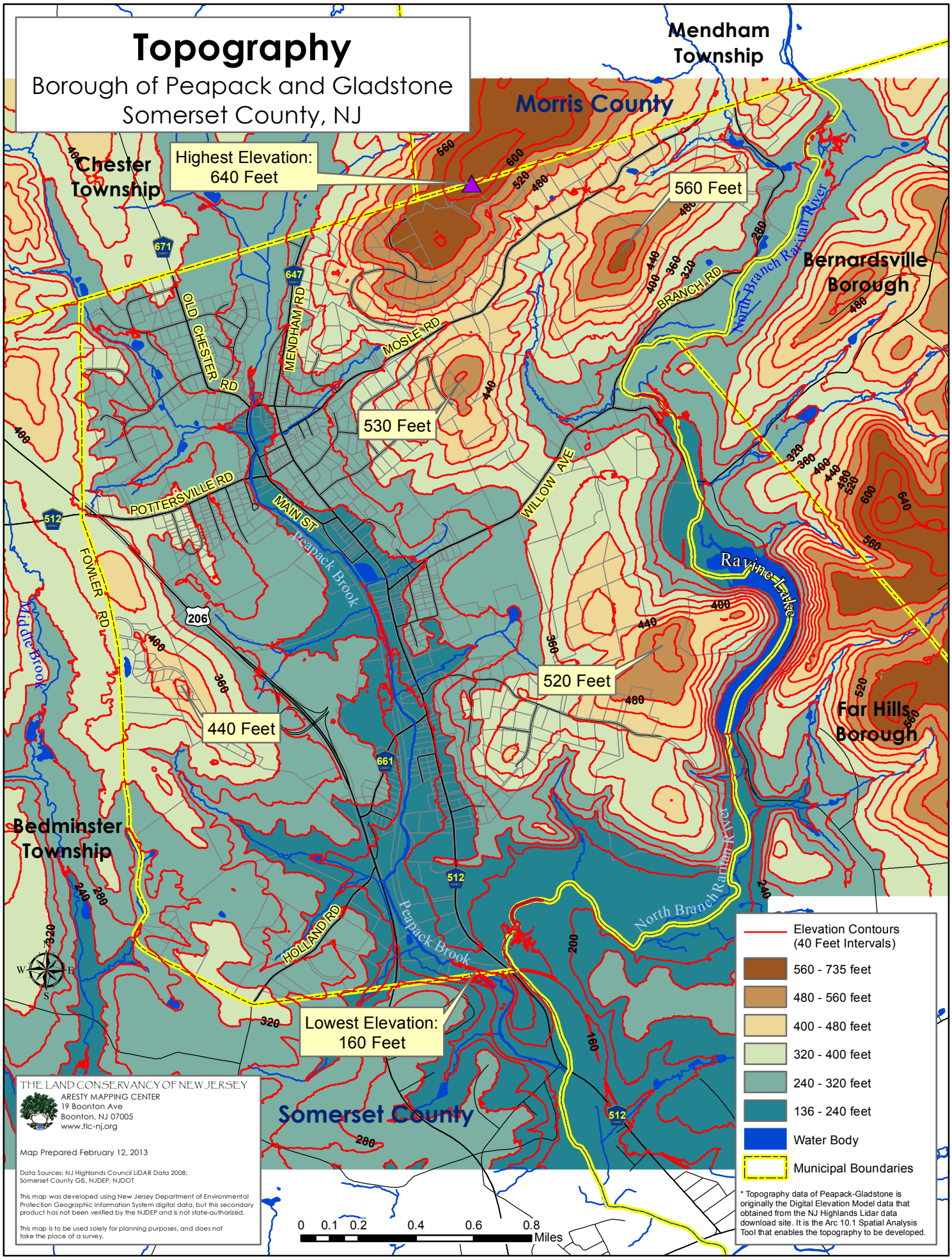
This map is to be used solely for planning purposes, and does not take the place of a survey.


Topography
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Highest Elevation: 640 Feet
560 Feet
530 Feet
520 Feet
440 Feet
Lowest Elevation: 160 Feet
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
North Branch Raritan River
POTTERSVILLE RD
MAIN ST
Peapack Brook
WILLOW AVE
Ravine Lake
FOWLER RD
Middle Brook
HOLLAND RD
671
647
512
206
661
Elevation Contours (40 Feet Intervals)
560 - 735 feet
480 - 560 feet
400 - 480 feet
320 - 400 feet
240 - 320 feet
136 - 240 feet
Water Body
Municipal Boundaries
* Topography data of Peapack-Gladstone is originally the Digital Elevation Model data that obtained from the NJ Highlands Lidar data download site. It is the Arc 10.1 Spatial Analysis Tool that enables the topography to be developed.
0 0.1 0.2 0.4 0.6 0.8 Miles
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 12, 2013
Data Sources: NJ Highlands Council LiDAR Data 2008; Somerset County GIS, NJDEP, NJDOT
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 the NJDEP and is not state-authorized.
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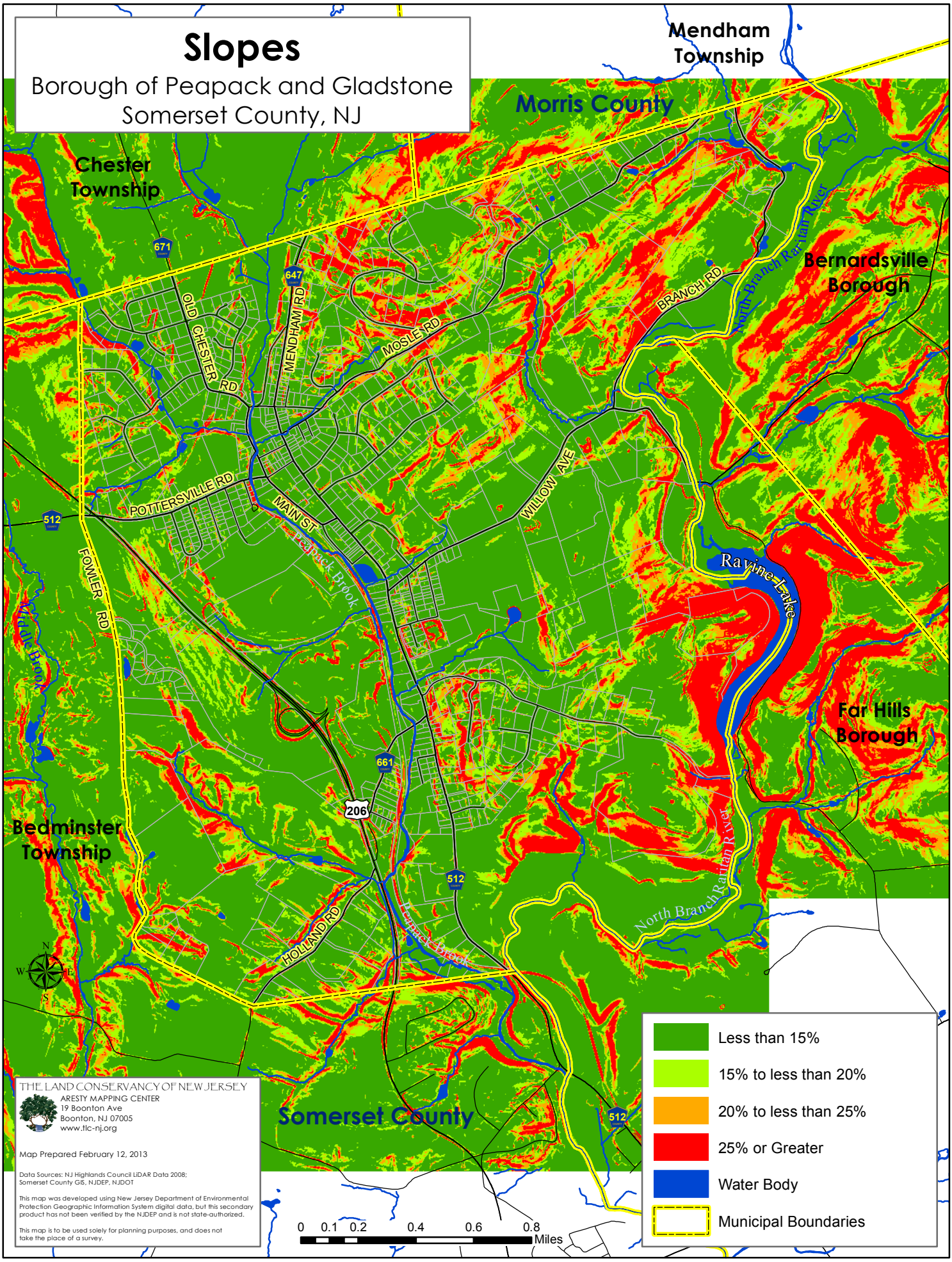
Slopes

Borough of Peapack and Gladstone
Somerset County, NJ



THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: NJ Highlands Council LiDAR Data 2008; Somerset County GIS, NJDEP, NJDOT

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 the NJDEP and is not state-authorized.

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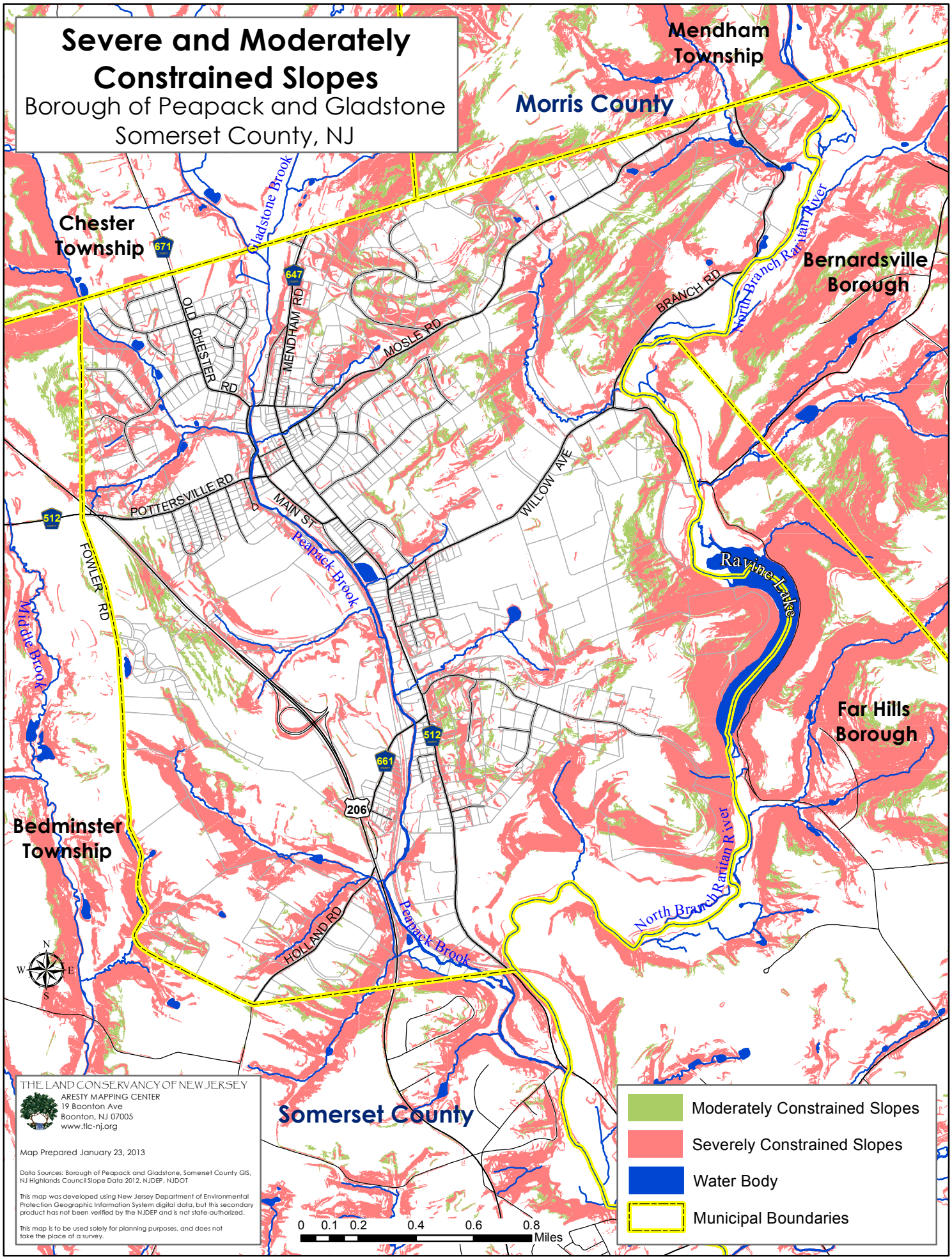
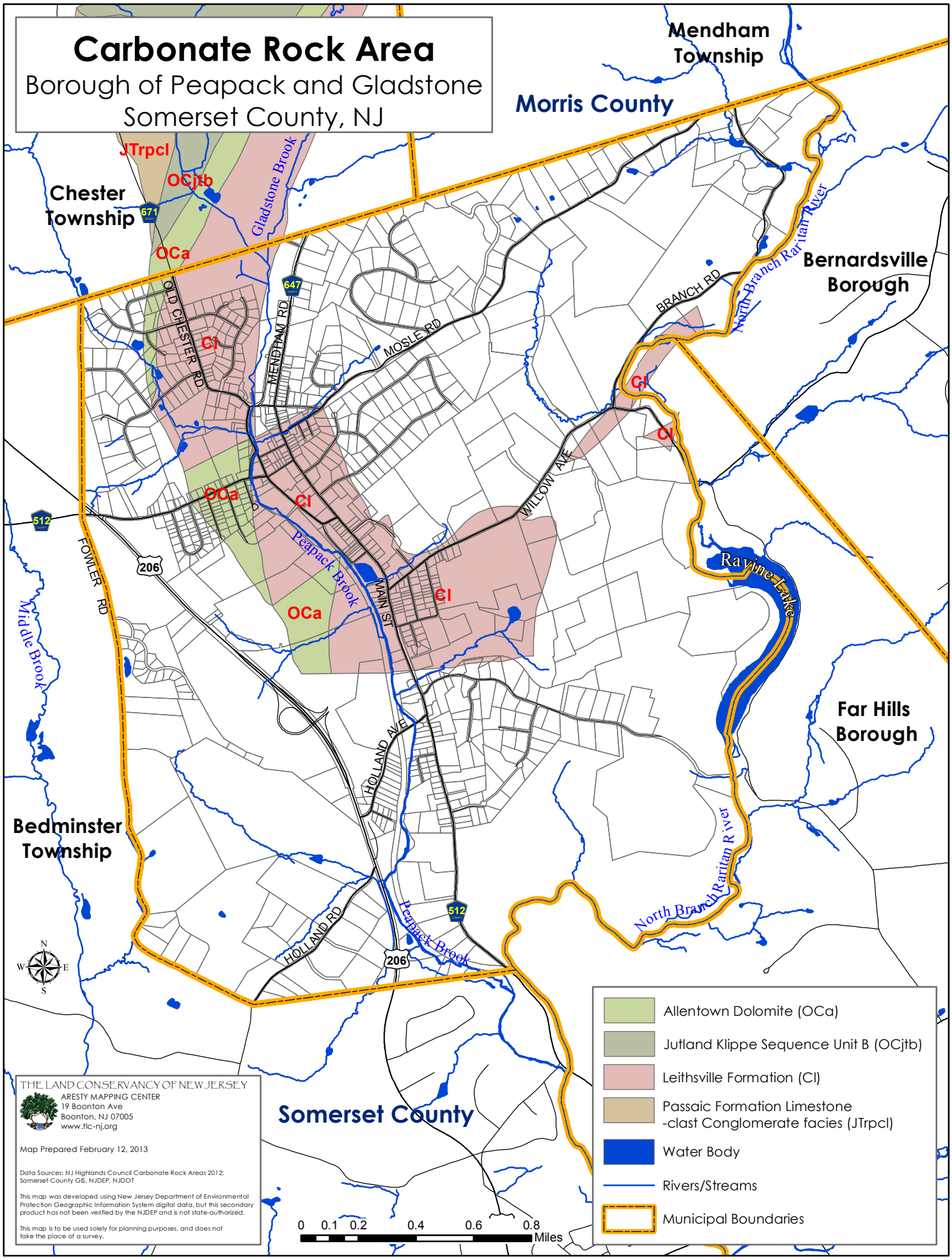

Severe and Moderately Constrained Slopes
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
Peapack Brook
Middle Brook
North Branch Raritan River
Ravine Lake
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
WILLOW AVE
POTTERSVILLE RD
MAIN ST
FOWLER RD
HOLLAND RD
671
647
512
661
206
N
W
E
S
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared January 23, 2013
Data Sources: Borough of Peapack and Gladstone, Somerset County GIS, NJ Highlands Council Slope Data 2012, NJDEP, NJDOT
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 the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.
0 0.1 0.2 0.4 0.6 0.8
Miles
Moderately Constrained Slopes
Severely Constrained Slopes
Water Body
Municipal Boundaries



THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: NJ Highlands Council Carbonate Rock Areas 2012; Somerset County GIS, NJDEP, NJDOT

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 the NJDEP and is not state-authorized.

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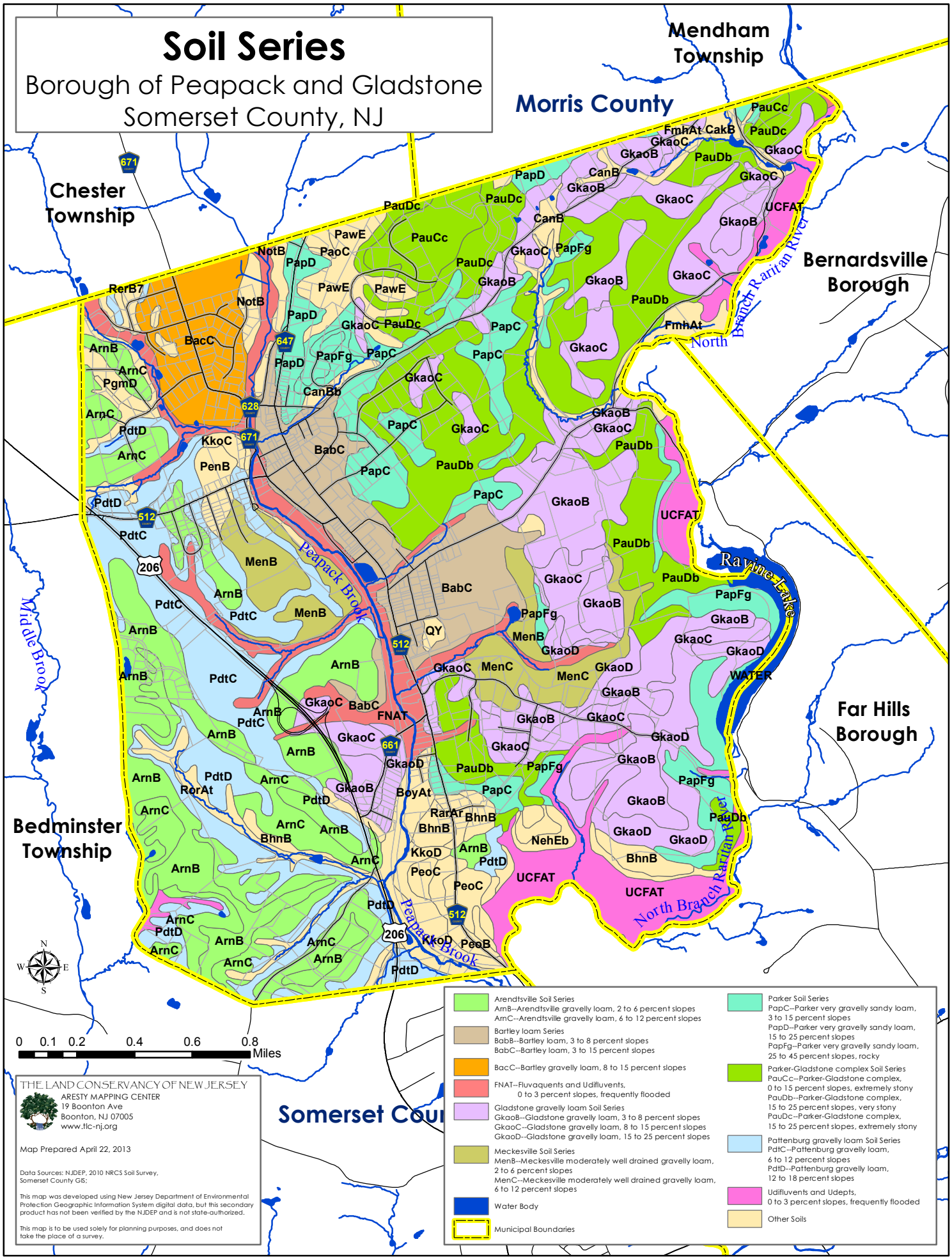
Soil Series

Borough of Peapack and Gladstone
Somerset County, NJ



Arendtsville Soil Series
ArnB--Arendtsville gravelly loam, 2 to 6 percent slopes
ArnC--Arendtsville gravelly loam, 6 to 12 percent slopes

Bartley loam Series
BabB--Bartley loam, 3 to 8 percent slopes
BabC--Bartley loam, 3 to 15 percent slopes

BacC--Bartley gravelly loam, 8 to 15 percent slopes

FNAT--Fluvaquents and Udifluvents,
0 to 3 percent slopes, frequently flooded

Gladstone gravelly loam Soil Series
GkaoB--Gladstone gravelly loam, 3 to 8 percent slopes
GkaoC--Gladstone gravelly loam, 8 to 15 percent slopes
GkaoD--Gladstone gravelly loam, 15 to 25 percent slopes

Meckesville Soil Series
MenB--Meckesville moderately well drained gravelly loam, 2 to 6 percent slopes
MenC--Meckesville moderately well drained gravelly loam, 6 to 12 percent slopes

Water Body

Municipal Boundaries

Parker Soil Series
PapC--Parker very gravelly sandy loam, 3 to 15 percent slopes
PapD--Parker very gravelly sandy loam, 15 to 25 percent slopes
PapFg--Parker very gravelly sandy loam, 25 to 45 percent slopes, rocky

Parker-Gladstone complex Soil Series
PauCc--Parker-Gladstone complex, 0 to 15 percent slopes, extremely stony
PauDb--Parker-Gladstone complex, 15 to 25 percent slopes, very stony
PauDc--Parker-Gladstone complex, 15 to 25 percent slopes, extremely stony

Pattenburg gravelly loam Soil Series
PdtC--Pattenburg gravelly loam, 6 to 12 percent slopes
PdtD--Pattenburg gravelly loam, 12 to 18 percent slopes

Udifluvents and Udepts,
0 to 3 percent slopes, frequently flooded

Other Soils

THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared April 22, 2013

Data Sources: NJDEP, 2010 NRCS Soil Survey, Somerset County GIS;

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 the NJDEP and is not state-authorized.

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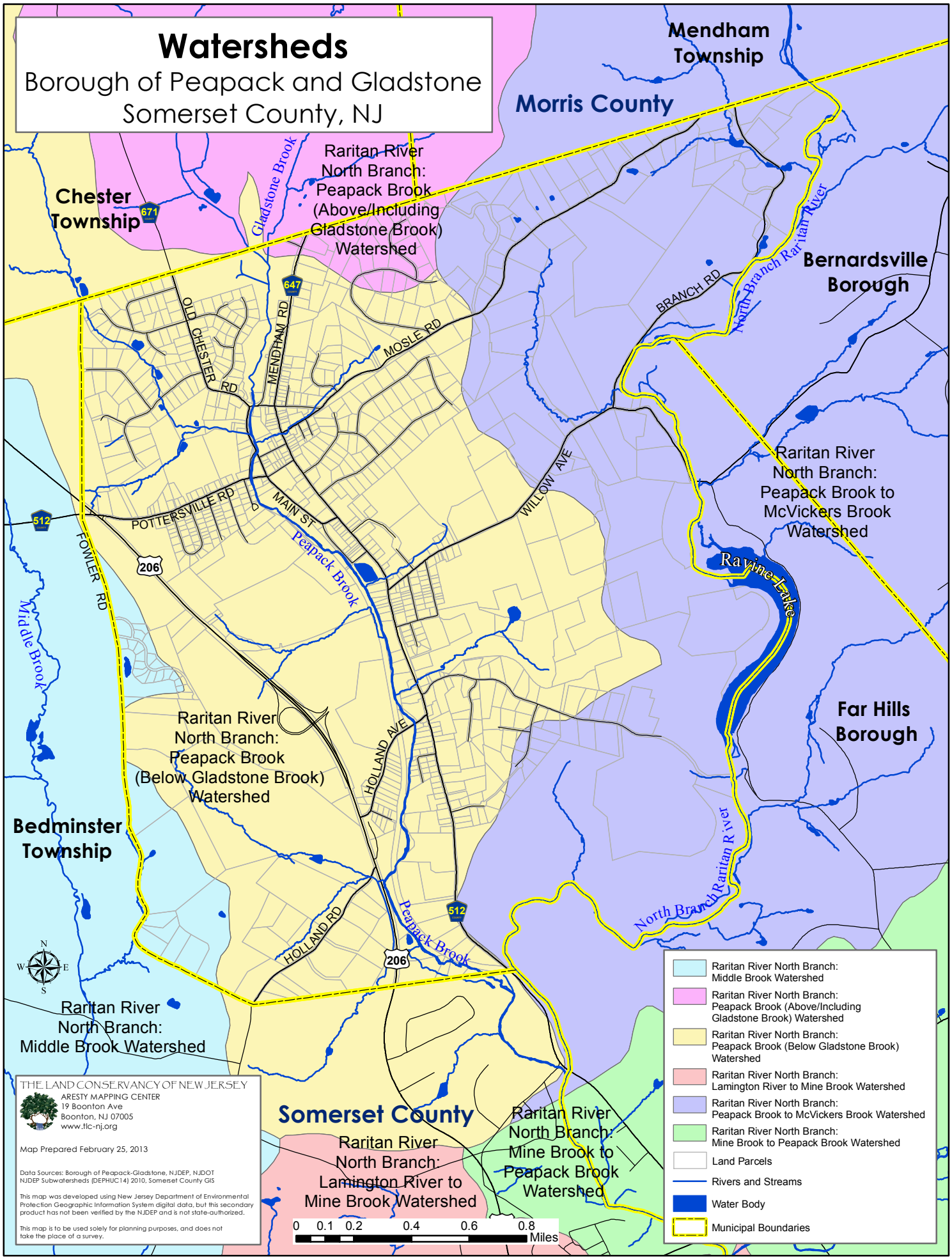
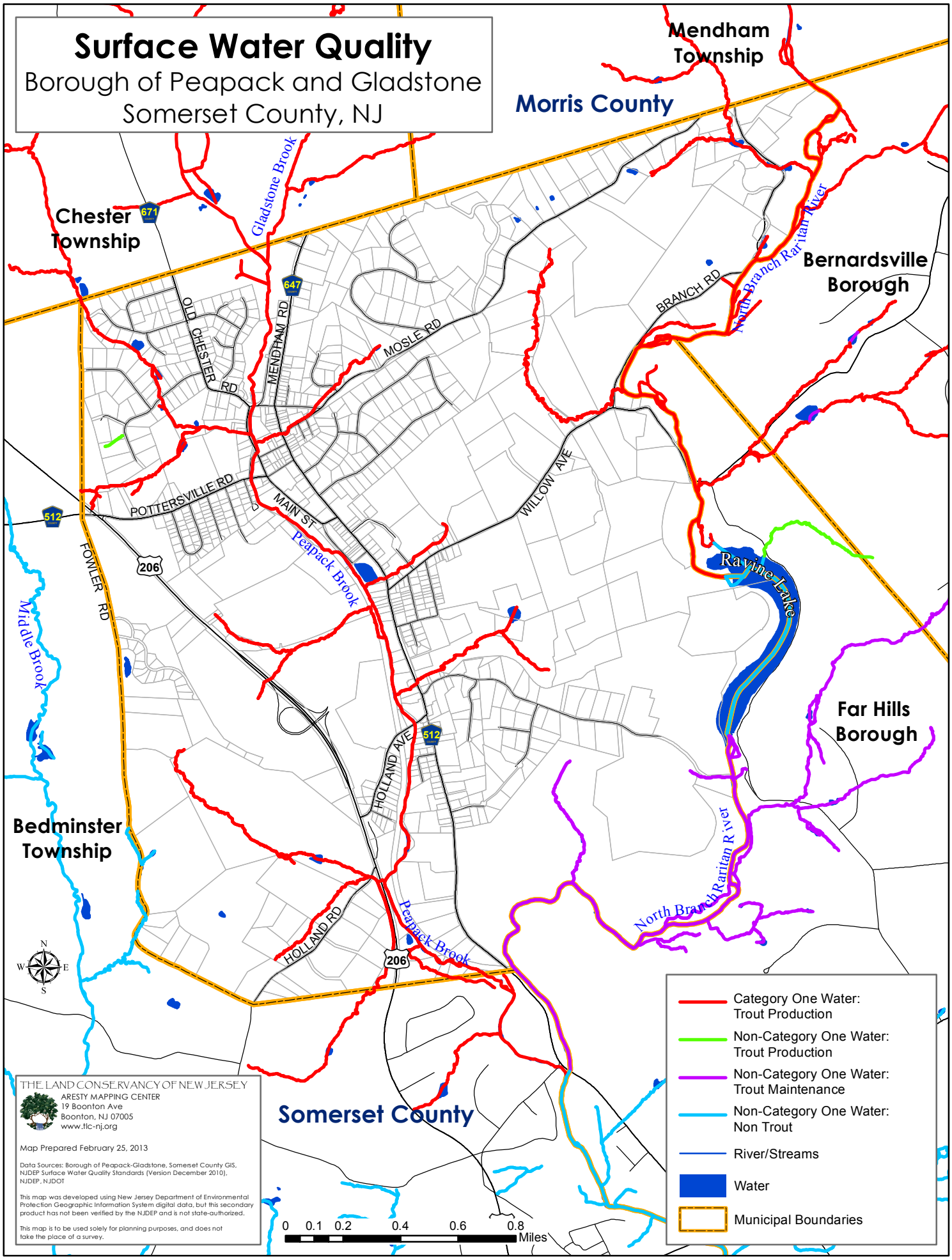

Watersheds
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Raritan River North Branch: Peapack Brook (Above/Including Gladstone Brook) Watershed
Raritan River North Branch: Peapack Brook (Below Gladstone Brook) Watershed
Raritan River North Branch: Peapack Brook to McVickers Brook Watershed
Raritan River North Branch: Middle Brook Watershed
Raritan River North Branch: Lamington River to Mine Brook Watershed
Raritan River North Branch: Mine Brook to Peapack Brook Watershed
Gladstone Brook
Peapack Brook
Middle Brook
North Branch Raritan River
Ravine Lake
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
WILLOW AVE
POTTERSVILLE RD
MAIN ST
FOWLER RD
HOLLAND AVE
HOLLAND RD
671
647
512
206
N
W
E
S
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 25, 2013
Data Sources: Borough of Peapack-Gladstone, NJDEP, NJDOT
NJDEP Subwatersheds (DEPHUC14) 2010, Somerset County GIS
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 the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.
0 0.1 0.2 0.4 0.6 0.8 Miles
Raritan River North Branch: Middle Brook Watershed
Raritan River North Branch: Peapack Brook (Above/Including Gladstone Brook) Watershed
Raritan River North Branch: Peapack Brook (Below Gladstone Brook) Watershed
Raritan River North Branch: Lamington River to Mine Brook Watershed
Raritan River North Branch: Peapack Brook to McVickers Brook Watershed
Raritan River North Branch: Mine Brook to Peapack Brook Watershed
Land Parcels
Rivers and Streams
Water Body
Municipal Boundaries



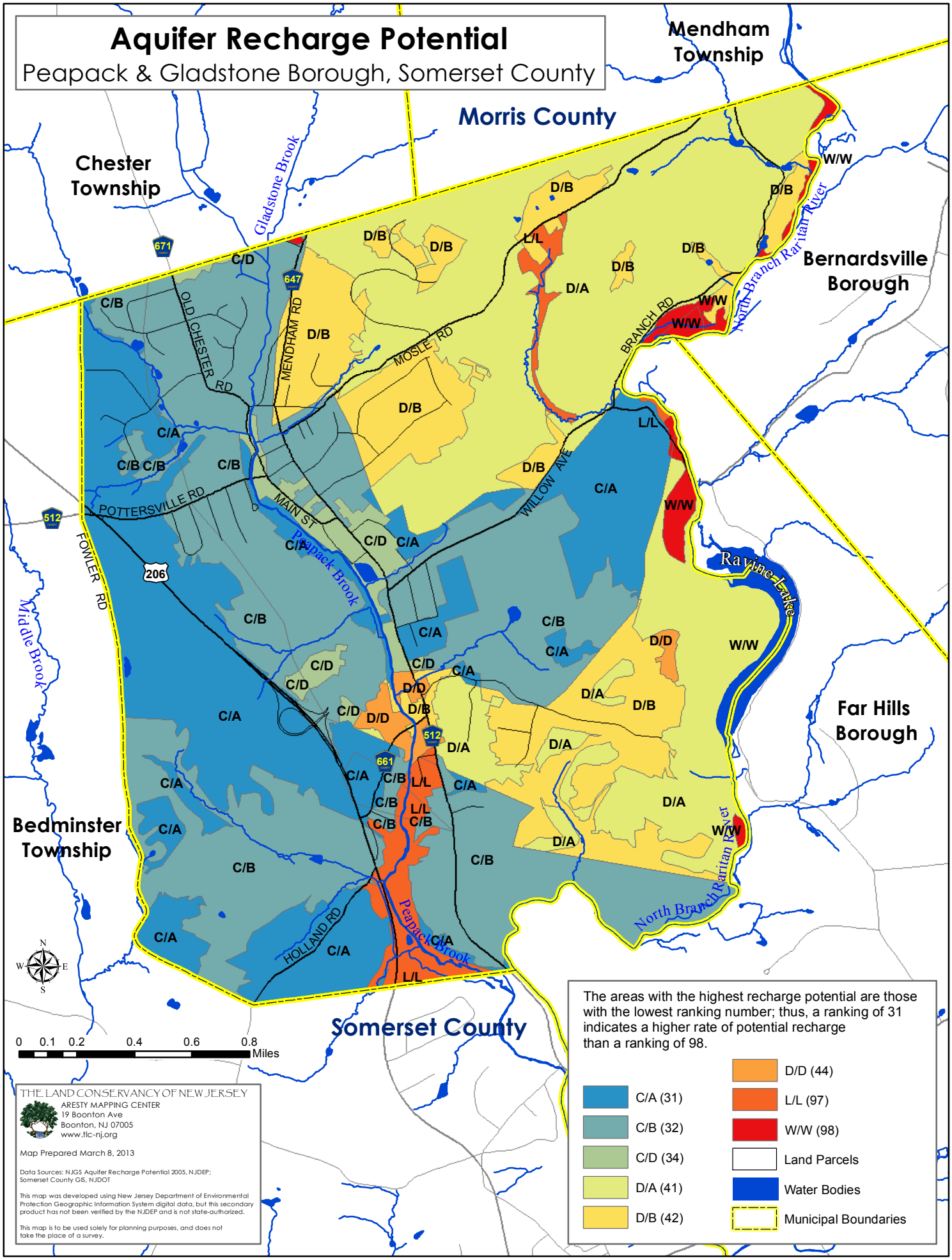
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 25, 2013

Data Sources: Borough of Peapack-Gladstone, Somerset County GIS, NJDEP Surface Water Quality Standards (Version December 2010), NJDEP, NJDOT

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 the NJDEP and is not state-authorized.

This map is to be used solely for planning purposes, and does not take the place of a survey.


Aquifer Recharge Potential
Peapack & Gladstone Borough, Somerset County
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
North Branch Raritan River
Ravine Lake
Peapack Brook
Middle Brook
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
WILLOW AVE
POTTERSVILLE RD
MAIN ST
FOWLER RD
HOLLAND RD
671
647
512
206
661
C/D
C/B
C/A
D/B
L/L
D/A
W/W
D/D
0 0.1 0.2 0.4 0.6 0.8 Miles
N
W
E
S
The areas with the highest recharge potential are those with the lowest ranking number; thus, a ranking of 31 indicates a higher rate of potential recharge than a ranking of 98.
C/A (31)
C/B (32)
C/D (34)
D/A (41)
D/B (42)
D/D (44)
L/L (97)
W/W (98)
Land Parcels
Water Bodies
Municipal Boundaries
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared March 8, 2013
Data Sources: NJGS Aquifer Recharge Potential 2005, NJDEP; Somerset County GIS, NJDOT
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 the NJDEP and is not state-authorized.
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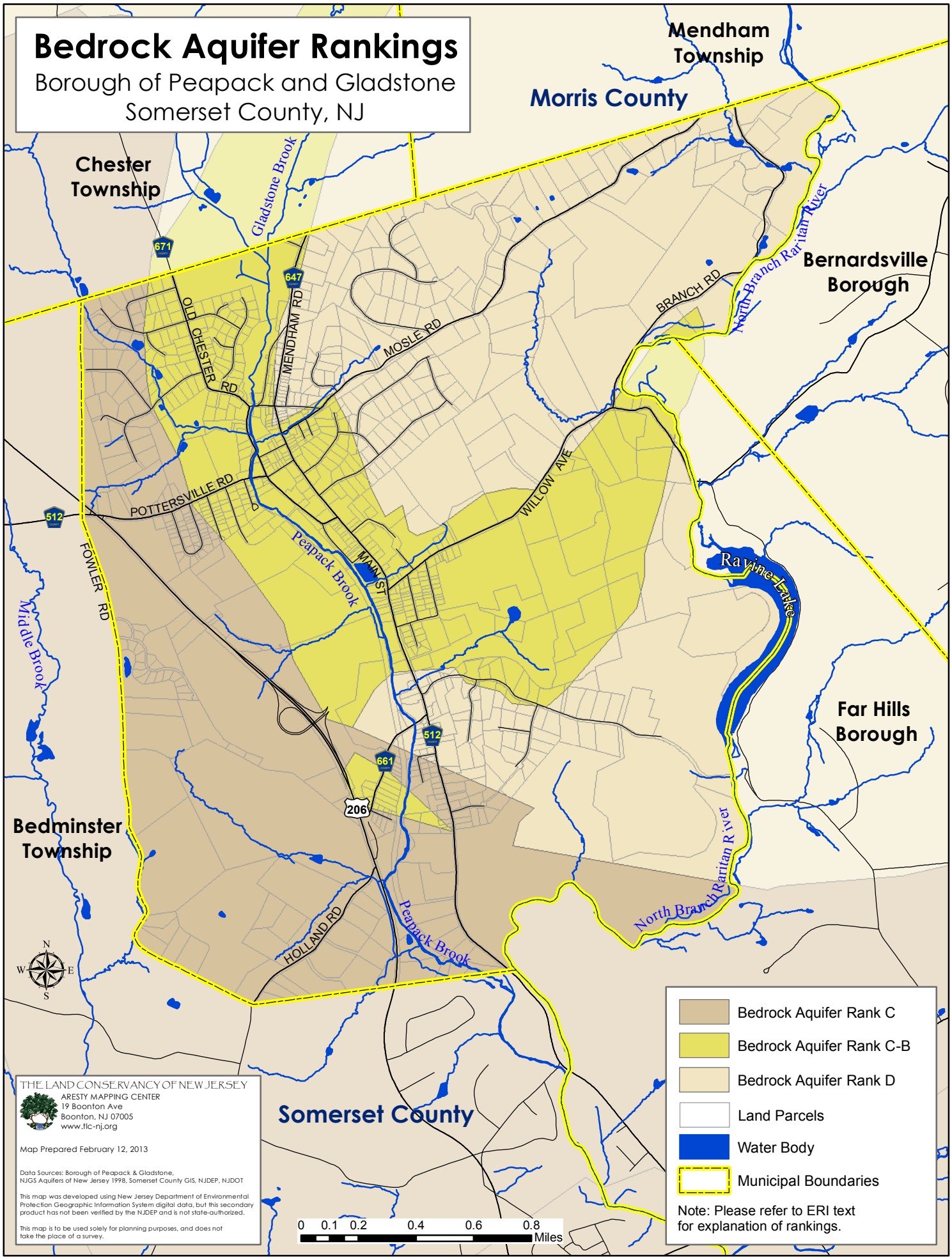
Bedrock Aquifer Rankings
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
North Branch Raritan River
Peapack Brook
Middle Brook
Ravine Lake
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
POTTERSVILLE RD
FOWLER RD
MAIN ST
WILLOW AVE
HOLLAND RD
671
647
512
661
206
N
W
E
S
0 0.1 0.2 0.4 0.6 0.8 Miles
Bedrock Aquifer Rank C
Bedrock Aquifer Rank C-B
Bedrock Aquifer Rank D
Land Parcels
Water Body
Municipal Boundaries
Note: Please refer to ERI text for explanation of rankings.
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 12, 2013
Data Sources: Borough of Peapack & Gladstone, NJGS Aquifers of New Jersey 1998, Somerset County GIS, NJDEP, NJDOT
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 the NJDEP and is not state-authorized.
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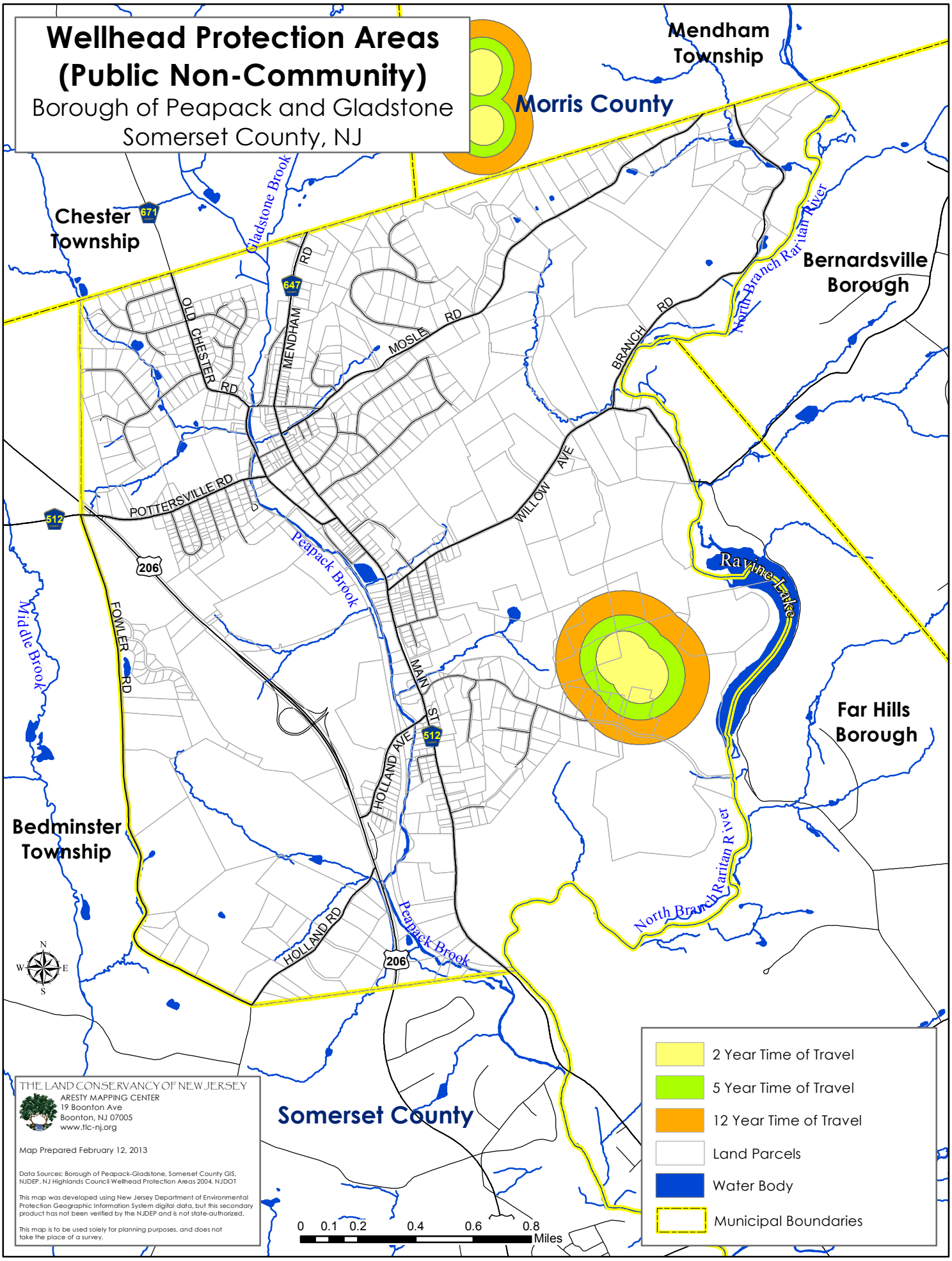

THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: Borough of Peapack-Gladstone, Somerset County GIS, NJDEP, NJ Highlands Council Wellhead Protection Areas 2004, NJDOT

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 the NJDEP and is not state-authorized.

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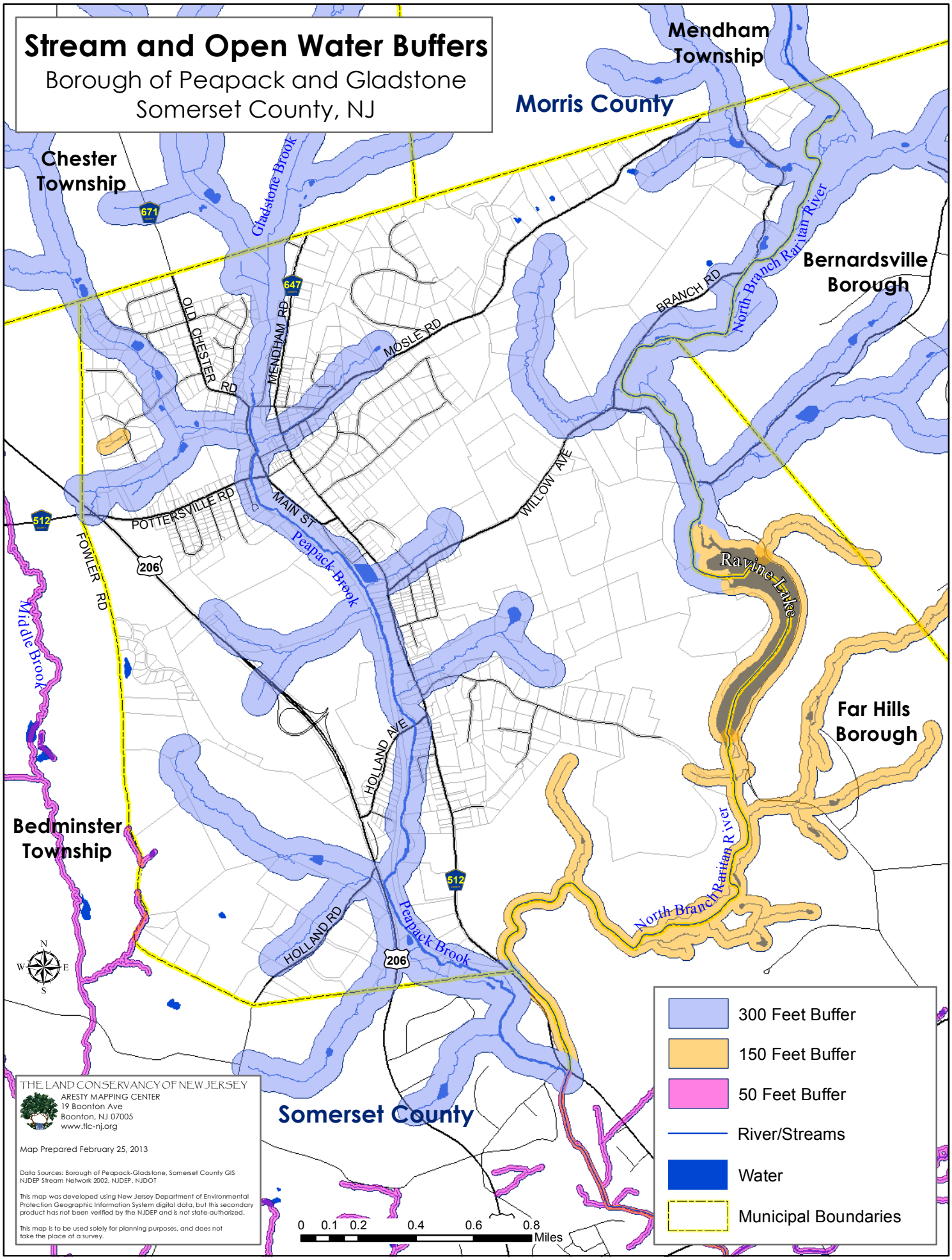
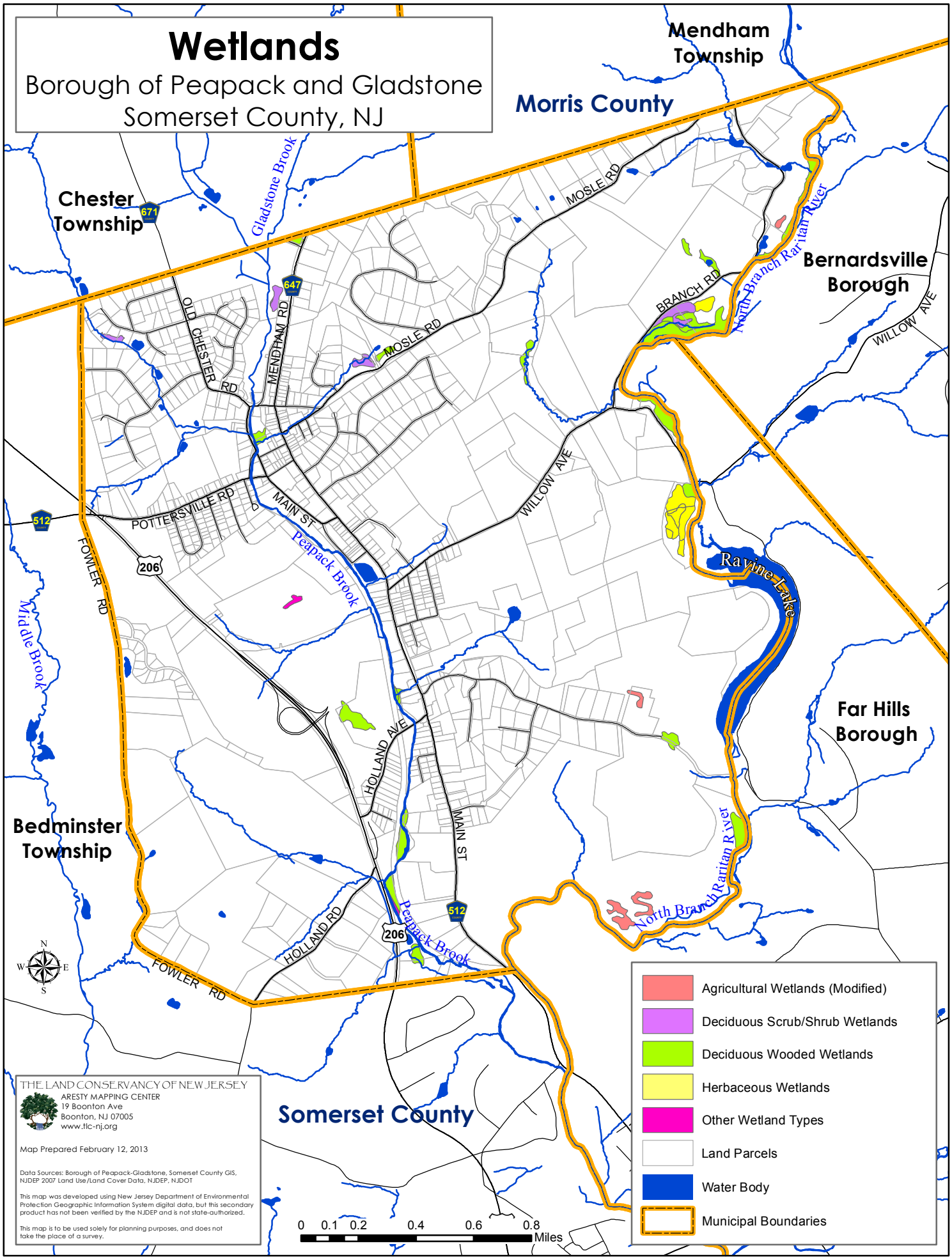

Stream and Open Water Buffers
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
North Branch Raritan River
Peapack Brook
Middle Brook
Ravine Lake
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
POTTERSVILLE RD
MAIN ST
WILLOW AVE
FOWLER RD
HOLLAND AVE
HOLLAND RD
671
647
512
206
N
W
E
S
300 Feet Buffer
150 Feet Buffer
50 Feet Buffer
River/Streams
Water
Municipal Boundaries
0 0.1 0.2 0.4 0.6 0.8
Miles
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 25, 2013
Data Sources: Borough of Peapack-Gladstone, Somerset County GIS
NJDEP Stream Network 2002, NJDEP, NJDOT
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 the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.



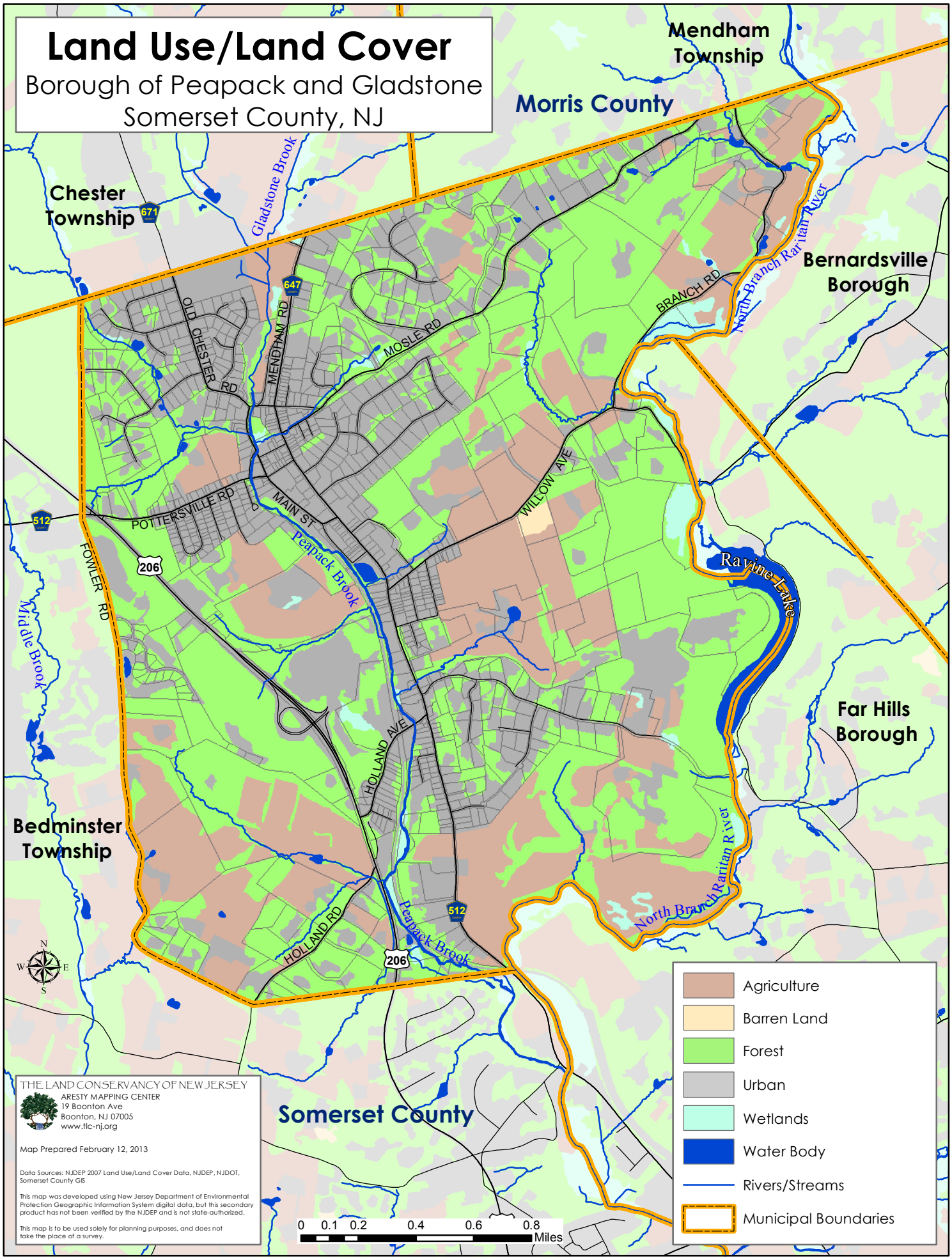
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: Borough of Peapack-Gladstone, Somerset County GIS, NJDEP 2007 Land Use/Land Cover Data, NJDEP, NJDOT

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 the NJDEP and is not state-authorized.

This map is to be used solely for planning purposes, and does not take the place of a survey.


Land Use/Land Cover
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
North Branch Raritan River
Peapack Brook
Ravine Lake
Middle Brook
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
POTTERSVILLE RD
MAIN ST
WILLOW AVE
FOWLER RD
HOLLAND AVE
HOLLAND RD
671
647
512
206
N
S
E
W
Agriculture
Barren Land
Forest
Urban
Wetlands
Water Body
Rivers/Streams
Municipal Boundaries
0 0.1 0.2 0.4 0.6 0.8
Miles
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 12, 2013
Data Sources: NJDEP 2007 Land Use/Land Cover Data, NJDEP, NJDOT, Somerset County GIS
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 the NJDEP and is not state-authorized.
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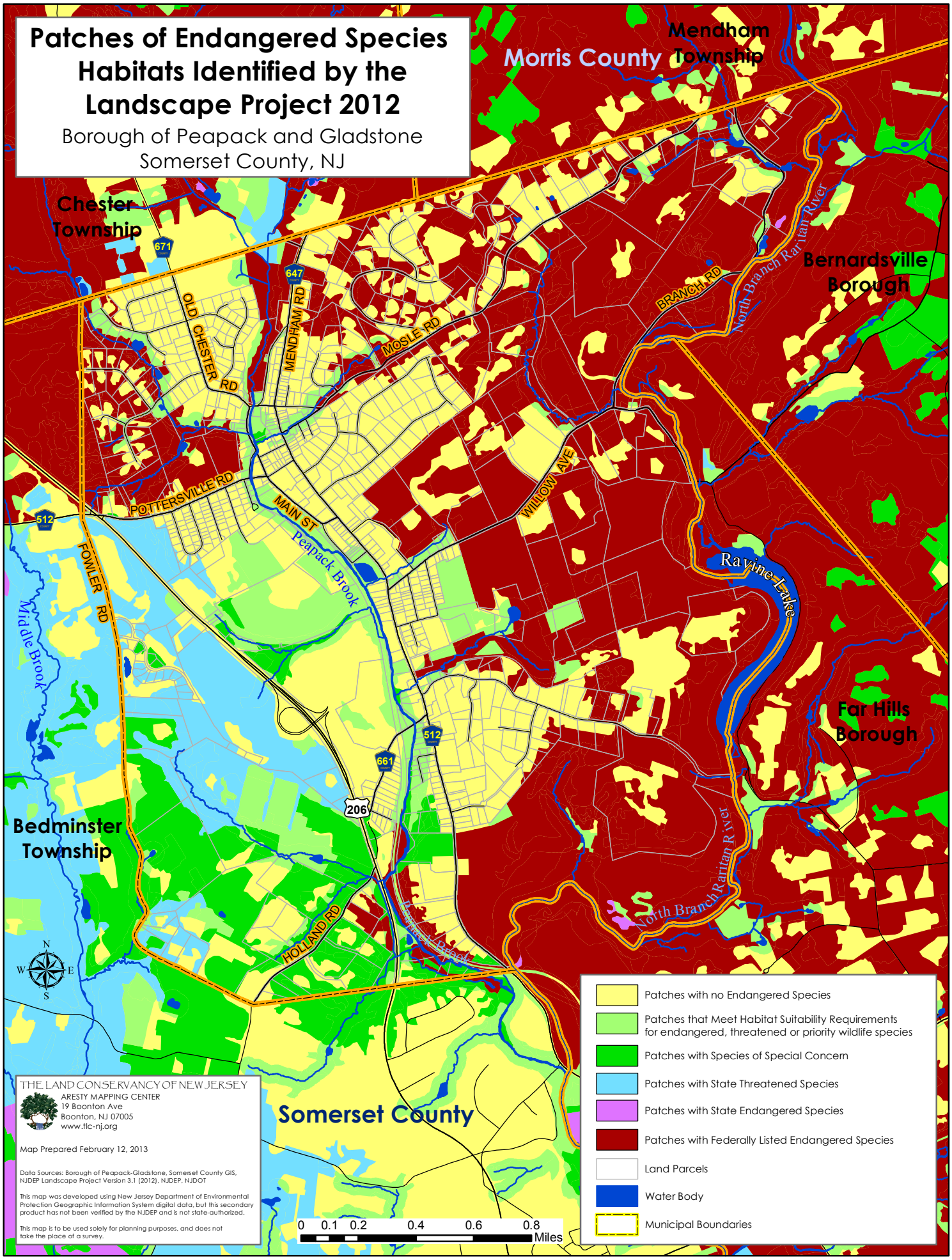
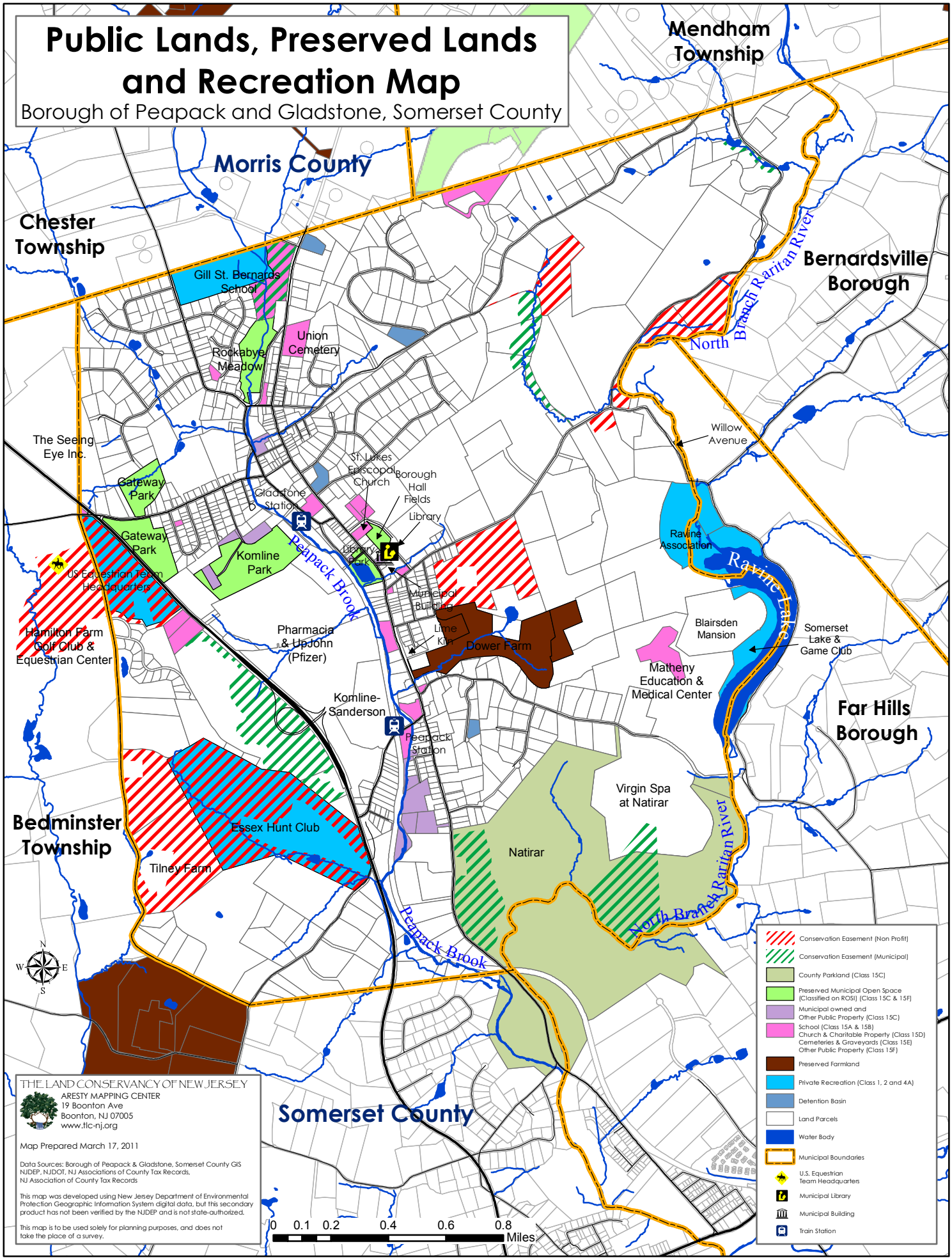
Map 17. Patches of Endangered Species Habitats Identified by the Landscape Project 2012




Public Lands, Preserved Lands and Recreation Map
Borough of Peapack and Gladstone, Somerset County
Mendham Township
Morris County
Chester Township
Bernardsville Borough
North Branch Raritan River
Gill St. Bernards School
Union Cemetery
Rockabye Meadow
The Seeing Eye Inc.
Willow Avenue
St. Lukes Episcopal Church
Borough Hall
Fields
Library
Gateway Park
Gladstone Station
Gateway Park
Komline Park
Peapack Brook
Library Park
Municipal Building
Lime Kiln
Dower Farm
US Equestrian Team Headquarters
Hamilton Farm Golf Club & Equestrian Center
Pharmacia & UpJohn (Pfizer)
Ravine Association
Ravine Lake
Blairsden Mansion
Somerset Lake & Game Club
Matheny Education & Medical Center
Far Hills Borough
Komline-Sanderson
Peapack Station
Virgin Spa at Natirar
Natirar
Bedminster Township
Essex Hunt Club
Tilney Farm
Peapack Brook
North Branch Raritan River
N
W
E
S
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared March 17, 2011
Data Sources: Borough of Peapack & Gladstone, Somerset County GIS
NJDEP, NJDOT, NJ Associations of County Tax Records,
NJ Association of County Tax Records
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 the NJDEP and is not state-authorized.
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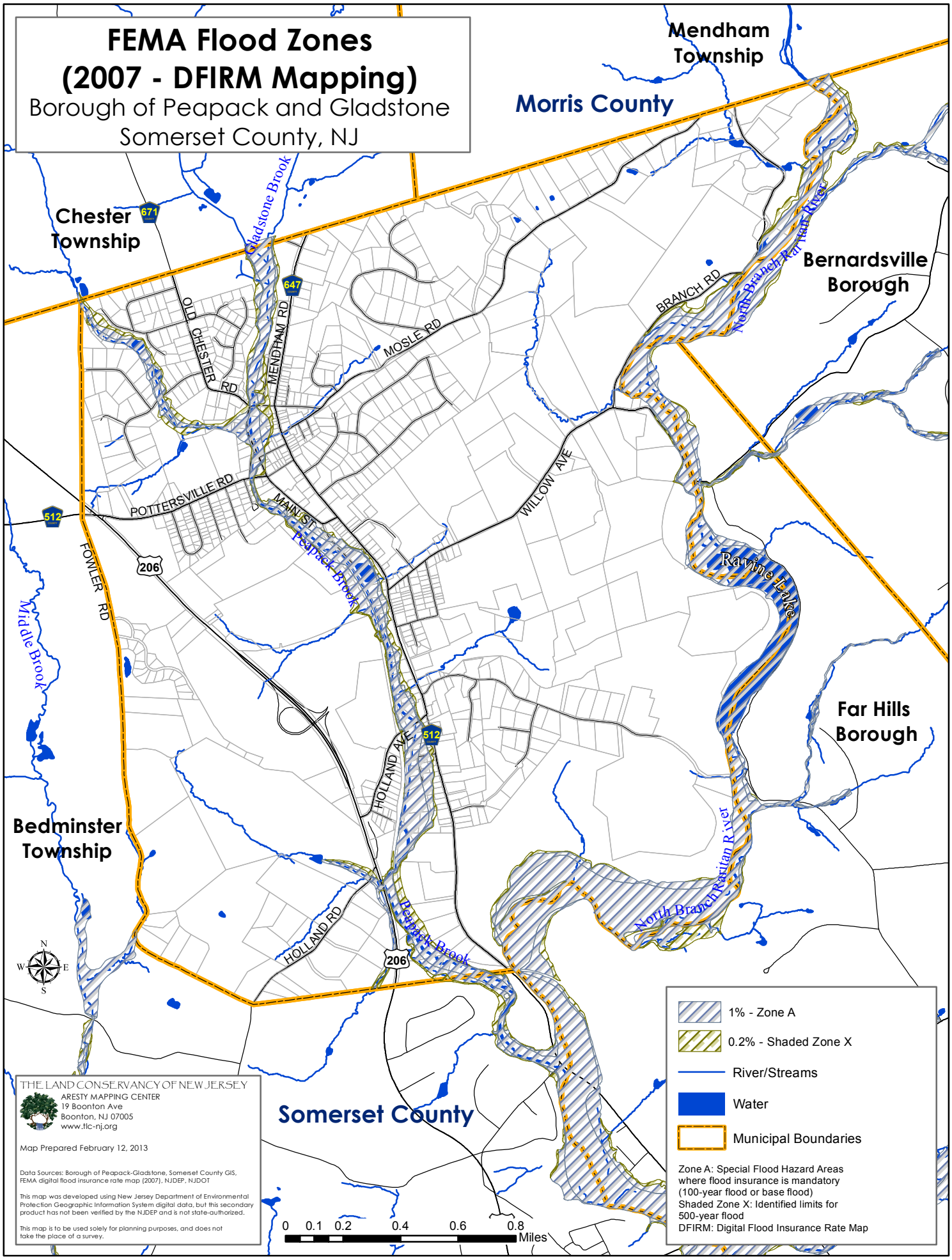
Somerset County
0 0.1 0.2 0.4 0.6 0.8 Miles
Conservation Easement (Non Profit)
Conservation Easement (Municipal)
County Parkland (Class 15C)
Preserved Municipal Open Space (Classified on ROSI) (Class 15C & 15F)
Municipal owned and Other Public Property (Class 15C)
School (Class 15A & 15B)
Church & Charitable Property (Class 15D)
Cemeteries & Graveyards (Class 15E)
Other Public Property (Class 15F)
Preserved Farmland
Private Recreation (Class 1, 2 and 4A)
Detention Basin
Land Parcels
Water Body
Municipal Boundaries
U.S. Equestrian Team Headquarters
Municipal Library
Municipal Building
Train Station



THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared February 12, 2013

Data Sources: Borough of Peapack-Gladstone, Somerset County GIS, FEMA digital flood insurance rate map (2007), NJDEP, NJDOT

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 the NJDEP and is not state-authorized.

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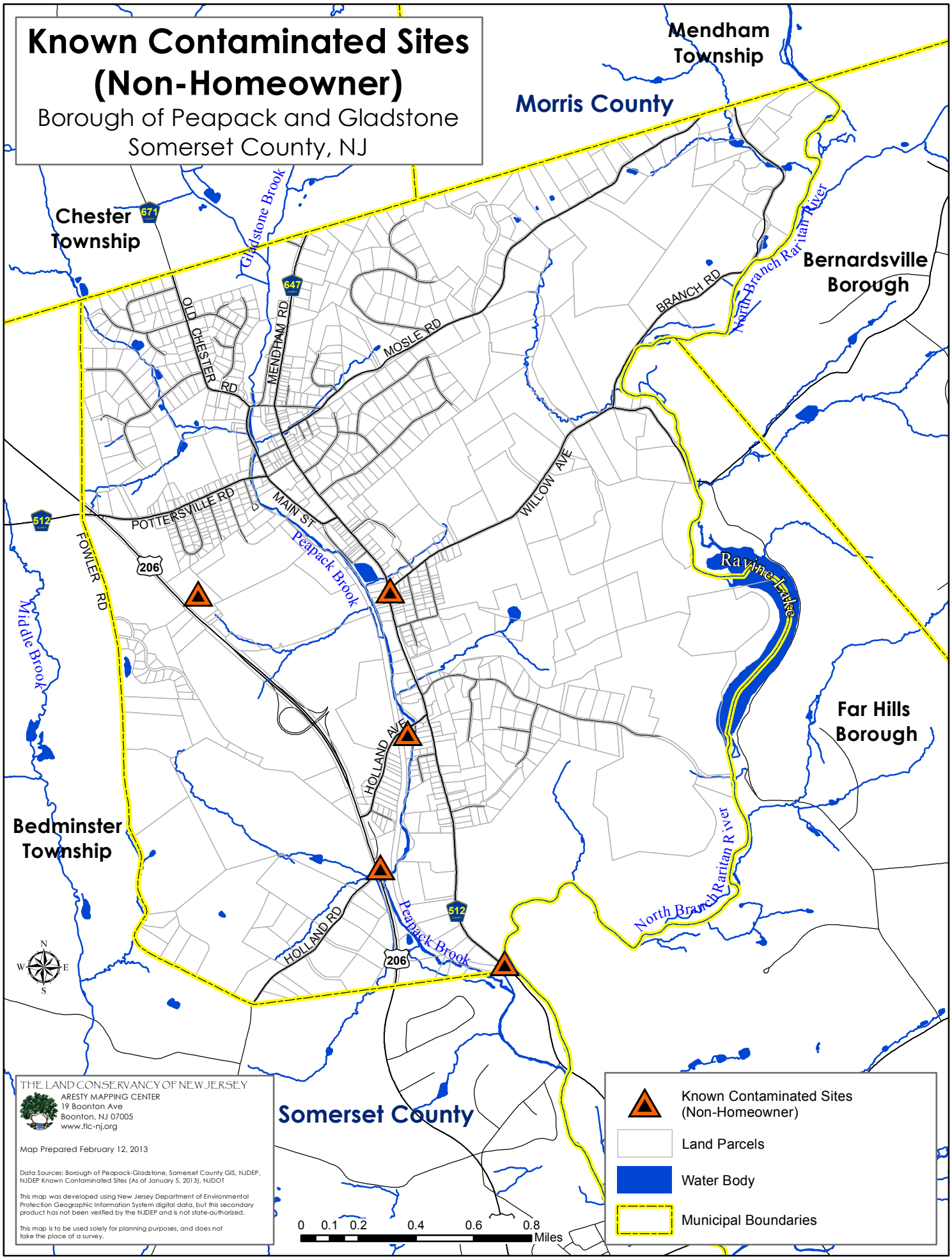
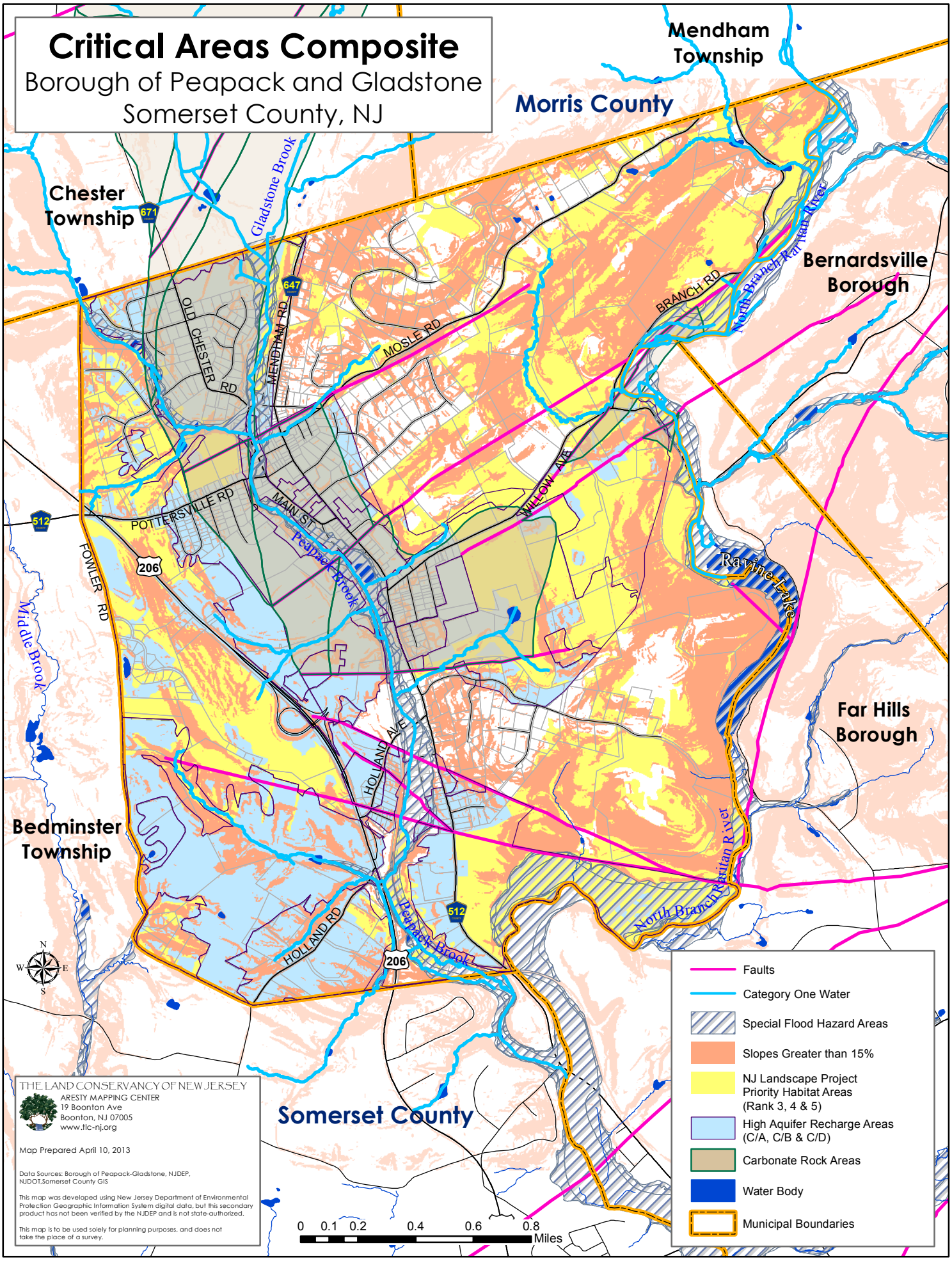

Known Contaminated Sites
(Non-Homeowner)
Borough of Peapack and Gladstone
Somerset County, NJ
Mendham Township
Morris County
Chester Township
Bernardsville Borough
Far Hills Borough
Bedminster Township
Somerset County
Gladstone Brook
North Branch Raritan River
Peapack Brook
Middle Brook
Ravine Lake
OLD CHESTER RD
MENDHAM RD
MOSLE RD
BRANCH RD
POTTERSVILLE RD
MAIN ST
WILLOW AVE
FOWLER RD
HOLLAND AVE
HOLLAND RD
671
647
512
206
N
S
E
W
THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org
Map Prepared February 12, 2013
Data Sources: Borough of Peapack-Gladstone, Somerset County GIS, NJDEP, NJDEP Known Contaminated Sites (As of January 5, 2013), NJDOT
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 the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.
0 0.1 0.2 0.4 0.6 0.8
Miles
Known Contaminated Sites (Non-Homeowner)
Land Parcels
Water Body
Municipal Boundaries

Critical Areas Composite

Borough of Peapack and Gladstone
Somerset County, NJ



THE LAND CONSERVANCY OF NEW JERSEY
ARESTY MAPPING CENTER
19 Boonton Ave
Boonton, NJ 07005
www.tlc-nj.org

Map Prepared April 10, 2013

Data Sources: Borough of Peapack-Gladstone, NJDEP, NJDOT,Somerset County GIS

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 the NJDEP and is not state-authorized.

This map is to be used solely for planning purposes, and does not take the place of a survey.

APPENDICES

A. Rare Plant Species and Ecological Communities Presently Recorded in the New Jersey Natural Heritage Database, July 30, 2008 Recorded in the New Jersey Natural Heritage Database

B. Historic Sites Inventory – Borough of Peapack & Gladstone.

C. Somerset County Reconnaissance Level Inventory Properties Eligible for the National Register of Historic Places – Borough of Peapack and Gladstone (Table VII-1)

D. Somerset County Cultural & Heritage Commission Proposed Historic Districts – Borough of Peapack & Gladstone

Source for *Appendices B, C and D*: 1989 Somerset County Cultural Resources Survey excerpted from the Borough of Peapack & Gladstone 1996 Master Plan Historic Preservation Plan Element

E. Documentation provided by Susan R. Rubright, Member, Park Manor Peapack L.L.C. regarding Blue Line Stream – Block 8, Lot 19. Letter dated April 2, 2013.

F. Letter Confirming ERI Update Compatibility with Borough Master Plan (Richard T. Coppola, June 7, 2013)

7/30/2008

Rare Plant Species and Ecological Communities Presently Recorded in the NJ Natural Heritage Database

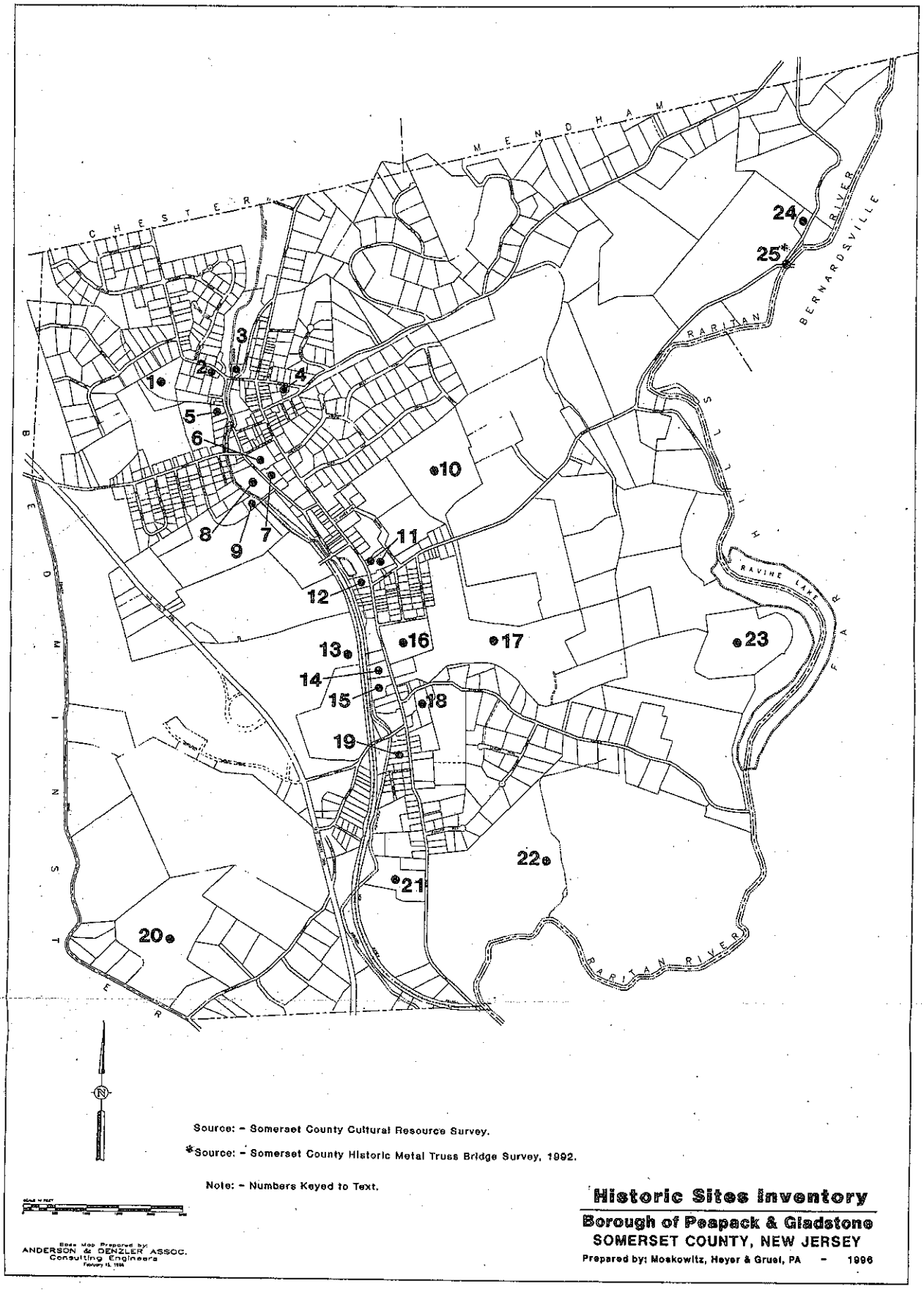
Scientific Name	Common Name	Federal Status	State Status	Regional Status	G Rank	S Rank
County: **Somerset**						
Other (Ecological)						
Primeval forest	Primeval Forest				G3?	S1
Subterranean Community - Other Classification						
Cave aquatic community	Cave Aquatic Community				G4?	S2
Cave terrestrial community	Cave Terrestrial Community				G4?	S2
Terrestrial Community - Other Classification						
Floodplain forest	Floodplain Forest				G4	S3?
Traprock glade/rock outcrop community	Traprock Glade/rock Outcrop Community				G2	S1
Vascular Plant						
Adlumia fungosa	Climbing Fumitory			HL	G4	S2
Agastache nepetoides	Yellow Giant-hyssop			HL	G5	S2
Alisma triviale	Large Water-plantain		E	LP, HL	G5	S1
Aplectrum hyemale	Puttyroot		E	LP, HL	G5	S1
Asclepias rubra	Red Milkweed			LP, HL	G4G5	S2
Asclepias variegata	White Milkweed			HL	G5	S2
Asclepias verticillata	Whorled Milkweed			HL	G5	S2
Aster praealtus	Willow-leaf Aster		E	LP, HL	G5T5?	S1
Botrychium oneidense	Blunt-lobe Grape Fern			HL	G4Q	S2
Bouteloua curtipendula	Side-oats Grama Grass		E	LP, HL	G5T5	S1
Calystegia spithamaea	Erect Bindweed		E	LP, HL	G4G5T4T5	S1
Cardamine angustata	Slender Toothwort			HL	G5	S3
Carex buxbaumii	Brown Sedge			HL	G5	S3

County: **Somerset**

Carex conoidea	Field Sedge		HL	G5	S2
Carex crawfordii	Crawford's Sedge		HL	G5	S2
Carex frankii	Frank's Sedge		HL	G5	S3
Carex pallescens	Pale Sedge		HL	G5	S2
Carex retrorsa	Retrorse Sedge		HL	G5	S2
Carex typhina	Cat-tail Sedge		HL	G5	S3
Carex willdenowii var. willdenowii	Willdenow's Sedge		HL	G5T5	S2
Castilleja coccinea	Scarlet Indian-paintbrush		HL	G5	S2
Cercis canadensis	Redbud	E	LP, HL	G5T5	S1
Cheilanthes lanosa	Hairy Lipfern		HL	G5	S2
Clematis occidentalis var. occidentalis	Purple Clematis		HL	G5T5	S2
Crataegus punctata	Dotted Hawthorn		HL	G5	S2
Cuphea viscosissima	Blue Waxweed		HL	G5?	S3
Cynoglossum virginianum var. virginianum	Wild Comfrey		HL	G5T5	S2
Desmodium humifusum	Trailing Tick-trefoil	E	LP, HL	G1G2Q	S1
Doellingeria infirma	Cornel-leaf Aster		HL	G5	S2
Eleocharis tenuis var. verrucosa	Warty Spike-rush	E	LP, HL	G5T3T5	S1.1
Epilobium angustifolium ssp. circumvagum	Narrow-leaf Fireweed		HL	G5T5	S1
Lysimachia hybrida	Lowland Loosestrife		HL	G5	S3
Malaxis unifolia	Green Adder's-mouth		HL	G5	S2
Melanthium virginicum	Virginia Bunchflower	E	LP, HL	G5	S1
Muhlenbergia capillaris	Long-awn Smoke Grass	E	LP, HL	G5TNR	S1
Muhlenbergia glomerata	Eastern Smoke Grass		HL	G5	S2
Obolaria virginica	Virginia Pennywort		HL	G5	S2
Panax quinquefolius	American Ginseng		HL	G3G4	S2

County: **Somerset**

Phlox pilosa	Downy Phlox	E	LP, HL	G5T5	SH
Plantago pusilla	Dwarf Plantain	E	LP, HL	G5	SH
Platanthera flava var. herbiola	Tubercled Rein Orchid		HL	G4T4Q	S2
Populus heterophylla	Swamp Cottonwood		HL	G5	S2
Potamogeton robbinsii	Robbin's Pondweed	E	LP, HL	G5	S2
Ptelea trifoliata	Wafer-ash	E	LP, HL	G5T5	S1
Ranunculus flabellaris	Yellow Water Buttercup		HL	G5	S3
Ranunculus pusillus var. pusillus	Low Spearwort		HL	G5T4?	S2
Rudbeckia fulgida	Orange Coneflower	E	LP, HL	G5T4?	S1
Sagittaria australis	Southern Arrowhead	E	LP, HL	G5	S1
Sanicula trifoliata	Large-fruit Black-snakeroot	E	LP, HL	G4	S1
Scutellaria leonardii	Small Skullcap	E	LP, HL	G4T4	S1
Selaginella rupestris	Rock Spike-moss		HL	G5	S2
Senecio pauperculus	Balsam Ragwort		HL	G5	S3
Spiranthes laciniata	Lace-lip Ladies'-tresses	E	LP, HL	G4G5	S1
Sporobolus neglectus	Small Rush-grass	E	LP, HL	G5	S1
Stachys palustris var. homotricha	Hairy Hedge-nettle	E	LP, HL	G5TNR	SH
Stachys tenuifolia	Smooth Hedge-nettle		HL	G5	S3
Triosteum angustifolium	Narrow-leaf Horse-gentian	E	LP, HL	G5	SH
Utricularia gibba	Humped Bladderwort		LP, HL	G5	S3
Viburnum opulus var. americanum	Highbush-cranberry		HL	G5T5	S3


CHESTER
MENDHAM
BERNARDSVILLE
RIVER
RARITAN
SOUTH BRANCH RARITAN
RAVINE LAKE
RARITAN RIVER
1
2
3
4
5
6
7
8
9
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11
12
13
16
17
23
14
15
18
19
22
21
20
24
25*
Source: - Somerset County Cultural Resource Survey.
*Source: - Somerset County Historic Metal Truss Bridge Survey, 1992.
Note: - Numbers Keyed to Text.
Base Map Prepared by:
ANDERSON & DENZLER ASSOC.
Consulting Engineers
Historic Sites Inventory
Borough of Peapack & Gladstone
SOMERSET COUNTY, NEW JERSEY
Prepared by: Moskowitz, Heyer & Gruel, PA - 1996

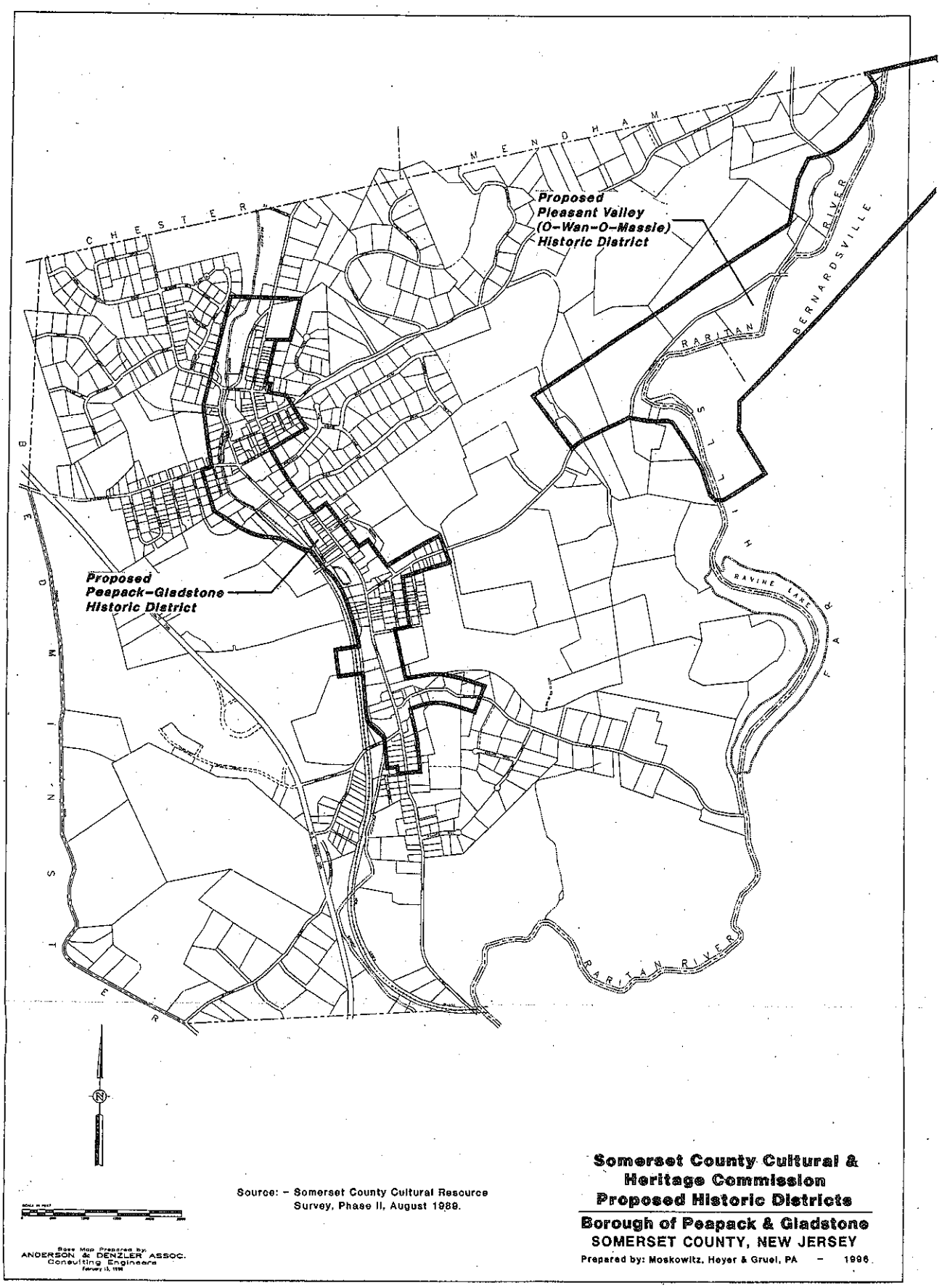
Table VII-1

SOMERSET COUNTY RECONNAISSANCE LEVEL INVENTORY PROPERTIES ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES BOROUGH OF PEAPACK AND GLADSTONE[1]

Key Map #	Use	Address/Location
1	Residence	End of private drive, southwest side of Chester Road, 0.15 miles west of Jackson Avenue
2	Residence	South side of Chester Road, approximately 200 feet west of Jackson Avenue
3	Residence	Northwest corner of Jackson Avenue and Church Street
4	Residence	South side of Jackson Avenue, 0.1 mile east of Mendham Road
5	Residence	291 Main Street
6	Residence	248 Main Street
7	Storage	West side of Main Street, 0.1 mile south of Overlook Avenue
8	Railroad Station	Gladstone railroad passenger station (State and National Register)
9	Residence	End of drive, West side of Main Street & NJ Transit railroad tracks between Lackawanna Avenue & Pottersville Road
10	Residence	End of private drive, north side of Willow
11	Residence	156 Main Street
12	Residence	165 Main Street
13	Lime Kiln - Archeological Site	West side of Peapack Creek, 0.1 mile west of 125 Main Street
14	Residence	101 Main Street
15	Residence & Auto Repair	99 Main Street
16	Lime Kiln - Archeological Site	East side of Main Street, 0.15 miles north of Highland Avenue
17	Farmhouse	North side of drive 0.3 mile east of Blairsden gate of the east side of Main Street, approximately 350 feet north of Highland Avenue
18	Residence	4 Highland Avenue
19	Residence	63 Main Street
20	Residence & horse farm	End of private drive, northeast side of Division Road., 0.2 miles northwest of Holland Road
21	Farmhouse	West side of Peapack Road, 0.5 miles south of Holland Avenue
22	Residence	End of private drive, 0.75 miles northeast of crossing of Main Street over NJ Transit railroad tracks; Natirar, King of Morocco estate
23	Retreat House	End of 1.2 mile drive that begins at Blairsden Gate on the east side of Main Street, 350 feet north of Highland Avenue (St. Joseph's Villa; Blairsden)
24	Residence	West side of Branch Road, 2 miles north of Smith Bridge
25	Bridge	

Source: Somerset County Cultural Resources Survey, 1989 & Somerset County Historic Metal Truss Bridge Survey, 1992.

[1] Does not include historic districts.


CHESTER
MENDHAM
Proposed
Pleasant Valley
(O-Wan-O-Massie)
Historic District
RARITAN RIVER
BERNARDSVILLE
RARITAN
SOUTH BRANCH
RAVINE LAKE
FAR
Proposed
Peapack-Gladstone
Historic District
BEDMINSTER
RARITAN RIVER
N
Source: - Somerset County Cultural Resource
Survey, Phase II, August 1989.
Somerset County Cultural &
Heritage Commission
Proposed Historic Districts
Borough of Peapack & Gladstone
SOMERSET COUNTY, NEW JERSEY
Prepared by: Moskowitz, Heyer & Gruel, PA - 1996
Base Map Prepared by:
ANDERSON & DENZLER ASSOC.
Consulting Engineers
February 15, 1996

PARK MANOR PEAPACK, L.L.C.
14 Ridge Road
Gladstone, NJ 07934

April 2, 2013

VIA HAND DELIVERY

Gian-Paolo Caminiti, Chair
Borough of Peapack & Gladstone
Land Use Board
P.O. Box 218
Peapack, New Jersey 07977

RE: Environmental Resource Inventory Update-2013/draft

Dear Mr. Caminiti:

Enclosed please find the materials that I discussed with the Environmental Commission at its meeting on March 25, 2013. As I mentioned at that meeting, I am not able to attend the Land Conservancy's presentation to the Land Use Board on Wednesday, April 3, 2013 as I will be appearing before a Planning Board in a neighboring municipality on a land use matter.

We appreciate the opportunity to present the enclosed to the Board and the Land Conservancy for your consideration. If there is to be an additional meeting on the ERI it is my hope that I will be able to appear in person.

Very truly yours,

Susan R. Rubright, Member

cc: Peapack & Gladstone Environmental Commission (w/enclosure)
Land Conservancy of New Jersey (w/enclosure) ✓

PARK MANOR PEAPACK, L.L.C.
14 Ridge Road
Gladstone, NJ 07934

April 2, 2013

VIA HAND DELIVERY

Gian-Paolo Caminiti, Chair
Borough of Peapack & Gladstone
Land Use Board
P.O. Box 218
Peapack, New Jersey 07977

RE: Environmental Resource Inventory Update-2013/draft

Dear Mr. Caminiti and Members of the Land Use Board:

Park Manor Peapack, LLC owns property located at 156 and 158 Main Street and known as Block 8, Lots 19 and 20, respectively, on the Borough of Peapack & Gladstone tax maps. We have reviewed the Environmental Resource Inventory Update 2013/draft, which indicates it was "compiled by the Land Conservancy of New Jersey with the Borough of Peapack & Gladstone Environmental Commission" (the "ERI"). We have a number of comments regarding the ERI and appreciate the opportunity to present them along with certain supporting documentation.

First, it is our understanding that the ERI is not a regulatory document. Second, we understand that the data in the ERI were gathered from a variety of existing data sources, including the New Jersey Department of Environmental Protection ("NJ DEP"). Neither the Land Conservancy nor the Borough conducted any independent studies or individual site investigations. Neither the Land Conservancy nor the Borough compared the source documents with actual site conditions. Accordingly, the ERI is not to be used to impose restrictions on land or landowners; rather, it is a tool to be utilized by the Borough for general planning purposes. Site specific data would prevail over the secondary source data reflected in the ERI.

The maps in the ERI show a "blue line stream" on a portion of Block 8, Lot 19. Map 12, entitled "Streams and Open Water Buffers", attributes a 300' buffer along the alleged blue line stream. According to a determination by the NJ DEP in 2007 that was based on an on-site inspection and analysis, this alleged stream does not exist and, accordingly, neither does the buffer. This determination was then independently verified by an environmental scientist in 2012. In support of the above, please find the following:

1. **Letter dated August 27, 2007 from Terry Pilawski, Chief, Bureau of Watershed Management, to Ray C. Liotta, Maser Consulting, PA, RE: Jurisdictional Determination, Lots 19 & 20, Block 8, Borough of Peapack-Gladstone, Somerset County, NJ.** (A copy of that letter, along with portions of a survey of the property prepared by Maser Consulting of the areas in question, and attached by the property owner are enclosed).

In the letter, Ms. Pilawski states that "the stream line shown adjacent to the (sic) Willow Avenue on the USGS quadrangle map does not physically exist. The site visit conducted on May 11, 2007 confirmed this fact and also no evidence of any relocation or piping of this stream was found."

Ms. Pilawski also notes that the "man-made drainage ditch located to the west of Route 512 is not a stream and is fed by stormwater runoff from the drainage conveyance system of Main Street." This ditch is located between the gray house next to Liberty Park and Liberty Park, directly across from the parking lot on 156 Main Street, Block 8, Lot 19 owned by Park Manor Peapack.

2. **Letter dated February 22, 2012 from Stephen J. Souza, Ph.D., President, Princeton Hydro, LLC., to William Ryden, P.E.** (copy enclosed). In this letter Dr. Souza states that "the objective of my site inspection of this parcel (Block 8, Lot 19) was to determine whether a blue line feature that appears on the NJDEP I-Map coverage of the site is an actual waterway or is the artifact of an older, now non-exiting feature." His conclusion is that "the blue line feature that appears on the I-Map and Google Maps is an artifact of a previous condition". He also opined that the parcel is not encumbered by any NJ DEP regulated features.

3. **Resolution memorializing grant of minor subdivision and variance approval dated November 3, 2004 to Nicolas Villa for property located at 2 School Street and known as Block 8, Lots 2.01 and 2.05.** That property is located directly across School Street from the Park Manor Peapack property and a blue line stream and 300' buffer are likewise shown on the ERI's Map12 to exist on Mr. Villa's property. Neither the resolution nor any document in the subdivision application file makes reference to a blue line stream, stream buffer or any NJ DEP regulated feature existing on Mr. Villa's property or in the area. It is extremely unlikely that the Planning Board would have missed the existence of such a feature during the review and approval process had it in fact existed.

We understand that the Borough is not in a position to change the NJ DEP maps. We are bringing this matter regarding our property to the Board's attention with the hope that language might be added to the ERI further clarifying that the ERI maps are based on secondary source materials, that independent verification via site inspections was not made and that site specific data prevail over information found in secondary source documents.

We appreciate your time and consideration.

Very truly yours,

Susan R. Rubright, Member

Arthur C. Rubright, Member

cc: Peapack & Gladstone Environmental Commission (w/enclosure)
Land Conservancy of New Jersey (w/enclosure)

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Watershed Management
Bureau of Watershed Regulation
P.O. Box 418, 401 East State Street
Trenton, New Jersey 08625-0418
Telephone: (609) 984-6888
Fax: (609) 984-6505
www.state.nj.us/dep/watershedmgt

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

Raymond C. Liotta
Maser Consulting P.A.
Perryville III Corporate Park
53 Frontage Road, Suite 120
P.O.Box 4017
Clinton, NJ 08809

AUG 2 7 2007

Re: Jurisdictional Determination
Lots 19 & 20, Block 8
Borough of Peapack – Gladstone, Somerset County, NJ

Dear Mr. Liotta:

This letter is in response to your correspondence dated June 20, 2007 requesting Jurisdictional Determination for the applicability of Special Water Resource Protection Area (SWRPA) as per Stormwater Management Rules (N.J.A.C. 7:8) for your project.

The stream line shown adjacent to the Willow Avenue on the Soil Survey map and on USGS quadrangle map does not physically exist. The site visit conducted on May 11, 2007 confirmed this fact and also no evidence of any relocation or piping of this stream was found. Hence there is no requirement for SWRPA along this virtual stream line.

The man-made drainage ditch located to the west of Route 512 is not a stream and is fed by the stormwater runoff from the drainage conveyance system of Main Street. Hence the SWRPA requirement does not apply to this feature either.

Based on the detailed review of the existing conditions, USGS quadrangle map, County Soil survey and category one waterbodies list together with the fact that the discharge from the proposed site does not discharge to the man-made recreational pond located west of Route 512 and provides approximately 750 feet travel distance prior to discharge in the Peapack Brook, it is determined that the SWRPA requirements does not apply to this pond.

AUG 29 2007

#0720417A

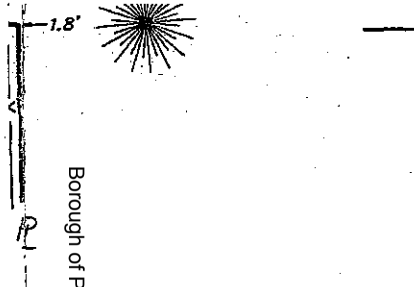
This letter does not relieve the applicant of the responsibility of obtaining any other required Federal, State or local permits and approvals as required by law and is based on a review of the information submitted to the Department.

The Department hopes this answers your concern satisfactorily. Should you have any questions in this regard, please contact, Kunal Patel, of my staff at 609-984-6888.

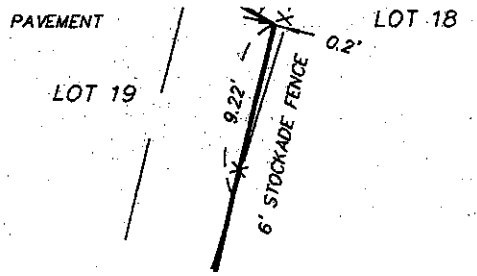
Sincerely,

for Terry Pilawski, Chief
Bureau of Watershed Regulation

cc: Borough of Peapack-Gladstone Township Engineer, Borough of Peapack-Gladstone
Kunal Patel, Bureau of Watershed Regulation, NJDEP



DETAIL 'E'
N.T.S.



DETAIL 'F'
N.T.S.

Borough of Peapack & Gladstone - Environmental Resource Inventory Update

Appendix E, P

LEONARDO E. PONZIO
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 39402

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners=Surveyors=Landscape Architects
State of N.J. Certificate of Authorization: 24GA27986500

CLINTON OFFICE
Perryville III Corporate Park
53 Frontage Road, Suite 120
P.O. Box 4017, Clinton, NJ 08809
Phone (908) 238-0900
Fax (908) 238-0901
E-mail - solutions@maserconsulting.com

Regional Offices
Red Bank, N.J.
Hamilton Square, N.J.
Logan, N.J.
Mt. Arlington, N.J.
Newburgh, N.Y.
West Nyack, N.Y.
Bethlehem, PA.

FEASIBILITY STUDY

BOUNDARY AND TOPOGRAPHIC SURVEY

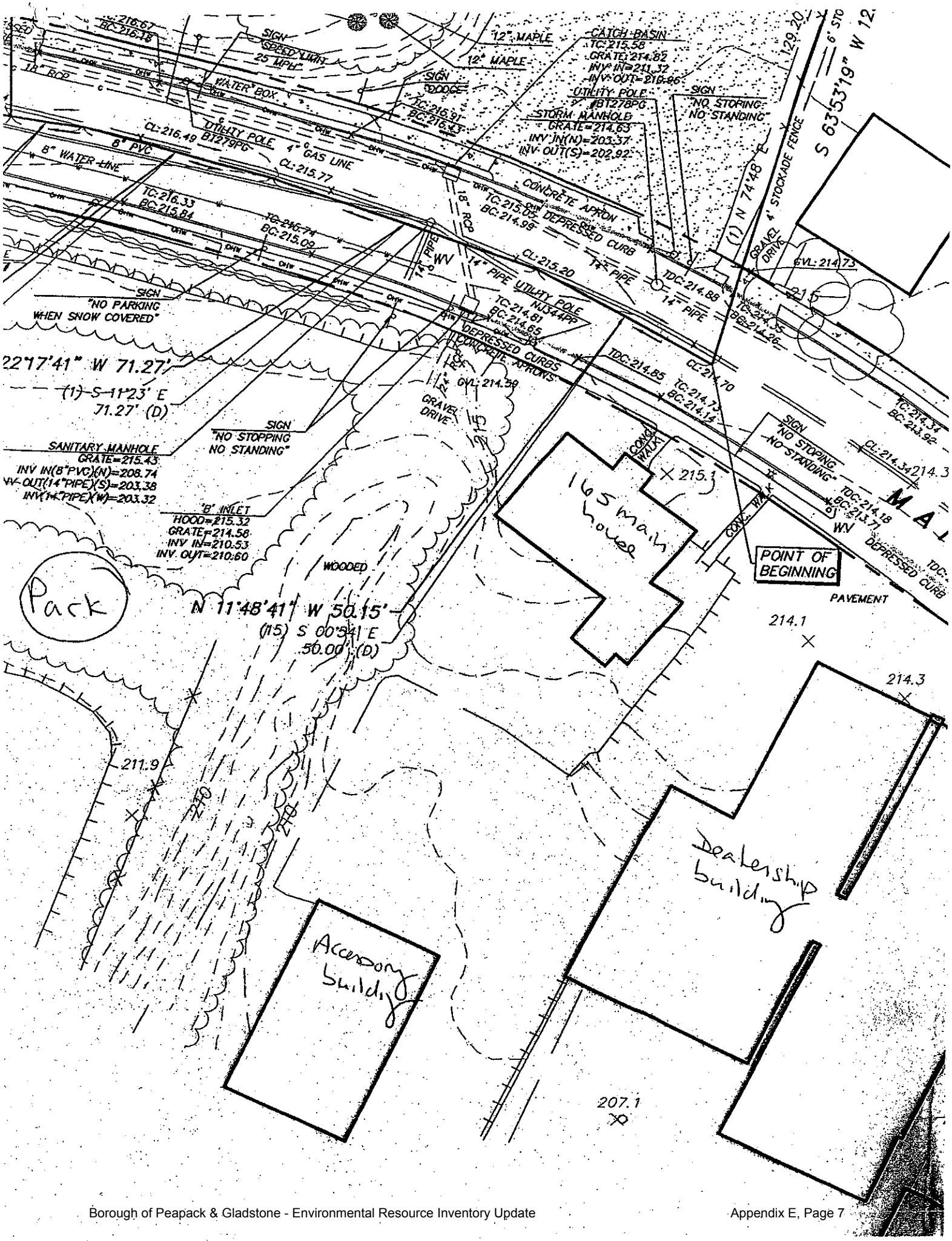
FOR

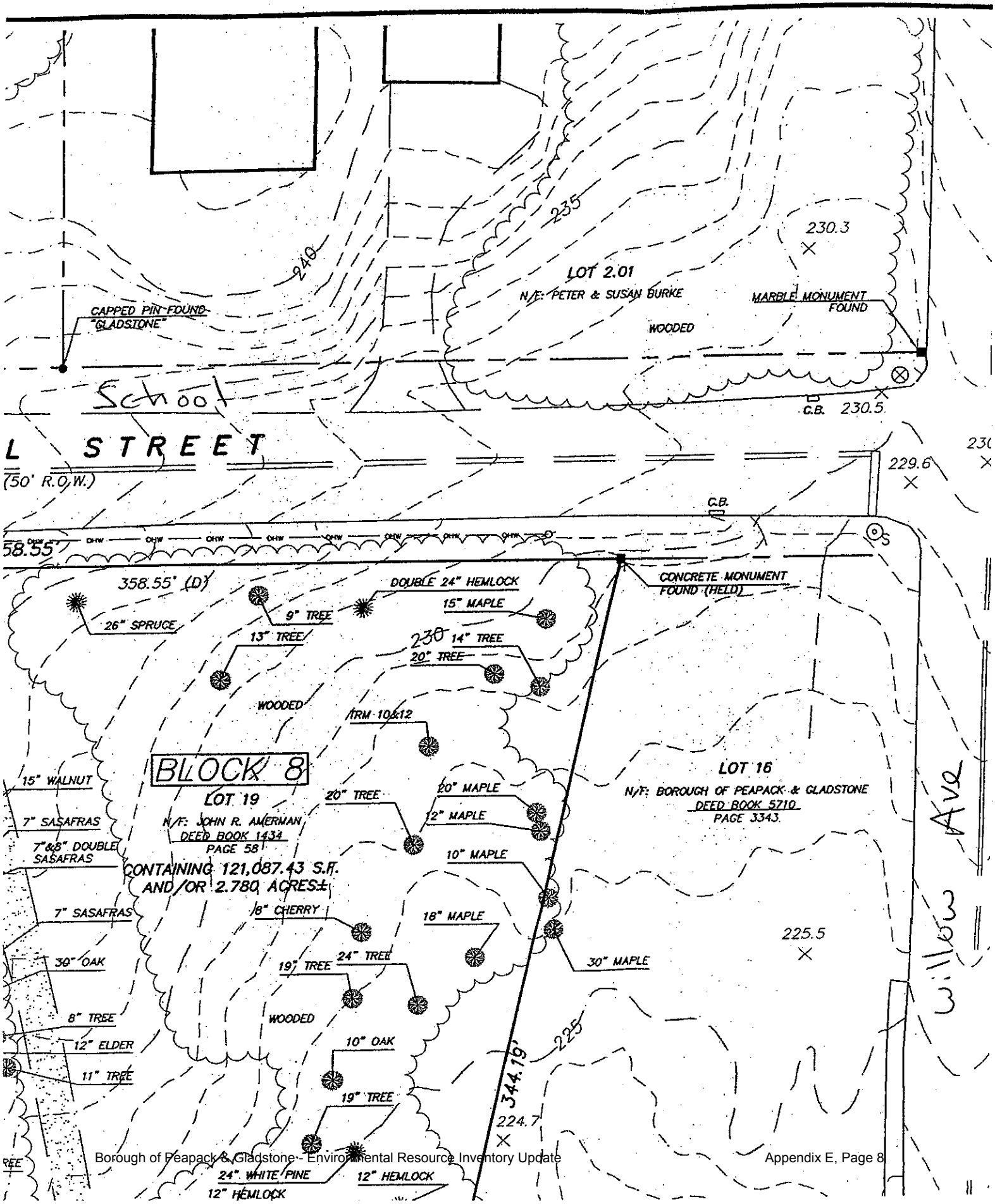
Susan R. Rubright, Esq.

BLOCK NUMBER 8
LOTS 19 & 20

TOWNSHIP OF PEAPACK–GLADSTONE SOMERSET COUNTY NEW JERSEY

JOB NUMBER: 07000117A	DATE: 4/24/07
SCALE: 1" = 30'	LATEST REVISION: 6-12-07
INDEX NUMBER: CLSU005516	DESIGN BY: JEH
SHEET NUMBER: 1 of 1	


SIGN
SPEED LIMIT
25 MPH
12" MAPLE
CATCH BASIN
TC: 215.58
GRATE: 214.82
INV IN=211.32
INV OUT=210.66
SIGN
"DODGE"
UTILITY POLE
BT278PG
STORM MANHOLE
GRATE=214.63
INV IN(N)=203.37
INV OUT(S)=202.92
SIGN
"NO STORING
NO STANDING"
WATER BOX
UTILITY POLE
BT279PG
4" GAS LINE
CL: 216.49
8" PVC
8" WATER LINE
CL: 215.77
TC: 216.33
BC: 215.84
TC: 216.91
BC: 216.43
TC: 215.07
BC: 214.99
DEPRESSED CURB
CONCRETE APRON
18" RCP
14" PIPE
14" PIPE UTILITY POLE
NJ344PP
TC: 214.81
BC: 214.65
DEPRESSED CURBS
CONCRETE APRONS
TDC: 214.88
14" PIPE
TDC: 214.85
TC: 214.72
BC: 214.15
CL: 214.70
TC: 214.35
BC: 214.26
TC: 214.34
BC: 213.92
SIGN
"NO PARKING
WHEN SNOW COVERED"
SIGN
"NO STOPPING
NO STANDING"
SIGN
"NO STOPING
NO STANDING"
CL: 214.34
GRAVEL DRIVE
GVL: 214.73
GVL: 214.39
4' STOCKADE FENCE
(1) N 74°48' E
S 63°53'19" W 12.
129.20
22°17'41" W 71.27'
(1) S 11°23' E
71.27' (D)
SANITARY MANHOLE
GRATE=215.43
INV IN(8"PVC)(N)=208.74
INV OUT(14"PIPE)(S)=203.38
INV IN"PIPE)(W)=203.32
"B" INLET
HOOD=215.32
GRATE=214.58
INV IN=210.53
INV OUT=210.60
CONC. WALK
CONC. WALK
165 main house
POINT OF BEGINNING
PAVEMENT
WOODED
Pack
N 11°48'41" W 50.15'
(115) S 00°54' E
50.00' (D)
214.1
214.3
211.9
207.1
Dealership building
Accessory building


LOT 2.01
N/F: PETER & SUSAN BURKE
MARBLE MONUMENT FOUND
CAPPED PIN FOUND "GLADSTONE"
WOODED
School
L STREET
(50' R.O.W.)
C.B.
230.3
230.5
229.6
240
235
358.55' (D)
DOUBLE 24" HEMLOCK
15" MAPLE
9" TREE
26" SPRUCE
13" TREE
14" TREE
20" TREE
CONCRETE MONUMENT FOUND (HELD)
WOODED
TRM 10&12
BLOCK 8
LOT 19
N/F: JOHN R. AMERMAN
DEED BOOK 1434
PAGE 58
CONTAINING 121,087.43 S.F.
AND/OR 2.780 ACRES±
LOT 16
N/F: BOROUGH OF PEAPACK & GLADSTONE
DEED BOOK 5710
PAGE 3343
15" WALNUT
7" SASAFRAS
7"&8" DOUBLE SASAFRAS
20" TREE
20" MAPLE
12" MAPLE
10" MAPLE
8" CHERRY
18" MAPLE
30" MAPLE
30" OAK
19" TREE
24" TREE
8" TREE
12" ELDER
11" TREE
10" OAK
19" TREE
344.19'
225
225.5
224.7
24" WHITE PINE
12" HEMLOCK
12" HEMLOCK
AVE

Scientists, Engineers & Environmental Planners Designing Innovative Solutions for Water, Wetland and Soil Resource Management

22 February 2012

Mr. William Ryden, P.E.
Anderson & Denzler Associates, Inc.
519 Ridgedale Avenue
P.O. Box 343
East Hanover, NJ 07936

Dear Mr. Ryden:

The following letter report submitted by Princeton Hydro, LLC summarizes our review of Block 8, Lot 19, 156 Main Street, Borough of Peapack and Gladstone, NJ. The lot is essentially bounded by Main Street to the west, School Street to the east and Willow Avenue to the south. The objective of my site inspection of this parcel was to determine whether a blueline feature that appears on the NJDEP I-Map coverage of the site is an actual waterway or is the artifact of an older, now non-existing feature. This same mapped feature appears on Google Maps. My inspection of the site was conducted on 17 February 2012.

Historically, there was likely some type of water conveyance feature that ran through the center of this parcel. However, I have concluded that presently there is no feature on the site that can be considered a waterway, intermittent stream or stormwater conveyance ditch. I reached this conclusion on the basis of four basic observations:

1. The stormwater collection and conveyance system that services School Street and Willow Avenue effectively diverts runoff from the parcel. Although there is no curb and gutter system, any runoff that flows down School Street towards Willow Avenue is channeled along the edge of the roadway to three (3) stormwater catch basins. These basins interconnect with the stormwater collection system located along Willow Avenue. This essentially eliminates the conveyance of stormwater runoff to the subject parcel. Additionally, as a result of some recent grading and the presence of a small (18" corrugated metal pipe) culvert, stormwater running down the north side of Willow Avenue upgradient of the School Street intersection is collected and diverted into the Willow Avenue stormwater collection system. This runoff likely served as the headwater for the artifact blueline stream. As such, essentially there is presently no source of storm event inflow due to the presence of the highly developed School Street and Willow Avenue stormwater collection and conveyance system (Photos 1-3).
2. Examination of the parcel itself revealed that although a topographic depression runs through the approximate center of the parcel, this feature is discontinuous as a result of past filling and grading activities. The greatest amount of filling and

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regrading occurs towards the lower edge of the parcel where it abuts a paved parking lot that is used as a sales lot for the car dealership located on Main Street. This filling and regrading essentially eliminates any potential for a functional swale. As such, although there is a topographic depression present in the subject parcel, it is discontinuous and cannot function in the capacity of a waterway, intermittent stream or stormwater conveyance ditch (Photo 4).

3. Examination of the vegetation present in the aforementioned topographic depression revealed no wetland or riparian vegetation. The understory of the area is vegetated by upland grasses and invasive plant species, in particular mugwort. There was also a dense amount of catbrier and wild blackberry (Photo 4). The over story consisted of maples and oaks. I observed no species of plants that are associated with wetland, stream or riparian systems. Although I did not conduct any actual soil borings, I did make a number of shallow (6") hand excavations into the soils located within the topographic depression. I observed a soil condition reflective of an upland area with no evidence of wetland like conditions.
4. Examination of the stormwater catch basin located on Main Street, which is immediately down gradient and essentially aligned with the approximate center of the subject parcel, has no inflow pipe that could be serving this parcel. As per my inspection of this catch basin there is no evidence of any subsurface drain or pipe that could be collecting runoff or flow from the subject parcel.

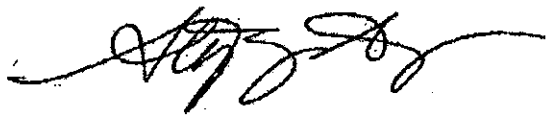
As such, based on the above I concluded that the blueline feature that appears on I-Map and Google Maps is an artifact of a previous condition. Largely as a result of the School Street / Willow Avenue stormwater collection system, what ever opportunity for runoff or flow to be directed to the subject parcel has been effectively eliminated. Additionally, although there is a topographic depression that runs through the majority of the approximate center of the subject parcel, grading and filling activities on the subject lot and adjacent lots has eliminated any vestiges of what was likely at some time a swale. Physically, there is no way for flow to be continuously conveyed from the top (School Street end) to the bottom (Main Street end) of the lot. Additionally, examination of the Main Street stormwater collection system did not reveal the presence of any subsurface pipe emanating from the approximately location of the subject parcel.

Related to my examination of the blueline feature, I was asked to also comment on the likelihood of the subject parcel being affected by the riparian buffer (Special Water Resource Protection Area – SWRPA) associated with Peapack Brook or Liberty Pond. The parcel is more than 300' from the top of bank of Peapack Brook. While within 300' of the edge of Liberty Pond, the pond itself will not likely qualify as a C-1 waterbody. I make this statement for two main reasons. First, the pond is man-made and is an off-line impoundment not directly subject to inflow from Peapack Brook. Second, the pond's primary source of inflow is stormwater runoff from the surrounding streets; as such it

functions in the capacity of a stormwater management basin. Even if it was assigned a riparian buffer, the land adjacent to the pond that would be encompassed by the buffer is already significantly altered and developed and as such has lost its ecological functions and services.

In conclusion, I found no evidence of any waterway or other feature on the subject parcel (Block 8, Lot 19) that would qualify as a blueline stream. Additionally, in my professional opinion, based on dealing with SWRPA and riparian buffer issues, I do not feel that the parcel is encumbered by any NJDEP regulated features. In its present state it is a partially developed, historically altered parcel that can be best characterized as a disturbed upland property. Should you have any questions or comments please contact me.

Sincerely,



Stephen J. Souza, Ph.D.
President, Princeton Hydro, LLC

BOROUGH OF PEAPACK AND GLADSTONE LAND USE BOARD
RESOLUTION OF MEMORIALIZATION

Approved: October 20, 2004
Memorialized: November 3, 2004

IN THE MATTER OF NICK VILLA
MINOR SUBDIVISION AND
VARIANCE APPLICATIONS
LOTS 2.01 AND 2.05, BLOCK 8
Application No. AP-2004-03

WHEREAS, Nick Villa (hereinafter known as the "Applicant") filed an application for minor subdivision and variance approvals with the Borough of Peapack and Gladstone Land Use Board (hereinafter known as the "Land Use Board") on May 6, 2004, and

WHEREAS, the application was deemed complete on May 18, 2004, and

WHEREAS, public hearings were held on July 21, 2004 and October 20, 2004, notice being required, at which time the Land Use Board rendered its decision on the application in accordance with the requirements of N.J.S.A. 40:55D-10(g), and

WHEREAS, it has been determined that the Applicant has complied with all of the rules, regulations and requirements of the Land Use Board and that all of the required provisions of compliance have been filed with the Land Use Board, and

WHEREAS, the Land Use Board has received as part of the hearing process the following testimony and documentary evidence submitted by the Applicant and its Consultants, the Land Use Board Staff, and members of the public:

The Applicant is the owner of property known as Lot 2.01, Block 8, on the Tax Map of the Borough of Peapack and Gladstone. Mr. and Mrs. Jeff Cutler is the owner of property known as Lot 2.05, Block 8. Existing Lot 2.01 consists of 1.421 acres of property and is located in the

R-18 Zone. Lot 2.05 consists of 12.660 acres of property and is located in the RR-1 Zone. The Applicant is seeking to reduce the size of Lot 2.05 to 12.162 acres of property and attaching the 0.498 acres of property to Lot 2.01. That lot would then exist in both the R-18 and RR-1 Zones. In addition, the Applicant would provide a dedication to the Borough of Peapack and Gladstone for road frontage on Willow Avenue of 0.225 acres. He then seeks to subdivide Lot 2.01 into two lots. New Lot 2.01 would consist of 45,631 square feet and new Lot 2.10 would consist of 28,162 square feet.

On proposed Lot 2.01, there is an existing 2-story frame dwelling. He originally proposed to construct a garage which would measure 23 feet by 23 feet. He subsequently modified that proposal to increase the garage dimension to 24 feet by 24 feet.

On proposed Lot 2.10, he intends to construct a 2-family dwelling that would have the architecture similar to a barn and would be 35 feet by 45 feet. He also originally proposed to construct a garage of 22 feet by 22 feet that was subsequently modified to 24 feet by 24 feet.

Both garages are proposed to be 19 feet 6 inches with a cupola. This will require height variances for accessory structures. The proposed 2-family dwelling on new Lot 2.10 also requires a use variance since two family dwellings are not permitted within the zone. The two new lots would be located in both the R-18 and the RR-1 Zones. There would also be a floor area ratio variance for the proposed 2-family dwelling since the proposal is for 12 percent versus 10 percent authorized. Additional variances are required for front yard setback for the garage on Lot 2.10 and a side yard setback variance on Lot 2.10 for 15 feet versus 25 feet. Finally, there is a lot area variance since proposed Lot 2.10 is 28,162 square feet in a zone requiring 45,000 square feet.

The Applicant, Mr. Villa, testified that he believed that the proposal advances the purposes of zoning by providing less density, promotes desirable visual environment, provides good civic design and planning of structures without adversely affecting either the public good or the zone plan. He advised the Board that he has the right to reacquire approximately 1.5 acres from Lot 2.05, Block 8. This is shown on the map by way of a dotted line. He indicated that the 1.5 acres will allow for the construction of a single-family residence in accordance with the RR-1 zoning. He also believed that he would have sufficient land in the R-18 Zone to resubdivide existing Lot 2.01 into three lots with few or no variances. He suggests to the Board that such a proposal, while more in line with the strict interpretation of the applicable ordinances, would not advance good planning in the area. He believes that his proposal maintains the rural character of this portion of the Borough by maintaining many of the natural characteristics of the area. He introduced various architectural sketches which suggest that the proposed 2-family dwelling and garage to be located on new Lot 2.10 will be in keeping with the character of the area. There is an existing barn in the neighborhood and his plan is to maintain that rustic character on new Lot 2.10.

The Applicant goes on to testify that the location of the proposed 2-family house and garage are intended to both preserve the natural features of the lot and preserve the street scape along Willow Avenue. He notes that there are slopes on the southerly portion of proposed Lot 2.10 along Willow Avenue. His proposal will allow him to maintain those largelyundisturbed. The same is true with regard to existing tree lines on both new Lots 2.10 and 2.01. There was discussion with regard to either reorienting the house so that the front door would face School Street (its current proposed location faces Willow Avenue) or to reorient the garage and the

house so that the garage would be on the northerly side of the lot. The Applicant indicates that to do so would adversely affect the street scape and push the house into the slopes located on the southerly side of the lot.

A concern was raised with regard to the option land on Lot 2.05. The Applicant presented evidence that Lot 2.05 has a deed restriction against further subdivision. Thus, with the acquisition of only a portion of the option land from Lot 2.05 and the integration of it into the proposed subdivision, the balance of the option land would remain incorporated as part of Lot 2.05 and would therefore be subject to the restriction against further subdivision as contained in the Deed.

The Applicant further discussed the height variances that he requested. He provided various renderings showing the structures at different heights and suggested to the Board that the proposal was the optimum height for an appropriate architectural character for the neighborhood and provides symmetry to the proposed 2-family dwelling.

The Applicant, in response to questions by both the Board and the Staff, presented an exhibit which established an area straddling Lots 2.10 and 2.01 which would be non-disturbance. The area is approximately 168 feet long by 50 feet wide. The Applicant agreed that this area would be restricted by deed on both lots further preserving the street scape along Willow Avenue and School Street.

The Board Engineer, Mr. Ryden, rendered a report dated May 18, 2004, which was incorporated into the record. The Board Planner, Mr. Coppola, also rendered a report dated June 10, 2004, which was also incorporated into the record.

In addition to the testimonial evidence, the Applicant submitted the following

documentary evidence:

A-1. Outline of Testimony for Land Use Board;

A-2. Photo Board of Prior Projects;

A-3. Conceptual Subdivision dated June 8, 2004;

A-4. Architectural Sketch of the new structures;

A-5. Sketch of the floor plan;

A-6. Subdivision Plat dated June 8, 2004;

A-7. Grading Exhibit dated June 14, 2004;

A-8. Architectural Sketches of the height of the two structures to be built;

A-9. Photo Board;

A-10. Deed;

A-11. Deed;

A-12. Deed of Lot 2.05, dated April 5, 2004, showing no further subdivision authorized;

A-13. Sketch of Non-disturbed Area on Lots 2.10 and 2.01;

A-14. Alternative Views from School Street of 2-family dwelling and garage;

A-15. Further Alternative from School Street, attached garage;

A-16. Sketch of Proposal.

The meeting was opened to the public and no public comment was received.

WHEREAS, the Land Use Board in reviewing the testimony and documentary evidence, makes the following findings of fact and conclusions:

1. The Board finds that the use variance can be granted since the Applicant has shown that good civic design and good planning is being employed by the proposal. In this case, the

Board finds that the potential of having four separate structures, three of which are in the R-18 Zone and one in RR-1 Zone is density that is not in character with the area. Rather, the proposal for a 2-family structure and one additional single-family lot that conforms with the RR-1 Zone is preferable. The Board further finds that the proposal is compatible with and consistent with the Master Plan and the Zoning Ordinance. The Board further finds that the grant of such a variance would not create substantial detriment to either the zone plan or to the neighborhood.

2. The height variance can be granted for 19 feet 6 inches, plus the cupola, for the accessory structures since the architecture for those garages will be in keeping with the area and will be similar in character to the principle structures.

3. The side yard variance for the 2-family house can be granted on the basis that the relocation of the house in accordance with the setback requirement will push the development into slopes which are currently being preserved under the proposal.

4. The lot area variance for proposed Lot 2.10 can be granted because the Applicant has shown that good planning practices and a desirable visual environment will be created by the configuration of the lots.

5. The Board further finds that the FAR variance can be granted for Lot 2.10 since the 2-family unit will tend to preserve the street scape and, by incorporating the barn architecture, and will maintain the rustic environment of the area.

6. The Board further finds that there is no negative impact to either the zone plan or to the neighborhood by the grant of any of the variances referenced hereinbefore.

NOW, THEREFORE, BE IT RESOLVED that the Land Use Board of the Borough of Peapack and Gladstone does hereby approve the minor subdivision and variances requested by

the Applicant, as more particularly described in a map entitled "Minor Subdivision Plat, Tax Map Lots 2.01 and 2.05, Block 8, prepared by Gladstone Design, Inc., Gladstone, New Jersey", which map is dated April 12, 2004, consisting of one (1) sheet.

This approval is subject to the following terms and conditions:

1. The map shall be revised to revise the size of the garages on Lots 2.10 and 2.01 to reflect 24 feet by 24 feet.

2. This approval shall incorporate A-13, which shows the area of non-disturbance on both Lots 2.10 and 2.01. Said area shall be designated on the revised map and shall be incorporated in the deeds of each of these lots. The language of these deed restrictions shall be reviewed by the Borough Engineer and the Board Attorney.

3. A sight easement shall be provided on the revised map for the intersection of School Street and Willow Avenue in accordance with Township regulations.

4. This approval is subject to all appropriate outside agencies that may have jurisdiction over this matter.

5. This approval is subject to the payment of all appropriate fees and taxes.

6. This approval is subject to the grant of the following variances:

A. Use variance for a 2-family dwelling on Lot 2.10;

B. Lot area variance for Lot 2.10 authorizing that lot to be 28,162 square feet;

C. Side yard variance for Lot 2.10 authorizing a side yard of 15 feet;

D. Accessory building heights of 19 feet 6 inches, plus a cupola versus 15 feet authorized;

E. An accessory building in the front yard on Lot 2.10.

The undersigned does hereby certify that the foregoing is a true copy of the action taken by the Borough of Peapack and Gladstone Land Use Board at its regular meeting on October 20, 2004.

Chairman _____

Secretary _____

IN FAVOR OF THE ACTION TAKEN: Suriano, Snedeker, Junghans, Yannacone, Muller, Tursini, and Roth.

DENIED: Taylor

ABSTAINED: Girardy, Gunning, and Terry.

RWT 10-27-04

COPPOLA & COPPOLA ASSOCIATES
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June 7, 2013

Barbara Osmun, Land Use Board Secretary
Borough of Peapack and Gladstone
1 School Street
PO Box 218
Peapack, NJ 07977

Re: Environmental Resource Inventory Update
Compatibility With Borough Master Plan

Dear Ms. Osmun:

As requested by the Land Use Board at the May 1, 2013 public hearing regarding the adoption of the "Environmental Resource Inventory Update" document prepared by The Land Conservancy Of New Jersey, please be advised for the record that we had reviewed the document prior to the public hearing and have found that it is compatible with the Borough Master Plan.

Truly yours,
Coppola & Coppola Associates

Richard T. Coppola, PP, AICP