NATURAL RESOURCE INVENTORY
FOR
VERONA TOWNSHIP, ESSEX COUNTY, NJ

PREPARED FOR:

VERONA ENVIRONMENTAL COMMISSION
600 BLOOMFIELD AVENUE
VERONA, NJ 07044

PREPARED BY:

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JUNE, 1999

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INTRODUCTION

Verona Township is located in Essex County, New Jersey, as shown on the Location Map, Page 2. Essex County encompasses about 27 square miles of land and has about 3.3 square miles of water. The highest point is 691 feet above sea level. It is the second most populated county in New Jersey and is comprised of 22 municipalities. Newark international airport and Port Newark are located in Essex County.

Verona lies in the piedmont province, one of the six physiographic provinces included in the appalachina highland physiographic division and is shown on Page 3, Geologic Map of New Jersey. The province consists mainly of lowland and gently rolling hills which rise to the Watchung Mountains. The Peckman River bisects Verona, and water drains from the Watchung Mountains in the east and west of the Township down toward the Peckman River.

Verona Township has a total land area of approximately 2.75 square miles. It is largely a residential community, with about 87% of the residential units being single family homes. The population is about 14,000 people.

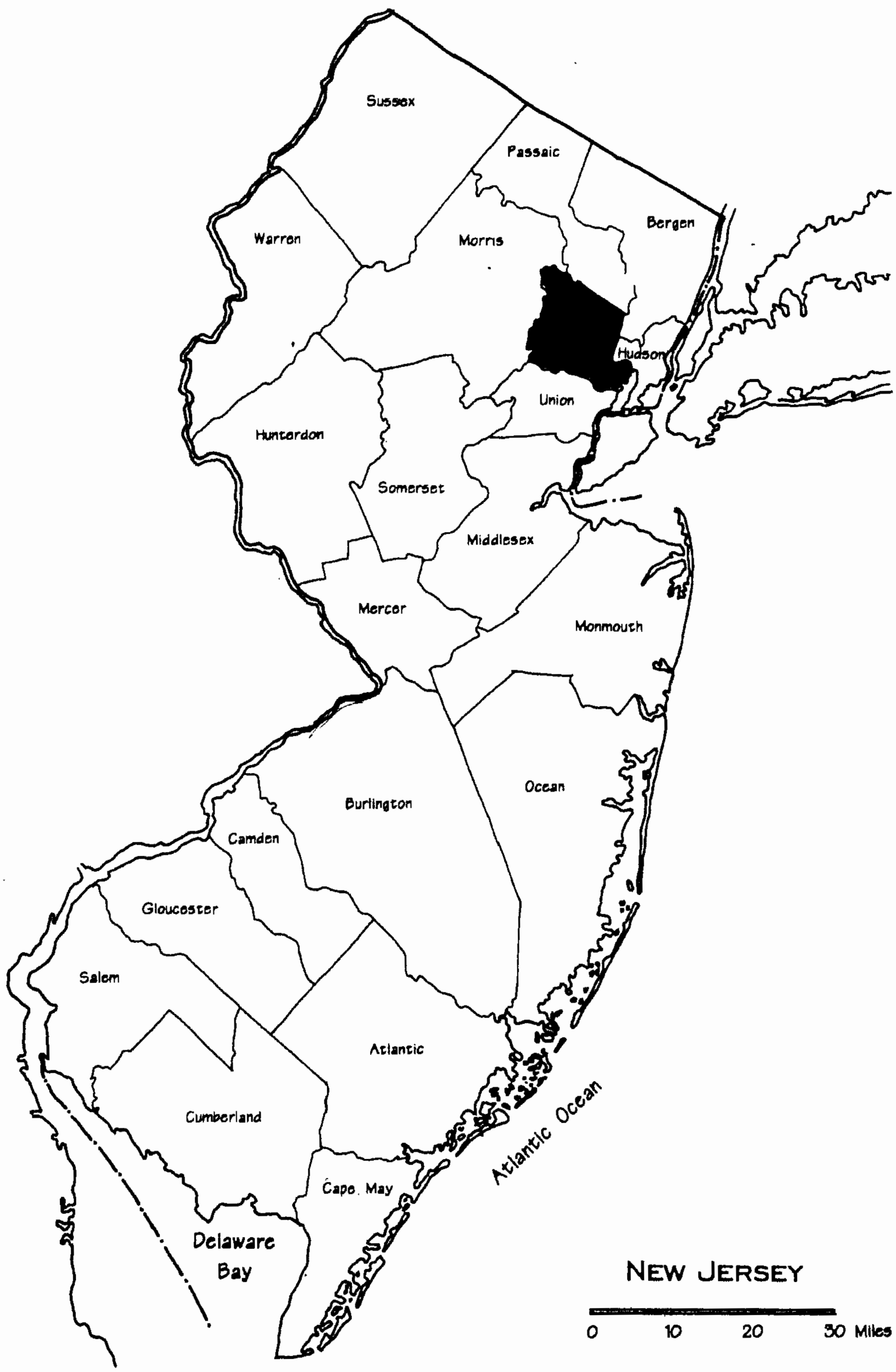
Only about 48 acres of land area within Verona remain vacant. About 218 acres, or 12.4 percent of the Township, is publicly owned. This acreage includes Verona Park (54.32 acres), Eagle Rock Reservation, and the Second Watchung Mountain. The natural resources in Verona, then, are concentrated in these vacant and publicly held lands. Other important natural resources are the Peckman River, Verona Lake itself, and the "urban forest".

Because of its location in one of the most urbanized and industrialized regions in New Jersey, degradation of water quality and air quality are major concerns. The quality and health of street trees, or the urban forest, are also of great importance to this developed community. These natural resources were examined in this study.

Other natural resources included within the scope of this inventory are: Geology, Geography (soils and topography), climate, and hydrology (wetlands, floodplains, and aquifer recharge areas).

This natural resource inventory will serve as the baseline for monitoring and evaluating the quality and extent of the natural resources in Verona Township. It is an objective inventory, and not intended to provide interpretation or recommendations. It is recommended that this document be adopted as part of the master plan for the community in order to provide a documented basis for resource protection ordinances.

This document should be revised and updated on a regular basis, or as more information becomes available. Natural resources that were not included within the scope of this inventory can be added over time. These include historic and cultural resources and population.



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LOCATION MAP

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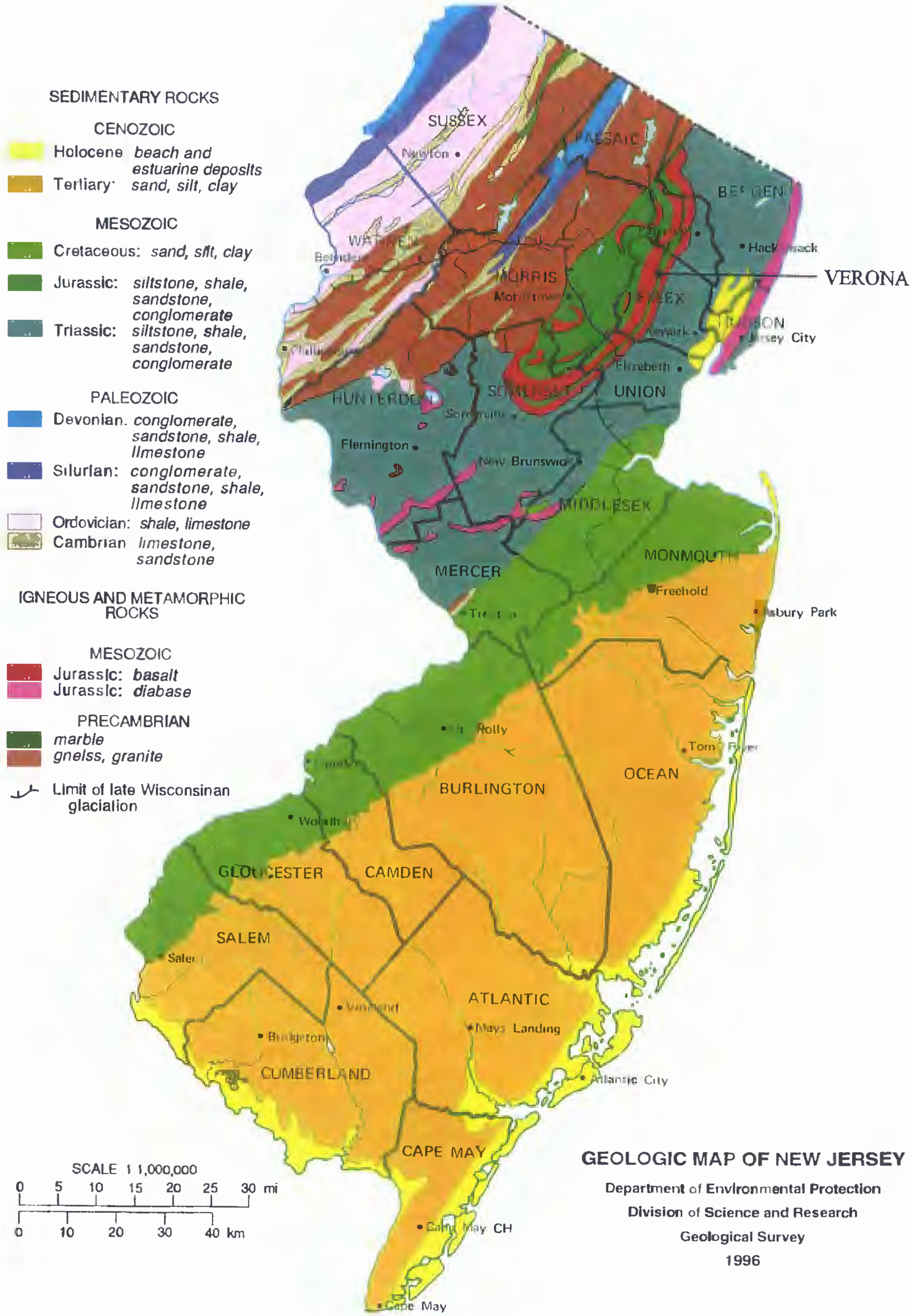


GEOLOGIC MAP OF NEW JERSEY

Department of Environmental Protection
Division of Science and Research
Geological Survey
1996

GEOLOGY

Verona lies in a valley between the First Watchung Mountains to the east and the Second Watchung Mountains to the west within the piedmont province. The Peckman River divides Verona , running through the valley. The mountain ranges, containing basalt bedrock, are not good aquifers. The valley, containing sediment, is a good aquifer. See pages 6-9 for Geologic Maps.

Rocks in the Piedmont Province are separated from rocks of the Highlands Province by a series of major faults, including the Ramapo fault. They are of Late Triassic and Early Jurassic age (230 to 90 million years old). They rest on an elongated crustal block that dropped downward during the initial stages of the opening of the Atlantic Ocean. This down dropped crustal block formed a valley called a rift basin, which is one of a series in eastern North America.

The Brunswick formation and Watchung Basalt underlie all of Essex County. The Peckman River is roughly the dividing line between these two geologic formations in Verona. East of the Peckman River, the geology is composed of the Feltville Formation (Lower Jurassic), and west of the Peckman River the geology is composed of Orange Mountain Basalt (Lower Jurassic).

The Brunswick formation is predominantly shale and sandstone with minor amounts of conglomerate formed by sediment that eroded from uplands adjacent to the rift basin. In the course of rifting, the rock layers became tilted northwest, gently folded, and cut by several major faults. Watchung Basalt was formed by three extensive lava flows of the lower Jurassic and upper Triassic periods.

The Feltville formation is the subgroup of the Brunswick formation that is found in Verona. It is made of sedimentary rock, which is composed of weathered material that has been transported, sorted, and deposited as sediment. As the sediment accumulated in layers over time, its increasing weight pressed the particles together and chemicals dissolved in water between the sediment grains to cement the particles together and form sedimentary rock. This formation includes brownish-red to light-grayish-red, fine to course-grained sandstone, gray and black, coarse siltstone, and silty mudstone. Fine-grained sandstone and siltstone are moderately well sorted, and have 15 percent or more feldspar interbedded with brownish-red, calcareous mudstone. Near the base are two thin laterally continuous beds of black, carbonaceous limestone and gray, calcareous siltstone, each up to 10 feet thick. These contain abundant fish, reptile, anthropod, and diagnostic plant fossils. Three or four thin, gray to black siltstone and mudstone sequences occur in the upper part of unit. The maximum thickness is about 510 feet.

Orange Mountain Basalt is an igneous rock, which is formed by lava flows that rose in fractures caused when the North American and African continental plates split apart. Basalt is a very hard rock, and remains as mountains after softer rocks have eroded away. Basalt forms the Watchung Mountains, is extensively quarried for crushed stone and is a poor aquifer. It is composed of dark-greenish-gray to greenish-black basalt composed mostly of calcic plagioclase and clinopyroxene; crystals are generally less than .04 inches long. It consists of three major flows. The flows are separated in places by a weathered zone or by a thin, up to 10-foot thick bed of red siltstone or volcaniclastic rock. The lowest flow is generally massive and has widely spaced curvilinear joints; columnar joints in the lowest flow become more common toward the northeast. The middle flow is massive or has columnar jointing. The lower part of the uppermost flow has pillow structures; the upper part has pahoehoe flow structures. The maximum thickness is about 597 feet.

Ground water is replenished by precipitation that does not run off the land. Several factors determine how much water percolates back in to the ground as opposed to running off the land. They are:

- The porosity and permeability of the surficial material
- The slope of the land
- The intensity and amount of precipitation.

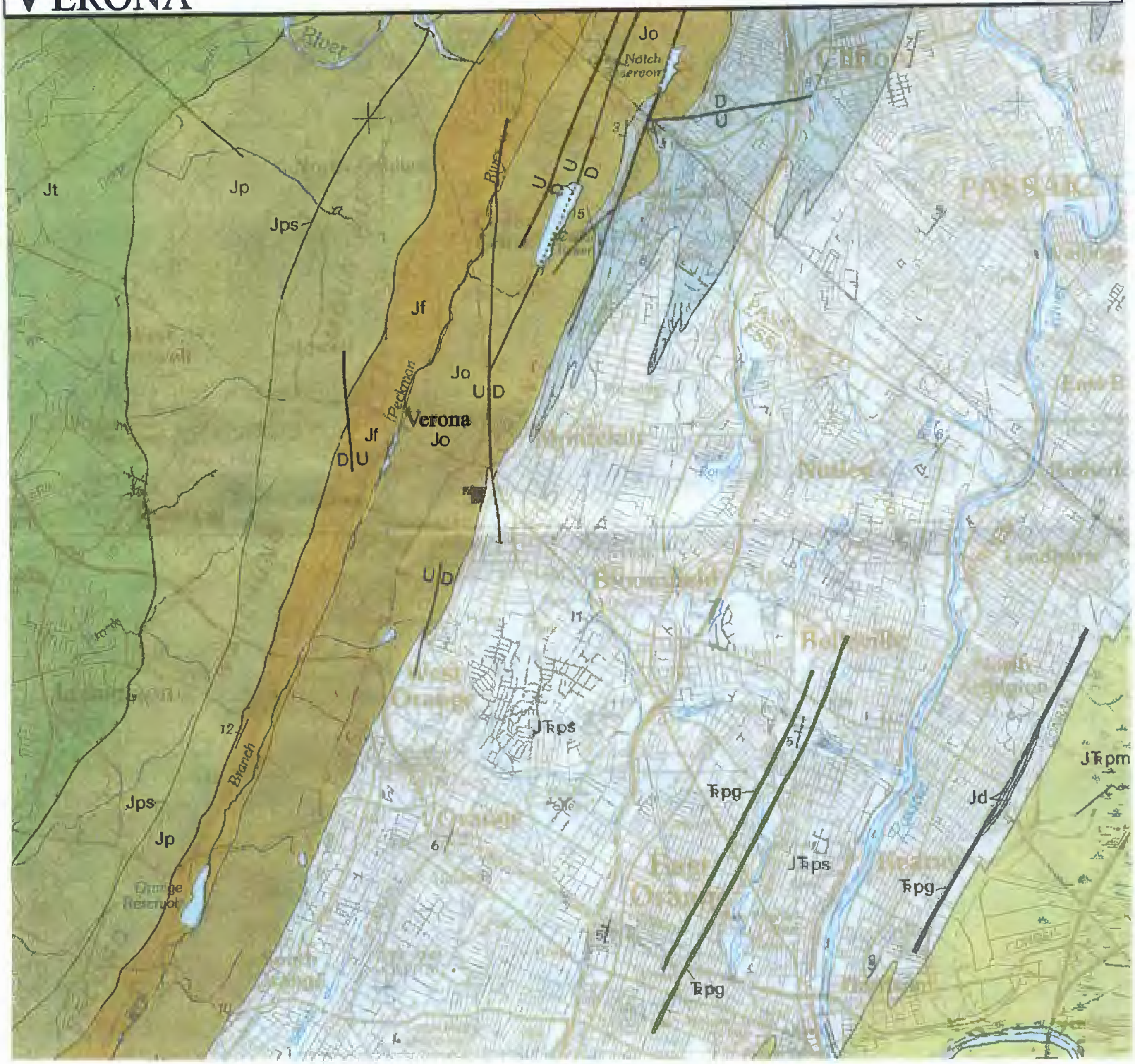
The geologic formations in Essex County can be divided into two groups with regard to porosity, or ability to hold ground water. They are the consolidated rocks of the Triassic age (the Brunswick Formation) and the unconsolidated sediments of the Pleistocene age. It is important to limit pervious cover over good aquifer recharge areas. See the Surficial Geology Map on Page 8.

The rocks of the Brunswick formation are the main source of ground water in Essex County. The shales and sandstones are capable of providing moderate to large yields for wells. The Watchung Basalt is capable of yielding only small to moderate quantities of water. The best producing wells in the Brunswick Formation in Essex County are for the most part between 300 and 400 feet deep.

Unconsolidated sediments overlay the Brunswick Formation throughout much of Essex County. They are made up of clay, silt, sand, gravel and boulders and can be divided into two general categories: stratified drift and unstratified drift. Only sand and gravel aquifers in the stratified drift deposits contain sufficient quantities of water to merit discussion.

The most productive aquifers in the stratified drift in Essex County are in stream valleys that were cut in the bedrock before the last glaciation and subsequently filled in. Subsurface exploration in western Essex County shows that valley fill aquifers are part of an extensive system underlying much of Essex and Morris Counties. Water levels in this area have declined almost continuously since 1947 due to increased demands for water.

Verona is uniquely situated in a river valley between two mountains. These geologic resources have played an important role in the development patterns of the Township and offered a unique and beautiful landscape. The mountainous areas, however, are a delicate resource that should be monitored carefully.



LEGEND

D / U	Normal fault - U, upthrown side D, downthrown side Bar and ball show dip of fault plane	Jf	Feltville Formation - Lower Jurassic
U / D	Reverse fault - U, upthrown side D, downthrown side Bar and ball show dip of fault plane	Jo	Orange Mountain Basalt - Lower Jurrasic

GEOLOGY MAP

JUNE, 1999 LAND PLANNERS LANDSCAPE ARCHITECTS 609.448.9520 MARCH ASSOCIATES

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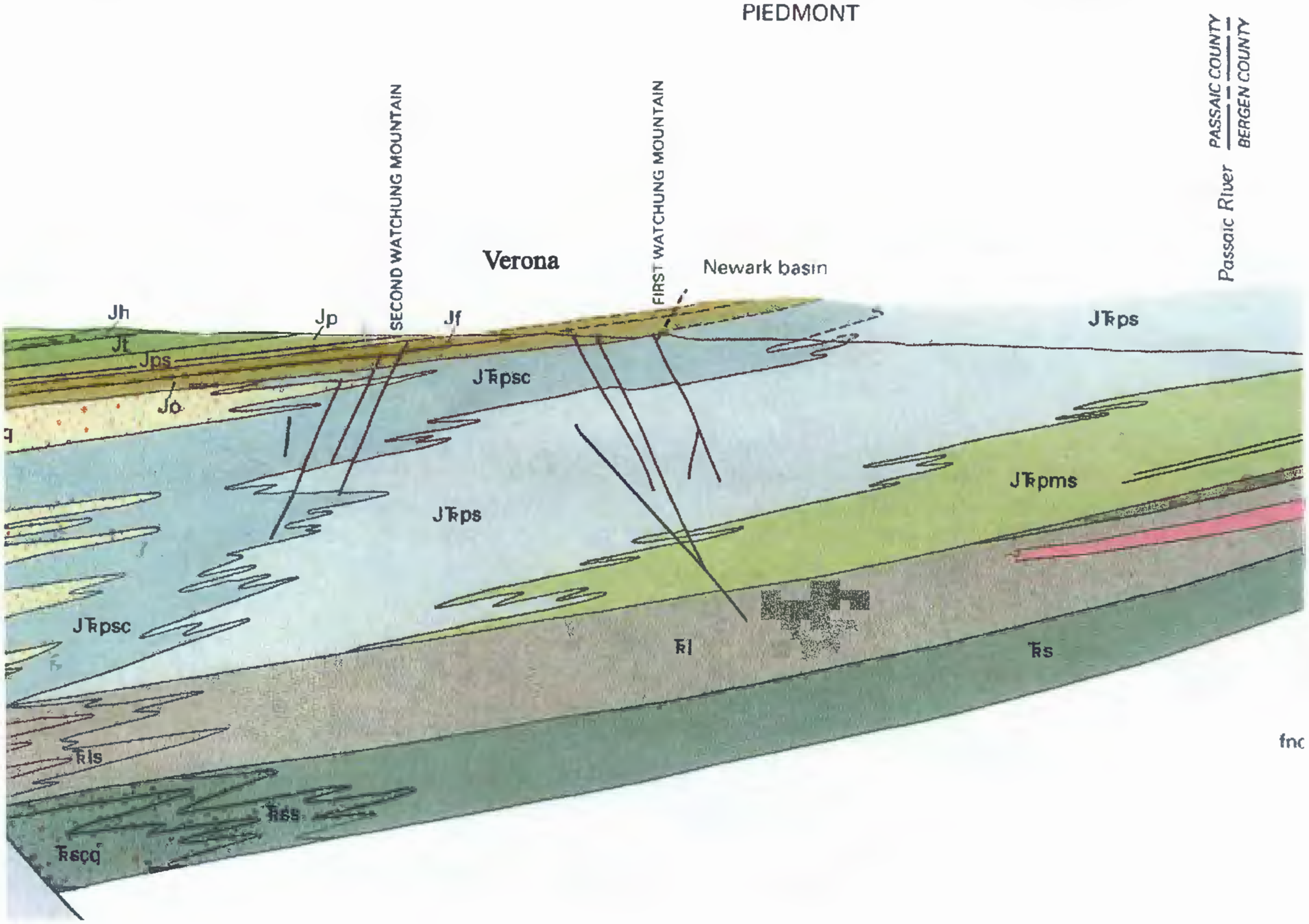

LEGEND

JTRp	PASSAIC FORMATION Siltstone and shale max. thickness 11,810 feet
JTRpms	Sandy mudstone
JTRps	Sandstone
JTRpsc	Conglomeratic sandstone
JTRpcq	Conglomerate containing quartzite
JTRpcl	Conglomerate containing limestone
TRpb	Van Houten cycles

D/U — Normal fault - U, upthrown side
D, downthrown side
Bar and ball show dip of fault plane

U/D — Reverse fault - U, upthrown side
D, downthrown side
Bar and ball show dip of fault plane

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SURFICIAL GEOLOGY MAP

600 1200 2400 3600 4800 7200

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BEDROCK MAP

600 1200 2400 3600 4800 7200

GEOGRAPHY

Verona lies in the piedmont province, one of the six physiographic provinces included in the appalachina Highland physiographic division. The province consists mainly of lowland and gently rolling hills which rise to the Watchung Mountains. See Page 3, Geologic Map of New Jersey.

A detailed soils map for Essex County has not been completed. A General Soil Map has been issued, which describes general soil types. According to the map, the Township of Verona is in the general soil type NJ013. See Page 11, General Soils Map. Soil erosion and sedimentation control during land development is regulated by the Hudson-Essex-Passaic Soil Conservation District.

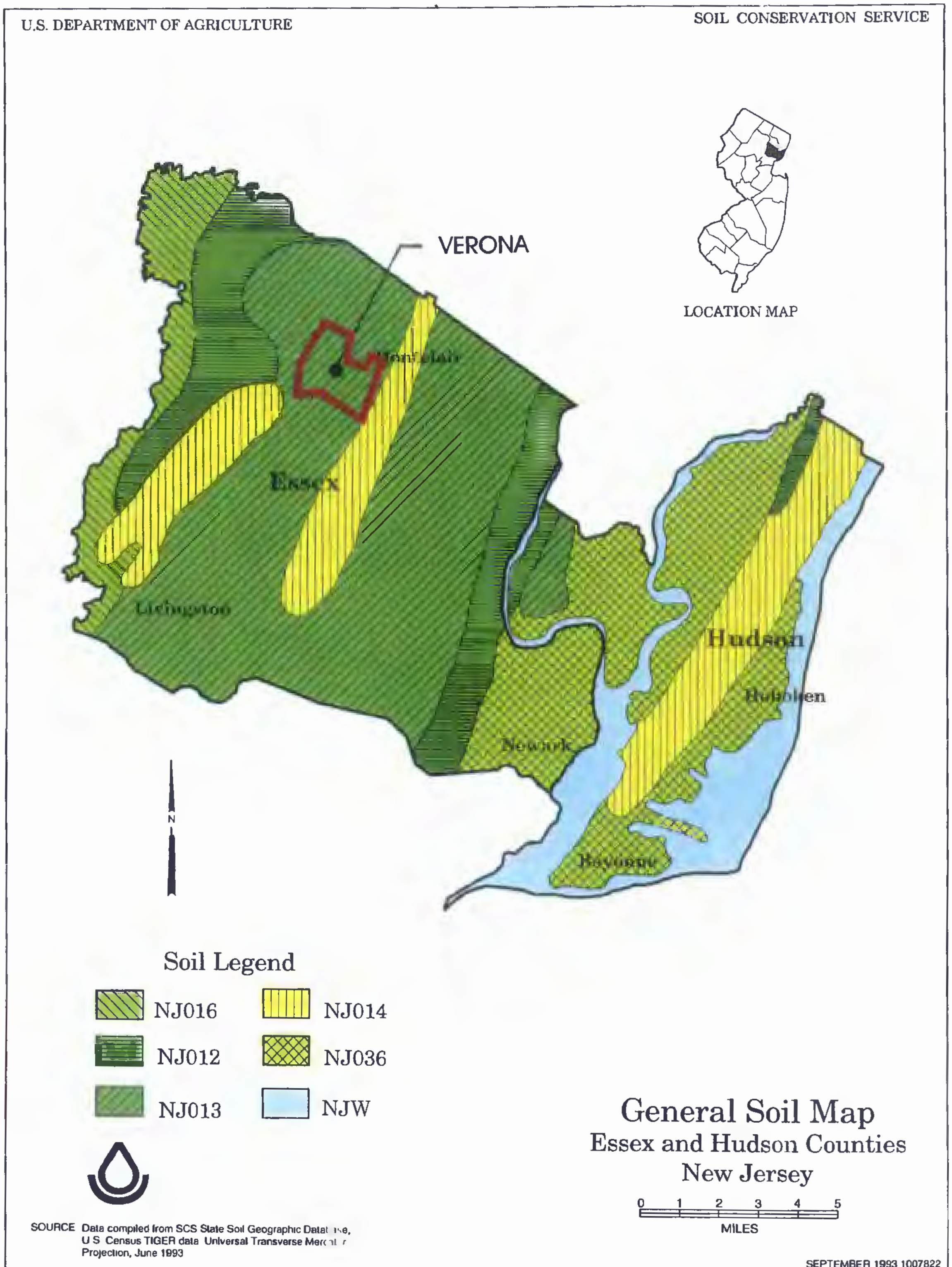
NJ013 is Urban Land-Boonton-Wethersfield with gently sloping to moderately steep, well drained and moderately well drained, very deep and deep gravelly loams formed in acid reddish sandstone, shale, basalt, and conglomerate glacial till over shale and basalt bedrock. These soils occur on upland glacial till plains and ridges. They fall into Hydrologic Group C. These soils are non-hydric.

Soils on steep slopes (25% or greater) are best protected from erosion by natural vegetative cover. In addition, stormwater runoff velocity is reduced by providing a rougher vegetative cover, such as meadow or shrub cover as opposed to lawn or impervious cover.

TOPOGRAPHY

The Peckman River forms a valley, which runs north-south through Verona, with slopes rising to the east and west. Elevations in the valley range from 350 at Verona Lake at the southern end of the valley to 310 in the Peckman River at the northern end of the valley. Verona Lake is formed by a manmade dam on the Peckman River, which flows north. Elevations rise to the east and west toward the Watchung Mountains, reaching elevations of approximately 630 feet in the northeast and northwest corners of the Township. See Page 12, USGS Map.

Most areas of Verona have slopes ranging from 0 to 25%. Toward the eastern and western boundaries of the Township, as the land rises up toward the First and Second Watchung Mountains on either side, slopes increase to 25% and greater. In the northwest portion of the Township, west of Fairview Avenue, there is an area of steeply sloping, forested land. This land is presumably undeveloped because of the environmental constraints offered by the steep topography.



USDA SCS NATIONAL CARTOGRAPHY & GIS CENTER FORT WORTH, TX 1994

USGS MAP

JUNE, 1999

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HYDROLOGY

Verona drains from the east and west toward the Peckman River. A floodway and flood hazard area has been delineated by the State of New Jersey Department of Environmental Protection (NJDEP). The NJDEP has also mapped wetlands located within Verona, which are generally associated with Verona Lake and the Peckman River. See Page 17, Wetlands Map.

Wetlands are:
MODL - Lawn, storm water management area
PFO1B - Palustrine, forested, broad leaved deciduous, saturated
PFO1A - Palustrine, forested, broad leaved deciduous, temporary
POWHh - Palustrine open water, permanent, diked
POWHx - Paiutstrine open water, permanent, excavated
R3OW - Riverine, upper perennial, open water
R4SB3 - Riverine, intermittent, streambed, mud.

The Peckman River bisects Verona Township running north-south. It flows north to the Passaic River. Verona Lake was created by a dam in the Peckman River in 1814. The area was originally a swamp, and was dammed for a grist mill. Verona Lake is part of Verona Park, which was designed in 1930 by the Olmstead Brothers and constructed a few years later.

The amount of wetlands and floodplain within the municipal limits of Verona do not represent significant land areas. Therefore, they are all the more precious. Floodplain and wetland areas act as stormwater storage during storm events and it is important to maintain natural vegetative cover in these areas. They are also important in particular where they overlay aquifer recharge areas.

WATER QUALITY

Water quality standards in New Jersey are based on the Clean Water Act, which is federal policy, the New Jersey Surface Water Quality Standards (SWQS), and the New Jersey Ground Water Quality Standards (GWQS). Water quality standards are based on water use.

Surface Water Use Designations

Designated Use	Water Classification
Primary and secondary contact recreation	FW-1, FW-2, SE-1, SC, AND PL
Secondary contact recreation	SE-2, SE-3
Maintenance, migration and propagation of the natural and established biota (biota indigenous to the unique ecological region)	FW-1, FW-2, (PL), SE-1, SE-2, AND SC
Maintenance and migration of fish populations	SE-3

Designated Use	Water Classification
Shellfish harvesting in accordance with State regulations	SE-1, SC
Public potable water supply, after such treatment as required by law or regulation	PL, FW-2

Ground water quality is assessed by means of primary and secondary drinking water standards. Primary standards measure the effect of drinking water on the health of the water consumer, while secondary standards measure the aesthetic qualities of drinking water such as hardness. In order to protect its designated uses, ground waters of New Jersey are divided into three classifications.

Ground Water Use Designations

Designated Use	Water Classification
Class I ground water	Waters of special ecological significance
Class II ground water	Waters for potable water supply
Class III ground water	Waters with uses other than water supply

General trends regarding the water quality status in rivers and streams are documented in the New Jersey State Water Quality Inventory Report. There are significant declines in un-ionized ammonia, Kjeldahl nitrogen, total organic carbon, and total phosphorus in the rivers and streams of New Jersey between 1974 and 1993. However, widespread increases of fecal coliform bacteria, nitrate nitrogen and chlorides were also documented.

Sewage treatment plant upgrades in the 1980's and 1990's are thought to have contributed to dramatic improvements in water quality. Unfortunately, expansions of suburban development, road expansion, and increases in population have somewhat offset these water quality improvements.

Ground water provides approximately 40% of the state's potable water. At present there is plenty of good quality ground water in most of New Jersey, but ground water quality problems are usually concentrated in the areas where the most volume of water is needed.

Verona lies within the Newark Basin, which comprises most of the Piedmont physiographic province in New Jersey. The Newark Basin contains most of the population of New Jersey. About 21% of the domestic water supply is from ground water in this area. The federal and state drinking water standards are often exceeded under natural conditions, with secondary standards more often being exceeded naturally. In the Newark Basin, manganese, hardness, corrosivity, total dissolved solids, iron, sulfate, sodium, and chloride are in excess of the secondary drinking water standards. Recently, radionuclides that exceed the primary drinking water standards have been recognized and documented.

Human activities also degrade ground water quality. Studies in Newark and the adjacent urban area to the east and northeast show naturally occurring and induced poor ground water quality in the fractured rock of the Brunswick Group. There has been saltwater intrusion from overpumping, and pollution related to industry and urban development patterns.

With regard to surface water monitoring, a network of 84 sampling sites assess the quality of New Jersey's nontidal freshwaters. The monitoring stations are a cooperative effort between the New Jersey Department of Environmental Protection (NJDEP) and the U.S. Geological Survey (USGS). Routine measurements taken at each station include: water temperature, dissolved oxygen, biochemical oxygen demand (BOD), TKN, TOC, flow-gage readings, pH, nitrite + nitrate, fecal coliform bacteria, weather conditions, specific conductivity, total phosphorous, and enterococcus bacteria.

Supplemental water column parameters include: sulfide, arsenic, cadmium, manganese, phenol, total hardness, lead, chromium, nickel, beryllium, selenium, copper, zinc, boron, mercury, iron, and aluminum. Sediment parameters that are monitored include: metals, organic pesticides, herbicides, and PCB's.

Verona is located within the Lower Passaic Watershed Management Area (#4). This watershed includes the lower Passaic River which is that section from the Pompton River confluence down to the Newark Bay, the Saddle River, Preakness Brook, Second River, and the Third River. Monitoring stations are located in the Passaic River at Little Falls, the Passaic River at Elmwood Park and Saddle River at Lodi, all classified as FW-2 nontrout waters. None of these water monitoring sites supports swimming as a use.

Land in this watershed is extensively developed, with many older communities, cities, and industrial centers. Of the 120 NJPDES permitted discharge sites, 100 are industrial/commercial and 20 are municipal. As a result of the highly urbanized development character within this watershed, water quality conditions are a result of point and non-point pollution sources and high sediment oxygen demands. The following tables summarized water monitoring results.

Physical/Chemical Water Quality at the Passaic River at Little Falls and Elmwood Park Monitoring Stations.

Physical/Chemical Quality	Status
Dissolved Oxygen	Acceptable at both locations
Temperature	No violations of the upper criterion for non-trout waters
Nutrients	Phosphorous highly elevated; 93% and 82% of phosphorous records for the period of assessment were in violation of the criterion at Little Falls and Elmwood Park respectively. Nitrate + Nitrite levels were also elevated.
Bacteria	Elevated at Little Falls. Elmwood Park exhibited severally elevated levels.
pH	Both stations had occasional violations of the upper pH limit of 8.5 SU. Little Falls showed exceedances in 11% of samples; Elmwood had exeedances in 3% of recorded values.
Sodium	Elevated sodium is a problem at both stations.
Heavy Metals	Both locations have lead violations of chronic criterion. At Little Falls, one of three values exceeded the criterion, however, the other two closely approached the chronic limit calculated for this location. At Elmwood Park, all three either equaled or exceeded the criterion. In addition, Elmwood Park showed high copper levels, although no violations were recorded, and mercury may be threatening the station at Little Falls.

Physical/Chemical Water Quality at the Saddle River at Lodi Monitoring Station.

Physical/Chemical Quality	Status
Dissolved Oxygen	Acceptable
Temperature	No violations of the upper criterion for non-trout waters
Nutrients	Highly elevated nutrient levels. 78% of values exceeded the water quality criterion.
Bacteria	Severely elevated.
Sodium	Extremely elevated sodium is a problem at this location. Exceedances of the criterion were seen in 45% of recorded values.
Unionized Ammonia	Although meeting water quality criteria, this parameter is elevated.

Biological monitoring within the Lower Passaic River watershed shows varying degrees of impairment within the management area. The Peckman River is moderately impaired, which means that the ability of the river to support aquatic life is partially supported.

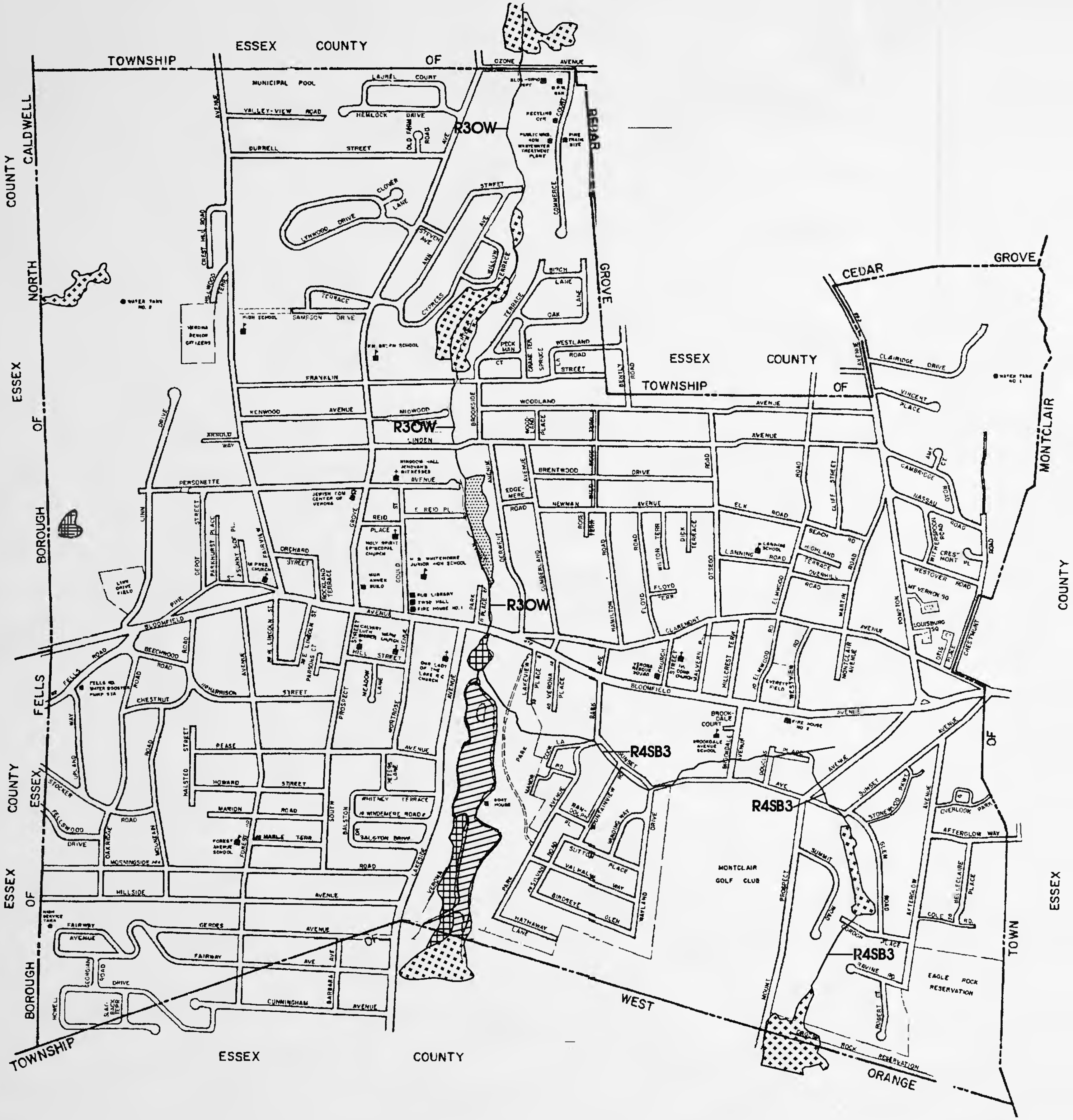
The outfall of Verona's sewage treatment plant into the Peckman River is monitored by the municipality of Verona for compliance by the NJDEP. The Peckman River is classified as FW-2 and regular water samples are analyzed and reported to the NJDEP. A sample report is shown in Appendix A.

Verona Township is supplied with public water by the Passaic Valley Water Commission and Wanaque Reservoir. The public water supply is also sampled and tested regularly by Verona. See Appendix B.

With regard to point source pollution, a wastewater discharge point located in Cedar Grove and operated by the Essex County Department of Public Works was scheduled to be taken offline by the end of 1997. The wastewater is now to be pumped to the Verona Wastewater Treatment Plant. The elimination of this wastewater discharge point is expected to improve the quality of the water in the Peckman River significantly.

A number of hazardous waste sites and contamination problems are found in this watershed. There are chromium disposal sites in Jersey City (to Newark Bay), the Wayne Township Landfill (volatile organics and heavy metals to a small pond), the Ottilio Landfill in Newark (base neutrals, volatile organics, and metals, and the Diamond Alkali/Shamrock Corporation site along the Passaic River to Newark. The last site is suspected of contributing dioxin and other chemicals to the waterway, sediments, and aquatic life.

The Lower Passiac River suffers water quality degradation due to non-point pollution sources, as well. These are habitat destruction, urban and suburban runoff, construction activities, waste storage leaks, riparian vegetation removal, and stream channel modifications.



LEGEND

	MODL	Lawns and Stormwater Management Areas
	PF01B	Palustrine, Forested Broad Leaved, Deciduous, Saturated
	PF01A	Palustrine, Forested Broad Leaved, Deciduous, Temporary
	POWHh	Palustrine, Open Water, Permanent, Diked
	POWHx	Palustrine, Open Water, Permanent, Excavated
	R3OW	Riverine, Upper Perennial, Open Water
	R4SB3	Riverine, Intermittent, Streambed, Mud

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WETLANDS MAP

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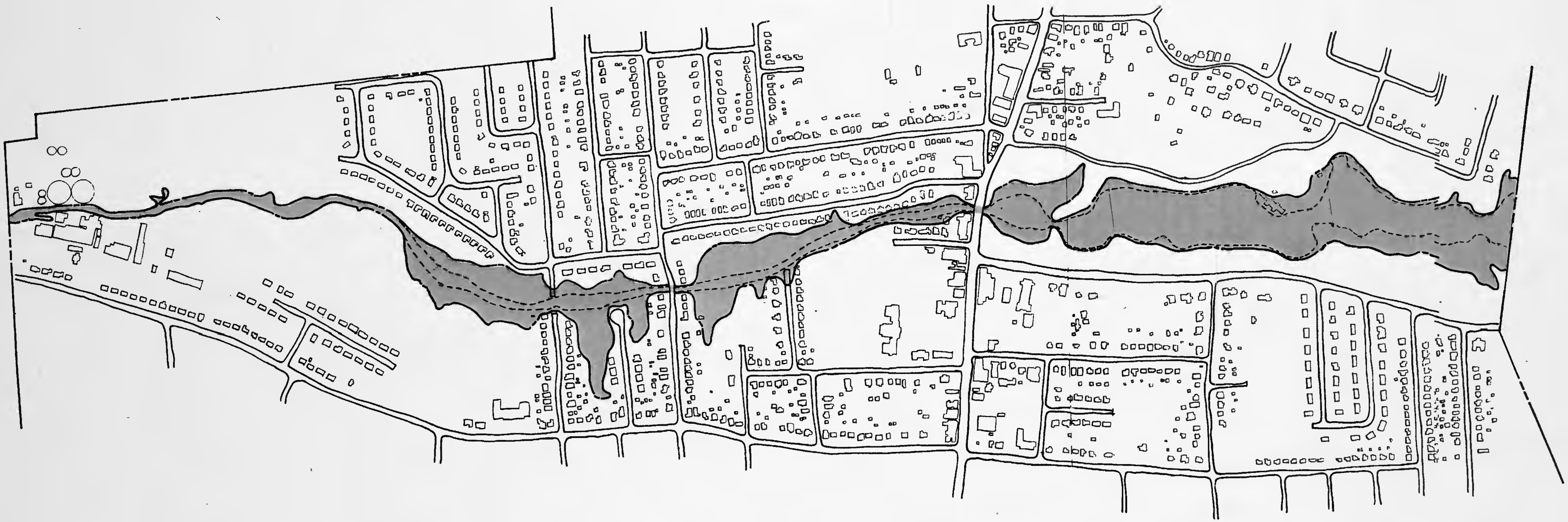

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FLOODPLAIN MAP

NOT TO SCALE

CLIMATE

The geographic location of New Jersey on the eastern coast of the United States allows for influence by wet, dry, hot, and cold airstreams, making daily weather highly variable. The New Jersey State Climatologist is responsible for collecting and archiving climate data in the state and keeps a website containing current data. Data such as summary of the day, summary of the month, hourly precipitation data, and 15-minute precipitation data are available at the website.

The nearest climate monitoring station to Verona is in Essex Fells and is at 350' above sea level. This station has been in service since 1948 and is located within the northern climate zone.

The northern climate zone has a continental type of climate with minimal influence from the Atlantic Ocean except when easterly winds prevail. Prevailing winds are from the northwest in the winter and from the southwest in the summer.

Since this climate zone is located near small mountains, temperatures are colder than in other parts of New Jersey. Winter temperatures can be as much as ten degrees Fahrenheit colder than in southern parts of New Jersey. The average snowfall averages 40 to 50 inches in the northern zone compared with an average of 10-15 inches in the extreme south.

There is a storm track that extends from the Mississippi Valley, over the Great Lakes and across the St. Lawrence Valley that is a major source of precipitation for this area. During the warm season, thunderstorms are responsible for most precipitation and often reach maximum development during the evening. This region has about twice as many thunderstorms as the coastal area.

The mountains in the northern climate zone affect the weather by forcing air to rise over the mountains during a cold front resulting in clouds and perhaps precipitation when the rest of the state has clear skies.

The growing season is about 155 days long and the average date for the last frost is May 4. The first frost falls on or about October 7.

Maximum Temperature Normals for Verona (Degrees Fahrenheit)

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
35.6	38.8	49.1	60.4	71.4	79.6	84.8	82.9	75.8	64.8	53.3	40.5
Minimum Temperature Normals for Verona (Degrees Fahrenheit)											
17.4	19.3	27.9	37.2	47.1	56.1	61.5	59.8	52.0	40.7	33.4	22.9
Precipitation Normals (Inches)											
3.70	3.15	3.94	4.45	4.80	4.03	4.90	4.28	4.46	3.84	4.23	4.07

The general trend in climate is heavily influenced by global warming, which is causing global temperatures to rise. Over the last 100 years, the average land surface temperature has risen, precipitation has increased, and sea levels have risen.

Global temperatures have risen by .8-1.0 degrees Fahrenheit, global precipitation has increased by about one percent over the world's continents in the last 100 years. High latitude areas have experienced the most increase in rainfall while tropical areas have seen a decline. The sea level has risen worldwide by approximately 6-8 inches. Approximately 1-2 inches of the rise has resulted from the melting of mountain glaciers while another 1-2 inches is a result of ocean water expansion from warmer ocean temperatures.

The continued addition of greenhouse gases to the atmosphere is likely to raise the earth's average temperature by several degrees in the next 100 years. This will in turn cause the level of the sea to continue to rise. Most of the United States is expected to continue to warm, but sulphides may limit warming in certain areas. There is likely to be a trend toward increased precipitation and evaporation causing more intense rainstorms and drier soils, but scientists can not yet predict where these will occur. The continued warming trend is likely to occur more rapidly over land than the open seas.

AIR QUALITY

According to the 1996 Air Quality Report, issued in August, 1997 by the New Jersey Department of Environmental Protection Bureau of Air Monitoring, air quality in New Jersey has improved dramatically since 1970, when the Clean Air Act was passed. The indicators of overall air quality are based on monitoring for six specific air pollutants, for which national Ambient Air Quality Standards (NAAQS) are set by the federal government. There are two standards, a "primary" standard, which is a health standard, and a "secondary" standard, which is a welfare standard.

Each day, an air quality summary for the previous day is provided to the Associated Press wire service. In addition, the NJDEP Air Monitoring web site is updated with the current air quality readings. See Appendix C. New Jersey is divided in to nine Pollutant Standards Index (PSI) reporting regions and Verona falls in to the Southern Metropolitan PSI region. The rating system is based on the highest rating by any pollutant within that region. A PSI rating of 100 (or greater) is a result of at least one pollutant in the reporting region has reached or exceeded a primary ambient air quality standard.

Air pollutants monitored in the Southern Metropolitan Reporting region include Carbon Monoxide (CO), Sulfer Dioxide (SO2), Smoke Shade (SS), Ozone (O3), and Nitrogen Dioxide (NO2). In comparison to the other PSI reporting regions in New Jersey, the quality of air in the Southern Metropolitan region is the worst in the State.

Carbon Monoxide is predominantly a source of emissions by gasoline fueled automobiles and trucks. Verona is located within an area that is designated a "non-attainment" area (Essex County) by the U.S. Department of Environmental Protection Agency for CO. This is based on non-attainment of a National Primary Health Standard, which is 35 ppm in a one-hour average time period.

Sulfer Dioxide emissions are the result of combustion of fossil fuels. NAAQS standards were not violated in 1996 in New Jersey. The highest annual average was calculated for the Jersey City reporting location.

No NAAQS have been established for the Smoke Shade category, although New Jersey has a primary AAQS standard. The highest daily average was recorded by the Elizabeth monitoring station, and the highest annual average was recorded in Jersey City.

Ozone remains New Jersey's most pervasive air quality problem, although the ozone levels in 1996 exceeded federal health standards fewer times than in any previous year. Ozone usually reaches unhealthful levels particularly on hot, sunny days. The entire State of New Jersey is designated a non-attainment area for Ozone. This is a result of not meeting the National Primary Health Standard of .12 ppm during a maximum daily one-hour average. The highest reading obtained in 1996 was .121 ppm.

Nitrogen Dioxides are products of combustion that are emitted in approximately equal amounts from industrial boilers and motor vehicles. NAAQS were not violated in New Jersey in 1996. The highest twelve month and the highest annual average for NO2 were recorded at the Elizabeth monitoring location.

Acid precipitation results from chemical reactions involving Sulfer dioxide and nitrogen dioxide gases released into the atmosphere during fuel combustion. Compounds formed by this chemical reaction can be deposited as dry particulate matter or in precipitation. Acid rain remains a persistent environmental problem in New Jersey. Measured pH levels ten times more acidic than the naturally occurring pH of rainwater, which is 5.0 to 5.6, are recorded regularly. In 1990, Clean Air Act Amendments were passed, and in 1995 and 1996 the acidity of precipitation in New Jersey improved because of the implementation of the first phase of acid rain controls.

The number of unhealthful days in 1996 in the Souther Metropolitan PSI region was 4, while all other regions had between 0 and 2 unhealthful days. (See Appendix D). The number of good days (the best rating) in the Southern Metropolitan region was only 133 as compared to 202 in the next highest region, which was the nearby Suburban region. Other regions had between 252 and 294 good days. This indicates a dramatic difference in air quality throughout the State of New Jersey.

VEGETATION

Vegetation in Verona primarily occurs in either natural woodland and naturalized areas located in Verona Park and along the Peckman River, or in the form of mature street trees and residential landscaping located throughout the community. Since 87% of the land use in Verona is single family residential, most of the vegetative resources are located on private property. The use of forest conservation easements and tree protection ordinances is critical to the preservation of the existing vegetative resources located on private property.

The majority of Verona's forest resources are in urban forests, or street trees. Only a small part of Verona Township remains in natural forest, with small forest fragments sprinkled throughout.

A street tree inventory undertaken by the shade tree commission is approximately 75% complete. The tree inventory was conducted in 1994-1996 and lists the following information about each tree surveyed:

- Location
- Species
- Diameter
- Condition
- Maintenance Needs.

It is not clear from the inventory whether street trees were located on public (within the right-of-way) or private property. If street trees are generally located on private property, the community must rely on tree cutting ordinances to protect the resource. Trees located within public rights-of-way or easements are under jurisdiction of Verona Township, and cannot be removed by a private homeowner.

The street tree inventory is an invaluable tool that can be used by the community as a baseline study and for maintenance planning purposes. The survey allowed the extraction of information concerning the health of the suburban forest.

The following conclusions are based on information in the tree inventory:

- A total of 2, 618 trees were surveyed. This total is estimated to be 75% of the street trees in Verona Township.
- Of the trees surveyed, 527 (20%) are invasive exotic species.
- 586 (22%) surveyed trees are Bradford Pears.
- Only two species account for a total of 1,075 (41%) of the trees surveyed.
- Only three species account for a total of 1,369 (52%) trees surveyed.

Successful street tree programs include a wide variety of tree types in order to avoid producing a monoculture, encourage the use of compaction tolerant, salt tolerant, and pollution tolerant species, promote the use of long lived species, and do not include the use of invasive exotic species. These objectives are based on past community experiences in the United States and are discussed further below.

The use of a wide variety of tree species throughout street tree plantings is a strategy commonly used to avoid large, devastating community tree losses by diseases specific to one type of tree. The best example of widespread tree loss is the American Elm tree, which succumbed to Dutch Elm Disease earlier this century. Entire communities had been planted with Elm trees, and the disease resulted in a critical loss economically, aesthetically, and environmentally. Other tree species that have devastated by disease are the American Chestnut, the American Dogwood, and the Hemlock.

Therefore, one measure of a successful street tree planting is the variety of tree types. Over 50% of the trees surveyed in Verona's street tree inventory were made up of only three tree species.

Street trees are subjected to a wide variety of stressful environmental conditions, including roadway and walkway salting, soil compaction, and air pollutants. Therefore, tree species that can withstand these conditions are recommended. In addition, trees that are long lived are the best investment. The tree inventory shows, however, that Bradford Pear trees account for 586 (22%) of the total trees surveyed. Bradford Pear trees are notorious for splitting in heavy winds and snow or ice storms. The damage destroys the form of the trees, which is symmetrical, and causes early death. Invasive exotic plant species are responsible for the decline of our native woodland forests. These are plants that are not native, but introduced from elsewhere and thrive in growing conditions in the Northeastern United States. They are so successful that they out compete the native woody plants, preventing native seedlings and ephemerals from emerging from the forest floor. This does not allow for regeneration of the native forest and results in a monoculture and the eventual decline of the native woodland. These invasive exotics do not often provide the same wildlife food value as our native plants do.

Invasive exotic plants are not usually considered a threat when their growth is controlled within the environment, such as in urban conditions, or when used as street trees. However, the use of invasive exotics as street trees threatens nearby forests and woodlands and seed dispersal by birds and wind can not be controlled. Once they have taken hold, the only way to reverse the damage is to eradicate the invasives and reforest with native woodland species.

Of the trees surveyed in the inventory, 527 (20%) are invasive exotic tree species. Specifically, Norway Maples make up 489 of the 527 trees. Norway maples are now in evidence in natural areas along the Peckman River, as discussed below. Norway Maples are also short lived because of a habit of self girdling.

A major problem with street trees is improper pruning by utility companies around overhead power lines (see Page 29). Other problems are: sidewalk heaving, planting of invasive exotic species, planting trees that will not thrive in compacted soils or difficult environmental conditions, inadequate soil volumes in urban plantings, and lack of maintenance. A strong street tree planting and maintenance is necessary in each community in order to promote street trees as a natural resource.

The sizes of the street trees inventoried is summarized in the table below. Of the trees surveyed, only 785 (30%) fall are greater than 18" diameter at breast height (dbh). This leaves 70% of trees in the 2-18" dbh category.

Trees by Range in Size

Range in Tree Size (diameter at breast height)	Tree Count
Not Listed	40
<3	245
3-6	453
7-12	406
13-18	689
19-24	425
25-30	234
31-36	116
>36	10
Total	**2618**

Tree condition based on the tree inventory is summarized in the table below. A total of 1,057 (41%) of the trees surveyed for condition were dead or in poor to fair condition.

Tree Condition

Tree Condition	Tree Count
Not Listed	47
Dead	14
Poor	198
Fair	845
Good	1452
Good/Fair	1
Total	**2557**

NATURAL WOODLAND AREAS

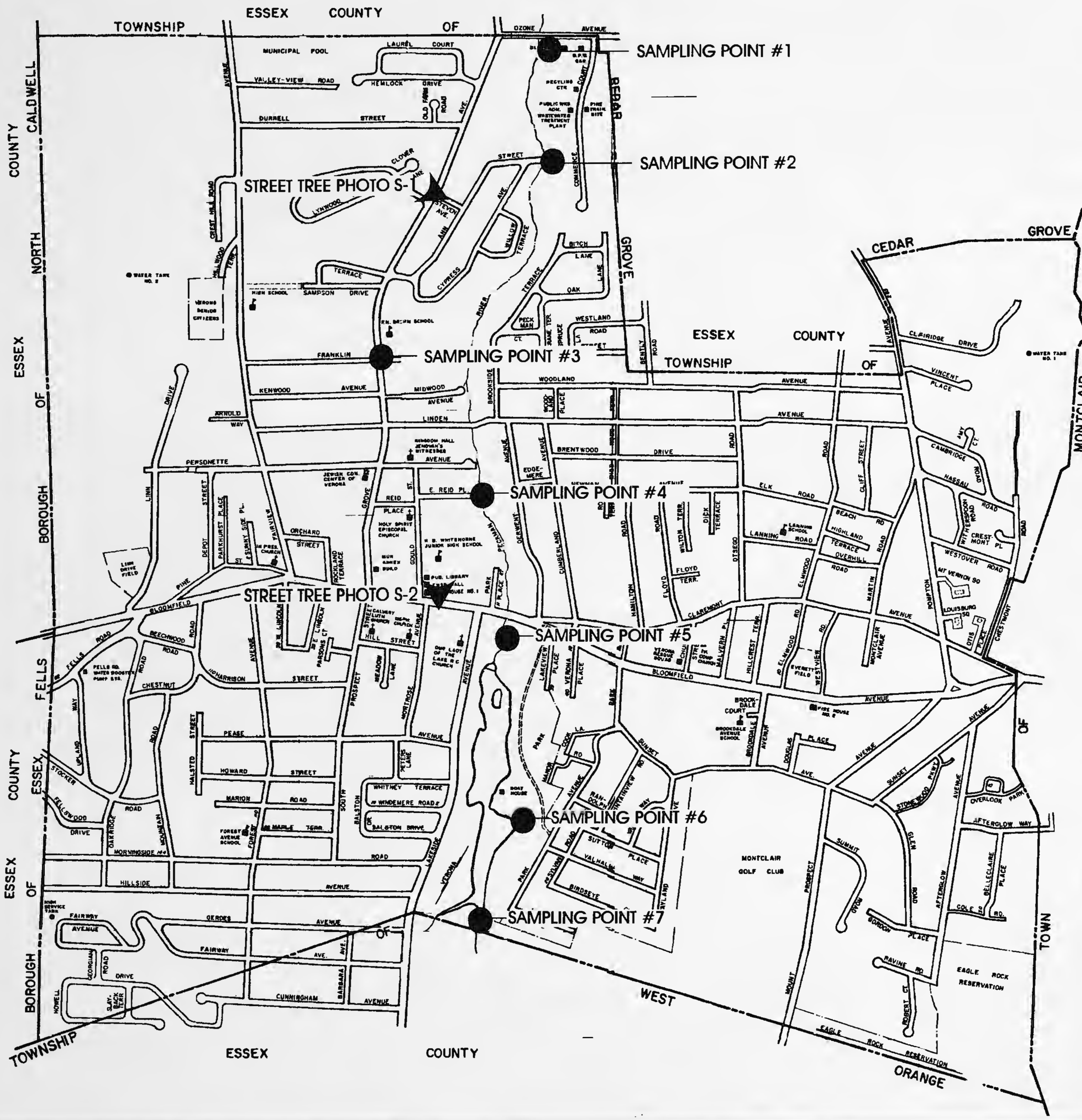
Field sample points were taken by March Associates along the Peckman River and within Verona Park to examine the natural woodland and naturalized vegetation in the community. March Associates is solely responsible for sample point locations, photographs, and field work conducted for the field sample points. Page 25 shows the sample points and describes the character of each location. Page 26 shows photographs taken at each sample point.

A wide variety of ecological conditions are present along the Peckman River ranging from natural areas in good condition to river banks that exhibit erosion and undercutting and are covered with invasive exotic plant species.

The presence of invasive exotic species is a major problem along certain portions of the Peckman River. The main culprit is Japanese Knotweed (Polygonum), although there is at least one stand of Norway Maple that appears to be thriving. See Appendix E for a list of invasive exotic plant species in the northeastern United States and Appendix F for native plant lists.

River and stream valleys are best vegetated in natural woodland areas as opposed to lawn or channelization. The presence of woodlands along stream corridors increases water quality by holding the soil, thereby preventing erosion and slowing storm water runoff. The presence of trees along stream corridors cools the water by shading it, which increases the ability of aquatic life to live and reproduce.

Equally, if not more important are the steeply sloping, wooded areas of high ground of the Second Watchung Mountain area. As documented in the Environmental Resource Inventory for the Hilltop Area, prepared in June, 1984, the area is a native forest ecosystem with White and black oak as the dominant species. Black birch, black cherry, red oak, american beech, red maple, and american ash are also present. The understory contains native shrubs and multiflora rose. Wildlife habitat includes squirrels, racoons, skunks, fox, woodchucks, opossum, rabbits, chipmunks, filed mice, rats, deer, snakes, and frogs. This resource is important because while wetland areas are protected from destruction by state and federal laws, no such laws currently govern our uplands. Forested hilltops are critical habitat for migrating birds.



SAMPLING POINT #1

Channelized river with a variety of vegetation including non-native, invasive exotic, and native trees. Species observed are crabapple, willow, tree-of-heaven, sassafras, dogwood, silver maple, pin oak, locust, virginia creeper.

SAMPLING POINT #2

Naturalized river edge with minor erosion and bank undercutting. Species observed include elm, box elder, pin oak, red maple, ash, spicebush, grape, virginia creeper, multiflora rose, and japanese knotweed.

SAMPLING POINT #3

Combination of channelized and natural river bank with mainly invasive exotic plants. Species observed include norway maple, which is used as a street tree on Franklin Ave., box elder, silver maple, multiflora rose and japanese knotweed.

SAMPLING POINT #4

River bank exhibits undercutting caused by erosion. Vegetation is lawn, residential plantings, and invasive exotic species. Species observed include norway maple, hickory, multiflora rose, and japanese knotweed.

SAMPLING POINT #5

Peckman River is channelized with stone walls as part of the original park plan by Olmstead. Vegetative cover is lawn and mature trees.

SAMPLING POINT #6

Large shade trees with lawn below are starting to exhibit signs of erosion. Areas of lawn around the lake edge are also exhibiting signs of erosion. Shrub layers around the lake edge are mostly native and appear healthy.

SAMPLING POINT #7

Native wetland ecosystem including dominant overstory of red maple and understory of arrowood viburnum beyond the park fence. Inside the park fence are typical landscape plants including invasive exotics such as barberry, privet, and norway maple.

STREET TREE PHOTO S-1

Street tree in residential neighborhood suffers from improper pruning under powerlines.

STREET TREE PHOTO S-2

'Bradford' Pear tree along 'Bloomfield' Avenue suffers from physical damage, improper pruning, and inhospitable growing conditions.

TOWNSHIP OF
VERONA
ESSEX COUNTY
NEW JERSEY

NATURAL RESOURCE INVENTORY

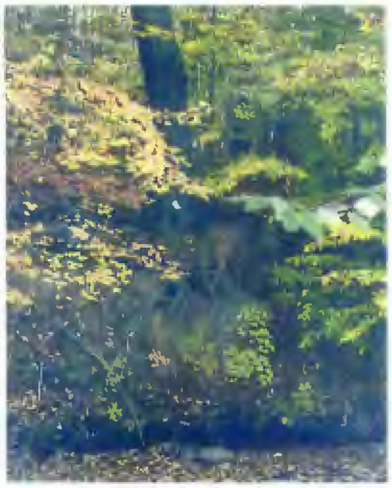
JUNE, 1999

LAND PLANNERS
LANDSCAPE ARCHITECTS
MARCH ASSOCIATES

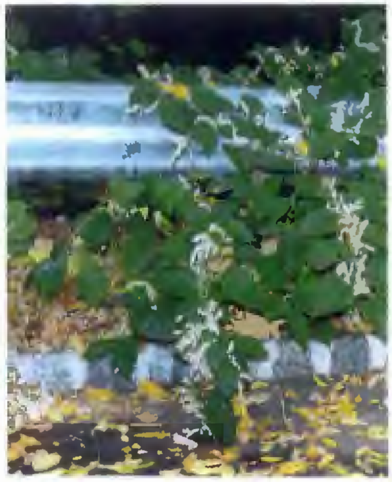
609.448.9520

VEGETATION
SAMPLING POINT LOCATIONS

600 1200 2400 3600 4200 6600

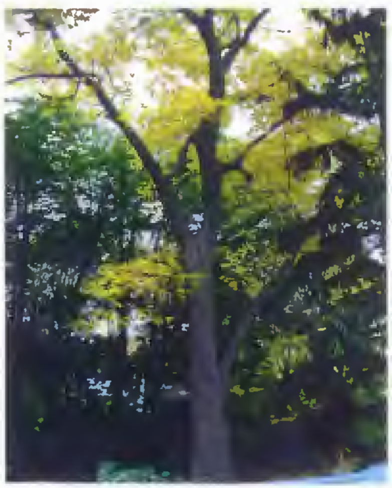


UNDERCUT STREAM BANK ALONG PECKMAN RIVER

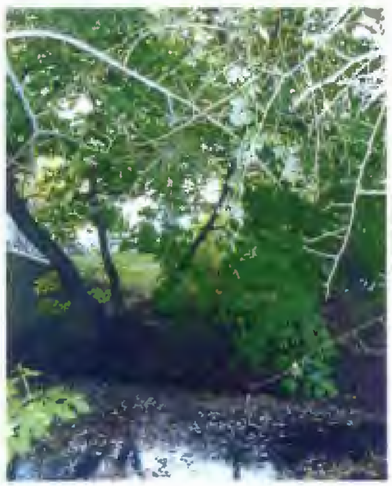


POLYGANUM AT SAMPLING POINT #4

SAMPLING POINT #5

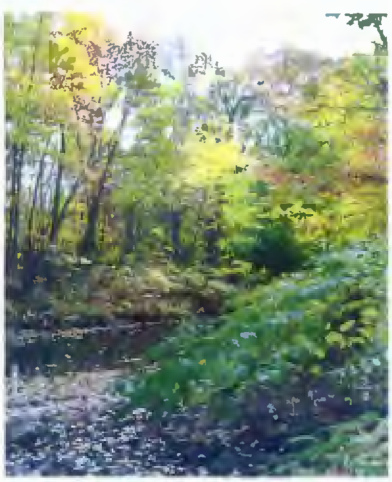


ASH TREE ON PECKMAN RIVER



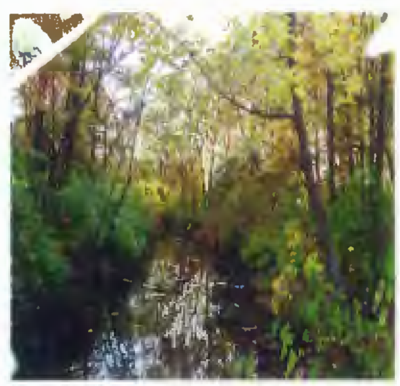
NORWAY MAPLE AT SAMPLING POINT #4

SOIL EROSION AT SAMPLING POINT #6



SAMPLING POINT #2

CHANNELIZED STREAM AT SAMPLING POINT #5



SAMPLING POINT #7

RARE SPECIES AND NATURAL COMMUNITIES

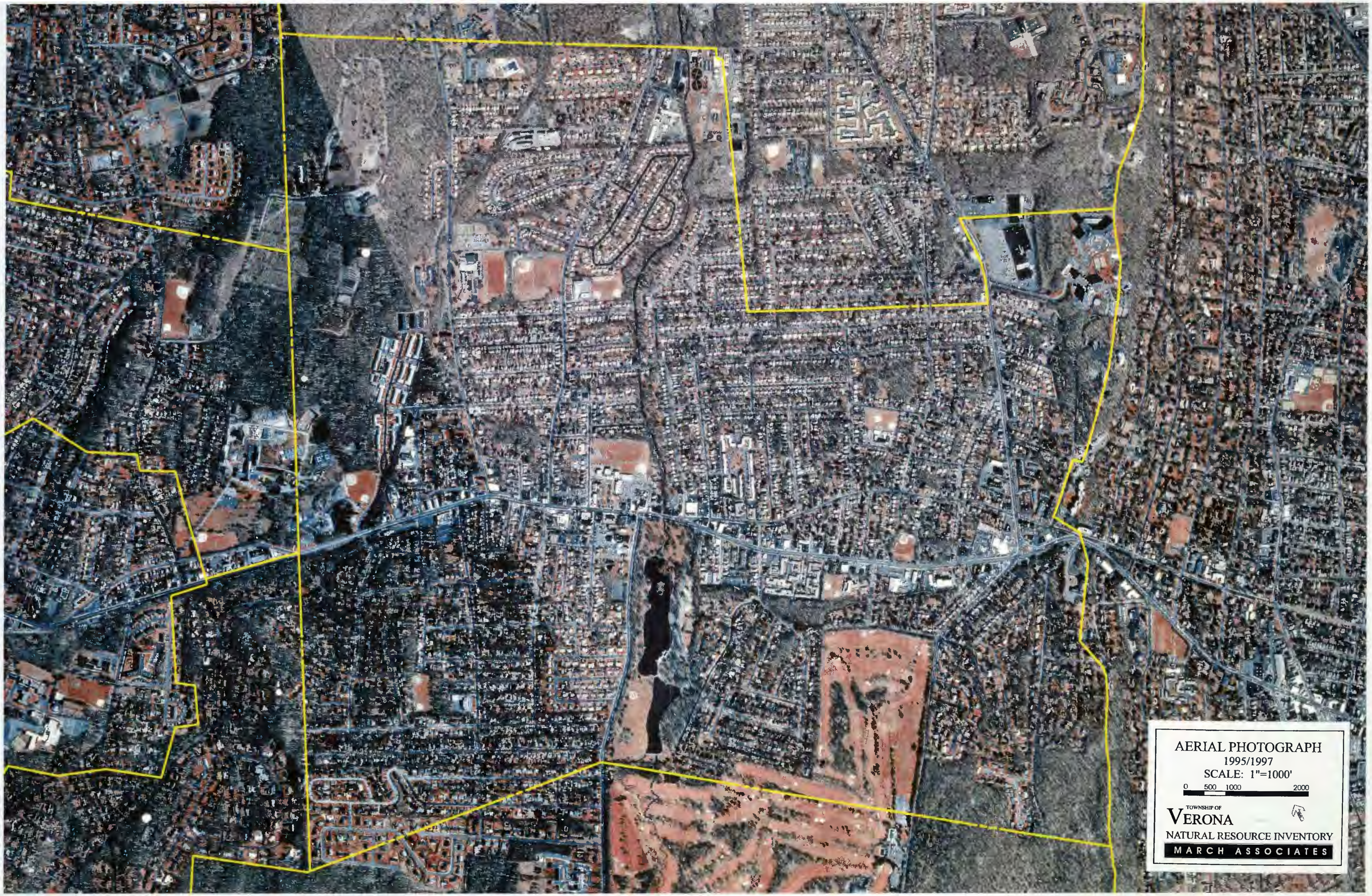
The Natural Heritage Foundation lists three vascular plant rare species and natural communities that have been identified in Verona. If suitable habitat is present at a project site, these species have a potential to be present. In order to protect the species and habitats, it is a policy of the Natural Heritage Foundation not to publish the exact locations to the general public. Environmental Commissions and other professionals may obtain the information for planning purposes.

The species are:

Alisma triviale	Large Water Plantain	Endangered
Ranunculus pusillus	Low Spearwort	Imperiled
Salix lucida	Shining Willow	Imperiled

An endangered plant is one whose prospects for survival within the State are in immediate danger due to one or more factors - loss of habitat, over exploitation, predation, competition, or disease. An endangered species requires immediate assistance or extinction will probably follow. The plant listed above is in a category in which less than 5 occurrences, or very few remaining individuals or acres.

The plants listed as imperiled, above, are so listed because of the rarity of occurrence (6 to 20 occurrences). The primary reason for the low number of plants is habitat destruction.


AERIAL PHOTOGRAPH
1995/1997
SCALE: 1"=1000'
0 500 1000 2000
TOWNSHIP OF
VERONA
NATURAL RESOURCE INVENTORY
MARCH ASSOCIATES

TOWNSHIP OF
VERONA
ESSEX COUNTY
NEW JERSEY

NATURAL RESOURCE INVENTORY

JUNE, 1999

LAND PLANNERS
LANDSCAPE ARCHITECTS
MARCH ASSOCIATES

609.448.9520

VEGETATION MAP

600 1200 2400 3600 4800 7200

ENVIRONMENTAL CONTAMINATION

The New Jersey Department of Environmental Protection is aware of 13 sites with on-site sources of environmental contamination; one site with an unknown source of contamination, and four sites with cases that were closed between 7/1/96 and 6/30/97. The site name and addresses are listed in Appendix D.

The specific contaminants are not listed, but the case numbers are listed, so that interested parties can inquire with the NJDEP about remediation efforts. Many of the contamination sites appear to be gasoline and automotive service related.

LIST OF RESOURCES

BASE MAP
1. Street map of Verona Township, 1"=500', prepared by James M. Helb, P.E., dated June 1, 1991.

BACKGROUND INFORMATION
1. Master Plan, Township of Verona, Queale & Lynch, Inc., June 25, 1992.
2. Political Subdivisions of New Jersey, New Jersey State Planning Commission, June, 1992.
3. New Jersey State Website, http://www.state.nj.us/.
4. Site Visit and photographs, March Associates Landscape Architects, P.C., 10/27/98.

AERIAL MAP
1. Color Infrared Digital Imagery, New Jersey Department of Environmental Protection, Bureau of Geographic Information & Analysis, Office of Information Resources Management, 1995/97.

GEOLOGY
1. Bedrock Geologic Map of Northern New Jersey, Plan and Section, 1:100,000, US Geological Survey, NJ Geological Survey, dated 1996.
2. Geologic Overlay, State of New Jersey, 1"=1 mile.
3. New Jersey Rocks and Sediment, Department of Environmental Protection, Division of Science and Research, NJ Geological Survey, 1996.
4. Geologic Map of New Jersey, Department of Environmental Protection, Division of Science and Research, NJ Geological Survey, 1996.

GEOGRAPHY
1. General Soil Map, Essex and Hudson Counties, New Jersey, 1993.

TOPOGRAPHY
1. U.S. Geological Survey, 1:24000, Caldwell and Orange, NJ quad sheets, dated 1954 and 1955 respectively and photo revised 1981.
2. Sheet 26 Topographic Series, State of New Jersey Department of Economic Development, Division of Planning and Development, 1880-3, Revised 1955.

HYDROLOGY
1. Delineation of Floodway & Flood Hazard Area, State of New Jersey Department of Environmental Protection, Division of Water Resources, 1"=200', April, 1980.
2. Freshwater Wetlands Map, State of New Jersey Department of Environmental Protection, 1"=1000', 1986.
3. Groundwater Resources of Essex County, New Jersey, Special Report No. 28, State of New Jersey, Department of Conservation and Economic Development, 1968.
4. New Jersey's Watersheds, Watershed Management Areas and Water Regions, NJDEP Office of Environmental Planning, January, 1997.
5. NJ Department of Environmental Protection Agency Website, http://www.state.nj.us/dep.

CLIMATE
1. The Climate of New Jersey, New Jersey State Climatologist Website, www.ncdc.noaa.gov/ol/climate/.
2. The EPA's Global Warming Website, www.epa.gov/docs/oppeoee1/globalwarming/climate/trends/.

AIR QUALITY
1. 1996 Air Quality Report, New Jersey Department of Environmental Protection, Bureau of Air Monitoring, August, 1997.
2. NJ Department of Environmental Protection Agency Bureau of Air Monitoring Website, http://www.state.nj.us/dep/airmon/.

WATER QUALITY

1. Sewage Discharge Monitoring Report, Township of Verona, dated 7/6/98.
2. Distribution System Water Quality 1998, Township of Verona.
3. Passaic Water Commission - Little Falls, NJ, Monthly Averages of Chemical Analyses - Verona Supply, Year of 1997.
4. Hackensack-Passaic Watershed Summary Information, www.state.nj.us/dep, 9/28/98.
5. Index of Watershed Indicators Scoresheet-Hackensack-Passaic, www.epa.gov/surf/IWI/02030103/, 9/28/98.

VEGETATION

1. Tree Inventory for Verona Township, 75% complete, dated Sept., 1994 and Sept., 1996.
2. Environmental Resource Inventory for Hilltop Site, Essex County, NJ., dated June, 1984.

RARE SPECIES AND NATURAL COMMUNITIES

1. Natural Heritage Data for Verona Township, dated October 23, 1998.

ENVIRONMENTAL CONTAMINATION

1. Known Contaminated Sites in New Jersey, SRP Report, New Jersey Department of Environmental Protection, 1997.

[redacted]/ADDRESS *(Include Facility Name/Location if Different)*
VERONA TOWNSHIP OF
600 BLOOMFIELD AVENUE
VERONA, NJ 07044

FACILITY VERONA WTP
LOCATION VERONA, NJ 07044

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

(2-16)	(17-19)
J0024490	004A
PERMIT NUMBER	DISCHARGE NUMBER

CREATED: 07/06/98

Form Approved.
OMB No. 2040-0004
Approval expires 05-31-98

MONITORING PERIOD							
	YEAR	MO	DAY		YEAR	MO	DAY
FROM	[illegible]	07	01	TO	[illegible]	07	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NORTHERN REGION / ESSEX

DMR NUMBER: NJ0024490 004A 071998

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUANTITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
SELENIUM, TOTAL RECOVERABLE 00981 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT				******						
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24
COPPER, TOTAL (AS CU) 01042 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	82.4	82.4		******	<10.0	<10.0		0	S.A.	24COMP
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		[illegible]	COMP24
NICKEL TOTAL RECOVERABLE 01074 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT				******						
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24
SILVER TOTAL RECOVERABLE 01079 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT				******						
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24
ZINC, TOTAL (AS ZN) 01092 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	82.4	82.4		******	< 10.0	< 10.0		0	S.A.	24COMP
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		[illegible]	COMP24
ANTIMONY, TOTAL (AS SB) 01097 1 0 EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT				******						
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24
[illegible] TOTAL RECOVERABLE [illegible] EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT				******						
	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER
MAYOR
[illegible]
TYPED OR PRINTED

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. *(Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)*

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TELEPHONE		DATE		
973	857-4843	98	08	12
AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
[illegible] IS AN ADDITION TO NOEL STATRE 7DAY PIMEPHALES T0P6C.

APPENDIX A

EPA Form 3320-1 (08-95) Previous editions may be used. (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.) PAGE OF

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME: VERONA TOWNSHIP OF
ADDRESS: 500 BLOOMFIELD AVENUE
VERONA, NJ 07044

FACILITY: VERONA WTP
LOCATION: VERONA, NJ 07044
DMR NUMBER: NJ0024490 004A 071998

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM *(NPDES)*
DISCHARGE MONITORING REPORT *(DMR)*

(2-16)	(17-19)
NJ0024490	004A
PERMIT NUMBER	DISCHARGE NUMBER

CREATED: 07/06/98

Form Approved. OMB No. 2040-0004 Approval expires 05-31-98

MONITORING PERIOD	YEAR	MO	DAY		YEAR	MO	DAY
FROM	[illegible]	07	01	TO	[illegible]	07	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NORTHERN REGION / ESSEX

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUANTITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
PH	SAMPLE MEASUREMENT	******	******		6.8	******	7.6		0	2/1	GR
00400 G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	******	******	**** ****	REPORT 01RPMN	******	REPORT 01RPMX	SU		TWICE/ DAY	GRAB
PH	SAMPLE MEASUREMENT	******	******		6.6	******	7.2		0	2/1	GR
00400 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	6.00000 01RPMN	******	9.00000 01RPMX	SU		TWICE/ DAY	GRAB
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	4,270.1	5,660.6		******	523.0	693.3		0	1/7	24COMP
00530 G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01WKAV	KG/DAY	******	REPORT 01MOAV	REPORT 01WKAV	MG/L		WEEKLY	[illegible]
SOLIDS, TOTAL SUSPENDED	SAMPLE MEASUREMENT	21.4	28.8		******	2.6	3.5		0	1/7	24CO
00530 1 1 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	[illegible]0.00000 01MOAV	10.00000 01WKAV	KG/DAY	******	30.00000 01MOAV	[illegible].00000 01WKAV	MG/L		WEEKLY	[illegible]
OIL AND GREASE FREON EXTR-GRAV METH	SAMPLE MEASUREMENT	******	******		******	1.5	1.5		0	1/30	GR
00556 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	10.00000 01MOAV	[illegible].00000 01RPMX	MG/L		ONCE/ MONTH	GRAB
NITROGEN, AMMONIA TOTAL (AS N)	SAMPLE MEASUREMENT	0.5	0.9		0.03	0.07	0.12		0	1/7	24COMP
00610 1 1 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	[illegible].00000 01MOAV	[illegible].00000 01WKAV	KG/DAY	[illegible].00000 01MOAV	3.00000 01WKAV	REPORT 01DAMX	MG/L		WEEKLY	COMP24
ENTEROCOCCI- GROUP D MF TRANS, M-E, EIA	SAMPLE MEASUREMENT	******	******		******	2.0	2.0		0	1/30	GR
31639 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	REPORT 01MOAV	REPORT 01RPINMX	#/100 ML		ONCE/ MONTH	GRAB

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MAYOR MATTHEW KERNAN	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. *(Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)*	[signature]	973	857-4843	98	08	12
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*

PRAMATER NO. (TBP3B) IS AN ADDITION TO NOEL STATRE 7DAY PIMEPHALES TBP6C.

APPENDIX A

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME VERONA TOWNSHIP OF
ADDRESS 600 BLOOMFIELD AVENUE
VERONA, NJ 07044

FACILITY VERONA WTP
LOCATION VERONA, NJ 07044
DMR NUMBER: NJ0024490 004A 071998

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

CREATED: 07/06/98

Form Approved.
OMB No. 2040-0004
Approval expires 05-31-98

(2-16)	(17-19)
NJ0024490	004A
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

	YEAR	MO.	DAY		YEAR	MO.	DAY
FROM	[illegible]	[illegible]	[illegible]	TO	[illegible]	[illegible]	31
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NORTHERN REGION / ESSEX

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUANTITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	3.00	2.16		******	******	******		0	CONT	******
50050 G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	REPORT 1YRAV	REPORT 01DAY	MGD	******	******	******	**** ***		CONTINUOUS	CONTINUOUS
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	3.02	2.18		******	******	******		0	CONT	******
50050 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 1YRAV	REPORT 01DAY	MGD	******	******	******	**** ***		CONTINUOUS	CONTINUOUS
COLIFORM, FECAL GENERAL	SAMPLE MEASUREMENT	******	******		******	4.4	35.0		0	1/30	GR
74055 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	******	200.00000 01MOAV	400.00000 01RPMX	#/100 ML		FOUR/ MONTH	GRAB
BOD, CARBONACEOUS 05 DAY, 20C	SAMPLE MEASUREMENT	1,224.7	1,322.6		******	150.0	162.0		0	1/7	2400
80082 G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01WKAV	KG/DAY	******	REPORT 01MOAV	REPORT 01WKAV	MG/L		WEEKLY	COMP
BOD, CARBONACEOUS 05 DAY, 20C	SAMPLE MEASUREMENT	8.2	9.8		******	1.0	1.2		0	1/7	2400HP
80082 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	[illegible].00000 01MOAV	[illegible].00000 01WKAV	KG/DAY	******	[illegible].00000 01MOAV	12.00000 01WKAV	MG/L		WEEKLY	COMP24
BOD, CARB-5 DAY, 20 DEG.C, PERCENT REMVL	SAMPLE MEASUREMENT	******	******		99.3	******	******		0	1/7	****
80091 K 1 0 PERCENTREMOVAL	PERMIT REQUIREMENT	******	******	**** ****	[illegible].00000 01MOAVMN	******	******	PERCENT		WEEKLY	CALCTD
SOLIDS, SUSPENDED PERCENT REMOVAL	SAMPLE MEASUREMENT	******	******		99.5	******	******		0	1/7	****
81011 K 0 PERCENTREMOVAL	PERMIT REQUIREMENT	******	******	**** ****	[illegible].00000 01MOAVMN	******	******	PERCENT		WEEKLY	CALCTD

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE		
MAYOR MATTHEW KERHAN	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)	(signature)	973	857-4843	98	08	12
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)
[illegible] IS AN ADDITION TO NOEL STATRE 7DAY PIMEPHALES TBPEC.

APPENDIX A

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*
NAME VERONA TOWNSHIP OF
ADDRESS 600 BLOOMFIELD AVENUE
VERONA, NJ 07044

FACILITY VERONA WTP
LOCATION VERONA, NJ 07044
PERMIT NUMBER: NJ0024490 004A 071998

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

(2-16)	(17-19)
NJ0024490	004A
PERMIT NUMBER	DISCHARGE NUMBER

CREATED: 07/06/98

Form Approved.
OMB No. 2040-0004
Approval expires 05-31-98

	MONITORING PERIOD					
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NORTHERN REGION / ESSEX

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUANTITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
LC50 STATRE 96HR ACU PIMEPHALES	SAMPLE MEASUREMENT	******	******		>100%	******	******		0	8 A	96 HR
TAN6C 1 1 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	0.00000 01RPMN	******	******	PERCENT		SEMI-ANNUAL	
IC25 STATRE 7DAY CHR CERIODAPHNIA	SAMPLE MEASUREMENT	******	******		97.0 %	******	******		0	QTRLY	96 HR
TBP3B 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	REPORT 01MOAVMN	******	******	PERCENT		QTRLY	
CHLORINE PRODUCED OXIDANTS	SAMPLE MEASUREMENT	0.08	0.08		******	0.1 ND	0.1 ND		0	1/7	GR
CPOX G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	KG/DAY	******	REPORT 01MOAV	REPORT 01DAMX	MG/L		WEEKLY	GRAB
CHLORINE PRODUCED OXIDANTS	SAMPLE MEASUREMENT	0.08	0.08		******	0.1 ND	0.1 ND		0	1/7	G
CPOX 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	KG/DAY	******	REPORT 01MOAV	REPORT 01DAMX	MG/L		WEEKLY	GRAB
TEMPERATURE, WATER DEG. CENTIGRADE	SAMPLE MEASUREMENT	******	******		17.5	20.7	24.0		0	2/1	GR
00010 G 0 RAW SEW/INFLUENT	PERMIT REQUIREMENT	******	******	**** ****	REPORT 01RPMN	REPORT 01MOAV	REPORT 01RPMX	DEG.C		TWICE/DAY	GRAB
TEMPERATURE, WATER DEG. CENTIGRADE	SAMPLE MEASUREMENT	******	******		18.5	22.6	25.0		0	2/1	GR
00010 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	REPORT 01RPMN	REPORT 01MOAV	REPORT 01RPMX	DEG.C		TWICE/DAY	GRAB
OXYGEN, DISSOLVED (DO)	SAMPLE MEASUREMENT	******	******		5.3	8.3	10.2		0	1/7	GR
00300 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	******	******	**** ****	REPORT 01RPINMN	4.00000 01WKAVMN	REPORT 01DAAV	MG/L		WEEKLY	GRAB

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	CERTIFICATION	SIGNATURE	TELEPHONE		DATE		
MAYOR MATTHEW [illegible] KERNAN	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. *(Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)*	[signature]	973	857-4843	98	08	12
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS *(Reference all attachments here)*
PARAMETER (TBP3B) IS AN ADDITION TO NOEL STATRE 7DAY PIMEPHALES TBP6C.

APPENDIX A

EPA Form 3320-1 (08-95) Previous editions may be used. (REPLACES EPA FORM T-40 WHICH MAY NOT BE USED.) PAGE OF

LABS:

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)

NAME VERONA TOWNSHIP OF
ADDRESS 600 BLOOMFIELD AVENUE
VERONA, NJ 07044

FACILITY VERONA WTP
LOCATION VERONA, NJ 07044
DMR NUMBERS NJ0024490 004A 071998

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

(2-16)	(17-19)
NJ0024490	004A
PERMIT NUMBER	DISCHARGE NUMBER

CREATED: 07/06/98

Form Approved. OMB No. 2040-0004. Approval expires 05-31-98.

	MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM	[illegible]	[illegible]	[illegible]	TO	[illegible]	[illegible]	[illegible]
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

NORTHERN REGION / ESSEX

NOTE: Read instructions before completing this form.

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53) AVERAGE	(54-61) MAXIMUM	UNITS	(4 Card Only) QUANTITY OR CONCENTRATION (38-45) MINIMUM	(46-53) AVERAGE	(54-61) MAXIMUM	UNITS	NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
PHOSPHORUS, TOTAL (AS P)	SAMPLE MEASUREMENT	33.7	36.2		******	4.1	4.4		0	1/7	24COMP
00665 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01WKAV	KG/DAY	******	REPORT 01MOAV	REPORT 01WKAV	MG/L		WEEKLY	COMP24
BARIUM, TOTAL (AS BA)	SAMPLE MEASUREMENT				******						
01007 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		SEMI-ANNUAL	COMP24
IRON, TOTAL (AS FE)	SAMPLE MEASUREMENT				******						
01045 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		SEMI-ANNUAL	COMP24
MANGANESE, TOTAL (AS MN)	SAMPLE MEASUREMENT				******						
01055 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		SEMI-ANNUAL	COMP24
MERCURY TOTAL RECOVERABLE	SAMPLE MEASUREMENT				******						
71901 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24
CYANIDE, TOTAL (AS CN)	SAMPLE MEASUREMENT				******						
00720 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	GRAB
ARSENIC, TOTAL RECOVERABLE	SAMPLE MEASUREMENT				******						
00978 1 0 EFFLUENT GROSS VALUE	PERMIT REQUIREMENT	REPORT 01MOAV	REPORT 01DAMX	GR/DAY	******	REPORT 01MOAV	REPORT 01DAMX	UG/L		ANNUAL	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	CERTIFICATION	SIGNATURE	TELEPHONE		DATE		
MAYOR MATTHEW T. KEENAN	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN; AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may include fines up to $10,000 and or maximum imprisonment of between 6 months and 5 years.)	[signature]	973	857-4843	98	08	12
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

PARAMETER NO. 7 (TBP3B) IS AN ADDITION TO NOEL STATRE 7DAY PIMEPHALES TOP6C.

APPENDIX A

REVD 1-2

PASSAIC VALLEY WATER COMMISSION - LITTLE FALLS, NJ
MONTHLY AVERAGES OF CHEMICAL ANALYSES - **VERONA SUPPLY**
YEAR OF 1997

	TEMPERATURE F (F)	COLOR (CU)	TURBIDITY (NTU)	pH (SU)	ALKALINITY (PPM)	EDTA HARDNESS (PPM)	(PPM) CALCULATED HARDNESS	TOTAL SOLIDS (PPM)	SPECIFIC CONDUCTANCE	SILICA - SiO_2 (PPM)	CALCIUM - Ca (PPM)	MAGNESIUM - Mg (PPM)	SULFATES - SO_4 (PPM)	IRON - Fe (PPM)	MANGANESE - Mn (PPM)	SODIUM - Na (PPM)	POTASSIUM - K (PPM)	FLUORIDE - F (PPM)	PHOSPHATE - P (PPM)	CHLORIDE - Cl (PPM)	NITRITE - N (PPM)	NITRATE - N (PPM)	COD (PPM)	DISSOLVED OXYGEN
JANUARY	46	6	0.24	7.8	30	52	47	98	313	0.4	14.4	2.6	16.3	0.015	0.020	13.6	0.70	0.06	0.22	23.7	<0.10	0.15	1	
FEBRUARY	45	5	0.15	7.8	29	56	47	91	208	2.0	14.0	2.9	17.5	0.006	0.003	12.0	0.80	0.06	<0.06	28.5	<0.10	0.15	2	
MARCH	49	6	0.17	7.9	26	63	52	72	214	0.8	16.0	2.9	16.0	0.012	0.005	12.1	0.70	0.05	<0.06	26.8	<0.10	0.19	2	
APRIL	50	6	0.16	8.0	27	60	54	94	213	0.8	15.6	3.6	17.8	0.015	0.010	15.1	1.00	0.04	<0.06	23.4	<0.10	<0.10	4	
MAY	58	7	0.24	8.0	28	61	53	127	204	2.2	16.8	2.6	15.9	0.024	0.030	15.2	0.70	0.04	<0.06	25.4	<0.10	0.18	2	-
JUNE	63	7	0.15	8.2	32	78	72	183	322	3.0	23.2	3.5	24.8	0.018	0.020	15.8	1.10	0.11	1.10	46.5	<0.10	1.18	4	-
JULY	65	7	0.38	8.1	35	54	56	84	233	3.6	16.0	2.9	14.8	0.020	0.036	13.0	0.80	0.09	<0.06	22.3	<0.10	0.22	2	-
AUGUST	69	6	0.24	8.2	39	63	61	194	253	2.2	19.2	3.2	17.0	0.014	0.017	14.4	0.90	0.06	<0.06	26.4	<0.10	0.11	-	-
SEPTEMBER	70	5	0.22	8.2	38	64	75	122	213	3.2	18.4	7.1	17.3	0.007	0.014	34.7	2.50	0.08	<0.06	27.4	<0.10	<0.10	4	-
OCTOBER	64	6	0.23	8.2	40	64	75	218	325	2.8	20.0	6.0	19.9	0.016	0.021	27.0	2.06	0.08	<0.06	36.5	<0.10	0.18	5	-
NOVEMBER	55	6	0.27	8.3	46	84	85	170	357	2.4	25.6	5.1	22.4	0.017	0.023	21.8	1.60	0.11	<0.06	44.1	<0.10	0.52	6	-
DECEMBER	49	6	0.29	8.4	48	80	91	170	547	2.0	27.2	5.7	23.9	0.036	0.017	26.9	1.70	0.11	<0.06	49.1	<0.10	0.65	9	-
ANNUAL AVG	57	6	0.23	8.1	35	65	64	135	284	2.1	18.9	4.0	18.6	0.017	0.018	18.5	1.21	0.07	0.11	31.68	<0.10	0.35	3.7	-
MAXIMUM	70	7	0.38	8.4	48	84	91	218	547	3.6	27.2	7.1	24.8	0.036	0.036	34.7	2.50	0.11	1.1	49.1	<0.10	1.18	9	-
MINIMUM	45	5	0.15	7.8	26	52	47	72	204	0.4	14.0	2.6	14.8	0.006	0.003	12.0	0.70	0.04	<0.06	22.3	<0.10	<0.10	1	-
STAND. DEV.	9	1	0.07	0.2	7	10	15	49	99.6	1.0	4.37	1.55	3.3	0.008	0.009	7.39	0.61	0.03	0.32	9.7	0	0.34	2.3	-

APPENDIX B

TOWNSHIP OF VERONA

Distribution System Water Quality 1998

Parameter	Units	Sample Dates and Location			
		10/6/98 (TG)	10/13/98 (TH)	10/20/98 (CC)	10/27/98 (WW)
pH	SU	8.34	7.95	8.46	
Temperature	Celcius	21.2	21.9	22.6	
Chlorine Residual - free	mg/L		0.55		
Chlorine Residual - total	mg/L	0.7	0.69	0.55	
Hardness	mg/L	70	58	60	
Alkalinity	mg/L	36	32	33	
TDS	mg/L	143	100	127	
Corrosivity	L.I.	-0.07	-0.59	-0.08	
Nitrate/Nitrite	mg/L	0.02	0.02	0.05	
TP	mg/L	0.47	0.58	0.57	
Turbidity	NTU	0.26	0.05	0.18	
Fluoride	mg/L	0.08	<0.10	0.11	
Color	CU				
Conductivity	uMhos/cm	233	209	213	
Total coliform	P/A	Neg	Neg	Neg	
SPC	cfu/1mL	1	1	<1	

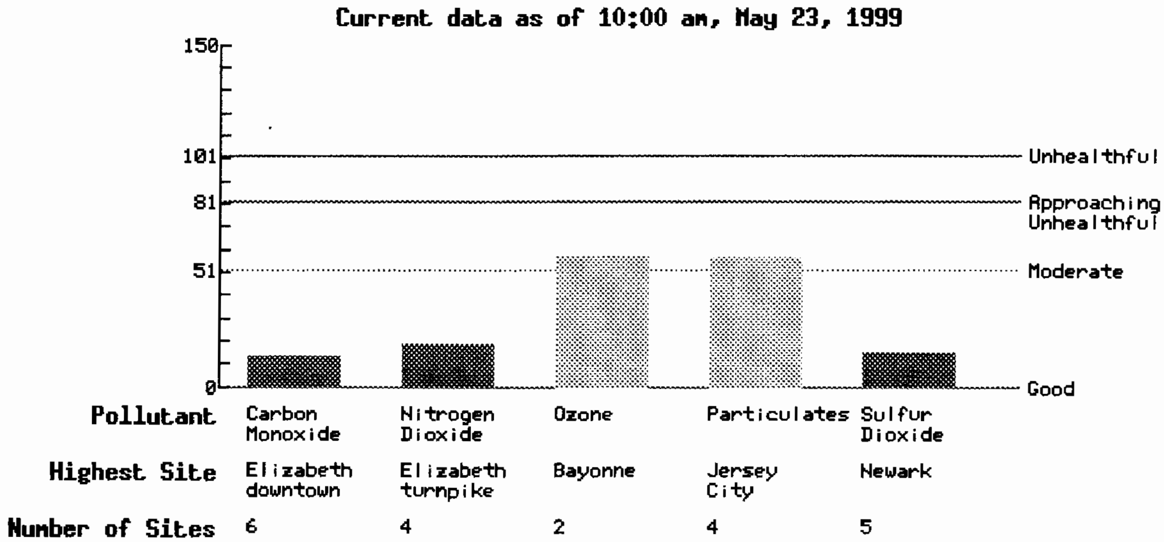
APPENDIX B

APPENDIX C

Current Air Quality Readings

Southern Metropolitan Region: Essex, Hudson and Union Counties

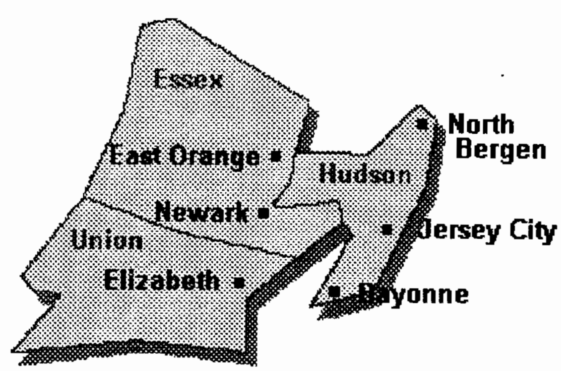
This chart shows the highest reading in the region for each pollutant and the monitoring site at which the reading was recorded. The tallest bar determines the overall rating in the region. Values over 100 represent unhealthful levels.



Southern Metropolitan sites:

Select one of the site names from the list below to get current readings for that site:

Bayonne
East Orange
Elizabeth (downtown)
Elizabeth (NJ Turnpike)
Jersey City
Newark
North Bergen



NJ *In Touch* DEP Home Back

TABLE 4

POLLUTANT STANDARDS INDEX (PSI)
ANNUAL SUMMARY - 1996

NUMBER OF DAYS

PSI REPORTING REGION	DESCRIPTOR RATINGS GOOD	MODERATE	APPROACHING UNHEALTHFUL	UHEALTHFUL	NOT AVAILABLE
Northern Metropolitan	269	96	1	0	0
Southern Metropolitan	133	223	6	4	0
Suburban	202	158	4	2	0
Northern Delaware Valley	287	75	1	0	3
Central Delaware Valley	258	101	5	2	0
Northern Coastal	262	100	3	1	0
Southern Coastal	273	93	0	0	0
Southern Delaware Valley	252	108	4	2	0
Delaware Bay	294	72	0	0	0
Statewide	100	245	11	10	0

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

OZONE
PARTS PER MILLION

NJ STANDARDS:
EPA STANDARDS: DAILY MAXIMUM 1-HOUR PRIMARY: 0.12 ppm
AND SECONDARY

1995	% Valid Data	Hourly Average Max.	Hourly Average 2nd	Hours >0.084	Hours >0.124	Days >0.124	Monthly Avg.	12-Month Avg.
JAN	99.6	.032	.030	0	0	0	.007	.017
FEB	99.6	.033	.033	0	0	0	.011	.017
MAR	99.5	.062	.048	0	0	0	.014	.016
APR	99.6	.064	.061	0	0	0	.020	.016
MAY	99.6	.091	.089	4	0	0	.020	.016
JUNE	88.2	.106	.105	25	0	0	.022	.015
JULY	99.3	.121	.118	33	0	0	.032	.016
AUG	99.3	.114	.114	27	0	0	.026	.016
SEPT	98.3	.089	.089	5	0	0	.015	.016
OCT	93.8	.063	.060	0	0	0	.009	.016
NOV	99.4	.032	.030	0	0	0	.006	.016
DEC	99.6	.031	.031	0	0	0	.009	.016
YEAR	98.0	.121	.118	94	0	0		

1996	% Valid Data	Hourly Average Max.	Hourly Average 2nd	Hours >0.084	Hours >0.124	Days >0.124	Monthly Avg.	12-Month Avg.
JAN	99.7	.037	.037	0	0	0	.009	.016
FEB	99.7	.045	.044	0	0	0	.013	.016
MAR	99.7	.050	.049	0	0	0	.014	.016
APR	99.3	.066	.064	0	0	0	.021	.016
MAY	98.8	.082	.078	0	0	0	.024	.017
JUNE	99.6	.076	.075	0	0	0	.021	.017
JULY	96.8	.121	.115	16	0	0	.024	.016
AUG	98.9	.107	.098	7	0	0	.021	.016
SEPT	99.3	.072	.072	0	0	0	.015	.016
OCT	99.5	.056	.046	0	0	0	.009	.016
NOV	99.4	.030	.029	0	0	0	.007	.016
DEC	99.6	.032	.031	0	0	0	.005	.015
YEAR	99.2	.121	.115	23	0	0		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITROGEN DIOXIDE

PARTS PER MILLION

STANDARDS:

12-MONTH PRIMARY AND SECONDARY: 0.05 ppm

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.1	.074	.061	.047	.043	.029	.032
FEB	99.1	.063	.063	.046	.045	.031	.031
MAR	99.1	.080	.070	.048	.047	.030	.031
APRIL	99.3	.081	.080	.057	.053	.029	.031
MAY	98.9	.092	.083	.042	.042	.027	.031
JUNE	98.6	.132	.105	.051	.051	.032	.031
JULY	99.2	.105	.100	.062	.053	.031	.031
AUG	99.1	.090	.084	.051	.051	.031	.030
SEPT	98.9	.078	.075	.049	.047	.030	.030
OCT	94.0	.091	.086	.056	.051	.034	.030
NOV	98.9	.085	.084	.065	.052	.031	.030
DEC	98.9	.143	.139	.055	.055	.030	.030
YEAR	98.6	.143	.139	.065	.062		
1998							
JAN	99.3	.068	.066	.041	.041	.030	.031
FEB	99.1	.092	.092	.061	.059	.031	.031
MAR	98.5	.077	.073	.055	.053	.034	.031
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITROGEN DIOXIDE

PARTS PER MILLION

STANDARDS:

12-MONTH PRIMARY AND SECONDARY: 0.05 ppm

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	97.3	.073	.071	.059	.050	.029	.034
FEB	98.1	.128	.115	.073	.058	.034	.034
MAR	98.8	.101	.101	.063	.054	.032	.033
APRIL	99.0	.078	.069	.051	.050	.030	.033
MAY	98.8	.071	.067	.053	.045	.030	.033
JUNE	86.8	.073	.072	.045	.044	.030	.032
JULY	98.4	.095	.094	.060	.051	.033	.032
AUG	98.5	.089	.088	.046	.045	.031	.032
SEPT	99.4	.073	.069	.049	.047	.030	.032
OCT	98.8	.109	.100	.074	.061	.036	.032
NOV	99.2	.071	.070	.054	.048	.032	.032
DEC	99.1	.100	.094	.063	.058	.030	.031
YEAR	97.7	.128	.115	.074	.073		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.3	.101	.098	.071	.067	.036	.032
FEB	97.6	.113	.096	.065	.063	.034	.032
MAR	99.1	.099	.089	.064	.059	.036	.032
APR	96.2	.088	.087	.062	.046	.030	.032
MAY	98.7	.076	.073	.062	.052	.031	.032
JUNE	99.6	.087	.079	.050	.048	.030	.032
JULY	96.4	.073	.071	.046	.046	.028	.032
AUG	90.7	.108	.094	.060	.060	.039	.033
SEPT	98.3	.107	.104	.058	.042	.029	.033
OCT	98.9	.131	.105	.071	.048	.033	.032
NOV	99.4	.118	.114	.079	.048	.031	.032
DEC	97.7	.090	.066	.047	.043	.030	.032
YEAR	97.7	.131	.118	.079	.071		

APPENDIX C

NEWARK
AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

OZONE
PARTS PER MILLION

NJ STANDARDS:
EPA STANDARDS: DAILY MAXIMUM 1-HOUR PRIMARY: 0.12 ppm
AND SECONDARY

1997	% Valid Data	Hourly Average Max.	Hourly Average 2nd	Hours > 0.084	Hours > 0.124	Days > 0.124	Monthly Avg.	12-Month Avg.
JAN	99.5	.030	.030	0	0	0	.010	.015
FEB	99.1	.044	.042	0	0	0	.012	.015
MAR	99.2	.049	.048	0	0	0	.017	.016
APR	99.2	.054	.053	0	0	0	.025	.016
MAY	99.1	.064	.064	0	0	0	.025	.016
JUNE	97.9	.109	.108	23	0	0	.027	.016
JULY	97.8	.111	.109	30	0	0	.032	.017
AUG	99.6	.096	.095	10	0	0	.022	.017
SEPT	99.2	.079	.078	0	0	0	.016	.017
OCT	94.8	.071	.069	0	0	0	.010	.017
NOV	99.0	.034	.033	0	0	0	.007	.017
DEC	99.5	.032	.031	0	0	0	.007	.018
YEAR	98.6	.111	.109	63	0	0		

1998	% Valid Data	Hourly Average Max.	Hourly Average 2nd	Hours > 0.084	Hours > 0.124	Days > 0.124	Monthly Avg.	12-Month Avg.
JAN	99.3	.036	.036	0	0	0	.008	.017
FEB	99.1	.041	.040	0	0	0	.012	.017
MAR	99.2	.065	.065	0	0	0	.015	.017
APR								
MAY								
JUNE								
JULY								
AUG								
SEPT								
OCT								
NOV								
DEC								
YEAR								

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITRIC OXIDE
PARTS PER MILLION

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	98.0	.511	.506	.352	.193	.054	.039
FEB	98.1	.477	.476	.241	.177	.058	.038
MAR	98.8	.429	.369	.142	.073	.028	.036
APR	99.0	.275	.265	.077	.075	.021	.035
MAY	98.8	.263	.259	.068	.056	.020	.036
JUNE	86.8	.150	.134	.040	.033	.015	.036
JULY	98.4	.111	.098	.047	.030	.013	.036
AUG	98.5	.178	.164	.039	.031	.015	.035
SEPT	99.4	.232	.174	.047	.037	.019	.035
OCT	98.8	.397	.343	.125	.119	.052	.035
NOV	99.2	.435	.369	.211	.169	.062	.036
DEC	99.1	.498	.471	.255	.185	.044	.033
YEAR	97.8	.511	.506	.352	.255		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.1	.499	.496	.270	.244	.058	.034
FEB	97.6	.521	.419	.198	.181	.048	.033
MAR	99.1	.520	.432	.140	.102	.042	.034
APR	96.2	.317	.298	.057	.055	.023	.034
MAY	98.7	.364	.316	.088	.081	.020	.034
JUNE	99.6	.126	.113	.050	.042	.016	.034
JULY	96.4	.253	.144	.042	.032	.013	.034
AUG	90.7	.255	.235	.061	.050	.023	.035
SEPT	98.3	.285	.273	.097	.045	.021	.035
OCT	98.9	.387	.378	.128	.126	.051	.035
NOV	99.4	.536	.500	.336	.177	.056	.035
DEC	97.7	.608	.512	.192	.180	.067	.037
YEAR	97.6	.608	.536	.336	.270		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITRIC OXIDE
PARTS PER MILLION

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.1	.449	.357	.139	.123	.043	.035
FEB	99.1	.321	.304	.116	.071	.032	.034
MAR	99.1	.449	.323	.117	.087	.035	.033
APR	99.3	.342	.238	.074	.055	.019	.033
MAY	98.9	.181	.143	.036	.028	.012	.032
JUNE	98.6	.209	.202	.061	.040	.016	.032
JULY	99.2	.164	.121	.038	.031	.012	.032
AUG	99.1	.151	.151	.059	.045	.017	.032
SEPT	98.9	.244	.234	.084	.060	.024	.032
OCT	94.0	.568	.390	.179	.155	.049	.032
NOV	98.9	.585	.545	.281	.212	.062	.032
DEC	98.7	.823	.768	.250	.211	.062	.032
YEAR	98.6	.823	.768	.281	.250		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.3	.480	.464	.159	.149	.051	.033
FEB	99.1	.649	.639	.187	.186	.040	.033
MAR	98.9	.207	.204	.108	.051	.028	.033
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

CARBON MONOXIDE
PARTS PER MILLION

STANDARDS: 1-Hour Primary and Secondary 35 ppm
8-Hour Primary and Secondary 9 ppm

a) Indicates Non-Overlapping 8-Hour Time Periods Were Considered

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times ≥ 9.0	Times[a] ≥ 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	99.9	3.7	3.1	0	2.0	2.0	1.9	0	0	1.4	0.8	0.8
FEB	99.6	1.9	1.8	0	1.5	1.5	1.5	0	0	1.1	0.7	0.7
MAR	99.5	2.8	2.6	0	2.0	1.9	1.9	0	0	1.3	0.7	0.7
APR	99.4	3.0	2.4	0	1.5	1.5	1.5	0	0	1.0	0.6	0.7
MAY	99.7	1.5	1.4	0	1.0	1.0	1.0	0	0	0.8	0.5	0.7
JUNE	99.3	2.6	2.5	0	2.1	2.1	1.7	0	0	1.4	0.6	0.7
JULY	99.6	2.4	2.2	0	2.0	1.9	1.5	0	0	1.1	0.5	0.7
AUG	99.7	1.8	1.8	0	1.5	1.5	1.3	0	0	0.9	0.6	0.7
SEPT	98.5	3.4	3.0	0	2.4	2.3	1.7	0	0	1.2	0.8	0.7
OCT	91.4	4.1	3.6	0	3.1	3.0	2.4	0	0	1.7	0.9	0.7
NOV	99.2	4.5	4.2	0	3.8	3.8	3.3	0	0	2.3	1.1	0.7
DEC	99.7	8.0	7.8	0	4.3	4.3	3.0	0	0	2.2	1.1	0.7
YEAR	98.8	8.0	7.8	0	4.3	4.3	3.8	0	0	2.3		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times ≥ 9.0	Times[a] ≥ 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	99.7	4.5	4.2	0	2.3	2.3	2.2	0	0	1.5	1.0	0.8
FEB	99.6	5.6	3.7	0	2.6	2.6	2.5	0	0	2.0	0.9	0.8
MAR	99.7	2.6	2.3	0	1.6	1.6	1.5	0	0	1.2	0.7	0.8
APR												
MAY												
JUNE												
JULY												
AUG												
SEPT												
OCT												
NOV												
DEC												
YEAR												

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

CARBON MONOXIDE
PARTS PER MILLION

STANDARDS: 1-Hour Primary and Secondary 35 ppm
8-Hour Primary and Secondary 9 ppm

a) Indicates Non-Overlapping 8-Hour Time Periods Were Considered

1995	% Valid Data	Hourly Avg. Max.	2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	2nd	2nd[a]	Times > 9.0	Times[a] > 9.0	Max. Daily Avg.	Monthly Avg.	12 Mon Avg
JAN	99.6	8.6	7.5	0	6.3	6.3	5.3	0	0	4.2	0.9	0.9
FEB	99.6	4.7	4.5	0	3.7	3.6	3.6	0	0	2.5	1.0	0.9
MAR	99.7	2.9	2.4	0	2.2	2.2	1.8	0	0	1.3	0.7	0.9
APR	99.4	3.2	2.8	0	2.1	2.1	1.6	0	0	1.2	0.6	0.9
MAY	99.6	2.6	2.5	0	2.0	1.9	1.7	0	0	1.4	0.7	0.9
JUNE	88.9	2.0	1.7	0	1.3	1.3	1.3	0	0	0.9	0.5	0.8
JULY	99.6	1.9	1.8	0	1.5	1.4	1.3	0	0	1.0	0.6	0.8
AUG	99.5	1.9	1.6	0	1.4	1.4	1.1	0	0	1.0	0.6	0.8
SEPT	99.4	3.2	2.8	0	1.5	1.5	1.5	0	0	0.9	0.6	0.8
	99.7	5.6	3.7	0	2.6	2.5	2.4	0	0	1.6	0.9	0.8
	99.6	4.5	4.0	0	3.2	3.1	2.6	0	0	1.8	0.9	0.8
DEC	99.6	4.7	4.2	0	3.9	3.9	3.0	0	0	2.5	0.8	0.7
YEAR	98.7	8.6	7.5	0	6.3	6.3	5.3	0	0	4.2		
1996												
JAN	99.6	5.1	4.6	0	3.7	3.7	2.9	0	0	2.3	0.8	0.7
FEB	99.4	3.8	3.5	0	3.0	3.0	2.6	0	0	2.1	0.8	0.7
MAR	99.5	3.1	2.9	0	2.4	2.4	2.0	0	0	1.5	0.8	0.7
APR	99.7	2.8	2.6	0	1.9	1.9	1.5	0	0	1.1	0.6	0.7
MAY	99.5	3.2	2.4	0	2.1	2.1	1.6	0	0	1.3	0.6	0.7
JUNE	99.9	1.6	1.5	0	1.3	1.3	1.2	0	0	0.9	0.6	0.7
JULY	97.2	2.1	1.9	0	1.6	1.5	1.4	0	0	1.1	0.6	0.7
AUG	99.6	3.5	3.3	0	2.4	2.4	1.8	0	0	1.5	0.8	0.7
SEPT	99.4	3.3	3.2	0	2.1	1.8	1.7	0	0	1.3	0.8	0.8
OCT	99.3	4.1	3.9	0	2.8	2.7	2.6	0	0	1.8	0.9	0.8
	99.4	5.6	5.4	0	4.8	4.8	3.8	0	0	3.0	0.9	0.8
DEC	99.1	4.2	4.2	0	2.8	2.8	2.7	0	0	1.7	0.8	0.8
YEAR	99.3	5.6	5.4	0	4.8	4.8	3.8	0	0	3.0		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

CARBON MONOXIDE
PARTS PER MILLION

STANDARDS: 1-Hour Primary and Secondary 35 ppm
8-Hour Primary and Secondary 9 ppm

a) Indicates Non-Overlapping 8-Hour Time Periods Were Considered

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times > 9.0	Times[a] > 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	99.9	3.7	3.1	0	2.0	2.0	1.9	0	0	1.4	0.8	0.8
FEB	99.6	1.9	1.8	0	1.5	1.5	1.5	0	0	1.1	0.7	0.7
MAR	99.5	2.8	2.6	0	2.0	1.9	1.9	0	0	1.3	0.7	0.7
APR	99.4	3.0	2.4	0	1.5	1.5	1.5	0	0	1.0	0.6	0.7
MAY	99.7	1.5	1.4	0	1.0	1.0	1.0	0	0	0.8	0.5	0.7
JUNE	99.3	2.6	2.5	0	2.1	2.1	1.7	0	0	1.4	0.6	0.7
JULY	99.6	2.4	2.2	0	2.0	1.9	1.5	0	0	1.1	0.5	0.7
AUG	99.7	1.8	1.8	0	1.5	1.5	1.3	0	0	0.9	0.6	0.7
SEPT	98.5	3.4	3.0	0	2.4	2.3	1.7	0	0	1.2	0.8	0.7
OCT	91.4	4.1	3.6	0	3.1	3.0	2.4	0	0	1.7	0.9	0.7
NOV	99.2	4.5	4.2	0	3.8	3.8	3.3	0	0	2.3	1.1	0.7
DEC	99.7	8.0	7.8	0	4.3	4.3	3.0	0	0	2.2	1.1	0.7
YEAR	98.8	8.0	7.8	0	4.3	4.3	3.8	0	0	2.3		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times > 9.0	Times[a] > 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	99.7	4.5	4.2	0	2.3	2.3	2.2	0	0	1.5	1.0	0.8
FEB	99.6	5.6	3.7	0	2.6	2.6	2.5	0	0	2.0	0.9	0.8
MAR	99.7	2.6	2.3	0	1.6	1.6	1.5	0	0	1.2	0.7	0.8
APR												
MAY												
JUNE												
JULY												
AUG												
SEPT												
OCT												
NOV												
DEC												
YEAR												

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITROGEN DIOXIDE

PARTS PER MILLION

STANDARDS:

12-MONTH PRIMARY AND SECONDARY: 0.05 ppm

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	98.8	.091	.086	.063	.053	.029	.031
FEB	98.2	.100	.080	.056	.056	.033	.030
MAR	98.3	.116	.097	.064	.057	.031	.030
APRIL	98.5	.079	.077	.050	.048	.030	.030
MAY	99.6	.073	.071	.050	.048	.030	.030
JUNE	99.0	.076	.069	.043	.040	.030	.030
JULY	99.2	.074	.071	.043	.042	.029	.030
AUG	99.2	.073	.073	.039	.038	.022	.029
SEPT	98.9	.070	.062	.039	.037	.024	.029
OCT	98.8	.120	.104	.068	.056	.033	.029
NOV	99.3	.071	.070	.054	.045	.030	.029
DEC	99.1	.109	.103	.053	.048	.028	.029
YEAR	98.9	.120	.116	.068	.064		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	98.1	.102	.098	.068	.059	.035	.030
FEB	99.1	.089	.089	.058	.055	.034	.030
MAR	98.8	.089	.089	.064	.056	.036	.030
APR	99.2	.093	.085	.068	.058	.032	.030
MAY	98.8	.087	.082	.063	.052	.033	.031
JUNE	98.5	.082	.067	.048	.042	.030	.031
JULY	98.9	.077	.074	.046	.041	.029	.031
AUG	98.8	.077	.075	.050	.050	.029	.031
SEPT	77.1	.086	.083	.044	.039	.026	.031
OCT	98.3	.112	.083	.058	.043	.030	.031
NOV	99.0	.116	.111	.075	.052	.029	.030
DEC	95.2	.059	.058	.042	.038	.028	.031
YEAR	96.7	.116	.112	.075	.068		

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITROGEN DIOXIDE

PARTS PER MILLION

STANDARDS:

12-MONTH PRIMARY AND SECONDARY: 0.05 rpm

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.1	.063	.058	.041	.039	.027	.030
FEB	98.8	.062	.062	.044	.043	.030	.030
MAR	98.7	.063	.059	.045	.045	.029	.029
APRIL	98.9	.076	.074	.057	.050	.027	.029
MAY	98.5	.093	.078	.039	.039	.027	.028
JUNE	98.7	.084	.082	.045	.043	.029	.028
JULY	57.5	.089	.088	.044	.042	.027	.028
AUG	95.0	.103	.097	.053	.043	.029	.028
SEPT	98.2	.078	.075	.045	.045	.027	.028
OCT	94.8	.065	.063	.045	.042	.029	.028
NOV	99.6	.095	.093	.063	.051	.030	.028
DEC	98.3	.087	.076	.049	.047	.030	.028
YEAR	94.6	.103	.097	.063	.057		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	96.6	.070	.068	.043	.041	.031	.029
FEB	97.9	.089	.085	.066	.054	.031	.029
MAR	98.7	.076	.072	.051	.050	.032	.029
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITRIC OXIDE
PARTS PER MILLION

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	98.8	.498	.498	.343	.218	.060	.045
FEB	98.2	.499	.499	.206	.181	.061	.043
MAR	98.3	.364	.315	.125	.062	.030	.042
APR	98.5	.215	.188	.069	.066	.023	.040
MAY	99.6	.369	.275	.074	.072	.027	.041
JUNE	99.0	.350	.306	.054	.044	.018	.041
JULY	99.2	.119	.105	.033	.030	.013	.041
AUG	99.2	.239	.183	.046	.043	.017	.040
SEPT	98.9	.331	.294	.076	.035	.019	.040
OCT	98.8	.497	.490	.123	.122	.059	.038
NOV	99.3	.488	.488	.222	.169	.070	.040
DEC	99.1	.436	.406	.199	.188	.047	.037
YEAR	98.9	.499	.499	.343	.222		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	98.1	.474	.470	.293	.198	.060	.037
FEB	99.1	.401	.353	.157	.147	.049	.036
MAR	98.8	.584	.451	.125	.100	.044	.037
APR	99.2	.303	.303	.094	.070	.028	.038
MAY	98.8	.300	.280	.100	.075	.025	.037
JUNE	98.5	.168	.141	.054	.031	.017	.037
JULY	98.9	.212	.154	.053	.042	.016	.038
AUG	98.8	.291	.257	.068	.048	.022	.038
SEPT	77.1	.383	.351	.095	.054	.027	.039
OCT	98.3	.423	.414	.118	.105	.060	.039
NOV	99.0	.866	.803	.359	.264	.065	.038
DEC	95.2	.468	.456	.134	.131	.064	.040
YEAR	96.7	.866	.803	.359	.293		

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

NITRIC OXIDE
PARTS PER MILLION

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Avg.
JAN	99.1	.407	.307	.132	.109	.043	.038
FEB	98.8	.283	.232	.079	.060	.033	.037
MAR	98.7	.415	.347	.092	.091	.036	.036
APR	98.9	.299	.285	.086	.057	.022	.036
MAY	98.5	.165	.152	.036	.032	.017	.035
JUNE	98.7	.174	.166	.041	.039	.017	.035
JULY	57.5	.095	.074	.024	.020	.012	.035
AUG	95.3	.219	.189	.058	.052	.021	.035
SEPT	98.2	.327	.325	.104	.091	.029	.035
OCT	94.8	.340	.319	.116	.100	.047	.034
NOV	99.6	.794	.790	.275	.252	.068	.034
DEC	98.3	.983	.707	.243	.203	.067	.034
YEAR	94.6	.983	.794	.275	.252		

1998							
JAN	96.6	.608	.450	.151	.126	.053	.035
FEB	97.9	.412	.403	.189	.138	.041	.036
MAR	98.7	.256	.232	.127	.053	.030	.035
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

CARBON MONOXIDE
PARTS PER MILLION

RECEIVED AUG 17 1998

STANDARDS: 1-Hour Primary and Secondary 35 ppm
8-Hour Primary and Secondary 9 ppm

a) Indicates Non-Overlapping 8-Hour Time Periods Were Considered

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times ≥ 9.0	Times[a] ≥ 9.0	Max. Daily Avg.	Monthly Avg.	12 Mon Avg
JAN	99.6	13.2	13.0	0	10.0	9.9	6.8	4	1	6.1	1.2	1.1
FEB	98.8	7.5	7.2	0	6.2	6.1	4.0	0	0	2.5	1.0	1.1
MAR	99.5	3.7	3.3	0	2.9	2.8	2.4	0	0	1.8	0.8	1.1
APR	99.3	3.8	3.5	0	2.7	2.6	1.7	0	0	1.6	0.7	1.1
MAY	100.0	4.3	4.1	0	2.5	2.5	2.1	0	0	1.7	0.9	1.1
JUNE	99.3	5.2	4.8	0	3.1	3.1	2.0	0	0	1.4	0.8	1.0
JULY	99.9	3.8	3.4	0	2.0	2.0	2.0	0	0	1.5	1.0	1.0
AUG	99.9	4.2	3.7	0	2.2	2.2	2.1	0	0	1.2	0.8	1.0
SEPT	99.9	4.7	4.2	0	2.9	2.5	1.8	0	0	1.5	0.8	1.0
[illegible]	99.7	7.6	7.0	0	3.8	3.8	3.7	0	0	2.4	1.2	1.0
NOV	99.7	6.6	6.5	0	5.2	5.0	4.3	0	0	2.9	1.2	1.0
DEC	99.5	5.7	5.2	0	3.7	3.7	3.4	0	0	2.7	1.0	1.0
YEAR	99.6	13.2	13.0	0	10.0	9.9	6.8	4	1	6.1		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times ≥ 9.0	Times[a] ≥ 9.0	Max. Daily Avg.	Monthly Avg.	12 Mon Avg
JAN	99.5	4.7	4.6	0	4.1	4.1	3.6	0	0	3.3	1.1	0.9
FEB	99.6	5.9	4.5	0	3.3	3.3	2.9	0	0	2.3	1.0	0.9
MAR	99.6	7.2	5.7	0	3.4	3.4	3.4	0	0	1.9	1.0	1.0
APR	99.6	4.6	4.4	0	3.4	3.4	2.6	0	0	1.8	0.9	1.0
MAY	99.2	4.2	4.1	0	3.4	3.4	2.8	0	0	1.8	0.8	1.0
JUNE	99.6	2.9	2.6	0	2.0	2.0	1.6	0	0	1.2	0.8	1.0
JULY	99.9	3.4	2.9	0	2.5	2.5	2.2	0	0	1.5	0.9	1.0
AUG	99.6	5.8	5.2	0	4.6	4.5	3.2	0	0	2.0	1.1	1.0
SEPT	99.4	5.3	5.2	0	3.6	3.1	2.1	0	0	1.7	0.9	1.0
OCT	99.7	5.8	5.1	0	3.2	3.2	3.2	0	0	2.0	1.2	1.0
N	99.4	10.7	9.5	0	8.4	8.1	6.0	0	0	4.4	1.1	1.0
DEC	95.8	6.3	6.0	0	3.9	3.9	2.9	0	0	1.7	1.1	1.0
YEAR	99.2	10.7	9.5	0	8.4	8.1	6.0	0	0	4.4		

APPENDIX C

EAST ORANGE

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

CARBON MONOXIDE

PARTS PER MILLION

STANDARDS: 1-Hour Primary and Secondary 35 ppm
8-Hour Primary and Secondary 9 ppm

a) Indicates Non-Overlapping 8-Hour Time Periods Were Considered

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times > 9.0	Times[a] > 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	99.5	4.9	4.7	0	3.1	3.0	2.7	0	0	2.2	0.9	1.0
FEB	99.6	3.4	3.0	0	2.1	2.1	1.6	0	0	1.3	0.8	1.0
MAR	99.6	4.5	4.1	0	2.7	2.7	2.3	0	0	1.4	0.8	0.9
APR	94.2	3.6	3.3	0	2.1	2.1	1.7	0	0	1.4	0.7	0.9
MAY	99.2	2.8	2.1	0	1.5	1.4	1.3	0	0	1.0	0.7	0.9
JUNE	99.9	2.4	2.2	0	1.9	1.8	1.6	0	0	1.2	0.7	0.9
JULY	99.9	5.0	4.8	0	3.7	3.6	2.5	0	0	1.6	0.8	0.9
AUG	96.9	3.7	3.2	0	2.6	2.6	1.8	0	0	1.3	0.9	0.9
SEPT	99.7	5.2	4.8	0	4.2	4.2	2.9	0	0	1.9	1.0	0.9
OCT	95.0	5.9	5.2	0	4.6	4.6	3.5	0	0	2.1	1.2	0.9
NOV	99.7	7.7	7.1	0	5.4	5.3	4.7	0	0	3.0	1.1	0.9
DEC	99.2	10.6	5.8	0	4.6	4.6	3.1	0	0	2.6	1.1	0.9
YEAR	98.5	10.6	7.7	0	5.4	5.3	4.7	0	0	3.0		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Times ≥ 35.0	8-Hour Moving Avg. Max.	8-Hour Moving Avg. 2nd	8-Hour Moving Avg. 2nd[a]	Times > 9.0	Times[a] > 9.0	Daily Avg.	Monthly Avg.	12-Month Avg.
JAN	97.0	6.4	4.5	0	2.9	2.9	2.6	0	0	1.9	1.0	0.9
FEB	99.3	3.7	3.7	0	3.0	3.0	2.8	0	0	2.1	0.9	0.9
MAR	99.9	4.0	3.5	0	2.3	2.3	2.0	0	0	1.6	0.9	0.9
APR												
MAY												
JUNE												
JULY												
AUG												
SEPT												
OCT												
NOV												
DEC												
YEAR												

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

~~SMOKE SHADE~~

~~COEFFICIENT OF HAZE (COHS)~~

TEOM

MICROGRAMS PER CUBIC METER (ug/m^3)

STANDARDS: ~~NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED~~

DAILY (24-HOUR) AVG. PRIMARY + SECONDARY STD.: 150 ug/m^3

ANNUAL AVG. PRIMARY + SECONDARY STD.: 50 ug/m^3

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	DAILY ~~24 Hour~~ Avg. Max.	DAILY ~~24 Hour~~ Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	99.7	127	126	71	47	20	30
FEB	99.1	86	84	50	39	23	29
MAR	98.4	178	139	65	50	25	29
APR	99.4	91	90	58	47	26	28
MAY	98.5	81	79	47	44	24	28
JUNE	70.4	121	95	69	69	34	28
JULY	99.2	180	137	75	67	39	27
AUG	98.9	126	109	71	61	34	27
SEPT	96.4	84	81	57	42	26	27
[illegible]	92.5	140	133	74	50	30	27
NOV	99.0	86	83	55	32	21	27
DEC	99.5	144	138	52	39	19	27
YEAR	95.9	180	178	75	74		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	98.7	107	100	60	53	24	27
FEB	99.6	110	94	51	45	24	27
MAR	99.5	125	104	61	54	26	27
APR	35.6	80	78	36	27	(18)	(27)
MAY	97.6	95	87	56	49	26	(27)
JUNE	99.9	133	122	70	50	33	(27)
JULY	97.3	95	87	63	53	33	(26)
AUG	99.9	125	123	88	84	40	(27)
SEPT	99.6	106	103	67	57	26	(27)
[illegible]	98.8	96	94	51	46	22	(26)
NOV	99.9	167	152	77	45	20	(26)
DEC	97.4	108	68	32	23	12.	(25)
YEAR	93.7	167	152	88	84		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

TAPERED ELEMENT
OSCILATING MICROBALANCE
TEOM

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	80.5	72	68	41	36	20	(25)
FEB	92.6	77	69	35	35	21	(25)
MAR	80.4	74	71	39	38	19	(24)
APR	100.0	160	114	47	44	23	25
MAY	99.7	117	105	47	39	22	24
JUNE	99.4	71	70	58	45	21	23
JULY	99.3	112	104	77	72	24	23
AUG	96.6	58	57	38	36	20	21
SEPT	99.3	68	66	48	33	19	20
OCT	94.4	65	61	35	32	17	20
NOV	99.2	60	58	32	27	14	19
DEC	99.9	102	86	29	27	14	20
YEAR	95.1	160	117	77	72		

1998							
JAN	99.9	74	60	28	27	15	19
FEB	99.4	60	57	35	26	13	18
MAR	99.6	84	56	31	31	16	18
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

SULFUR DIOXIDE
PARTS PER MILLION

Standards:			
3-Hour Secondary	0.5 ppm	12-Month Primary	.03 ppm
24-Hour Primary	0.14 ppm	12-Month Secondary	.02 ppm
24-Hour Secondary	0.10 ppm		

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	3-Hr. Average Max.	3-Hr. Average 2nd	Times > 0.5	24-Hr. Average Max.	24-Hr. Average 2nd	Times > 0.14	Times > 0.10	Monthly Avg.	12-Month Moving Avg.
JAN	98.9	.033	.030	.028	.026	0	.020	.019	0	0	.009	.008
FEB	99.1	.051	.043	.038	.038	0	.025	.022	0	0	.012	.008
MAR	99.3	.070	.062	.041	.033	0	.015	.014	0	0	.007	.007
APR	99.2	.069	.045	.047	.033	0	.017	.012	0	0	.005	.007
MAY	99.3	.074	.029	.038	.018	0	.011	.008	0	0	.004	.007
JUNE	88.3	.126	.121	.099	.062	0	.029	.019	0	0	.007	.007
JULY	99.3	.064	.044	.031	.024	0	.010	.009	0	0	.006	.007
AUG	98.9	.055	.048	.040	.023	0	.011	.010	0	0	.005	.007
SEPT	99.4	.279	.129	.139	.048	0	.024	.013	0	0	.005	.007
T	99.2	.039	.035	.031	.025	0	.014	.012	0	0	.006	.007
NOV	99.6	.036	.036	.033	.026	0	.021	.017	0	0	.008	.007
DEC	99.2	.050	.041	.038	.037	0	.029	.023	0	0	.009	.007
YEAR	98.3	.279	.129	.139	.099	0	.029	.029	0	0		
996												
JAN	99.5	.061	.057	.053	.044	0	.032	.027	0	0	.012	.007
FEB	99.6	.057	.054	.045	.035	0	.026	.022	0	0	.010	.007
MAR	99.5	.054	.037	.033	.030	0	.020	.020	0	0	.009	.007
APR	99.6	.059	.048	.036	.025	0	.014	.012	0	0	.006	.007
MAY	99.3	.091	.063	.056	.029	0	.022	.014	0	0	.006	.007
JUNE	99.4	.037	.032	.026	.023	0	.014	.011	0	0	.005	.007
JULY	96.9	.052	.041	.023	.022	0	.010	.009	0	0	.005	.007
AUG	99.3	.039	.034	.028	.025	0	.014	.010	0	0	.006	.007
SEPT	99.0	.029	.028	.021	.019	0	.011	.009	0	0	.004	.007
T	99.2	.050	.038	.032	.029	0	.017	.015	0	0	.007	.007
NOV	99.6	.050	.048	.049	.039	0	.029	.020	0	0	.009	.007
DEC	99.2	.054	.035	.041	.028	0	.023	.021	0	0	.011	.008
YEAR	99.2	.091	.063	.056	.053	0	.032	.029	0	0		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

SULFUR DIOXIDE
PARTS PER MILLION

Standards: 3-Hour Secondary 0.5 ppm; 24-Hour Primary 0.14 ppm; 24-Hour Secondary 0.10 ppm; 12-Month Primary .03 ppm; 12-Month Secondary .02 ppm

	%	Hourly Avg.		3-Hr. Average			24-Hr. Average					12-Month
1997	Valid Data	Max.	2nd	Max.	2nd	Times > 0.5	Max.	2nd	Times > 0.14	Times > 0.10	Monthly Avg.	Moving Avg.
JAN	98.8	.037	.034	.033	.032	0	.023	.020	0	0	.010	.007
FEB	99.3	.033	.029	.029	.024	0	.017	.017	0	0	.009	.007
MAR	99.5	.042	.035	.030	.024	0	.013	.012	0	0	.006	.007
APR	99.3	.036	.032	.028	.028	0	.013	.011	0	0	.005	.007
MAY	99.3	.032	.025	.017	.017	0	.009	.009	0	0	.004	.007
JUNE	99.4	.077	.052	.050	.030	0	.015	.015	0	0	.006	.007
JULY	99.2	.076	.075	.065	.051	0	.018	.015	0	0	.005	.007
AUG	99.1	.054	.024	.031	.016	0	.009	.009	0	0	.005	.007
SEPT	99.4	.052	.046	.044	.031	0	.016	.012	0	0	.006	.007
OCT	94.6	.038	.038	.034	.028	0	.021	.018	0	0	.008	.007
NOV	99.0	.044	.040	.031	.029	0	.024	.021	0	0	.008	.007
DEC	98.9	.054	.048	.041	.040	0	.029	.025	0	0	.011	.007
YEAR	98.8	.077	.076	.065	.051	0	.029	.025	0	0		
1998												
JAN	99.5	.036	.036	.035	.031	0	.020	.019	0	0	.009	.007
FEB	99.1	.055	.050	.044	.040	0	.022	.017	0	0	.007	.007
MAR	99.5	.036	.035	.031	.027	0	.013	.013	0	0	.007	.007
APR												
MAY												
JUNE												
JULY												
AUG												
SEPT												
OCT												
NOV												
DEC												
YEAR												

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

SMOKE SHADE
COEFFICIENT OF HAZE(COHS)

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1995	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	DAILY ~~24-Hour~~ Avg. Max.	DAILY ~~24-Hour~~ Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	97.7	2.68	2.55	1.28	0.63	0.24	0.39
FEB	81.7	3.93	3.78	1.08	0.85	0.39	0.38
MAR	98.0	2.23	2.15	1.01	0.93	0.39	0.38
APR	81.9	2.09	2.07	1.04	0.95	0.44	0.38
MAY	99.7	2.30	2.09	1.00	0.93	0.44	0.40
JUNE	89.3	1.83	1.81	0.98	0.75	0.48	0.40
JULY	99.1	2.06	1.90	1.02	0.91	0.53	0.41
AUG	96.8	2.15	1.88	0.87	0.76	0.43	0.42
SEPT	99.6	2.17	2.01	0.93	0.74	0.42	0.42
OCT	99.6	3.92	3.52	1.57	1.30	0.68	0.44
NOV	99.7	2.81	2.66	1.62	1.19	0.56	0.45
DEC	94.6	3.09	2.85	1.38	0.91	0.40	0.45
YEAR	94.9	3.93	3.92	1.62	1.57		

1996	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	DAILY Avg. Max.	DAILY Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	88.0	3.13	2.97	1.93	1.65	0.63	0.48
FEB	86.2	2.96	2.95	1.47	1.40	0.56	0.50
MAR	96.9	2.47	2.35	1.03	1.00	0.43	0.50
APR	82.9	2.10	1.99	1.01	0.82	0.33	0.49
MAY	79.4	1.18	1.15	0.54	0.46	0.25	0.48
JUNE	96.5	1.71	1.68	0.89	0.84	0.44	0.47
JULY	96.4	2.08	1.56	0.79	0.77	0.46	0.47
AUG	99.7	2.22	1.90	1.06	1.05	0.54	0.48
SEPT	99.6	1.76	1.69	0.84	0.67	0.41	0.47
OCT	97.6	2.68	2.57	1.43	0.97	0.48	0.46
NOV	94.4	2.62	2.36	0.79	0.73	0.40	0.44
DEC	94.5	2.94	2.62	0.91	0.90	0.42	0.45
YEAR	92.7	3.13	2.97	1.93	1.65		

APPENDIX C

NEWARK

AIR QUALITY IN NEW JERSEY COMPARED WITH STANDARDS

SMOKE SHADE
COEFFICIENT OF HAZE(COHS)

STANDARDS: NO AIR QUALITY STANDARDS HAVE BEEN ESTABLISHED

1997	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	98.5	3.57	2.51	1.07	0.97	0.46	0.43
FEB	99.0	2.36	2.30	0.95	0.94	0.44	0.42
MAR	99.5	2.58	2.11	0.90	0.81	0.43	0.42
APR	98.2	2.08	1.90	0.77	0.75	0.32	0.42
MAY	94.8	2.15	2.02	0.73	0.60	0.29	0.42
JUNE	99.2	2.53	2.04	0.93	0.76	0.37	0.42
JULY	99.5	1.85	1.75	0.91	0.70	0.37	0.41
AUG	99.6	1.42	1.41	0.75	0.67	0.36	0.40
SEPT	99.0	2.55	2.18	0.89	0.73	0.40	0.40
OCT	94.8	2.99	2.31	1.10	1.01	0.45	0.39
NOV	93.9	2.37	2.27	1.35	1.09	0.44	0.40
DEC	99.2	3.30	2.88	1.14	1.00	0.48	0.40
YEAR	97.9	3.57	3.30	1.35	1.14		

1998	% Valid Data	Hourly Avg. Max.	Hourly Avg. 2nd	Daily Avg. Max.	Daily Avg. 2nd	Monthly Avg.	12-Month Moving Avg.
JAN	99.3	2.49	2.44	1.04	0.91	0.48	0.40
FEB	99.6	3.73	3.25	1.39	1.28	0.44	0.40
MAR	99.6	1.76	1.64	0.99	0.77	0.40	0.40
APR							
MAY							
JUNE							
JULY							
AUG							
SEPT							
OCT							
NOV							
DEC							
YEAR							

APPENDIX D

VII. MUNICIPAL LISTING OF SITES
ESSEX COUNTY

SITE NAME	STREET ADDRESS	IDENTIFIER

VERONA BOROUGH

A. SITES WITH ON-SITE SOURCE(S) OF CONTAMINATION

SITE NAME	STREET ADDRESS	IDENTIFIER
19 VALHALLA WAY STATUS: ACTIVE - 05/25/1994	19 VALHALLA WAY CONTACT: BFO-N - 940525130557M	NJL800060998
49 GOULD STREET STATUS: PENDING - 08/25/1993	49 GOULD ST CONTACT: BFO-N - 930894	NJL000069427
ALBERONA AUTO CLINIC STATUS: PENDING - 12/20/1994	250 BLOOMFIELD AVE CONTACT: BFCM-6 - 9412119	NJL600219810
BRENTWOOD DRIVE STATUS: ACTIVE - 09/24/1996	BRENTWOOD DR CONTACT: BFO-N - 931228111931	NJL800046948
CARNEVALES SERVICE CENTER STATUS: ACTIVE - 02/11/1992	710 BLOOMFIELD AVE CONTACT: BUST - 0063588	NJL600179139
CHARLES BAHR & SON INCORPORATED STATUS: ACTIVE - 11/01/1993	49 DURRELL ST CONTACT: BUST - 0125354	NJC876009390
DEPT OF PUBLIC WORKS VERONA BOROUGH STATUS: ACTIVE - 09/10/1996	200 BLOOMFIELD AVE CONTACT: BUST - 0082307	NJL800190076
EXXON SERVICE STATION VERONA BOROUGH STATUS: ACTIVE - 03/13/1991	101 BLOOMFIELD AVE CONTACT: BUST - 0077871	NJD986598654
MARVEC CONSTRUCTION CORPORATION STATUS: PENDING - 01/21/1994	251 1/2 GROVE AVE CONTACT: BFO-CA - 940175	NJL000070185
MISCIA SERVICE CENTER INCORPORATED STATUS: ACTIVE - 06/27/1990	277 BLOOMFIELD AVE CONTACT: BUST - 0067467	NJL600043822
MOBIL SERVICE STATION VERONA BOROUGH STATUS: ACTIVE - 03/08/1994	655 BLOOMFIELD AVE CONTACT: BUST - 0037640	NJD986604304
TEXACO SERVICE STATION VERONA BOROUGH STATUS: ACTIVE - 04/03/1995	725 BLOOMFIELD AVE CONTACT: BUST - 0110521	NJD986580959
VALHALLA WAY GROUND WATER CONTAMINATION STATUS: ACTIVE - 07/21/1993	VALHALLA WAY CONTACT: BFO-N - 9004050935M	NJL840000244

13 Site(s) with On-Site Contamination in VERONA BOROUGH

B. SITES WITH UNKNOWN SOURCE(S) OF CONTAMINATION

SITE NAME	STREET ADDRESS	IDENTIFIER
28 VALHALLA WAY I F O	28 VALHALLA WAY I F O	NJL000069377

1 Unknown Source Contaminated Site(s) in VERONA BOROUGH

C. SITES WITH CASE(S) THAT WERE CLOSED BETWEEN 07/01/1996 - 06/30/1997

SITE NAME	STREET ADDRESS	IDENTIFIER
15 GLEN ROAD STATUS: NFA - 09/26/1996	15 GLEN RD CONTACT: BFO-N - 951108141408	NJL800186074
24 VALHALLA WAY STATUS: NFA-A - 01/14/1997	24 VALHALLA WAY CONTACT: BFO-N - 960620154650	NJL800233728
37 AFTERGLOW AVENUE STATUS: NFA - 07/31/1996	37 AFTERGLOW AVE CONTACT: BFO-N - 960202200919	NJL800201972
53 FLOYD ROAD STATUS: NFA - 08/07/1996	53 FLOYD RD CONTACT: BFO-N - 960514104212	NJL800225286

4 Site(s) with Cases that were Closed Between 07/01/1996 and 06/30/1997 in VERONA BOROUGH

APPENDIX E

Exotic/Invasive Plant List[1]

Common Name	*Scientific Name*
Large Trees	
Amur Maple	Acer ginnala
Japanese Red Maple	Acer japonicum
Norway Maple	Acer platanoides
Sycamore Maple	Acer psuedoplatanus
Tree-of-Heaven	Ailanthus altissima
Black Alder	Alnus glutinosa
Paper Mulberry	Broussonetia papyrifera
Golden Rain Tree	Koelreuteria paniculata
White Mulberry	Morus alba
Empress Tree	Paulownia tomentosa
Amur Cork Tree	Phellodendron amurense
Sawtooth Oak	Quercus acutissima
White Cottonwood	Populus alba
Sweet Cherry	Prunus avium
Siberian Elm	Ulmus pumila
Chinese Tallow Tree	Sapium sebiferum
Shrubs & Small Trees	
Milmosa	Albizia julibrissin
Japanese Barberry	Berberis japonica
Japanese Barberry	Berberis thunbergii
Common Barberry	Berberis vulgaris
Russian Olive	Eleagnus angustifolium
Thorny Eleagnus	Eleagnus pungens
Autumn Olive	Eleagnus umbellata
Winged Euonymous	Euonymous alatus
Rose-of-Sharon	Hibiscus syriacus
Privet	Ligustrum spp.
Amur Honeysuckle	Lonicera maackii

[1]The Once and Future Forest, Leslie Jones Sauer, Island Press, Washington, DC, 1998.

APPENDIX E

Common Name	*Scientific Name*
Morrow Honeysuckle	Lonicera morrowi
Bell's Honeysuckle	Lonicera morrowi x tatarica
Tatarian Honeysuckle	Lonicera tatarica
Glossy Buckthorn	Rhamnus frangula
Buckthorn	Rhamnus cathartica
Multiflora Rose	Rosa multiflora
Cut Leaved Rasberry	Rubus laciniata
Wineberry	Rubus phoenicolasius
Japenese Spiraea	Spiraea japonica
Vines	
Porcelain Berry	Ampelopsis brevipedunculata
Oriental Bittersweet	Celastrus orbiculatus
Climbing Euonymus	Euonymus fortunei
English Ivy	Hedera helix
Japanese Honeysuckle	Lonicera japonica
Silver Fleece Vine	Polygonum aubertii
Kudzu	Pueraria lobata
Bittersweet Nightshade	Solanum dulcamara
Periwinkle	Vinca minor
Wisteria	Wisteria floribunda, Wisteria sinensis
Annuals	
Pigweed	Amaranthus hybridus
Jointed Grass	Arthraxon hispidus
Beggar Tick	Bidens polylepis
Balloon Vine	Cardiospermum halicababum
Curled Thistle	Carduus acanthoides
Lamb's Quarters	Chenopodium album
Common Day Flower	Commelina communis
Crab Grass	Digitaria sanguinalis
Buckwheat	Fagopyrum sagittatum
Red Morning Glory	Ipomoea coccinea

APPENDIX E

Common Name	*Scientific Name*
Ivy Leaved Morning Glory	Ipomoea hederacea
Common Morning Glory	Ipomoea purpurea
Prickly Lettuce	Lactuca serriola
Nipplewort	Lapsana communis
Field Cress	Lepidium campestre
Pepper Grass	Lepidium virginicum
Stilt Grass	Microstegium vimineum
Beefsteak Plant	Perilla frutescens
Smartweed	Polygonum caespitosum
Mile-a-Minute	Polygonum perfoliatum
Lady's Thumb	Polygonum persicaria
Jointed Charlock	Raphanus raphanistrum
Giant Nodding Foxtail	Setaria faberi
Sicklepod	Senna obtusifolia
Yellow Foxtail	Setaria pumila
Chickweed	Stellaria media
Sow Thistle	Sonchus arvensis
Coclebur	Xanthium strumarium
Biennials	
Garlic Mustard	Alliara petiolata
Burdock	Arctium minus
Woodland Burdock	Arctium nemorosum
Nodding Thistle	Carduus nutans
Spotted Knapweed	Centuria maculosa
Bull Thistle	Cirsium vulgare
Water Hemlock	Conium maculatum
Queen Anne's Lace	Daucus carota
Cut-Leaf Teasel	Dipsacus laciniatus
Common Teasel	Dipsacus sylvestris
White Sweet Clover	Melilotus alba
Yellow Sweet Clover	Melilotus officinalis

APPENDIX E

Common Name	*Scientific Name*
Wild Parsnip	Pastinaca sativa
Flannel Leaved Mullein	Verbascum thapsus
Herbaceous Perennials	
Yarrow	Achillea millefolium
Goutweed	Aegopodium podagraria
Rhode Island Bent Grass	Agrostis capillaris
Redtop	Agrostis gigantea
Bugleweed	Ajuga reptans
Wild Onion	Allium vineale
Oatgrass	Arrhenatherum elatius
Mugwort	Artemisia vulgaris
Giant Reed	Arundo donax
Smooth Brome	Bromus inermis
Asiatic Sand Sedge	Carex kobomugi
Brown Knapweed	Centaurea jacea
Knapweed	Centaurea nigrescens
Chicory	Cichorium intybus
Canada Thistle	Cirsium arvense
Field Bindweed	Convolvulus arvensis
Tickseed	Coreopsis lanceolata
Crown Vetch	Coronilla varia
Bermuda Grass	Cynodon dactylon
Orchard Grass	Dactylis glomerata
Chinese Yam	Dioscorea batatas
Quackgrass	Elytrigia repens
Hairy Willow Herb	Epilobium hirsutum
Weeping Lovegrass	Eragrostis curvula
Cypress Spurge	Euphorbia cyparissias
Leafy Spurge	Euphorbia esula
Tall Fescue	Festuca arundinacea
Fescue	Festuca elatior

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Common Name	*Scientific Name*
Sheep Fescue	Festuca ovina
Fennel	Foeniculum vulgare
Field Madder	Galium mollugo
Ground Ivy	Glechoma hederacea
Velvet Grass	Holcus lanatus
Hops	Humulus japonica
St. John's Wort	Hypericum perforatum
Cogon Grass	Imperata cylindrica
Yellow iris	Iris pseudacorus
Chinese Lespedeza	Lespedeza cuneata
Butter and Eggs	Linaria vulgaris
Birdsfoot Trefoil	Lotus corniculatus
Moneywort	Lysimachia nummularia
Purple Loosestrife	Lythrum salicaria
Purple Loosestrife	Lythrum virgatum
Miscanthus	Miscanthus sinensis
Reed Canary Grass	Phalaris arundinacea
Timothy	Phleum pratense
Narrow-leaved Plantain	Plantago lanceolata
Broad-leaved Plantain	Plantago major
Canada Bluegrass	Poa compressa
Rough Bluegrass	Poa tivialis
Lesser Celandine	Ranunculus ficaria
Japanese Knotweed	Reynoutria japonica
Sheep Sorrel	Rumex acetosella
Curly Dock	Rumex crispus
Broad Leaved Dock	Rumex obtusifolia
Johnson Grass	Sorghum halepense
Stinging Nettle	Urtica dioica
Periwinkle	Vinca minor

APPENDIX F

Lowland Native Plant List **Swamps and Floodplains of the Piedmont**

Common Name	*Scientific Name*	*Seral Stage*[2]
Overstory Trees		
Red Maple	Acer rubrum	Pioneer-Early Seral
American Elm	Ulmus americana	
Black Willow	Salix nigra	
Pin Oak	Quercus palustris	
Swamp White Oak	Quercus bicolor	
Silver Maple	Acer saccharinum	
Box Elder	Acer negundo	
Sweet Gum	Liquidambar styraciflua	Pioneer
Sour Gum	Nyssa sylvatica	Early Seral
Sycamore	Platanus occidentalis	Pioneer-Climax
River Birch	Betula nigra	Early Seral-Climax
Shadbush	Amelanchier canadensis	
Others		
Shrubs and Vines		
Spicebush	Lindera benzoin	
Silky Dogwood	Cornus amomum	
Smooth Alder	Alnus serulata	
Common Elder	Sambucus canadensis	
Winterberry	Ilex verticillata	
Arrowwood	Viburnum dentatum	
Highbush Blueberry	Vaccinium corymbosum	
Swamp Azalea	Rhododendron viscosum	
Buttonbush	Cephalanthus occidentalis	
Witchhazel	Hamamelis virginiana	
Virginia creeper	Pathenocissus quinquefolia	
Riverbank Wild Grape	Vitis riparia	
Poison Ivy	Toxicodendron radicans	
Others		
Herbaceous Plants		

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Common Name	*Scientific Name*	*Seral Stage*[2]
Skunk cabbage	Symplocarpus foetidus	
Jack-in-the-pulpit	Arisaema triphyllum	
Marsh Marigold	Caltha platustris	
Spring Beauty	Claytonia virginica	
Trout Lily	Crythronium americanum	
Tussock Sedge	Carex stricta	
Cinnamon Fern	Osmunda cinnamomea	
Marsh Fern	Thelypteris palustris	
Sensitive Fern	onoclea sensibilis	
Clearweed	Pilea pumila	
Wood Nettle	Laportea canadensis	
Blue Flag	Iris versicolor	
Many Others		

APPENDIX F

Upland Native Plant List **Mixed Oak Forest**

Common Name	*Scientific Name*	*Seral Stage*[2]
Dominant Trees		
White Oak	Quercus alba	Climax
Red Oak	Quercus rubra	
Black Oak	Quercus velutina	Climax
Other Trees		
Chestnut Oak	Quercus prinus	Climax
Scarlet Oak	Quercus coccinea	Early Seral
Shagbark Hickory	Carya ovata	Early Seral-Climax
Bitternut Hickory	Carya cordiformis	
Pignut Hickory	Carya glabra	
Sugar Maple	Acer saccharum	
Red Maple	Acer rubrum	Pioneer-Early Seral
Black Birch	Betula lenta	
American beech	Fagus grandiflora	Climax
White Ash	Fraxinus americana	
Black Cherry	Prunus serrotina	
Flowering Dogwood	Cornus florida	
Sassafras	Sassafras albidum	
Ironwood	Carpinus caroliniana	
Others		
Shrubs and Vines		
Maple-leafed Viburnum	Viburnum acerifolium	
Arrowood	Viburnum dentatum	
Pinxter Flower	Rhododendron periclymenoides	
Mountain Laurel	Kalmia latifolia	
Black Huckleberry	Gaylussacia baccata	
Virginia Creeper	Parthenicussus quinquefolia	Early Successional Climax
Others		Climax

APPENDIX F

Common Name	*Scientific Name*	*Seral Stage*[2]
Herbaceous Plants		
Mayapple	Podophyllum peltatum	
Wild Sarsaparilla	Aralia nudicaulis	
Wood Anemone	Anemone quinquefolia	
False Soloman's Seal	Smilacina racemosa	
White Wood Aster	Aster divaricatus	
Sweet Cicely	Osmorhiza claytoni	
Jack-in-the-pulpit	Arisaema triphyllum	
White Baneberry	Actaea pachypoda	
Hairy Soloman's Seal	Polyganatum pubescens	
Christmas Fern	Polystichum achrostichoides	
Marginal Wood Fern	Dryopteris marginalis	
Bracken Fern	Pteridium aquilinum	