Environmental Resource Inventory

Update – 2013

for

Township of Teaneck

County of Bergen

Compiled by

The Land Conservancy of New Jersey
An accredited land trust

with

Township of Teaneck Environmental Commission

June 2013

ENVIRONMENTAL RESOURCE INVENTORY UPDATE - 2013

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County of Bergen

Prepared for:

Township of Teaneck Environmental Commission

Prepared June 26, 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.

Approved by the Township of Teaneck Plauning Board on July 11, 2013

ENVIRONMENTAL RESOURCE INVENTORY UPDATE - 2013

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Township of Teaneck
County of Bergen

Produced by:

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Top: Birdhouses Looking South from Andreas Park (Photograph taken by *Past President Teaneck Greenway-Louis Osman*)

Center: Bald Eagle (Photograph taken by *Mark Oppenheim*)

Bottom: Cleared Trail to River Road (Photograph taken by *Past President Teaneck Greenway-Louis Osman*)

EXECUTIVE SUMMARY

Conservation of natural resources has been important to Teaneck Township since the early 1930s when the Township's *Master Plan* recognized the benefit of establishing a greenbelt along the new State Route 4. This heavily wooded greenway runs along both sides of Route 4 and offers a quiet respite of trees and green space to residential neighborhoods that adjoin the Route 4 corridor.

Reaffirming its commitment to preserve and protect its natural resources for the broadest number of its residents, the Township of Teaneck has prepared this update to and expansion of its *2002 Environmental Resources Inventory (ERI).* Since publication of the *2002 ERI*, the Township has experienced directly the effects of a changed climate that has brought increased flooding and elevated temperatures. Local ordinances have been enacted in recognition of the ways in which human development is tied to the landscape and how the landscape responds to human activities.

Teaneck is defined by its waterways and water resources. The Hackensack River forms the Township's western boundary, while Overpeck Creek, a tributary to the Hackensack, cradles the southeastern corner, and Hirshfeld Brook flows northward from the center of Teaneck. Upstream on the Hackensack and its other tributaries, to the north of Teaneck, are three of the 13 major water supply reservoirs in the state, Lake Tappan, Woodcliff Lake and Oradell Reservoir, plus a fourth reservoir, Lake DeForest, in New York State. At its mouth, downstream of Teaneck, the Hackensack feeds into Newark Bay through the Hackensack Meadowlands, an area of tidal marshes that are home to more than 700 plant and animal species including several rare and threatened species. There are approximately 70 acres of natural and manmade lakes in Teaneck.

The *2013 Environmental Resource Inventory (ERI) Update* is based on available data from federal and state resources, as well as municipal resources, including the *1980 Natural Resource Inventory* and *2002 Environmental Resource Inventory* for the Township of Teaneck. Extensive mapping and tables detailing the Township's environmental resource base are included within the *ERI Update*. Sections include information on geology, topography, slopes, hydrology and water resources, soils, flooding, wetlands, wildlife habitat, historic resources, regional planning, air, and climate change.

Teaneck Township has achieved bronze certification through the Sustainable Jersey program. The submittal of an updated *Environmental Resource Inventory* will help meet its 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. Knowledge of the natural resources of Teaneck will allow its officials and its citizens to make informed decisions as they strive to preserve and promote the character of the Township and to create a sustainable community within its landscape.

GEOGRAPHY AND TOPOGRAPHY

The Township of Teaneck is located in the northeast corner of New Jersey in south-central Bergen County, along the tidal Hackensack River a few miles west of the Hudson River and its prominent Palisades.

Physiographic Provinces

The New Jersey Department of Environmental Protection (NJDEP) New Jersey Geological Survey (NJGS) Information Circular *Physiographic Provinces of New Jersey* defines four distinct physiographic provinces, or regions, banding New Jersey. Their distinct characteristics result from the diverse impacts of millions of years of geologic processes including mountain building, erosion and deposition. From northwest to south they are: Valley and Ridge, Highlands, Piedmont and Coastal Plain. The first three, all in northern New Jersey, are part of a larger U.S. classification called the Appalachian Highlands.

Teaneck lies entirely within the Piedmont Province. This province, extending from Bergen County southwest to Hunterdon and Mercer counties, covers about 1,600 square miles, or roughly 20% of New Jersey. The Piedmont Province is characterized by a low rolling plain interrupted by higher ridges. Elevations range generally between 300 to 400 feet. High Mountain (885 feet) to the west of Teaneck and the Palisades (maximum elevation 547 feet) to the east along the Hudson River are two of the tallest ridges in the province. The province is underlain mainly by slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous Jurassic rock (see *Bedrock Geology* on *page 4*). *(NJDEP NJGS)*

Topography and Slope

According to Teaneck's 2002 *Environmental Resource Inventory (ERI),* the topography of the Township is "gently rolling." The south-north trending ridgelines flanking the railroad corridor encompass the highest elevations (162 feet near Teaneck High School) and, and though lower than average, are typical of the Piedmont, with steep front faces and long back slopes. From these ridgelines the land slopes down towards the railroad corridor in the interior and to nearly sea level along the Hackensack River on the western border and Overpeck Creek on the eastern border. The majority of the land, 84.77%, contains slopes of 0-4%, while 0.35% has slopes of greater than 15%. The *Topography (2002 ERI Map 3)* and *Slope Analysis Maps (2002 ERI Map 4)* depict Teaneck's topography and slope and are included in the *Maps section (Maps 1 and 2)* of this report. The slope breakdown as computed for the 2002 *ERI* is:

Table 1. Slope Breakdown for Teaneck Township

Slope	*Acres*	*%*
0-2%	2,354	58.69%
3-4%	1,046	26.08%
5-7%	457	11.39%

Table 1. Slope Breakdown for Teaneck Township		
Slope	*Acres*	*%*
7-9%	80	1.99%
10-15%	60	1.50%
>15%	14	0.35%
	*4,011	100.00%
**Note: This total is higher than the total acreage of 3,993.04 calculated for this 2013 Update using ArcGIS software.* *Source: 2002 ERI*		

In Teaneck, the few areas of steep slopes are along roadways and the railroad corridor or in developed residential neighborhoods. In general, 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 for 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 predevelopment conditions. Excess sediments in streams can harm aquatic life, accelerate the filling of ponds and wetlands, and decrease a stream's aesthetic appearance.

The runoff characteristics of the various soil groupings in Teaneck are discussed in the *Soils* section on *page 7*.

GEOLOGY

The geology of Teaneck can be classified into two layers: *bedrock geology,* which is the consolidated, underlying rock that extends deep into the earth's crust, and *surficial geology,* which is the unconsolidated sedimentary materials overlaying bedrock formations, and which is the parent material 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 stormwater and surface runoff, and the stability of foundations for buildings, bridges, tunnels, and other structures." *(NJDEP New Jersey Geological Survey, Information Circular – Geologic Mapping in New Jersey)*

Bedrock Geology

Teaneck is located in the Newark Basin, a rift basin formed during the breakup of the supercontinent Pangaea in the Mezozoic era. The underlying bedrock geology of Teaneck is predominantly sedimentary Passaic Formation (formerly called Brunswick Formation) Sandstone and Siltstone facies, comprising 95.5% of the Township's total area. Passaic Formation Mudstone facies underlie the southeastern corner in the vicinity of I-95 and Overpeck Creek, comprising 3.14% of Teaneck's area. Two pockets of intrusive Jurassic Diabase exist in south-central Teaneck, totaling 1.35% of Teaneck (see *Table 2* below and *Geology* (*2002 ERI Map 1*, included in the *Maps section* as *Map 3*). [1]

Table 2. Bedrock Geology of Teaneck Township

Abbrev.	*Name*	*Lithology*	*Acres*	*%*
JTrps	Passaic Formation Sandstone and Siltstone facies	sandstone and siltstone	3,814.04	95.52%
JTrpms	Passaic Formation Mudstone facies	sandy mudstone	125.25	3.14%
Jd	Jurassic Diabase	diabase, medium- to coarse-grained	53.74	1.35%
Total			3,993.04	100.00%
Source: NJGS Bedrock Geology 2007				

Passaic Formation is a non-marine sedimentary rock formed by the accumulation on low land of mud and sand washed down from higher ground by streams and spread at times of high water during the late Triassic to early Jurassic periods of the Mezozoic era.

[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.

Passaic Formation Sandstone and Siltstone facies (JTrps) is interbedded grayish-red to brownish-red, medium- to fine-grained, medium- to thick-bedded sandstone and brownish-to-purplish-red coarse-grained siltstone; the unit is planar to ripple cross-laminated, fissile, locally calcareous, containing desiccation cracks and root casts. Upward-fining cycles are 6-15 feet thick. Maximum thickness is about 3,610 feet.

Passaic Formation Mudstone Facies (JTrpms) is reddish-brown to brownish-red, massive, silty to sandy mudstone and siltstone, which are bioturbated, ripple cross-laminated and interbedded with lenticular sandstone.

Diabase is an intrusive igneous, or plutonic, rock that formed below the surface from the solidification of a lava flow.

Jurassic Diabase (Jd) is composed of fine-grained to aphanitic dikes; medium- to coarse grained, subophitic discordant stock-like intrusions of dark-greenish-gray to black diabase. Diabase is dense, hard, and sparsely fractured. Diabase sills, as much as 1,575 feet thick, and diabase stocks and dikes intruded about the time of the earliest lava flows during the Early Jurassic (the Palisades is an example of a diabase sill). (*USGS & NJGS)*

Surficial Geology

Surficial geology refers to the unconsolidated materials overlaying bedrock formations. The oldest deposits are the till laid down over bedrock by advancing glaciers. As the glaciers retreated, melt water deposited sand and gravel (stratified drift) over the till. Alluvium, estuarine and other postglacial deposits are the most recent deposits and overlie glacial sediments. *Table 3* details the surficial geology of Teaneck Township. The majority of the Township (69.52%, or 2,776 acres) is covered in Rahway Till (Qwtn), with another 13.00% salt marsh and estuarine deposits (Qmm) and 7.98% upper postglacial stream terrace deposits (Qst2).

Table 3. Surficial Geology of Teaneck Township

Name	Acres	%	% of Teaneck
Alluvium (Qal)	20.23	0.52%	0.51%
Salt-Marsh And Estuarine Deposits (Qmm)	518.98	13.39%	13.00%
Lower Postglacial Stream Terrace Deposits (Qst1)	1.39	0.04%	0.03%
Upper Postglacial Stream Terrace Deposits (Qst2)	318.66	8.22%	7.98%
Late Wisconsinan Glacial Delta Deposits (Qwde)	137.84	3.56%	3.45%
Late Wisconsinan Glacial Lake-Bottom Deposits (Qwlb)	73.04	1.88%	1.83%
Late Wisconsinan Glaciofluvial Terrace Deposits (Qwft)	30.79	0.79%	0.77%
Rahway Till (Qwtr)	2,775.91	71.60%	69.52%
Grand Total	3,876.84		97.09%
Total Area including Water	3,993.04		
Source: NJGS Surficial Geology 2006			

Lithology of Surficial Units

Postglacial Deposits

Alluvium (Qal) – Sand, gravel, silt, minor clay and peat; reddish brown, yellowish brown, brown, gray. As much as 20 feet thick.

Salt Marsh and Estuarine Deposits (Qmm) – Silt, sand, peat, clay, minor pebble gravel; brown, dark-brown, gray, black. Up to 100 feet thick.

Lower Postglacial Stream Terrace Deposits (Qst1) – Sand, minor pebble gravel and silt, very pale brown to yellowish brown forming stream terraces with surfaces 5 to 15 feet above the modern floodplain.

Upper Postglacial Stream Terrace Deposits (Qst2) – Sand, minor pebble gravel and silt, very pale brown to yellowish brown forming stream terraces with surfaces 15 to 30 feet above the modern floodplain.

Glacial Deposits

Late Wisconsinan Glacial Delta Deposits (Qwde) – Sand, pebble-to-cobble gravel, minor silt; yellowish brown, reddish brown, light gray. As much as 150 feet thick.

Late Wisconsinan Glacial Lake-Bottom Deposits (Qwlb) – Silt, clay, fine sand; gray, brown, yellowish brown, reddish brown. As much as 200 feet thick.

*Late Wisconsinan Glaciofluvial Terrace Deposit*s (Qwft) – Sand, pebble-to-cobble gravel, minor silt; yellowish brown to reddish brown. As much as 40 feet thick.

Rahway Till (Qwtr) – A nonstratified sediment deposited directly from the ice of Glacial Lake Teaneck. Clayey, sandy-silt with some to many pebbles and cobbles and very few boulders; reddish brown, reddish yellow, yellowish brown, brown. Gravels include mudstone, sandstone, gneiss, conglomerate, quartzite and rounded quartz pebbles. As much as 100 feet thick, generally less than 40 feet thick. *(NJDEP NJGS)*

SOILS

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, 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*)

Soils of Teaneck Township

The official Soil Survey for Bergen County was updated in 2008 by the Natural Resources Conservation Service (NRCS), an agency of the United Sates Department of Agriculture (USDA). The soils information in this *Environmental Resource Inventory Update (ERI Update)* is based on the data from that official survey and supersedes the information presented in the *2002 ERI*. The value of soil information in land use planning, however, remains the same, providing information on limitations and hazards.

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), such as Boonton, and by characteristics that differentiate them from other soil groupings in the same series, such as degree of slope or stoniness.

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 their series, steepness and frequency of flooding as follows:

- The first three letters of the abbreviation name the soil or complex. For example, Boh is Boonton and Bou is Boonton-Urban land complex.
- Capital letters at the end of the abbreviation indicate the slope phase, with "A" being less steep and "E" being steeper. An example is the Boonton_Urban land complex, which includes BouB, BouC and BouD.
- The small letter "t" at the end of an abbreviation indicates "frequently flooded." An example is Preakness silt loam, PrnAt.

The Soil Survey also categorizes each map unit as one of four *map unit types*: Consociations, complexes, associations and undifferentiated groups. The soils of Teaneck are typed as either consociations or complexes.

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. Consociations, excluding water, represent 27.48% of Teaneck's total area. Examples are Boonton and Dunellen loam.

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. There are no associations in Teaneck. Complexes make up 69.38% of Teaneck's total area. Many of the complexes in Teaneck combine consociations with Urban land, such as Boonton-Urban land complex.

Table 4 below lists the soils found in Teaneck, and the *Soil Series* map (*Map 4* in the *Maps section*) depicts their distribution within the Township.

Table 4. Soils of Teaneck Township

Abbrev.	*Name/Description*	*Type*	*Acres*	*% of Teaneck*
BohC	Boonton moderately well drained gravelly loam, 8 to 15% slopes	Consociation	7.22	0.18%
BouB	Boonton-Urban land complex, 0 to 8% slopes 50% Boonton, 40% Urban land, 10% minor soils	Complex	340.04	8.52%
BouC	Boonton-Urban land complex, 8 to 15% slopes 50% Boonton, 40% Urban land, 10% minor soils	Complex	461.73	11.56%
BouD	Boonton (60%)-Urban land (30%) complex, 15 to 25% slopes 60% Boonton, 30% Urban land, 10% minor soils	Complex	199.90	5.01%
DuoB	Dunellen loam, 3 to 8% slopes	Consociation	62.69	1.57%
DuuA	Dunellen-Urban land complex, 0 to 3% slopes 55% Dunellen, 30% Urban land	Complex	82.71	2.07%
DuuB	Dunellen-Urban land complex, 3 to 8% slopes 60% Dunellen; 30% Urban land	Complex	480.50	12.03%
DuuC	Dunellen-Urban land complex, 8 to 15% slopes 60% Dunellen; 30% Urban land	Complex	635.85	15.92%
DuuD	Dunellen-Urban land complex, 15 to 25% slopes 55% Dunellen; 25% Urban land	Complex	146.67	3.67%
HasB	Haledon-Urban land complex, 3 to 8% slopes 60% Haledon; 30% Urban land	Complex	35.27	0.88%
OtsD	Otisville gravelly loamy sand, 15 to 25% slopes	Consociation	6.45	0.16%
PbuA	Pascack silt loam, 0 to 3% slopes	Consociation	9.38	0.23%
PrnAt	Preakness silt loam, 0 to 3% slopes, frequently flooded	Consociation	8.81	0.22%
UdkttB	Udorthents, loamy, 0 to 8% slopes, frequently flooded	Consociation	17.75	0.44%
UdoB	Udorthents, organic substratum, 0 to 8% slopes	Consociation	204.01	5.11%
UdouB	Udorthents, organic substratum-Urban land complex, 0 to 8% slopes 55% Udorthents; 30 % Urban land	Complex	120.69	3.02%
UdrB	Udorthents, refuse substratum, 0 to 8% slopes	Consociation	143.85	3.60%
UdwB	Udorthents, wet substratum, 0 to 8% slopes	Consociation	167.40	4.19%
UdwuB	Udorthents, wet substratum-Urban land complex	Complex	266.98	6.69%

Table 4. Soils of Teaneck Township				
Abbrev.	*Name/Description*	*Type*	*Acres*	*% of Teaneck*
	(SSURGO1). 55% Udorthents; 30 % Urban land			
UR	Urban land	Consociation	469.74	11.76%
Water	Water	Consociation	125.41	3.14%
Grand Total			***3,993.04***	***100.00%***
Source: NRCS Soil Survey 2008				

Soil Series and Other Descriptions

The NRCS official soil series descriptions for soils that occur in Teaneck Township are summarized below, along with descriptions of other map units such as udorthents, Urban land and water.

Boonton Series

The Boonton series consists of deep or very deep moderately well and well drained soils formed in glacial till composed mostly of red to brown shale, sandstone, basalt, and some granitic gneiss on gently sloping to very steep uplands. They are moderately deep to a fragipan (a dense, hard subsoil forming a restrictive feature). Slope is usually smooth and regular and gradient ranges from 0 to 50%.

Taxonomic Class: Coarse-loamy, mixed, active, mesic Oxyaquic Fragiudalfs

Typical Pedon: Boonton silt loam idle pasture, at an elevation of about 155 feet.

Type Location: Passaic County, New Jersey; Totowa Borough, 0.2 mile northeast of Totowa Road on Brookmans Lane, 585 feet east of Brookmans Lane in idle pasture. USGS Paterson quadrangle; Latitude 40 degrees, 54 minutes, 44 seconds N, Longitude 74 degrees, 12 minutes, 11 seconds W, NAD 1927.

Range in Characteristics: Thickness of the solum (or upper layers) ranges from 36 to more than 60 inches. Depth to bedrock is more than 48 inches. The top of the fragipan is at a depth of 20 to 36 inches. In most pedons, the upper part of the fragipan is part of the argillic horizon. Few or common redoximorphic features are in some pedons, but depletions with chroma of 2 or less are absent within 16 inches of the mineral soil surface. Rock fragments of mostly rounded gravel occur throughout the soil, and range from 0 to 35% in individual horizons. Stones and cobbles range from 0 to 10% in the solum and from 0 to 20% in the substratum. Reaction is strongly acid to extremely acid in the upper part of the solum. It ranges from strongly acid to slightly acid in the lower part of the solum, and from moderately acid to neutral in the C horizon.

Geographically Associated Soils: Holyoke and *Haledon* are the most extensive associated soils and are developed from similar materials. Holyoke soils are shallow to basalt bedrock and usually are on higher and steeper positions in the landscape. Haledon soils have low chroma depletions in the top 10 inches of the argillic horizon and are in lower

positions in the landscape, in drainageways, or at the base of steeper slopes. Other associated soils are Riverhead and *Dunellen* which formed in stratified, water sorted material.

Drainage and Saturated Hydraulic Conductivity: Moderately well and well drained. Runoff is slow to rapid. Saturated hydraulic conductivity is moderately low to high in the mineral soil above the fragipan, low or very low in the fragipan, and low to high below the fragipan. There is a perched water table (a water table that is above the normal water table and separated from it by a dry, or unsaturated, zone) at a depth of 18 to 36 inches from November to May of most years.

Use and Vegetation: Most Boonton soils are in areas that have become highly urbanized. Undeveloped sites are wooded or idle fields. Wooded areas have oaks, red maple, white ash, hickory, gray birch, and dogwood trees.

Distribution and Extent: Till uplands in Northeastern New Jersey and southeastern New York. The series is of moderate extent (62,000 acres).

Boonton and Boonton-Urban land complex soils comprise 25.27% of Teaneck's soils, totaling 1,008.89 acres.

Dunellen Series

The Dunellen series consists of very deep, well drained soils formed in stratified materials. Dunellen soils are on outwash plains and stream terraces. Slope ranges from 0 to 35%. The underlying bedrock is red, soft shale or siltstone.

Taxonomic Class: Coarse-loamy, mixed, active, mesic Typic Hapludults

Typical Pedon: Dunellen sandy loam-cultivated.

Type Location: Somerset County, New Jersey; Franklin Township, 250 yards north of East Millstone Reformer Church, 100 yards east of Delaware and Raritan Canal; USGS Bound Brook quadrangle, latitude 40 degrees, 30 minutes, 17 seconds N., longitude 74 degrees, 34 minutes, 44 seconds W, NAD 27.

Range in Characteristics: Solum thickness ranges from 25 to 40 inches. Depth to bedrock is typically greater than 10 feet. Rock fragments range from 0 to 15% in the upper part of the solum and from 0 to 30% in the lower solum. Rock fragments in the C horizon (or substratum) range from 5 to 50%, but average less than 35% and occur mostly as thin lenses of gravel. Rock fragments are mostly rounded pebbles composed of red shale, sandstone or siltstone, and include basalt, granitic gneiss, quartzite and conglomerates. Evidence of illuviation is weakly expressed and includes either few or common, faint or distinct clay films on faces of peds or bridging between sand grains. Reaction of the soil ranges from very strongly acid through moderately acid unless limed.

Geographically Associated Soils: Closely associated soils on terraces are the Nixon and Ellington soils. Nixon soils are finer textured and Ellington soils are mottled in the B horizon. Other nearby soils are the *Boonton*, *Haledon*, Penn, and Rowland soils. Boonton and Haledon soils are on more sloping uplands capped with glacial till. Penn soils are 20

to 40 inches to shale bedrock. Rowland soils are moderately well to somewhat poorly drained soils on floodplains.

Drainage and Permeability: Dunellen soils are well drained. Saturated hydraulic conductivity ranges from moderately high or high in the solum and high or very high in the substratum. Runoff is negligible to high.

Use and Vegetation: Dunellen soils are principally used for community development. Most remaining areas are idle on the urban fringe and some areas are used for pasture, hay or general crops. Trees in wooded areas include red, white and black oak, hickory, red maple, and ash.

Distribution and Extent: Central and northern New Jersey. The series is of moderate extent, about 55,000 acres.

Dunellen loam and Dunellen-Urban land complex soils together comprise 35.27% of Teaneck, totaling 1,408.41 acres. Dunellen loam (62.69 acres) is found in park areas of Teaneck, including Feldman Nature Preserve, Brett Park, Argonne Park and at the Teaneck Armory.

Haledon Series

The Haledon series consists of very deep, somewhat poorly drained soils formed in glacial till and found in low positions on undulating uplands. The soils developed in coarse textured glacial till composed primarily of basalt, red sandstone and shale, and granitic gneiss with lesser amounts of quartzite and gray sandstone and shale. They are found at the base of steeper sloping uplands and in shallow drainageways. Slope ranges from 0 to 15%.

Taxonomic Class: Coarse-loamy, mixed, active, mesic Aquic Fragiudalfs

Typical Pedon: Haledon cobbly loam at an elevation of about 140 m (460 feet).

Type Location: Passaic County, New Jersey; Township of Wayne, 10 feet west of unimproved dirt road, 1,000 feet north of junction of dirt road with Patterson-Hamburg turnpike. Junction of dirt road with turnpike is 1,600 feet east of entrance to north Jersey Country Club; USGS Paterson quadrangle, longitude 40 degrees 57 minutes 20 seconds N., latitude 74 degrees 12 minutes 45 seconds W, NAD 27.

Range in Characteristics: Thickness of the solum ranges from 40 to 60 inches. Depth to the fragipan is 24 to 35 inches. Depth to bedrock is greater than 6.5 feet. Rock fragments of mostly gravel, cobbles, and stones of basalt, shale, sandstone and gneiss range from 5 to 25% in the solum and from 15 to 35% in the substratum. Mineralogy is dominated by quartz, feldspar, amphibole and mica. Reaction ranges from extremely acid to moderately acid in the upper part of the solum, from strongly acid to slightly acid in the lower part of the solum and upper part of the C horizon, and from moderately acid to neutral in the lower part of the C horizon.

Related soils in other families are the *Boonton*, Califon, Hibernia, Rockaway, Wethersfield and Wurtsboro soils. *Boonton* and Rockaway soils do not have low chroma

redoximorphic features in the upper 10 inches of the argillic horizon. Califon and Hibernia soils have less than 35% base saturation. Wethersfield and Wurtsboro soils do not have argillic horizons.

Geographically Associated Soils: These are the *Boonton*, Rockaway and the Holyoke soils. *Boonton* and Rockaway soils usually are in higher positions in the landscape. Holyoke soils are in a higher position in the landscape and are shallow to bedrock.

Drainage and Saturated Hydraulic Conductivity: Somewhat poorly drained. Surface runoff is medium to very high. Saturated hydraulic conductivity is moderately high or high above the fragipan and very slow or slow in the fragipan and densic materials. A perched high water table is within 12 inches of the surface in the late winter and early spring of most years, and following periods of extended rainfall. Lateral seepage is common, particularly at slope breaks.

Use and Vegetation: Most areas are wooded or in idle fields. Much of this soil is used for housing or urban development. Vegetation is largely forest dominated by oak and maple with some birch and ash.

Distribution and Extent: Northeastern New Jersey and New York City metropolitan area. The series is of moderate extent.

Haledon-Urban land complex soils comprise 0.88% of Teaneck, totaling 35.27 acres.

Otisville Series

The Otisville series consists of very deep, excessively drained soils formed in Wisconsinan age outwash and are on long narrow ridges, summits, shoulders and sideslopes on terraces, kames and eskers on outwash plains, and on beaches and offshore bars on lake plains. Slope ranges from 0 to 60%.

Taxonomic Class: Sandy-skeletal, mixed, mesic Typic Udorthents

Typical Pedon: Otisville gravelly sandy loam, in pasture.

Type Location: Orange County, New York; 2.5 miles west southwest of Otisville, 0.35 mile northwest of railroad crossing at Cuddebackville. USGS Otisville, NY topographic quadrangle; Latitude 41 degrees, 28 minutes, 05 seconds N. and Longitude 74 degrees, 35 minutes, 33 seconds W., NAD 1927.

Range in Characteristics: Solum thickness ranges from 14 to 36 inches. Rock fragments mainly consist of acid siltstone and shale, with some quartz.

Geographically Associated Soils: These are the Alton, Atherton, Chenango, Fredon, Halsey, Hinckley, Hoosic, Oakville, Plymouth and Tunkhannock series. The excessively drained Hinckley and Plymouth soils, somewhat excessively drained Alton, Chenango, Hoosic and Tunkhannock soils, and well drained Oakville soils are on similar landscape positions. The somewhat poorly drained Fredon soils, poorly drained Atherton soils, and very poorly drained Halsey soils are on lower landscape positions.

Drainage and Permeability: Excessively drained. The potential for surface runoff ranges from negligible to low. Permeability is rapid in the solum and rapid or very rapid in the substratum.

Use and Vegetation: The soils are mainly idle or used for pasture, hay, corn, and small grain. Limited areas are in deciduous fruit trees. Woodlots are dominated by oak-hickory associations at the southern limit of the series while sugar maple and American beech are prominent near the northern limit.

Distribution and Extent: In widely scattered areas ranging from borders of the Adirondack Mountains of New York to northern New Jersey and northeastern Ohio. The series is moderately extensive, about 28,000 acres.

Otisville soils comprise 0.16% of Teaneck, totaling 6.45 acres located in a north/south linear strip between Brett Park and Andreas Park.

Pascack Series

The Pascack series consists of very deep, moderately well drained and somewhat poorly drained soils formed in glacial outwash, which in many places has a loamy mantle. The outwash is derived principally from red shales and sandstones, basalt, and granitic gneiss. They are nearly level to undulating soils in slight depressions or broad drainageways on outwash plains and terraces. Slope ranges from 0 to 8%.

Taxonomic Class: Coarse-loamy, mixed, active, mesic Aquic Hapludults

Typical Pedon: Pascack silt loam – old field presently wooded, 1% slope.

Type Location: Bergen County, New Jersey; Borough of Old Tappan, 400 feet south of Willow Drive and 650 feet west of western end of Forest Avenue.

Range in Characteristics: Thickness of the solum ranges from 20 to 40 inches and typically corresponds to the depth to coarser textured strata. Rock fragments, mainly rounded gravel and a few cobbles, range from 0 to 25% in the solum and from 0 to 40% in individual layers of the substratum. Unless limed, the soil ranges from very strongly acid through moderately acid. The argillic horizon is weakly expressed. Clay films on faces of peds range from very few to common and are faint or distinct. Most pedons have sand grains that are coated and bridged with clay.

Geographically Associated Soils: These are the competing *Dunellen* soils and the Adrian, Birdsboro, *Boonton*, Bowmansville, *Otisville*, Reaville, and Riverhead. Adrian soils are shallow organic soils in adjacent depression. Birdsboro soils are fine-loamy and typically occur on a different terrace level along major streams. *Boonton* soils are on uplands and formed in glacial till. Bowmansville soils are on adjacent or nearby floodplains. *Otisville* and Riverhead soils are coarse textured soils with a dominant portion derived from granitic gneiss and are commonly on nearby eskers and kames. Reaville soils are somewhat poorly drained soils on uplands and are moderately deep to shale bedrock.

Drainage and Permeability: Moderately well and somewhat poorly drained. Surface runoff is slow. Permeability is moderately rapid in the solum and rapid or very rapid in

the substratum. The soil has a seasonal high water table at a depth of 1 to 3 feet from October through May of most years.

Use and Vegetation: Most of the acreage is used for community development. Some areas are idle or wooded. Common crops are corn, soybeans, vegetables, and nursery stock. Common trees are red, white and black oak, hickory, red maple and white ash.

Distribution and Extent: Northeastern and central New Jersey. The series is of small extent.

Pascack soils comprise 0.23% of Teaneck, totaling 9.38 acres and are located in the area of Tokoloka Park.

Preakness Series

The Preakness series consists of very deep, poorly and very poorly drained soils on broad, nearly level outwash plains or in narrow swales that dissect outwash terraces. The soils formed in stratified coarse textured materials dominantly from granitic rocks with minor amounts or other materials. Slope ranges from 0 to 3%.

Taxonomic Class: Coarse-loamy, mixed, active, acid, mesic Typic Humaquepts.

Typical Pedon: Preakness sandy loam – old field.

Type Location: Morris County, New Jersey; nearly level idle field on a sandy outwash plain 1/4 mile east of Comly Road, north side of right-of-way for Interstate Highway 287.

Range in Characteristics: Thickness of the solum ranges from 20 to 36 inches. Depth to bedrock is more than 6.5 feet. Rock fragments, sand, and silt are derived mainly from granitic gneiss and are composed of quartz, feldspar, amphibole and mica with minor amounts of sandstone, shale, quartzite and conglomerate. There are 0 to 20% cobbles or gravel through the solum and 0 to 70% in individual strata of the C horizon with a weighted average of less than 35% rock fragments in the textural control section. Reaction is strongly or very strongly acid unless limed, and ranges to moderately acid in the lower part of the substratum.

Geographically Associated Soils: These are the Natchaug, Parsippany, Pompton, and Riverhead soils on nearby landscapes. Natchaug soils have organic soil materials 16-51 inches thick. Parsippany soils have a fine textural control section. Pompton soils are somewhat poorly drained and are on slightly higher landscape positions. Walpole soils have a sandy textural control section.

Drainage and Saturated Hydraulic Conductivity: Preakness soils are poorly or very poorly drained. Runoff is negligible or low. Saturated hydraulic conductivity is moderately high or high in the surface and subsoil and high to very high in the substratum. The water table is at or near the surface from late autumn through winter and spring. The soils are often ponded in winter and during periods of high rainfall because of their low topographic position. In many places adjacent to streams, Preakness soils flood frequently for brief periods in late winter and early spring. They flood more extensively but less often following severe storms of low frequency in August through October.

Use and Vegetation: Many areas of these soils are idle or are drained and used for housing developments. In the past, many areas had been drained and used for production of vegetables. Native vegetation is red maple, elm, willow, and ash with some sedge and other hydrophytic species.

Distribution and Extent: Northeastern New Jersey and New York City, New York. The series is of moderate extent.

Preakness silt loam, totaling 8.81 acres, or 0.22% of Teaneck, can be found in the eastern portion of Argonne Park.

Udorthents

Udorthents are defined in soil taxonomy as a form of Orthent. Orthents "have either textures of very fine sand or finer in the fine earth fraction, or textures of loamy fine sand or coarser and coarse fragment content of 35% or more and that have an organic carbon content that decreases regularly with depth." They are primarily found on "recent erosional surfaces," where former soils have been removed or truncated either geologically or through cultivation, mining or other human activity. Some orthents are in areas of recent loamy deposits, glacial deposits or debris from landslides and mudflows. Udorthents are found in cool to hot, moist regions. They are generally acid to neutral and commonly occur in areas of recently exposed loess or till; areas of weakly cemented rocks, such as shale; or areas where the regolith, or loose earth, is thin over hard rocks. Many of these soils in gently sloping areas are the result of mining or other earth-moving activities; they are also extensive on steep slopes in humid parts of the U.S. Vegetation is commonly a deciduous forest.

There are a number of udorthent types in Teaneck, in general, they are either a loamy material transported by human activity (UdkttB) or a loamy material spread over an organic, refuse or wet substratum as listed in Table 1 on page 8 above.

Udorthents and Udorthents–Urban land complexes comprise 23.06% of Teaneck, totaling 920.68 acres.

Urban Land

Urban land is described by the Soil Science Society of America as "areas so altered or obstructed by urban works or structures that identification of soils is not feasible [and] supporting little or no vegetation without major reclamation." The NRCS defines the parent material "as surface covered by pavement, concrete, buildings, and other structures underlain by disturbed and natural soil material." Where a map unit is classified as urban land by the soil survey, urban land is characterized as comprising 95% of the area, with urthodents comprising the remaining 5%. Where Urban land is combined with one of the soil series described above, its percentage varies, as listed in *Table 4* on page 8. Within these complexes, urban land is often underlain by recognizable soil types.

Urban land comprises 11.76% of Teaneck, totaling 469.74 acres.

Water covers 125.41 acres, making up the remaining 3.14% of Teaneck's total area.

Limitations for Use

Hydric Soils

According to the NRCS, "A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." *(NRCS, Hydric Soils - Introduction).* Hydric soils are an important element of wetland areas and naturally support wetland vegetation. If a soil is classified as "hydric," federal and state wetlands regulations may restrict land use due to the relationship of hydric soils to wetlands and wetland preservation.

The NRCS Soil Survey for Bergen County indicates the following soils with hydric components:

- PbuA – a minor component of this consociation, Preakness, frequently flooded, is a hydric soil, and represents 5% of the consociation. Landform: Drainageways.
- PrnAt – Preakness silt loam, frequently flooded, is a hydric soil and represents 85% of this consociation. Landform: Drainageways.
- UdkttB – The minor component Parsippany, frequently flooded, is a hydric soil and represents 5% of this consociation. Landform: Outwash plains.
- UdwB and UdwuB – The minor components Pawcatuck, very frequently flooded, and Transquaking, very frequently flooded, are hydric soils, each representing 1% of the consociation. Landform: tidal marshes. *(USDA NRCS*

Soils with hydric components total 479 acres, or 12% of Teaneck's total area.

Limitations for Development and Recreational Use

Other qualities and characteristics of soils determine land's suitability for development and recreational use, including its capacity to support foundations. They also help to identify areas whose water characteristics, such as ponding, flooding or a high water table, or potential for frost heaves contraindicate development. The NRCS Soil Survey states: "Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads….A high water table makes a soil poorly suited to basements or underground installations." *(USDA NRCS)*

Table 5 and *Table 6* below outline the limitations of Teaneck soils for building site development, including roads and landscaping, and for recreational use as camp areas, picnic areas, playgrounds, paths, trails and golf fairways. The ratings are defined as follows:

Not limited (N) indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Somewhat limited (S) indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

Very limited (V) indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

In the tables below, where the map unit is a complex (see *Table 4* on page 8, only the ranking for the main soil component (e.g., Boonton) is listed; the substratum associated with the urban land component of a complex (e.g., BouB, Boonton-Urban land complex, Urban land, Boonton substratum) may be rated differently or not rated at all ***(NR)***. The ratings of these components are not listed here but may obtained by accessing the NRCS Web Soil Survey at *http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm*. Only the ratings for the major soil components are listed below.

The following descriptions elucidate the categories shown in *Table 5* below.

Dwellings are single-family houses of three stories or less and *small commercial buildings* are structures that are less than three stories high and do not have basements. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established.

Table 5. Soil Suitability for Buildings, Roads and Landscaping

Map Symbol	*Dwellings*		*Small Commercial Buildings*	*Local Roads/Streets*	*Shallow excavations*	*Lawns & Landscaping*
	Without Basements	*With Basements*				
BohC	**S**	**V**	**V**	**S**	**V**	**S**
	Slope; depth to saturated zone (DSZ)			*Slope; frost action; DSZ*	*DSZ; cutbanks cave; slope*	*Slope; gravel; DSZ; large stones; droughty*
BouB	**N**	**N**	**S** - slope	**S** – frost action	**V** - cutbanks cave	**N**
BouC	**S** - slope	**S** - slope	**V** - slope	**S** - slope; frost action	**V** - cutbanks cave; slope	**S** - slope

Table 5. Soil Suitability for Buildings, Roads and Landscaping						
Map Symbol	*Dwellings*		*Small Commercial Buildings*	*Local Roads/Streets*	*Shallow excavations*	*Lawns & Landscaping*
	Without Basements	*With Basements*				
BouD	**V** - slope	**V** - slope	**V** - slope	**V** - slope; frost action	**V** - slope; cutbanks cave	**V** - slope
DuoB	**N**	**N**	**N**	**S** - frost action	**V** - cutbanks cave	**N**
DuuA	**N**	**N**	**N**	**S** - frost action	**V** - cutbanks cave	**N**
DuuB	**N**	**N**	**N**	**S** - frost action	**V** - cutbanks cave	**N**
DuuC	**S** - slope	**S** - slope	**V** - slope	**S** - slope; frost action	**V** - cutbanks cave; slop	**S**- slope
DuuD	**V** - slope	**V** - slope	**V** - slope	**V** - slope; frost action	**V** - slope; cutbanks cave	**V**- slope
HasB	**V** - DSZ	**V** - DSZ	**V** - DSZ	**V** – DSZ; frost action	**V** - DSZ; cutbanks cave	**V** - DSZ
OtsD	**V** - slope	**V** - slope	**V** - slope	**V** - slope	**V** - slope; cutbanks cave	**V** - slope; droughty; gravel; large stones
PbuA	**S** - DSZ	**S** - DSZ	**S** - DSZ	**V** - frost action; DSZ	**V** - DSZ; cutbanks cave	**S** - DSZ
PrnAt	**V** - flooding; DSZ; ponding	**V** - flooding; DSZ; ponding	**V** - flooding; DSZ; ponding	**V** - DSZ; frost action; flooding; ponding	**V** - DSZ; cutbanks cave; ponding; flooding	**V** - flooding; DSZ; ponding
UdkktB	**N**	**N**	**N**	**V** - frost action; low strength	**S** - too clayey; cutbanks cave	**N**
UdoB	**N**	**N**	**N**	**N**	**V** - cutbanks cave	NR
UdouB	NR	NR	NR	NR	NR	NR
UdrB	**N**	**N**	**N**	**V** - low strength	**S** - cutbanks cave	**N**
UdwB	NR	NR	NR	NR	NR	NR
UdwuB	NR	NR	NR	NR	NR	NR
UR	NR	NR	NR	NR	NR	NR
Water	NR	NR	NR	NR	NR	NR

Legend: N = Not Limited; S = Somewhat Limited; V = Very Limited; NR = Not Rated
Source: USDA NRCS Web Soil Survey

Following is a summary description of the recreational uses listed in *Table 6* below.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The

ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established.

Table 6. Soil Suitability for Recreational Development

Map Symbol	*Camp Areas*	*Picnic Areas*	*Playgrounds*	*Paths and Trails*	*Golf Fairways*
BohC	**S**	**S**	**V**	**V**	**S**
	Slope; gravel; depth to saturated zone (DSZ)			Water erosion	Slope; gravel; DSZ; large stones; droughty
BouB	**N**	**N**	**V** - slope	**N**	**N**
BouC	**S** - slope	**S** - slope	**V** - slope	**V** - water erosion	**S** - slope
BouD	**V** - slope	**V** - slope	**V** - slope	**V** - slope; water erosion	**V** - slope
DuoB	**N**	**N**	**S** - slope; gravel content	**N**	**N**
DuuA	**N**	**N**	**S** - gravel	**N**	**N**
DuuB	**N**	**N**	**S** - slope; gravel content	**N**	**N**
DuuC	**S** - slope	**S** - slope	**V** - slope; gravel content	**N**	**S** - slope
DuuD	**V** - slope	**V** - slope	**V** - slope	**S** - slope	**V** - slope
HasB	**V**	**V**	**V** - slope	**V**	**V**
	Depth to saturated zone				
OtsD	**V**	**V**	**V**	**S**	**V**
	Slope; too sandy; gravel content			Slope; too sandy	Slope; droughty; gravel; large stones

Table 6. Soil Suitability for Recreational Development					
Map Symbol	*Camp Areas*	*Picnic Areas*	*Playgrounds*	*Paths and Trails*	*Golf Fairways*
PbuA	**S**	**S**	**S**	**S**	**S**
	Depth to saturated zone				
PrnAt	**V**	**V**	**V**	**V**	**V**
	Depth to saturated zone; flooding; ponding				
UdkktB	**S**	**S**	**S**	**N**	**N**
	Slow water movement				
UdoB	NR	NR	NR	NR	NR
UdouB	NR	NR	NR	NR	NR
UdrB	**N**	**N**	**S** - slope	**N**	**N**
UdwB	NR	NR	NR	NR	NR
UdwuB	NR	NR	NR	NR	NR
UR	NR	NR	NR	NR	NR
Water	NR	NR	NR	NR	NR
Legend: N = Not Limited; S = Somewhat Limited; V = Very Limited; NR = Not Rated *Source: NRCS Web Soil Survey*					

<u>*Note*</u>: The ratings in the above table are defined as follows:

Not limited (N) indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

Somewhat limited (S) indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

Very limited (V) indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Not rated (NR) indicates not rated at all.

HYDROLOGY

The Hackensack River and its tributaries are important features of Teaneck and Bergen County. The Hackensack forms the western boundary, while Overpeck Creek, a tributary to the Hackensack, cradles the southeastern corner, and Hirshfeld Brook flows northward from the center of Teaneck. Upstream on the Hackensack and its other tributaries, to the north of Teaneck, are three of the 13 major water supply reservoirs in the state, Lake Tappan, Woodcliff Lake and Oradell Reservoir, plus a fourth reservoir, Lake DeForest, in New York State. At its mouth, downstream of Teaneck, the Hackensack feeds into Newark Bay through the Hackensack Meadowlands, an area of tidal marshes that are home to more than 700 plant and animal species including several rare and threatened species. There are approximately 70 acres of natural and manmade lakes in Teaneck.

Watersheds

According to the NJDEP, a watershed is "the area of land that drains into a body of water such as a river, lake, stream or bay. It is separated from other systems by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it." The NJDEP has divided the state into Watershed Management Areas, adopting a watershed based approach to natural resource management. Teaneck Township lies within Watershed Management Area 5 (WMA 5), which has a drainage area of approximately 163 square miles. WMA 5 comprises three watersheds: Hudson River, Pascack Brook and Hackensack River, where Teaneck is located. Although it is the most populated watershed management area, WMA 5 remains 50% undeveloped and is 30% residential. Within the Hackensack River watershed are subwatersheds. These subwatersheds are identified by U.S. Geological Survey numerical hydrologic unit codes (HUC) known as HUC 14s, as well as by name. *(NJDEP)*

Teaneck Township encompasses portions of three HUC 14 subwatersheds, all part of the larger Hackensack River watershed, which covers approximately 85 square miles. The eastern portion of the Township lies within the Overpeck Creek subwatershed. Overpeck Creek joins the Hackensack River south of Teaneck, in Little Ferry. The western portion of Teaneck lies within the Hackensack River (Fort Lee Road to Oradell Gage) subwatershed and drains directly into the Hackensack River. The third subwatershed is located in north-central Teaneck, draining to Hirshfeld Brook, which flows northwest to join the Hackensack River in New Milford. See *Table 7* below and the *Watersheds* map (*Map 5*) in the *Maps* section.

Table 7. HUC 14 Watersheds of Teaneck Township

HUC 14	*Watershed Name*	*Acres*	*% of Teaneck*
02030103180020	Hirshfeld Brook	718.85	18.00%
02030103180030	Hackensack River (Ft Lee Rd to Oradell Gage)	1,165.54	29.19%
02030103180040	Overpeck Creek	2,108.65	52.81%
	Total	3,993.04	100.00%

Source: NJDEP

Surface Water

There are 13 miles of linear waterway in Teaneck. *Table 8* below lists the water bodies and their Surface Water Classifications. The named streams are labeled on the *Wetlands and Surface Water Quality* map (*Map 6* in the *Maps* section).

Table 8. Stream Classifications in Teaneck Township		
Name	*Category*	*Length (Feet)*
French Brook	FW2-NT/SE1	1,703.04
Hackensack River	SE1	18,565.07
Hackensack River Unnamed Tributaries	FW2-NT/SE1	481.40
Hirshfeld Brook	FW2-NT/SE1	7,205.04
Hirshfeld Brook Unnamed Tributaries	FW2-NT/SE1	643.59
Metzler Brook	FW2-NT/SE2	894.11
Overpeck Creek	FW2-NT/SE2	14,125.47
Overpeck Creek Unnamed Tributaries	FW2-NT/SE2	15,098.34
Teaneck Creek	FW2-NT/SE2	6,469.67
Teaneck Creek Unnamed Tributaries	FW2-NT/SE2	7,346.97
Total in Feet		***72,532.71***
Total in Miles: 13.74		
Source: NJDEP Surface Water Quality Standards (December 2010)		

Definitions of Stream Classifications

Surface waters in New Jersey are classified based on the type of waterbody and the designated uses of the waterbody. These classifications are listed and defined in the Surface Water Quality Standards (SWQS), N.J.A.C. 7:9B. New Jersey's freshwaters are classified as FW1 (not subject to any man-made wastewater discharges) or FW2 waters (all other freshwaters except Pinelands waters). Freshwaters are further classified based on trout status: trout production (FW2-TP), trout maintenance (FW2-TM), and nontrout (FW2-NT). Saline waters are classified as saline estuarine (SE) and saline coastal (SC). SE waters are further classified into SE1, SE2, and SE3 based on their designated uses.

The Hackensack River is classified SE1 from its confluence with Overpeck Creek south of Teaneck to Oradell Reservoir north of Teaneck. All other streams in Teaneck are a combination of FW2-NT and SE waters. Their usage classifications are either SE1 or SE2, as shown in the table above. Designated uses for these waters are as follows:

In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;
2. Primary contact recreation;
3. Industrial and agricultural water supply;
4. Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation,

resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and
5. Any other reasonable uses.

In all SE1 waters the designated uses are:
1. Shellfish harvesting in accordance with N.J.A.C. 7:12;
2. Maintenance, migration and propagation of the natural and established biota;
3. Primary contact recreation; and
4. Any other reasonable uses.

In all SE2 waters the designated uses are:
1. Maintenance, migration and propagation of the natural and established biota;
2. Migration of diadromous fish;
3. Maintenance of wildlife;
4. Secondary contact recreation; and
5. Any other reasonable uses

(*N.J.A.C. 7:9B-1.12*)

Waters are also classified by antidegration standards into Outstanding Natural Resource Waters (ONRW – FW1 or Pinelands); Category One (C1) waters, which 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); and Category Two (C2) waters, which all other waters that are not ONRW or C1. Like C1 waters, C2 waters are protected from any measurable change in existing water quality; however, some lowering of existing water quality may be allowed by the NJDEP based on a social or economic justification. All waters in Teaneck are Category Two waters, but the Hackensack River above Oradell Reservoir is a Category One waterway. *(NJDEP)*

Groundwater

Groundwater is the water that seeps from the surface through the soil into surficial and bedrock aquifers. When this water successfully reaches the water table, it supports aquifer recharge, stream baseflow and wetlands. NJDEP has calculated groundwater recharge rates for Bergen County; see *Table 10* below.

The groundwater's capacity to infiltrate to aquifers and its susceptibility to contamination are controlled by the characteristics of the soils or other surface materials and the nature of the bedrock and surficial geology under that surface layer. As discussed in the soils chapter, much of Teaneck is covered by urban land and urban land complex. This type of surface promotes direct runoff into the water bodies, carrying any contaminants picked up along the way, such as fertilizer and motor oil. The extreme rapid runoff often caused by impervious surfaces also removes the opportunity for the water to seep into the ground and recharge aquifers.

Bedrock and Surficial Aquifers

Bedrock and surficial aquifers are the holding tanks for groundwater. An aquifer is "a formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs." (USGS) The character of the bedrock and surficial geology defines its ability to serve as aquifer, that is, to accept and hold the groundwater. Aquifer capacity is greatest if it is made up of sandy, porous substrate and bordered by confining layers of non-porous clay or rock material that trap water between them.

According to the United States Geological Survey's Groundwater Watch, most of the Piedmont Province is underlain by dense, almost impermeable bedrock that yields water primarily from secondary porosity and permeability provided by fractures. The bedrock is partly covered by glacial deposits, which include productive sand and gravel aquifers that are part of the surficial aquifer system in northern New Jersey. In Teaneck, the bedrock is predominantly Passaic Formation, part of the Brunswick aquifer system, and diabase. The hard, sparsely fractured character of diabase makes it a low ranking aquifer, while the Brunswick aquifer is ranked in the middle of aquifer yields. Some areas of Teaneck are covered by surficial aquifers of lake bottom sediment, another low ranking aquifer, and a sand and gravel aquifer totaling just other 3 acres has the highest yield potential. *Table 9* below shows the extent of each aquifer type found in Teaneck and *Table 10* and *Table 11* in the following section provide information on the aquifer rankings and recharge potential.

Table 9. Aquifers of Teaneck Township

Aquifer Name	*Rank*	*Acres*	*%*
Bedrock Aquifers			
Brunswick	C	3,939.61	98.66%
Diabase	E	53.43	1.34%
Total Area		3,993.04	100.00%
Surficial Aquifers			
Lake-bottom Sediment	E	619.16	15.51%
Sand and Gravel	B	2.99	0.07%
None present		3,370.89	84.42%
Total Area		3,993.04	100.00%
Source: NJGS Aquifers of New Jersey 1998			

Groundwater and Aquifer Recharge

The State has established aquifer and groundwater recharge rankings. Aquifer rankings are based on statewide median well yield ranges in gallons per minute (gpm). Groundwater rankings are based on county level recharge rates in inches of infiltration per year. *Table 10* below shows the ranking levels for Bergen County.

Table 10. Statewide Aquifer and Bergen County Groundwater Ranking			
Aquifer Yields		*Groundwater Recharge*	
Alpha / Numeric Ranking	*Median GPM*	*Level / Numeric Ranking*	*In/Yr*
A / 1	>500	A / 1	18-21
B / 2	250 to 500	B / 2	12-17
C / 3	100 to 250	C / 2	8-11
D / 4	25 to 100	D / 3	1 to 7
E / 5	<25	E / 5	0
L (hydric soils), W (wetlands and open water), X (no information) = no recharge calculated			
Source: NJDEP NJGS 2005			

Table 11 below and the *Aquifer Recharge Potential* (*Map 7* in the *Maps* section) show the aquifer recharge potential for areas of Teaneck 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 highest ranked aquifers in Teaneck (level B) are surficial sand and gravel aquifers, but they are rare, less than 1% of the township, located north and south of Route 4 in and near Overpeck County Golf Course in east-central Teaneck. Brunswick/Passaic Formation bedrock is a level C aquifer and Glacial Lake Sediment and Diabase are both ranked E. Hydric soils, wetlands and open water, where no recharge was calculated, overlie other areas of Brunswick/Passaic bedrock and surficial glacial lake sediment, providing no recharge. The surficial glacial lake sediment occurs along the Hackensack River and Overpeck Creek and in Overpeck County Park. The Brunswick aquifer recharge area covers 79.67% of the Township and is combined most commonly with groundwater recharge rankings B (31.97%) and C (27.07%). Areas with no groundwater recharge potential and low aquifer potential (E/E) are found in 10.82% of the Township. Wetlands and open water (W/W) cover 6.39%.

Table 11. Aquifer Recharge Potential in Teaneck Township			
Aquifer/Groundwater Combined Rank	*Numeric Rank*	*Acres*	*% of Township*
B/B	22	1.11	0.03%
B/E	25	1.88	0.05%
C/B	32	1,276.52	31.97%
C/C	33	1,080.99	27.07%
C/D	34	8.60	0.22%
C/E	35	815.94	20.43%
E/B	52	79.51	1.99%
E/C	53	29.24	0.73%
E/E	55	431.94	10.82%
L/L	97	12.15	0.30%

Table 11. Aquifer Recharge Potential in Teaneck Township			
Aquifer/Groundwater Combined Rank	*Numeric Rank*	*Acres*	*% of Township*
W/W	98	255.15	6.39%
Grand Total		***3,993.04***	***100.00%***
Source: NJDEP NJGS 2005			

LAND USE AND LAND COVER

The NJDEP periodically compiles information on land use and land cover (LULC) in New Jersey using aerial photography in the spring of each update year. Comparing data over time provides information on the changes in land use cover. *Table 12* below compares the LULC categories for the last four updates and the following text describes the characteristics of the categories. The most significant change is the 14% decrease in forest cover between 1986 and 2007, a loss of 44 acres.

Table 12. Land Use Land Cover in Teaneck Township

	1986	*1995/1997*	*% Change*	*2002*	*% Change*	*2007*	*% Change*	*% Change 1986-2007*
Agriculture	2.47	2.47	0%	3.11	26%	3.11	0%	26%
Barren Land	9.61	-	-100%	12.63	--	54.23	330%	465%
Forest	319.52	322.58	1%	332.85	3%	275.12	-17%	-14%
Urban	3,405.83	3,415.74	0%	3,377.14	-1%	3,394.79	1%	0%
Water	124.16	125.12	1%	141.06	13%	140.56	0%	13%
Wetlands	131.46	127.14	-3%	126.25	-1%	125.23	-1%	-5%
Total Area	3,993.04	3,993.04		3,993.04		3,993.04		

Source: NJDEP LULC

Following is a summary of the NJDEP 2007 LULC categories.

Agriculture – includes all lands used primarily for the production of food and fiber and some of the structures associated with this production. The 3.11 acres of agricultural land in Teaneck are classified in the sub-category of orchards/vineyards/nurseries/horticultural areas.

Barren Land –The sub-categories of barren land that are identified in Teaneck include altered lands and transitional areas.

- Extraction mining operations, landfills and other disposal sites compose the majority of man-altered barren lands. The 2007 LULC identified 4.75 acres of *altered lands* in Teaneck Township.

- *Transitional areas* encompass lands on which site preparation for a variety of development types has begun. However, the future land use has not been realized. Included are residential, commercial and industrial areas under construction, areas under construction for unknown use, and abandoned structures. The 2007 LULC identified 49.48 acres of transitional areas in Teaneck.

- Barren land represented 1.36% of Teaneck's total area in 2007.

Forestland – includes any lands covered by woody vegetation other than wetlands. These areas are capable of producing timber and other wood products, and of supporting many kinds of outdoor recreation. Forestland is an important category environmentally, because

it affects air quality, water quality, wildlife habitat, climate, and many other aspects of the ecology of an area. Forest totals 275.12 acres and covers 6.89% of the Township according to the 2007 LULC data. See *Forest Types* on *page 30* for more information on this classification and *Vegetative Cover, Maps 8 and 9 (for Route 4)* in the *Maps* section.

Wetlands – are areas that are inundated or saturated by surface or ground waters at a frequency and duration sufficient to support vegetation adapted for life in saturated soil conditions. Included in this category are naturally vegetated swamps, marshes, bogs and savannas which are normally associated with topographically low elevations but may be located at any elevation where water perches over an aquiclude (or bed of low permeability). Wetlands that have been modified for recreation, agriculture, or industry will not be included here but described under the specific use category such as urban land.

The wetlands of New Jersey are located around the numerous interior stream systems, and along coastal rivers and bays. New Jersey supports diverse wetland habitats dependent upon physiographic and geological variables. According to the 2007 LULC data, wetlands in Teaneck occupy 125.23 acres, representing 3.14% of the Township's total area. See *Wetlands* on *page 35* for a detailed discussion of wetlands types in Teaneck Township and the *Wetlands Map* (*Map 6* in the *Maps* section) for the location of these wetlands.

Urban Land – Urban or Built-up Land is characterized by intensive land use where the landscape has been altered by human activities. Although structures are usually present, this category is not restricted to traditional urban areas. Urban or Built-up Land includes Residential; Commercial and Service; Industrial; Transportation, Communication and Utilities; Industrial and Commercial Complexes; Mixed Urban or Built-up; Other Urban or Built-up; and Recreational. Included with each of the above land uses are associated lands, buildings, parking lots, access roads, and other appurtenances, unless these are specifically excluded.

Urban or Built-up Land takes precedence over other categories when the criteria for more than one category are met. For example, recreational areas that have enough tree cover to meet Forest category criteria are classified as Recreational Land in the Urban Land category. *Table 13* below shows the breakdown of Urban Land classifications in Teaneck.

Table 13. Urban Land Classifications in Teaneck Township

Classification	*Acres*	*% of Category*	*% of Teaneck*
Athletic Fields (Schools)	44.08	1.30%	1.10%
Commercial/Services	361.51	10.65%	9.05%
Industrial	25.70	0.76%	0.64%
Major Roadway	122.64	3.61%	3.07%
Military Installations	12.31	0.36%	0.31%
Mixed Residential	1.25	0.04%	0.03%
Mixed Transportation Corridor Overlap Area	0.13	0.00%	0.00%

Table 13. Urban Land Classifications in Teaneck Township			
Classification	*Acres*	*% of Category*	*% of Teaneck*
Other Urban Or Built-Up Land	80.35	2.37%	2.01%
Railroads	23.30	0.69%	0.58%
Recreational Land	247.39	7.29%	6.20%
Residential, High Density Or Multiple Dwelling	163.11	4.80%	4.08%
Residential, Rural, Single Unit	9.03	0.27%	0.23%
Residential, Single Unit, Low Density	20.31	0.60%	0.51%
Residential, Single Unit, Medium Density	2,270.76	66.89%	56.87%
Transportation/Communication/Utilities	12.93	0.38%	0.32%
Total Urban	3,394.79	100.00%	85.02%
Total Teaneck	3,993.04		
Source: NJDEP LULC 2007			

While urban land represents 85% of Teaneck, the subcategories are important to recognize. Urban land that is commercial or industrial in nature has more impervious coverage than urban land that is low to medium density residential or recreational.

Water – All areas within the landmass of New Jersey that are periodically water covered are included in this category. All water bodies should be delineated as they exist at the time of data acquisition, except areas in an obvious state of flood. Not included in this category are water treatment and sewage treatment facilities. See *Table 14* below for a breakdown of the LULC water classifications in Teaneck. Water represents 3.52% of Teaneck's total area.

Table 14. Waters in Teaneck Township by LULC Classification		
Classification	*Acres*	*% of Water*
Artificial Lakes	17.16	12.21%
Bridge Over Water	1.49	1.06%
Natural Lakes	52.51	37.36%
Streams And Canals	8.28	5.89%
Tidal Rivers, Inland Bays, And Other Tidal Waters	61.11	43.48%
Total Water	140.56	100.00%
Water as a % of Teaneck	3,993.04	3.52%
Source: NJDEP LULC 2007		

VEGETATION

Vegetation plays an important role in the health of the environment, helping to prevent erosion and loss of soil nutrients, reduce runoff and increase the rate at which water infiltrates into the soil, offset the carbon footprint and reduce temperature extremes, buffer winds and absorb noise, trap air-borne dust, carbon and ash, remove noxious gases, carbon dioxide, carbon monoxide, sulfur dioxide and odor from the air and return oxygen and water vapor to the air. A forest canopy can lower summer temperatures as much as 21^{o}F. In addition, vegetation provides habitat for many species of animals, including those whose survival is threatened or endangered by the loss of such habitat.

Out of Teaneck's 3,993 acres, 251 are classified by the NJDEP LULC as forest cover and another 125.23 acres as wetlands.

Forest Types

Table 15 below lists the forest types found in Teaneck Township and the narrative that follows summarizes the NJDEP descriptions of those types.

Table 15. Forest Types in Teaneck Township

Forest Type	*Calculated Acres*	*% of Forest*	*% of Teaneck*
Deciduous Forest (>50% Crown Closure)	148.24	53.88%	0.77%
Deciduous Forest (10-50% Crown Closure)	75.85	27.57%	3.71%
Deciduous Brush/Shrubland	30.60	11.12%	1.90%
Old Field (< 25% Brush Covered)	2.12	0.77%	0.05%
Phragmites Dominate Old Field	18.31	6.65%	0.46%
Forest Area Total	*275.12*	*100.00%*	6.89%
Teaneck Total Acreage	3,993.04		

Source: NJDEP 2007 LULC

Deciduous Forest – includes forested lands that contain deciduous tree species. Deciduous trees are those species that 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 sub-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 sub-category contains deciduous forest stands that have crown closure greater than 10%, but less than 50%.

Brush/Shrubland – includes areas where the vegetation is predominately between 0 and 20 feet high. Vegetative communities in these areas may range from early successional species that are only a few years old to climax or sub-climax communities that are many years old. Brushland areas represent critical habitat for many species of wildlife in New Jersey**.** The following types have been identified in Teaneck:

Deciduous Brush/Shrubland
(>25% Brush Covered with Deciduous Species Predominant > 75%)
This sub-category contains natural forested areas with deciduous species less than 20 feet in height and brush cover greater than 25%.

Old Field (<25% Brush Covered)
This sub-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 by the amount of brush cover. If a field contains few woody stems (<5%), it would be placed in the inactive farmland category.

Phragmites Dominate Old Field (2002)
This sub-category contains open fields where the common reed *Phragmites australis* dominates.

Tree Canopy

Of concern to the Township is the viability and extent of its tree canopy. The Township has a *Community Forestry Plan* and is in its third five-year plan cycle (2011-2015). Goals include a street tree inventory and twice-yearly evaluation of public trees. In the period 2006–2010, the Township removed 1,478 public shade trees, including 830 maples, and planted 1,162. Recent major storms such as Irene in 2011 and Sandy in 2012 have negatively affected the shade tree population. The recommendation of the current *Forestry Plan* is to inventory not only trees on street right-of-ways but also major trees on public and private lands. Teaneck is a Tree City USA in good standing. In February 2013, the Township designated a 250-year-old red oak tree located at the intersection of Cedar Lane and Palisade Avenue as a municipal historic site.

Rare and Endangered Plant Species and Ecological Communities

The New Jersey 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 Bergen County as of 2008 is included in the *Appendices* of this Plan (*Appendix A*). 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)* An inventory of flora found in Teaneck parks, developed for the 1980 *Natural Resource Inventory*, is included in the *Appendices* of this document (*Appendix B-1*).

WILDLIFE

Wildlife is an integral part of the ecosystem on the global, regional and local level. The interactions of wildlife with other animals and plants help sustain the normal functioning of the biosphere. The health and sustainability of our wildlife species affects the health and sustainability of industries such as agriculture, forestry, fisheries that support human life. Birds, insects and other wildlife play key roles in biological processes such as seed dispersal, pollenization, nutrient cycling, habitat maintenance and pest control. Wildlife that prey on other wildlife help maintain the balance of nature. Wildlife is dependent on quantity and quality of habitat for survival.

Critical Habitat

The NJDEP Landscape Project (*Version 3.1 2012*) is an "ecosystem-level approach to the long-term protection of imperiled and priority species and their important habitats in New Jersey." Data is collected from Division of Fish and Wildlife Endangered Species Program surveys, other professional surveys and validated sighting report forms and correlated with NJDEP Land Use/Land Cover data from 2007. The database is intended to be used as a planning tool both for site specific consideration and for identifying future survey areas. Species included in The Landscape Project are those that depend on the identified habitat for their survival. Migratory birds, for example, that do not rely on habitat in New Jersey for their survival would not be included.

The Landscape Project ranks patches of habitat using a numeric system (0 through 5), for the purpose of identifying habitat that may be suitable for threatened, endangered and priority wildlife species. Habitat identified as Ranks 3 through 5 is considered environmentally significant by the NJDEP. 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.

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 patches that do not contain any species occurrences and do not meet any habitat-specific suitability requirements.

There are 271 acres in Teaneck identified by the Landscape Project as patches where occurrences of one or more species have been recorded (Ranks 2-4), representing 6.78% of the Township's total area. An additional 313 acres, or 7.85% of Teaneck, have been identified as meeting habitat suitability requirements for endangered, threatened or priority wildlife species, even though no occurrences have been recorded (Rank 1). In total, almost 15% of Teaneck is suitable habitat. Of this habitat, 90% occurs in riparian areas (see *Riparian Zones* on *page 38*).

Threatened, Endangered and Priority Species

There are no federally endangered species occurrences recorded for Teaneck. The Landscape Project identifies habitat for one state endangered species, one state threatened species and five species of special concern. These species patches are found almost exclusively along the waterways, in wetland areas and parklands. *Table 16* below (and *Map 10, Endangered Species Habitat* in the *Maps* section) lists the species recorded in Teaneck, the types of occurrences and habitats, the rank for each species, and the acres of identified habitat patches. Often more than one species is identified within the same patch and the patch is ranked according to the highest ranking species. In Teaneck, the snowy egret has the broadest habitat, but frequently shares habitat with the glossy ibis, little blue heron, bald eagle and occasionally the yellow–crowned night heron. In forested areas, the wood thrush and the bald eagle may share habitat. The brown thrasher does not overlap with the other identified species.

Table 16. Landscape Project Identified Species in Teaneck Township

Common Name	*Scientific Name*	*Occurrence Types*	*Habitat*	*Rank/Status*	*Acres*	*% of Teaneck*
Bald Eagle	Haliaeetus leucocephalus	Foraging, nest	Water, wetlands, forest	4 / State Endangered	147.00	3.68%
Brown Thrasher	Toxostoma rufum	Breeding Sighting	Forest, urban	2 / Special Concern	4.73	0.12%
Glossy Ibis	Plegadis falcinellus	Foraging	Water, wetlands	2 / Special Concern	115.69	2.90%
Little Blue Heron	Egretta caerulea	Foraging	Water, wetlands	2 / Special Concern	128.36	3.21%
Snowy Egret	Egretta thula	Foraging	Water, wetlands	2 / Special Concern	189.24	4.74%
Wood Thrush	Hylocichla mustelina	Breeding Sighting	Forest, urban, wetlands	2 / Special Concern	28.03	0.70%
Yellow-crowned Night-heron	Nyctanassa violacea	Foraging	Water	3 / State Threatened	33.45	0.84%
Total Acres in Teaneck					3,993.04	

Source: NJDEP Landscape Project 3.1 (2012)

Exact species occurrence locations are not published because they may represent nest sites, roost sites, dens and other sites used by species that are vulnerable to human disturbance and, in some cases, susceptible to illegal collection. Landscape Project maps display habitat patches that animals use and that have general species occurrence information embedded within them, rather than pinpointing exact locations of the most sensitive wildlife sites.

A 1977 Flora-Faunal Survey of Five Selected Parks in Teaneck as reported in the 1980 *NRI* is included in the *Appendices (Appendix B-2).*

WETLANDS, RIPARIAN AREAS AND FLOOD ZONES

Activities in wetlands, riparian areas and flood hazard areas are regulated under New Jersey law. Wetlands, riparian areas and flood hazard areas often overlap and multiple jurisdictions may apply, including the Freshwater Wetlands Protection Act, the Flood Hazard Control Act and the Stormwater Management Act, the rules for which appear in Title 7 of the New Jersey Administrative Code (N.J.A.C.).

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.

Wetlands in Teaneck are regulated by the NJDEP under the Freshwater Wetlands Protection Act Rules, N.J.A.C. 7:7A, which govern the implementation of the Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq. The Rules define a 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." In designating a wetland, the NJDEP uses "the three-parameter approach (that is, hydrology, soils and vegetation) enumerated in the 1989 Federal Manual." (*N.J.A.C. 7:7A)*

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. The transition area required depends on the resource value classification of the wetlands, as described below. The resource value classification of a given wetland can be determined solely on a case by case basis through a site-specific Letter of Interpretation (LOI) issued by the NJDEP.

Exceptional Resource Value Wetland *(150 foot transition area)*

- 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.

Note: There are no trout producing waters in Teaneck (see *Hydrology* chapter), but a comparison between the Endangered Species Habitat and Wetlands mapping indicates there may be wetlands located within patches documented as state endangered and/or threatened species or species of special concern habitat and within patches that meet habitat suitability.

Ordinary Resource Value Wetland *(a transition area is not required adjacent to a freshwater wetland of ordinary resource value or adjacent to a State open water)*

- 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 NJDEP will only consider a use that was legally existing in that location prior to July 1, 1988, or was permitted under 7:7A 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 *(50-foot transition area)*

- 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 (LULC) data, there are approximately 125 acres of wetlands within Teaneck, occupying 3.14% of the Township. The *Wetlands and Surface Water Quality* map (*Map 6* in the *Maps* section) shows the locations of wetlands in Teaneck. The LULC data identifies a number of wetland types, including bogs, herbaceous swamps, wet meadows, forested wetlands, scrub/shrub and brush covered wetlands, vegetated pond margins, and inter tidal marshes. *Table 17* below presents a summary of the LULC wetlands mapped in Teaneck. The dominant type of

wetland in Teaneck is deciduous wooded wetlands, totaling 81.5 acres, or 2.04% of the Township. Phragmites Dominate Interior Wetlands is the second most common, totaling 26.57 acres, or 0.67%.

Table 17. Wetland Types in the Township of Teaneck			
Wetland Type	*Acres*	*% of Wetlands*	*% of Teaneck*
Deciduous Scrub/Shrub Wetlands	11.68	9.328%	0.293%
Deciduous Wooded Wetlands	81.50	65.084%	2.041%
Herbaceous Wetlands	0.87	0.696%	0.022%
Managed Wetland In Maintained Lawn Greenspace	0.50	0.400%	0.013%
Phragmites Dominate Coastal Wetlands	4.10	3.275%	0.103%
Phragmites Dominate Interior Wetlands	26.57	21.217%	0.665%
Total Wetlands	125.23	100.000%	
Teaneck Total Area	3,993.04		3.136%
Source: NJDEP 2007 Land Use/Land Cover			

Each type of wetland has distinct characteristics. Below are NJDEP descriptions of the LULC wetlands classifications found in Teaneck:

Coastal Wetlands

Phragmites Dominate Coastal Wetlands – saline marsh areas where the common reed, Phragmites australis (an invasive species), dominates.

Interior Wetlands

Deciduous Scrub/Shrub Wetlands – brush communities composed primarily of young samplings of deciduous tree species such as Acer rubrum, A. negundo, Liquidamber stryaciflua, Alnus serrulata, Cornus stolonifer, and C. amomum; and woody shrubs such as Vaccinium corymbosum, V. macrocarpon, Spirea alba, Viburnum dentatum, Rosa palustris, Myrica pennsylvania, M. gale, Clethra alnifolia, Cephalanthus occidentalis and Rhododendron viscosum, among others.

Deciduous Wooded Wetlands – closed canopy swamps dominated by deciduous trees normally associated with watercourses, edges of marshes, and isolated wetlands. The important canopy species includes Acerrubrum, Nyssa sylvatica, Fraxinus pennsylvanica, Salix nigra, Quercus bicolor, Q. phellos, Q. falcata, Liquidambar styraciflua, and Platanus occidentalis. These species combine to form a series of mixed hardwood lowland habitats throughout the entire state.

Herbaceous Wetlands/Non-Tidal Marshes – wetlands dominated by various herbaceous species that are not connected or associated with tidal waters. Lake edges, open flood plains and abandoned wetland agricultural fields are locations for this cover type. Leersia oryzoides, Phalaris arundinacea, Nuphar lutea, Polygonum arifolium, P. sagittatum, Typha latifolia and Phragmites are species that may dominate this cover type. Bog herbaceous vegetation includes numerous *Cyperaceae* genera, *Juncus* sp. and the carnivorous genera of *Drosera* and *Sarracenia*.

Phragmites Dominate Interior Wetlands – fresh marsh areas where the common reed, Phragmites australis (an invasive species), dominates.

Other Urban or Built-up

Managed Wetland in Maintained Lawn Greenspace – former natural wetland areas that now are part of an altered managed landscape, but which still exhibit signs of soil saturation on the imagery. These areas do not support typical wetland vegetation, but are vegetated primarily by grasses and other planted vegetation that may be routinely mowed. Examples of this category would be maintained open lawns and storm water swales in residential, commercial or industrial areas. None of the wetlands included in this category are routinely inundated, although the swales may be on occasion. These altered wetlands exist on areas shown on the US Soil Conservation Service soil surveys to have hydric soils. *(NJDEP)*

Though this information is based on NJDEP mapped wetlands, unmapped wetlands, which are still subject to NJDEP regulation, may exist in Teaneck. In addition, wetlands classifications in the NJDEP 2007 LULC data are determined by analysis of aerial photos rather than on the ground and are not regulatory. The Land Use Regulatory Program (LURP) of the NJDEP determines the extent and final determination of wetlands in the State of New Jersey on a case by case basis. These wetlands would require a professional delineation before a regulated activity could occur in or around them.

It is important to note that wetlands types are not static. According to the NJDEP, wetland classifications may change over time and wetlands may transition naturally to other land uses, such as open water. *Table 12* in the *Land Use and Land Cover* section on page 27 shows that wetlands in Teaneck decreased by 5% between 1986 and 2007. Most of Teaneck's wetlands are encompassed within public parkland, including Feldman Nature Preserve, Tokoloka Park, Andreas Park, Phelps Park, Windsor Park, Argonne Park, Overpeck County Park and the Overpeck County Golf Course.

Wetlands loss, in some instances, can be reversed. The Teaneck Creek Conservancy, located in a portion of Overpeck County Park, is working with Bergen County and other organizations to "remove old construction debris and re-create additional freshwater forested wetlands that were once the dominant habitat feature on the site." A Wetlands Restoration Plan for the 46-acre site has been approved by the NJDEP. Implementation of the plan is expected to result in 20 new wetland acres. *(Teaneck Creek Conservancy)*

Riparian Zones

Riparian zones are stream banks and other areas adjacent or hydrologically connected to the surface water network (e.g., streams, rivers, lakes or reservoirs). Activities within riparian zones are regulated under the Flood Hazard Control Act, N.J.A.C. 7:13, with the intent of preserving and protecting quality of surface waters, vegetation and habitat. According to the NJDEP, the riparian zone may be located within the jurisdictional boundaries of other rules implemented by the Division of Land use Regulation, including the Freshwater Wetlands Protection Act rules (N.J.A.C. 7:7A) (see *Wetlands* on *page 35* and *Stream Classifications* on *page 22*) and the Stormwater Management rules (N.J.A.C. 7:8).

According to N.J.A.C. 7:13-4.1, the riparian zone is determined as follows:

(a) A riparian zone exists along every regulated water, except there is no riparian zone along the Atlantic Ocean nor along any manmade lagoon, stormwater management basin, or oceanfront barrier island, spit or peninsula.

(b) The riparian zone includes the land and vegetation within each regulated water described in (a) above, as well as the land and vegetation within a certain distance of each regulated water as described in (c) below. The portion of the riparian zone that lies outside of a regulated water is measured landward from the top of bank. If a discernible bank is not present along a regulated water, the portion of the riparian zone outside the regulated water is measured landward as follows:

1. Along a linear fluvial or tidal water, such as a stream, the riparian zone is measured landward of the feature's centerline;

2. Along a non-linear fluvial water, such as a lake or pond, the riparian zone is measured landward of the normal water surface limit;

3. Along a non-linear tidal water, such as a bay or inlet, the riparian zone is measured landward of the mean high water; and

4. Along an amorphously-shaped feature, such as a wetland complex, through which a regulated water flows but which lacks a discernible channel, the riparian zone is measured landward of the feature's centerline.

(c) The width of the riparian zone along each regulated water described in (a) above is as follows:

1. The riparian zone is 300 feet wide along both sides of any Category One water, and all upstream tributaries situated within the same HUC-14 watershed;

2. The riparian zone is 150 feet wide along both sides of the following waters not identified in (c)1 above:

i. Any trout production water and all upstream waters (including tributaries);

ii. Any trout maintenance water and all upstream waters (including tributaries) within one linear mile as measured along the length of the regulated water;

iii. Any segment of a water flowing through an area that contains documented habitat for a threatened or endangered species of plant or animal, which is critically dependent on the regulated water for survival, and all upstream waters (including tributaries) within one linear mile as measured along the length of the regulated water; and

iv. Any segment of a water flowing through an area that contains acid producing soils; and

3. The riparian zone is 50 feet wide along both sides of all waters not identified in (c)1 or 2 above.

(d) The riparian zones established by this chapter are separate from and in addition to any other similar zones or buffers established to protect surface waters. For example, the Stormwater Management rules at N.J.A.C. 7:8 ... establish 300-foot Special Water Resource Protection Areas and buffers … along certain waters. Furthermore, the Freshwater Wetlands Protection Act rules at N.J.A.C. 7:7A establish 50-foot and 150-foot transition areas along freshwater wetlands and other features that are also regulated under this chapter. Compliance with the riparian zone requirements of this chapter does not constitute compliance with the requirements imposed under any other Federal, State or local statute, regulation or ordinance.

The riparian zone along Teaneck waters is generally likely to be established at 50 feet. However, riparian zones must be determined on a case by case (application by application) basis. If acid-producing soils or a plant or animal species specified in the NJDEP's *List of Threatened and Endangered Species That Are Critically Dependent on Regulated Waters for Survival* is determined to be present, then the 150 foot riparian zone requirement would be invoked. (See *Riparian Buffers* map, *Map 11* in *Maps* section.)

Riparian areas serve as an interface between water and land and their differing ecosystems. Riparian areas, like wetlands, help to filter chemicals, pollutants, and sediments from water, maintain groundwater recharge and provide flood control and critical habitat for wildlife. Riparian areas also help to moderate fluctuations in water temperature, maintain stream base flow and stabilize streambanks, reducing erosion and the amount of sediment reaching streams. The soils, leaves and vegetated floor of a riparian area act like a sponge, absorbing floodwaters and releasing them slowly. They also trap sediments that can add to nutrients to the riparian zone instead of entering the waters, where they can degrade water quality. Mature trees in a forested floodplain also serve to slow the velocity of floodwaters.

The effectiveness of riparian areas can be affected by land use changes, such as an increase in paved surfaces or reduction or removal of vegetation, both of which may increase the flow of storm or flood water runoff into the area and into surface waters. Removing negative-impact land use activities and maintaining vegetated riparian areas are critical for maintaining water quality of stream systems and downstream reservoirs. Minimizing or excluding development in these buffer areas adjacent to water bodies and streams can help to reduce the impact of developed land uses on adjacent aquatic ecosystems and downstream water quality.

Under the Flood Hazard Control Act, as stated below, the clearing, cutting and/or removal of vegetation in a riparian zone is regulated.

Flood Zones

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. As stated in Teaneck's *2002 Environmental Resource Inventory* (ERI), data on flood zones is "pertinent for planning purposes since it signals areas where development may be restricted because of direct threats to property and life, and because of the potential degradation of the abutting watercourses by the introduction of pollutants."

At the federal level, the United States Geological Survey (USGS) maps flood prone areas, which were discussed and mapped in the *2002 ERI*, and the Federal Emergency Management Agency (FEMA) evaluates and maps Special Flood Hazard Areas (SFHAs) and other flood zones, creating official Flood Rate Insurance Mapping (FIRM) that can be used in participating communities, such as Teaneck, to determine flood insurance rates. On the state level, the NJDEP delineates Flood Hazard Areas along streams and regulates activities within these areas. In recent years, FEMA and the state have coordinated to integrate NJDEP flood hazard area parameters into FEMA updates. Municipal code may set standards that are stricter than either the state or FEMA.

USGS Flood Prone Areas

Flood-prone areas are outlined on standard USGS 1:24,000-scale topographic quadrangle maps as part of the federal program for managing flood losses in urban areas. Flood-prone area maps, although not a published series, are available, by quadrangle name, from the Water Resources Division District Office in the state of interest. Locations of these offices can be obtained by contacting the Office of Water Information, Water Resources Division, U.S. Geological Survey, 423 National Center, Reston, VA 20192. *http://egsc.usgs.gov/isb/pubs/booklets/usgsmaps/usgsmaps.html.*

The *2002 ERI* mapped USGS flood prone areas and undocumented flood prone areas (see page 43 in that document). Much of the documented flood prone area is captured by the FEMA mapping, although it appears to be more extensive in the vicinity of Overpeck and Teaneck creeks than the currently effective FIRM mapping. The undocumented flood prone areas are generally wetlands in the vicinity of Feldman Nature Preserve, Tokoloka Park, Argonne Park and straddling Hirshfeld Brook in Windsor Park. There is no source date given for the USGS mapping in the *2002 ERI*.

FEMA Mapping

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 of flooding in a given year. *(FEMA)*

The Township of Teaneck is a participating community in the NFIP. The effective FEMA Flood Insurance Rate Map (FIRM) mapping is from September 30, 2005. 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 December 2012, in the aftermath of Hurricane Sandy, FEMA released near-term Advisory Base Flood Elevations (ABFEs) for portions of 10 counties, including Bergen County and a portion of Teaneck. These ABFEs, which reflect the change in known flood risk since effective FIRM mapping for tide-affected areas, are based on work already underway toward the release of preliminary new FIRM mapping scheduled for 2013. The ABFEs do not replace the effective FIRMs as far as flood insurance is concerned, but are meant as guides for rebuilding in storm-damaged areas. They show a more current picture of flood risk and provide a model of what to expect in the next round of FIRM mapping. The ABFEs were made effective by executive order of the Governor in January 2013, primarily as a guideline for rebuilding.

A comparison of the *FEMA Flood Zones (2005 DFIRM)* and *FEMA Advisory Base Flood Elevation (2012)* maps (*Maps 12 and 13* in the *Maps* sections) shows expanded flood zones in the lower portion of the Hackensack River in Teaneck and in the area of Overpeck Creek, but mostly in non-developed areas. The extent of the flood data on the ABFE mapping is limited to the tidal grids chosen by FEMA and thus does not include mapping for the northern portion of the Hackensack in Teaneck.

Table 18 below shows the extent in Teaneck of FEMA 100-year and 500-year flood zones. There are 389.474 acres mapped as 100-year flood zone and 44.243 acres in the area between the limits of the 100-year flood and the limits of the 500-year flood. Together, these flood zones represent 10.76% of the Township's total area. They are located along all the major waterways except Hirshfeld Brook.

Table 18. FEMA Flood Zones in Teaneck Township

Flood Hazard	*Acres*	*% of Total Municipal Area*
100-year Flood (1% annual chance)	389.474	9.75%
500-year Flood (0.2% annual chance)	40.243	1.01%
Not in Flood Zone	3,563.320	89.24%
Total Township Acreage	3,993.037	100.00%

Source: FEMA DFIRM 2005

FEMA Flood Insurance Study and Recent Storms

According to the FEMA *Bergen County Flood Insurance Study (FIS),* effective September 30, 2005, flooding in Bergen County is generally the result of heavy rainfall from hurricanes moving up the coast, large frontal storms from the west and south, and local thunderstorms. Flooding in Teaneck may be exacerbated by tidal surges from the

south and reservoir overflows from the north. At the time of the *2005 FIS* the storm of record for the Hackensack was Hurricane Floyd on September 16, 1999, when Oradell Reservoir reached a peak elevation more than 2 feet above any previous elevation *(FIS).* That record was superseded in April 2007, when the crest at the New Milford gage (NMLN4) reached 12.36 feet. At the New Milford gage, major flood stage is 10 feet and flood stage is 6 feet *(NOAA).*

The principal flooding in southern Bergen County results from the tidal stages of Newark Bay. Nearly every year there is flooding in the Hackensack Meadowlands, and several hurricanes have produced extraordinary surges. The high tide record in the *2005 FIS* was set during Hurricane Donna in 1960, at 8.9 feet *(FIS).* This was dramatically outdone by Hurricane Sandy, when a combination of high winds and an astronomical (full moon) high tide produced a surge of 11.9 feet at the mouth of the Hackensack in Newark Bay in October 2012. (*NewJersey.com)* This tidal surge delivered major flooding and damage to towns as far north as Little Ferry where the topography is generally low and the flood gates could not contain the floodwaters. Teaneck was only minimally affected by flooding; however, heavy winds caused damage to trees and widespread power outages.

According to the FIS, flooding of locations along tidal waterways, but inland from the mouth at Upper Newark Bay, depends on the duration of the storm as well as the tide crest elevation. A high-storm tide of short duration may be more critical for inland areas than a lower tide of longer duration such as those brought about by nor'easters. Land development since Hurricane Donna in 1960 has produced a general increase of water-surface elevations. Impervious surface such as highways and parking lots allow for faster, or higher concentration runoff of shorter duration, causing flash floods on smaller streams. In addition in areas where storm drains and culverts are inadequate and there are narrow channels in the floodplain, backwater can cause flooding along streams.

In Teaneck and Englewood a flood control project for Overpeck Creek from Route 4 to West Forest Avenue included channelization of the creek and construction of concrete retaining walls designed to control the 100-year flood. According to FEMA, this has diminished flooding along Route 4, but not as successfully along West Forest Avenue. In the 1950s tide gates were constructed along Overpeck Creek to control the level of the creek and eliminate brackish water from reaching the area. They were renovated in 1979. *(FIS)*

State Delineated Waters

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." As defined by the rules, a flood hazard area exists along every regulated water that has a drainage area of 50 acres or more. Regulated waters are waters that have been delineated in Appendix 2 of the Flood Hazard Control Act (FHCA) rules. In most cases the delineation includes both the flood hazard area design flood elevation and the floodway limit. To determine which mapping

is available for a particular water, or to obtain copies of maps or other information regarding the use or revision of these studies, contact the NJDEP as described at N.J.A.C. 7:13-3.3. *(NJDEP Division of Land Use Regulation)*

A flood hazard area is defined as the area inundated by the flood hazard area design flood, which is equal to the 100-year flood plus a "factor of safety." It includes both a floodway and a flood fringe. There are six measures for determining the flood hazard area under the FHCA rules. They include a NJDEP delineation method (flood studies are undertaken); FEMA tidal, fluvial and hydraulic methods; and approximation and calculation methods. The waters in Teaneck for which the state has delineated a flood hazard area are shown in *Table 19* below.

Table 19. State Flood Hazard Area Delineations

Studied Water	*Section Studied*
Frenchs Creek	Entire reach
Hackensack River	Entire reach
Metzlers Creek	Entire reach
Overpeck Creek	Entire reach
Teaneck Creek	Downstream of a point located 2000 feet upstream of Degraw Avenue
Source: N.J.A.C. 7:13 Appendix 2	

The section of Hirshfeld Brook in Teaneck is not included in this list although the brook is a studied water in Bergenfield, Dumont and New Milford, nor is it considered a flood zone on FEMA mapping (see *FEMA Flood Zones* map in the *Maps* section). However, the *2002 ERI* maps a section of the brook and adjacent wetlands near the border with Bergenfield as an undocumented flood prone area.

NJDEP regulated activities in a flood hazard area or riparian zone include:

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. (N.J.A.C. 7:13-2.4)

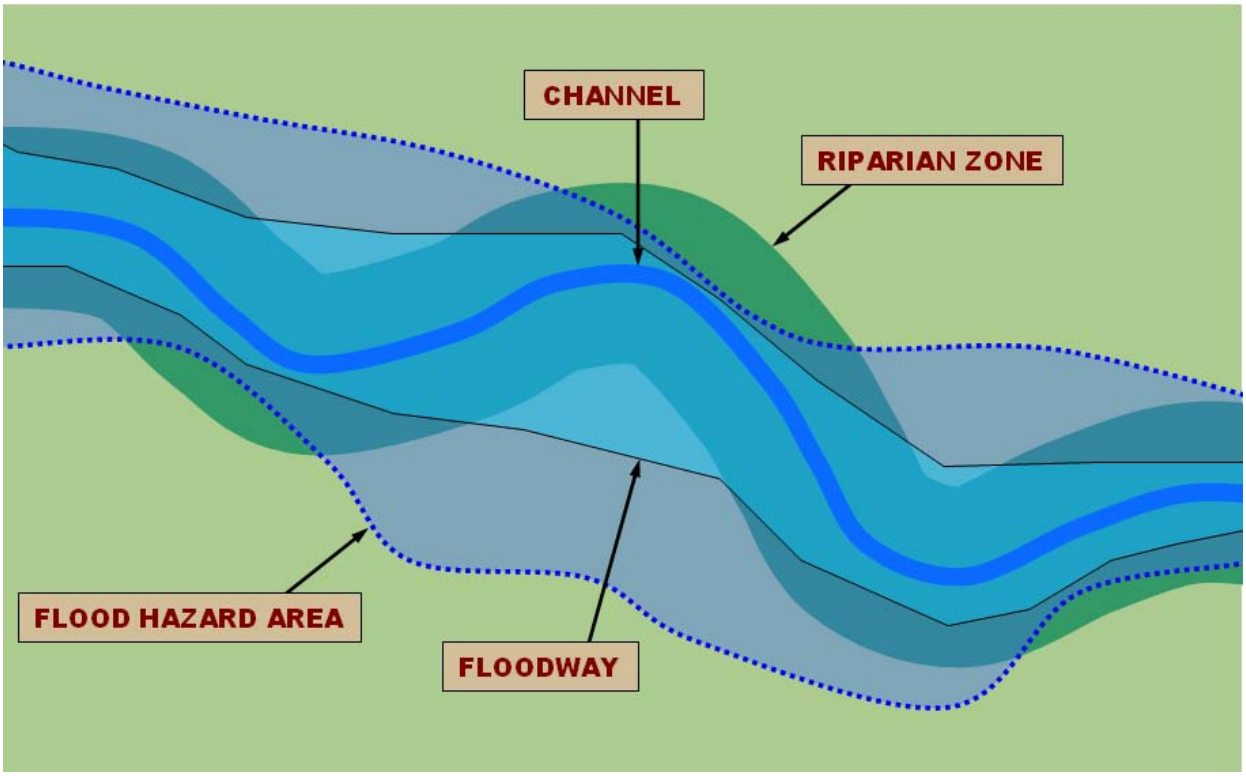
In order to engage in any of these activities in a regulated area, the appropriate permit must be obtained. There are several different categories of permits, including permits by rule, general permits and individual permits.

There are area specific standards, depending on whether the area includes a channel, riparian zone, floodway, flood fringe, fishery resources, threatened & endangered species, or acid producing soils. And there are site specific standards for different facets such as stormwater management, excavating, filling, building, roads and parking areas.

Construction is not necessarily prohibited in a regulated area but a disturbance must be justified.

Figure 1 below shows how flood hazard areas and riparian areas map overlap.

Figure 1. Example of Flood Hazard Area and Riparian Overlap



Source: NJDEP

Municipal Code

Flood hazard areas and damage control and prevention are addressed primarily in Section 16A. Flood Damage Protection of the Township of Teaneck Municipal Code (available at ecode360 through a link on the Township website). The references for the chapter are the FEMA Flood Insurance Studies and Rate Maps from September 2005 discussed above.

According to the Code,

> (a) The flood hazard areas of the Township of Teaneck are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
>
> (b) These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazard which increase flood heights and velocities and, when

inadequately anchored, damage uses in other areas. Uses that are inadequately floodproofed, elevated or otherwise protected from flood damage also contribute to the flood loss.

The code requires a development permit before construction or development begins within any area of special flood hazard, sets standards for flood hazard reduction and prohibits encroachments in the floodway portion of the special flood hazard area.

Teaneck is more prone to flooding as a result of heavy rainfall than tidal influences. An April 2007 set record levels at the New Milford gage, as a result of the combination of heavy rains and the overflow of reservoirs upstream. While Hurricane Sandy set a record at the Newark gage on the Passaic River, the impacts of the tidal surge were only minimally felt in Teaneck. There was little rainfall associated with this event, which caused more damage from heavy winds than from flooding.

Charles, McKearnin, Township Engineer, indicates that there are both residential and commercial properties within the FEMA Special Flood Hazard Area in Teaneck, particularly along Pomander Walk, parts of Cedar Lane, New Bridge Road, Fabry Terrace, Kilmurray Drive, East Oakdene Avenue and the Liberty Road/Ivy Lane area.

HISTORIC AND CULTURAL RESOURCES

Overview of Teaneck's History

Lenni Lenape Indians were the first known inhabitants of the area that is now Teaneck. They established camp sites on either side of the ridge that runs north to south through the center of the Township, where Queen Anne Road is located today, and occupied a village on the banks of what is now called Overpeck Creek. The first known European structures to appear in this area date to 1704. A number of early settlers built stone farmhouses along the eastern side of the Teaneck Ridge, and seven of those houses are still standing (see *Table 20 Designated Historic Sites* below and the *Historic Sites* map, *Map 14* in the *Maps* section).

The first business district in the Teaneck area was New Bridge Village, in 1742. During the Revolutionary War, it was considered neutral ground, with both the Americans and the British raiding it for food and timber, and ultimately destroying much of it. At one point, the Americans razed the New Bridge down to its beams as a defensive measure against the British. Today the 1889 Drawbridge at New Bridge Road, located at the narrows of the Hackensack River on the site of the earlier bridge, is listed on the State and National Registers of Historic Sites as the oldest highway swing-bridge in New Jersey and is closed to vehicular traffic. It connects Historic New Bridge Landing in River Edge with Brett Park in Teaneck.

Aside from the war, Teaneck was a quiet farm community until the mid-nineteenth century when passenger rail service enticed wealthy New Yorkers to establish homes on large tracts of land and commute into the city. The largest estate, Englewood Farms, occupied 2,000 acres in the center of present-day Teaneck and belonged to William Walter Phelps. The son of a wealthy railroad magnate and New York City mercantilist he is known as the "Father of Teaneck" The municipal complex now sits on the site of Phelps' Victorian mansion.

The Township of Teaneck was formally established on February 19, 1895, cobbled from portions of Englewood, Hackensack, Ridgefield Park, Bergen Fields and Bogota. The population at the time was 811. During the early days of the 20th century, the town's affairs focused on construction of streets and street lamps, trolley lines (along DeGraw Avenue and Old Fort Lee Road), telephones and speeding traffic. The Cedar Lane area emerged as a business district in 1926 where the first buildings, specifically designed as stores, were constructed. The medical center at Holy Name Hospital was built in 1924 on lands owned by Mrs. Phelps. Fairleigh Dickinson University, established in 1954 along River Road, was a community college before becoming a private university.

Teaneck's first *Master Plan*, in 1933, had the vision to set aside land for parks, including the purchase of land along either side of State Route 4 to provide a greenbelt buffering residential neighborhoods from the new roadway. This greenbelt is still in existence today and is shown on the *Vegetative Cover (Route 4)* map in the *Maps* section (*Map 9*). *Note*: The vegetative cover is mapped according to the NJDEP Land Use/Land Cover

(LULC) definitions. The absence of "green" on the map does not mean the land is barren but that it does not meet the NJDEP definitions for forested coverage according to the state's interpretation of the orthophotography.

Residential development began in earnest after the opening of the Phelps Estate in 1927. The completion of the George Washington Bridge in 1931 and its connection to Teaneck via Route 4 brought hundreds of curious and eager new home buyers. The population at the 2010 census was 39,776. (*Information sourced from accounts by former Township Historian Robert D. Griffin and Township Historian Larry J. Robertson, 2007 Open Space and Recreation Plan, various articles including the Teaneck Suburbanite, July 5, 2006, and the Bergen County Historical Society and Parks Department websites)*

Designated Historic Sites

A guide to the Township's historic landmarks, prepared by the Teaneck Historic Preservation Commission for the Township's Centennial Anniversary in 1995, provides an overview of three centuries of architecture. (*A Guide to the Historic Landmarks of Teaneck, New Jersey).* In addition, Bergen County conducted a historic sites survey in 1984-85 that identified possible sites for historic preservation. A number of properties are listed on the national and state registers, and the Historic Preservation Commission of Teaneck Township, established by ordinance in 1988, has worked to achieve municipal historic designation for several of properties. The most recent addition to the Teaneck list of historic places is the site of 250-300 year old red oak tree, which was designated by Ordinance 4283 adopted by resolution on February 5, 2013. The tree had to be cut down in June 2013, but cuttings were taken and sections of the tree retained for commemorative purposes. Bergen County, in consultation with the Puffin Foundation and the Netivot Shalom, Inc., will erect a commemorative plaque at the corner of Cedar Lane and Palisades Avenue, and the County plans to plant propagated trees in Overpeck Park and elsewhere in consultation with the Puffin Foundation. Several properties proposed for historic designation by the Historic Preservation Commission have not been designated due to objections by the property owners.

Table 20 below and the *Historic Sites* map in the *Maps* section identify the sites in Teaneck that have achieved official recognition or designation by the National (N) and/or State (S) Registers of Historic Places and the Township of Teaneck (M).

Table 20. Designated Historic Sites of Teaneck Township

	Name	*Address*	*Block/Lot*	*Reg.*
1	The John Ackerman House*	1286 River Road	1402/6	MSN
2	The Banta-Coe House*	884 Lone Pine Road	301/4	MSN
3	The Brinkerhoff-Demarest House*	493 Teaneck Road	3705/5	MSN
4	The Adam Vandelinda House*	586 Teaneck Road	3104/33	MSN
5	The James Vandelinda House*	566 Teaneck Road	3111/29	MSN
6	The Caspar Westervelt House*	20 Sherwood Road	3309/5	MSN
7	Zabriskie-Kipp-Cadmus House*	664 River Road	212/15	MSN

Table 20. Designated Historic Sites of Teaneck Township				
	Name	*Address*	*Block/Lot*	*Reg.*
8	Thurnauer House	628 North Forest Drive	1607/1	M
9	Lutheran (Van Buskirk) Church Cemetery	1526 River Road	1211/7	M
10	Old Burial Ground / Teaneck Historical Burial Ground	662 Pomander Walk	212/2	M
11	Christian Cole House	1617 River Road	1201/19	M
12	Louis Bourgeois House	114 Bogert Street	4909/1	M
13	John I. Post House	790 Old Newbridge Road	1001/4	M
14	George V. Demarest House	12 Degraw Avenue	3216/11	M
15	Ende-Sutherland House	720 Roemer Avenue	1103/3	M
16	Site of Red Oak Tree	339 Cedar Lane	2609/25 (partial)	M
17	Teaneck Armory (1799 Teaneck Rd)	Teaneck Rd/Liberty St	5301/1	S
18	Drawbridge at New Bridge	Old New Bridge Road at Hackensack River		SN

** National Historic Register Thematic Nomination of Early Stone Houses of Bergen County*
Sources: National Register of Historic Places; NDEP-NHPO; Teaneck Township Code

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) at *http://climate.rutgers.edu/njwxnet/index.php*.

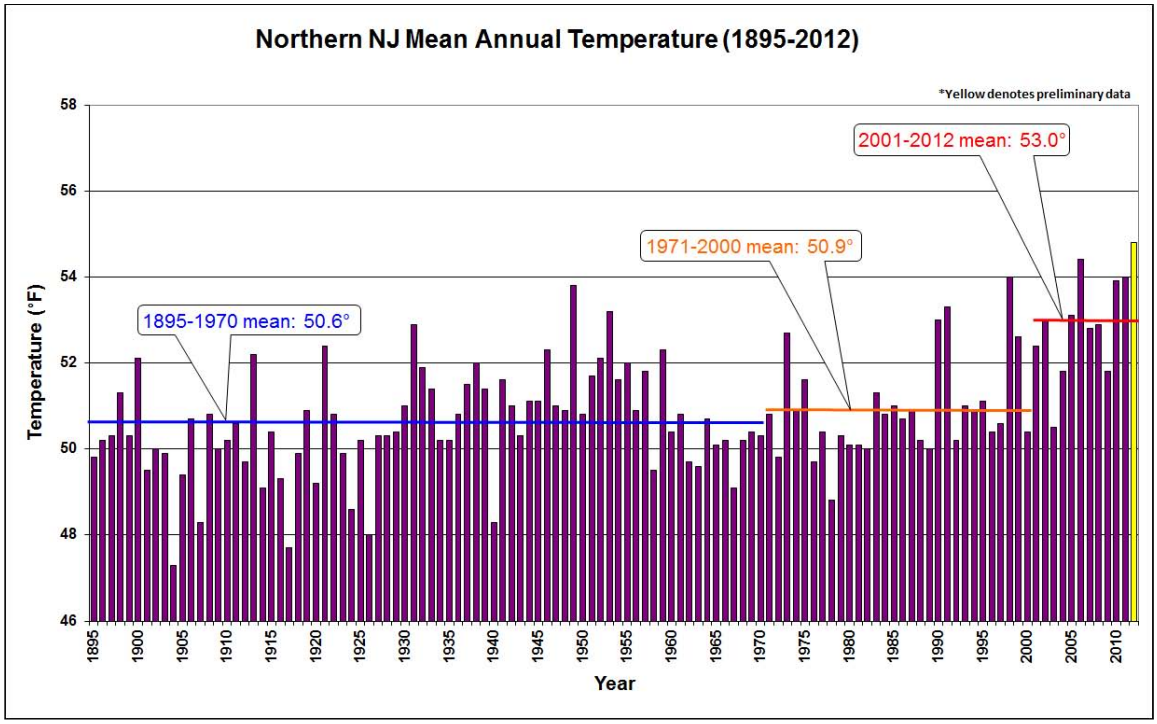
Climate Zone

New Jersey is divided into five climate zones, with the Township of Teaneck lying in the Central Zone. According to the ONJSC publication *The Climate of New Jersey*, the Central Zone "runs from New York Harbor and the Lower Hudson River to the great bend of the Delaware River in the vicinity of Trenton. This region has many urban locations with large amounts of pollutants produced by the high volume of automobile traffic and industrial processes. The concentration of buildings and paved surfaces serve to retain more heat, thereby affecting the local temperatures. Because of the asphalt, brick and concrete, the observed nighttime temperatures in heavily developed parts of the zone are regularly warmer than surrounding suburban and rural areas. This phenomenon is often referred to as a 'heat island.' The northern edge of the Central Zone is often the boundary between freezing and non-freezing precipitation during wintertime. In summer, the northern reaches often mark the boundary between comfortable and uncomfortable sleeping conditions." (*ONJSC)*

Temperature and Precipitation

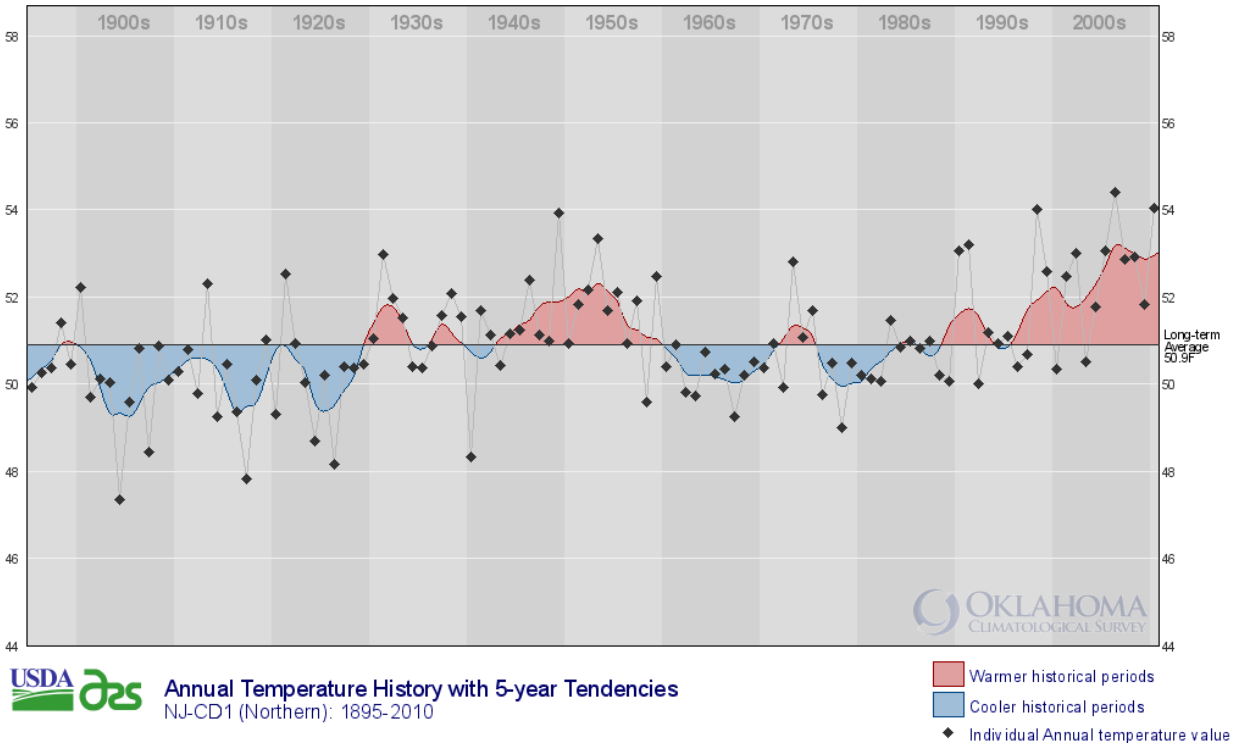
The ONJSC maintains temperature and precipitation data from monitoring stations around the state. Some of these records go back as far as the 1890s. The ONJSC has compiled a northern New Jersey regional report, with values calculated from an average of monthly temperatures recorded at stations throughout the region, which includes Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex, Union, and Warren counties and covers 37% of the state. The graphs below show an overall upward trend in mean temperature between 1895 and 2012 and indicate that in the last couple of decades, this region is both warmer and wetter than in the preceding historical periods. As shown below, the long-term temperature average is 50.9^{o}F *(Figure 3)* but the average (or mean) temperature for the ten year period 2001-2012 is 53.0^{o}F *(Figure 2).* The long-term mean total precipitation is 46.51 inches *(Figure 5)* for the period 1895-2010, whereas the mean precipitation for 2001-2102 is 52.36 inches *(Figure 4).*

Figure 2. Northern NJ Mean Annual Temperature (1895-2012)



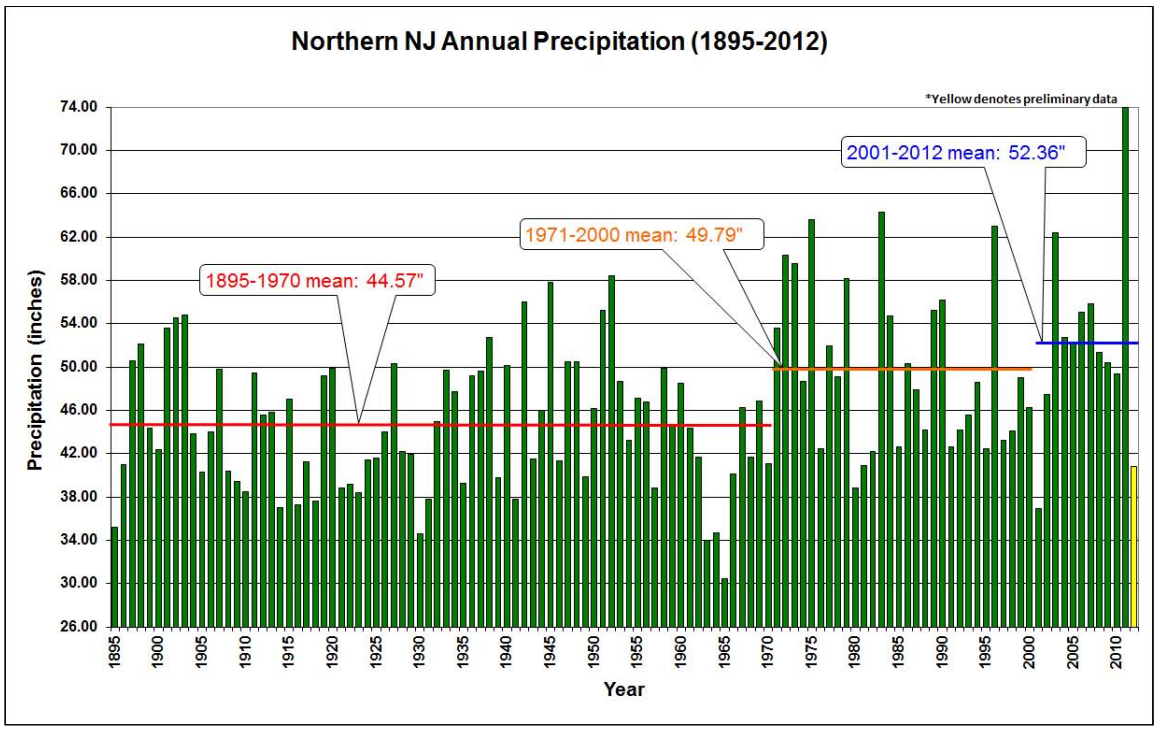
Source: ONJSC

Figure 3. Northern NJ Annual Temperature History 1895-2010



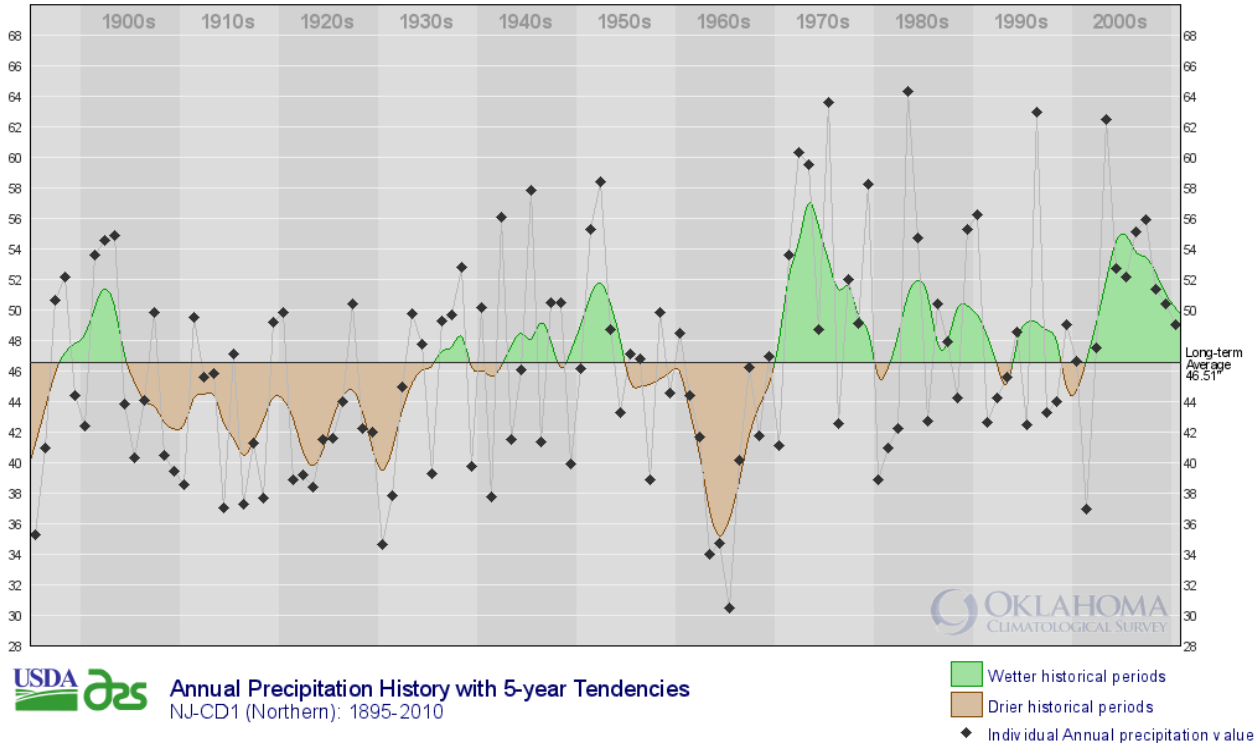
Source: ONJSC/Courtesy of Oklahoma Climatological Survey

Figure 4. Northern NJ Annual Precipitation (1895-2012)



Source: ONJSC

Figure 5. 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 station is Teterboro (approximately 4 miles). *Table 21* shows typical 24-hour reporting from the Teterboro station.

Table 21. Daily Weather Tracking NJ Weather & Climate Network (NJWxNet)
Teterboro Station March 1, 2013

Time	*Temp*	*Windchill*	*Dewpoint*	*Rel humid*	*Pressure*	*Precip*	*Wind speed*	*Wind dir*	*Windsp max*
12:51:00 AM	37	37	30	75	29.6		1	NW	
1:51:00 AM	35	31	30	82	29.61		5	WNW	
2:51:00 AM	35	29	30	82	29.61		7	WNW	
3:51:00 AM	35	30	30	82	29.63		6	NW	
4:51:00 AM	36	36	28	75	29.63		1	NW	
5:51:00 AM	34	29	29	82	29.64		6	NW	
6:51:00 AM	36	31	29	75	29.65		6	NNW	
7:51:00 AM	38	34	30	73	29.67		5	NW	
8:51:00 AM	41	34	30	65	29.68		13	NW	
9:51:00 AM	43	43	30	61	29.68		2	NW	
10:51:00 AM	42	37	29	59	29.69		9	NNW	
11:51:00 AM	43	40	29	57	29.69		5		
12:51:00 PM	44	39	28	53	29.68		9	WNW	
1:51:00 PM	44	37	29	55	29.67		14	WNW	
2:51:00 PM	43	37	28	55	29.68		10	NW	
3:51:00 PM	43	37	27	53	29.68		12	NW	
4:51:00 PM	42	36	28	57	29.7		12	NW	
5:51:00 PM	41	33	29	62	29.72		15	WNW	21
6:51:00 PM	40	33	28	62	29.74		13	NW	
7:51:00 PM	39	31	27	62	29.75		13	NNW	
8:51:00 PM	39	33	27	62	29.77	0	9	NNW	
9:51:00 PM	38	33	27	64	29.77	0	7	NNW	20
10:51:00 PM	37	37	27	65	29.78		2	NNW	
11:51:00 PM	36	28	25	64	29.77		13	NW	
Average	39	34	29	66	30	0	8		

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 Historical Data

Neither of the above networks provides long-term historical averages. These are available, however, from the ONJSC and the National Climatic Data Center. For temperature information the closest station to Teaneck Township is Teterboro Airport (c. 4 miles), but the station didn't begin reporting until 1997. Newark Airport (c. 16 miles) has temperature data beginning in 1931. The highest daily temperature recorded was 92.5°F for Newark in July 2011 and 91.1°F for Teterboro in July 1999. The lowest temperature for Teterboro was 16.8°F in January 2004 and for Newark it was 9°F in February 1934.

Table 22 shows the monthly and annual averages for mean, median, minimum and maximum temperatures for Newark and Teterboro. The mean average annual temperature for both stations is almost identical even though the time periods for the data collected are very different. The maximum annual temperature average is slightly more than a degree higher for Newark than for Teterboro and the minimum is more than two degrees lower.

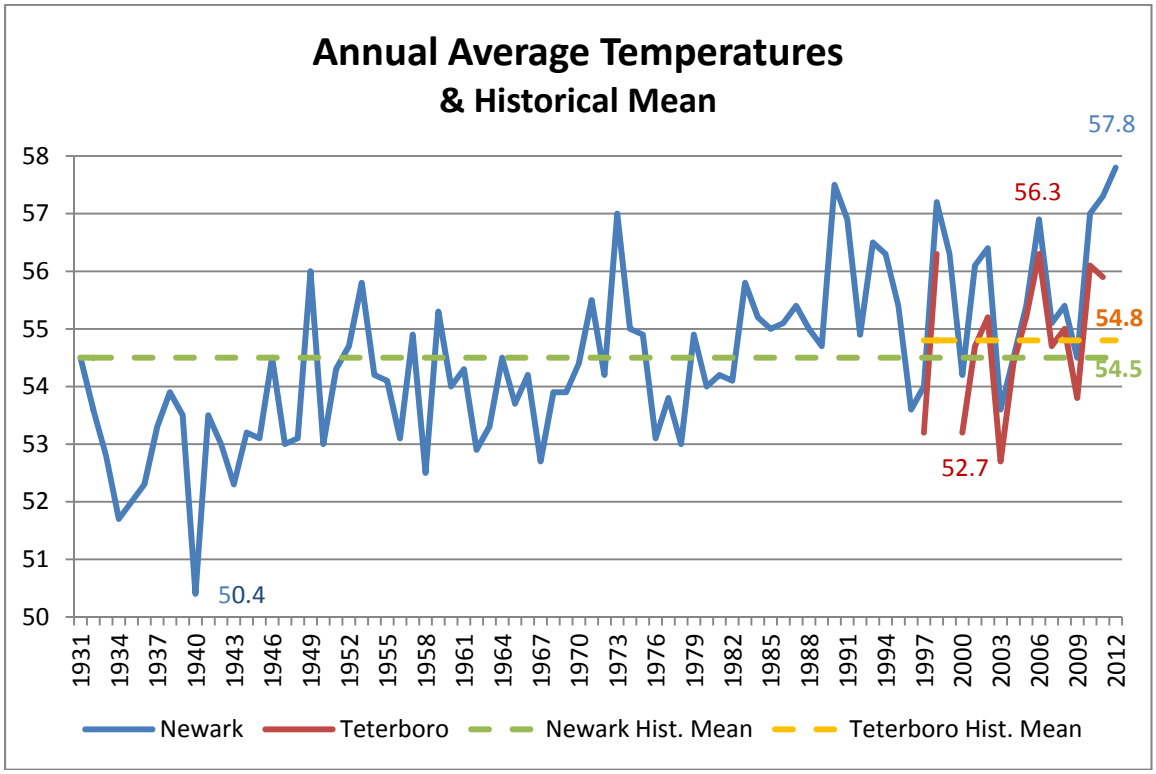
Table 22. Monthly and Annual Historical Temperature Averages

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Newark Airport 1931-2012													
Mean	31.9	33.5	41.7	52.2	62.6	71.9	77	75.4	68.1	57	46.6	35.9	54.5
Median	31.6	33.5	41.8	52.6	62.8	72	76.8	75.4	68	56.8	47	36.5	54.3
Min	20.9	18.6	33.9	45.8	54.3	67.5	73.1	70.1	63.6	51.8	39.9	25.6	50.4
Max	42	40.7	51.3	57.9	68.9	77.8	82.7	80.4	74.5	63.5	52	43.5	57.8
Teterboro Airport 1997-2012													
Mean	32.4	34.9	42.9	52.8	62.4	71.8	77	75.7	68.6	56.3	47.1	37	54.8
Median	31.7	34.7	42.3	53.2	62.8	71.5	77.1	76	69	56	47.2	36.4	54.8
Min	23.6	27.8	37.7	49	58.1	68.6	72.1	73	65.5	53.7	42.5	30.2	52.7
Max	39.6	40	50.6	57.8	66.8	75.1	80.8	79.6	72.8	63.9	51.3	42.5	56.3

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

Figure 6 plots the annual average temperatures, along with the historical mean for each station. Breaks in the annual average temperature lines for Teterboro are due to gaps in the data.

Figure 6. Annual Average Temperatures



Source: ONJSC. Accessed March 2013.

Table 23 summarizes historical data for total precipitation, including the liquid equivalent of snowfall, at three monitoring stations close to Teaneck: New Milford, Teterboro and Woodcliff Lake.

Teterboro Airport, which has data back only to 1998, has the highest mean precipitation – 51.07 inches. This is slightly below the 2001–2012 mean of 52.36 inches for all of northern New Jersey shown in *Figure 4* above.

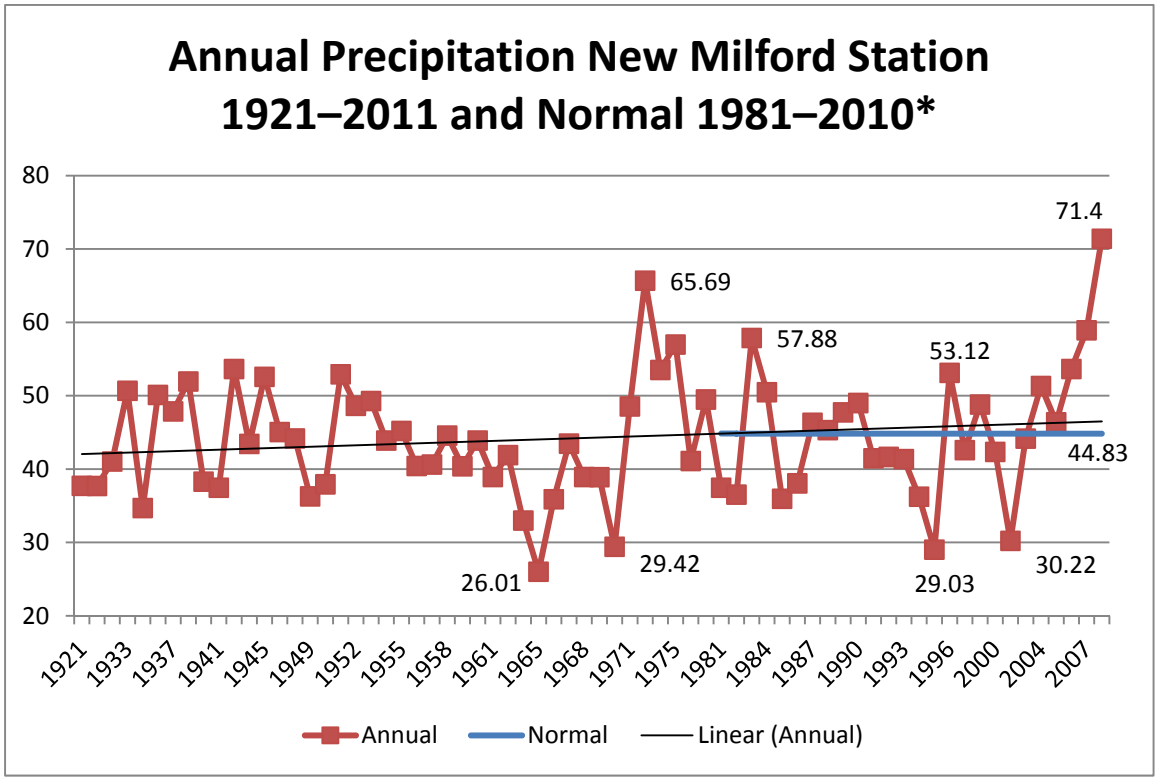
Woodcliff Lake and New Milford, with data dating back to 1919, report mean precipitation of 46.39 and 44.36 inches, as compared to a long-term average of 46.51 inches for all of northern New Jersey as shown in *Figure 5* above.

All three stations reported the maximum annual precipitation in 2011 and the maximum monthly precipitation in August 2011, the month in which Hurricane Irene occurred. Minimum annual precipitation occurred in 1965 in New Milford, 1995 in Woodcliff Lake, and 2001 at Teterboro Airport (which only started reporting in 1998).

Table 23. All Precipitation Historical Summary (Inches)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Teterboro Airport – c. 4 mi. – Elev. 9 ft. - 1998-2012													
Mean	4.35	2.78	4.03	4.51	3.96	4.64	3.82	4.82	5.11	3.97	2.98	3.8	51.07
Median	2.7	2.65	4.24	4	4.21	4.4	3.55	3.85	4.33	3.49	2.92	3.7	50.07
Min	1.82	0.65	0.72	1.8	1.03	0.62	0.42	2.39	1.68	0.69	1.08	1.38	33.66
Max	21.09	6.39	7.99	13.61	6.21	9.61	10.05	15.97	11.74	12.9	6.01	6.34	68.9
Woodcliff Lake (Hackensack/United Water Company) – c. 9 mi. -- Elev. 103 ft -- 1919-2012													
Mean	3.35	2.91	3.99	3.87	3.94	3.8	4.5	4.51	4.18	3.55	3.79	3.6	46.39
Median	3.13	2.64	3.77	3.57	3.64	3.66	3.9	4	3.52	3.06	3.73	3.42	46.6
Min	0.49	0.45	0.63	0.82	0.83	0.24	0.37	0.77	0.33	0.16	0.54	0.2	28.5
Max	11.25	7.72	9.9	12.6	12.05	10.66	14.06	18.25	12.98	15.17	9.78	10.24	67.02
New Milford (Hackensack/United Water Company) – c. 2.5 mi – Elev. 12-15 ft. - 1919-2012													
Mean	3.23	2.77	3.74	3.74	3.66	3.63	4.23	4.31	4.08	3.38	3.62	3.43	44.26
Median	3	2.51	3.42	3.26	3.45	3.47	3.92	3.86	3.52	3.07	3.5	3.31	43.68
Min	0.38	0.46	0.91	0.41	0.73	0.14	0.67	0.56	0.3	0.2	0.58	0.26	26.01
Max	8.88	6.39	8.96	11.95	10.4	11.69	9.79	17.58	12.19	15.1	10.29	9.04	71.4
Note: All precipitation includes the liquid equivalent of snowfall. *Source: NJ State Climatologist, Rutgers University. Accessed March 2013.*													

Figure 7 shows the annual precipitation for the New Milford station; including only those years for which complete information was available (58 out of 92). The trend line for 1921–2011 shows an upward trend in precipitation amounts. The current annual normal for the New Milford station, based on the period 1981–2011, is 44.8 inches, which has been exceeded in the last five complete reporting years (2004 – 51.33; 2205 – 46.38; 2006 – 53.65; 2007 – 58.93; 2011 – 71.40).

Figure 7. Annual Precipitation at New Milford Station 1921–2011



**includes only years for which information is complete*
Source: ONJSC, Rutgers University. Accessed March 2013.

Table 24 shows the historical summary for snowfall for two monitoring stations that have reported snowfall amounts. Newark Airport, in Essex County, has a lower mean (27.6 inches) and maximum (78.4 inches) snowfall than Charlotteburg Reservoir, in Morris County, which is at a higher elevation and had a mean snowfall of 38.8 inches and a maximum annual snowfall of 96 inches. This maximum annual snowfall occurred in 1995–96, with a maximum monthly snowfall of 37 inches in January 1996. The maximum annual snowfall for Newark Airport also occurred in 1995–1996; the maximum monthly snowfall of 37.4 inches occurred in January 2011. The Charlotteburg station is located in New Jersey's Northern climate zone, while the Newark Airport station is located in the Central climate zone, along with Teaneck. In 2013, according to NOAA, a blizzard on February 8-9 dropped 11.8 inches in New Milford.

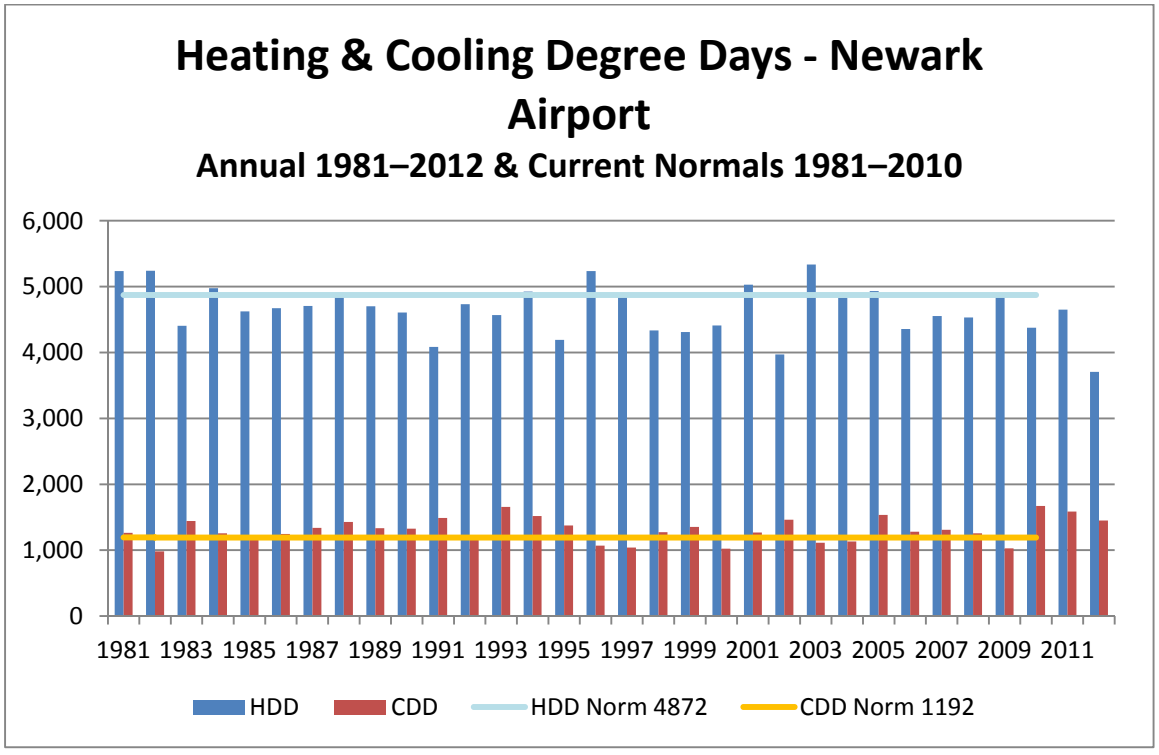
Table 24. Snowfall Historical Summary
(Inches)

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Season
Newark Airport – 16 mi – Elev. 159 ft. – 1930-2012													
Mean	0	0	0	0.1	0.7	5.4	7.6	8.5	4.6	0.7	0	0	27.6
Median	0	0	0	0	0	3.1	5.6	6.1	3.2	0	0	0	23.2
Min	0	0	0	0	0	0	T	T	0	0	0	0	1.9
Max	T	T	T	5.2	8.7	29.1	37.4	33.4	26	13.8	T	T	78.4

Table 24. Snowfall Historical Summary (Inches)													
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Season
Charlotteburg Reservoir – 24 mi – Elev. 760 ft. - 1893-2005													
Mean	0.0	0.0	0.0	0.1	1.7	7.2	10.0	10.8	7.4	2.0	0.0	0.0	38.8
Median	0.0	0.0	0.0	0.0	0.5	5.0	8.0	9.8	5.5	0.0	0.0	0.0	35.0
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
Max	0.0	0.0	0.0	2.5	17.0	32.0	37.0	34.5	34.3	15.0	0.0	0.0	96.0
Source: NJ State Climatologist, Rutgers University. Accessed March 2013.													

Figure 8 shows annual heating degree days (HDD) and cooling degree days (CDD) by five-year intervals for Newark Airport, the closest station to Teaneck reporting this data. For the last three years of available data, the annual heating degree days (the number of degrees the average daily temperature is below 65°F) are below the current normals set by the ONJSC based on data from 1981–2010 and the annual cooling degree days (the number of degrees the average daily temperature is above 65°F) are above the current normals.

Figure 8. Heating & Cooling Degree Days at Newark Airport



Sources: ONJSC

Extreme Phenomena

Tropical Cyclones and Other Storms

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 that have affected Teaneck Township are Hurricane Irene in August 2011 and Hurricane Sandy in October 2012. Both storms, as well as the snowstorm of October 2011, resulted in significant damage from downed trees, including widespread and sustained power outages. Hurricane Sandy brought devastating flooding to coastal areas of New Jersey, with record surge levels. Overpeck Creek and the southern portion of the Hackensack River are tidal and some towns in municipalities south of Teaneck incurred significant flooding during Sandy due to coastal velocity surges resulting from record high tides. While some flooding occurred in the Pomander Walk vicinity of Teaneck and at the Department of Public Works complex, wind caused more damage in the Township than flooding. *(Jaime Evelina, Teaneck Township Clerk)*

According to the FEMA Flood Insurance Study from 2005, winter nor'easters are as much an influence in Bergen County as tropical cyclones.

Notable recent storms affecting Bergen County:

- *2012 Oct. 29-30 Hurricane Sandy:* According to NOAA, Sandy was a category 3 hurricane at its strongest (eastern Cuba) but when it made landfall in New Jersey at Brigantine, it was downgraded to post-tropical cyclone. The tide level at the Hackensack gage was 8.2 feet with an estimated inundation of 3.5 feet. (*http://www.nhc.noaa.gov/data/tcr/AL182012_Sandy.pdf*) This storm produced maximum wind gusts in Teterboro of 72 mph and Teaneck of 76 mph. A record storm tide occurred at The Battery in New York Harbor. The storm tide measured 14.65 feet early on Oct. 30, which resulted in a storm surge of 9.43 feet above the predicted astronomical tide of 4.65 feet.

- *2012 Nov. 6-7 Nor'easter:* The combination of heavy precipitation, near hurricane force wind gusts, and high seas in excess of 8 feet at local beaches led to over 375,000 additional (post-Sandy) power outages across NJ, NY, and CT. 7.5 inches of snow were reported in Ridgefield.

- *2011 Oct. 29 Early season winter storm:* A historic and unprecedented early-season winter storm of record magnitude for October impacted the area. Thousands of people across New Jersey, southern New York and Connecticut lost power during this event as heavy snow accumulated on trees that still had partial to full foliage during mid-autumn. This caused extensive felling of trees and limbs across the region and damage to power lines. 5.8 inches of snowfall were reported in Tenafly, and 3 inches in Dumont.

- *2011 Aug. 28 Hurricane Irene*: This category 3 storm made landfall locally as a tropical storm around 9 am EDT over New York City. Copious amounts of tropical moisture within the storm produced extended periods of heavy rainfall. In New Jersey and eastern Pennsylvania, Hurricane Irene produced torrential rains that resulted in major flooding and several record breaking crests on rivers. Bergenfield and Teterboro reported flooding and all lanes of Route 46 in Lodi were closed due to flooding. 55 mph wind speeds were reported at Latitude 40.6 / Longitude 74 and sustained winds of 32 mph and gusts up to 48 pm were reported at Teterboro Airport, along with 8.22 inches of rain. Storm surge values between 3 and 5 ft were measured along the Jersey shores, causing moderate to severe tidal flooding.

- *2010 Oct. 1 Post tropical storm Nicole:* Low pressure tracked up the east coast and interacted with a stalled frontal boundary and approaching upper level low pressure system. Strong southerly flow allowed for the transport of tropical moisture, including the remnants of Tropical Storm Nicole, up the coast which resulted in heavy rain and flooding across portions of Bergen, Hudson, and Passaic Counties. All lanes on Route 46 westbound near Route 17 in Hasbrouck Heights were closed due to flooding. Total rainfall amounts in Bergen County ranged from 3.25 inches in Midland Park to 4.65 inches in Rivervale.

- *2007 Apr. 15-17 Nor'easter:* Heavy rain caused widespread and significant river, stream, and urban flooding of low lying and poor drainage areas. Significant river flooding lasted through April 23rd. Bergen County rainfall ranged from 4.60 inches in Woodcliff Lake to 8.04 inches at Lodi. Heavy rains caused seven landslides in Bergen County and record water levels at Oradell Reservoir and the New Milford gage on the Hackensack River.

- *1999 Sept.16 Tropical storm Floyd:* This category 2 storm caused a 100 year flood event with winds in the Teaneck area of 50 mph (tropical cyclone level) 8.53 inches of rain were reported at Teterboro Airport.

- 1985 *Sept. 27 Hurricane Gloria:* This category 3 storm skirted the coast of NJ and was the first significant system to strike the northeastern United States since Hurricane Agnes in 1972 and the first major storm to affect New York and Long Island directly since Hurricane Donna in 1960.

- *1972 June 22 Agnes:* This category 1 storm was one of the costliest and deadliest (130 deaths) tropical cyclones on record, resulting in inland floods caused by torrential rains. Its floodwaters destroyed many rail lines in the northeast.

- *1960 Sept. 12 Hurricane Donna*: This category 4 storm caused a then-record high tide of 8.9 feet, which was dramatically outdone during Sandy when a tide of 11.9 feet was recorded at the mouth of the Hackensack River in Newark Bay. *(NOAA, FEMA, USGS)*

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)*

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 1878 through June 2012. 55 occurred in Bergen County; of these, 41 occurred in municipalities along the Hudson River and the Palisades. The community hit hardest is Alpine, with a total of 21. None occurred in Teaneck. Neighboring communities that experienced landslides are River Edge, Englewood and Hackensack, with one each. Seven slides occurred during heavy rains on April 15, 2007, and another three during the heavy rains of Hurricane Irene on August 28, 2011, all causing debris flow. In general, the other slides were isolated instances of rockfall, rockslide or debris flow caused by weathering or heavy rain. Two of the slides resulted in fatalities, and the majority caused damage. (*NJDEP)*

Earthquakes

The NJDEP maintains a database of recorded earthquakes epicentered in New Jersey, totaling 177 as of November 2012. They occur more frequently along the fault lines in north central New Jersey than in other parts of the state. (There are no fault lines mapped for Teaneck, although there is one to the east that runs approximately from Fort Lee through Englewood). New Jersey earthquakes generally have been minor in nature, often registering in the category of micro-earthquakes. The strongest recorded earthquake epicentered in New Jersey, magnitude 5.3, occurred in 1783, just north of present-day Picatinny Arsenal in Morris County, along the Longwood Valley Fault. *(NJDEP)* The strongest earthquakes in American history, a succession of quakes that occurred in 1811-1812, with magnitudes as high as 8.8, epicentered in New Madrid, Missouri, were felt in New Jersey as was an August 2011 earthquake epicentered in Virginia *(Lamont-Doherty Cooperative Seismographic Network)*.

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 Teaneck is located has a moderate seismic hazard ranking of 16-32%. 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 measured 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 worldwide 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 "micro-earthquake."

Table 25. 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%

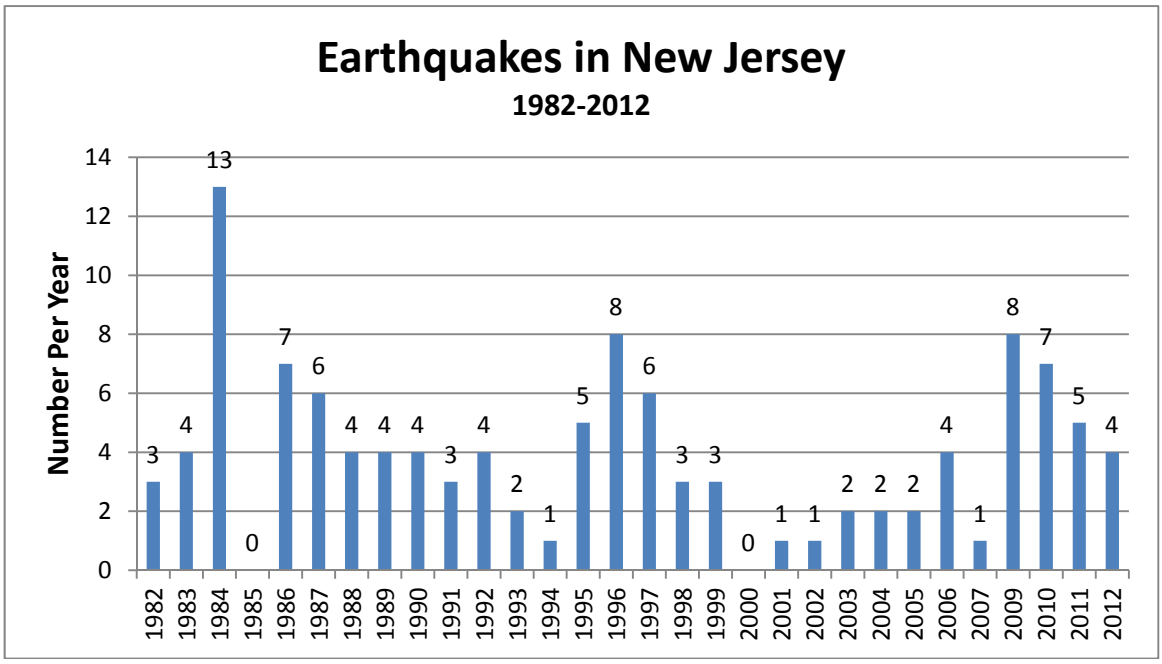
Source: NJDEP

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 9 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.

Figure 9. Earthquakes in New Jersey



Source: NJDEP

Earthquakes epicentered in or around Teaneck are listed in *Table 26* below and the range of magnitudes is charted in *Figure 10*. Two earthquakes have been recorded with epicenters in or very near Teaneck. The most recent, epicentered on the Teaneck/Hackensack border, occurred in October 2007 and was a magnitude of 1.3. The second, magnitude 1.9, micro-earthquake was epicentered near Lodi in 2005. The strongest earthquakes in the surrounding area occurred in 1953 in Old Tappan (3.2) and in 1976 near Ridgefield (3.1). *(NJDEP)*

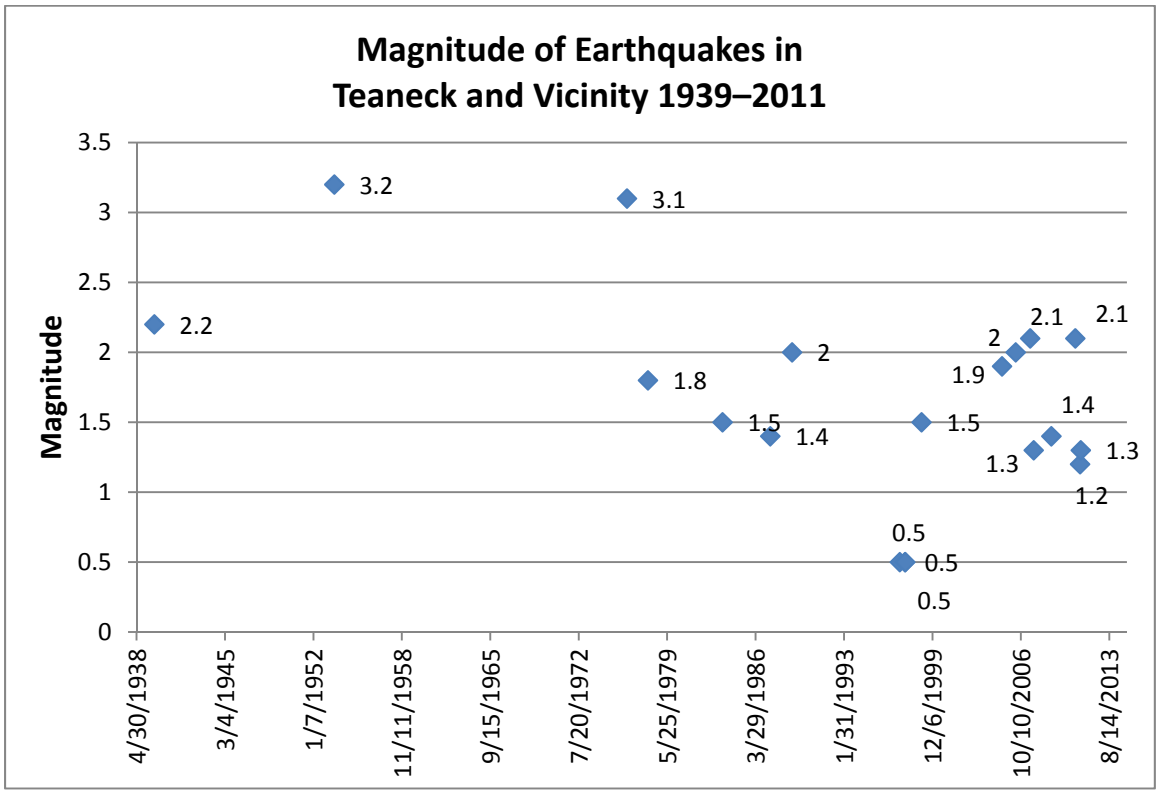
Table 26. Earthquakes Epicentered in and Around Teaneck 1783-2012

ID	*Date*	*Time*	*Lat-N*	*Long-W*	*Depth (km)*	*Magnitude*	*Location*
171	05/29/2011	8:33:07	40.823	73.973	8.00	1.3	3 km S of Fort Lee
169	05/08/2011	12:32:00	40.854	74.170	5.60	1.2	1 km SW of Clifton
168	12/25/2010	18:32:31	40.859	74.179	2.00	2.1	1 km W of Clifton
157	2/16/2009	19:38:31	40.948	74.022	7.00	1.4	1 km ESE of Oradell
152	10/05/2007	12:48:54	40.895	74.033	8.00	1.3	5 km NNE of Teterboro
151	06/28/2007	6:18:09	40.876	74.194	2.00	2.1	7 km E of Fairfield
150	05/15/2006	8:25:26	40.862	74.152	8.00	2.0	9 km S of Fair Lawn
145	04/23/2005	14:24	40.885	74.069	6.60	1.9	1.3 Km East of Lodi
137	1/31/1999	10:39	40.975	74.050	3.00	1.5	2 km W of Emerson
132	10/24/1997	3:32	40.765	74.069	7.00	0.5	3 km SW Secaucus
131	10/21/1997	1:10	41.003	74.086	14.00	0.5	3 km SW Woodcliff Lake
128	5/25/1997	6:23	40.856	73.967	12.00	0.5	1 km NE Fort Lee
96	1/22/1989	8:27	40.880	73.940	5.90	2.0	Englewood

Table 26. Earthquakes Epicentered in and Around Teaneck 1783-2012							
ID	*Date*	*Time*	*Lat-N*	*Long-W*	*Depth (km)*	*Magnitude*	*Location*
87	5/16/1987	10:01	40.860	74.180	3.06	1.4	Near Paterson
64	9/6/1983	10:44	40.830	73.970	7.10	1.5	Fort Lee
41	11/27/1977	13:57	41.000	74.200	5.00	1.8	Oakland
34	4/13/1976	15:39	40.800	74.000	0.00	3.1	Near Ridgefield
23	8/17/1953	4:22	40.870	74.070	0.00	3.2	Old Tappan
19	9/13/1939	1:22	40.800	74.000	0.00	2.2	Union City

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 10. Magnitude of Earthquakes in Teaneck & Vicinity



Source: NJDEP

Climate Change

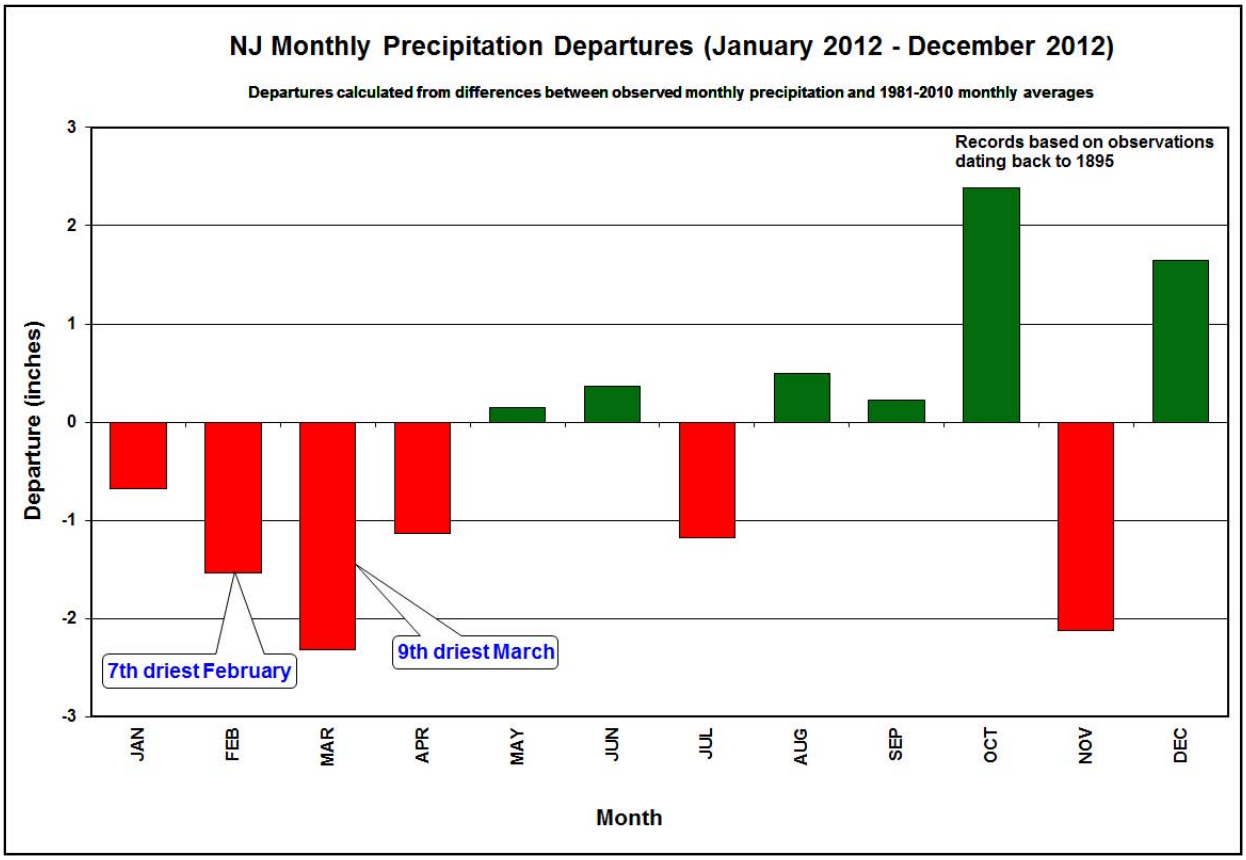
In 2007, the International Panel on Climate Change (IPCC) reported that increasing carbon dioxide (CO_2) emissions into the atmosphere, as a result of human activity, have warmed the Earth's surface by more than 1.3°F during the past century. The Union of Concerned Scientists has indicated that temperatures 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)*

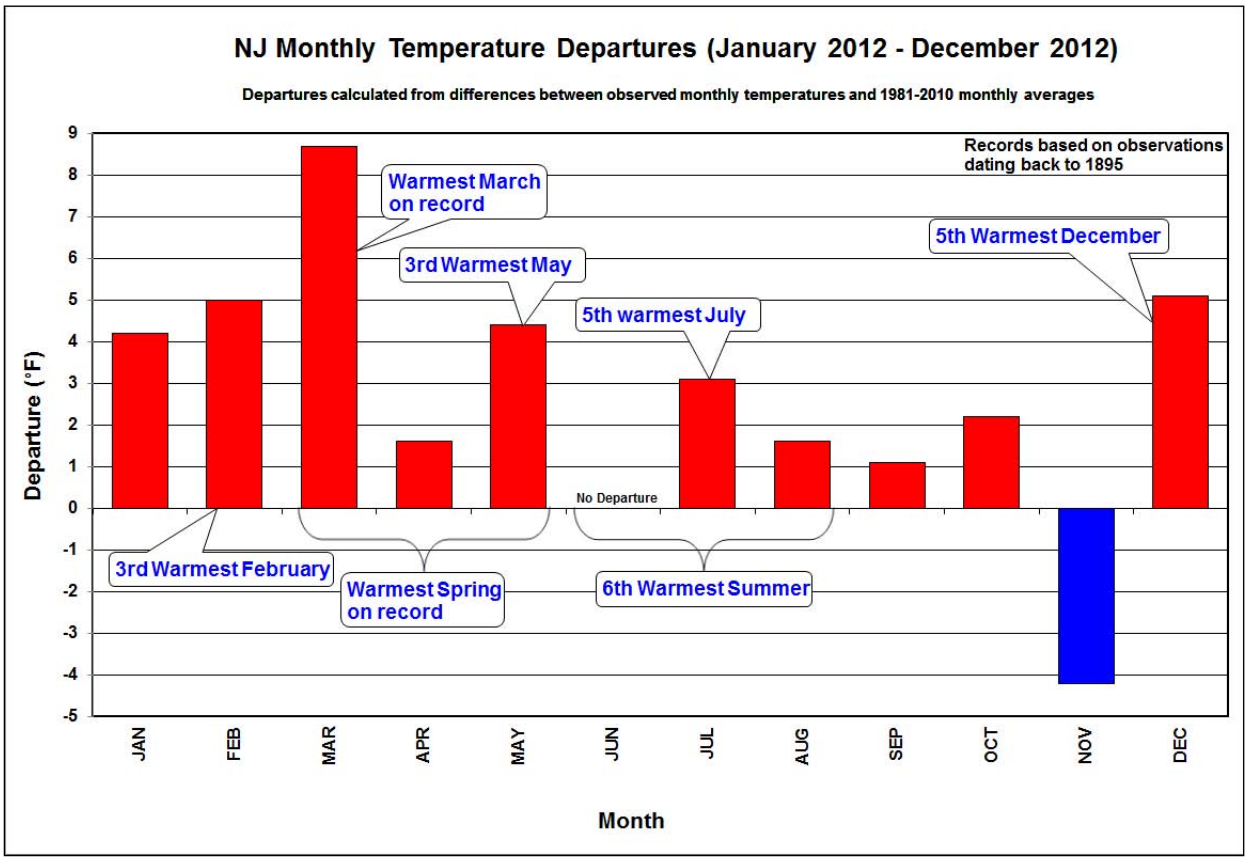
Figure 11 and *Figure 12* show 2012 monthly departures from current normals (monthly averages for the period 1981–2010) for precipitation and temperature in New Jersey. Generally, the winter was drier, the summer wetter and most months warmer than the current normals.

Figure 11. NJ Monthly Precipitation Departures 2012



Source: ONJSC

Figure 12. NJ Monthly Temperature 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.

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 is 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 contribute another approximately 23%, while terrestrial carbon sequestration (forests absorbing carbon) provide an offset of -7.6%. The NJDEP predicts that major new initiatives and technologies will be required.

Clean Energy Initiatives

The National Renewal Energy Laboratory (NREL) is a laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC. NREL reviews and analyzes potential capacity and actual use of solar, wind, biomass, geothermal and hydropower renewable energy sources on a national, state and county level.

NREL reports that wind and solar photovoltaics are the fastest growing renewable electricity sectors. In 2011 in the United States, wind installed capacity increased by nearly 17% and solar photovoltaic installed capacity grew more than 86% from the previous year. In that same year, biomass produced about 11% of total renewable electricity generation, wind 23%, solar (photovoltaics and concentrating solar power) 1%, hydropower 62%, and geothermal 3%. These renewable energy sources accounted for 12.8% of total overall installed electricity generated in 2011. *(NREL)*

The New Jersey Board of Public Utilities (BPU) offers programs and incentives to residents and businesses to adopt clean energy technologies and tracks the installations and energy generated. As of October 31, 2012, 65 wind, biopower, and fuel cell installations totaling more than 41.9 MW (megawatts) of installed capacity have benefitted from the Clean Energy rebate programs. Solar installations total 18,493 projects generating 918 MW.

Wind power initiatives in New Jersey are concentrated in southern Jersey, but an analysis by the NREL showed that biomass resource potential in Bergen County totals more than 150,000 tons of per year through a combination of urban wood waste (>50 tons/year), methane emissions from landfills (>10) and domestic water treatment (>1), and secondary mill residue (>5). The Village of Ridgewood has an operational biomass facility. The Bergen County Utilities Authority is entering phase II of a feasibility study for a facility in Little Ferry funded by a grant from the BPU.

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.

The Township of Teaneck municipal code does not address solar energy as a permitted use. However, on a municipal level, solar systems were installed at Richard Rodda Community Center and Firehouse 3 in 2005. Christ Episcopal Church installed solar panels in 2005, and in 2011 PSE&G, which provides electric service to the Township began installing solar panels on utility poles in Teaneck and many other New Jersey communities. The power generated by these panels is tied into the electric grid that serves all PSE&G customers.

PSE&G's utility pole, or neighborhood, solar program is expected to generate 40 MW of power and its centralized solar program another 40 MW. The centralized program includes solar farms, installations on rooftops of schools, commercial buildings and nonprofit agencies, and carport installations. Through these programs, collectively called Solar 4 All, PSE&G expected to generate enough solar energy by early 2013 to power about 13,000 average size New Jersey homes each year.

New Jersey's Clean Energy Program (NJCEP), administered by the BPUI, 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. Eleven businesses in Teaneck were listed as participants in 2011–2012.

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

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 oversees the State's ambient air monitoring network.

2011 NJDEP Air Monitoring

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 (AQI) website (*www.njaqinow.net*). The NJDEP also provides an annual AQI summary. In 2011 for the Northern Metropolitan Area, with monitoring stations in Leonia and Elizabeth, which monitor ozone, there were 327 good days, 27 moderate days and 11 days that were unhealthy for sensitive groups. There were no days in the bottom two categories: – unhealthy and very unhealthy.

In 2011, NJDEP released annual air monitoring reports for the six pollutants for which standards have been set by the US EPA – ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, and lead – are known as *criteria pollutants* (see *Criteria Pollutants* below). These pollutants are regularly tracked at select air monitoring stations throughout the state, including several near Teaneck. Although there are monitoring sites throughout the state, each site measures a limited set of pollutants; no one site tracks them all.

Nationally, according to the EPA, over the period 1990-2010, total emissions of criteria pollutants decreased by more than 41% nationally In New Jersey, according to the NJDEP DAQ website, air quality has improved significantly 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. A study published in *Teaneck Township's 1980 NRI* indicated that levels of carbon monoxide, sulfur dioxide and particulates were all found to be within acceptable limits for one hour collections of data at five different locations during the spring and summer of 1977. That report is included in the *Appendices* of this *ERI Update (Appendix*

B-3). The study noted that if traffic volumes were to increase on Teaneck's busiest arteries, additional test should be made. A more recent study, conducted at Teterboro Airport, will be discussed below.

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 Teaneck) 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 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.

New Jersey is classified as a "marginal" non-attainment area for NAAQS for the 2009-2011 period. In this category, the average of the fourth highest daily maximum 8-hour average concentration recorded each year for three years falls in the range of .085 ppm to less than .092 ppm. This is an improvement from 2010, when New Jersey was in the low end of the Moderate range. However, the statistics for ozone at the monitoring station in

neighboring Leonia are slightly higher than in 2010, when Leonia had only five days about .075 ppm. For 2011, Leonia reported 10 days above the 8-hr. average standard and exceeded the NAAQS standard for three-year averaging by .001 ppm, as shown in *Table 27* below.

Table 27. Ozone 2011

Station	*Highest*	*2nd*	*3rd*	*4th*	*Avg. of 4th Highest 8-Hr Avgs. 2000-2011*	*# Days with 8-Hr Avg Above .075ppm*
Leonia	.095	.087	.087	.082	.076	10
Newark Firehouse	.091	.091	.084	.081	.076	8

Source: NJDEP 2011 Ozone Summary

Sulfur Dioxide

NJDEP 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 28.*

Table 28. National and New Jersey Ambient Air Quality Standards for Sulfur Dioxide
ppm = parts per million; ppb = parts per billion; µg/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. In 2011, no stations with three-averages recorded exceedances of the primary or secondary SO_2 NAAQs. The last year an exceedance of the national SO_2 standards was recorded in the state was 1980. *Table 29* below shows data for the monitoring sites in Elizabeth and Jersey City, which illustrate that SO_2 levels

in this area are well below the national standard limits. However, SO_2 is a major contribution to acid deposition (see *Acid Deposition* section below).

Table 29. Sulfur Dioxide 2011				
National Standards in Parts per Billion (ppb) and Parts per Million (ppm)				
	75 ppb	*0.5 ppm*	*0.14 ppm*	*0.03 ppm*
Monitoring Site Data				
Monitoring Site	*3-Year Avg. 99th Percentile of Daily Max 1-Hour Avg. (ppb)*	*3-Hour Average Max (ppm)*	*24-Hour Average Max (ppm)*	*12-Month Average Max (ppm)*
Elizabeth	16	0.014	0.012	0.001
Jersey City	21	0.022	0.020	0.002
Source: NJDEP 2011 Sulfur Dioxide Summary				

Carbon Monoxide

According to the NJDEP, 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 30).* In addition, New Jersey standards are not to be exceeded more than once in any 12-month period.

Table 30. 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." In 2011, average concentrations were higher in November and December than in other months of the year. Because on-road vehicle emissions from the major contributor to CO levels, there is a variation throughout the day, with the highest peak around 7 to 8 a.m., and another, lower but more extended, rise between 5 and 7 p.m.

In 2011, of the CO monitoring stations having the highest 8-hour averages were East Orange, Jersey City, Newark Firehouse and Elizabeth. Closest to Teaneck, neighboring the stations having the highest 1-hour averages were Jersey City, Newark Firehouse and East Orange. In 2010, Hackensack, a station that is no longer reporting, had the lowest concentration. Most CO monitoring stations are in high traffic areas in northeastern New Jersey. All statistics are well below the national and state standards.

Table 31. Carbon Monoxide 2011
1-Hour and 8-Hour Averages
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	3.7	3.6	3.1	2.6
Jersey City	5.7	4.0	2.9	1.7
Newark Firehouse	4.02	3.49	2.80	2.78

Source: NJDEP Carbon Monoxide Summary 2011

Nitrogen Dioxide

According to the NJDEP, 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 32).* 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 32. National and New Jersey Ambient Air Quality Standards for Nitrogen Dioxide 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 fell steadily from an average of 0.040 ppm in 1975 to 0.012 ppm in 2010. In that time period, neither the statewide nor the individual station averages exceeded the health standard of .053 ppm, although the highest reporting stations in 1975 came close. Of the eight reporting stations for 2011, Elizabeth Lab reported the highest levels all categories except Nitric Oxide. Elizabeth Lab reported the highest levels, and Chester had the lowest levels. The results for these three stations are listed in *Table 33* below.

Table 33. Nitrogen Dioxide (NO_2) and Nitric Oxide (NO) 2011 Parts Per Million (ppm) National Standards: 1-Hour - .100 ppm; 12-Month - .053 ppm				
	Nitrogen Dioxide			*Nitric Oxide*
Monitoring Sites	*1-Hr Avg 2011 98th %-ile*	*1-Hr Avg 2009-2011 98th %-ile `*	*Calendar Year 12-Mo Avg*	*Calendar Year 12-Mo Avg*
Bayonne	.064	.065	.018	.010
East Orange	.062	.064	.021	.015
Elizabeth Lab	.071	.071	.024	.026
Source: NJDEP 2011 Nitrogen Dioxide Summary				

Although NO_2 concentrations score well within the NAAQS, (NO_x) continue to be of concern because of their role in the formation of other pollutants – particularly ozone and fine particles and because they contribute to acid deposition and possibly the eutrophication of water bodies (see *Acid Deposition* section below).

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 34.*

Table 34. Particulate Matter – 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 $\mu g/m^3$	---
	24-Hr Avg	35 $\mu g/m^3$	---

Source: NJDEP 2011 Particulate Summary

In 2011, two New Jersey air monitoring stations measured PM_{10}, 24 measured $PM_{2.5}$ and three 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 (TEOM analyzers) that continuously measure particulate concentrations, 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*). Additionally, four stations have speciation sampler that analyzes "the chemical analytes" in the sample.

In 2011, the Jersey City Firehouse, the only PM_{10} monitoring stations in northern New Jersey reported an annual mean concentration of 30 $\mu g/m^3$, versus the national standard of 50; and a highest 24-hour concentration of 63 $\mu g/m^3$, versus the national standard of 150.

In 2011, no sites in New Jersey were in violation for either the annual or 24-hour standard for $PM_{2.5}$. Elizabeth Lab reported the highest levels, at 12.2 $\mu g/m^3$ for the annual mean concentration and 42.4 $\mu g/m^3$ for the highest 24-hour concentration. However, in 2005, the EPA designated 10 northern New Jersey counties, including Bergen County, 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, Chester, Elizabeth Lab, New Brunswick and Newark Firehouse perform fine particulate speciation analysis, measuring 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 and Chester the lowest. Both organic and elemental carbon are sourced primarily from motor vehicles, and Elizabeth Lab is located in a high traffic area.

"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." Three stations in northern New Jersey measure smoke shade concentrations and reported levels in 2011 well below the benchmark (see *Table 35*).

Table 35. Smoke Shade 2011
Benchmark 2.0

Station	*Highest 24-Hr Avg*	*2nd Highest 24-Hr Avg*	*Annual Mean*
Elizabeth	0.65	0.59	0.20
Elizabeth Lab	0.99	0.95	0.39
Jersey City	0.90	0.88	0.29
Source: NJDEP			

Lead

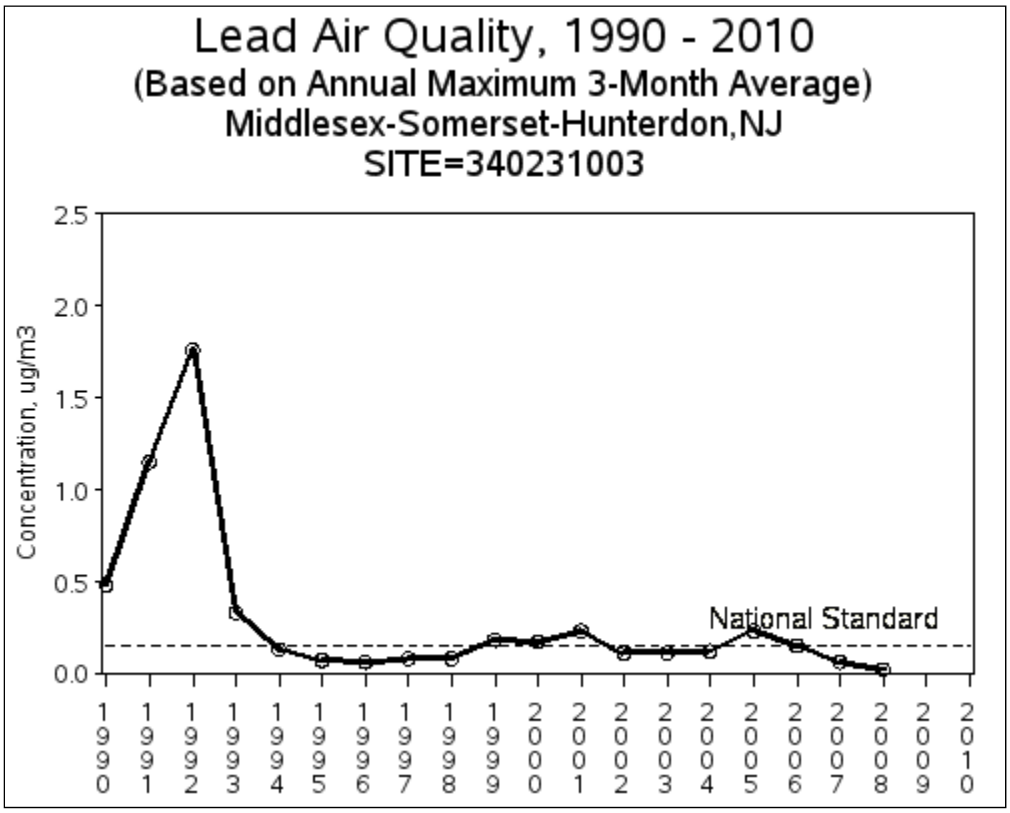
Lead is a hazard to the health of humans and the environment, whether the source is lead in the air, in paint on walls, in our water, or in our soils. When taken into the body, lead circulates via the blood and accumulates in the bones. It affects the oxygen carrying capacity of the blood and can negatively 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 13* below) 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 13. 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 Bergen County, comparing air concentrations to health benchmarks, is shown in *Table 36* below.

Table 36. Bergen County Average 2005 NATA Modeled Air Concentrations Compared to Health Benchmarks

Pollutant	*Modeled Air Concentration (ug/m3)*	*Health Benchmark (ug/m3)*	*Risk Ratio*	*% Contribution from*				
				Point Sources	*Nonpoint Sources*	*On-road Mobile Sources*	*Nonroad Mobile Sources*	*Background / Secondary*
Acetaldehyde	2.2	0.45	**4.9**	<1%	5%	9%	4%	82%*
Acrolein	0.087	*0.020*	***4.3***	<1%	23%	15%	10%	52%*
Arsenic Compounds	0.00054	0.00023	***2.4***	2%	19%	8%	6%	65%
Benzene	1.7	0.13	**13**	<1%	13%	38%	17%	32%
1,3-Butadiene	0.12	0.033	**3.8**	0%	<1%	0%	0%	100%
Cadmium Compounds	0.00013	0.00024	0.6	8%	56%	0%	<1%	36%
Carbon Tetrachloride	0.61	0.067	**9.1**	0%	<1%	0%	0%	100%
Chloroform	0.20	0.043	**4.6**	<1%	70%	0%	0%	30%
Chromium (hexavalent form)	0.00027	0.000083	**3.2**	43%	14%	6%	1%	36%
Cobalt Compounds	0.00028	0.00011	**2.6**	95%	5%	0%	0%	0%
1,4-Dichlorobenzene	0.14	0.091	**1.6**	<1%	68%	0%	0%	32%
1,3-Dichloropropene	0.20	0.25	0.8	0%	100%	0%	0%	0%
Diesel Particulate Matter	1.2	0.0033	**379**	0%	0%	47%	53%	0%
Ethylbenzene	0.51	0.4	**1.3**	1%	23%	49%	27%	0%
Ethylene Oxide	0.0071	0.011	**1**	9%	23%	0%	0%	68%
Formaldehyde	2.4	0.077	**32**	<1%	3%	12%	8%	77%*
Methyl Chloride	1.2	0.56	**2.2**	<1%	1%	0%	0%	99%
Naphthalene	0.19	0.029	**6.7**	<1%	50%	29%	4%	17%
Nickel Compounds	0.0013	0.0021	0.6	30%	57%	3%	2%	8%
PAH/POM	0.016	0.0072**	**1.9**	<1%	77%	10%	13%	0%
Perchloroethylene	0.32	0.17	**1.9**	<1%	79%	0%	0%	21%
1,1,2-Trichloroethane	2.8E-6	0.063	4.5E-5	52%	48%	0%	0%	0%

- *Chemicals with risk ratios greater than or equal to 1 are in **bold**. The four highest risks for Bergen 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 Bergen County are diesel particulate matter (379), formaldehyde (32), benzene (13) and carbon tetrachloride (9.1).

Diesel particulate matter, according to the table above, poses the highest risk factor for Bergen County, with an overall ratio of 379 times the benchmark. Sussex County has the

lowest cancer risk ratio (40) from diesel particulate matter and Hudson County the highest (925). In Bergen County, 47% of diesel particular matter comes from on-road mobile sources and 53% 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 Bergen County, background and secondary formations account for 77% of sources, while on-road sources account for 12%, nonroad mobile for 8% and nonpoint for 3%. The Countywide ratio is 32 times the benchmark.

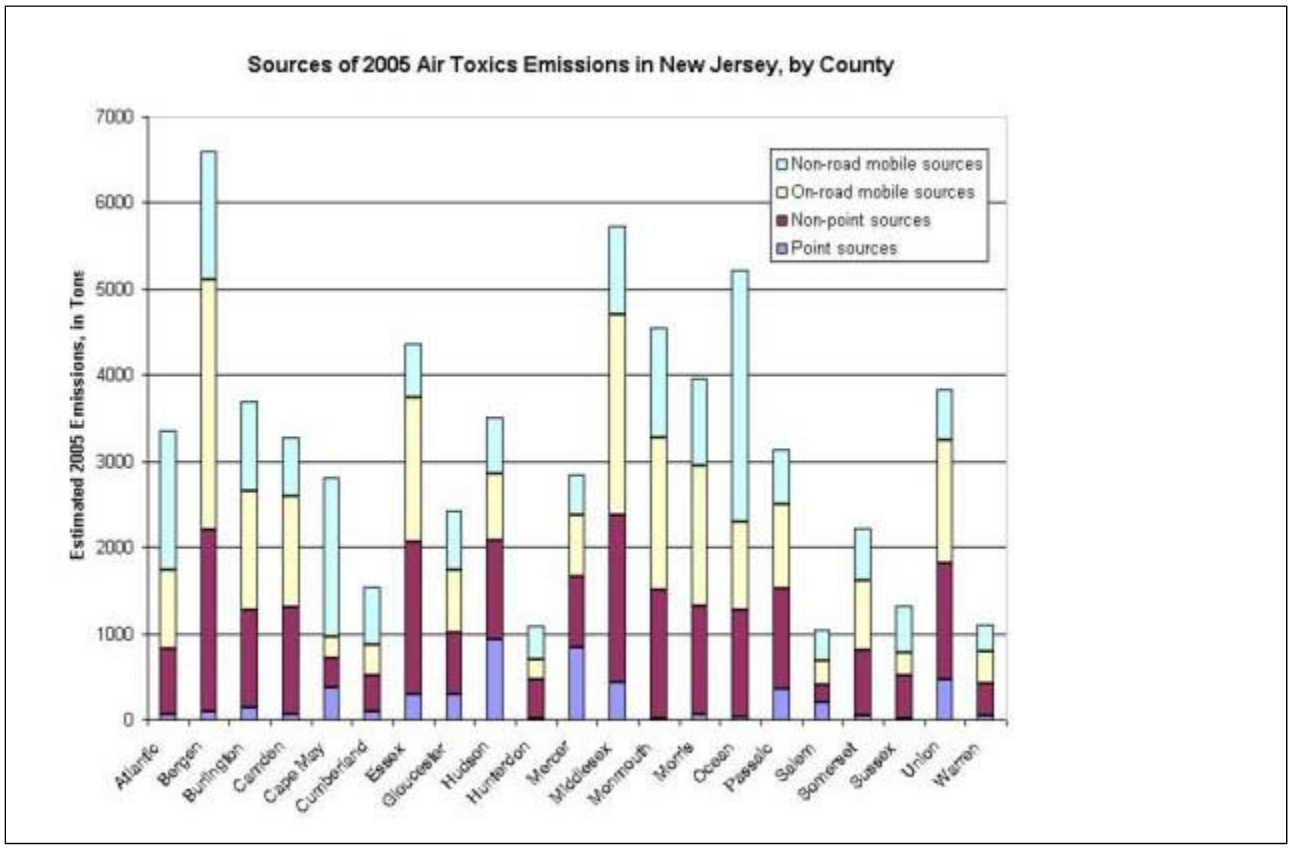
Benzene. Benzene is a component of gasoline and oil and is used industrially to make other chemicals, plastics and synthetic fibers. It is ranked in the top 20 chemicals for production volume in the U.S. The risk in Bergen County is 13 times benchmark. Primary sources are on-road mobile (38%) and background concentrations (32%). Nonroad mobile sources account for 17% and nonpoint sources for 13%.

Carbon tetrachloride (CT). The entire state is at a risk ratio of 5-10 times benchmark, with Bergen 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.

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.”

Bergen County’s emissions are the highest in the state and come mostly from on-road sources, followed by non-point sources and non-road mobile sources, with a very low contribution by point sources (see *Figure 14* below).

Figure 14. 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.

The NJDEP provides annual reports on concentrations of air toxics measured at stations in Camden, Chester, Elizabeth and New Brunswick. An *Air Toxics Environmental Trends Report* updated in January 2012 graphs the measurements through 2010 of the VOCs benzene, formaldehyde, 1,3-butadiene and acetaldehyde and the metals arsenic and cadmium, have higher concentrations than other metals in New Jersey. The report shows that though trends are generally downward, levels in 2010 were still above the health benchmarks. The primary source for the VOCs is motor vehicles and the primary reasons for declining trends are improvements in automotive technology and more stringent emission standards. Arsenic emissions can be sourced to waste incineration and the metallurgical industry. Cadmium in the air comes primarily from the burning of fossil fuels and incineration of municipal waste. Here too the reductions can be attributed to more stringent emission regulations. The report indicates that several other air toxics not specifically reported on continue to be found in relatively high concentrations. *(NJDEP)*

Acid Deposition

Another area under observation by the NJDEP is atmospheric deposition, which is described as "a process in which pollutants are deposited on land or water from the air," either through precipitation (wet deposition) or by the settling out of particulates or the absorption of gaseous pollutants by land or water bodies (dry deposition). The pollutants involved include sulfur dioxide, nitrogen oxides, mercury and VOCs (such as formaldehyde), as well as an ammonium derivative. Sources for these pollutants may include power plants, motor vehicles, incinerators and certain industries. Acid deposition affects the pH scale. Normal pH is approximately 5.6, while the mean value recorded at Washington Crossing State Park was 4.94. This increase in acidity of soils and water bodies can reduce the viability of aquatic life and terrestrial vegetation.

Teterboro Study

In 2008, the NJDEP released the results of a study by Environ International Corporation conducted at Teterboro Airport in 2006. For the study, special monitoring stations were set up near each end of the airport's two runways to monitor volatile organic compounds (VOCs), carbonyls, fine particulate matter ($PM_{2.5}$), black carbon (BC), and other gaseous compounds (continuously measured by open path monitors), as well as wind speed and direction, traffic, and aircraft activity. The focus of the study was on compounds known to be emitted by mobile sources.

The study indicated that

(1) Concentrations of certain VOCs (those listed in bold below) were higher at Teterboro Airport than at other NJDEP monitoring locations;

Among the individual VOCs and carbonyls that were evaluated throughout the study, 16 compounds were consistently detected in greater than 70% of the samples

- 2-Butanone (MEK) (77%)
- Acetone (99%)

- Benzene (86%)
- Dichlorodifluoromethane (75%)
- Ethylbenzene (73%)
- Methylene chloride (82%)
- Toluene (98%)
- Trichlorofluoromethane (81%)
- Xylenes (73-88%)
- Acetaldehyde (100%)
- Benzaldehyde (91%)
- Butyraldehyde (79%)
- Formaldehyde (100%)
- Hexaldehyde (77%)
- Propionaldehyde (96%)
- Valeraldehyde (75%)

(2) Risks associated with the concentrations of VOCs at parts of Teterboro Airport were higher than risks at other NJDEP monitoring locations (based on conservative risk screening calculations intended to overestimate exposures and be health protective), but these risks were not necessarily associated with the airport operations;

(3) Similar to other locations in New Jersey, risks at Teterboro Airport exceed health benchmarks, and these exceedances are typical of urban areas in the U.S;

(4) $PM_{2.5}$ average concentrations at Teterboro Airport appear to be higher than at other New Jersey monitoring locations in 2006, although the method used to measure $PM_{2.5}$ at Teterboro Airport typically yields higher concentrations than the Federal Reference Method used elsewhere;

(5) High Black Carbon, $PM_{2.5}$ concentrations and signals from open path monitors were observed to come from both roadways and the airport.

(6) Airport contributions appear to be highly dependent on wind direction and wind speed, as well as airport activity

(7) The concentrations of the compounds consistently detected around Teterboro Airport are associated with total cancer risks that are up to five times higher at parts of Teterboro Airport than at other NJDEP locations (including Elizabeth which has high contributions from mobile sources). Noncancer health index

values are up to two times higher at Teterboro than at the other NJDEP locations. The risks at all locations are largely associated with formaldehyde (see *Air Toxics* below).

The report concluded that "the airport activities have measurable impacts on local air quality, although the data were insufficient to quantify" and "its impact cannot be differentiated from the preponderance of other emissions, specifically mobile sources." Additionally, "The Teterboro Airport contribution to ambient air toxics levels at 51 of the 53 census tracts within a 5 km radius from the airport is less than 1%." The southwestern portion of Teaneck is approximately 3 km from Teterboro Airport and the extreme northeast corner is approximately 8 km.

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 Bergen County have been ranked at Tier 2 or 3, moderate to low risk for radon presence. The Township of Teaneck is ranked Tier 2.

Radon levels in many areas of Bergen County are below the EPA and NJDEP standards but slightly above the national average. The EPA standard for acceptable range is 4 pC1/L or below. The NJDEP standard is 2 pCi/L. The national average indoor radon level is 1.3 picocuries per liter (pCi/L, a measure of radioactivity); the average for Bergen County is 1.8 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.*

Meteorology and Pollution

As mentioned in the Environ study of Teterboro Airport discussed above, 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. Newark firehouse monitors solar radiation. *(NJDEP DAQ)*

NOISE ASSESSMENT

Noise, when it is unwanted or disturbing, becomes a form of pollution that can have physiological and psychological impacts on both humans and wildlife. In humans, long-term exposure to high noise levels results in interference with conversation and other normal human activities, such as sleeping, working, and recreation. The 1982 EPA publication *Guidelines for Noise Impact Analysis* stated that research implicates noise as one of several factors producing stress-related health effects such as heart disease, high-blood pressure, stroke, ulcers, and other digestive disorders. According to some studies, in wildlife the effects of long-term exposure to noise can include chronic stress, raised heart rates, compromised reproductive functions and auditory systems, which they depend on to avoid predators, obtain food and communicate. In urban centers, stressors include air traffic, road traffic, trains and heavy machines and equipment *(Noise Pollution Clearinghouse)*. Some noise guidelines recommend maximum 24-hour exposures levels of 70 dB (decibels) to prevent measurable hearing loss over a lifetime, and 55 dB outdoors/45 dB indoors as levels that prevent activity interference and annoyance. *Figure 15* below shows typical sound levels for common noise sources (dBA is a sound measurement weighted for the range of human hearing).

Figure 15. Common Outdoor and Indoor Noise Levels

Outdoor	*dBA* Levels*	*Indoor*
	110	
Jet Flyover at 1000 ft		
	100	
Gas Lawn Mower at 3 ft		Inside Subway Train (New York)
	90	
Diesel Truck at 50 ft		Food Blender at 3 ft
Noisy Urban Daytime	**80**	Garbage Disposal at 3 ft
		Shouting at 3 ft
Gas Lawn Mower 100 ft	**70**	Vacuum Cleaner at 10 ft
Commercial Area		
Heavy Traffic at 300 ft	**60**	Normal Speech at 3 ft
Quiet Urban Daytime		Large Business Office
	50	Dishwasher Next Room
Quiet Suburban Daytime		Small Theater or Large Conference
	40	
Quiet Urban Night Time		Room (Background)
Quiet Suburban Nighttime	**30**	Library
Quiet Rural Nighttime		Bedroom at Night
	20	Concert Hall (Background)
	10	Broadcast and Recording Studio
	0	Threshold of Hearing

Regulations aimed at minimizing noise pollution can exist at many levels, from municipal to federal. Teaneck residents are affected by three major sources of noise that are outside of municipal control: aircraft, railroads and highways.

Aviation

Teaneck residents are affected by the flight patterns at nearby Teterboro Airport. The federal government and airport management each play a part in aviation noise abatement. According to the Federal Aviation Administration (FAA):

> The federal government has the authority and responsibility to control aircraft noise by the regulation of source emissions, by flight operational procedures, and by management of the air traffic control system and navigable airspace in ways that minimize noise impact on residential areas, consistent with the highest standards of safety and efficiency. The federal government also provides financial and technical assistance to airport proprietors for noise reduction planning and abatement activities.
>
> Airport sponsors are primarily responsible for planning and implementing action designed to reduce the effect of noise on residents of the surrounding area. Such actions include optimal site location, improvements in airport design, noise abatement ground procedures [and non-discriminatory] restrictions on airport use. (*FAA)*

In addition, the FAA encourages local municipalities to adopt land use planning measures that minimize development in areas likely to be affected by such noise intrusions. The Federal Interagency Commission on Aviation Noise (FICAN) lists two publications related to this: *Land Use Compatibility and Airports* and *Guidelines for Sound Installations for Residences Exposed to Aircraft Operations*.

The Port Authority of New York & New Jersey (Port Authority) owns and operates Teterboro Airport, which claims an enforceable and stringent noise limitation program that became effective in 1987, three years before the federal *1990 Aircraft Noise and Capacity Act.* Teterboro Airport is designated by the Port Authority as a "reliever airport," with a "focus on removing the smaller and slower aircraft from the regional air traffic that would cause major congestion at the Port Authority's commercial airports." In October 2012, the Port Authority published a *Sustainable Management Plan (SMP)* for the airport. Regarding noise, the plan indicates the agency is committed to continuing its noise abatement programs and procedures that were developed since 1987 in concert with the FAA, indicating that community members can visit the noise office at the airport by appointment and observe the real-time monitoring of noise data. The Port Authority's noise management program includes addressing noise concerns of surrounding communities as well as pilot education. The *SMP* reports that the airport has been successful in decreasing its noise impacts (see *TANAAC 2011* summary below). Going forward, the *SMP* seeks to modify approach procedures to address excessive fuel use and take into consideration that some approaches "overfly areas sensitive to aircraft noise,"

with the goal of improving approach times and achieving fuel savings, emission reductions and area noise reductions.

The Port Authority's mandatory Noise Rules for Teterboro Airport are:

- 80 dB(A) departure limit on Runway 24 from 2200 to 0700 local (note: dB(A) is a weighted measure that adjusts for the range of human hearing)
- 90 dB(A) departure limit on Runway 24 from 0700 to 2200 local
- 95 dB(A) departure limit on Runways 01, 19 and 06 at all times, and
- 95 dB(A) departure limit for helicopters at all times.

If an aircraft exceeds an applicable decibel limit by more than 1.0 dB(A), a noise violation is issued. If an aircraft receives three noise violations within a two-year period, permission to use the airport is withdrawn.

In addition, on a voluntary basis, the airport asks aircraft operators to consider abiding by the following:

- No operation of Stage II aircraft at any time (note: Stage II aircraft have less strict noise standards than Stage III and Stage IV aircraft; an FAA Reauthorization bill signed into law in 2012 mandates phase out of Stage II jets and compliance with Stage III noise limits by 2015), and
- No operations of ANY aircraft between the hours of 11 p.m. and 6 a.m.

The Port Authority is a partner in the Teterboro Aircraft Noise Abatement Advisory Committee (TANAAC), formed in 1987 and composed of locally elected officials and members of the aviation community. The TANAAC *2011 Full Year Report* indicates that overall aircraft activity at Teterboro decreased between 2007 and 2011 from 182,101 movements to 152,250, and the percentage of total movements that occurred during the nighttime also decreased. Of the six regional monitoring stations (RMS) – located in Bogota, Carlstadt, Hackensack (2), Hasbrouck Heights and Moonachie – the monitor at Hackensack Medical Center (HMS) reported the highest number of noise events above 90 dB(A) in reporting years 2006–2011. The peak year was 2009, with 246 events at or above that level. 2011 was the lowest reporting year for the HMS station, at 135 events. Carlstadt monitoring station reported 11 noise events above 95 dB(A) in 2011 and HMS 6. Of the other four stations, Hasbrouck Heights, Hackensack and Moonachie had no events above 95 dB(A) and Bogota 2. There were 87 first violations of noise in 2011, compared to 173 in 2004.

The LDN(A), or Day/Night Level average for 365 days, at the two closest noise monitoring stations to Teaneck was 50.6 for RMS 4 in Hackensack and 48.4 for RMS 5 in Bogota. These are below the LDN 65 dB standard adopted by federal and state agencies including the FAA and the EPA.

Noise complaints peaked in 1998 at 5,042, falling to a low of 519 in 2010 but rising steeply to 2,687 complaints in 2011. The 2011 complaints were made by 188 discrete

callers – the second lowest number of callers since 2000. In 2011, 39 of the complaints (15 complainants) came from Teaneck. The number one complaint was that planes were low and loud. (*TANAAC 2011 Full Year Report)*

Railroads

The Federal Rail Administration (FRA) Title 49. Transportation. PART 210—Railroad Noise Emission Compliance Regulations set varying standards depending on the age of vehicle, whether it is moving or stationary, the coupling of cars, etc. The maximum is 96 dBA for a moving locomotive manufactured before 1980. Horns and whistles are an exception to the noise standards. To address local issues with train horns, the Train Horn Rule from 2006 allows localities to establish quiet zones where trains would not routinely sound their horns when approaching public highway rail-grade crossings; emergencies are an exception, and in order to qualify, localities must mitigate the risk. *(FRA)*

At the state level, the Noise Control Rules, N.J.A.C. 7:29, were amended in June 2012 and now incorporate by reference the Federal provisions on railroad noise "pertaining to the sound level standards and measurement of railroad noise generated by idling train locomotives and rail car coupling operations." NJDEP is working with Rutgers on development of a railroad model ordinance.

Teaneck Study

In 2009, a Rutgers graduate student, Craig B. Anderson, published a theses entitled "Assessment of railway activity and train noise exposure: a Teaneck, New Jersey, case study." A pdf of the publication is available from the Rutgers University Community Repository. The abstract appears below:

> Three train tracks run through Teaneck, NJ, a suburban city, unimpeded by road crossings; the tracks are as close as 7 meters to residential properties. In 2000, trains began idling in Teaneck for extended periods of time (up to 54 hours), exposing residents to persistent, elevated sound levels, as well as diesel emissions, and generating complaints. The goals of this study were to characterize the time-activity patterns of passby and idling trains; idling locations; and the sound emission levels of passbys, idling locomotives, and train horns over a one-year period. From October 2006 through November 2007, source sound levels were measured continuously with a Norsonic 121 sound-level meter and WAV files of actual sounds were recorded during train events. Concurrently, research staff visually noted train activities 24 hours/day, every third day, for three consecutive weeks each season, including train direction, track, idle location, locomotive-to-meter distance (idles), and other identifying information. Specific source characterization measurements of individual locomotives were made at measured distances with a hand-held Quest 2900 sound-level meter. Over this time period: ~1.2 trains passed per hour (1.1 daytime; 1.4 nighttime, 10 p.m.-7 a.m.); average passby duration was 2.8 minutes; and passbys were most frequent during the midnight hour. Trains tended to travel southbound during the day and northbound at night, resulting in horn blowing behind homes, while people slept, as the trains approached a grade crossing on Teaneck's northern boundary. Idles averaged 87.2 minutes in duration, with the longest lasting ~36 hours. Idle events occurred

equally in southern and northern Teaneck, but average idle durations in southern Teaneck were 2-3 times longer than all other locations. Train(s) idled in Teaneck for a total of ~10.7 hours/day, or 44.6% of the time. Average sound levels at 30.5 meters (100 feet) were: 78.1 dBA (peak: 84.9 dBA) for passby trains; 65.0 dBA (68.5 dBA) for single, idling locomotives; and 104.3 dBA (109.0 dBA) for train horns. Ambient sound-level measurements in neighborhoods had an Ldn of ~50 dBA. Sound emissions from train activity produced moderate-to-severe noise impacts in areas within 152 meters (500 feet) of the railway, especially during non-summer nights.

Highways

Portions of Teaneck are subject to roadway noise from NJ Route 4 and I-80/95. Sources of highway noise include exhausts, engines, tire/pavement interface.

In general, the federal government administers only a few hundred miles of roadway, basically in national parks. The remaining roads are administered by state, county and local government agencies. Federal regulations, however, do include noise abatement criteria, which represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. Federal Highway Administration (FHWA) Title 23. Highways – Part 722-Procedures for Abatement of Highway Traffic Noise and Construction Noise, final rule published July 13, 2010 and effective July 13, 2011, requires states to revise their noise policies to meet the new requirements in this final rule.

The New Jersey Department of Transportation (NJDOT) regulates highway noise at the state level. The NJDOT indicates that noise impacted communities can build noise barriers within the State's Right of Way at no cost to the State. Following FHWA regulations, the NJDOT must undertake a noise analysis for new roadways and improvements that increase capacity on existing roadways, and for projects that retrofit existing roadways with noise barriers. The NJDOT has established a Traffic Noise Management Policy and Noise Wall Guidelines, effective June 2011, in response to the revised federal regulations. The NJDOT states: "The findings of a noise study will identify noise impacts as defined by Federal Regulation and recommend mitigation measures to be pursued, if any." In recent years, studies have been conducted to determine the effectiveness of pavement composition, particularly asphalt/rubber composite containing recycled tire materials, on road noise abatement.

Teaneck Study

A study of traffic noise at five different locations in Teaneck across several days and at various hours was undertaken in 1977 and included in the *1980 NRI*. The Noise Level Monitoring data is included in the *Appendices* of this Plan (*Appendix B-4*). The monitoring took place for the most part at intersections during the change of traffic lights from red to green, when traffic was accelerating. The report observed that in general the intersection noises were between 65 and 80 dB, with a maximum of 102 dB recorded at the intersection of Cedar Lane with Elm and Garrison at 10:05 a.m. with heavy trucks passing. The study also noted that noise levels at the entrances to residences would be

"significantly less" due to setbacks and would decrease with distance from the intersection. *(1980 NRI)*

Other State and Local Regulations

The NJDEP, authorized by the Noise Control Act of 1971, N.J.A.C. 7:29, oversees noise control and abatement in New Jersey as outlined in the State Noise Control Regulations, N.J.A.C. 7:29, effective June 7, 2012. The NJDEP's noise regulations establish sound level standards of 50 dB from 10 p.m. to 7 a.m. and 65 dB during the daytime for stationary commercial and industrial sources, as measured at the property line of an affected person. As stated above, public highways, aircraft and railroads are not regulated by the Noise Control Act. The NJDEP does not have a Noise Control Program, but its Noise Information website provides a list of contacts depending on the type of noise: aircraft, highway, commercial or industrial, or residential noise and nuisances. The Office of Local Environmental Management (OLEM) acts as the liaison to the New Jersey Noise Control Council (NCC) and works with County Health Departments and municipalities to monitor noise complaints and compliance. The NJDEP also posts on its website a Model Noise Ordinance, which can be adopted by municipalities (the municipal ordinance must be submitted to the NJDEP for approval). It regulates a number of noise sources not covered under the state regulations including noise from residential and multi-use properties and equipment such as landscaping tools. Alternatively, municipalities can enforce noise locally under a nuisance code not reviewed by the NJDEP and which can be enforced by local police or health officer. *(NJDEP)*

Bergen County

The Environmental Protection Program within the Bergen County Department of Health Services (BCDHS) handles noise complaints for the County. According to the website, "the noise program within BCDHS involves responding to citizen complaints and supplying support for local enforcement of Noise Ordinances. When noise complaints are received, they are investigated to confirm that a violation of the State Noise Regulations exist, and then every effort is made to alleviate the problem." Exceptions are trains, planes, road noise, fire signals, church bells during services. The Program received one complaint from a Teaneck resident in 2011, involving dumpsters making noise early in the mornings. *(BCDHS EPP)*

Teaneck Township

The Teaneck Township Health Department handles noise complaints for violations of noise restrictions as established by the municipal code. According to the Health Department's 2012 report, less than 10 noise complaints were submitted to the Township in 2012, none of which required inspection. The Health Department coordinates with the Building Department, conducting evaluations and inspections for applications including noise-related items such as air conditioner units, generators and pool pumps. The staff includes an inspector who is NJ State certified in noise complaints. *(The State of Health in Teaneck – 2012 Report & Nelson Wong, Environmental Health Specialist)*

Teaneck submitted a Noise Ordinance to the NJDEP in June 1988, which was disapproved. However, Teaneck municipal code includes regulations of noise as a nuisance as outlined below.

Municipal Code

There are incidental references to noise under several sections of the municipal code, but the main noise regulations are listed under Section 21. Health and Sanitation.

Section 21-15 declares unreasonable and unnecessary noise a nuisance and therefore unlawful and prohibited. It sets parameters for noise in residential areas, public spaces and commercial areas where noise would impinge on residential areas. Certain noises such as earth moving and lawnmowers are prohibited between 8 p.m. and 6:30 a.m. weekdays and 8 p.m. and 7:30 a.m. weekends and Township-specified holidays; noisy animals and birds are also addressed as is the use of sound systems, loudspeakers and public address systems in parks.

Section 21-45 sets maximum permissible sound levels from stationary sources as measured at any residential property line, for continuous airborne sound and impulsive sound, measured in decibels or octave bands, as appropriate. Continuous airborne sound is restricted to 45 dBA from 10 p.m. to 7 a.m. and to 55 dBA from 7 a.m. to 10 p.m. and as is impulsive sound with a peak in excess of 70 decibels.

WATER QUALITY ASSESSMENT

Water quality affects people and their environment in many different ways. We may think of it most often in relation to our drinking water, but the quality of our water is also important to other aspects of our environment and our water use, from recreational activities to the sustainability of wildlife and our food supply. Those who supply our drinking water are required to submit annual consumer confidence reports on the status of the water they supply; in addition, the NJDEP assesses state waters against the designated uses outlined in the Surface Water Quality Standards, and regulates wastewater discharges to the water supply.

Public Water Supply

United Water New Jersey (UWNJ) provides water to hundreds of thousands of customers in Bergen and Hudson counties, including residents of Teaneck. This water comes primarily from three reservoirs upstream of Teaneck on the Hackensack River (Oradell, Lake Tappan and Lake DeForest) and Woodcliff Lake Reservoir on Pascack Brook, a tributary of the Hackensack. Supplemental water may come from UWNJ wells in Upper Saddle River, from the North Jersey District Water Supply Commission Wanaque South Project or the Boonton, Wanaque and Monksville reservoirs. Additional treated water may come from United Water Jersey City, United Water New York, the Park Ridge Water Department, the Passaic Valley Water Commission or the Ridgewood Water Department. *(UWNJ)*

Water Quality Reporting

The EPA and NJDEP require water companies to provide their customers annually with a consumer confidence report on how their drinking water compared to government standards. UWNJ's report on 2011 data, issued in June 2012, showed no violations against primary standards directly related to the safety of drinking water or against NDMA, an unregulated substance for which the EPA requires monitoring (its likely sources are a disinfection by-product, chemical synthesis and manufacture of rubber, leather and plastics). Against secondary standards, which are non-mandatory guidelines related to the aesthetic quality of drinking water, UWNJ reported exceedances of New Jersey's Recommended Upper Limit for aluminum, chloride, hardness, sodium and total dissolved solids (minerals that dissolve in water). According to UWNJ, these contaminants are not considered to present a risk to human health. UWNJ received waivers for synthetic organic chemicals because its system is not vulnerable to that type of contamination. *(UWNJ)*

Source Water Assessment Program

Under the Federal Safe Drinking Water Act, all states were required to establish a Source Water Assessment Program (SWAP). New Jersey's SWAP Plan:

1. determined the source water assessment area of each ground and surface water source of public drinking water
2. Inventoried the potential contamination sources within the source water assessment area, and
3. Determined the public water system source's *susceptibility* to regulated contaminants.

In 2004, source water assessment reports were completed for all Public Community and Non-Community Water Systems in New Jersey. The SWAP report for UWNJ included one surface water intake, Hirshfeld Brook, with headwaters in Teaneck and three wells with Wellhead Protection Areas that extended into Teaneck. The three wells (Bogota 2, 3 and 4) have since been taken out of service. There are also several Public Non-Community wells on the boundaries of Teaneck, in Bogota and Englewood City, whose Wellhead Protection Areas, that is, the extent of groundwater area from which the wells may draw, extend into Teaneck.

The portion of the Hackensack River: Hirshfeld Brook HUC 14 subwatershed that is located in Teaneck, is the only area of the Township that is the source of surface water for a public water supply. A source water assessment (SWA) area for surface waters is the area upstream of a surface water intake, including land that drains to the upstream areas. The intake for Hirshfeld Brook is located in New Milford before the confluence of the brook with the Hackensack River. The headwaters begin in the vicinity of Milton Votee Park in Teaneck, paralleling the railroad line and traveling north through Windsor Park into Bergenfield. This Hirshfeld Brook SWA area totals 2,980.97 acres, of which 718.85 are in Teaneck. Hirshfeld Brook's waters are treated at UWNJ Treatment Facility ID 11 in Haworth. Hirshfeld Brook is among three seasonal sources of water supply to the Haworth plant and has a capacity of 6.7968 million gallons per day. In 2009, United Water completed a $100 million upgrade of its Haworth Water Treatment Plant.

The SWAP report from 2004 assessed the susceptibility to contaminants at the Haworth Entry Point to the Distribution System (EPTDS) to be high for pathogens, and volatile organic compounds (VOCs), inorganics and Disinfection Byproduct Precursors (DBPs), medium for nutrients and low for pesticides, radionuclides and radon. All surface waters, such as Hirshfeld Brook, were assessed to be at high risk for pathogens because "they are subject to various sources of microbial contamination runoff containing fecal matter." The SWAP susceptibility ratings for UWNJ's source waters are included in its Consumer Confidence Report. The susceptibility ratings do not mean that contaminants are present; they assess the *potential* for contamination.

All SWAP reports include a Potential Contaminant Source Inventory. This inventory focuses on two contaminant groups: point and nonpoint sources.

- Nonpoint sources, primarily land use sources, include runoff from roadways, pesticide and herbicide application, storage facilities, and landfills. Percentage of developed land and type of use are factors in determining susceptibility for both surface waters and groundwaters, particularly susceptibility to contamination by nutrients, pesticides, VOCs and inorganics.

- Point sources include known contaminated sites, leaking underground storage tanks, storage facilities, and New Jersey Pollution Discharge Elimination Systems (NJPDES) discharges. For groundwater such point sources were considered significant for VOCs, inorganics and disinfection byproduct precursors. For surface waters, various point source factors such as NJPDES Discharge to Surface Water permits, NJPDES stormwater permitted locations and Known Contaminated Sites were considered factors for nutrients, VOCs and/or inorganics. The SWAP Report for UWNJ includes an Appendix that inventories specific point source potential contaminant source sites regulated by the NJDEP, including a number in Teaneck. Not all sites listed in the report were ultimately determined to be a direct factor in determining susceptibility. *(NJDEP SWAP)*

Water Quantity

UWNJ-Haworth serves 800,000 customers in 60 communities in Bergen and Hudson counties, drawing primarily from its reservoirs, wells and surface water intakes. It also contracts for bulk purchases from Jersey City Municipal Utilities Authority (JCMUA), which it manages. The NJDEP Division of Water Supply and GeoScience issues reports on Public Water System usage and whether capacity is in a surplus or deficit. The difference between UWNJ-Haworth's available water supply limits and peak demand returned a surplus of 408.316 million gallons per month (MGM) in July 2011 and 1,712.526 million gallons per year (MGY) in 2007. (See *Table 37* below.)

In addition to water supply limits, there is another measurement that can be in either surplus or deficit. This is firm capacity, which is defined as having adequate pumping equipment and/or treatment capacity to meet peak daily demand, when the largest pumping unit or treatment unit is out of service. UWNJ's firm capacity has been determined to be 194.500 million gallons per day (MGD). Peak daily demand as of July 2011 was 154.954 MGD, leaving a firm capacity surplus of 39.546 MGD. (See *Table 37* below.)

Table 37. United Water New Jersey – Haworth
Public Water Supply Usage and Deficit/Surplus
MGD=Million Gallons Per Day; MGM=Million Gallons Per Month; MGY=Million Gallons Per Year

Water Supply	*Limits*	*Peak Demand*	*Surplus*
UWNJ Allocation	4860.000 MGM 43084.000 MGY		
JCMUA Contract	217.000 MGM 2555.000 MGY		
Total	507.000 MGM 45639.000 MGY	4668.684 MGM 43926.474 MGY	408.316 MGM 1712.526 MGY
Firm Capacity	194.500 MGD	154.954 MGD	39.546 MGD

Source: NJDEP Division of Water Supply and GeoScience. Public Water System Deficit/Surplus. Accessed 10/18/2012. http://www.state.nj.us/dep/watersupply/pws.html

NJDEP Integrated Water Quality Monitoring and Assessment Report

According to the NJDEP, water quality standards, monitoring, and assessment provide the scientific foundation for the protection of New Jersey's water resources and implementation of the federal Clean Water Act and the New Jersey Water Pollution Control Act. The *2010 Integrated Water Quality Monitoring and Assessment Report* (Integrated Report) describes the overall quality of New Jersey's surface waters based on data collected between January 1, 2004 and December 31, 2008.

The Integrated Report assesses each HUC 14 subwatershed to determine compliance with surface water quality standards (SWQS), which determine stream classifications and designated uses for all state waters. The report determines, for each designated use, whether the subwatershed is fully supporting the use, not supporting the use or whether there is insufficient information.

A subwatershed is "fully supporting" a designated use only if data for a "minimum suite of parameters" associated with SWQS for that use are available and there are no exceedances of the applicable criteria for each parameter in the suite. If data are available for only some of the minimum suite of parameters, the use is not assessed due to insufficient information. If any one parameter associated with a designated use exceeds the applicable NJDEP criteria, then the subwatershed is "not supporting" the designated use.

A water use also may be identified as "threatened" or "impaired." A threatened water is one that, while it currently supports its uses, has the potential for one or more of these uses to become impaired in the future if pollution control actions are not taken. A water body is considered "impaired" if any of its uses are not being supported. Both the section of the Hackensack River in Teaneck and Overpeck Creek qualify as impaired waters. Hirshfeld Brook is not assessed due to insufficient information. *Table 38* below lists the status for each of the three HUC 14 subwatersheds that encompass Teaneck.

Impaired waters, those waters that are not supporting designated uses, are placed on the 303(d) List of Water Quality Limited Waters and require the development of a Total Maximum Daily Load (TMDL) plan. A TMDL identifies the point and nonpoint sources for pollutants of concern and identifies the measures needed to reduce loads for each source to levels that will meet surface water quality standards. Point sources are defined as those regulated under the federal Clean Water Act, such as wastewater treatment facilities, combined sewer overflows and stormwater. Nonpoint sources are diffuse sources, not regulated under the Clean Water Act, such as overland runoff and air deposition. TMDL Plans that address the impaired waters in Teaneck have yet to be developed.

Table 38. Designated Uses by Subwatershed – 2010 Integrated Assessment Report						
AU ID	*AU Name*		*Water Type*	*Size*	*Location Description*	
NJ02030103180020-01	**Hirshfeld Brook**		FRESHWATER LAKE RIVER	3.7 AC. 6.46 MI	HUC14: 02030103180020 As of 2010 contains the following monitoring sites and associated SWQS Classification 01378520 FW2-NT	
Use	**Attainment**	**Threatened**	**Cause**	**Cycle First Listed**	**TMDL Status**	**Source**
Agricultural Water Supply	Insufficient Information	N				
Aquatic Life	Insufficient Information	N				
Fish Consumption	Insufficient Information	N				
Industrial Water Supply	Insufficient Information	N				
Primary Contact Recreation	Insufficient Information	N				
Public Water Supply	Insufficient Information	N				
AU ID	*AU Name*		*Water Type*	*Size*	*Location Description*	
NJ02030103180030-01	**Hackensack R (Ft Lee Rd to Oradell gage)**		RIVER	11.37 MI	HUC14: 02030103180030 As of 2010 contains the following monitoring sites and associated SWQS Classification 01378500 SE1 01378567 SE1 01-HR SE1 H161 SE1 H304 SE1	
Use	***Attainment***	***Threatened***	***Cause***	***Cycle First Listed***	***TMDL Status***	***Source***
Aquatic Life	Not Supporting	N	Copper (M) Turbidity	2008 2008	Low Priority Medium Priority	• Industrial Point Source Discharge • Urban Runoff/Storm Sewers • Combined Sewer Overflows • Source Unknown • Atmospheric Deposition - Toxics
Fish Consumption	Not Supporting	N	Benzo(a)pyrene (PAHs) (T)	2008	Medium Priority	
			Chlordane (Pe)	2008	Medium Priority	
			DDD (Pe)	2008	Medium Priority	
			DDE (Pe)	2008	Medium Priority	
			DDT (Pe)	2008	Medium Priority	
			Dieldrin (Pe)	2008	Medium Priority	
			Dioxin (including 2,3,7,8-TCDD)	2006	Medium Priority	
			Heptachlor epoxide (Pe)	2008	Medium Priority	
			Mercury in Fish Tissue PCB in Fish Tissue	2006 2008	Medium Priority Medium Priority	
Primary Contact Recreation	Not Supporting	N	Enterococcus (Pa)	2008	Medium Priority	
AU ID	*AU Name*		*Water Type*	*Size*	*Location Description*	
NJ02030103180040-01 *note: SWClass in Hydrology lists Overpeck as FW2-NT/SE2	Overpeck Creek		FRESHWATER LAKE RIVER	241.6 AC 27.83 MI	HUC14: 02030103180040 As of 2010 contains the following monitoring sites and associated SWQS Classification 01378583 FW2-NT 0137859950 FW2-NT 0137859960 FW2-NT 01378600	

Table 38. Designated Uses by Subwatershed – 2010 Integrated Assessment Report						
					FW2-NT 0137860050 FW2-NT 01378602 FW2-NT 01378604 FW2-NT 01378606 FW2-NT 0	
Use	**Attainment**	**Threatened**	**Cause**	**Cycle First Listed**	**TMDL Status**	**Source**
Agricultural Water Supply	Not Supporting	N	Total Dissolved Solids	2006	Medium Priority	• Agriculture • Urban Runoff/Storm Sewers • Combined Sewer Overflows
Aquatic Life	Not Supporting	N	Ammonia (Un-ionized)	2007	Medium Priority	
			pH	2006	Medium Priority	
Fish Consumption	Not Supporting	N	Chlordane (Pe)	2006	Medium Priority	
			DDD (Pe)	2006	Medium Priority	
			DDE (Pe)	2006	Medium Priority	
			DDT (Pe)	2006	Medium Priority	
			Dioxin (including 2,3,7,8-TCDD)	2006	Medium Priority	
			Polychlorinated biphenyls	2006	Medium Priority	
Industrial Water Supply	Fully Supporting	N				
Primary Contact Recreation	Not Supporting	N	Escherichia coli (Pa)	2006	Medium Priority	
Public Water Supply	Not Supporting	N	Cadmium (M) Chloride	2007 2007	Low Priority Low Priority	
			Lead (M)	2007	Low Priority	
			Total Dissolved Solids	2006	Medium Priority	

T = Toxic Organics; Pe = Pesticides; Pa – Pathogens; M = Metals (Other than Mercury)
Source: NJDEP

Causes of Impairment

The descriptions below provide more information about the contaminant categories in the *2004 SWAP* reports and the causes of impairment listed in the *2010 Integrated Assessment Report*. These descriptions are taken from the US EPA Water Assessment website and the NJDEP SWAP reports.

Ammonia occurs naturally in water in trace amounts, but too much ammonia from fertilizers, sewage and other wastes can be poisonous to fish, especially when water temperature and pH are high. Ammonia also can cause heavy plant growth, foul odors, and low oxygen levels that can interfere with use for fishing, swimming and water supplies. Ammonia is a common cause of fish kills and can harm people's health after it is converted to nitrate by bacteria in the water. High nitrates in groundwater used for drinking have been linked to potentially fatal oxygen levels in babies, known as "blue-baby syndrome." Also, excess ammonia can cause heavy growth of harmful algae, which can cause illness in humans if swallowed during recreational activities such as swimming. Too much ammonia can also cause oxygen-poor waters, since dissolved oxygen in water is used up by bacteria and other microbes in converting ammonia into

their food. Ammonia pollution also plays a big role in nitrogen and phosphorus pollution, which is currently the third highest reported cause of water pollution in the US affecting more than 6,000 waterways.

Dioxins, highly toxic chemicals used in some manufacturing processes, can build up in the food chain. They may settle in sediment or on aquatic plants, which are then eaten and concentrated by fish, other aquatic life, wildlife, and people. Dioxins are considered likely to increase cancer risk of people and wildlife, and may harm the immune system, hormone levels, and fetal development. Dioxins can be formed unintentionally by burning trash or leaded gasoline and as waste byproducts from manufacturing some pesticides. These chemicals can be found in fish, some waterways, and their bottom sediments. They can reach waterways through the air, by rainfall runoff and soil erosion from contaminated sites, from pulp and paper mills, and from other industrial discharges. Dioxin levels in the environment have been declining since the early seventies but are still a concern at some sites because they are long-lasting in the environment, and some dioxins are still released at low levels. Approximately 500 waters are reported as dioxin-polluted, mainly in the more industrialized states. These chemicals may build up to harmful levels in fish and in the human body.

Disinfection Byproduct (DBP) Precursors. Disinfection byproducts are formed when the disinfectants used to kill pathogens during treatment react with dissolved organic material present in the water. A common source of DBP precursors is naturally occurring organic material such as leaves in surface water. The amount of organic matter, the type of disinfectant, the concentration of disinfectant, time of contact, pH, and temperature all have an effect on the concentration of disinfection byproducts produced. Chlorine is the most common disinfectant used in New Jersey.

Mercury is found in many rocks, including coal. Mercury ranks among the top ten national causes of water pollution, with more than 4,300 waters reported. Coal-burning power plants account for over half of all US man-made mercury emissions, but mercury in the air also involves worldwide sources. Burning hazardous wastes, producing chlorine, breaking mercury products, and spilling mercury, as well as improper treatment and disposal, can also release it into the environment. Mercury in the air eventually settles into water or onto land where it can be washed into water. As a water pollutant, mercury can be dissolved in the water or be deposited in bottom sediments. Once deposited, certain microbes can change it into a highly toxic form that builds up in fish, shellfish and animals that eat fish. The most common way people can be exposed to mercury is by eating fish or shellfish that are contaminated with mercury. Eating fish from mercury-polluted waters should be avoided, especially by children and nursing or pregnant women. Eating mercury-contaminated fish or shellfish can affect the human nervous system and harm the brain, heart, kidneys, lungs, and immune system.

Metals Other Than Mercury enter waterways from factories, mining, and runoff from urban areas, as well as from natural processes such as erosion of soil and rocks. At high levels, all metals such as arsenic, cadmium, chromium, copper, lead, selenium, and zinc can be toxic to aquatic animals and humans. Metals occur in nature, although the amount occurring naturally varies according to local geology. Excess metals are the fifth most frequent reported cause of waterbody pollution, affecting over 5,900 waters nationwide. Metals at toxic levels in water are rarely due to natural causes alone. Metals on land and

in soils can also infiltrate into groundwater. Disturbed soils in metals-enriched areas can wash into streams during storms. Metals in the air from industrial emissions can be deposited onto waters or land surfaces. All metals can be toxic to aquatic animals and humans at sufficiently high exposure levels. Human health problems from high exposure, such as drinking contaminated water over a prolonged period, can include damage to organs. Excess metals at toxic concentrations can affect the survival, reproduction, and behavior of aquatic animals and can result in fish kills. Additionally, toxic levels of metals can decrease a waterway's suitability for industrial and household water uses. Metals can be removed from water destined for human use, but treatment can be expensive. Metal-containing appliances and products should be properly disposed of.

Nutrients. Common types of nutrients include nitrogen and phosphorous. Nutrients can harm environmental quality, human health, and the efficiency of the drinking water treatment plant by encouraging growth of photosynthetic microorganisms in surface water sources, which alter water characteristics (eutrophic conditions). Sources of nutrients are point and nonpoint sources. Effluents from a sewage treatment plant are a point source of nutrients. Nonpoint sources of nutrients include discharge from septic fields, areas where animal waste is stored, and runoff from agricultural and residential land where fertilizers were used. The use of nitrogen-based fertilizers in urban areas is considered a major source.

Pathogens (Bacteria and Other Microbes) are potentially disease-causing organisms from human or animal wastes that enter waters through septic tank leaks or sewage discharges, farm and feedlot manure runoff after rain, boat discharges, and pet and wildlife waste. People can become ill by eating contaminated fish or shellfish or swimming in waters with high levels of these microbes. They are the most commonly reported cause of water pollution nationwide, with more than 10,300 waters identified. These microbes can affect human and animal health. They reach the water directly in urban and suburban areas from wastewater treatment plants, sewer overflows, failing sewer lines, slaughterhouses and meat processing facilities; tanning, textile, and pulp and paper factories; fish and shellfish processing facilities; sewage dumped overboard from recreational boats; and pet waste, litter and garbage. The amount of bacteria and other microbes present, and thus the health risks they represent, can change rapidly due to factors such as rainfall and runoff from the sources mentioned above. Serious but rarely life-threatening illnesses are caused mainly by swallowing pathogen-contaminated water during swimming or other recreation, but can also come from skin contact with the water or eating contaminated fish or shellfish. Livestock, pet, and wildlife illnesses also can occur. Besides causing illnesses, pathogens in waterways can cause significant economic losses due to beach closures, swimming and boating bans, and closures of shellfish harvest beds. When present in raw drinking water sources, they can be treated but require advanced and expensive methods to disinfect and filter the water supply.

Pesticides (including insecticides, fungicides and herbicides) are a broad variety of chemicals used to kill unwanted pests or plant life. In water, pesticides can affect the health of aquatic insects, fish, plants, and animals who are exposed through feeding or contact. About 1,000 waters throughout the US are currently reported as polluted by pesticides. Although pesticides are mainly used around homes, forestry, and agriculture, they can easily enter waters through direct application, drift from airborne applications,

stormwater or irrigation runoff, discharge from industries, or wastewater treatment plants. Timing and amount of pesticide used, rainfall and wind after use, and how fast the pesticide degrades all affect how much of it may reach the water. The potential human health effects of pesticides depend on the type of pesticide and amount of exposure, but can include nerve damage, hormonal effects, skin or eye irritation, or cancer-causing or reproductive effects. However, in many cases the amount of pesticide to which people are likely to be exposed is too small to pose a risk. Insecticide and herbicide effects on waters can be significant. Aquatic insects may be especially susceptible to insecticides, affecting a main food supply for fish. Fish themselves also can be killed or affected by slowed growth, less disease resistance, and poor reproduction. Death of aquatic plants from herbicides can remove food sources and cover for aquatic life, reduce oxygen and water quality, and degrade fish habitat.

Ph/Acidity/Caustic Conditions (Acidity) outside a certain range can sicken or kill fish and other aquatic life. Highly acidic or alkaline water can also release pollutants from sediments that can further harm aquatic life. The health and survival of aquatic plants and animals depends heavily on pH, which is a measurement of how acidic or basic the water is. Think of acid and base as two extremes, with neutral in the middle; a pH toward either extreme is generally harder for aquatic life to survive. Most aquatic plants and animals under those extreme conditions have reduced ability to grow, reproduce, and survive. Low pH (acidic) can cause toxic metals such as aluminum and copper to dissolve into the water from bottom sediments. High pH (basic or alkaline conditions) can increase the toxic form of ammonia, which can further harm fish and other aquatic life. Natural sources that influence acidity in waterways are the surrounding rock and soils, and processes such as decay of plants. Human activities that can result in acidity include agriculture (animal feedlots), urbanization and industry (emissions from vehicles and coal-fired power plants leading to acid rain and ocean acidification), and mining (acid mine drainage). Although human activities commonly result in more acidic conditions, high alkaline conditions can occur by means of stormwater runoff from sources associated with agriculture (lime-rich fertilizers) and urbanization (asphalt roads), wastewater discharges and leakage from sources associated with industry (e.g., soap manufacturing plants), and mining (oil and gas brine mining wastes). Around 4,000 waters have been reported as polluted by pH problems, making this the eighth most common reporting category.

Polychlorinated Biphenyls (PCBs) are a toxic mixture of chlorinated industrial chemicals which, although banned since the 1970s, are still a common pollutant because they build up in fish flesh and are long-lasting in the bottom sediments of rivers and lakes. PCBs in fish that are eaten by humans and wildlife can build up and may have cancer-causing and health effects. PCB contamination has caused many fishing bans and warnings. More than 4,500 water bodies are currently listed in the PCB-polluted category, making this the sixth-highest water pollution cause. PCBs have reached waterways worldwide by direct dumping, leakage from landfills not designed to handle hazardous waste, and through the air after burning PCB-containing waste. Originally PCBs were widely used in industry, particularly as coolants and lubricants in transformers and other electrical equipment. PCBs have been shown to cause cancer in animals. Studies have also provided evidence of potential cancer causing effects in humans. Non-cancer health effects on the immune system, reproductive system, and

nervous system in animals have been documented. PCBs are also related to deformities in birds and heart effects in young fish. PCB risks to human health occur when PCBs build up through eating PCB contaminated fish and other sources. Other negative effects on people include recreational and commercial fishing bans at numerous PCB-contaminated lakes and rivers and the related economic impacts over the past several decades.

Salinity/Total Dissolved Solids/Chlorides/Sulfates (Salts) are minerals that dissolve in water; they can be toxic to freshwater plants and animals and make water unusable for drinking, irrigation, livestock and manufacturing. Common table salt is a familiar example that consists of sodium and chloride, but salts can also consist of other minerals such as calcium, magnesium, sulfate, bicarbonate, and potassium. Dissolved salts are essential to life in our waters when in small quantities, but too much is harmful to freshwater aquatic life and many human uses. More than 1,000 normally fresh water bodies across the country have been listed as polluted because they contain too much salt. Most freshwater plants and animals tolerate only very low amounts of salts, and can sicken or die when these ranges are exceeded. Although salts occur naturally, human activities can increase salts to beyond the range tolerated by freshwater aquatic life. Some of the sources and activities that increase the salts in streams, lakes, groundwater and other waters include water withdrawals, disposal of human and industrial wastewater, fertilizer and lime application, repeated use of irrigation water, mining and oil or gas drilling, weathering of cement in urban areas, salt-water intrusion into drinking water supplies in arid areas and along the coasts, and de-icing treatment of roads and other surfaces during the winter. The lower dissolved oxygen concentration in urban areas may result from the large percentage of heat absorbing impervious surface area and resulting poorer exchange with atmospheric oxygen, and the higher surface temperature effects the density of air. Increased total dissolved solids concentrations in urban areas are due to the road salt applications. Once in a waterway, excess salt is very difficult to remove. Preventing salt from entering water in the first place is the best management practice. Note: UWNJ exceeded the allowances for sodium in 2011.

Radiation (Radionuclides). Radioactive materials can enter water by being deposited in surface water from the air due to accidental or intentional release, by dissolving from underground deposits of radioactive metals such as uranium as water flows through them, by entering ground water or surface water from the ground through erosion, seepage from improper disposal sites, in mining runoff or dumped mine tailings or from other human activities such as farming, storm water, and industrial activities. It can become a health concern when radioactive materials become concentrated in waterways. Although quantities that pose a health risk are uncommon and localized, radiation can be a water pollutant in some US waterways. 32 polluted waters currently occupy this reporting category. Radioactive atoms, known as “radionuclides,” are a water pollutant that comes originally from underground deposits of radium, uranium and other radioactive metals. Health becomes a concern when radionuclides become concentrated in bodies of water due to natural occurrences, accidental releases of radioactivity, or improper disposal practices. The primary environmental and human health risks from radiation involve cancer, but the degree of risk varies with how much radiation is involved over how long a time period.

Toxic Organics are harmful, man-made chemicals that all contain carbon. They often remain in the environment for long periods and can accumulate in animal and fish tissues and sediments. They also can get into drinking water supplies, posing potential long-term health risks to humans. Toxic organic chemicals are the reported cause of water pollution in more than 280 waters nationwide. These pollutants include a large number of chemicals such as solvents, pesticides, dioxins, PCBs, furans, and other nitrogen compounds. Common sources include wood preservatives, antifreeze, dry cleaning chemicals, cleansers, and a variety of other chemical products. Two important sources of toxic organic chemicals in water are improper disposal of industrial and household wastes and runoff of pesticides. Excessive application of insecticides, herbicides, fungicides, and rodenticides, or application of any of these shortly before a storm, can result in toxic chemicals being carried by stormwater runoff from agricultural lands, construction sites, parks, golf courses, and residential lawns to receiving waters. Other organic pollutants come from auto exhaust and from burning municipal and chemical wastes. These substances can be toxic to all forms of life, and are known to cause cancer in animals. For humans, some of them are suspected to cause cancer and are also known to be harmful to immune, reproductive, nervous, and hormone systems.

Turbidity (Murky Water) refers to water that is cloudy, muddy or opaque (turbid) because of suspended soil particles, algae, microbes, or organic matter. Turbidity is a reported as a pollution cause for more than 3,000 waters nationwide. The primary source of turbidity is rainwater runoff from disturbed or eroding land. Additional sources may include urban waste discharges, as well as particles from the decay of plant materials. High turbidity can reduce light penetration and degrade or eliminate aquatic plants in lakes and estuaries, leaving poorer shelter, nurseries, and food for fish and other aquatic animals. Loss of aquatic plants then allows wind and waves to stir up more cloudiness, which can make waters unattractive for recreational use. Suspended particles also increase temperature, reduce oxygen in water, clog fish gills and reduce survival of fish eggs. Although turbidity is not a direct cause of human health risk, other pollutants such as metals and bacteria may attach to suspended particles. If not controlled, turbidity can promote growth of bacteria, leading to waterborne diseases such as intestinal illnesses after swimming. Numerous studies show a strong relationship between reduction of turbidity and reduction of some disease-related microbes.

Volatile Organic Compounds (VOCs). Common types of VOCs include chemicals that are used as solvents, degreasers, and gasoline components. VOCs are manmade compounds and are the most common organic contaminants in groundwater in New Jersey. Sources of VOCs can be point and nonpoint. Examples of VOCs are methyl tertiary butyl ether (MTBE), benzene and vinyl chloride.

Statewide Ranking of Pollution Sources

The EPA has published a report ranking the probable sources of contaminants associated with threatened or impaired waters in New Jersey. Urban runoff/storm sewers is the leading probable source, associated with 13,690 miles of rivers and streams and 28,435 acres of lakes, reservoirs and ponds. See *Table 39* below.

Table 39. Ranking of Probable Sources for Contaminants in New Jersey Waters – 2010			
Rivers and Streams		Lakes, Reservoirs and Ponds	
Probable Source	*Miles Threatened or Impaired*	*Probable Source*	*Acres Threatened or Impaired*
Urban Runoff/Storm Sewers	13,690.6	Urban Runoff/Storm Sewers	28,435.6
Agriculture	11,572.9	Atmospheric Deposition - Toxics	24,834.4
Atmospheric Deposition - Toxics	6,796.4	Agriculture	22,383.6
Industrial Point Source Discharge	2,855.2	Upstream Impoundments	6,419.5
Package Plant Or Other Permitted Small Flows Discharges	2,214.2	Industrial Point Source Discharge	5,742.1
Municipal Point Source Discharges	1,641.8	Package Plant Or Other Permitted Small Flows Discharges	4,817.6
Source Unknown	1,518.2	Transfer Of Water From An Outside Watershed	3,381.1
Upstream Impoundments	1,146.3	Source Unknown	2,829.4
Transfer Of Water From An Outside Watershed	885.0	Municipal Point Source Discharges	2,740.4
Natural Sources	695.4	Natural Sources	2,014.8
Combined Sewer Overflows	408.8	Combined Sewer Overflows	770.6
Source: US EPA			

Wastewater

The Bergen County Utilities Authority (BCUA) has served Teaneck residents since 1951. Its website notes:

> As the population and industrial development of Bergen County proceeded in the early decades of the 20th century, the Hackensack River and its tributaries became increasingly polluted. The effects of this pollution were intensified in the tidal areas since the tidal action tended to confine the pollutants in the lower part of the river. In order to relieve the pollution in Overpeck Creek, a main tributary of the Hackensack River, the Bergen County Sewage Authority (now Bergen County Utilities Authority) undertook the construction of a trunk sewer,

intercepting sewers, and a sewage treatment plant. to serve twelve municipalities and various industries located in the Overpeck Valley. The initial pollution control project was placed in service in 1951.

In the intervening years, the system has been expanded to serve more communities and businesses.

For 2011, the BCUA reports:

> Daily influent carbonaceous biochemical oxygen demand (CBOD) concentration averaged 198 mg/l and after secondary treatment and disinfection was discharged at 13.2 mg/l, for a removal efficiency of 93.1%. Total suspended solids (TSS) removal was 91.1% based upon a yearly average daily wastewater influent concentration of 250 mg/l and 22.0 mg/l effluent discharge. A maximum daily average effluent concentration of 25 mg/l for CBOD and 30 mg/l of TSS as well as minimal removal efficiencies of 85% are required by the BCUA's NJPDES permit. Therefore, based on these annual averages, the BCUA complied with NJPDES permit effluent limitations [for the Little Ferry facility, which discharges to the Hackensack River; the BCUA also was in compliance at its Edgewater facility, which discharges to the Hudson River],

For Water Pollution Control, Local Discharge Limitations are set as shown in Table 40 below.

Table 40. Local Discharge Limitations

Hazardous Limits

Parameter	Limitation (mg/l)
Acrolein	0.30
Acrylonitrile	8.40
Benzene	0.85
Bromoform	1.00
Carbon Tetrachloride	0.15
Chlorobenzene	10.60
Chloroethane	21.50
Chloroform	1.75
1,2-Dichlorobenzene	21.60
1,4-Dichlorobenzene	26.30
1,1-Dichloroethane	19.40
1,2-Dichloroethane	4.50
1,1-Dichloroethylene	0.14
1,2-trans-Dichloroethylene	17.00
1,2-Dichloropropane	21.20
Ethyl Benzene	9.30
Methylene Chloride	17.00
1,1,2,2-Tetrachloroethane	3.85
Tetrachloroethylene	1.80
Toluene	8.10

1,1,1-Trichloroethane	65.00
1,1,2-Trichloroethane	8.60
Trichloroethylene	3.30
Trichlorofluoromethane	6.25
*Vinyl Chloride * Limit to be set at current detection limit of 0.005 mg/l.	0.00024
Copper (total)	1.0 mg/l Daily Maximum
Cyanide	0.50 mg/l Daily Maximum
Oil or Grease - Petroleum origin	• 100 mg/l Monthly Average • 150 mg/l Single Sample
Explosivity	• 5% LEL any 2 successive readings • 10% LEL any 1 reading

Non-hazardous Limits

Biochemical Oxygen Demand, BOD	BCUA must be notified if over 350 mg/l Suspended Solids, S.S. BCUA must be notified if over 350 mg/l
pH	5.5 - 9.5 Daily Range
Oil or Grease - Non-petroleum origin	200 mg/l Daily Maximum

REGIONAL PLANNING REVIEW

Regional Planning

New Jersey State Development and Redevelopment Plan (SDRP)

The *2001 SDRP*, in effect as of the date of this *ERI Update*, designates planning areas designed to reflect appropriate levels of development. It identifies areas for growth, areas for limited growth and areas for conservation. The State Plan Policy Map dated October 9, 2012 designates the majority of Teaneck as Metropolitan Area – Planning Area 1 (PA1), with the exclusion of Overpeck County Park and Golf Course, which are identified as PA8, Parks and Natural Areas.

Metropolitan Planning Areas (PA1) comprise the most densely developed regions in the state. The goals in these planning areas revolve around revitalizing existing cities and towns by encouraging compact growth and redevelopment. The Metropolitan Planning Area is identified as the most appropriate location for future development in New Jersey. Teaneck will want to monitor any plans future development and redevelopment to ensure that environmental resources are not negatively impacted.

Within *Parks and Natural Areas (PA8)* the intention of the State Plan is to provide for the protection of critical natural resources, provide public recreational and educational opportunities, ensure the maintenance of associated facilities, and ensure the connection of these areas into systems of open lands. The Teaneck Creek Conservancy in Overpeck Creek County Park oversees protection of the resources in its area. The 2007 *Open Space and Recreation Plan* for the Township of Teaneck envisions a series of interconnected greenways. All of these areas contain environmentally significant resources of import to Teaneck, from wetlands to tree canopy.

The State Planning Commission has been working on a replacement to the current State Plan, which is titled the State Strategic Plan. Originally proposed for adoption in 2012, this has not occurred. According to the Association of New Jersey Environmental Commissions (ANJEC), the emphasis of this proposed plan is on economic growth, and "although it also discusses open space preservation, it does not offer measures for environmental protection. Instead, it calls for focusing State policies and investments in 'vibrant regions,' fostering critical job growth, supporting effective regional planning and preserving the State's critical resources." If this Plan is adopted, the official state policy map will be phased out. In this version of the State Plan "the responsibility of protecting the environment through zoning and other ordinances lies specifically with local governments." *(ANJEC)*

Garden State Greenways (GSG)

GSG is a vision for a statewide system of interconnected natural lands, or greenways, in New Jersey. GSG identifies natural resources – wetlands, forests, fertile soils, diverse plant and animal habitat – that help provide clean water, clean air, a healthy food supply and scenic areas and recreation. Connectors link resource hubs. The connectors identified in Teaneck include the linking of existing parklands along the eastern border (identified

as the Overpeck Creek and Argonne Park Greenways in the Teaneck 2007 OSRP) and, along the western border, a connector that follows the Hackensack River (identified as the Hackensack River Greenway in the OSRP). Both these areas include wetlands, riparian zones and habitat for threatened and endangered species.

Water Quality Management Plan

The Statewide Water Quality Management Plan was adopted by the NJDEP in November, 1985 as part of a comprehensive effort to protect water quality in the State.

> The Plan serves as the foundation of the State's Water Quality Management Planning Program, and unified three federal Clean Water Act programs - wastewater facilities planning (201), basin planning (303(e)), and areawide planning (208) - into one comprehensive Statewide program. In addition to addressing federal requirements, these three programs serve to satisfy State requirements for water quality planning specified in the NJ Water Quality Planning Act. The existing DEP Water Quality Management Planning Program and Water Quality Management Planning rules (N.J.A.C. 7:15) represent the State's current implementation of the areawide planning program (208). The areawide WQM plans (formerly known as 208 plans), as part of the Statewide WQM Plan, are umbrella plans, each with various adopted components that address different aspects of water resource planning.

Twelve WQM areas were created in New Jersey and WQMPs for each area received Governor and EPA approval. Bergen County is part of the Northeast Water Quality Management Planning Area. WQMPs may be amended by following a specific set of procedures. In 2003, an amendment to set TMDLs for phosphorus in Overpeck Lake, which has been identified as being eutrophic, was proposed and approved by the EPA but is not on the list of adopted amendments.

Wastewater Management Plans

Wastewater management plans (WMPs), including designated sewer service areas are a major component of the WQMP. The State requires (WMPs) to be updated every six years. For Teaneck, this responsibility lies with the Bergen County Utilities Authority.

Bergen County

Bergen County Master Plan

The Bergen County Department of Planning and Economic Development plans to complete a County Master Plan that "will provide a guidance tool for future development, redevelopment, and preservation throughout Bergen County, as well as provide municipalities with a regional framework for their local planning processes." This plan will be fully in accordance with the New Jersey Municipal Land Use Law as well as consistent with the goals and objectives of the New Jersey State Development and Redevelopment Plan. "The Master Plan will create a unifying vision for the County's 70 municipalities and help them plan for sustainable growth while protecting environmental resources."

Bergen County Open Space Plan

Bergen County adopted an Open Space and Recreation Plan in 2004. Among the goals and objectives of this Plan, the following align with the protection of environmental resources:

- To protect and preserve natural and scenic values in the County.
- To preserve the major waterways of the County.
- To conserve major ridgelines, significant treed areas and areas designated as natural areas.
- To improve the quantity, quality and availability of parks and open space, including active and passive recreational facilities, parks and environmentally sensitive areas.
- To preserve the environment, including wetland areas, streams and wetland corridors.
- To promote the establishment of a linear greenway park system along the Hackensack, Passaic, and Ramapo Rivers.
- To protect the quality and purity of rivers and streams.

Bergen County Environmental Council

The Council is composed of volunteers, appointed by the Bergen County Board of Chosen Freeholders for a two-year term. The Council reports to the Bergen County Executive. John DeRienzo, Mayor of Haworth, serves as chairman.

The Council's mission is to develop a water management strategy on a watershed basis for Bergen County that will:

- Identify water quality problems,
- Prioritize those problems,
- Research and recommend solutions, and
- Communicate those findings to the public and appropriate agencies.

The Council's functions are:

- To promote and actively participate in educating the public on the impact and prevention of nonpoint source pollution.
- To coordinate the efforts of various environmental agencies and organizations to improve water quality and prevent nonpoint source pollution.
- To develop programs that promote best management practices that help prevent nonpoint source pollution.
- To research and utilize available funding sources and grants.

Bergen County Utilities Authority

The Bergen County Utilities Authority (BCUA) is a public utility providing sewage disposal for forty-seven (47) municipalities and solid waste services for seventy (70) municipalities in Bergen County. In 2009, the BCUA passed an Environmental Policy

Mission Statement Resolution restating its mission, as a requirement of participation in the NJDEP Environmental Stewardship Program:

> 1. The Authority hereby restates and incorporates as part of its Mission Statement the precepts that:
>
> > (a) The Authority is committed to conducting its business in an environmentally responsible manner by maintaining a value system, which strives for continual improvement in compliance programs, prevention of pollution, and resource conservation;
> >
> > (b) The Authority continues to fulfill its dual mission of providing excellent wastewater treatment and solid waste management services, while being ever being mindful of the important role we play in protecting the environment; and
> >
> > (c) In furtherance of this mission the Authority is of the opinion that it is in the best interests of the community to:
> >
> > > i. Ensure compliance with all applicable environmental regulations, standards and permits;
> > >
> > > ii. Proactively promote pollution prevention, waste minimization, and resource conservation activities;
> > >
> > > iii. Ensure effective use of natural resources, including energy;
> > >
> > > iv. Continue to optimize our wastewater treatment operation; and
> > >
> > > v. Communicate this policy to our employees, the public and interested parties.
>
> 2. The formal action(s) of the Commissioners of the Bergen County Utilities Authority embodied herein are expressly contingent upon and subject to the provisions of N.J.S.A. 40:14B-14b

Bergen County Department of Public Works

The Department of Public Works is responsible for the design, construction and maintenance of the county roads, bridges and drainage systems. County roads in Teaneck include C.R. 39 (Teaneck Road), C.R. 41 (River Road), C.R. 49 (New Bridge Road / Liberty Road), C.R. 49S (Rosmer Avenue) and C.R. 60 (Cedar Lane).

The Department of Public Works sponsors a tree replacement program each year open to all municipal government agencies.

Stormwater Management

Based upon NJDEP's Stormwater Regulations, the County has been designated as the "Review Agency" to formally review Municipal Stormwater Plans and Ordinances. Section 38 of the township code addresses Stormwater Control.

PUBLIC & PRESERVED LANDS INVENTORY

This section of the *Environmental Resource Inventory Update* inventories the public lands in Teaneck Township as depicted on the *Public, Houses of Worship, Charitable, and Education Lands* map and the *Preserved Land* map (*Maps 15 and 16* in the *Maps* section). These maps were produced using ESRI's ArcGIS 10.1 software. **Acreages may vary slightly from the Township's tax records, as they were calculated using the ArcGIS software**. This information is included within the *Parcel Data Tables* in *Appendix C*. Property information was gathered through the New Jersey County Tax Board's database (2013) and confirmed by the Township Tax Assessor when necessary. All acreages below are rounded to the nearest acre unless otherwise stated, see *Appendix C* for greater detail.

Preserved Land

Municipal Parks (ROSI) (15C)

Teaneck Township has listed 274 on its Recreation and Open Space Inventory (ROSI) filed with NJDEP Green Acres (see *ROSI, Appendix D* in the *Appendices*). Teaneck is home to a multitude of municipally owned parks, which, due to the easy walk-ability of the Township, are accessible to most residents with a short walk or bicycle ride. The largest of these parks is Argonne Park, which covers 54 acres. Argonne Park features a large section of undeveloped and wooded land, while also hosting picnic areas, tennis courts, a baseball field, and basketball courts.

Bergen County Parks (15C)

Bergen County owns 382 acres in Teaneck, consisting of Overpeck County Park and Overpeck County Golf Course. The County Park is located in five municipalities and covers over 805 acres. It is the result of a massive reclamation project, where a landfill had been capped and redeveloped into a multi-use recreational facility. The sections of the park located in Teaneck include baseball fields in the southern section on the eastern side of the New Jersey Turnpike. The other sections consist of natural areas featuring trails and picnic areas. The Overpeck County Golf Course occupies 133 acres in Teaneck and is one of five Bergen County run golf courses. Overpeck offers 18 holes as a par 72 course featuring multiple water challenges, which offer difficulty as well as scenic views.

The Township of Teaneck is home to 653 acres of preserved open space, making up approximately 16% of the Township's 3,993 acres.

Public Land

Municipal Land (Non-ROSI) (15C)

The Township of Teaneck owns 84 acres of land that is used for general municipal purposes, including the municipal building, public works, and senior housing.

State Owned Properties (15C)

The State of New Jersey Department of Military and Veterans Affairs owns and manages the Armory in Teaneck, which totals 13 acres. The Teaneck Armory is home to the 250th Brigade Support Battalion and is located at the corner of Teaneck and Liberty Roads. In addition to military activities (including hosting the National Guard), the Armory includes a large soccer field and is often used as a venue for large public events.

Educational Land

Education Properties – Public (15A)

There are 61 acres of public education properties located in Teaneck Township. All but one of these properties is owned by the Friends of Teaneck Community School, a charter school; the rest are owned by the Board of Education. The school system in Teaneck includes four elementary schools, two middle schools, and one high school.

Education- Private (15B)

There are 75 acres of private education property located in Teaneck Township, with the majority of these lands owned by Fairleigh Dickinson University. The University owns 69 acres of property on what it calls its Metropolitan Campus. The University hosts parts of its business, healthcare, science, and professional programs for both graduate and undergraduate students, which include both commuters and on-campus residents. The remaining private schools are all of religious affiliation, including the North American Islamic Trust, Sinai Special Needs Institute, St. Anastasia's Church, and the Yeshiva High School for Girls.

Houses of Worship & Charitable Land

Houses of Worship and Charitable (15D)

Teaneck Township is home to a wide array of religious organizations and establishments, including churches, synagogues, temples, and mosques. These organizations occupy 43 acres of Teaneck, spread throughout the community. These organizations have helped form the culture of Teaneck Township. Teaneck has maintained a pedestrian friendly atmosphere. Lastly there is a single cemetery located in Teaneck Township, known as the Lutheran (Van Buskirk) Church Cemetery, located at 1526 River Road.

Other Exempt Properties (15F)

In addition to standard religious establishments, there are other exempt properties in Teaneck, some religious and others secular. These properties total 26 acres and are located throughout the community. These establishments include the Holy Name Hospital, an American Legion, the National Institute for People with Disabilities, and the Devereux Foundation. Holy Name Hospital, which occupies 20 acres, has served northern New Jersey for 85 years.

REFERENCES

Aero News Network. FAA Reauthorization Requires Phase-out of Stage 2 Jets. February 22, 2012. http://aero-news.net/index.cfm?do=main.textpost&id=4c5f11d2-3cf2-477f-b572-d79c3d8da728 Accessed April 2013.

Amendments to the Northeast Water Quality Management Plan. http://www.nj.gov/dep/wms/bear/Northeast%20Lakes.pdf

Anderson, Craig B. Assessment of railway activity and train noise exposure: a Teaneck, New Jersey, case study. Theses. Rutgers University. Graduate School - New Brunswick. 2009. http://rucore.libraries.rutgers.edu/dlr/output.php?ds=Full&type=FULL&demono=rutgers-lib:26177 Accessed April 2013.

Bergen County Department of Health Services. Environmental Protection Programs. http://www.bergenhealth.org/environmental/EnvironIndex.html. Accessed March 2013.

Bergen County Environmental Council. http://www.co.bergen.nj.us/environmental/ Accessed April 2013.

Bergen County Geographic Information System. http://gis.co.bergen.nj.us/ Accessed February–April 2013.

Bergen County Historical Society. Historic New Bridge Landing. http://www.bergencountyhistory.org/Pages/steubenhsehistory.html. Accessed April 2013.

Bergen County Parks. http://www.co.bergen.nj.us/bcParks/index.aspx. Accessed April 2013.

Bergen County Planning Department. http://www.co.bergen.nj.us/planning/os/2012NJRegisterList.pdf Accessed February 2013.

Bergen County Radon Information. http://county-radon.info/NJ/Bergen.html. Accessed March 2013.

Bergen County Utilities Authority. http://www.bcua.org/. Accessed April 2013.

Bergen County Utilities Authority. Water Pollution Control. http://www.bcua.org/WPC_IPP_copy(1).htm Accessed April 2013.

Bergen County. http://www.co.bergen.nj.us/ Accessed April 2013.

Center for Hearing and Communication. Noise Center. http://www.chchearing.org/noise-center Accessed April 2013.

Common Outdoor and Indoor Noise Levels. http://www.us202-700.com/pdf/noise_figure1.pdf Accessed April 2013.

Federal Aviation Administration (FAA). Airport/Aircraft Noise Issues. http://www.faa.gov/about/office_org/headquarters_offices/apl/noise_emissions/airport_aircraft_noise_issues/ Accessed April 2013.

FAA. Compliance. Chapter 13. http://www.faa.gov/airports/resources/publications/orders/compliance_5190_6/media/5190_6b_chap13.pdf Accessed April 2013.

FAA. Southern Region Task Force. Land Use Compatibility and Airports. http://www.fican.org/pdf/Land_Use_Planning_and_Airports.pdf. Accessed April 2013.

Federal Emergency Management Agency. (FEMA) www.fema.gov Accessed November 2012.

FEMA. Community Status Book Report. New Jersey. http://www.fema.gov/cis/NJ.html Accessed February 2013.

FEMA. Flood Insurance Study. Bergen County, New Jersey. September 30, 2005.

Federal Interagency Commission on Aviation Noise. http://www.fican.org Accessed April 2013.

Federal Railroad Administration (FRA). www.fra.dot.gov Accessed April 2013.

Guidelines for Sound Installations for Residences Exposed to Aircraft Operations. Prepared for Department of the Navy. April 2005. Wyle Research & Consulting. http://www.fican.org/pdf/Wyle_Sound_Insulation.pdf Accessed April 2013.

New Jersey's Clean Energy Program. http://www.njcleanenergy.com/ Accessed March 2013.

NorthJersey.com. Oradell Dam's Water Levels Remain High. Scott Fallon, Denisa R. Superville. August 29, 2011. http://www.northjersey.com/news/Oradell_Dam_water_levels_remain_high.html Accessed April 2013.

Hydrogeological Framework of Bedrock Aquifers in the Newark Basin, New Jersey. http://www.impacttectonics.org/gcherman/downloads/GCHganj01rev0806.pdf Accessed February 2013.

Lamont-Doherty Cooperative Seismographic Network. http://www.ldeo.columbia.edu/LCSN Accessed November 2012

League of Women Voters of New Jersey Education Fund. Biomass: Sewage Sludge to Energy. http://bio-organic.com/pdffiles/Ridgewood,%20NJ%20Renewable%20Energy.pdf. Accessed March 2013.

Little Ferry. Water Elevations. http://www.littleferrynj.org/filestorage/159/1302/sandywaterelevations.pdf Accessed March 2013.

N.J.A.C. 7:13. Flood Hazard Area Control Act Rules. 2010. http://www.state.nj.us/dep/landuse/7-13.pdf. Accessed January 2, 2012

N.J.S.A. 46:3C1. New Residential Construction Off-Site Conditions Disclosure Act. 1995.

National Academy of Sciences, Biological Effects of Ionizing Radiation, Sixth Report, 1998

National Oceanic and Atmosphere Administration (NOAA). FAQ / New NOAA Climate "Normals" (1981–2010) for the United States. http://www.crh.noaa.gov/images/fgf/climate/NCDCNormalsFAQs.pdf Accessed November 2012.

National Register of Historic Places. New Jersey – Bergen County. http://www.nationalregisterofhistoricplaces.com/NJ/Bergen/state.html Accessed March 2013.

National Renewable Energy Laboratory. 2011 Renewable Energy Data Book. http://www.nrel.gov/docs/fy13osti/54909.pdf Accessed March 2013.

National Renewable Energy Laboratory. Wind Data. http://www.nrel.gov/gis/data_wind.html Accessed March 2013.

Natural Systems Utilities. Village of Ridgewood, NJ – Biogas Recovery & Renewable Energy. http://www.naturalsystemsutilities.com/village-of-ridgewood-nj-biogas-recovery-renewable-energy/ Accessed March 2013.

New Jersey's Clean Energy Program. 2012 Renewable Energy Incentive Program (REIP) Wind and Biopower Feasibility Study Application Checklist http://www.njcleanenergy.com/files/file/Emily%20Woods/2012_REIP_Wind%20%20Biopower_Feasibility_Study_Application_Checklist_Jan_2012UPDATED.pdf. Accessed January 2013.

New Jersey Department of Environmental Protection (NJDEP). 2011 Carbon Monoxide Summary.

NJDEP. 2009-2010 Nonpoint Source Report. http://www.nj.gov/dep/watershedrestoration/docs/nps_report2009-10.pdf Accessed April 2013.

NJDEP. 2011 Nitrogen Dioxide Summary.

NJDEP. 2011 Ozone Summary.

NJDEP. 2011 Particulate Summary.

NJDEP. 2011 Sulfur Dioxide Summary.

NJDEP. 2011 Acid Deposition Summary.

NJDEP. 2011 Air Quality Index Summary.

NJDEP. Air Toxics in New Jersey. 2005 Risk Results for New Jersey. County Risk Ratio Tables. Bergen County. http://www.state.nj.us/dep/airmon/airtoxics/bergenavg05.htm Accessed October 2012.

NJDEP. Air Toxics in New Jersey. http://www.state.nj.us/dep/airtoxics/index.html Accessed November 2012.

NJDEP. Air Toxics. Environmental Trends report. Updated 1/2012. http://www.nj.gov/dep/dsr/trends/pdfs/air-toxics.pdf Accessed April 2013.

NJDEP. Atmospheric Deposition: Acidity and Nutrients. http://www.nj.gov/dep/dsr/trends2005/pdfs/atmospheric-dep-acid.pdf. Accessed April 2013.

NJDEP. Bureau of Mobile Sources. http://www.state.nj.us/dep/stopthesoot/sts-facts.htm. Accessed March 2013.

NJDEP. Compliance and Enforcement. Noise Information and Complaints. *http://www.state.nj.us/dep/enforcement/contact-noise.html* Accessed April 2013.

NJDEP. Compliance and Enforcement. What's All the Noise About? http://www.state.nj.us/dep/enforcement/noise-intro.html. Accessed November 2012.

NJDEP. Compliance and Enforcement. Fiscal Year 2010 Highlights. http://www.nj.gov/dep/enforcement/cehighlightsfy2010.pdf Accessed April 2010.

NJDEP. Division of Fish and Wildlife. Frequently Asked Questions About the Landscape Project. http://www.state.nj.us/dep/fgw/ensp/landscape/landscape_faqs.pdf Accessed February 2013.

NJDEP. Division of Land Use Regulation. Streams and Rivers. http://www.nj.gov/dep/landuse/fha_main.html Accessed November 2012.

NJDEP. Division of Land Use Regulation. List of Threatened And Endangered Species That Are Critically Dependent on Regulated Waters for Survival. Revised May 15, 2008. http://www.nj.gov/dep/landuse/download/fh_009.pdf

NJDEP. Division of Water Supply and Geoscience. New Jersey Geological and Water Survey. Digital Geodata Series. http://www.state.nj.us/dep/njgs/geodata/index.htm#list Accessed March 2013.

NJDEP. Division of Water Supply and Geoscience. New Jersey Geological and Water Survey. Earthquake Risk in New Jersey. 1998/2005. http://www.state.nj.us/dep/njgs/enviroed/freedwn/e-quake.pdf Accessed November 2012.

NJDEP. Division of Water Supply and GeoScience. Public Water System Deficit/Surplus. United Water New Jersey. http://www.state.nj.us/cgi-bin/dep/watersupply/pwsdetail.pl?id=2004002. Accessed January 2013.

NJDEP. Division of Water Supply and Geoscience. Reservoir Storage and Related Diversions in the Passaic and Hackensack River Basins, 1898-2011. http://www.state.nj.us/dep/njgs/geodata/dgs09-1.htm#image Accessed March 2013.

NJ DEP. Historic Preservation Office. New Jersey and National Registers of Historic Places. Bergen County. Last Update: 1/18/2013. http://www.state.nj.us/dep/hpo/1identify/nrsr_lists/bergen.pdf Accessed March 2013.

NJDEP. Land Use Land Cover Classification System (2007). http://www.state.nj.us/dep/gis/digidownload/metadata/lulc07/anderson2007.html Accessed February 2013.

NJDEP. Office of Climate and Energy. Statewide Greenhouse Gas Emission Inventory for 2008. May 2011.

NJDEP. Office of Pollution Prevention and Right to Know. http://www.state.nj.us/dep/opppc/rpprindex.html. Accessed January 2013.

NJDEP. Office of Science. Air Quality Evaluation of Teterboro Airport Teterboro, New Jersey. http://www.nj.gov/dep/dsr/teterboro/ Accessed April 2013.

NJDEP. Office of Science. http://www.nj.gov/dep/dsr/trends/index.htm. Accessed April 2013.

NJDEP. Radiation Protection and Release Prevention. http://www.state.nj.us/dep/rpp/radon/index.htm. Accessed March 2013.

NJDEP. RPRP. New Jersey Radon Potential. http://www.nj.gov/dep/rpp/radon/radonin.htm. Accessed March 2013.

NJDEP. Site Remediation Program http://www.state.nj.us/dep/srp/: Accessed January 2013.

NJDEP. Site Remediation Program Remedial Priority Scoring System. http://www.nj.gov/dep/srp/srra/rps/. Accessed January 2013

NJDEP. Surface Water Quality Standards. http://www.nj.gov/dep/wms/bwqsa/swqs.htm#1 Accessed March 2013.

NJDEP. Sustainability and Green Energy (SAGE). http://www.nj.gov/dep/sage/index.html Accessed November 2012.

NJDEP. Water Monitoring and Standards.. New Jersey 2010 Integrated Water Quality Monitoring and Assessment Report. http://www.state.nj.us/dep/wms/bwqsa/2010_revised_final_integrated_report_complete.pdf Accessed April 2013.

NJDEP. Water Monitoring and Standards. New Jersey 2010 Integrated Water Quality Monitoring and Assessment Report. Appendix A. http://www.state.nj.us/dep/wms/bwqsa/2010_revised_final_appx_a_integrated_list.pdf Accessed March 2013.

NJDEP. Water Monitoring & Standards. New Jersey 2010 Integrated Water Quality Monitoring and Assessment Report. Appendix B. New Jersey Revised Final 2010 303(d) List of Water Quality Limited Waters. January 2012. http://www.state.nj.us/dep/wms/bwqsa/2010_revised_final_appx_b_303d_list_complete.pdf Accessed April 2013.

New Jersey Department of Transportation (NJDOT). http://www.state.nj.us/transportation/ Accessed November 2012.

NJDOT. Noise Study Process. http://www.state.nj.us/transportation/eng/documents/miscref/noisestudy.shtm. Accessed April 2013.

New Jersey Geologic Survey (NJGS). Aquifer Recharge Potential of New Jersey Overview. http://www.nj.gov/dep/njgs/geodata/dgs07-1/readme.htm#composite_aqrp_ranks Accessed February 2013.

NJGS. Bulletin 14. The Geology of New Jersey. 1915. http://www.nj.gov/dep/njgs/enviroed/oldpubs/bulletin14.pdf Accessed March 2013.

NJGS. Guidelines for Delineation of Wellhead Protection Areas in New Jersey. 2003. http://www.state.nj.us/dep/njgs/whpaguide.pdf Accessed April 2013.

New York-New Jersey Harbor & Estuary Program. http://www.harborestuary.org/ Accessed March 2013.

NJ.com. Earthquake Rattles New York and New Jersey. August 24, 2011. http://www.nj.com/news/index.ssf/2011/08/earthquake_rocks_new_jersey_an.html

New Jersey Department of Transportation (NJDOT). http://www.state.nj.us/transportation/

NJDOT. Straight Line Diagrams. http://www.state.nj.us/transportation/refdata/sldiag/_Booklet.pdf Accessed April 2013.

National Oceanic and Atmospheric Administration (NOAA). The Deadliest, Costliest and Most Intense United States Tropical Cyclones from 1950 to 2010. http://www.nhc.noaa.gov/pdf/nws-nhc-6.pdf Accessed April 2013.

NOAA. Global Climate Change Impacts on the US. 2009.

NOAA. National Climatic Data Center. http://www.ncdc.noaa.gov Accessed November 2012.

NOAA. National Weather Service Forecast Office. New York, NY. Significant Weather Events. Archive. http://www.erh.noaa.gov/er/okx/stormtotals.html Accessed April 2013.

NOAA. National Weather Service. National Hurricane Center. http://www.nhc.noaa.gov/ Accessed April 2013.

NOAA. Water Level and Meteorological Data Report. Hurricane Sandy. January 24, 2013. http://tidesandcurrents.noaa.gov/publications/Hurricane_Sandy_2012_Water_Level_and_Meteorological_Data_Report.pdf Accessed April 2013.

NOAA. Winter Storm Summaries. http://www.hpc.ncep.noaa.gov/winter_storm_summaries/event_reviews/2012/Early_Season_NorEaster_Nov2012.pdf) Accessed April 2013.

Noise Pollution Clearing House. www.nonoise.org Accessed April 2013.

Noise Pollution Clearing House. Noise Effects on Wildlife.. http://www.nonoise.org/library/fctsheet/wildlife.htm Accessed April 2013.

NorthJersey.com. NJ inspectors determine cause of Meadowlands flooding. Scott Fallon, Staff Writer. http://www.northjersey.com/news/Officials_Surge_of_water_from_Hurricane_Sandy_record-breaking_at_Meadowlands.html?page=all Accessed April 2013.

Port Authority of New York & New Jersey. Teterboro Airport. Projects. http://www.panynj.gov/airports/teb-projects.html. Accessed April 2013.

Port Authority of NY and NJ. Teterboro Airport. Noise. http://www.panynj.gov/airports/teb-noise.html Accessed April 2013.

Port of New York and New Jersey. Teterboro Airport Sustainable Management Plan. October 2012. http://www.panynj.gov/about/pdf/teterboro-sustainable-management-plan-a.pdf Accessed April 2013.

PSE&G. http://www.pseg.com/family/pseandg/solar4all/index.jsp Accessed March 2013.

Rutgers University. Noise Technical Assistance Center. http://www.envsci.rutgers.edu/org/rntac/FAA Accessed April 2013

Rutgers University. Office of New Jersey State Climatologist (ONJSC). http://climate.rutgers.edu/stateclim/ Accessed March 2013.

Rutgers University. Office of New Jersey State Climatologist. The Climate of New Jersey. http://climate.rutgers.edu/stateclim_v1/njclimoverview.html. Accessed January 2, 2012

Soil Science Society of America. https://www.soils.org/publications/soils-glossary/# Accessed January 2013.

Sound Initiative. A Coalition for Quieter Skies. http://www.soundinitiative.org/support.htm Accessed April 2013.

Teaneck Creek Conservancy. http://teaneckcreek.org. Accessed April 2013.

Teaneck Historic Preservation Commission, with assistance from the New Jersey Historical Commission. *A Guide to the Historic Landmarks of Teaneck, New Jersey*. 1996.

Teaneck Patch. Utility to Install Solar Panels in Teaneck. Noah Cohen. April 13, 2011. http://teaneck.patch.com/articles/utility-to-install-solar-panels-in-teaneck. Accessed March 2013.

Teaneck Suburbanite newspaper. *Farming Community Grows into Suburb.* News article, July, 2006.

Teaneck Suburbanite newspaper. *GW bridge Spurred Township's Growth.* News article, July 19, 2006.

Teaneck Suburbanite newspaper. *When Teaneck was a Field of Blood.* News article, July 5, 2006.

Teterboro Noise Abatement Advisory Committee. 2011 Full Year Report. http://www.moonachie.us/images/TANAAC_JAN2012.pdf Accessed April 2013.

Township of Teaneck, NJ Code. http://www.ecode360.com/TE0774 Accessed April 2013.

Township of Teaneck. Health Department. The State of Health in Teaneck – 2012 Report

Township of Teaneck. Open Space and Recreation Plan. Compiled by Morris Land Conservancy (now The Land Conservancy of New Jersey) with the Township of Teaneck Project Team and Environmental Commission. October 2007.

U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). Official Soil Series Descriptions. http://soils.usda.gov/technical/classification/osd/index.html Accessed March 2013.

USDA NRCS. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm Accessed April 2013.

U.S. Department of Transportation (USDOT). Federal Highway Administration. Highway Traffic Noise. http://www.fhwa.dot.gov/environment/noise/index.cfm Accessed April 2013.

USDOT. Federal Railroad Administration. General Health Effects of Transportation Noise. Cynthia S.Y. Lee, Gregg G. Fleming. June 2002.

USDOT. FRA. Guidelines on Assessing Noise and Vibration Impacts. http://www.fra.dot.gov/Page/P0216 Accessed April 2013.

U.S. Environmental Protection Agency (USEPA). 40th Anniversary of the Clean Air Act. http://www.epa.gov/air/caa/40th.html Accessed October 2012.

USEPA. Air and Radiation. National Ambient Air Quality Standards (NAAQS). http://www.epa.gov/air/criteria.html

USEPA. Air Trends. Lead. http://www.epa.gov/airtrends/lead.html Accessed October 10, 2012.

USEPA. How to Manual: Update and Enhance Your Local Source Water Protection Assessments. http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/upload/2006_09_27_update_assessments_updated.pdf. Accessed April 2013.

USEPA. Lead in Air. http://www.epa.gov/airquality/lead/ Accessed October 10, 2012.

USEPA. Noise Pollution. www.epa.gov/air/noise.html. Accessed April 2013.

USEPA. The Clean Air Act - Highlights of the 1990 Amendments. http://www.epa.gov/air/caa/CAA_1990_amendments.pdf. Accessed October 2012.

USEPA. Summaries of Water Pollution Reporting Categories. October 2012. (http://www.epa.gov/waters/ir/34PARENTATTAINSDESCRIPTIONS.pdf_ Accessed April 2013.

USEPA. Toxics Release Inventory. http://www.epa.gov/tri/. Accessed January 2013.

USEPA. Watershed Assessment, Tracking & Environmental Results. New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ#causes Accessed April 2013.

U.S. Geological Survey (USGS). Earthquake Hazards Program. http://earthquake.usgs.gov/hazards/. Accessed March 2013.

USGS. Ground Water Atlas of the United States. http://pubs.usgs.gov/ha/ha730/ch_l/L-text4.html. Accessed March 2013.

USGS. Ground Water Atlas of the United States. Surficial Aquifer System. http://pubs.usgs.gov/ha/ha730/ch_l/L-text2.html

USGS. New Jersey Water Science Center. Summary of Flooding in New Jersey Caused by Hurricane Irene, August 27–30, 2011. http://nj.usgs.gov/hazards/flood/flood1108/ Accessed April 2013.

USGS. Summary of April 15-18, 2007 Flooding in New Jersey. http://nj.usgs.gov/hazards/flood/flood0407/ Accessed April 2013.

U.S. Government Printing Office. Federal Code of Regulations. http://www.ecfr.gov/cgi-bin/ECFR?page=browse Accessed April 2013.

United Water New Jersey. Water Quality Information. Customer Confidence Report. June 2012.

Wind Powering America. http://www.windpoweringamerica.gov/wind_resource_maps.asp?stateab=nj Accessed January 2013.

Personal Communication

Anthony DeCandia, Environmental Program Coordinator, County of Bergen, Department of Health Services, Environmental Division

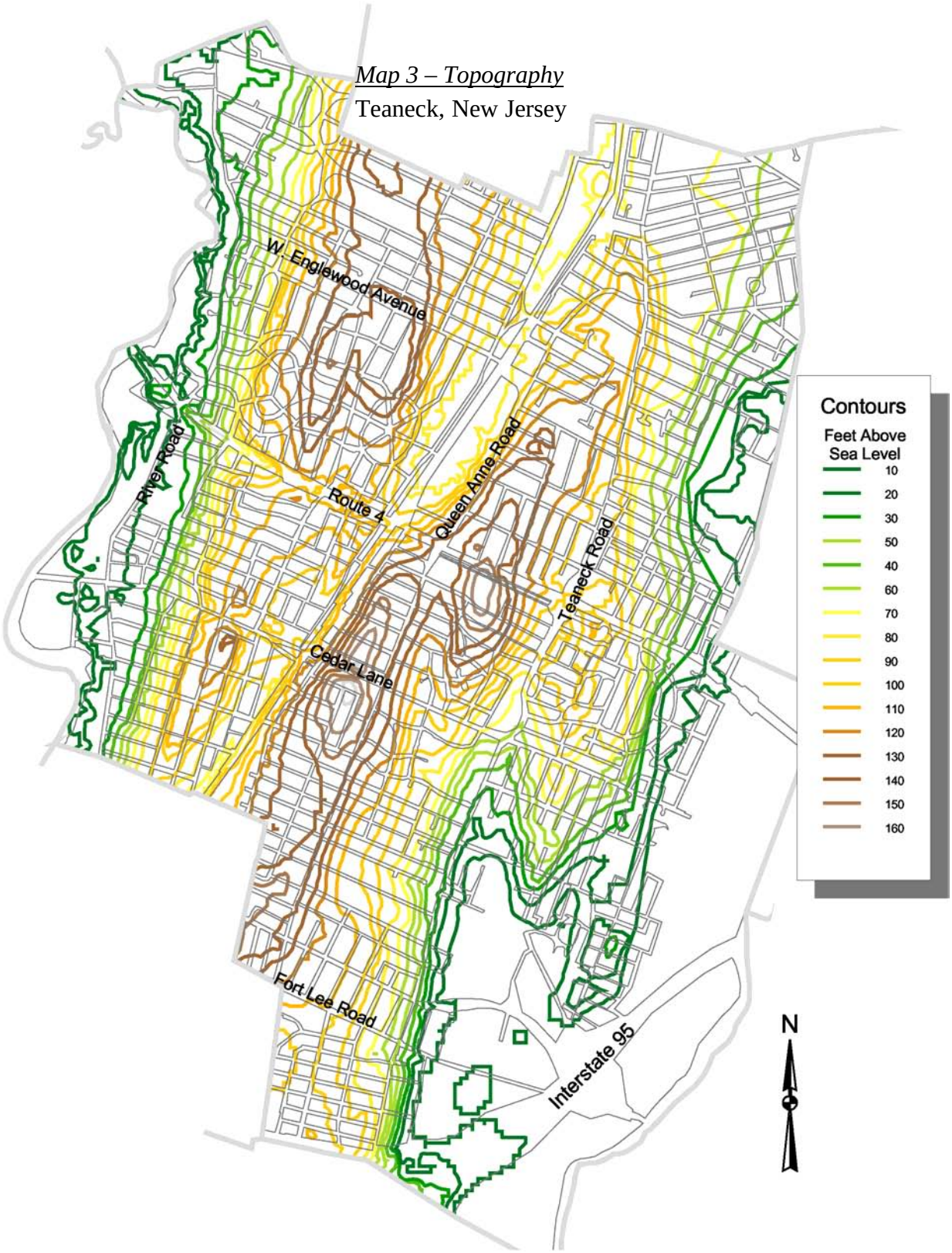
John H. Heilferty, Environmental Specialist 4, E&T Species/Vernal Habitat Unit, NJDEP Division of Land Use Regulation, Linda Morehouse and Winnifred Asa-Awuku, Bergen County Department of Health Services, Environmental Protection Program. April 2013.

Nelson Wong, Registered Environmental Health Specialist, Teaneck Health Department

MAPS

1. **Topography** ***(2002 Environmental Resource Inventory [ERI] Teaneck Township, Map 3*****)**
2. **Slope Analysis (*2002 ERI, Map 4*)**
3. **Geology (*2002 ERI, Map 1*)**
4. **Soil Series**
5. **Watershed**
6. **Wetlands and Surface Water Quality**
7. **Aquifer Recharge Potential**
8. **Vegetative Cover**
9. **Vegetative Cover (Route 4)**
10. **Patches with Endangered Species Habitats Identified by the Landscape Project**
11. **Riparian Buffers**
12. **FEMA Flood Zones (2005 DFIRM)**
13. **FEMA Advisory Base Flood Elevation (2012)**
14. **Historic Sites**
15. **Public, Houses of Worship, Charitable, Education Lands**
16. **Preserved Land**

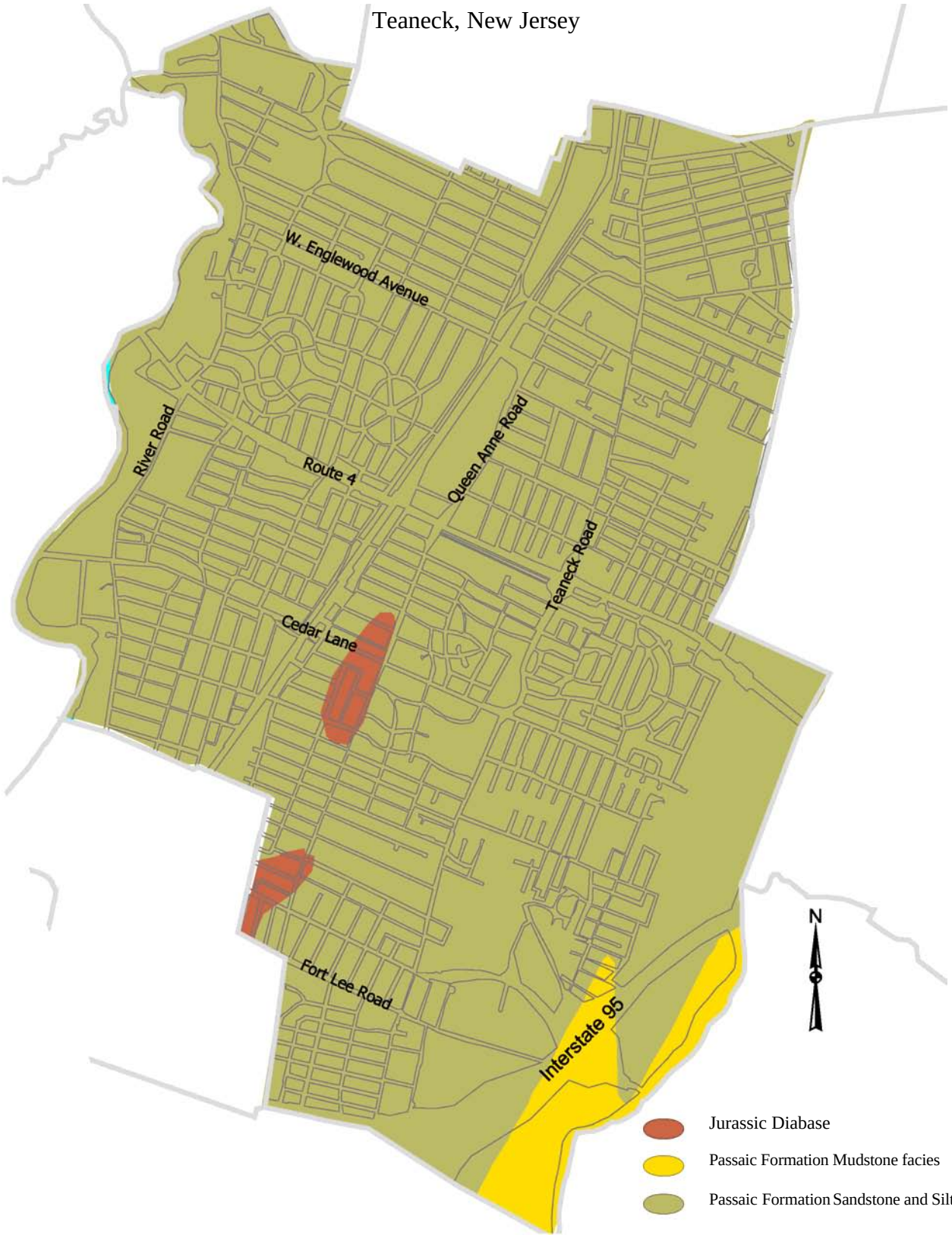
Map 3 – Topography
Teaneck, New Jersey

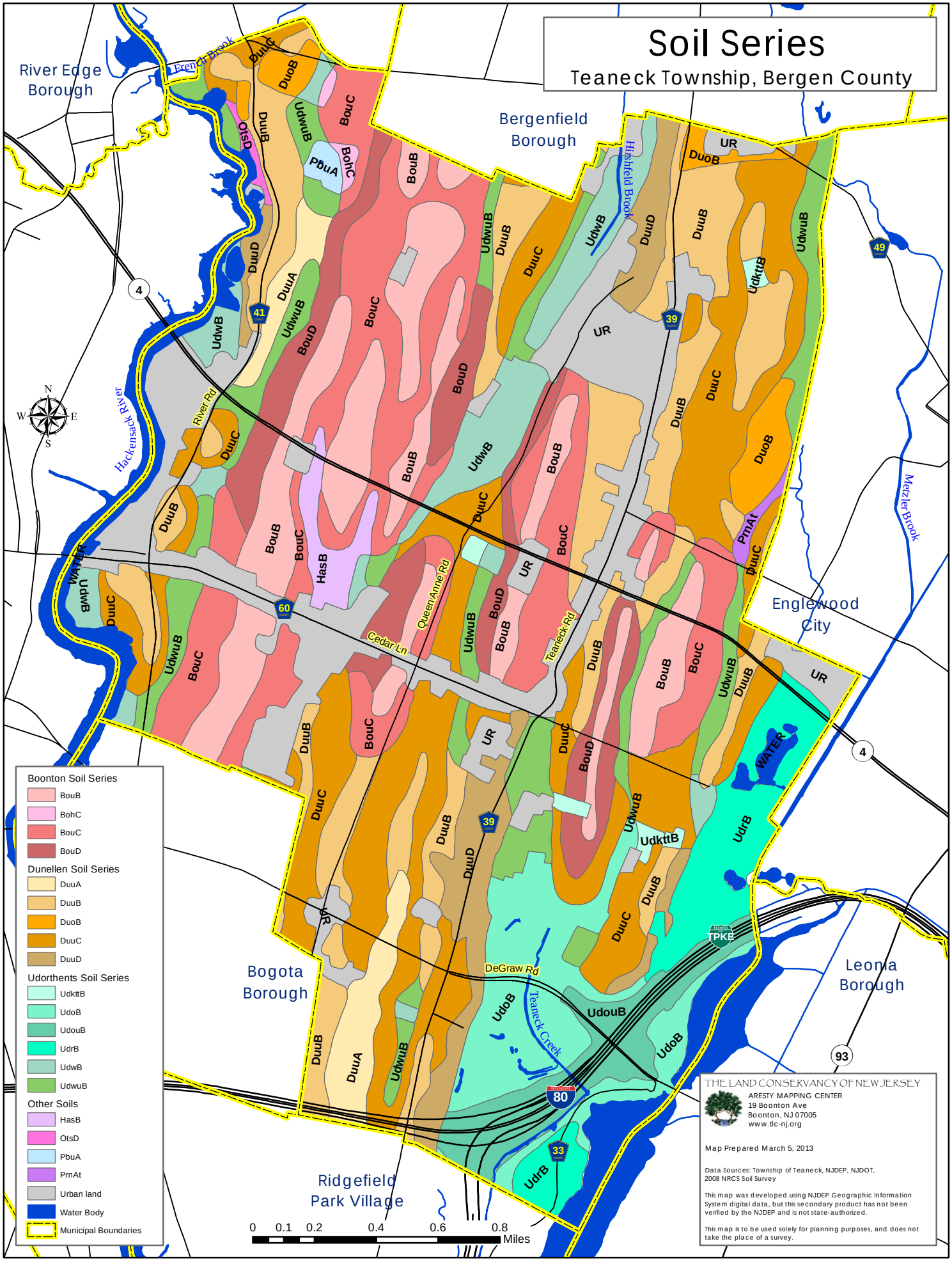


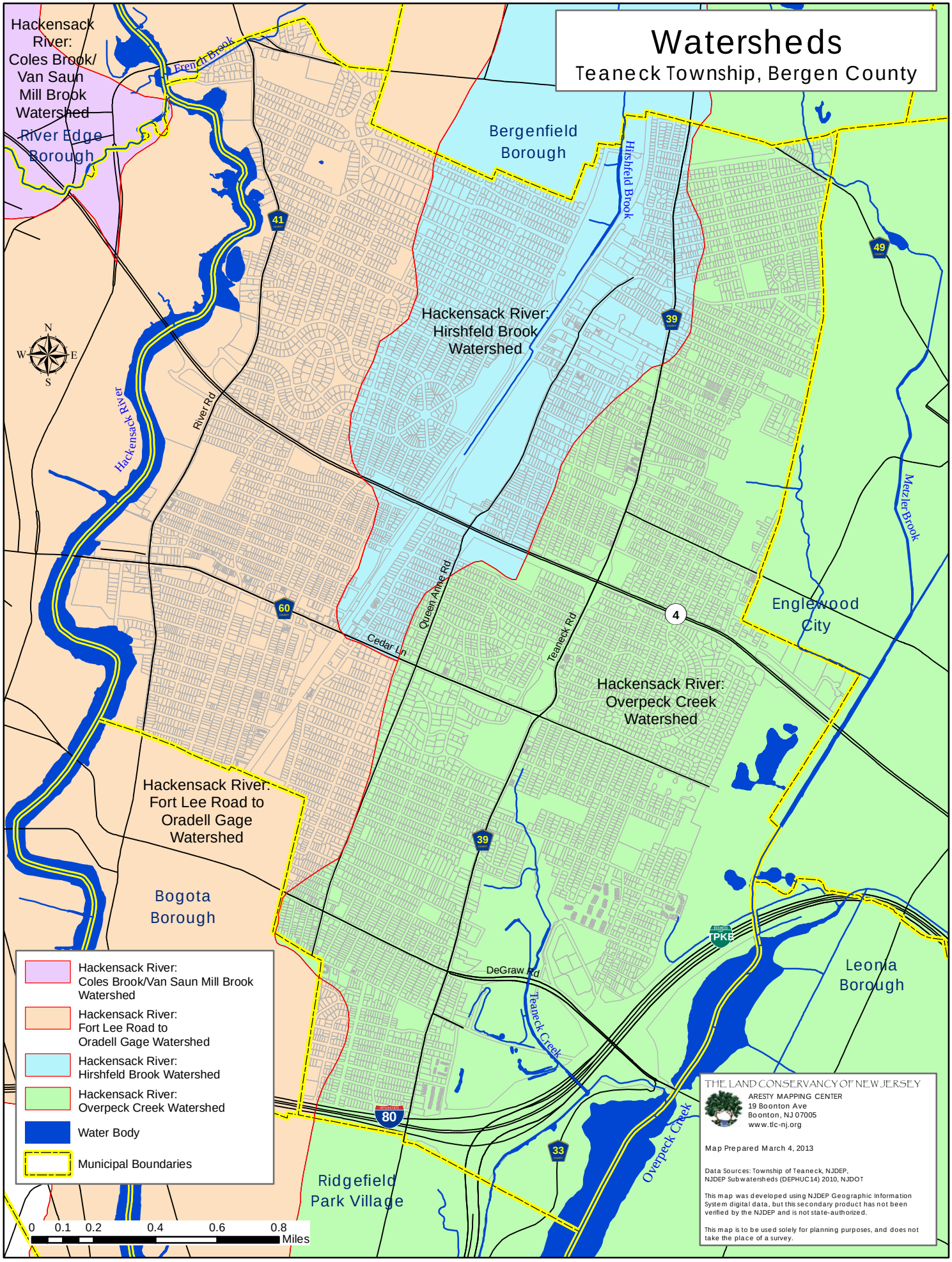
Map 4 - Slope Analysis Map
Teaneck, New Jersey

Map 1 - Geology Map

Teaneck, New Jersey




Soil Series
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
French Brook
Hirshfield Brook
Hackensack River
Metzler Brook
River Rd
Queen Anne Rd
Cedar Ln
Teaneck Rd
DeGraw Rd
Teaneck Creek
TPKE
80
Boonton Soil Series
BouB
BohC
BouC
BouD
Dunellen Soil Series
DuuA
DuuB
DuoB
DuuC
DuuD
Udorthents Soil Series
UdkttB
UdoB
UdouB
UdrB
UdwB
UdwuB
Other Soils
HasB
OtsD
PbuA
PrnAt
Urban land
Water Body
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 March 5, 2013
Data Sources: Township of Teaneck, NJDEP, NJDOT, 2008 NRCS Soil Survey
This map was developed using NJDEP 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.


Watersheds
Teaneck Township, Bergen County
Hackensack River: Coles Brook/ Van Saun Mill Brook Watershed
River Edge Borough
French Brook
Bergenfield Borough
Hirshfeld Brook
Hackensack River: Hirshfeld Brook Watershed
Hackensack River
River Rd
Queen Anne Rd
Cedar Ln
Teaneck Rd
Metzler Brook
Englewood City
Hackensack River: Overpeck Creek Watershed
Hackensack River: Fort Lee Road to Oradell Gage Watershed
Bogota Borough
DeGraw Rd
Teaneck Creek
Leonia Borough
Overpeck Creek
Ridgefield Park Village
Hackensack River: Coles Brook/Van Saun Mill Brook Watershed
Hackensack River: Fort Lee Road to Oradell Gage Watershed
Hackensack River: Hirshfeld Brook Watershed
Hackensack River: Overpeck Creek Watershed
Water Body
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 March 4, 2013
Data Sources: Township of Teaneck, NJDEP, NJDEP Subwatersheds (DEPHUC14) 2010, NJDOT
This map was developed using NJDEP 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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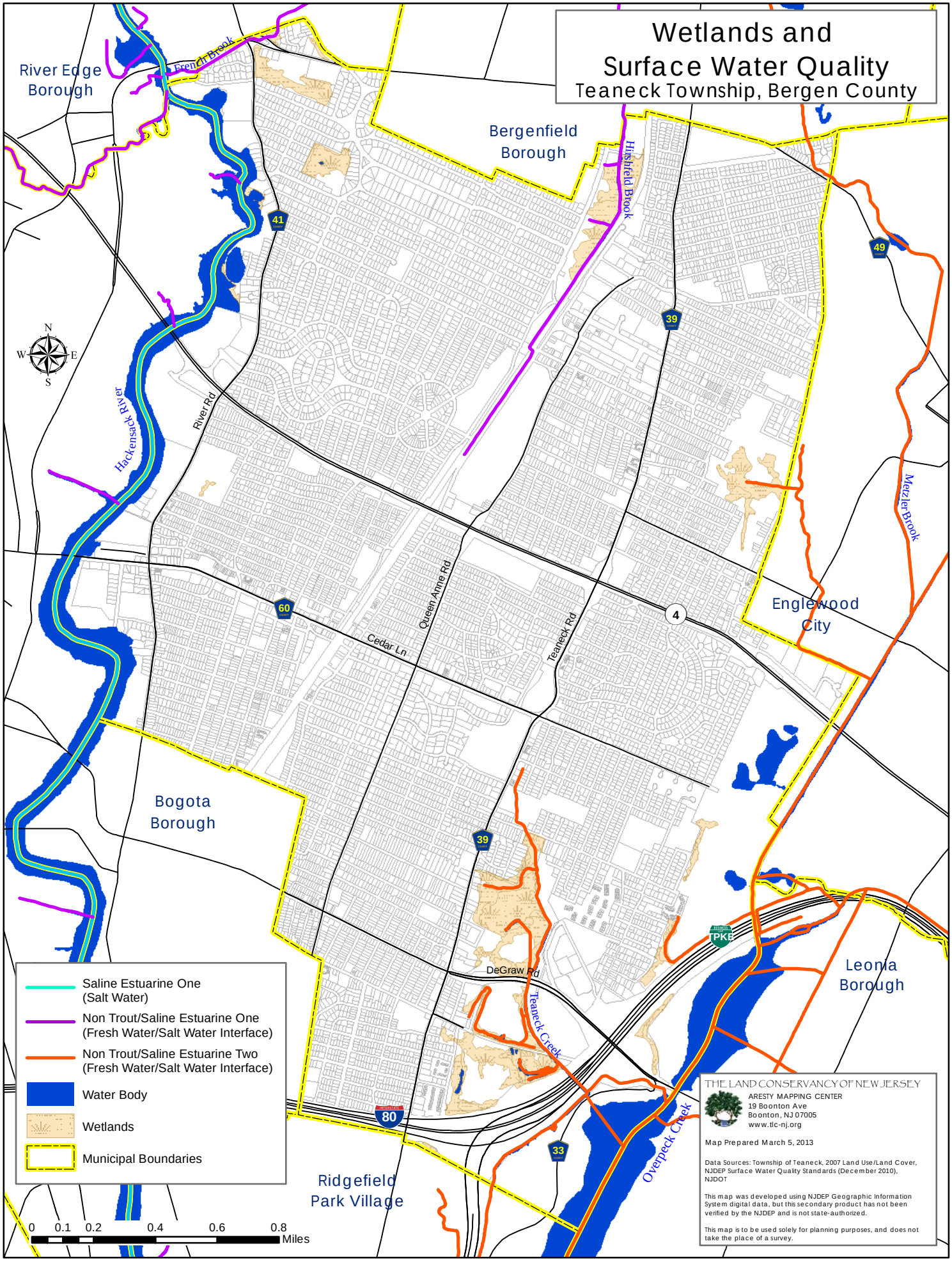
Wetlands and
Surface Water Quality
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
French Brook
Hirshfield Brook
Metzler Brook
Hackensack River
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
Teaneck Creek
Overpeck Creek
41
49
39
60
4
80
33
TPKE
N
W
E
S
Saline Estuarine One (Salt Water)
Non Trout/Saline Estuarine One (Fresh Water/Salt Water Interface)
Non Trout/Saline Estuarine Two (Fresh Water/Salt Water Interface)
Water Body
Wetlands
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 March 5, 2013
Data Sources: Township of Teaneck, 2007 Land Use/Land Cover, NJDEP Surface Water Quality Standards (December 2010), NJDOT
This map was developed using NJDEP 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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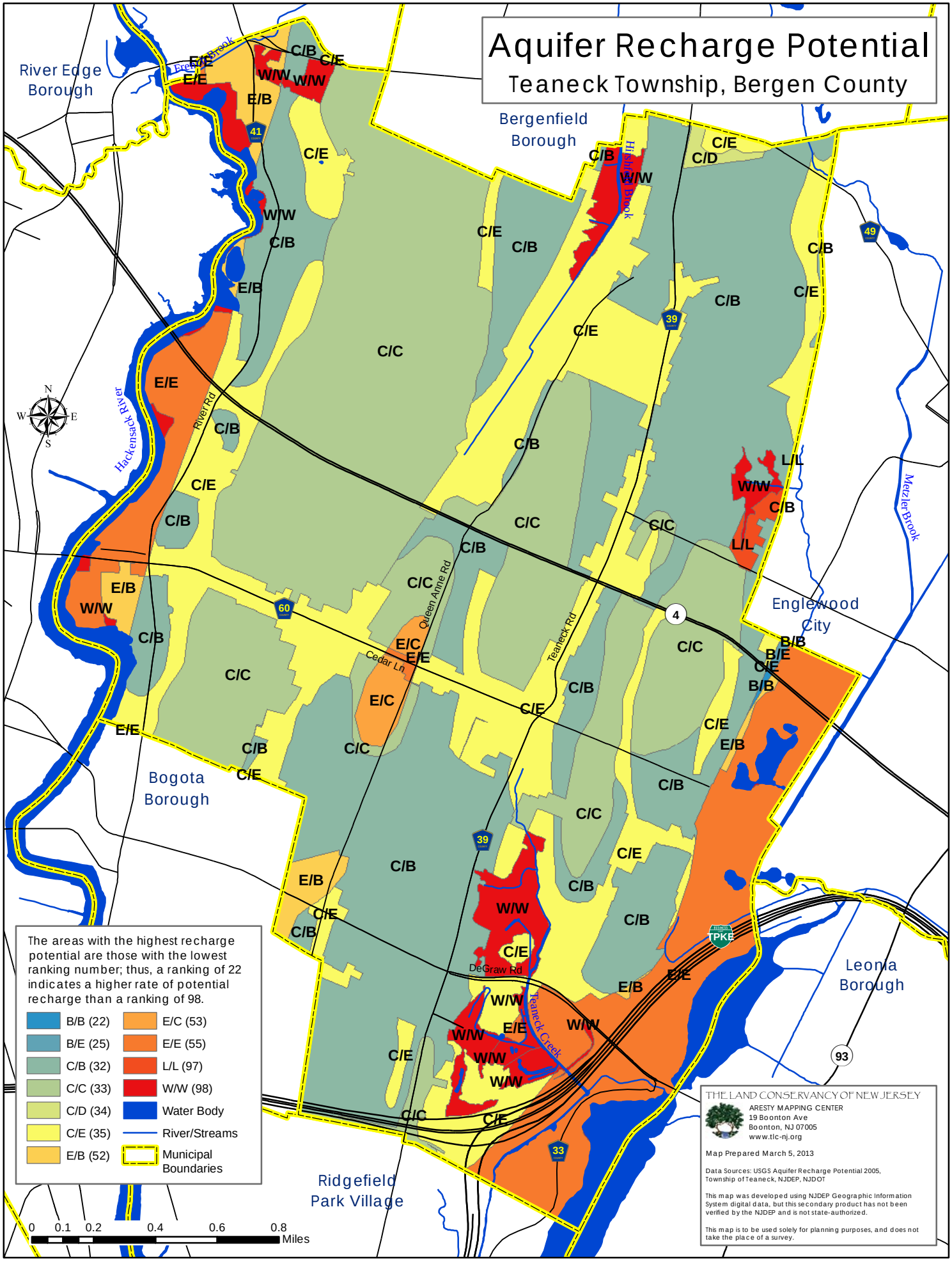
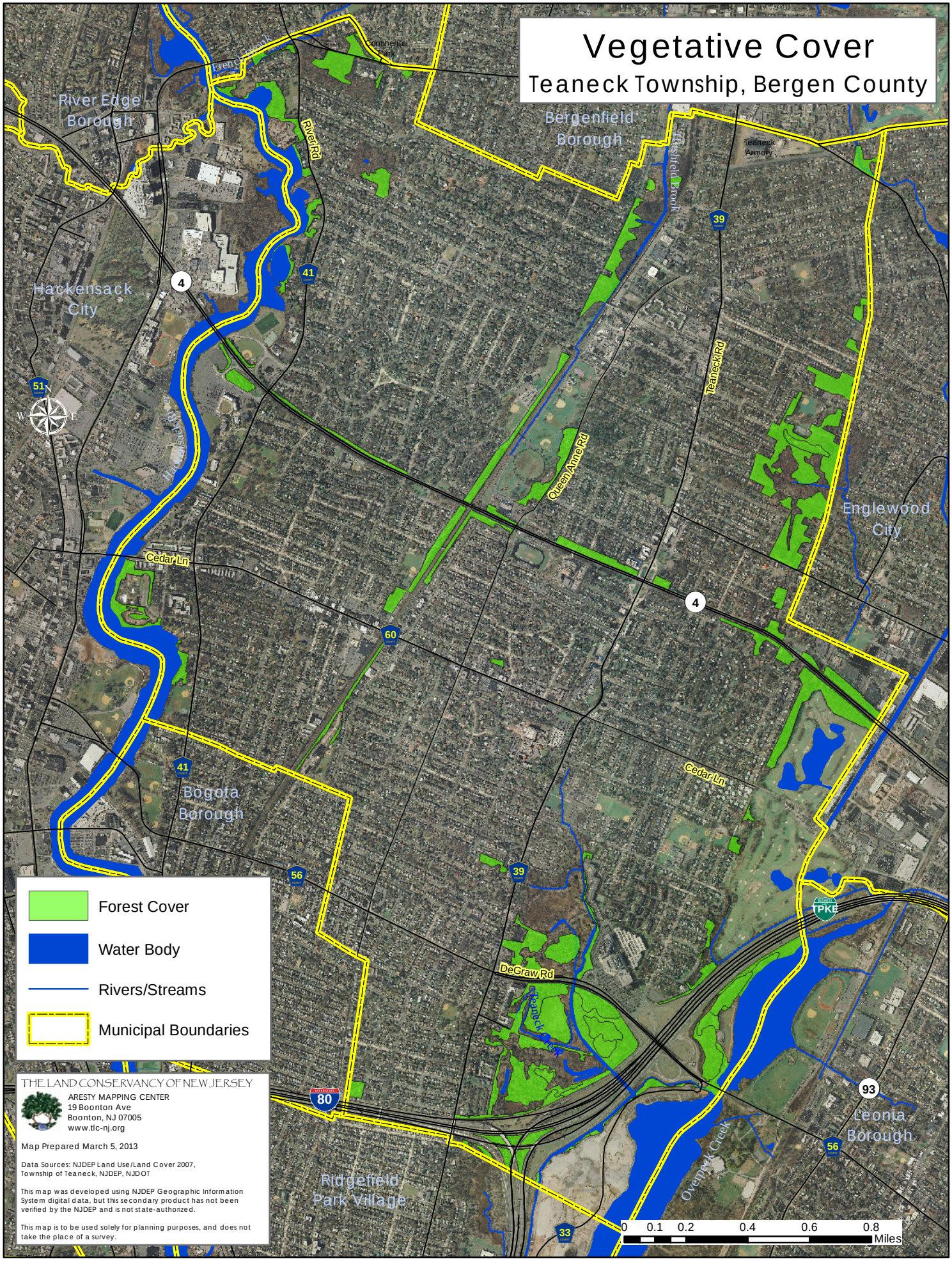

Aquifer Recharge Potential
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
Hackensack River
Metzler Brook
Hirshfield Brook
Teaneck Creek
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
TPKE
The areas with the highest recharge potential are those with the lowest ranking number; thus, a ranking of 22 indicates a higher rate of potential recharge than a ranking of 98.
B/B (22)
B/E (25)
C/B (32)
C/C (33)
C/D (34)
C/E (35)
E/B (52)
E/C (53)
E/E (55)
L/L (97)
W/W (98)
Water Body
River/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 March 5, 2013
Data Sources: USGS Aquifer Recharge Potential 2005, Township of Teaneck, NJDEP, NJDOT
This map was developed using NJDEP 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 March 5, 2013

Data Sources: NJDEP Land Use/Land Cover 2007, Township of Teaneck, NJDEP, NJDOT

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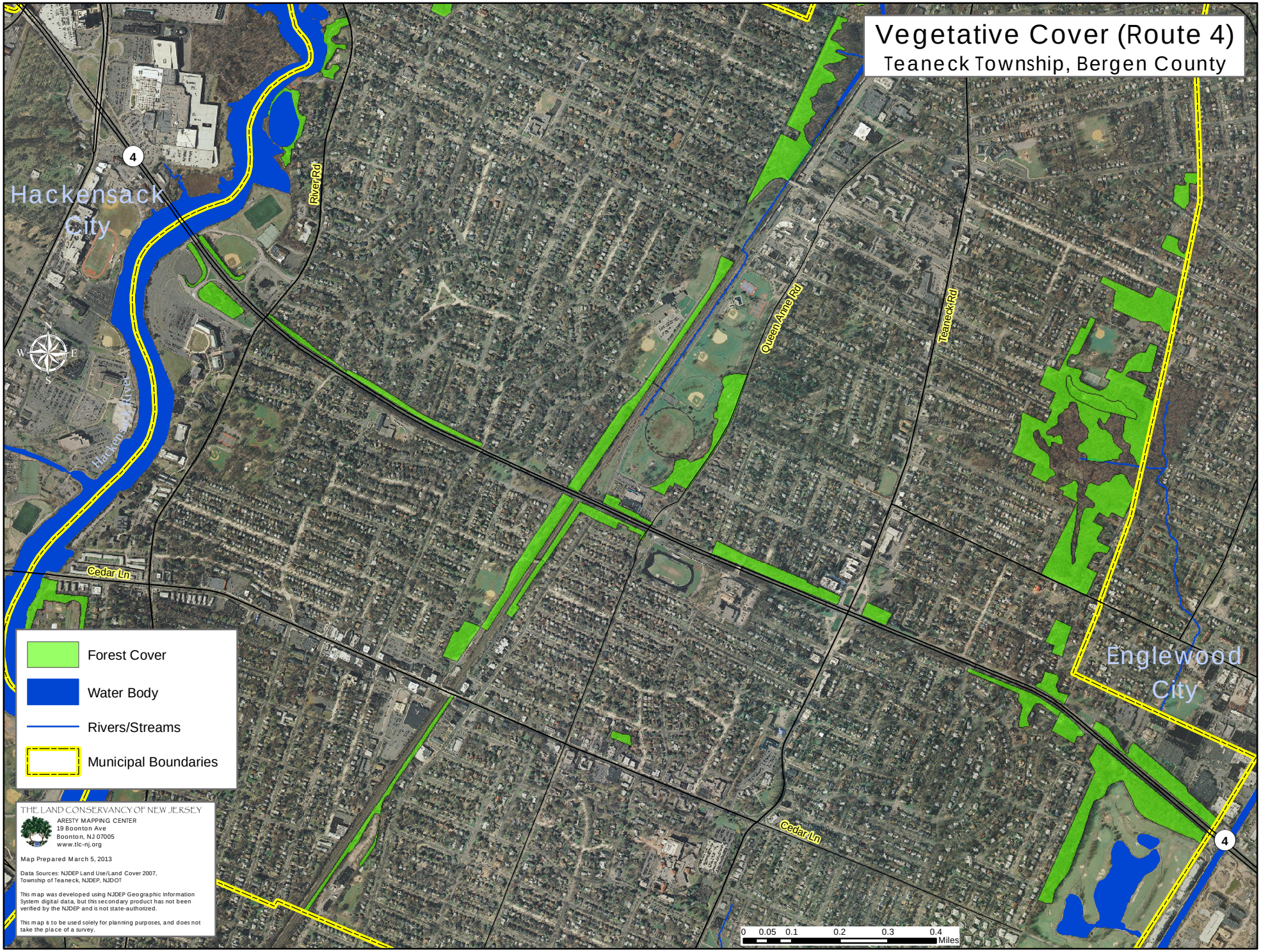

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ARESTY MAPPING CENTER
19 Boonton Ave
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Map Prepared March 5, 2013

Data Sources: NJDEP Land Use/Land Cover 2007, Township of Teaneck, NJDEP, NJDOT

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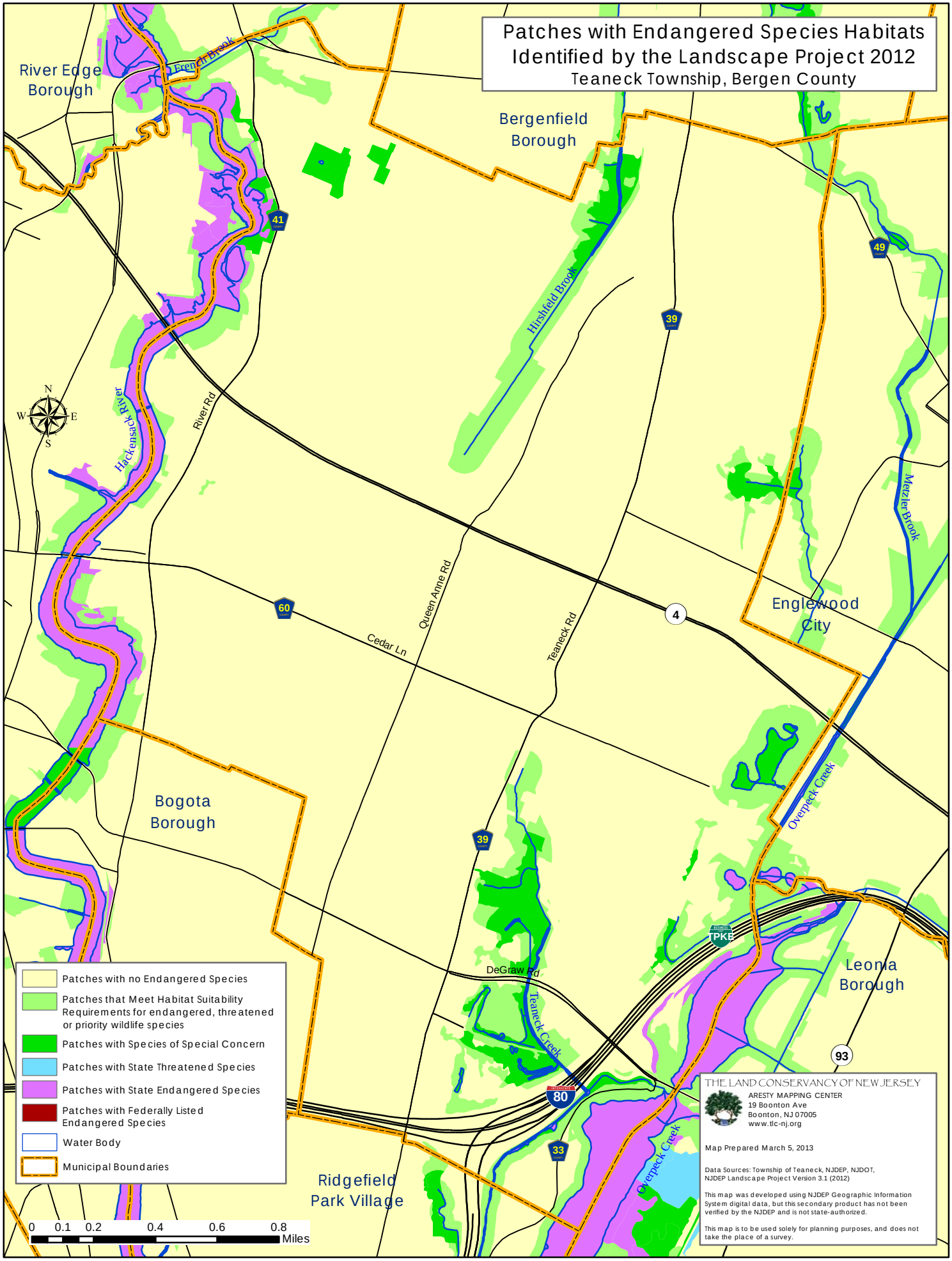
Patches with Endangered Species Habitats
Identified by the Landscape Project 2012
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
French Brook
Hirshfield Brook
Metzler Brook
Overpeck Creek
Hackensack River
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
Teaneck Creek
TPKE
41
49
39
60
4
80
33
93
N
W
E
S
Patches with no Endangered Species
Patches that Meet Habitat Suitability Requirements for endangered, threatened or priority wildlife species
Patches with Species of Special Concern
Patches with State Threatened Species
Patches with State Endangered Species
Patches with Federally Listed Endangered Species
Water Body
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 March 5, 2013
Data Sources: Township of Teaneck, NJDEP, NJDOT, NJDEP Landscape Project Version 3.1 (2012)
This map was developed using NJDEP 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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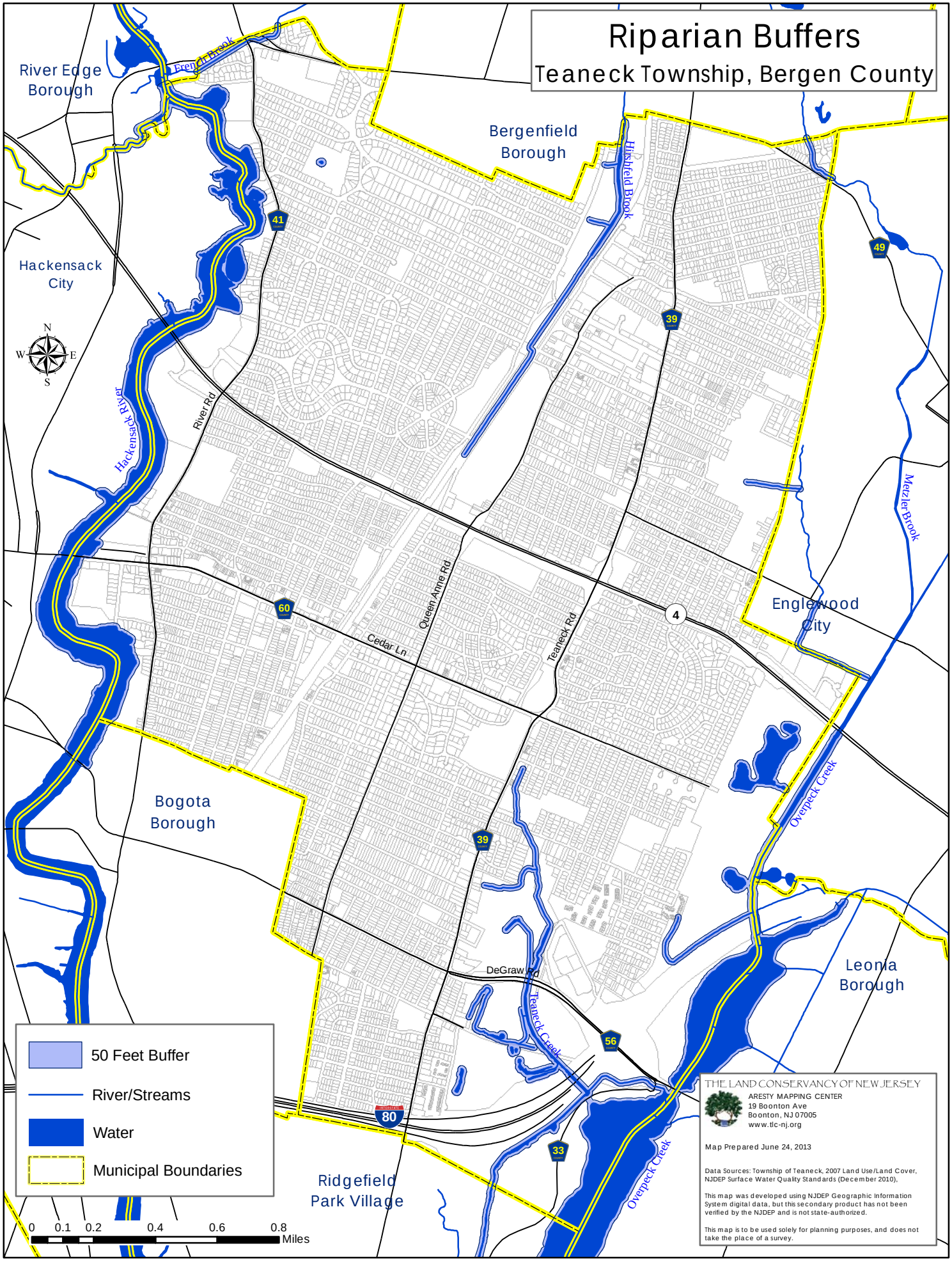
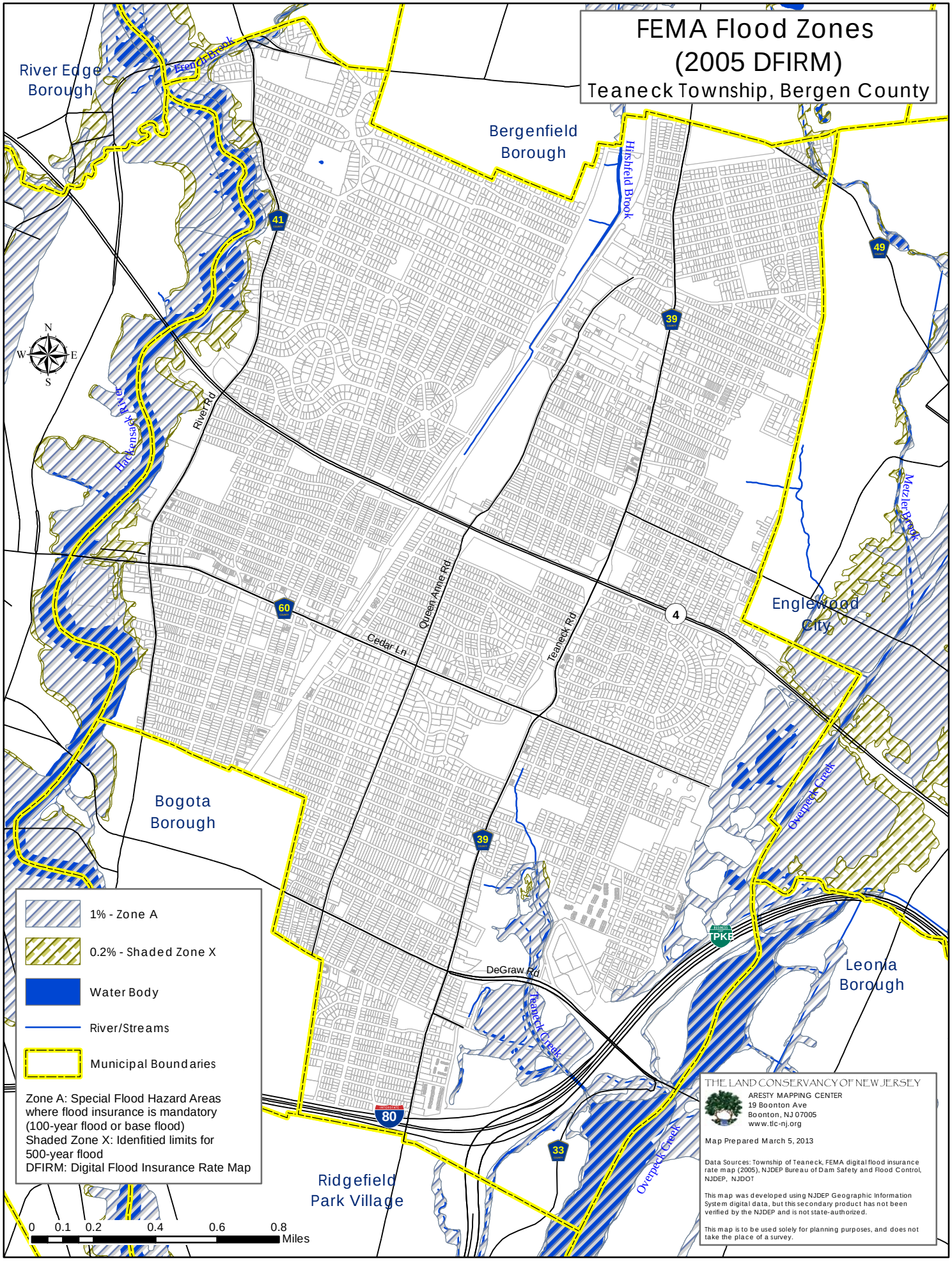
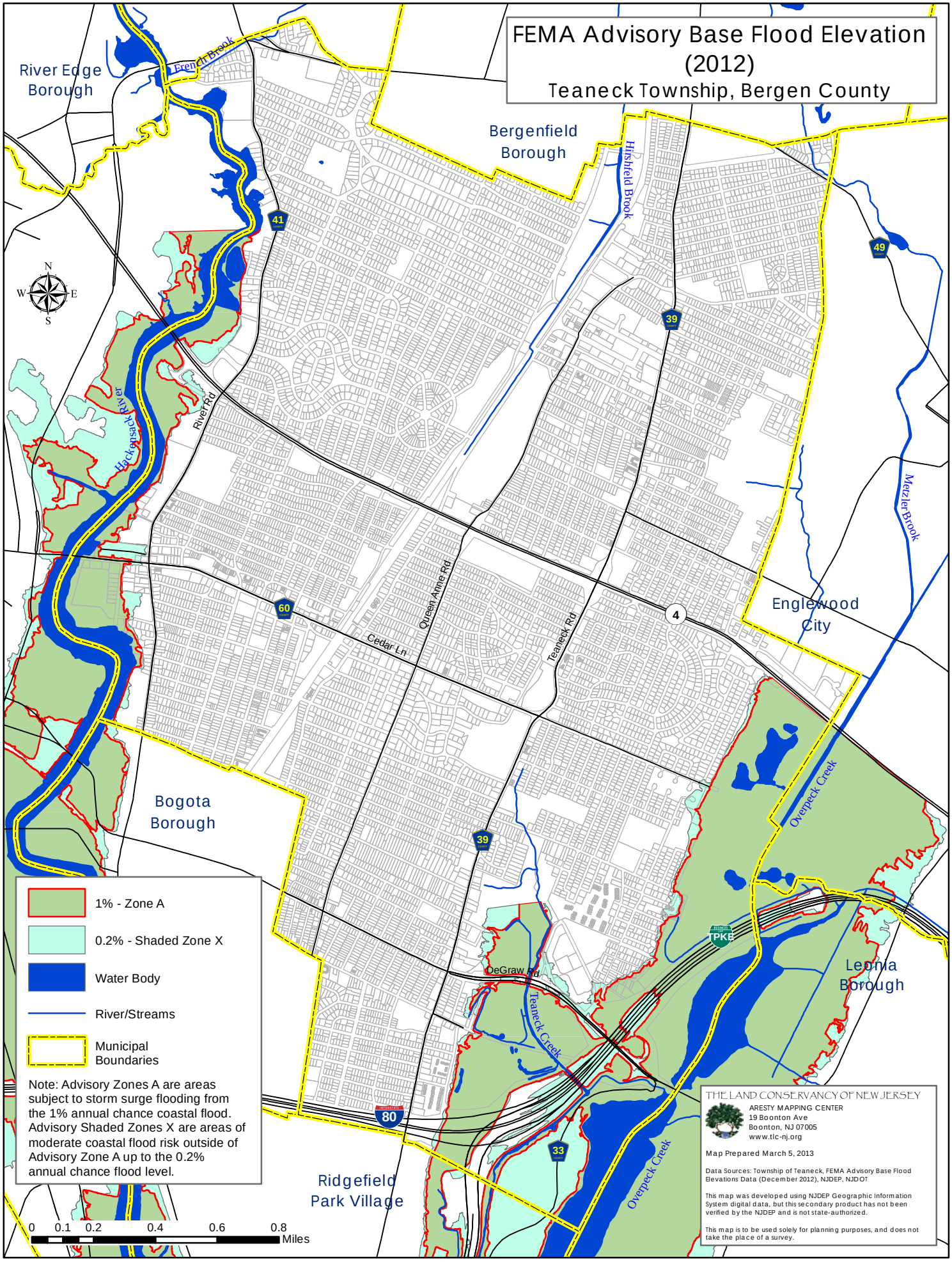

Riparian Buffers
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Hackensack City
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
Frenchs Brook
Hirshfeld Brook
Metzler Brook
Hackensack River
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
Teaneck Creek
Overpeck Creek
N
W
E
S
41
49
39
60
4
56
80
33
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 June 24, 2013
Data Sources: Township of Teaneck, 2007 Land Use/Land Cover, NJDEP Surface Water Quality Standards (December 2010),
This map was developed using NJDEP 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.


FEMA Flood Zones
(2005 DFIRM)
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
Frenchs Brook
Hirshfeld Brook
Metzler Brook
Overpeck Creek
Teaneck Creek
Hackensack River
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
41
49
39
60
4
80
33
TPKE
N
W
E
S
1% - Zone A
0.2% - Shaded Zone X
Water Body
River/Streams
Municipal Boundaries
Zone A: Special Flood Hazard Areas where flood insurance is mandatory (100-year flood or base flood)
Shaded Zone X: Idenfitied limits for 500-year flood
DFIRM: Digital Flood Insurance Rate Map
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 March 5, 2013
Data Sources: Township of Teaneck, FEMA digital flood insurance rate map (2005), NJDEP Bureau of Dam Safety and Flood Control, NJDEP, NJDOT
This map was developed using NJDEP 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.


FEMA Advisory Base Flood Elevation (2012)
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Englewood City
Bogota Borough
Leonia Borough
Ridgefield Park Village
French Brook
Hirshfeld Brook
Metzler Brook
Hackensack River
River Rd
Queen Anne Rd
Teaneck Rd
Cedar Ln
DeGraw Rd
Teaneck Creek
Overpeck Creek
TPKE
41
49
39
60
4
80
33
1% - Zone A
0.2% - Shaded Zone X
Water Body
River/Streams
Municipal Boundaries
Note: Advisory Zones A are areas subject to storm surge flooding from the 1% annual chance coastal flood. Advisory Shaded Zones X are areas of moderate coastal flood risk outside of Advisory Zone A up to the 0.2% annual chance flood level.
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 March 5, 2013
Data Sources: Township of Teaneck, FEMA Advisory Base Flood Elevations Data (December 2012), NJDEP, NJDOT
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	State, National & Municipal Registers
1	John Ackerman House
2	Banta-Coe House
3	Brinkerhoff-Demarest House
4	Adam Vandelinda House
5	James Vandelinda House
6	Caspar Westervelt House
7	Zabriski-Kipp-Cadmus House
	Municipal Register (additional properties)
8	Thurnauer House
9	Lutheran (Van Buskirk) Church Cemetery
10	Old Burial Ground /Teaneck Historical Burial Ground
11	Christian Cole House
12	Louis Bourgeois House
13	John I. Post House
14	George V. Demarest House
15	Ende-Sutherland House
16	Red Oak Tree
	State & National Registers (additional properties)
17	Teaneck Armory (1799 Teaneck Rd)
18	Drawbridge at New Bridge

Historic Sites designated by the National Register of Historic Places NJDEP Historic Preservation Office & Township of Teaneck

Water Body

River/Streams

Municipal Boundaries

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ARESTY MAPPING CENTER
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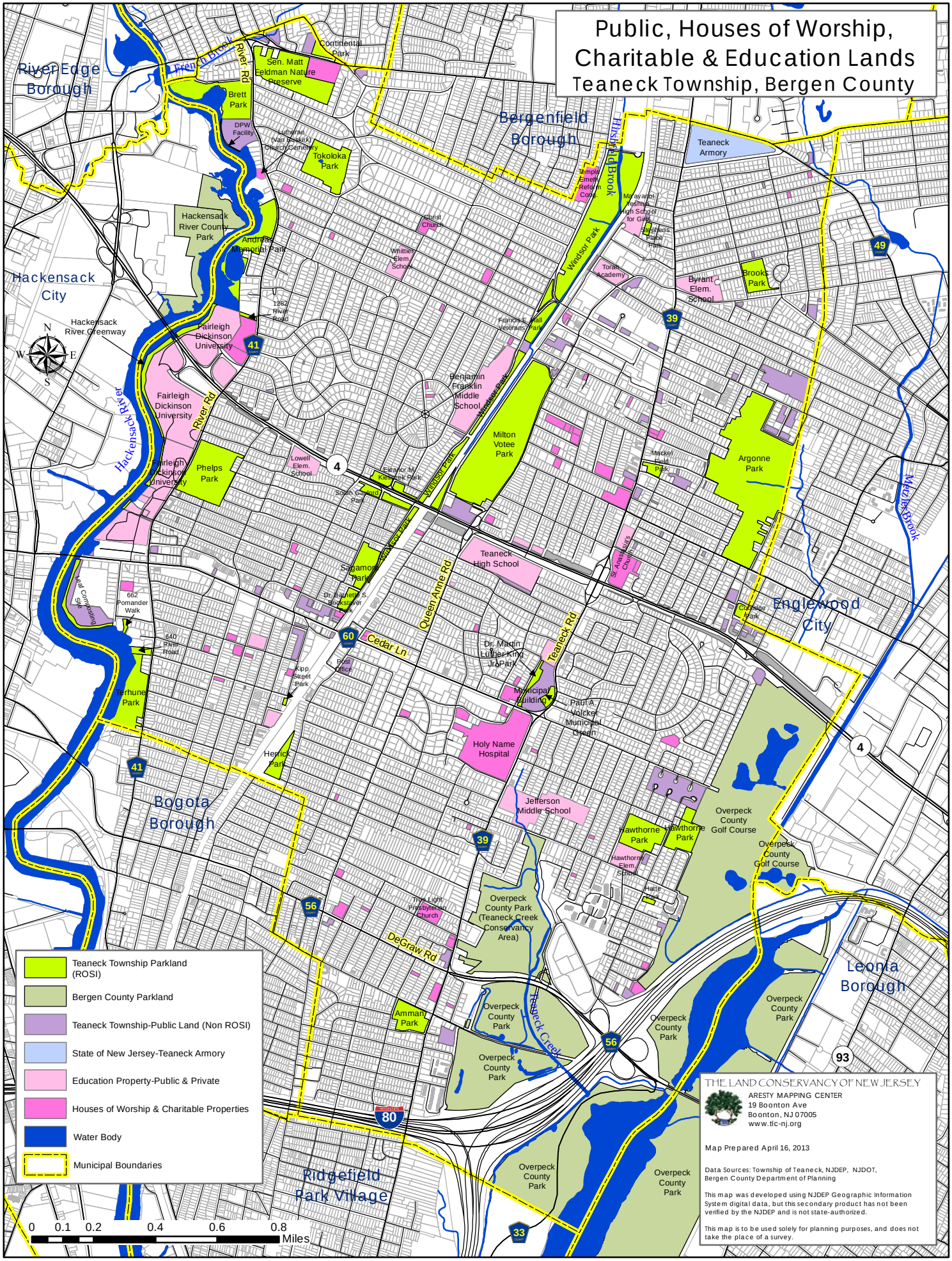
Public, Houses of Worship, Charitable & Education Lands

Teaneck Township, Bergen County



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19 Boonton Ave
Boonton, NJ 07005
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Map Prepared April 16, 2013

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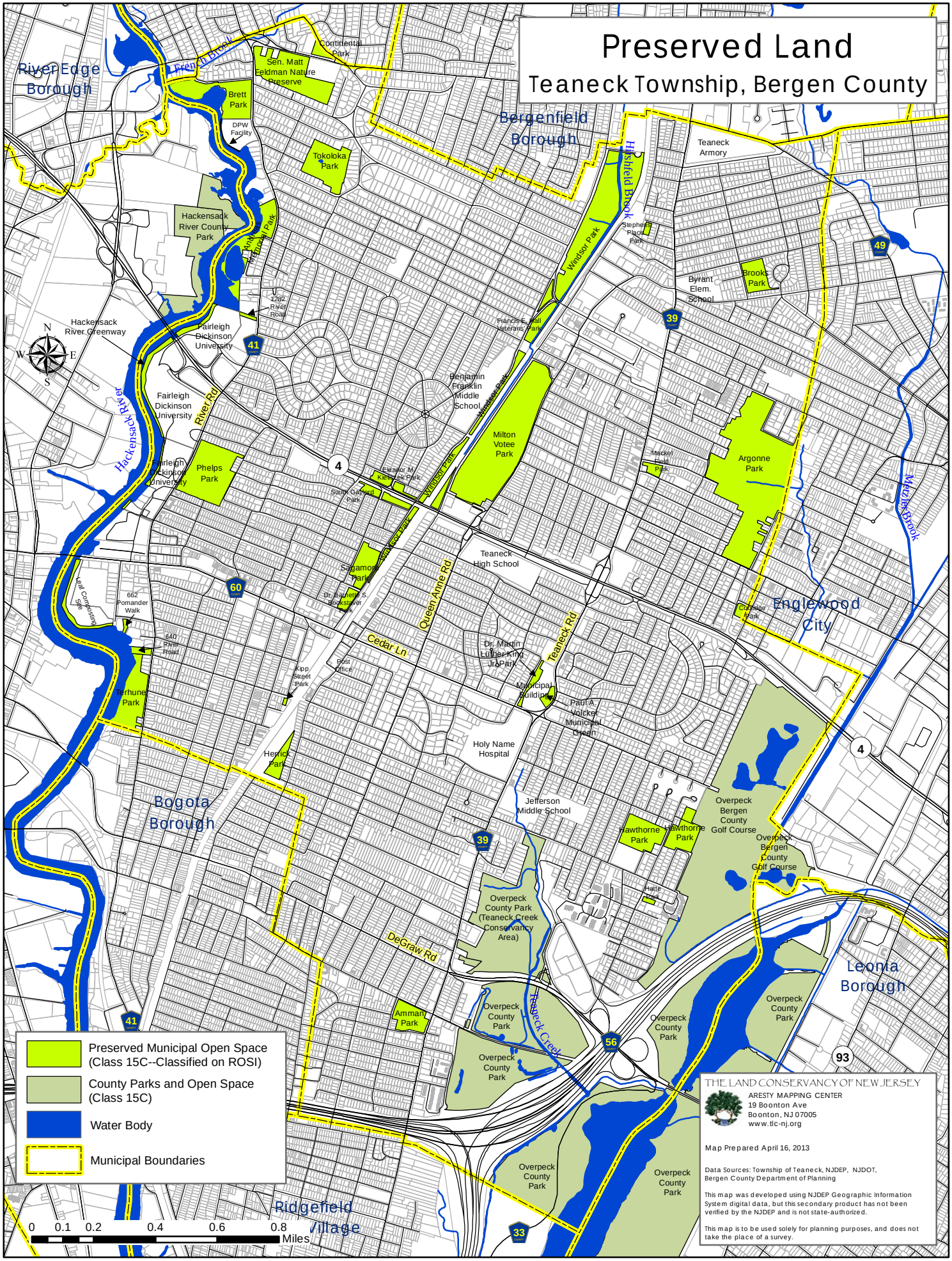
Preserved Land
Teaneck Township, Bergen County
River Edge Borough
Bergenfield Borough
Bogota Borough
Englewood City
Leonia Borough
Ridgefield Village
Brett Park
DPW Facility
Continental Park
Sen. Matt Feldman Nature Preserve
Tokoloka Park
Hackensack River County Park
Anderson Memorial Park
Hackensack River Greenway
Fairleigh Dickinson University
Phelps Park
Terhune Park
Kipp Street Park
Herrick Park
Amman Park
Benjamin Franklin Middle School
Milton Votee Park
Windsor Park
Francis E. Hall Veterans Park
Stephen Place Park
Teaneck Armory
Brooks Park
Byrant Elem. School
Argonne Park
Mackel Field Park
Elevator M. Kletzek Park
South Garland Park
Sagamore Park
Dr. Bennette S. Bookstaver Park
Teaneck High School
Dr. Martin Luther King Jr. Park
Municipal Building
Paul A. Volcker Municipal Green
Holy Name Hospital
Jefferson Middle School
Overpeck Bergen County Golf Course
Hawthorne Park
Overpeck County Park (Teaneck Creek Conservancy Area)
Overpeck County Park
Cedar Ln
Queen Anne Rd
Teaneck Rd
DeGraw Rd
River Rd
Hackensack River
Hirshfield Brook
Windsor Park
Madzia Brook
Teaneck Creek
662 Pomander Walk
640 River Road
1282 River Road
Leaf Composting Site
Post Office
Preserved Municipal Open Space (Class 15C--Classified on ROSI)
County Parks and Open Space (Class 15C)
Water Body
Municipal Boundaries
0 0.1 0.2 0.4 0.6 0.8 Miles
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APPENDICES

A. New Jersey Natural Heritage Program: List of Rare and Endangered Plant Species and Ecological Communities Recorded for Bergen County (2008)

B. Excerpts from: *A Floral-Faunal Survey of Five Selected Parks and A Report of Air Constituents and Noise Levels at Five Selected Street Sites in the Township of Teaneck 1980*

1. **The Dominant Floral Species of the Parks and Plant Species Listed in the Selected Municipal Parks (pages 1-18)**
2. **The Dominant Animal Species of the Parks (pages 19-22)**
3. **Air Pollutant Monitoring. (pages 32-37)**
4. **Noise Level Monitoring (pages 27-31)**

C. Parcel Data Tables for Teaneck Township

1. **Preserved Lands**
2. **Public Lands**
3. **Houses of Worship, Charitable and Education Lands**

D. Teaneck Township Recreation and Open Space Inventory (ROSI), January 2011

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: **Bergen**						
Nonvascular Plant						
Sphagnum contortum	Sphagnum		E	LP, HL	G5	S1
Sphagnum majus ssp. norvegicum	Sphagnum		E	LP, HL	G5?TNR	S1.1
Vascular Plant						
Adlumia fungosa	Climbing Fumitory			HL	G4	S2
Agastache nepetoides	Yellow Giant-hyssop			HL	G5	S2
Agastache scrophulariifolia	Purple Giant-hyssop			HL	G4	S2
Alopecurus aequalis var. aequalis	Short-awn Meadow-foxtail			HL	G5TNR	S2
Amelanchier humilis	Low Service-berry			HL	G5	S1
Ammannia latifolia	Koehn's Toothcup		E	LP, HL	G5	S1
Anemone canadensis	Canada Anemone			HL	G5	SX
Aplectrum hyemale	Puttyroot		E	LP, HL	G5	S1
Arabis hirsuta var. pycnocarpa	Western Hairy Rockcress			HL	G5T5	S1
Asclepias verticillata	Whorled Milkweed			HL	G5	S2
Athyrium pycnocarpon	Glade Fern		E	LP, HL	G5	S1
Betula papyrifera var. papyrifera	Paper Birch			HL	G5T5	S2
Botrychium oneidense	Blunt-lobe Grape Fern			HL	G4Q	S2
Bouteloua curtipendula	Side-oats Grama Grass		E	LP, HL	G5T5	S1
Callitriche palustris	Marsh Water-starwort			HL	G5	S2
Carex disperma	Soft-leaf Sedge			HL	G5	S1
Carex haydenii	Cloud Sedge		E	LP, HL	G5	S1
Carex pseudocyperus	Cyperus-like Sedge		E	LP, HL	G5	S1

County: **Bergen**

Carex tuckermanii	Tuckerman's Sedge	E	LP, HL	G4	S1
Carex utriculata	Bottle-shaped Sedge		HL	G5	S2
Castilleja coccinea	Scarlet Indian-paintbrush		HL	G5	S2
Cercis canadensis	Redbud	E	LP, HL	G5T5	S1
Chenopodium simplex	Maple-leaf Goosefoot		HL	G5	S2
Corallorhiza wisteriana	Spring Coralroot		HL	G5	SX
Coreopsis rosea	Rose-color Coreopsis		LP, HL	G3	S2
Crataegus chrysocarpa var. chrysocarpa	Fireberry Hawthorn		HL	G5TNR	S1
Cryptogramma stelleri	Slender Rockbrake	E	LP, HL	G5	SH.1
Cuphea viscosissima	Blue Waxweed		HL	G5?	S3
Cypripedium reginae	Showy Lady's-slipper	E	LP, HL	G4	S1
Dirca palustris	Leatherwood		HL	G4	S2
Doellingeria infirma	Cornel-leaf Aster		HL	G5	S2
Dryopteris celsa	Log Fern		HL	G4	SX
Elatine americana	American Waterwort		HL	G4	S2
Eleocharis halophila	Salt-marsh Spike-rush		HL	G4	S2
Epilobium angustifolium ssp. circumvagum	Narrow-leaf Fireweed		HL	G5T5	S1
Equisetum pratense	Meadow Horsetail	E	LP, HL	G5	S1
Eriophorum gracile	Slender Cotton-grass	E	LP, HL	G5TNR	SH
Eriophorum viridicarinatum	Thin-leaf Cotton-grass		HL	G5	S3
Gnaphalium macounii	Winged Cudweed	E	LP, HL	G5	SH
Gymnocarpium dryopteris	Oak Fern		HL	G5	S1
Hemicarpha micrantha	Small-flower Halfchaff Sedge	E	LP, HL	G4	S1
Hottonia inflata	Featherfoil	E	LP, HL	G4	S1
Hydrocotyle ranunculoides	Floating Marsh-pennywort	E	LP, HL	G5	S1

County: **Bergen**

Hypericum adpressum	Barton's St. John's-wort		E	LP, HL	G2G3	S2
Hypericum majus	Larger Canadian St. John's Wort		E	LP, HL	G5	S1
Isotria medeoloides	Small Whorled Pogonia	LT	E	LP, HL	G2	S1
Juncus brevicaudatus	Narrow-panicle Rush			HL	G5	S2
Lemna perpusilla	Minute Duckweed		E	LP, HL	G5	S1
Lemna trisulca	Star Duckweed			HL	G5	S2
Lemna valdiviana	Pale Duckweed		E	LP, HL	G5	S1
Limosella subulata	Awl-leaf Mudwort		E	LP, HL	G4G5	S1
Linum sulcatum	Grooved Yellow Flax		E	LP, HL	G5T5	S1
Luzula acuminata	Hairy Wood-rush		E	LP, HL	G5T4T5	S2
Lycopodiella inundata	Northern Bog Club-moss			HL	G5	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
Menyanthes trifoliata	Buck-bean			HL	G5	S2
Mimulus alatus	Winged Monkey-flower			HL	G5	S3
Muhlenbergia glomerata	Eastern Smoke Grass			HL	G5	S2
Nuphar microphyllum	Small Yellow Pond-lily		E	LP, HL	G5T4T5	SH
Obolaria virginica	Virginia Pennywort			HL	G5	S2
Phaseolus polystachios var. polystachios	Wild Kidney Bean			HL	G4TNR	S2
Platanthera hyperborea var. hyperborea	Leafy Northern Green Orchid			HL	G5T5	SX
Poa autumnalis	Flexuous Spear Grass		E	LP, HL	G5	SH.1
Potamogeton oakesianus	Oakes' Pondweed			HL	G4	S2
Prenanthes racemosa	Smooth Rattlesnake-root		E	LP, HL	G5TNR	SH
Ptelea trifoliata	Wafer-ash		E	LP, HL	G5T5	S1

County: **Bergen**

Pycnanthemum clinopodioides	Basil Mountain-mint	E	LP, HL	G2	S1
Pycnanthemum torrei	Torrey's Mountain-mint	E	LP, HL	G2	S1
Ranunculus ambigens	Water-plantain Spearwort		HL	G4	S2
Ranunculus flabellaris	Yellow Water Buttercup		HL	G5	S3
Ranunculus micranthus	Rock Buttercup		HL	G5	S2
Rotala ramosior	Toothcup		HL	G5	S3
Saccharum alopecuroidum	Silver Plume Grass		HL	G5	SH
Sagittaria subulata	Awl-leaf Arrowhead		HL	G4	S2
Salix candida	Hoary Willow		HL	G5	S2
Salix lucida ssp. lucida	Shining Willow		HL	G5T5	S1
Salix pedicellaris	Bog Willow	E	LP, HL	G5	S1
Schoenoplectus torreyi	Torrey's Bulrush	E	LP, HL	G5?	S1
Scirpus maritimus	Saltmarsh Bulrush	E	LP, HL	G5	SH
Scleria pauciflora var. caroliniana	Carolina Nut-rush		HL	G5T4T5	S2
Scleria verticillata	Whorled Nut-rush	E	LP, HL	G5	S1
Scutellaria leonardii	Small Skullcap	E	LP, HL	G4T4	S1
Silene caroliniana var. pensylvanica	Wild-pink		HL	G5T4	S3
Solidago rigida	Prairie Goldenrod	E	LP, HL	G5T5	S1
Sphenopholis pensylvanica	Swamp Oats		HL	G4	S2
Sporobolus compositus var. compositus	Long-leaf Rush-grass		HL	G5T5	S2
Stachys hyssopifolia	Hyssop Hedge-nettle		HL	G5	S2
Thuja occidentalis	Arborvitae	E	LP, HL	G5	S1
Tiarella cordifolia	Foamflower	E	LP, HL	G5T5	S1
Triphora trianthophora	Three Birds Orchid	E	LP, HL	G3G4	S1
Trollius laxus ssp. laxus	Spreading Globe Flower	E	LP, HL	G4T3	S1
Utricularia intermedia	Flat-leaf Bladderwort		HL	G5	S3

County: **Bergen**

Verbena simplex	Narrow-leaf Vervain	E	LP, HL	G5	S1
Viola canadensis	Canadian Violet	E	LP, HL	G5TNR	S1
Viola septentrionalis	Northern Blue Violet	E	LP, HL	G5	S1
Vitis novae-angliae	New England Grape	E	LP, HL	G4G5Q	S1

The Floral-Faunal Inventory of Five Selected Parks in Teaneck, New Jersey

A Means of Study

The five parks under study, namely Windsor, Argonne, Maria Andreas Memorial, Tokaloka and Board of Education Tract were visited in the winter, spring and summer on the following dates:

January 22, 1977
February 12, 1977
May 3, 1977
May 17, 1977
May 20, 1977
May 24, 1977
June 1, 1977
June 2, 1977
July 1, 1977
August 17, 1977
August 23, 1977

Five members of the CESC staff participated in the survey, Mr. William D. Michalsky, Mr. George E. Young, Mr. Terence M. O'Leary, Mr. William D. Fulcher and Dr. V. Eugene Vivian. The final identification of fauna except birds was the responsibility of Mr. Michalsky, while the final identification of birds and all plants was assumed by Dr. Vivian.

To encounter the greatest number of species in each park, the following procedures were employed during each of the seasons, winter, spring and summer. All boundaries and tracts in each park were traversed on foot. A series of straight line transects or crossings of each park was made both in east-west directions and in north-south directions.

Most identifications were made in the field while questionable species with high population numbers were collected for identification in the laboratory.

The plant species are divided into four convenient groups; trees, shrubs, herbs and non-flowering plants. For each group the plants are listed in order as they appear in Britton and Brown's "Flora of the Eastern United States and Canada, Henry A. Gleason", Hafner Press 1967. The other species lists are arranged in the order appearing in the references cited in each table.

B The Dominant Floral Species of the Parks

A total of three hundred and twenty-eight (328) species or varieties was located. The species totals for each park are shown in Table I below.

Table I

Total Number of Plant Species Found in Each of Five Selected Parks in Teaneck, New Jersey

Park	Plant Species Number
Windsor	205
Argonne	195
Maria Andreas Memorial	141
Tokaloka	50
Board of Education Tract	87

Fourteen (14) plant species were found in all of the parks while thirty (30) more were found in at least four of the five parks. In this way a list of forty-four (44) possibly dominant species was obtained. No quantitative sampling was possible within the scope of this study, but a general vegetative map for each of the parks indicates the dominant plants as developed by visual estimate.

A list of these forty-four species is shown in Table II below:

Table II

The Most Widely Distributed Plant Species in Five Selected Parks in Teaneck, New Jersey

(In as much as all of these are well known species, common names rather than scientific names are used for greater public communication.)

* Denotes species occurring in all parks
Names in italics denote species growing in wet or high water table areas.

Trees

Black Willow *
Blue Beech
Gray Birch*
Swamp White Oak
Pin Oak
Scarlet Oak
American Elm
White Mulberry
Sweet Gum
Black Cherry
Norway Maple
Red Maple *
Box Elder
White Ash*

Shrubs and Woody Vines

Catbrier
Spice Bush
Common Blackberry
Poison Ivy*
Fox Grape
Virginia Creeper*
*Toothed Arrowwood**
Japanese Honeysuckle

Herbs

Reed Grass
Broad-leaved Panic Grass
Straw colored Cyperus
Skunk Cabbage *
Day Lily
Wild Leek
Wild Garlic
False Solomon's Seal
Virginia Knotweed*
Mexican Bamboo
Celandine
Common Cinquefoil
Jewel Weed *
Fringed Loosestrife
Enchanter's Nightshade *
Ground Ivy
Turtle Head *
Giant Ragweed
Mugwort
Great Burdock

Non-Flowering Plants

Field Horsetail *
Sensitive Fern*
Cinnamon Fern

Interpretation

The array of the most widely distributed plants reflects not only environmental conditions such as ground water level but also points to present and past land use.

High Water Table

Ground water levels close to or at the surface are indicated by many of the plants of wide distribution. The names of these plants are printed in italics in Table II. Of these, the Red Maple is clearly the dominant tree species; this is most evident in early spring by the profusion of bright red buds and flowers in so many trees in all of the parks except Maria Andreas Memorial Park. There are extensive low spots and stream channels in both Argonne and Windsor Parks, while low spots of significant size are also found in Tokaloka Park and the Board of Education Tract.

Sweet Gum (Liquidambar styraciflua) is the only other tree of the wetter areas with large populations even though Swamp White Oak (Quercus bicolor) and Pin Oak (Quercus palustris) occur frequently in most of the parks.

Toothed Arrowwood (Viburnum dentatum) is far and away the most widespread and populous understory shrub in wetlands, often associated with the Red Osier Dogwood (Cornus stolonifera). On slightly higher but still moist ground, Spice Bush (Lindera Benzoin) with aromatic leaves and twigs flourishes in all parks except Andreas Memorial Park.

In late summer and early fall Jewel Weed or Orange Spotted Touch-me-not (Impatiens biflora) is an herb reaching five or more feet in height which covers acres in Argonne and Windsor Parks and is found in conspicuous populations in the other parks. Ecologically and botanically it was interesting to note the hydrophilic ground cover plant, Clearweed, (Pilea pumila),growing as an extensive understory plant beneath the prolific Jewel Weed. Both of these plants are found chiefly on stream flood plain locations which are flooded much of the year but remain usually higher than the water table in summer and autumn.

Other wet woodland indicator plants are the Turtle Head (Chelone glabra) and the Cinnamon Fern (Osmunda cinnamomea), both well distributed in the parks. One usually reaches Turtle Head or Cinnamon Fern without getting one's feet wet, but to reach the everpresent odorous Skunk Cabbage, over shoes are needed except in late summer.

The high water tables probably account for the use of these lands as public parks, expecially Argonne and Windsor Parks which are both at the bottom of one or more slopes. Both Tokaloka Park and the Board of Education Tract are on lands sloping toward the Hackensack River and each has depressions or drainage ditches for surface overflow and storm drainage. Much of Maria Andreas Memorial Park is on the Hackensack River Flood Plain. Such conditions suggest special land uses if these parks are to be utilized for a variety of functions by the residents of the township.

Existing Land Use

Although there are some older trees in the parks, particularly in the "estate" portion of Andreas Memorial Park and in parts of Argonne Park, most of the trees are younger than fifty years old. Looking backward in time, it is simple to project that extensive wood cutting was done in these areas in the "twenties." Thus the land was disturbed from its more permanent earlier vegetative cover of either woodland or farmland.

Plant residents pointing to an earlier woodlands populated with larger trees and rich soil are the False Solomon's Seal (Smilacina racemosa) and the Wild Leek (Allium triococcum). All in the Lily Family, these plants favor habitats of deep shade and thick layers of leaf mulch developed from the leaves of canopy trees. With their bulbous or tuberous underground stems they can survive indefinitely year after year in changing woodland environmental conditions.

Today the parks are surrounded by residences on one or all boundaries. Many cultivated plant species of trees, shrubs and herbs became established in the parks by seed dispersal by animals or birds or by garden refuse placed in the parks by householders.

Norway Maple, long a popular street shade tree, is found on the borders of most of the parks. Sorbaria (Sorbaria canadensis),a shrub, Lily of the Valley, (Convallaria majalis) and Day Lily (Hemerocallus fulva) are good examples of the case in point.

Plants with hooked or burred seed cases such as Enchanter's Nightshade (Circaea canadensis) and Great Burdock (Arctium Lappa) owe their distribution not only to mammals found in parks such as rabbits and squirrels but also to dogs and house cats which move through the parks either under control or out of control.

Finally there are many plants which are most successful on disturbed borders or areas in the parks. Most typical of the successful "disturbance" species are Gray Birch (Betula populifolia) , Great Reed Grass (Phragmites communis) and the vines such as Common Blackberry (Rubus alleghéniensis), Poison Ivy (Rhus radicans), Virginia Creeper (Parthenocissus quinquefolius), and the shady lawn invader Ground Ivy (Glecoma hederacea).

Other trees which invade cleared woodlands or disturbed park borders are Black Cherry (Prunus serotina), White Ash (Fraxinus americana) and White Mulberry (Morus alba). Red Maple (Acer rubrum) the dominant wetland tree, is a most successful wetland invader, as its universal distribution attests.

The presence of the Great Reed Grass in many of the parks provides significant evidence of recent disturbances in the wetter areas of the parks.

Township of Teaneck, New Jersey

Faunal-Floral Survey of Selected Municipal Parks

C

Floral Survey

*NOTE - The flora (plants) have been arbitrarily separated into four groups, namely trees, shrubs, herbs and non-flowering plants.

TREES

Scientific Name	Common Name	PARK: Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
TAXACEAE	**YEW FAMILY**					
Taxus baccata L.	European Yew		x			
PINACEAE	**PINE FAMILY**					
Abies balsaminea (L.) Mill.	Balsam Fir			x		
Picea rubens Sarg.	Red Spruce			x		
Pinus Strobus L.	White Pine		x	x		
Chamaecyparis thyoides (L.) BSP var. retinospora	White Cedar			x		
SALICACEAE	**WILLOW FAMILY**					
Populus alba L.	White Poplar	x	x			
Populus grandidentata Michx.	Large toothed Aspen	x	x			
Populus nigra L. var. italica Du Roi	Lombardy Poplar	x		x		
Populus tremuloides Michx.	Quaking Aspen	x ?				
Salix nigra L.	Black Willow	x	x	x	x	x
Salix babylonica L.	Weeping Willow	x	x			
Salix alba L.	White Willow	x	x			
JUGLANDACEAE	**WALNUT FAMILY**					
Juglans nigra L.	Black Walnut	x				x
Carya cordiformis (Wang.) K. Koch	Bitternut Hickory	x	x			x
Carya ovata (Mill.) K. Koch	Shellbark Hickory		x			x
Carya glabra (Mill.) Sweet	Pignut Hickory					x
BETULACEAE	**BIRCH FAMILY**					
Carpinus caroliniana Walt.	Blue Birch	x	x	x		x
Betula lutea Michx. F.	Yellow Birch	x				
Betula nigra L.	River Birch			x		
Betula populifolia Marsh.	Gray Birch	x	x	x	x	x

(Faunal-Floral Survey, Continued) Trees

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
FAGACEAE	**BEECH FAMILY**					
Fagus grandifolia Ehrh.	American Beech	x	x	x		
Fagus grandifolia Ehrh. var. riversii	Copper Beech			x		
Quercus alba L.	White Oak	x	x			
Quercus bicolor Willd.	Swamp White Oak	x	x		x	x
Quercus Prinus L.	Chestnut Oak				x	
Quercus velutina Lam.	Black Oak	x				
Quercus borealis Michx. f. var.maxima (marsh) Ashe	Red Oak	x	x			
Quercus palustris Muenchh.	Pin Oak	x	x	x		x
Quercus coccinea Muenchh.	Scarlet Oak	x		x	x	x
ULMACEAE	**ELM FAMILY**					
Ulmus americana L.	American Elm		x	x	x	x
Ulmus rubra Muhl.	Slippery Elm	x	x			
Ulmus sp?	Horticultural Variety	x	x	x		
Celtis occidentalis L.	Hackberry	x				
MORACEAE	**MULBERRY FAMILY**					
Morus rubra L.	Red Mulberry			?		
Morus alba L.	White Mulberry	x	x	x		x
MAGNOLIACEAE	**MAGNOLIA FAMILY**					
Liriodendron tulipifera L.	Tulip Tree	x		x		x
LAURACEAE	**LAUREL FAMILY**					
Sassafras albidum (Nutt.) Nees.	Sassafras	x		x	x	x
HAMAMELIDACEAE	**WITCH HAZEL FAMILY**					
Liquidambar styraciflua L.	Sweet Gum	x	x		x	x
ROSACEAE	**ROSE FAMILY**					
Platanus occidentalis L.	Sycamore	x	x			
Pyrus communis L.	Pear		x		x	
Pyrus Malus L.	Apple	x		x		
Pyrus Coronaria L.	Wild Crab Apple	x	x		x	
Crataegus sp?	Hawthorn					
Prunus serotina Ehrh.	Black Cherry	x	x	x		x
Prunus avium L.	Sweet Cherry			x		
Amelanchier canadensis (L.) Medic.	Shad bush	x		x		

(Faunal-Floral Survey, Continued) Trees

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokaloka	Board of Education Tract
FABACEAE	BEAN FAMILY					
Gleditsia triacanthos L.	Honey Locust	x				
Robinia Pseudoacacia L.	Black Locust	x	x		x	
Robinia viscosa Vent.	Clammy Locust					x
SIMARUBACEAE	QUASSIA FAMILY					
Ailanthus altissima (Mill.) Swingle	Tree of Heaven	x		x		x
AQUIFOLIACEAE	HOLLY FAMILY					
Ilex opaca Ait.	American Holly				x	
ACERACEAE	MAPLE FAMILY					
Acer platanoides L.	Norway Maple	x	x	x		x
Acer platanoides L. var. Schwedleri	Bronze Norway Maple					x
Acer saccharum Marsh.	Sugar Maple	x				
Acer Pseudoplatanus L.	Sycamore Maple	x	x	x	x	x
Acer rubrum L.	Red Maple	x	x	x	x	x
Acer saccharinum L.	Silver Maple		x	x		x
Acer Negundo L.	Box Elder	x	x	x		x
HIPPOCASTANACEAE	HORSE CHESTNUT FAMILY					
Aesculus Hippocastanum L.	Horse Chestnut			x		
Aesculus Hippocastanum L. var?	Pink Horse Chestnut			x		
TILIACEAE	LINDEN FAMILY					
Tilia americana L.	American Linden	x		x		x
Tilia sp?	European Linden			x		
CORNACEAE	DOGWOOD FAMILY					
Cornus florida L.	Flowering Dogwood	x				
Nyssa sylvatica Marsh.	Sour Gum	x				
OLEACEAE	OLIVE FAMILY					
Fraxinus americana L.	White Ash	x	x	x	x	x
BIGNONIACEAE	TRUMPET CREEPER FAMILY					
Catalpa speciosa Warder.	Catalpa	x				

(Faunal-Floral Survey, Continued)

SHRUBS

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokaloka	Board of Education Tract
LILIACEAE	**LILY FAMILY**					
Smilax rotundifolia L.	Catbrier	x	x	x	x	
MYRICACEAE	**BAYBERRY FAMILY**					
Myrica pensylvanicum Loisel.	Bayberry	x		x		
BETULACEAE	**BIRCH FAMILY**					
Alnus rugosa (Du Roi) Spreng.	Speckled Alder	x				
Corylus americana Walt.	Hazel Nut	x				
BERBERIDACEAE	**BARBERRY FAMILY**					
Berberis vulgaris L.	Barberry	x	x	x		
LAURACEAE	**LAUREL FAMILY**					
Lindera Benzoin (L.) Blvme.	Spice Bush	x	x		x	x
HAMAMELIDACEAE	**WITCH HAZEL FAMILY**					
Hamamelis virginiana L.	Witch Hazel		x			
ROSACEAE	**ROSE FAMILY**					
Philadelphius coronarius L.	Mock Orange	x		x		
Ribes nigrum L.	Black Currant	x	x			x
Sorbaria sorbifolia (L.) R.Br.	Sorbaria	x	x			
Pyracantha coccinea	Firethorn			x		
Rubus hispidus L.	Dewberry			x		
Rubus allegheniensis Porter	Common Blackberry	x	x	x	x	
Rosa carolina L.	Wild Rose	x	x			
Rosa multiflora	Multiflora Rose		x			x
BUXACEAE	**BOX FAMILY**					
Pachysandra procumbens Michx.	Pachysandra	x	x			
ANACARDIACEAE	**CASHEW FAMILY**					
Rhus radicans L.	Poison Ivy	x	x	x	x	x
Rhus Vernix L.	Poison Sumac	x				
Rhus Copallinum L.	Dwarf Sumac	x				
Rhus glabra	Smooth Sumac	x				

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
VITACEAE	**GRAPE FAMILY**					
Vitis Labrusca L.	Fox Grape		x	x	x	x
Vitis vulpina L.	Frost Grape		x		x	
Ampelopsis cordata Michx.	High Climbing Ampelopsis					
Parthenocissus quinquefolius (L.) Planch.	Virginia Creeper	x	x	x	x	x
AQUIFOLIACEAE	**HOLLY FAMILY**					
Ilex vomitoria Ait.	Yaupon		x			
CELASTRACEAE	**STAFF TREE FAMILY**					
Celastrus scandens L.	Bittersweet	x	x			
Euonymus atropurpurea Jacq.	Burning Bush					x
MALVACEAE	**MALLOW FAMILY**					
Malva neglecta Wallr.	Common Mallow		x			
ELEAGYNACEAE	**OLEASTER FAMILY**					
Eleagnus angustifloia L.	Oleaster		x			
ARALIACEAE	**GINSENG FAMILY**					
Aralia racemosa L.	Spikenard	x			x	
Hedera Helix L.	English Ivy	x				
CORNACEAE	**DOGWOOD FAMILY**					
Cornus Amomum Mill.	Silky Cornel	x	x			x
Cornus rugosa Lam.	Round leaved Dogwood		x			
Cornus stolonifera Michx.	Red Osier	x	x			x
Cornus racemosa Lam.	White-berried Dogwood	x	x	x		
ERICACEAE	**HEATH FAMILY**					
Rhododendron nudiflorum (L.) Torr.	Pinkster Flower		x			x
Rhododendron maximum, L. var.?	Rhododendron			x		
Vaccinium angustifolium Ait.	Blueberry		x		x	x
Vaccinium corymbosum L.	High Bush Blueberry		x			x
OLEACEAE	**OLIVE FAMILY**					
Liqustrum vulgare L.	Privet	x		x	x	
Syringa vulgaris L.	Lilac	x	x			
Vinca minor L.	Periwinkle	x	x	x		

(Faunal-Floral Survey, Continued) Shrubs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
RUBIACEAE	MADDER FAMILY					
Cephalanthus occidentalis L.	Button bush			x		
CAPRIFOLIACEAE	HONEY SUCKLE FAMILY					
Vivurnum Opulus L. var. americanum Ait.	High-bush Cranberry	x				
Viburnum acerifolium L.	Maple-leaved Arrow wood		x			x
Viburnum cassinoides L.	Withe Rod		x			
Viburnum prunifolium L.	Black Haw	x	x			x
Viburnum dentatum L. var. dentatum	Toothed Arrow wood	x	x	x	x	x
Sambucus canadensis L.	Common Elder	x	x			x
Diervilla Lonicera Mill.	Bush Honey Suckle	x				
Symphoricarpos albus Blake	Snowberry			x		
Lonicera japonica Thunb.	Japanese Honey Suckle	x	x	x	x	

HERBS

TYPHACEAE	CATTAIL FAMILY					
Typha latifolia L.	Broad leaved Cattail	x		x		
ALLISMACEAE	WATER PLANTAIN FAMILY					
Alisma Plantago-aquatica L.	Water Plantain	x				
GRAMINEAE	GRASS FAMILY					
Dactylis glomerata L.	Orchard Grass	x	x	x		
Phragmites communis Trin.	Reed Grass	x	x	x	x	
Alopecuris pratensis L.	Meadow Foxtail	x	x	x		
Anthoxancum odoratum L.	Sweet Vernal Grass		x	x		
Zizania aquatica L.	Wild Rice			x		
Digitaria sanguinalis (L.) Scop	Crab Grass		x			
Panicum latifolium L.	Broad leaved Panic Grass	x	x	x		x
Panicum angustifolium Ell.	Narrow leaved Panic Grass			x		x
Echinocloa Crusgalli (L.) Beauv.	Barnyard Grass		x	x		x

(Faunal-Floral Survey, Continued) Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
CYPERACEAE	SEDGE FAMILY					
Cyperus strigosus L.	Straw-colored Cyperus	x	x	x	x	
Carex laxiflora Lam. var. laxiflora B. B.	Open Flowered Sedge	x				
Carex styloflexa Buckl.	Bent Sedge	x		x	x	
Carex lupulina Muhl.	Hop Sedge		x			
ARACEAE	ARUM FAMILY					
Arisaema triphyllum (L.) Schott var. triphyllum	Jack in the Pulpit	x	x			x
Peltandra podophyllum (L.) Kunth.	Arrow Arum	x		x		
Symplocarpus foetidus (L.) Nutt.	Skunk Cabbage	x	x	x	x	x
LEMNACEAE	DUCKWEED FAMILY					
Lemna minor L.	Duckweed	x				
COMMELINACEAE	SPIDERWORT FAMILY					
Commelina erecta L.	Day Flower		x	x		
PONTEDERIACEAE	PICKEREL-WEED FAMILY					
Pontederia cordata L.	Pickerel-weed	x		x		
JUNCACEAE	RUSH FAMILY					
Juncus tenuis Willd.	Path Rush		x			
Juncus canadensis J. Gay	Canada Rush	x	x			
Luzula campestris (L.) D.C.	Wood Rush			x		
LILIACEAE	LILY FAMILY					
Veratrum viride Ait.	False Green Hellebore	x	x			
Melanthium virginicum L.	Bunch flower	x				
Hemerocallus fulva L.	Day Lily	x	x	x		x
Allium tricoccum Ait.	Wild Leek	x	x	x	x	
Allium vineale L.	Field Garlic	x	x	x		x
Lilium canadense L.	Field Lily	x	x		x	
Erythronium americanum Ker.	Dog-tooth Violet					x
Ornithogalum umbellatum L.	Star- of - Bethlehem			x		x
Muscari botryoides (L.) Mill	Grape Hyacinth	x				
Yucca filamentosa L.	Adam's Needle			x		
Smilacina racemosa (L.) Desf.	False Solomon's Seal	x	x		x	x
Maianthemum canadense Desf. var. canadense	Wild Lily of the Valley		x		x	x
Polygonatum biflorum (Walt.) Ell.	True Solomon's Seal		x			x

(Faunal-Floral Survey, Continued) Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
Convallaria majalis L.	Lily of the Valley		x	x	x	
Smilax herbacea L.	Carrion Flower		x		x	x
DIOSCORIACEAE	YAM FAMILY					
Dioscorea villosa L.	Wild Yam	x	x		x	
IRIDACEAE	IRIS FAMILY					
Narcissus Pseudo - Narcissus L.	Daffodil					x
Iris versicolor L.	Blue Flag	x	x	x		
URTICACEAE	NETTLE FAMILY					
Humulus japonicus Sieb. & Zucc.	Japanese Hops	x	x	x		
Urtica dioica L.	Stinging Nettle	x	x			
Boehmeria cylindrica (L.) Sw.	False Nettle	x	x	x		
Pilea pumila(L.) Gray	Clearweed	x	x			
POLYGONACEAE	BUCKWHEAT FAMILY					
Rumex Acetellosa L.	Red Sorrel	x	x			
Rumex obtusifolius L.	Bitter Dock			x		x
Rumex pulcher L.	Curled Dock	x	x			
Polygonum aviculare L.	Dooryard Knotweed		x			
Polygonum pensylvanicum L. var. pensylvanicum	Smartweed		x			
Polygonum Bistorta L.	Bistort	x				
Polygonum densiflorum Meissn.	Water Smartweed	x				
Polygonum orientale L.	Prince's Feather	x				
Polygonum robustius (Small) Fern.	Water Pepper	x	x			
Polygonum hydropiperoides Michx.	Water Pepper	x	x			
Polygonum saggitum L.	Arrow leaved Tear thumb	x	x			
Polygonum arifolium L.	Halberd leaved Tear thumb	x				
Polygonum virginianum L.	Virginia Knotweed	x	x	x	x	x
Polygonum scandens L.	False Climbing Buck-wheat	x				
Polygonum cuspidatum Sieb. & Zucc.	Mexican Bamboo	x	x	x		x
CHENOPODIACEAE	PIGWEED FAMILY					
Chenopodium ambrosiodes L.	Mexican Tea	x	x	x		
Chenopodium album L.	Lambs Quarters		x			
AMARATHACEAE	AMARANTH FAMILY					
Amananthus Powellii Wats.	Pigweed		x			
Acnida cannabina L.	Water Hemp			x		

(Faunal-Floral Survey, Continued) Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
PHYTOLACCACEAE	**PHYTOLACCA FAMILY**					
Phytolacca americana L.	Pokeweed	x	x	x		
PORTULACACEAE	**PORTULACA FAMILY**					
Claytonia virginica	Spring Beauty	x		x		
CARYOPHLLACEAE	**PINK FAMILY**					
Stellaria media (L.) Cyrill.	Common Chickweed	x				
Stellaria graminea L.	Grass leaved Chick-weed		x			
Lychnis alba Mill.	White Campion	x	x			
Silene stellata (L.) Ait. f.	Starry Campion					
Silene Cucubalus Wibel.	Bladder Campion	x				
Saponaria officinalis L.	Soapwort	x		x		
NYMPHEACEAE	**WATER LILY FAMILY**					
Nuphar advena Ait.	Yellow Water Lily			x		
RANUNCULACEAE	**CROWFOOT FAMILY**					
Thalictrum polygamum Muhl.	Meadow Rue	x	x			
Ranunculus micranthus Nutt.	Small flowered Crowfoot	x				x
Ranunculus septentrionalis Poir. var. septentrionalis	Meadow Buttercup		x	x		
Anemone quinquefolia L.	Wood Anemone		x			
PAPAVERACEAE	**POPPY FAMILY**					
Chelonidium majus L.	Celandine	x	x	x		x
CRUCIFERAE	**MUSTARD FAMILY**					
Brassica campestris L.	Field Mustard		x			x
Lepidium campestre (L.) R. Br.	Sweet Pepper Grass	x	x	x		
Capsella Bursa-pastoris (L.) Medic.	Shepherd's Purse		x	x		
Cardamine bulbosa (Schreb) BSP	Bitter Cress	x				
Nasturtium officinale R. Br.	Water Cress		x			
Hesperis matrionalis L.	Dame's Rocket	x	x			
CAPPARIDACEAE	**CAPER FAMILY**					
Cleome spinosa L.	Spider Flower		x			
CRASSULACEAE	**ORPINE FAMILY**					
Sedum Telephium L.	Live-for-ever		x			

(Faunal-Floral Survey, Continued)

Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
ROSACEAE	**ROSE FAMILY**					
Gillenia stipulata (Muhl,) Trel.	Indian Physic		x			
Fragaria virginica Duchesne	Wild Strawberry	x				
Potentilla canadensis L.	Common Anguefoil	x	x	x		x
Geum virginianum L.	White Avens			x		
Geum canadense Jacq.	White Avens		x			
Agrimonia pubescens Wallr.	Hairy Agrimony		x	x		
CAESALPINACEAE	**CAESALPINIA FAMILY**					
Cassia nictitans L. var. nictitans	Wild Sensitive Plant	x				
FABACEAE	**BEAN FAMILY**					
Trifolium pratense L.	Red Clover	x	x			
Trifolium repens L,	White Clover	x		x		
Trifolium hybridum L,	Alsike Clover	x	x			
Trifolium agrarium L.	Hop Clover	x				
Trifolium procumbens L.	Low Hop Clover	x	x			
Melilotus alba Desv.	Sweet White Clover	x	x	x		
Desmodium canadense	Canada Tick Trefoil		x			
Vicia angustifolia Reichard	Purple Vetch	x				
Lathyrus palustris L.	Vetchling	x				
Apios americana Medic.	Ground Nut	x				
OXALIDACEAE	**SORREL FAMILY**					
Oxalis stricta L.	Yellow Wood Sorrel	x	x			
GERANIACEAE	**GERANIUM FAMILY**					
Geranium maculatum L.	Wild Geranium	x	x	x		
EUPHORBIACEAE	**SPURGE FAMILY**					
Cnidoscolus stimulosus (Michx.) Engelm. & Gray	Tread Softly	x				
Euphorbia maculata L.	Spotted Spurge	x				
BALSAMINEACEAE	**TOUCH ME NOT FAMILY**					
Impatiens biflora Willd.	Jewel Weed	x	x	x	x	x
Impatiens Balsamina L.	Balsam		x			
VIOLACEAE	**VIOLET FAMILY**					
Viola cucullata	Blue Marsh Violet	x	x			x

(Faunal-Floral Survey, Continued)

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
LYTHRACEAE	**LOOSE STRIFE FAMILY**					
Lythrum Salicaria L.	Purple Loosestrife			x		
ONAGRACEAE	**EVENING PRIMROSE FAMILY**					
Ludwigia palustris (L.) Ell.	Marsh Purslane			x		
Circaea canadensis Hill	Enchanter's Nightshade	x	x	x	x	x
Epilobium adenocaulon Haussk.	Purple veined Willow Herb	x	x			
Oenothera biennis L.	Evening Primrose	x	x	x		
UMBELLIFERAE	**PARSLEY FAMILY**					
Sanicula marilandica L.	Black Snakeroot	x	x			
Cryptotaenia canadensis (L.) D.C.	Honewort		x			
Osmorhiza claytoni (Michx.) Clarke	Sweet Cicely		x			
Daucus carota L.	Wild Carrot	x	x			
Sium suave Walt.	Water Parsnip			x		
PRIMULACEAE	**PRIMROSE FAMILY**					
Lysimachia quadrifolia L.	Whorled Loosestrife		x			x
Lysimachia terrestris (L.) BSP	Swamp Candles	x		x		
Steironema ciliatum (L.) Raf.	Fringed Loosestrife	x	x	x		x
APOCYNACEAE	**DOGBANE FAMILY**					
Apocynum androsaemifolium L.	Dogbane	x	x			
ASCLEPIADACEAE	**MILKWEED FAMILY**					
Asclepias incarnata L.	Swamp Milkweed	x	x			
Asclepias syriaca L.	Common Milkweed	x	x	x		
CONVOVULACEAE	**MORNING GLORY FAMILY**					
Ipomaea purpurea (L.) Reth	Morning Glory	x				
Convovulus sepium L. var. sepium	Morning Glory			x		
Cuscuta pentagona Engelm.	Dodder	x	x	x		
Cuscuta Gronovii Willd.	Common Dodder	x				
POLEMONIACEAE	**PHLOX FAMILY**					
Phlox divaricata L.	Phlox		x			
VERBENACEAE	**VERVAIN FAMILY**					
Verbena urticaefolia L. var. urticaefolia	White Vervain	x	x			
Verbena hastata L.	Blue Vervain	x		x		

(Faunal-Floral Survey, Continued) Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
LABIATAE	**MINT FAMILY**					
Leonurus Cardiaca L.	Motherwort			x		
Glecoma hederacea L.	Ground Ivy	x	x	x		x
Prunella vulgaris L.	Heal All	x	x			
Lycopus americanus Muhl.	Bugle Weed	x	x			
Lycopus rubellus Moench.	Bugle		x			
Mentha piperita L.	Peppermint		x			
Collinsonia canadensis L.	Horse Balm	x				
SOLANACEAE	**POTATO FAMILY**					
Solanum Dulcamara L.	Bittersweet	x	x			x
Solanum nigrum L.	Black Nightshade					x
Solanum caroliniense L.	Horse Nettle	x				
SCROPHULARIACEAE	**FIGWORT FAMILY**					
Verbascum Thapsis L.	Great Mullein	x		x		
Verbascum phlomoides L.	Mullein	x				
Chelone glabra L.	Turtlehead	x	x	x	x	x
PLANTAGINACEAE	**PLANTAIN FAMILY**					
Plantago major L.	Common Plantain	x	x	x		
Plantago lanceolata L.	English Plantain	x	x	x		
RUBIACEAE	**MADDER FAMILY**					
Houstonia serpyllifolia Michx.	Bluets		x			
Diodia teres Walt.	Buttonweed			x		
Galium circaezans Michx.	Wild Liquorice					x
Galium Aparine L.	Bedstraw		x			x
CUCURBITACEAE	**GOURD FAMILY**					
Echinocystis lobata (Michx.) T.& G	Balsam Apple			x		
Sicyos angulatus L.	Bur Cucumber	x	x			
LOBELIACEAE	**LOBELIA FAMILY**					
Lobelia siphylitica L.	Great Blue Lobelia		x			
COMPOSITAE	**COMPOSITE FAMILY**					
Helianthus strumusus L.	Rough Sunflower	x				
Ambrosia trifida L.	Giant Ragweed	x	x	x		x
Ambrosia artemisiifolia L.	Common Ragweed	x	x	x		
Xanthium strumarium L.	Cocklebur	x	x			
Rudbeckia hirta L.	Black eyed Susan		x			

(Faunal-Floral Survey, Continued) Herbs

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
Bidens coronata (L.) Britt.	Brook Sunflower	x		x		
Galinsoga parviflora Cav.	Small flowered Galinsoga			x		
Helenium autumnale L.	Sneezeweed			x		
Anthemis arvensis L.	Chamomile	x				
Achillea Millefolium L.	Yarrow	x	x	x		
Chrysanthemum Levcanthemum L.	Common Ox Eye Daisy	x	x			
Artemesia vulgaris L.var. hispida Gleas.	Mugwort	x	x	x		x
Solidago hispida Muhl. var. graminifolia	Goldenrod		x			
Solidago graminifolia (L.) Salisb.	Lance-leaved Goldenrod	x				
Solidago sp?	Goldenrods	x		x		
Aster cordifolius L.	Heart leaved Aster		x	x		x
Aster ericoides L.	Many flowered Aster	x	x	x		
Erigeron annuus (L.) Pers.	Daisy Fleabane	x	x			
Erigeron strigosus Muh. var. strigosus	Daisy Fleabane			x		
Conyza canadense (L.) Cron	Horseweed	x	x			
Eupatorium purpureum L.	Joe Pye Weed	x				
Eupatorium dubium Willd.	Joe Pye Weed	x	x	x		
Eupatorium rugosum Houtt.	White Snakeroot			x	x	
Hieracium canadense Michx.	Hawkweed		x	x		
Taraxacum officinale Weber.	Common Dandelion			x		
Vernonia noveboracensis (L.) Michx.	New York Ironweed		x	x		
Arctium Lappa L.	Great Burdock	x	x	x		x
Cirsium vulgare (Savi.) Torr.	Bull Thistle	x	x	x		
Sonchus arvensis L.	Sow Thistle	x				
Lactuca biennis (Moench.) Fern.	Wild Lettuce		x			
Lactuca canadensis L. var. canadensis	Wild Lettuce	x		x		
Cichorium Intybus L.	Chickory	x				

NON–FLOWERING PLANTS – CLUB MOSSES HORSETAILS FERNS, MOSSES , FUNGI

EQUISETACEAE	HORSETAIL FAMILY					
Equisetum sylvaticum L.	Woodland Horsetail	x	x	x	x	x
OSMUNDACEAE	ROYAL FERN FAMILY					
Osmunda regalis L.	Royal Fern		x			
Osmunda cinnamomea L.	Cinnamon Fern	x	x		x	x
POLYPODIACEAE	POLYPODY FAMILY					
Dennstaedtia punctiloba	Hay-Scented Fern				x	
Pteridium aquilinum (L.) Kuhn	Bracken		x			
Onoclea sensibilis L.	Sensitive Fern	x	x	x	x	x
Athyrium thelypteroides (Michx.) Desv. var. aspleniodes (Michx.) Farw.	Silvery Spleenwort	x	x		x	
Athyrium Felix-femina (L.) Roth	Lady Fern	x		x		x
Thelypteris noveboracensis (L.) Nieuwl.	New York Fern		x			x
Thelypteris palustris Schott.	Marsh Fern		x			x

Floral Survey, continued

Non-Flowering Plants

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokalota	Board of Education Tract
Dryopteris austriaca (Jacq.) Woynar var. spinulosa (Mull) Fiori	Spinulose Shield Fern		x		x	x
Dryopteris Clintoniana (D.C. Eaton) Dowell	Clinton's Shield Fern	x	x			
Mosses and Liverworts						
Mnium giganteum	Leafy Moss	x	x	x	x	
Catharinea sp?	Star Moss			x		x
Dicranum sp?	Larger Broom Moss			x		x
Brachythecium sp?		x			x	
Pallavicinia lyelli	Ribbed Hepatic		x			
Fungi						
Fomes sp?	Bracket Fungus	x	x			
Polyporus versicolor	Turkey Tail Fungus		x			

D

The Dominant Animal Species of the Parks

During the days of observation described above forty-three (43) species of vertebrate animals were observed in the five parks. No attempt was made to determine the scope of invertebrate distribution. Such a count is beyond the scope of this investigation. It is most likely that the largest animal group both in species diversity and also in total population numbers, are the insects. This ratio is universal in temperate and tropical climates. On the other hand, no serious infestations of insect pests were noted such as gypsy moth, tent caterpillar, fall webworm or red oak caterpillar.

The vertebrate species distribution by parks is shown in Table III below:

Table III
Total Number of Animal Species Found in Each of Five Selected Parks in Teaneck, New Jersey
Vertebrate Species Only

Park	Animal Species Number		
	Actually Observed	Projected	Total Observed and Projected
BIRDS			
Windsor	22	34	56
Argonne	15	39	54
Andreas	23	55	78
Tokaloka	17	47	64
Board of Education Tract	15	33	48
MAMMALS			
Windsor	5	5	10
Argonne	3	5	10
Andreas	0	0	8
Tokaloka	1	5	6
Board of Education Tract	1	6	7
REPTILES AND AMPHIBIANS			
Windsor	0	6	6
Argonne	0	5	5
Andreas	3	7	10
Tokaloka	0	5	5
Board of Education Tract	0	6	6
FISH			
Windsor	0	0	0
Argonne	0	0	0
Andreas	2	2	4
Tokaloka	0	0	0
Board of Education Tract	0	0	0

With prudent management, there is every reason to expect that the animal populations of the Teaneck Parks will be maintained or even increased where feasible and desirable.

The Faunal-Floral Survey of Five Selected Parks in Teaneck, New Jersey

KEY: S – Seen
P^s – Presence probable, sign detected, tracks, scat, lairs
P^r – Presence possible, existing records

MAMMALS

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokaloka	Board of Education Tract
Didelphis marsupialis	Opossum	S	P^r	P^r		
Eptesicus fuscus	Big Brown Bat	S	P^r	P^r	P^r	P^r
Procyon lotor	Raccoon	P^s		P^s		
Mephitis mephitis	Striped Skunk	P^r	P^r		P^r	P^r
Vulpes fulva	Red Fox	P^r	P^r	P^r	P^r	P^r
Marmota monax	Woodchuck			P^s		P^s
Sciurus carolinensis	Eastern Gray Squirrel	S	S		S	S
Peromyscus leucopus	White footed Mouse	P^s	P^s	P^r	P^r	P^r
Ondatra zibethica	Muskrat	S	S	P^r		
Rattus norvegicus	Norway Rat	P^r	P^r	P^r		
Silvilagus floridanus	Eastern Cottontail	S	S	P^s	P^r	P^r

Reference: Palmer, Ralph S. The Mammal Guide, Garden City, New York: Doubleday and Company, Inc., 1954

BIRDS

KEY: S – Seen
H – Heard
P – Presence possible, existing records
M – Probable during Spring or Fall Migration

Butorides virescens	Green Heron			P		
Branta canadensis	Canada Goose			M		
Anas platyrhyncos	Mallard Duck			S		
Anas rubripes	Black Duck			P		
Accipiter striatus	Sharp Shinned Hawk	P	P		P	P
Accipiter Cooperi	Cooper's Hawk				P	P
Buteo lineatus	Red Shouldered Hawk	P	P			
Buteo platypterus	Broad winged Hawk	P				
Phasiannus colchicus	Ring-necked Pheasant	S	P			
Charadrius vociferus	Kill Deer	P		P		
Philohela minor	Woodcock	P	P			
Totanus flavipes	Lesser Yellow legs			S		
Erolia minutilla	Least Sandpiper			S		
Pisobia fuscicollis	White-Rumped Sandpiper			S		
Larus argentatus	Herring Gull			S		
Zenaidura macrowia	Mourning Dove	S	S	P	S	P
Columba livia	Domesticated Pigeon	S	P	S	P	P
Coccyzus americana	Yellow billed Cuckoo				P	P

(Birds Continued)

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokaioka	Board of Education Tract
Coccyzus erythrophthalmus	Black billed Cuckoo				P	P
Otus nevius	Screech Owl		P			P
Bubo virginianus	Great Horned Owl		P			
Chardellis minor	Nighthawk	P		P		
Chaetura pelagica	Chimney Swift	P	P	P	P	P
Archilocus colubris	Ruby throated Hummingbird					
Megaceryle alcyon	Belted Kingfisher			P		
Colaptes auratus	Flicker	P	P	P	P	P
Dendrocopos villosus	Hairy Woodpecker	S	P	P	P	S
Dendrocopos pubescens	Downy Woodpecker	S	S	P	S	S
Tyrannus tyrannus	Eastern Kingbird	S	S	P		
Empidonax minimus	Least Flycatcher		P			
Sayornis phoebe	Phoebe			S		
Iridoprocne bicolor	Tree Swallow			S		
Hirundo rustica	Barn Swallow			S		
Riparia riparia	Bank Swallow			S		
Cyanocitta cristata	Blue Jay	S	S	S	H	H
Corvus corax	Common Crow	S	H	S	H	S
Parus atricapillus	Black-capped Chickadee					
Parus bicolor	Tufted Titmouse	S	P	P	S	P
Gitta carolinensis	White breasted Nuthatch	P	S	P	P	P
Certhia familiaris	Brown Creeper	P	P	P	P	P
Troglodytes aedon	House Wren	P	P	P	P	S
Dumetella carolinensis	Catbird	S	P	P	S	S
Minus polyglottos	Mockingbird	P	P	P	S	P
Turdus migratorius	Robin	S	S	P	P	P
Hypocichla mustelina	Wood thrush	P	S	P	H	H
Hypocichla guttala	Hermit thrush	P	S	P	S	P
Sialis sialis	Eastern Bluebird	P	P	P	P	P
Regulus satrapa	Golden Crowned Kinglet	M	M	M	M	M
Regulus calendula	Ruby Crowned Kinglet	M	M	M	M	M
Sturnus vulgaris	Starling	S	S	S	S	P
Vireo olivaceus	Red eyed Vireo	P	P	P	H	P
Vireo griseus	White eyed Vireo	P	P	P	P	P
Dendroica coronata	Myrtle Warbler	M	M	M	M	S
Mniotilta varia	Black and White Warbler	M	M	M	M	M
Seiurus aurocapillus	Ovenbird	P	P	P	S	P
Setophaga ruticilla	Redstart	P	P	P	H	P
Gleothylpis trichas	Yellowthroat	S	S	P	H	P
Dendroica petechia	Yellow Warbler	M	M	M	M	M
Passer domesticus	House Sparrow	S	P	P	P	S
Agelaius phoenicus	Redwing	S	S	P	P	S
Icterus galbula	Northern Oriole	M	M	M	M	P
Quiscalus quiscula	Purple Grackle	P	P	P	P	P
Molothrus ater	Brown headed Cowbird	P	P	P	P	P
Piranga olivacea	Scarlet Tanager	P	P	P	S	P

(Birds Continued)

Scientific Name	Common Name	Windsor	Argonne	Andreas	Tokaloka	Board of Education Tract
Pheuticus ludovicianus	Rose breasted Grosbeak	M	M	M	M	S
Hesperiphona vespertina	Evening Grosbeak	M	M	M	M	M
Carpodacus mexicanus	Purple Finch	S	S	M	M	M
Acanthus flammea	Redpoll	M	M	M	M	M
Spinus trista	Goldfinch	P	P	P	P	P
Pipilo erythrophthalmus	Rufous sided Towhee				P	P
Richmondena cardinalis	Cardinal	P	H	P	S	H
Junco hyemalis	Slate colored Junco	M	M	M	M	M
Spizella arborea	Tree Sparrow	M	M	M	M	M
Spizella passerina	Chipping Sparrow			P		
Zonotrichia atricapilla	White throated Sparrow	M	M	M	S	M
Melospiza melodia	Song Sparrow	S	P	P	P	P
Melospiza georgiana	Swamp Sparrow	P				
Plectrophenax nivalis	Snow Bunting	M	M	M	M	M

Reference: Peterson, Roger Tory. A Field Guide to the Birds, Boston, Massachusetts: Houghton Mifflin Company, 1947.

REPTILES

Thamnophis s. sirtalis	Garter Snake	P[r]	P[r]	P[r]	P[r]	P[r]
Thamnophis s. sauritus	Ribbon Snake			P[r]		
Coluber c. constrictor	Northern Black Racer					P[r]
Natrix s. sipedon	Common Water Snake			P[r]		
Chrysemys pipictata	Eastern Painted Turtle			S		
Chelydra s. serpentina	Snapping Turtle			P[r]		

AMPHIBIANS

Eurycea bislineata	Two lined Salamder	P[r]	P[r]			
Desmognathus f. fuscus	Dusky Salamander	P[r]	P[r]			
Plethodon c. cinereus	Eastern Red backed Salamander				P[r]	P[r]
Rana catesbiana	Bull Frog			P[r]		
Rana virgatipes	Green Frog	P[r]		S		
Rana palustris	Pickerel Frog			S		
Rana pipiens sphenocephala	Leopard Frog	P[r]		P[r]		
Rana sylvatica	Wood Frog				P[r]	P[r]
Hyla c. crucifer	Spring Peeper	P[r]	P[r]	P[r]	P[r]	P[r]
Hyla v. versicolor	Eastern Gray Tree Frog				P[r]	P[r]

Reference: Conant, Roger. A Field Guide to Reptiles and Amphibians, Boston, Massachusetts: HoughtonMifflin Company, 1958.

FISH

Anguilla rostrata	America Eel			P[r]		
Carassius auratus	Golden Carp			S		
Enneacanthus obesus	Black Banded Sunfish			S		
Lctahlurus catus	Catfish			P[r]		

Reference: Zim, Herbert S., and Hurst H. Shoemaker. Fishes: A Guide to Familiar American Species, New York: Golden Press, Inc., 1956.

AIR POLLUTANT MONITORING

Methods of Data Collection

Selected components of the ambient air were measured during spring and summer days at five locations in the Township of Teaneck in Bergen County, New Jersey. Winter days were assumed to be generally indicating less pollutant concentration because of greater ambient air velocities and lesser possibilities of air inversion. Serious effort was made to monitor the air quality on days with low wind velocities and higher humidities. In two instances the overcast situation changed to rain early in the day and the monitoring was rescheduled inasmuch as rain washed air would not be indicative of fair weather pollutant concentrations in the ambient air.

The observation stations were sited at:

1. The proposed housing development are northwest of the intersection of North Glenview Avenue and DeGraw Boulevard.

2. Cedar Lane at its intersections with Garrison and Elm Streets.

3. The Plaza area on Queen Anne Road north to State Street.

4. Teaneck Road at its intersection with East Tryon Avenue.

5. The area north of New Jersey Route 4 between Palisade Avenue and Queen Anne Road near the Votee Park maintenance Building.

The air constituents monitored were carbon monoxide, sulfur dioxide, nitrogen dioxide, lead and particulate matter.

The instruments utilized were the La Motte air sampler (model No.BD) which draws one liter of air per minute. The sampling periods ranged from 30 minutes to two hours with the exception of particulate sampling which ranged from two to five and one half hours. Particulates were collected by means of 2 Macalester High Volume Samplers, Model No. 6027033.

Concentrations of air constituents were determined colorimetrically using La Motte fixation and colorimetric methods. Calibration of the methods were made by sampling in Camden, New Jersey and comparing results with New Jersey Department of Environmental Protection values obtained for the same constituents during the same collection period.

The values obtained at each site are shown in Tables A-I to A-5.

TABLE A - I

Concentrations of Selected Air Constituents Monitored at De Graw Boulevard Near Glenview Avenue in Teaneck Township, Bergen County, New Jersey

Date	Time	Location	Relative Humidity %	Temp °C	Light Int. f.c.	Wind Dir. mph	Weather	Clouds	Carbon Monoxide ppm Sample Time	Sulfur Dioxide ppm Sample Time	Nitrogen Dioxide ppm	Lead ppm	Particulate Micrograms per-cu-meter
5/24/77	3:30 P	Bus Stop 110 m west of intersection	63	30	6,600	SW-5	Sunny Hazy	Stratus	9/30 min.	0.02/30 min	--	--	--
6/2/77	12:30 P	Same	55	30	10,200	SW-1-3	Sunny Hazy	Stratus	8/30 min	0.01/30 min	--	--	--
8/23/77	2:40 P	Same	60	27	8,400	SW-3-5	Sunny Hazy	Stratus	9/30 min	0.007/30 min	0.00	--	--

TABLE A - II

Concentration of Selected Air Constituents Monitored at Cedar Lane at Chestnut Street or Elm Street in Teaneck Township, Bergen County, New Jersey

5/24/77	9:30 A	At SE Corner Auto Service Station at Elm	60	27	10,000	NW-5-8	Sunny	None	8 /30 min	0.01/30 min	--	--	41/2hrs
6/2/77	2:40 P	Parking Lot at NE corner Chestnut	37	30	8,700	W-5-10	Sunny	Cirrus Cumulus	0.2/30 min	0.01/30 min	--	--	--
8/23/77	1:15 P	Same	63	29	11,000	SW-3-5	Hazy Sunny	Stratus	9/60 min	0.0/30 min	0.0/30 min	--	--

TABLE A - III

Concentration of Selected Air Constituents Monitored at the Plaza near Queen Anne Road in Teaneck Township, Bergen County, New Jersey

Date	Time	Location	Relative Humidity %	Temp °C	Light Int f.c.	Wind Dir. mph	Weather	Clouds	Carbon Monoxide ppm Sample Time	Sulfur Dioxide ppm Sample Time	Nitrogen Dioxide ppm	Lead ppm	Particulate Micrograms per-cu-meter
5/24/77	2:50 P	At Parking Lot of Natl Comm. Bank	58	31	4,300	W-5-15	Sunny	Stratus	9 /30 min	0.02/30	–	–	–
6/2/77	5:25 P	Same	39	29	5,800	W-5-8	Sunny	Cumulus	9/30 min	0.03/30	–	–	44/2hrs
8/23/77	9:30 A	Same	83	22	7,000	SW-3-5	Sunny	None	9 /60 min	0.01/60	0.00	–	42/5½hrs

TABLE A - IV

Concentration of Selected Air Constituents Monitored at the Intersection of Teaneck Road and Tryon Avenue in Teaneck Township, Bergen County, New Jersey

5 /24/77	5:00 P	SE Corner10 meters from Intersection	52	31	2,700	SW-5	Hazy	Stratus	8/30	0.03/30	–	–	–
6/2/77	4:20 P	Same	38	31	7,600	SW-1-3	Sunny	Cumulus cirrus	0.8/30	0.02/30	–	–	42/5hrs
8/23/77	11:30 A	Same	65	26	11,000	SW-3-5	Sunny	High Stratus	10/60	0.01/60	0.28/30	–	–

TABLE A - V

Concentration of Selected Air Constituents Monitored At the Site of the Proposed Community Recreation Center in Votee Park North of New Jersey Route 4 in Teaneck Township, Bergen County, New Jersey

Date	Time	Location	Relative Humidity %	Temp °C	Light Int. f.c.	Wind Dir. mph	Weather	Clouds	Carbon Monoxide ppm Sample Time	Sulfur Dioxide ppm Sample Time	Nitrogen Dioxide ppm	Lead ppm	Particulate Micrograms per-cu-meter
5/24/77	12:30 P	30 m from N.J. Route 4	63	30	6,800	SW-5-10	Hazy	Stratus	6/30	0.02	–	–	48/2hrs
6/2/77	10:30-11:30 A	Same	76	28	8,600	NW-3-5	Sunny with Haze	Stratus	10/30	0.01	–	–	45/2hrs
7/1/77	8:25 A	Same	71	27	7,200	W-5	"	Cirrus	8/60	0.02/60	–	–	–
7/1/77	9:25 A	Same	67	28	8,000	"	"	Stratus	6/60	–	–	–	–
7/1/77	10:25 A	Same	61	30	8,400	"	"	"	8/60	–	–	0.3	–
7/1/77	11:30 A	Same	60	28	2,100	"	"	"	9/60	0.02/60	–	0.3	40/5½hrs
7/1/77	12:30 P	Same	"	"	"	"	"	"	8/60	0.02/30	–	–	42/5½hrs
8/17/77	10:15 A	Same	84	29	3,000	E-5	Rain	Nimbo Stratus	8/30	–	–	–	–
8/23/77	10:15 to 3:30	Same	83	22	7,000	SW0305	Cloudy	Stratus	–	–	–	–	43/5½hrs

Interpretation

The three principal air constituents monitored, namely carbon monoxide, sulfur dioxide and particulates were all found to be within acceptable limits for one hour collections of data.

Carbon Monoxide

The acceptable maximum concentration for carbon monoxide in ambient air for one hour is 35 parts per million and for an eight hour period 9 parts per million are considered the healthful limit. Most of the data were purposely collected in the heavy motor vehicle activity period of the day between 9 AM and 5 PM. If a person were to remain continuously on the street at the busiest intersections, the safe limit of 9 parts per million per hour over a nine hour period might often be exceeded. Such a condition was not found to be the case at the site of the proposed new community recreation building at a distance of 100 feet (30 meters) from Route 4.

It seems reasonable to conclude that the ambient air at any distance of thirty or more meters from busy roadways would be at safe levels for carbon monoxide concentration.

It is possible that if traffic volumes were to increase on the Township of Teaneck's busiest traffic arteries, that additional testing should be made. If higher levels of carbon monoxide concentration were found than encountered in this study, then a system of traffic volume restriction for such arteries would need to be adopted.

Sulfur Dioxide

All readings for sulfur dioxide concentrations were found to be within the acceptable 0.03 ppm limits for one hour periods and 0.02 ppm limits for averages over a 24 hour period.

Particulate Matter

The concentrations of particulate matter encountered at 4 of the 5 sites were in the 40's (40 micrograms per cubic meter). These data compare favorably with the geometric means obtained for nearly Hackensack and Fort Lee.

	Hackensack	Fort Lee
1975	54.0 ug/m3	41.7 ug/m3
1976	43.8	40.8

Lead

Tests for lead fallout at the Votee Park site were registered at 0.3 milligrams per cubic meter of air. These data, not contracted for, are inconclusive because of the limited sampling, but apparently acceptable.

Nitrogen Dioxide

Only one area sampled showed a detectable concentration of nitrogen dioxide at 0.28 parts per million. All other areas sampled showed a zero level concentration. This non-required data seems to indicate acceptable levels for nitrogen dioxide.

"Benchmark" Comparisons

New Jersey Department of Environmental Protection air quality data obtained for 1975 and 1976 at Hackensack to the west and Fort Lee to the east are similar to data collected on selected Township of Teaneck intersections. The comparisons are shown below:

Constituent		Hackensack Geometric means (24 hr. projection)	Fort Lee Geometric means (24 hr. projection)	Teaneck Modal Value
Carbon Monoxide	1975	8	7.7	8
	1976	7.5	7.4	8
Sulfur Dioxide	1975	.017	.014	.01 - 02
	1976	0.14	.014	.01 - 02
Particulates	1975	54.0	41.7	42
	1976	43.8	40.8	

Conclusion

The air quality at the sites selected were close to the healthful limits in sampling areas immediately adjacent to busy traffic artery intersections. Most ambient air testing is not done in such close proximity to prime sources of air contamination by the New Jersey Department of Environmental Protection in order to obtain a more accurate generalized reading.

It seems wise to recommend that continued testing of air quality be done in Teaneck to insure that healthful levels continue to be maintained.

NOISE LEVEL MONITORING

Methods of Data Collection

Noise levels were monitored on eight different days in the winter, spring and summer at five location in the Township of Teaneck. The observation stations were sited at:

1. The proposed housing development are northwest of the intersection of North Glenview Avenue and DeGraw Boulevard.
2. Cedar Lane at its intersections with Garrison and Elm Streets.
3. The Plaza area on Queen Anne Road north to State Street.
4. Teaneck Road at its intersection with East Tryon Avenue.
5. The area north of New Jersey Route 4 between Palisade Avenue and Queen Anne Road near the Votee Park maintenance Building.

Determinations of noise intensity in decibels was obtained by utilization of two Castle-Fisher Noise Level Meters, Model 4. The two meters produced readings within 2 decibels of each other at all times. Calibration of the meters was provided by two Fisher made meters at Glassboro State College.

Atmospheric conditions were recorded at positions less than three meters (10 feet) from an intersection, and at periods when a traffic light first changed from red to green.

Interpretation

In general the intersection noise levels were in range between 65 and 80 db. noise levels. It is interesting to note that a volkswagon "bug" produces as much noise as a truck for an observer at an intersection at the time when the traffic light becomes green. Start up noise levels at the onset of green light periods for the more heavily trafficked thoroughfare ranged from seven to nine (7-9) decibels louder than during yellow light periods when few vehicle motors were being accelerated. As might be anticipated, rush hour traffic between 8 and 9 AM or between 4 and 6 PM generated higher noise levels. The increase, however, was no more than five (5) decibels.

The data obtained are recorded in tables N-I to N-V and a brief summary table is provided in Table N-VI

There are no standards as yet for acceptable street and highway noise levels. At a distance of 200 feet (61 meters) from an industrial property line, the New Jersey State Department of Environmental Protection's industrial code limits noise to 65 decibels A for the daylight hours of 7 AM to 10 PM and 50 decibels during the night hours of 10 PM to 1 AM. For this study 90 decibels were taken as an acceptable maximum.

Of the four street intersection sites, noise level readings were made fairly close to each intersection, 2 - 5 meters (6 - 15 feet) distant. The noise levels would be significantly less at the entrances to residences with their usual set back or from any buildings at any distance from the intersection. This statement is well substantiated by the data in Tables N-I and N-V where readings further frow the sound sources are contrasted with readings close to the intersection or sound source.

TABLE N - I

Noise Levels Observed at Various Sites in the Proposed Housing Site in the Area Northwest of De Graw Boulevard and East Glenview Avenue

Date	Time	Distance from Intersection Meters	ENVIRONMENTAL CONDITIONS				General Weather	Clouds	Range db	Modal Reading db
			Relative Humidity %	Temp. °C	Light Intensity Foot Candles	Wind mph				
12/28/76	4:10 P	50	80	-3	30	E-5	Overcast	Stratus	70-81	75
5/20/77	10:30 A	30	55	21-23	10,000-11,000	W-5	Sunny	Clear	68-76	71
5/20/77	10:40 A	60	55	21-23	10-11,000	W-5	Sunny	Clear	62-68	65
5/20/77	10:50 A	200	55	21-23	10-11,000	W-5	Sunny	Clear	64-76	68
5/20/77	11:00 A	400	55	21-23	10-11,000	W-5	Sunny	Clear	66-76	70
5/20/77	11:10 A	500	55	21-23	10-11,000	W-5	Sunny	Clear	62-70	65
5/20/77	11:20 A	350	55	21-23	10-11,000	W-5	Sunny	Clear	62-70	65
5/20/77	11:40 A	1000	55	21-23	10-11,000	W-5	Sunny	Clear	260-68	60
5/20/77	12:00 Noon	1200	55	21-23	10-11,000	W-5	Sunny	Clear	260-66	60
5/20/77	12:10 P	1400	55	21-23	10-11,000	W-5	Sunny	Clear	260-66	60
5/20/77	12:20 P	900	55	21-23	10-11,000	W-5	Sunny	Clear	260-70	67
5/20/77	12:30 P	700	55	21-23	10-11,000	W-5	Sunny	Clear	60-72	66
6/2/77	12:45 P	30	55	30	10,200	W-5	Sunny	Cirrus & Cumulus	76-90	84
6/2/77	1:00 P	60	55	30	10,200	W-5	Sunny	"	68-78	72
6/2/77	1:10 P	200	55	30	10,200	W-5	Sunny	"	78-82	82
6/2/77	1:20 P	400	55	30	10,200	W-5	Sunny	"	75-82	78
6/2/77	1:30 P	500	55	30	10,200	W-5	Sunny	"	64-75	68
6/2/77	6:30 P	700	55	30	10,200	W-5	Sunny	"	66-68	68
8/23/77	2:50 P	200 Turnpike Bridge	65	27	10,000	SW-3-5	Overcast	Stratus	72-84	80
8/23/77	2:55 P	0 Briuge Heavy Traffic	65	27	10,000	SW-3-5	Overcast	Stratus	75-90	84
8/23/77	3:00 P	Redlight	65	27	10,000	SW-3-5	Overcast	Stratus	68-81	75
8/23/77	3:00 P	0 Greenlight	65	27	10,000	SW-3-5	Overcast	Stratus	75-90	82
8/23/77	3:15 P	30	65	27	10,000	SW-3-5	Overcast	Stratus	70-80	76
8/23/77	3:20 P	30	65	27	10,000	SW-3-5	Overcast	Stratus	76-86	80

TABLE N - II

Noise Levels Observed On Cedar Lane at Intersections with Elm and Garrison Streets

5/24/77	9:55 A	5-NE Corner	60	27	10,000	NW-5-8	Fair	None	75-85	80
5/24/77	Elm	5-NW Corner	60	27	10,000	NW-5-8	Fair	None	83-86	84
5/24/77	Street	5-SE Corner	60	27	10,000	NW-5-8	Fair	None	77-82	81
5/24/77	9:55 A	5-SW Corner	*There was a jack hammer on Elm at J&J Drug Store and Clements Sewer Service pumps in front of Mobil Gas Station						80-87	84
5/24/77	11:25 A	5-SW Corner	60	27	10,000	NW-5-8	Fair	None	80-84	82
Garrison Street	10:05 A	5-NE Corner	60	27	10,000	NW-5-8	Fair	None	76-78	76
	10:05 A	5-SE Corner	60	27	10,000	NW-5-8	Fair	None	68-78	80
	10:05 A	5-NW Corner	60	27	10,000	NW-5-8	Fair	None	76-82	80

(Table N - II Continued)

Date	Time	Distance from Intersection Meters	Relative Humidity	Temp °C	Light Intensity Foot Candles	Wind mph	General Weather	Clouds	Range db	Modal Readin db
5/24/77	10:05 A	5-SW-Corner	*Several heavy trucks passing at this moment						68-102	84
5/24/77	11:25 A	5-NE-Corner	60	27	10,000	NW-5-8	Fair	None	72-98	78
5/24/77	11:25 A	5-SE-Corner	60	27	10,000	NW-5-8	Fair	None	66-78	74
5/24/77	11:25 A	5-NW-Corner	60	27	10,000	NW-5-8	Fair	None	74-82	78
5/24/77	11:25 A	5-SW-Corner	60	27	10,000	NW-5-8	Fair	None	66-80	72
6/1/77	11:20 A	10-SE-Elm Corner	70	18	4,000	NE	Rain	Nimbo Stratus	70-72	71
6/2/77	3:00 P	5-NE-Garrison	37	30	8,700	SW-1-3	Sunny	Cumulus Cirrus	70-79	74
6/2/77	3:00 P	5-SE-Garrison	37	30	8,700	SW-1-3	Sunny	"	71-84	76
6/2/77	3:00 P	5-NW-Garrison	37	30	8,700	SW-1-3	Sunny	"	76-84	80
6/2/77	3:00 P	5-SW-Garrison	37	30	8,700	SW-1-3	Sunny	"	70-83	75
8/23/77	1:35 P	NE	63	29	11,000	SW-3-5	Hazy/Sunny	Stratus	65-82	75
8/23/77	1:45 P	SE	63	29	11,000	SW-3-5	"	Stratus	67-80	75
8/23/77	1:30 P	NW	63	29	11,000	SW-3-5	"	Stratus	68-80	73
8/23/77	1:20 P	SW	63	29	11,000	SW-3-5	"	Stratus	65-82	75

TABLE N - III

Noise Levels Observed At the Plaza and Queen Anne Road in Teaneck Township, Bergen County, N.J.

5/24/77	2:00 P	2-NE-Corner	63	30	6,800	SW-5-10	Hazy	Stratus	66-84	72
5/24/77	2:00 P	2-NW-Corner	63	30	6,800	SW-5-10	Hazy	Stratus	66-84	72
5/24/77	2:00 P	2-SE-Corner	63	30	6,800	SW-5-10	Hazy	Stratus	67-77	72
5/24/77	2:00 P	2-SW-Corner	63	30	6,800	SW-5-10	Hazy	Stratus	64-84	70
6/1/77	10:40 A	5-SE-Corner	70	18	4,000	W-1-3	Rain	Nimbo Stratus	61-66	66
6/2/77	5:45 P	2-NE-Corner	39	29	5,800	W-5-8	Sunny	Cumulus	66-72	70
6/2/77	5:45 P	2-NW-Corner	39	29	5,800	W-5-8	Sunny	Cumulus	70-88	78
6/2/77	5:45 P	2-SE-Corner	39	29	5,800	W-5-8	Sunny	Cumulus	66-80	72
6/2/77	5:45 P	2-SW-Corner	39	29	5,800	W-5-8	Sunny	Cumulus	70-88	72
8/23/77	9:25 A	10-SW-Corner	83	22	10,000	SW-3-5	Sunny	Cumulus		70
8/23/77	10:00 A	10-SW-Corner	83	22	10,000	SW-3-5	Sunny	Cumulus	65-75	70
8/23/77	10:15 A	10-SW-Corner	83	22	10,000	SW-3-5	Sunny	Cumulus	66-76	71

TABLE N-IV

Noise Levels Observed At the Intersection of Teaneck Road and Tryon Avenue East in Teaneck Township, Bergen County, New Jersey

5/24/77	3:15 P	2-SE	52	31	3,500	SW-5-10	Hazy	Stratus	74-88	80
5/24/77	3:15 P	2-NW	52	31	3,500	SW-5-10	Hazy	Stratus	74-92	80
5/24/77	3:15 P	2-SE	52	31	3,500	SW-5-10	Hazy	Stratus	70-86	80
5/24/77	3:15 P	2-SW	52	31	3,500	SW-5-10	Hazy	Stratus	75-84	77
5/24/77	5:00 P	2-NE	52	31	3,500	SW-5-10	Hazy	Stratus	72-80	78
5/24/77	5:00 P	2-NW	52	31	3,500	SW-5-10	Hazy	Stratus	72-86	72
5/24/77	5:00 P	2-SE	52	31	3,500	SW-5-10	Hazy	Stratus	72-78	72

(Table N - IV Continued)

Date	Time	Distance from Intersection Meters	Relative Humidity	Temp °C	Light Intensity	Wind mph	General Weather	Clouds	Range db	Modal Reading db
5/24/77	5:00 P	2-SW	52	31	3,500	SW-5-10	Hazy	Stratus	72-82	71
6/1/77	11:00 A	SE	70	18	4,000	W-1-3	Rain	Nimbo Stratus	68-78	72
6/1/77	11:00 A	SW	70	18	4,000	W-1-3	Rain	Nimbo Stratus	61-76	63
6/2/77	4:15 P	NE	38	31	7,600	SW-1-3	Sunny	Cumulus Cirro Cumulus	72-84	78
6/2/77	4:15 P	NW	38	31	7,600	SW-1-3	Sunny	"	70-84	76
6/2/77	4:15 P	SE	38	31	7,600	SW-1-3	Sunny	"	70-88	77
6/2/77	4:15 P	SW	38	31	7,600	SW-1-3	Sunny	"	70-94	70
8/23/77	11:40 A	NE	65	26	11,000	SW-3-5	Sunny	High Stratus	75-85	81
8/23/77	11:40 A	NW	65	26	11,000	SW-3-5	Sunny	"	70-80	75
8/23/77	11:40 A	SE	65	26	11,000	SW-3-5	Sunny	"	79-89	81
8/23/77	11:00 A	SW	65	26	11,000	SW-3-5	Sunny	"	67-77	73

TABLE N - V

Noise Levels Observed At the Site of the Proposed Community Recreation Center in Votee Park North of New Jersey Route 4 Between Queen Anne Road and Palisades Avenue

5/24/77	10:25 A	10 from Rt. 4	60	28	10,200	N-5-7	Hazy	Haze	72-80	72
5/24/77	12:45 P	"	60	28	10,200	N-5-7	Sunny	"	76-88	88
5/24/77	2:30 P	"	60	28	10,200	N-5-7	Sunny	"	71-76	73
6/1/77	10:10 A	"	64	21	8,200	NE	Rain	Nimbo Stratus	72-76	74
6/2/77	11:45 A	"	68	28	8,800	W-1-3	Sunny	Cumulus	76-84	78
6/2/77	12:-M	"	68	28	8,800	W-1-3	Sunny	Cumulus with Stratus	71-88	78
6/2/77	12:10 P	"	68	28	8,800	W-1-3	Sunny	"	73-81	77
7/1/77	8:00 A	30 from Rt. 4	68	28	8,800	W-1-3	Sunny	"	73-81	66
7/1/77	8:30 A	"	68	28	8,800	W-1-3	Sunny	"		68
7/1/77	8:40 A	"	68	28	8,800	W-1-3	Sunny	"		68
7/1/77	8:50 A	"	71	27	7,250	W-5	Hazy	Cirro Stratus		70
7/1/77	9:00 A	"	71	27	7,250	W-5	Hazy	"		70
7/1/77	9:10 A	"	71	27	7,250	W-5	Hazy	"		70
7/1/77	9:30 A	"	71	27	7,250	W-5	Hazy	"		68
7/1/77	9:45 A	"	67	28	7,250	W-5	Hazy	"		66
7/1/77	11:00 A	"	61	30	6,400	W-5	Hazy	"		66
7/1/77	12:00 A	"	60	28	2,100	W-5	Hazy	"		69
7/1/77	12:30 P	"	60	28	2,100	W-5	Hazy	66-73		69
7/1/77	12:45 P	"	60	28	2,100	W-5	Hazy	"		68
7/1/77	12:50 P	"	60	28	2,100	W-5	Hazy	"		68
7/1/77	11:00 P	"	56	31	2,100	W-5	Hazy	"		68
7/1/77	11:30 P	"	56	31	2,100	W-5	Hazy	"		67
8/17/77	10:15 A	"	84	29	3,000	E-5	Rain	Nimbo Stratus	63-80	73

TABLE N - VI

Summary of Noise Level Values Obtained at Five Selected Sites in Teaneck Township, Bergen County, New Jersey

From Table	Site	Highest Level Recorded db	Time of Highest Noise Level	Modal Noise Level db
N - I	Glenview and De Graw	92	1:10 PM	76*
N - II	Cedar Lane	102	10:05 AM	78
N - III	Plaza	88	5:00 PM	72
N - IV	Teaneck and Tryon	92	3:15 PM	76
N - V	Votee Park	88**	12:45 PM	68

Within 30 meters of the intersection

Maximum recorded on 2 different days

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES	PARK NAME
101	1	15C	640 RIVER ROAD	TOWNSHIP OF TEANECK	PARK	1.08	640 River Road
101	7	15C	550 RIVER RD	TOWNSHIP OF TEANECK		11.22	Terhune Park
107	5	15C	370 KIPP ST	TOWNSHIP OF TEANECK	KIPP ST PARK	0.17	Kipp Street Park
201	11	15C	672 POMANDER WALK	TOWNSHIP OF TEANECK		0.22	Portion: 5' Wide Trail Easement
212	2	15C	662 POMANDER WALK	TOWNSHIP OF TEANECK	HISTORIC SITE	0.37	662 Pomander Walk
301	1	15B	1000 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY (TEANECK EASEMENT)	CAMPUS	0.80	FDU:Hackensack River Greenway
301	2	15B	2 LONE PINE LANE	FAIRLEIGH DICKINSON UNIVERSITY (TEANECK EASEMENT)	CAMPUS	0.01	FDU:Hackensack River Greenway
401	1	15B	1020 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY (TEANECK EASEMENT)	CAMPUS	2.43	FDU:Hackensack River Greenway
511	22	15C	1005 RIVER RD	TOWNSHIP OF TEANECK	PARK BATHROOM B	16.17	Phelps Park
803	6	15C	900 WINDSOR RD	TOWNSHIP OF TEANECK		4.99	Sagamore Park
810	9	15C	860 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT	1.54	Dr. Barnette S. Bookstaver Park
902	1	15C	399 WOODS RD	TOWNSHIP OF TEANECK	PARK	1.13	South Gaylord Park
903	1	15C	401 WOODS RD	TOWNSHIP OF TEANECK	PARK	1.25	South Gaylord Park
1002	1	15C	1660 RIVER RD	TOWNSHIP OF TEANECK	VACANT	11.63	Clarence W. Brett Park
1002	2	15C	1600 RIVER RD	TOWNSHIP OF TEANECK	1S-CB-O	0.17	Portion: 5' Wide Trail Easement
1102	11	15C	ROEMER AVE	TOWNSHIP OF TEANECK	VACANT	0.99	Continental Park
1103	1.01	15C	1725 RIVER RD	TOWNSHIP OF TEANECK	VACANT	14.99	Sen. Matt Feldman Nature Preserve
1204	1	15C	589 MAITLAND AVE	TOWNSHIP OF TEANECK	PARK	10.55	Tokoloka Park
1301	1	15C	1400 RIVER RD	TOWNSHIP OF TEANECK	1S-F-O	19.84	Maria W. Andreas Memorial Park
1401	1	15B	1200 RIVER RD (REAR)	FAIRLEIGH DICKINSON UNIVERSITY (TEANECK EASEMENT)	1S-CB-O	1.32	FDU:Hackensack River Greenway
1401	2	15C	1262 RIVER RD	TOWNSHIP OF TEANECK	VACANT	0.39	1282 River Road
2210	5	15C	434 BILLINGTON RD	TOWNSHIP OF TEANECK	1S-F-A	1.33	Eleanor M. Kieliszek Park
2211	1	15C	374 BILLINGTON RD	TOWNSHIP OF TEANECK	VACANT LAND	0.79	Eleanor M. Kieliszek Park
2402	2	15C	PALISADE AVE	TOWNSHIP OF TEANECK	VACANT LAND	2.92	Herrick Park
2601	1	15C	949 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	0.66	Windsor Park
2701	1	15C	1001 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT	1.54	Windsor Park
2904	11	15C	873 BROAD ST	TOWNSHIP OF TEANECK		1.35	Dr. Martin Luther King Jr. Park
2904	12	15C	818 TEANECK RD	TOWNSHIP OF TEANECK	2S-B-O	1.07	Paul A. Volcker Municipal Green
3303	5	15C	200 TEANECK RD	TOWNSHIP OF TEANECK	VACANT LAND	5.30	Amman Park

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES	PARK NAME
4204	5	15C	665 GLENWOOD AVE	TOWNSHIP OF TEANECK	1S-B-O	6.12	Hawthorne Park
4208	11	15C	LUCY AVE	TOWNSHIP OF TEANECK	VACANT LAND	7.53	Hawthorne Park
4302	3	15C	565 GLENWOOD AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.39	Harte Park
4701	1	15C	1101 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	3.13	Windsor Park
4702	1	15C	1104 QUEEN ANNE RD	TOWNSHIP OF TEANECK	1S-B-O-2AG	39.63	Milton Votee Park
4703	2	15C	1086 QUEEN ANNE RD	TOWNSHIP OF TEANECK	VACANT LAND	0.07	Milton Votee Park
4704	1	15C	1086 PALISADE AVE	TOWNSHIP OF TEANECK	VACANT LAND	1.28	Milton Votee Park
4901	2	15C	1355 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	2.18	Windsor Park
5006	1	15C	1471 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	0.95	Windsor Park
5007	1	15C	1421 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	3.28	Francis E. Hall Veterans' Park
5101	1	15C	1601 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	28.96	Windsor Park
5103	7	15C	1665 STEPHENS PL	TOWNSHIP OF TEANECK	STEPHENS PL PRK	0.47	Stephens Place Park
5511	28	15C	150 INTERVALE RD	TOWNSHIP OF TEANECK	VACANT LAND	4.68	Bernard E. Brooks Park
5708	1	15C	1415 BALSAM ST	TOWNSHIP OF TEANECK	VACANT LAND	0.05	Argonne Park
5714	1	15C	200 ENGLEWOOD AVE	TOWNSHIP OF TEANECK	VACANT LAND	53.51	Argonne Park
5801	9	15C	38 GENESEE AVE	TOWNSHIP OF TEANECK	VACANT LAND	1.17	Mackel Field Park
5802	1	15C	1295 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.16	Argonne Park
5926	1	15C	1125 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.91	Coolidge Park
					Total (Preserved):	**270.67**	
BLOCK	**LOT**	**CLASS**	**PROPERTY LOCATION**	**OWNER**	**BUILDING**	**ACRES**	**PARK NAME**
3501	1	15C	FORT LEE RD	COUNTY OF BERGEN	VACANT LAND	35.02	OVERPECK PARK
3602	10	15C	379 TEANECK RD	COUNTY OF BERGEN	VACANT LAND	0.77	OVERPECK PARK
3603	1	15C	DEGRAW AVE	COUNTY OF BERGEN	VACANT LAND	0.41	OVERPECK PARK
3608	1	15C	FORT LEE RD	COUNTY OF BERGEN	VACANT LAND	38.80	OVERPECK PARK
3609	1	15C	FORT LEE RD	COUNTY OF BERGEN	VACANT LAND	0.19	OVERPECK PARK
3703	11	15C	80 FYCKE LANE	COUNTY OF BERGEN	VACANT LAND	47.29	OVERPECK PARK: TEANECK CREEK CONSERVANCY
4101	1	15C	COLUMBUS DR	COUNTY OF BERGEN	2S-B-O	132.55	OVERPECK GOLF COURSE
4306	1	15C	ROUTE NO.95	COUNTY OF BERGEN	VACANT LAND	43.74	OVERPECK PARK
4501	1	15C	ROUTE NO.95	COUNTY OF BERGEN	VACANT LAND	82.52	OVERPECK PARK
					Total (County Parkland)	**381.28**	

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
105	21	15C	440 KIPP ST	TOWNSHIP OF TEANECK		0.03
201	11	15C	672 POMANDER WALK	TOWNSHIP OF TEANECK	LEAF COMPOSTING SITE	8.86
502	18	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.73
502	19	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.05
503	10	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.09
504	9	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.11
510	2	15C	681 MARTENSE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.08
604	5	15C	668 TILDEN AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.09
605	6	15C	668 MAPLE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.02
608	1	15C	682 BEVERLY RD	TOWNSHIP OF TEANECK	PARKING LOT	0.34
610	29	15C	619 CEDAR LANE	TOWNSHIP OF TEANECK	2S-B	0.15
705	4.01	15C	AMERICAN LEGION DRIVE	TOWNSHIP OF TEANECK	PARKING LOT	1.44
705.01	4.01	15C	ALMA TERRACE	TOWNSHIP OF TEANECK	PARKING LOT	0.17
706	5	15C	404 CEDAR LANE	TOWNSHIP OF TEANECK	VACANT LAND	0.03
706	9	15C	380 CEDAR LANE	TOWNSHIP OF TEANECK	VACANT LAND	0.14
817	8	15C	539 CEDAR LANE	TOWNSHIP OF TEANECK	PARKING LOT	0.32
818	6	15C	BEVERLY RD	TOWNSHIP OF TEANECK	PARKING LOT	0.31
819	1	15C	408 BEVERLY RD	TOWNSHIP OF TEANECK	MUN. PARKING LT	0.24
819	14	15C	824 WINDSOR RD	TOWNSHIP OF TEANECK	PARKING LOT	0.41
819	16	15C	BEVERLY RD	TOWNSHIP OF TEANECK	VACANT	0.07
819	17	15C	821 GARRISON AVE	TOWNSHIP OF TEANECK	PARKING LOT	2.00
1002	2	15C	1600 RIVER RD	TOWNSHIP OF TEANECK	1S-CB-O: DPW FACILITY	6.16
1101	1	15C	739 ROEMER AVE	TOWNSHIP OF TEANECK	VACANT	0.93
1102	10	15C	661 ROEMER AVE	TOWNSHIP OF TEANECK	VACANT	1.28
1107	1	15C	440 NEW BRIDGE RD	TOWNSHIP OF TEANECK	VACANT	0.58
1107	5	15C	416 NEW BRIDGE RD	TOWNSHIP OF TEANECK	VACANT	0.02
1112	1	15C	751 ROEMER AVE	TOWNSHIP OF TEANECK	VACANT	0.37
1501	1	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.06
1501	7	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.06
1502	1	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.16
1503	1	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.14
1507	1	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.20
1610	13	15C	1196 THE STRAND (REAR)	TOWNSHIP OF TEANECK	VACANT LAND	0.03
1618	1	15C	668 NORTHUMBERLAND RD	TOWNSHIP OF TEANECK	VACANT LAND	0.12
2105	18	15C	1357 TAFT RD (REAR)	TOWNSHIP OF TEANECK	VACANT LAND	0.14
2107	5	15C	1220 EMERSON AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.01
2205	9	15C	1192 WINDSOR RD	TOWNSHIP OF TEANECK	VACANT LAND	0.20

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
2306	15	15C	370 QUEEN ANNE RD (REAR	TOWNSHIP OF TEANECK	VACANT LAND	0.01
2702	11	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	0.46
2703	10	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT	1.60
2801	2	15C	101 CRANFORD PL	TOWNSHIP OF TEANECK	VACANT	0.70
2904	12	15C	818 TEANECK RD	TOWNSHIP OF TEANECK	2S-B-O: MUNICIPAL BLDG	5.51
3114	85	15C	127 OAKDENE AVE	TOWNSHIP OF TEANECK	VACANT	0.01
3205	6	15C	370 TEANECK RD	TOWNSHIP OF TEANECK		0.78
3210	2	15C	325 QUEEN ANNE RD	TOWNSHIP OF TEANECK	PARKING LOT	0.38
3306	2	15C	207 MUNN AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.01
3502.01	8	15C	18 E SHERWOOD AVE	TOWNSHIP OF TEANECK	VACANT LAND	1.66
3701	14	15C	56 FYCKE LANE	TOWNSHIP OF TEANECK	VACANT LAND	0.17
4001	8	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.14
4002	11	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.20
4003	23	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	1.15
4102	27	15C	FARRAGUT DR	TOWNSHIP OF TEANECK	VACANT LAND	1.00
4201	19	15C	EAST CEDAR LANE	TOWNSHIP OF TEANECK	SENIOR HOUSING	7.92
4207	1	15C	HAWTHORNE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.36
4303	1	15C	314 HOME ST	TOWNSHIP OF TEANECK	VACANT LAND	0.42
4402	12	15C	309 E OAKDENE AVE	TOWNSHIP OF TEANECK	1S-S-O	0.57
4402	14	15C	289 E OAKDENE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.15
4703	4	15C	1079 PALISADE AVE	TOWNSHIP OF TEANECK	2S-B-O	3.08
4808	15	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	1.77
4811	12	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.12
4812	15	15C	1056 MARGARET ST	TOWNSHIP OF TEANECK	VACANT LAND	0.32
4901	1	15C	1375 WINDSOR RD	TOWNSHIP OF TEANECK	1S-B-0	0.67
4903	4	15C	1350 QUEEN ANNE RD	TOWNSHIP OF TEANECK	VACANT LAND	0.22
4905	14	15C	1344 TEANECK RD	TOWNSHIP OF TEANECK	VACANT LAND	0.44
4906	17	15C	1240 TEANECK RD	TOWNSHIP OF TEANECK	VACANT LAND	0.52
5002	1	15C	108 AMSTERDAM AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.23
5002	20	15C	29 STATE ST	TOWNSHIP OF TEANECK	VACANT LAND	0.31
5002	23	15C	89 STATE ST	TOWNSHIP OF TEANECK	VACANT LAND	0.34
5002	25	15C	105 STATE ST	TOWNSHIP OF TEANECK	VACANT LAND	0.63
5005	12	15C	195 THE PLAZA	TOWNSHIP OF TEANECK	VACANT LAND	0.05
5008	4	15C	1389 PALISADE AVE	TOWNSHIP OF TEANECK	VACANT LAND	1.35
5105	10	15C	GALWAY PL	TOWNSHIP OF TEANECK	VACANT LAND	0.03
5107	18	15C	56 TRYON AVE WEST	TOWNSHIP OF TEANECK	VACANT LAND	0.83
5207	14	15C	43 SACKVILLE ST	TOWNSHIP OF TEANECK	VACANT LAND	0.14

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
5302	29	15C	207 LIBERTY RD	TOWNSHIP OF TEANECK	VACANT LAND	0.46
5402	15	15C	100 IRVINGTON RD	TOWNSHIP OF TEANECK	VACANT LAND	0.02
5402	23	15C	152 IRVINGTON RD	TOWNSHIP OF TEANECK	VACANT LAND	0.09
5404	12	15C	246 STUYVESANT RD	TOWNSHIP OF TEANECK	VACANT LAND	0.02
5411	3	15C	204 HAMILTON RD	TOWNSHIP OF TEANECK	VACANT LAND	0.03
5413	18	15C	93 VAN BUSKIRK RD	TOWNSHIP OF TEANECK	VACANT LAND	0.09
5502	4	15C	151 INTERVALE RD	TOWNSHIP OF TEANECK	VACANT LAND	0.10
5507	6	15C	1603 ARDSLEY CT	TOWNSHIP OF TEANECK	VACANT LAND	0.76
5507	16	15C	1615 ARDSLEY CT (REAR)	TOWNSHIP OF TEANECK	VACANT LAND	0.14
5508	7	15C	201 HARGREAVES AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.12
5602	1	15C	116 TRYON AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.17
5608	10	15C	210 SHEPARD AVE	TOWNSHIP OF TEANECK	VACANT LAND	6.68
5612	11	15C	1466 ENDICOTT TERR	TOWNSHIP OF TEANECK	VACANT LAND	0.24
5703	11	15C	1421-1425 TEANECK RD	TOWNSHIP OF TEANECK	1S-CB-O	0.35
5706	6	15C	ENGLEWOOD AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.66
5706	9	15C	1423 ASPEN TERR	TOWNSHIP OF TEANECK	VACANT LAND	0.49
5707	2	15C	ENGLEWOOD AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.80
5707	10	15C	1423 SPRUCE ST	TOWNSHIP OF TEANECK	VACANT LAND	0.38
5710	35	15C	1391 TEANECK RD	TOWNSHIP OF TEANECK	VACANT LAND	0.44
5713	39	15C	ARLINGTON AV	TOWNSHIP OF TEANECK	VACANT LAND	0.07
5801	4	15C	75 BEDFORD AVE	TOWNSHIP OF TEANECK	VACANT LAND	1.19
5801	15	15C	GENESEE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.12
5802	3	15C	1279 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.07
5808	1	15C	1231 TEANECK RD	TOWNSHIP OF TEANECK	2S-B-A	0.44
5809	2	15C	1233 OVERLOOK AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.07
5816	2	15C	GENESEE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.06
5902	9	15C	66 E FOREST AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.11
5905	2	15C	150 E FOREST AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.10
5909	9	15C	254 E.FOREST AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.05
5911	1	15C	1140 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.77
5918	3	15C	36 PROSPECT TERR SO	TOWNSHIP OF TEANECK	VACANT LAND	0.13
5921	11	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.08
5923	9	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.19
5924	11	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.17
5925	2	15C	1124 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.12
5925	7	15C	1096 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.36
5925	8	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.06

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
5927	1	15C	1101 LORAINE AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.35
5927	4	15C	1111 WEBSTER AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.10
5927	5	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.32
6001	1	15C	266 TIETJEN AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.34
6001	3	15C	286 TIETJEN AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.30
6001	7	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	0.67
6001	8	15C	1091 WEBSTER AVE	TOWNSHIP OF TEANECK	VACANT LAND	0.18
6002	10	15C	ROUTE 4 BUFFER	TOWNSHIP OF TEANECK	VACANT LAND	4.81
					Total (Public Property):	**83.65**
5301	1	15C	1799 TEANECK RD	STATE OF N.J./DEPT MILITARY	2S-B-O	13.22
					Total (Armory):	**13.22**
					Total Public Property:	**96.87**

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
108	1	15A	563 CHESTNUT AVE	FRIENDS OF TEANECK COMM SCHOOL INC	2S-CB-B	1.33
901	1	15A	1035 LINCOLN PL	BOARD OF EDUCATION	2S-B-O	3.81
1813	11	15A	500 RUTLAND AVE	BOARD OF EDUCATION	2S-B-A	3.26
2105	7	15A	1300 WINDSOR RD	BOARD OF EDUCATION	2S-B-L	13.28
2801	1	15A	1009 QUEEN ANNE RD	BOARD OF EDUCATION	3S-B-O	12.97
2904	10	15A	1 MERRISON ST	BOARD OF EDUCATION	2S-B-O	2.52
3820	1	15A	659 TEANECK RD	BOARD OF EDUCATION	2S-B-O	13.51
4208	12	15A	225 FYCKE LANE	BOARD OF EDUCATION	2S-B-O	3.94
4811	11	15A	1061 MARGARET ST	BOARD OF EDUCATION	VACANT LAND	0.49
4812	14	15A	1060 MARGARET ST	BOARD OF EDUCATION	VACANT LAND	0.67
5512	15	15A	1 TRYON AVE	BOARD OF EDUCATION	1S-B-O-	5.32
				Total (Public Education):		**61.10**
301	1	15B	1000 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY	CAMPUS	11.85
301	2	15B	2 LONE PINE LANE	FAIRLEIGH DICKINSON UNIVERSITY	CAMPUS	0.27
301	3	15B	868 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY	CAMPUS	0.17
301	5	15B	5 LONE PINE LANE	FAIRLEIGH DICKINSON UNIVERSITY	1.5S-F-F	0.61
301	6	15B	914 RIVER RD	FAIRLEIGH DICKINSON UNIV	2S-F-L-1UG	0.92
302	3	15B	860 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY	CAMPUS	8.80
401	1	15B	1020 RIVER RD	FAIRLEIGH DICKINSON UNIVERSITY	CAMPUS	25.97
703	7	15B	441 NORTH ST	NORTH AMERICAN ISLAMIC TRUST	3S-B-A	1.52
1401	1	15B	1200 RIVER RD (REAR)	FAIRLEIGH DICKINSON UNIVERSITY	1S-CB-O	13.01
1403	1	15B	1140 RIVER RD	FAIRLEIGH DICKINSON UNIV H-CF2-01	2S-B-O	2.97
2901	1	15B	951 QUEEN ANNE RD	SINAI SPECIAL NEEDS INSTITUTE	2S-AL-S-2UG	0.14
5005	15	15B	1443 PALISADE AVE	YESHIVA GEDOLAH OF ENGLEWOOD	2S-CB-A	0.16
5102	1	15B	1650 PALISADE AVE	YESHIVA HIGH SCHOOL FOR GIRLS, INC.	2S-B-A-	3.43
5108	1	15D	112 TRYON AVE WEST	TORAH ACADEMY OF BERGEN COUNTY	1SB	3.08
5109	2	15D	1500 PALISADE AVE	TORAH ACADEMY OF BERGEN COUNTY	1S-CB-A	0.20
5901	1	15B	1095 TEANECK RD	ST ANASTASIA'S CHURCH	1S-B-A	1.87
					Total (Other School Property):	**74.95**
					Total (Education Lands):	**136.06**
104	1	15D	480 KIPP ST	ARCHDIOCESE,SYRIAN ORTHODOX CHURCH	2S-F-S-1AG	0.22
209	1	15D	513 KENWOOD PLACE	FRIENDS OF LUBAVITCH OF BERGEN CO.	2S-F-O	0.22
701	10	15D	687 LARCH AVE	BERGEN ETHICAL SOCIETY	2S-B-L-2UG	0.40
711	10	15D	260 ELM AVE	ARCHDIOCESE OF THE SYRIAN CH.,THE	1S-B-A	0.54

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
808	2	15D	510 CLAREMONT AVE	CONGREGATION BETH AM	1S-F-O	0.39
813	8	15D	836 GARRISON AVE	A.A.H. BERGEN CTY INC	2S-F-L-1UG	0.17
819	15	15D	320 BEVERLY RD	EAST BERGEN CHRISTIAN CHURCH, INC	2S-CB-O	0.31
1103	4.01	15D	600 ROEMER AVE	NORTHERN TEANECK SYNAGOGUE ASSOC.		4.14
1209	31	15D	735 RUTLAND AVE	UNITY CHURCH OF CHRIST	2.5S-B-O-2UG	0.47
1401	3.01	15D	1200 RIVER RD	GRACE EVAN LUTH CHURCH OF TEANECK	1S-B-O	4.01
1401	3.02	15D	1190 RIVER RD	HOPE PRESBYTERIAN CHURCH THE		1.74
1701	20	15D	693 W ENGLEWOOD AVE	CONGREGATION B'NAI YESHURUN	1.5S-AL-F-1AG	0.15
1807	1	15D	480 WARWICK AVE	CHRIST CHURCH	2S-B-A	1.14
1905	12	15D	1666 WINDSOR RD	TEMPLE EMETH	1S-B-A	3.76
2003	25	15D	333 WARWICK AVE	CHRIST CHURCH	2S-B-L-2UG	0.27
2008	10	15D	354 MAITLAND AVE	CONGREGATON BETH SHOLOM	1S-B-A	0.69
2101	4	15D	396 W ENGLEWOOD AVE	CONGREGATION RINAT YISREAL	2S-S-L-2UG	0.15
2105	5	15D	268 W ENGLEWOOD AVE	TZEMACH CONGREGTN DOVID INC	SYNAGOGE	0.17
2107	15	15D	1257 KENSINGTON RD	ALLEGHENY E CONF ASSN 7TH DAY ADVT	2S-F-2-2AG	0.13
2107	18	15D	1223 KENSINGTON RD	CONG BETH SHOLOM OF TEANECK, N.J.	2S-F-L	0.17
2412	15	15D	283 HERRICK AVE	ST MARKS EPISCOPAL CHURCH	2S-B-L-2AG	0.13
2609	1	15D	811 PALISADE AVE	UNION FOR TRADITIONAL JUDAISM,ET AL	2S-CB-A	0.22
2609	25	15D	339 CEDAR LANE	UNION FOR TRADITIONAL JUDAISM,ET AL	VACANT	0.16
2908	16	15D	145 CHERRY LANE	JEWISH COMM CTR %S.BERNSTEIN	2S-S-L	0.20
2913	23	15D	87 STERLING PL	JEWISH COMM.CTR.%S.BERNSTEIN	1.5S-F-F-1AG	0.25
2914	2	15D	70 STERLING PL	JEWISH COMM CTR.% S.BERNSTEIN	2S-B-O	1.42
3002	2	15D	70 CEDAR LANE	ST PETERS MAR THOMA CHURCH, NJ, INC	1S-B-O	0.47
3003	1	15D	118 CHADWICK RD	ST MARKS EPIS CHURCH	1S-B-O	0.82
3005	1	15D	725 QUEEN ANNE RD	ARZEI DAROM CORP	2S-S-L-1AG	0.39
3201	1	15D	231 HILLSIDE AVE	BERGEN PASSAIC UNIT, NJARC	2S-F-L	0.35
3203	1	15D	50 OAKDENE AVE	TRUE LIGHT PRESBYTERIAN CHURCH, INC	2S-B-O	2.11
3204	14	15D	4 HILLSIDE AVE	TRINITY EVANGELICAL FREE CHURCH	1.5S-AL-F-1AG	0.14
3204	15	15D	390 TEANECK RD	TRINITY EVANGELICAL FREE CHURCH	1S-B-O	0.41
3209	5	15D	368 HICKORY ST	TEANECK UNITED METHODIST CHURCH	2S-S-O	1.06
3209	28	15D	382 BEECH ST	ZION KOREN EVANGELICAL	2S-F-O-1UG	0.17
3215	9	15D	315 LOCUST ST	VANTAGE HEALTH SYSTEM INC	2S-AL-2-1AG	0.17
3415	1	15D	QUEEN ANNE ROAD (REAR	HAN MOORY CHURCH	VACANT LAND	0.13
3610	20	15D	292 WILLOW ST	TEANECK CONG.JEHOVAHSC/O PAUL F.	1S-B-O	0.16
3801	10	15D	756 HARTWELL ST	1ST REFORMED PROTESTANT CHURCH	2S-F-L-1UG	0.14
3810	27	15D	631 JOHN ST	ST PETERS MAR THOMA CHRUCH INC	2S-F-2-1AG	0.11
3909	14	15D	868 PERRY LANE	YOUNG ISRAEL OF TEANECK	2S-AL-L-2AG	1.04

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
4305	8	15D	319 HARDING AVE	DAR-UL-ISLAH	2S-AL-O	0.29
4401	12	15D	FABRY TERRACE	DAR-UL-ISLAH	VACANT LAND	0.02
4402	10	15D	318 FABRY TERR	DAR-UL-ISLAH INC		0.14
4402	11	15D	320 FABRY TERR	DAR-UL-ISLAH	2S-CB-O	0.75
4813	15	15D	1075 QUEEN ANNE RD	NJ GRACE BAPT CHURCH	2S-ST-O	0.39
4904	64	15D	126 W ENGLEWOOD AVE	YESHIVA GEDOLAH OF TEANECK INC	2S-S-L	0.17
4905	5	15D	40 W ENGLEWOOD AVE	IGLESIA(MERCY CHURCH OF GOD)	2S-F-O-	0.21
4906	16	15D	1234 TEANECK RD	PRESBYTERIAN CHURCH OF TEANECK	2S-B-O	0.62
4907	17	15D	61 CHURCH ST	ST.PAULS LUTHERAN CHURCH	1S-B-0	1.35
4910	1	15D	1260 ALICIA AVE	WILHELM PROPERTIES,INC.	2S-F-O	0.71
4910	2	15D	1274 ALICIA AVE	WILHELM PROPERTIES,INC.	2S-S-O	0.35
4910	3	15D	130 EVERGREEN PLACE	WILHELM PROP.INC, OFF.O/T TREASURER	2S-F-O-2AG	0.29
4910	4	15D	EVERGREEN PL	WILHELM PROPERTIES, INC.	VACANT LAND	1.03
4911	18	15D	147 CHURCH ST	MOUNT HOLINESS TEMPLE	2S-B-O-2AG	0.36
4912	3	15D	134 CHURCH ST	ST PAULS LUTH CHURCH	2S-F-O-2AG	0.43
5005	14	15D	1429 PALISADE AVE	COVENANT LIFE MINISTRIES INC	1S-B-O	0.31
5404	4	15D	204 STUYVESANT RD	GALILEE UNITED METHODIST CHURCH	2S-F-S-1AG	0.13
5712	1	15D	1321 TEANECK RD	EVERGREEN BPT CHURCH NJ INC	1S-B-A-3AG	0.23
5712	2	15D	1329 TEANECK RD	EVERGREEN BPT CHURCH NJ INC	2S-F-O-1UG	0.25
5712	47	15D	17 FRANKLIN RD	EVERGREEN BAPTIST CHURCH OF NJ, INC	CHURCH PKG LOT	0.34
5714	3	15D	GENESEE AVE	GALILEE M E CHURCH	VACANT LAND	0.09
5919	1	15D	46 ROBINSON ST	ST ANASTASIA'S CHURCH	1S-B-O	4.46
5919	2	15D	50 ROBINSON ST	ST.ANASTASIA'S CHURCH	VACANT LAND	0.35
				Total (Houses of Worship & Charitable Property):		**42.51**
1211	7	15E	1526 RIVER RD	PROTESTANT LUTH CEMTRY	CEMETERY	0.56
					Total (Cemetery):	**0.56**
202	17	15F	733 POMANDER WALK	SHELTER OUR SISTERS,INC.	3S-B-C	0.81
708	11	15F	650 AMERICAN LEGION DR	AMERICAN LEGION	1S-CB-A	0.29
710	9	15F	263 ELM AVE	ST.MARK'S SYRIAN ORTHODOX CATHEDRAL	2S-F-O-1UG	0.17
1702	2	15F	624 OGDEN AVE	NEW CONCEPTS FOR LIVING,INC	1.5S-AL-F-2AG	0.19
2702	7	15F	1014 PALISADE AVE	THE DEVEREUX FOUNDATION	1.5S-F-F-1AG	0.24
3003	4	15F	718 TEANECK RD	HOLY NAME HOSPITAL, ATTN M.RICHETTI	3S-B-O	20.15
3104	17	15F	26 PARKER LANE	COUNTY OF BERGEN	1.5S-AL-S	0.13
3216	14	15F	300 TEANECK RD	GERIATRIC SERVICES, INC.	2S-AL-O	0.88
3709	5.02	15F	565 JOHN ST	NTNAL INSTITUTE PEOPLE W/DISABILITY	2S-AL-L-2AG	0.11

BLOCK	LOT	CLASS	PROPERTY LOCATION	OWNER	BUILDING	ACRES
4913	15.01	15F	1 W FOREST AVE	COMMUNITY SCHOOL INC	2S-B-O	2.47
5403	11	15F	236 IRVINGTON RD	CENTER FOR FAMILY SUPPORT OF NJ INC	1.5S-AL-F-1AG	0.14
				Total (Other Exempt):		**25.58**
				Total (Houses of Worship, Charitable and Other Exempt Lands):		**68.65**
				Total (Education, Houses of Worship & Charitable Lands):		**204.71**

EXHIBIT 1 to DECLARATION
RECREATION AND OPEN SPACE INVENTORY

Local Unit: Township of Teaneck County: Bergen

NOTE: All lands held for recreation and conservation purposes (1) must be described by their block and lot identification numbers as shown on the current, official tax map and (2) keyed to a current, legible, official map of the Local Unit and current tax map of Local Unit. The official map used for this ROSI is named Tax Assessment Map, Township of Teaneck, Bergen County, N.J. and is dated July, 2005, and revised April 12, 2006.

Developed and Partially Developed Lands Held for Recreation and Conservation Purposes
(*If necessary, use the first page following & after Page 4 for additional developed and partially developed lands)

Key	Municipal Location	Name	Block	Lot	Acres	Funded/Unfunded
1.	see attached list					
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						

Subtotal of Acres on this page 192.346

Total Acres of developed and partially developed lands from all pages of this ROSI... 192.346

EXHIBIT I to DECLARATION
RECREATION AND OPEN SPACE INVENTORY

Local Unit: Township of Teaneck County: Bergen

NOTE: All lands held for recreation and conservation purposes (1) must be described by their block and lot identification numbers as shown on the current, official tax map and (2) keyed to a current, legible, official map of the Local Unit and current tax map of Local Unit. The official map used for this ROSI is named Tax Assessment Map, Township of Teaneck, Bergen County, N.J. and is dated July, 2005, revised April 12, 2006.

Wholly Undeveloped Lands Held for Recreation and Conservation Purposes
(*If necessary, use the second page following & after Page 4 for additional wholly undeveloped lands)

Key	Municipal Location	Name	Block	Lot	Acres	Funded/Unfunded
A.	see attached					
B.						
C.						
D.						
E.						
F.						
G.						
H.						
I.						
J.						
K.						

Subtotal of Acres on this page 81.8993

Total Acres of wholly undeveloped lands from all pages of this ROSI..... **81.8993**

CERTIFICATION: I HEREBY CERTIFY that this Exhibit 1 to Declaration, comprising 6 total pages, is a complete and accurate listing of all lands held by the Local Unit, as of this 9 day of November, 2010, for recreation and conservation purposes during the time of receipt of Green Acres funding. This ROSI is being submitted to Green Acres as part of the project entitled Improvements to Votee Park Athletic Fields.

William Broughton, Township Manager
Chief Executive Officer of Local Unit
Date: 1-6-11

Planning Board Chairperson (or equivalent)
Date: 1-6-11

This Certification is to be signed only on this page, Page 4, of EXHIBIT 1 to DECLARATION.

Key	Location/Name	Block	Lot	Acres	Funded/ Unfunded	Development Status
1	Amman Park	3303	5	5.29	Unfunded	partially
2	Maria W. Andreas Memorial Pk	1301	1	23.38	Unfunded	partially
3	Argonne Park	5708	1	0.057	Unfunded	partially
4	Argonne Park	5714	1	54.0	Funded	partially
5	Argonne Park	5802	1	0.15	Unfunded	partially
6	Clarence W. Brett Park	1002	1	10.54	Funded	partially
7	Bernard E. Brooks Park	5511	28	4.73	Unfunded	partially
8	Coolidge Park	5926	1	0.92	Unfunded	partially
9	Harte Park	4302	3	0.5	Funded	partially
10	Hawthorne Park	4204	5	6.892	Funded	partially
11	Hawthorne Park	4208	11	7.708	Funded	partially
12	Herrick Park	2402	2	2.74	Unfunded	partially
13	Eleanor M. Kieliszek Park	2210	5	1.25	Funded	partially
14	Dr. Martin Luther King Jr. Park	2904	11	1.23	Unfunded	partially
15	Mackel Field Park	5801	9	1.24	Unfunded	partially
16	Phelps Park	511	22	16.31	Unfunded	partially
17	Sagamore Park	803	6	4.48	Unfunded	partially
18	Terhune Park	101	7	10.3	Unfunded	partially
19	Milton Votee Park	4702	1	39.48	Unfunded	partially
20	Milton Votee Park	4703	2	0.079	Unfunded	partially
21	Paul A. Volcker Municipal Green	2904	portion of 12**	1.07	Unfunded	partially
	SUB TOTAL THIS PAGE			192.346		
	TOTAL			274.2453		

** Paul A. Volcker Municipal Green includes the portion designated as area A as per the attached Recreation and Open Space Inventory Map (ROSI) for the Municipal Complex, Block 2904, Lot 12 prepared by David A. Hals, P.E., L.S., P.P.

G:\MAIN\Teaneck\TT-5993\Miscellaneous\Recreation and Open Space Inventory (ROSI) 2010 revised 11-24-2010 incl FDU.wpd

2010 RECREATION AND OPEN SPACE INVENTORY (ROSI) - TOWNSHIP OF TEANECK

Key	Location/Name	Block	Lot	Acres	Funded/ Unfunded	Development Status
A	Dr. Barnette S. Bookstaver Park	810	9	1.48	Unfunded	undeveloped
B	Continental Park	1102	11	1.2	Unfunded	undeveloped
C	Senator Matthew Feldman Nature Preserve	1103	1.01	15.1	Unfunded	undeveloped
D	Francis E. Hall Veterans' Park	5007	1	3.0	Unfunded	undeveloped
E	Eleanor M. Kieliszek Park	2211	1	1.0	Funded	undeveloped
F	Kipp Street Park	107	5	0.157	Unfunded	undeveloped
G	662 Pomander Walk	212	2	0.335	Unfunded	undeveloped
H	640 River Road	101	1	0.91*	Unfunded	undeveloped
I	South Gaylord Park	902	1	1.16	Funded	undeveloped
J	South Gaylord Park	903	1	1.31	Funded	undeveloped
K	Stephens Place Park	5103	7	0.459	Unfunded	undeveloped
L	Tokoloka Park	1204	1	10.58	Unfunded	undeveloped
M	Milton Votee Park	4704	1	1.35	Unfunded	undeveloped
N	Windsor Park	2601	1	0.77	Funded	undeveloped
O	Windsor Park	2701	1	1.45	Funded	undeveloped
P	Windsor Park	4701	1	2.75	Funded	undeveloped
Q	Windsor Park	4901	2	2.33	Funded	undeveloped
R	Windsor Park	5006	1	1.02	Funded	undeveloped
S	Windsor Park	5101	1	30.0	Funded	undeveloped
T	Leaf Composting site - 5 foot wide trail easement adjacent to the mean high water line of the Hackensack River (1885') (subject to pre-existing utility and access easements)	201	portion of 11	0.216±	Unfunded	undeveloped

U	1282 River Road (subject to drainage way and pre-existing outfall)	1401	2	0.348±	Unfunded	Undeveloped
V	D.P.W.Facility - future 5 foot wide trail easement adjacent to the mean high water line of the Hackensack River (1210') and access to River Road (250') (No trail currently exists, the entire site up to the mean high water line is currently being utilized by the pre-existing D.P.W. facility. Moreover, security considerations require that access to the D.P.W. facility be restricted to the public. Future trail use is subject to the foregoing reservations.)	1002	portion of 2	0.167±	Unfunded	Undeveloped
W	Fairleigh Dickinson University Hackensack River Greenway (as per recorded Developer's Agreement dated September 24, 2002, by and between the Township of Teaneck, the Planning Board of the Township of Teaneck and Fairleigh Dickinson University, recorded on October 28, 2002 in the Office of the Bergen County Clerk in Deed Book 8522, page 393 (see attached)	301 401 1401	portion of 1 & 2 portion of 1 portion of 1	0.812 0.7084 1.4336 0.2845 1.3168 (metes and bounds description is attached)	Unfunded	Undeveloped
	SUB TOTAL THIS PAGE			81.8993		

* 640 River Road - Excludes tidelands area claimed by the State of New Jersey Deed Book 8992, Page 393 (0.17 ± acres), subject to Drainage easements conveyed to County of Bergen (Deed Book 9153, Pg 065; Deed Book 9126, Pg 641) and road widening easement granted to the County of Bergen (Deed Book 7326, Pg 533)