ENVIRONMENTAL RESOURCE INVENTORY

TOWNSHIP OF CEDAR GROVE
ESSEX COUNTY, NEW JERSEY

Prepared by:

Cedar Grove Environmental Commission
525 Pompton Avenue
Cedar Grove, NJ 07009

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1.0 INTRODUCTION

Now in the 21st century, the Township of Cedar Grove faces environmental concerns that probably were never imagined 100 years ago. The farms and open spaces that existed here at that time have given way to a nearly fully developed community of 12,411 residents (as of 2010 census). Cedar Grove now must confront issues such as diminishing open space, loss of wildlife and wildlife habitat, ever-increasing vehicular traffic and congestion, air and water pollution, insufficient acreage for parks, ball fields, and outdoor recreation, threats to pedestrian and bicycling safety, and flooding and wind damage from storms.

The Township aims to preserve as much of its remaining open space as possible. The redevelopment of the Essex County Hilltop property, which once housed the Essex County Psychiatric Hospital (sanitarium), has provided one such opportunity. While part of the parcel will be developed, two parts have been preserved as Essex County parks.

Using New Jersey Green Acres program funding, Essex County has preserved some 200 acres of the property now known as the Hilltop Reservation. Over 90 acres of this new park lies within Cedar Grove. This reservation protects a significant area from development and ensures public access for passive recreation for future generations. The second part is the 77 acre Essex County Cedar Grove Park located off on Fairview Avenue. Construction on this park started on May 13, 2016 and was completed December 2016. There are two miles of walking paths through the park, four bocce courts, a playground, as well as a 15,000 square foot community center called the Essex County Robert J. O'Toole Community Center.

The importance of the Township's environmental resources to the quality of life in the municipality cannot be overstated. A thriving residential population, a vital downtown business district, an attractive location in which to live, learn, and conduct business, all depend upon a healthy environment.

This Environmental Resource Inventory (ERI) was prepared by the Cedar Grove Environmental Commission, which was established by municipal ordinance in 1999. The Commission is the successor of the Environmental Advisory Committee and its predecessor, the Natural Resources Advisory Committee. The ERI builds upon the foundation laid by the Natural Resources Advisory Committee in its November 1, 1978 Natural Resources Inventory (NRI).

2.0 PURPOSE

The purpose of the Environmental Resource Inventory (ERI) is to present the environmental conditions, both natural and human-influenced, that affect the people of Cedar Grove and the surrounding areas. The information and data provided in the ERI can be used in municipal land use planning, open space preservation, and development. The ERI is a dynamic document that must be revised as the Township changes and as more data become available. It is a notebook of accumulated knowledge of Cedar Grove.

The ERI describes the natural and environmental characteristics of Cedar Grove including its geology, geography, topography, soils, wetlands, ground and surface-water resources, and flood hazard areas. The ERI includes a survey of wildlife and wildlife habitat, vegetation, critical areas and land use. It discusses historic factors, air quality conditions, community noise problems including contributions of aircraft and surface transportation, information on contaminated sites, and the use of Integrated Pest Management. The ERI also describes transportation and pedestrian access in Cedar Grove, including the historic Lenape Trail and its branches within the Township.

The ERI is an important tool for the Township Planning Board, the Zoning Board of Adjustment, the Township Council, and citizens interested in learning about and protecting the environment of Cedar Grove. It is intended that the ERI be incorporated into the Master Plan as an appendix.

The ERI is to be used as:

- a basis for land use planning;
- a resource for preparing and revising the Master Plan;
- a guide to site plan review;
- a tool for determining zoning regulations, Township ordinances, and land use management techniques;
- a source of information on sensitive areas and potential land use and natural resource problems;
- a tool for understanding natural systems and their limitations;
- an educational tool for residents to learn about Cedar Grove and its environment.

The New Jersey State Legislature gave Environmental Commissions the authority and responsibility for conducting ERIs. According to the Environmental Commission Enabling Legislation (NJSA 40:56A): “[An Environmental Commission] organized according to this act shall have power to conduct research into the use and possible use of open land areas of the

municipality, [and] shall keep an index of [wetlands], in order to obtain information on the proper use of such areas [and] recommend to the Planning Board [and Township Council] plans and programs for inclusion in a master plan and the development and use of such areas".

The Municipal Land Use Law (MLUL) requires a land use plan element of the Master Plan "including, but not necessarily limited to, topography, soil conditions, water supply, drainage, flood plain areas, marshes, and woodlands … ". The MLUL states that whenever the Environmental Commission has prepared and submitted an ERI to the planning board and board of adjustment, an informational copy of every application for development shall be made available to the Environmental Commission. The basis for this ERI was the general guidance provided in the publication "*The Environmental Resource Inventory: ERI* " distributed by the Association of New Jersey Environmental Commissions (ANJEC), the Cedar Grove NRI (November 1978), historical documents assembled by the Cedar Grove Historical Society, and others.

3.0 BACKGROUND

The Township of Cedar Grove is located in northwestern Essex County, the second most densely populated county in New Jersey, and part of the most densely populated state in the United States. The Township spans between the First and Second Watchung Mountains, covering approximately 4.2 square miles (https://nationalmap.gov/ustopo/). The Township lies within the basin of the Peckman River, which in turn is part of the Lower Passaic River watershed. Environmental conditions within the Township relate mostly to topography, bedrock and soil character, and surface and ground-water conditions.

Established in 1908, the Township is a largely residential community. Based on the 2010 census, Cedar Grove is home to 12,411 people.

Industrial and commercial uses are centered in three areas of the Township. Commercial businesses are primarily located along Pompton Avenue, which is part of State Highway 23. Commercial and industrial operations are based west of Grove Avenue and in the Commerce Park (Industrial Village), which is located east of Pompton Avenue, in a former sand and gravel pit.

Farming played a large part in Cedar Grove's history. The last operational farm, Morgan's Farm, was donated to the Township and is now parkland, as well as an organic farm with a weekend farm stand. The Canfield-Morgan House, associated structures and farm, all sited on the property, are maintained by the Cedar Grove Historical Society.

4.0 BRIEF HISTORY OF CEDAR GROVE

Cedar Grove has a rich history, originating as an agricultural township established in 1908, and growing in population density to where it is now a suburban town in the 21st century. Historically, the Lenni Lenape Indians inhabited the Cedar Grove area before the first European settlers. Gravestones located within the cemetery at the Morgan Farm (within the PSE&G electrical transmission right-of-way) provide evidence that local settlements dated to 1775.

In 1693, the area now known as Cedar Grove was part of Newark Township, which was formed out of the "Newark tract". Caldwell Township was formed in February 1798 out of portions of Newark Township and Acquackanonk Township (Passaic County). In February 1892, Verona Township was formed from a part of Caldwell Township. Verona Borough was divided out of Verona Township in April 1907. And on April 9, 1908, Cedar Grove replaced Verona Township (Snyder, 1969).

Situated in the Peckman River Valley, Cedar Grove lies between the First and Second Watchung Mountains. The Peckman River begins in West Orange near Eagle Rock Reservation. The early mills took advantage of the water power of the Peckman River.

The earliest reported mill was constructed just south of the current Cedar Grove border, where Nicholas Stagg created a dam and built a sawmill. Two ponds associated with the mill were later known as the Bronze and McConnell ponds (1940s). According to the pamphlet entitled "Early Cedar Grove" (Jacobus, 1976), the mills made shoe pegs, brush handles, and spokes and hubs; farmers brought their felled trees to be cut into boards. In 1876, the 32-acre Stagg property along Grove Avenue was handed over to William Grosch who founded the American Bronze Powder Company.

In Cedar Grove, a pond south of Bradford Avenue, known as Banker's Pond, was fed by a spring. Ice obtained from the pond was used at Overlook Hospital. An ice house was present at the location of the current Blasi Field backstop at the Grove Avenue intersection.

A dam was constructed just below the railroad trestle that served the former Erie Railroad - Caldwell Branch (located near the east end of Peckmantown Road). Below that was Devil's Hole along the current Community Park. The Van Orden Corset Company factory, which

produced steel stays for corsets and was powered by a steam boiler that received water piped from the pond, operated below this dam.

In 1770, Richard and Thomas Van Riper built a small turning mill on the site of what later was the Bowden cotton mill (according to Robert Evans in Early Cedar Grove). Four ponds were established along the next stretch of the river, near what is now Community Park. These ponds were near the tennis courts (this water ran a Snuff Mill), with the second pond located just south of Little Falls Road (this pond may have been used to store water for the cotton Mill, which was located just downstream), and the third pond (located north of Little Falls Road) emptied into the fourth pond. The small Bowden ice house was located along the fourth pond. A cotton mill was located at its north end.

In 1951, William Bowden donated the former mill property to Cedar Grove and Bowden's pond became a popular ice skating spot in the winter. Bowden's pond became the “new” tennis courts years later (now called Bowden Courts).

There also was a paper mill north of Bowden Pond. The Marley sawmill, which was built in the early 1800s, also did hub turning. Remnants of the mill and dam are located north of the arch bridge off of Little Falls Road (the mill burned down around 1900). A cornerstone from this mill was relocated to Morgan’s Farm. There also are remnants of a dam behind Leonard R. Parks School, west of Pompton Avenue.

The Peckman River, in addition to being the center of much industry, was a source of food and recreation in the late 1800s and into the mid-1900s. Interesting quotes regarding the river (often referred to as “the Brook” by local residents) can be found in the 1976 pamphlet entitled “Early Cedar Grove” (F. Leslie Jacobus, Editor).

> From George I. Jacobus: “It will thus be seen that in the early days, The Brook was very important to the area. Its waters provided the only source of power for many years and the pretty stream was a source of pleasure to many people
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> From Pauline Canfield Calandra” “(The Peckman River) was a bright, clear stream in whose waters we all went paddling and sometimes found places deep enough to try to swim. We looked for tadpoles and we found them.”

> Other quotes from George Jacobus: “My grandfather told me that he and his bro**3.0** would often go out early and catch a mess of trout, for breakfast in The Brook. He also said roving Indians often camped along The Brook when he was a boy and that Grove Avenue generally followed an old Indian trail.”
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> He continued, “In those days we often went down to the Peckman River and caught a mess of trout for breakfast. When I was a boy that stream was just as clean and clear as could be. Nearby where we lived, my father felled a tree and made a bridge over the river so I could go to school. Near where we lived there was a turn-off in the road where you could drive into the brook and give your horses a drink and then go out on the road again.”

The water quality declined in the Peckman River with local development and industrialization. At one time, three sewer treatment plants discharged barely treated water into the River within, or immediately south of, Cedar Grove. River quality increased drastically with the advent of tertiary wastewater treatment plants, and reduced industrial discharges. Since the mid-1990s, the river has once again been home to trout, which were re-introduced by the Friends of the Peckman River, a local organization founded by Samuel V. (Sam) Perelli.

Farming also played an important role in Cedar Grove history. Land was cleared, tilled, and planted for vegetables, fruit trees and livestock. A former goat farm occupied what now is largely Community Park. Cattle were raised and slaughtered at the former Overbrook Sanitarium.

There has been tremendous alteration of the landscape and historical development throughout the Township from 1940 to 2001. While farms and large tracts of open space were once dominant in Cedar Grove and the surrounding area, the farms are gone, and the last large open space tracts within the Township are the Mills and Hilltop Reservations, and Essex County Cedar Grove Park.

Railroads played an important part in the transportation history of Cedar Grove. According to P.E. Jaeger (2000), in the late 1890's there were three rail stations: Little Falls Road, Overbrook, and Pompton Avenue. Overbrook, later called the Essex County Hospital, was a hospital for the mentally ill. The Caldwell Railway Company began operations in 1891 and was succeeded by the Erie Railroad; its trains traveled over the trestle bridge, which traversed the Peckman River. A state grant secured by Cedar Grove’s Open Space Trust Fund Committee helped refurbish this bridge, currently a part of the Essex County Bikeway.

A brush factory, constructed in 1854, was located on Pompton Avenue, just South of Little Falls Road. In 1884, a fire burned the factory to the ground with only the chimney remaining. This business, Jenkin's Brush, is Cedar Grove's oldest business, and today still makes customized brushes for industry at 444 Pompton Ave.

The first post office was established in 1874 after the Montclair Railway arrived in town. The mail was brought by cart to the post office from the railroad station on Little Falls Road.

Cedar Grove's first restaurant was opened in 1902 by Jennie Taylor. The building is currently Shook's Funeral Home. In 1937, *The Observer* was started as the first newspaper devoted exclusively to happenings in Cedar Grove. Publication stopped in 1948 and then decades later started up again, joining the other local newspaper, *The Verona-Cedar Grove Times* – both of which still publish today. Cedar Grove Hardware was originally located in the building later occupied by *The Observer,* near the confluence of Taylor's Brook and the Peckman River.

During the 1930s and 1940s, The Meadowbrook nightclub on Pompton Avenue hosted such music legends as Glenn Miller, the Dorseys, Guy Lombardo, and Frank Sinatra. Down the road from The Meadowbrook was an industrial village, which was developed by Thomas Wilberton after World War II (P.E. Jeager).

4.1 The Canfield-Morgan House

The ancestral home of John and Susan Canfield is located at 903 Pompton Avenue. The farmhouse was built in 1845. Corn, apples, and other crops were grown on the 14-acre property and sold at local markets. Benjamin and Grace Canfield occupied the house after John Canfield's death in 1903. James and Edith Morgan bought the 20-acre property from the Canfields in 1910 and continued to use the property for farming vegetables and apples. Edith Morgan, who was interested in botany, planted several unique trees such as the Franklinia, the Dawn Redwood, and the Southern Magnolia. The Morgan's entertained their guests at their country estate with tennis and other leisure activities.

When James Morgan died in 1920, his wife and her four children continued to work on the farm. Unlike his siblings who left the farm, J. Courtenay Morgan remained on the farm with his mother. They used, by leasing or renting, several adjacent properties to increase their agricultural production. When Edith passed away in the 1960s, Courtenay, a bachelor,

continued farming until his death in 1985. The remaining 14.5 acres, house, and barn are his legacy to the Township.

The Cedar Grove Historical Society restored and improved this historical landmark through donations, grants and volunteer work by the Boy Scouts, and other local organizations and clubs.

Grants and donations were used to restore the farmhouse and barn, build a gazebo, public restrooms and an outdoor amphitheater. This amphitheater is used for outdoor concerts and movies during the pleasant weather, and becomes a skating pond during the winter. Several volunteer projects included restoring the barn shutters and farm equipment, building trellises, gardening, and developing nature trails. Plaques have been installed along the trails to identify trees and areas of historical significance. Part of the property is now a large organic vegetable garden, with the produce and honey (from bee hives on the farm) sold at their farm stand, and proceeds going to support the farm and The Morgan Museum.

5.0 PHYSICAL FEATURES

5.1 Topography

The topography of Cedar Grove is dominated by several natural features, namely the First and Second Watchung Mountains, and the Peckman River. The ground surface elevations, as determined from the USGS topographic maps for the Orange, Caldwell and Paterson quadrangles (https://nationalmap.gov/ustopo/) are lowest along the Peckman River and nearby lowlands that have locally associated floodplains. From the Verona border (at the southern limit of the Township) to the Little Falls border (at the northern limit of the Township) the elevations along the Peckman River decrease from 320 feet above mean sea level (MSL) to 180 feet. The ground elevation near Town Hall (located at 525 Pompton Avenue) is approximately 302 feet above MSL. It is notable that Town Hall sits nearly dead center within the Peckman River valley.

The elevations along the Watchung Mountain ridgelines rise to approximately 620 feet above mean sea level (MSL). The steepest slopes occur on the eastern flanks of both mountains, while the western slopes are much more gradual, and therefore, more suitable for development and for recreational purposes. The western slope of the First Mountain and the eastern slope of the Second Mountain run within the borders of Cedar Grove. Portions of these areas are preserved in Mills Reservation and Hilltop Reservation. Township ordinances protect steep slopes and crestlines from development, and preserve the viewsheds created by the mountains and the valley. (Figure 1)

The City of Newark-owned Cedar Grove Reservoir is located along the western flank of the First Watchung. Constructed in the early 1900s, the reservoir is dammed on three sides. Some of the earth used to construct the dams was taken from the Newark-owned property located west of Ridge Road. Remnant ponds can be found in the area where the ground was gouged out to extract earthen materials.

5.2 Geology

Cedar Grove, as well as all of Essex County, is located within the Piedmont Physiographic Province. This geologic region is situated east of the New Jersey Highlands, or Reading (New England) Prong. The Piedmont is characterized by lowlands and a series of mountainous ridges. The lowland areas are underlain by interbedded mudstone, siltstone, sandstone and other clastic rock composed of sediments that were deposited during the Triassic and Jurassic

geologic periods. These sedimentary formations are part of the larger Newark Supergroup. The sediments were deposited in a broad, mudflat environment through which numerous, slow-moving streams flowed. Later tectonic activity formed a rift basin - one of many that were formed up and down the now Atlantic coast of North America - during the late Triassic breakup of the super continent, Pangaea. (Pangaea consisted of the joined continents of Africa, Europe, North America; rocks similar to those found in this area can be found in northwestern Africa.)

The Newark rift basin was the site of crustal extension. Molten rock, or lava, was extruded through fissures that developed in the crust. A series of three lava flows occurred over several million years, and each successive flow was buried by hundreds of feet of sediment.

The rocks in what is now New Jersey were uplifted and tilted. The rocks now dip to the northwest. This uplifting exposed the lava flows on the eastern flanks. Subsequent erosion carved out the intervening valleys and left the more resistant lava rock, or basalt, as mountains. Two of these mountain ridges, locally known as Watchung Mountains, are present in Cedar Grove.

The first Watchung Mountain, or “First Mountain”, is found at the eastern portion of the Township (geologic map, http://www.state.nj.us/dep/njgs/pricelst/bedrock250.htm). The basalt formation of the First Mountain is called the Orange Mountain Basalt. Significant rock exposures are seen along East Bradford Avenue, Reservoir Drive (Normal Avenue), and in Mills Reservation. The basalt was mined in several local quarries, including the abandoned quarry located along Old Quarry Road. (Figure 2)

Joints or cracks are evident in portions of the basalt. Ground water can be seen seeping out along these fractures, most dramatically in the winter when ice builds up along the outcrops. A series of ancient gravity or normal faults run through this basalt, near its contact with the Passaic Formation to the east, and were mapped by the NJ Geological Survey from outcrops present along the Cedar Grove / Montclair border, particularly along Normal Avenue (Volkert, 2002).

Second Mountain forms much of the western portion of the Township. Parts of Second Mountain are preserved in the Hilltop Reservation, where the exposures can be seen. Other notable exposures of this basalt formation, known as the Preakness Basalt, are found in the

Park Ridge Estates housing development and along West Lindsley Road. Basalt was quarried west of the former Meadowbrook.

The sedimentary rocks are not well exposed in the Township, but are typically buried beneath a veneer of glacial and fluvial deposits. These rocks can be found along the central valley in the Township, through which the Peckman River flows. The sedimentary rocks are part of the Feltville Formation, consisting of siltstone and shale. The Feltville Formation may be exposed in excavations for building foundations and swimming pools. Small outcrops of the younger Passaic Formation, which occurs stratigraphically below the Orange Mountain Basalt, appear due to faulting along the eastern limits of the township along Normal Avenue at Mills Reservation. The thickness of the Feltville Formation was explored just north of the Township border, in Little Falls, via boreholes drilled for the Passaic River flood-diversion tunnel study.

During the Pleistocene Epoch, northern New Jersey was “overrun” by the Wisconsin Glacier. This glacier both scoured the bedrock, as evidenced by striations left on exposed basalt in Mills Reservation, and deposited materials, or glacial till. The sand and gravel deposits that historically were mined in portions of the Township were remnant deposits from the most recent glaciation. The glaciers also deposited large boulders, or glacial erratics. Probably the most notable erratic is the large block of limestone ridden with marine fossils that was discovered by several Township youth in 1973, just east of the Bradford Arms Apartments. This rock, which is over 370 million years old, is displayed in the Township library.

The glacial deposits can be generalized into two types: unstratified drift - that is also known as till or ground moraine - and stratified drift. The unstratified drift is a heterogeneous mixture of clay, silt, sand, gravel, cobbles and boulders that were deposited at the glacial margins. Stratified drift was deposited by glacial meltwaters, and generally are stratified sand, and sand and gravel. According to a 1968 report entitled “Ground-Water Resources of Essex County, New Jersey” (New Jersey Department of Conservation and Economic Development), the stratified sand and gravel deposits west of the Peckman River in Cedar Grove are up to 100 feet thick. The deep cuts into bedrock were due to the lowered water table during the last period of glaciation.

Cedar Grove has variation in glacial deposits, which can be seen on the geologic maps shown at the NJDEP Division of Water Science and Geoscience site (http://www.nj.gov/dep/njgs/).

Discontinuous till is shown at along the western flanks of the First and Second Mountains. A band of glacial sediments that runs through the center of the Township from north to south consists of sand and gravel, typical of what is known in the “sand pit” at the southern end of the Township, just west of Grove Avenue, and in the former sand and gravel quarry along what is now Commerce Drive. (Figure 3)

The geologic conditions often have a significant impact and can add expense to property development in the Township. Glacial clay, streams and wetlands can result in drainage problems. Bedrock can require a developer to blast for foundations, roadways and infrastructure. Steep slopes can affect site drainage, site engineering, and building design.

5.3 Soils

The soils of the Township range from clay-based soils that were derived from weathering of the parent basalt and siltstone/shale bedrock, and those that were deposited glacially. The clay-rich soils have low permeability, often resulting in slow drainage. The glacial deposits vary from a mixture of fine and course materials to those that are dominated by sand and gravel, likely deposited in kames, or short irregular hills deposited at the edge of glaciers. These courser glacial deposits are fairly well drained, and were mined in various portions of the Township, including the current business park east of Pompton Avenue and along Commerce Road.

Riverbank, overbank, and floodplain deposits are found along the Peckman River and its tributaries. These materials vary in thickness and composition.

The soils in the developed areas of the Township are termed “urban land” by the US Department of Agriculture, Soil Conservation Service. Much of the natural structure of these soils has been altered by human activity. A county-wide soil survey was completed and published in 2003, which contains more detailed information on soils. (www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/new_jersey/NJ013/0/Essex%20County.pdf).

The central portions of the Township are shown in a 1951 Rutgers study to be covered with soils that developed on ground moraine. These soils were described as having a moderately heavy to heavy texture, with low permeability resulting in poor drainage. In the western portion of this area, the ground moraine is underlain by stratified drift, which has variable drainage

properties. Stratified drift also pervades in the north, including the land on either side of the Peckman River.

Within the Hilltop Reservation and in the residential areas to the north, the soils were mapped as part of the Boonton series, primarily a gravelly loam on slopes varying from three to 30 percent. These soils are deep, moderately-well-drained and well-drained, formed in glacial till. Typically, the soils have a dark brown silt loam surface layer (about 8 inches thick) with a subsoil (8 to 30 inches thick) of dark yellowish-brown, fine sandy loam, dark brown gravelly loam and dark brown gravelly fine sandy loam. A very firm and brittle fragipan (30 to 60 inches), dark brownish-red, gravelly sandy loam may occur beneath the upper subsoil (Hudson-Essex-Passaic Soil Conservation District, 1984).

5.4 Wetlands

Wetlands, both of the upland and lowland type, appear within the Township. County-preserved wetlands are present in the Hilltop and Mill Reservations. The National Wetlands Inventory map (US Department of the Interior, Fish and Wildlife Service) shows significant wetland areas are associated with the Peckman River and its tributaries. The wetlands mapped by the NJDEP appear at http://www.state.nj.us/dep/gis/wetshp.html. (Figure 4)

The Peckman River wetlands are most pronounced along W. Bradford Avenue, near Community Park and north of the arch bridge on the west side of Little Falls Road. Scattered wetland areas are located throughout the Township in low-lying areas, along ground-water seeps and in areas that are dominated by clayey soil. Some of these wetlands areas are now incorporated into stormwater management facilities associated with various residential and commercial developments.

Vernal habitats are of interest to the NJDEP because of the importance for breeding of frogs and salamanders. A vernal habitat must meet four criteria: 1) occurs in a confined basin depression without a permanent flowing outlet, 2) features evidence of breeding by one or more species of fauna adapted to reproduce in ephemeral aquatic conditions, 3) maintains ponded water for at least two continuous months between March and September of a normal rainfall year, 4) is free of fish throughout the year, or dries up at some time during the year. Such ponds may exist in wooded and undeveloped portions of the Township. The NJDEP identifies and tracks vernal habitats throughout the state in order to preserve these habitats.

6.0 WATER RESOURCES

6.1 Ground Water

Ground water is water that occurs in any manner beneath the ground surface. The water may exist in, above, or below the natural ground-water table. In areas of the Township where clay is common, ground water may be perched above the water table after rains, particularly in the spring and fall, and after snow melts.

Ground water that is used as a water supply is pumped from the bedrock. Although more productive wells could tap the sedimentary formations, because of the limited areas where these formations could be reached, it appears that most production wells – with the likely notable exception of domestic wells - were completed into the basalt. The Essex County Improvement Authority-owned wells located off of Grove and Fairview Avenues are registered with the New Jersey Department of Environmental Protection as “public-community supply wells”. (Three were registered as of the July 1,1997 report issued by the New Jersey Geological Survey.)

The 1968 report on the water resources within Essex County listed four wells in Cedar Grove. Three of the four wells listed in the report tapped the basalt. The wells (and years installed) were owned by Rich-Tex, Inc. (1951), Brindell Goat Dairy (1958) and the Essex County Board of Freeholders (1957). The Brindell well was the shallowest rock well at 110 feet, and yielded 10 gallons per minute (gpm); this well was located either in or near what is now Community Park. The Essex County well, though only 125 feet deep, produced 198 gpm. The fourth well (Rich-Tex, Inc.; 1952) was completed to 105 feet within the glacial deposits, and yielded 80 gpm.

Although the Township water supply relies on surface water reservoirs, protection of ground-water supplies is nevertheless important to local users and purveyors.

6.1.1 Well-Head Protection Areas

Ground-water quality protection is vital to the health of New Jersey residents. For this reason, the NJDEP has established Well Head Protection Areas around important drinking-water supply wells. Two of these protection areas encompass about 30 percent of Cedar Grove. The eastern protection area is related to a Montclair well located north of Bellevue Avenue, some 1,900 feet from the township. The more critical protection area is aimed at protecting the active Essex

County Utilities Authority (ECUA)-owned wells along Fairview Avenue. Similar protection areas would be drawn if the ECUA chose to reactivate the wells located west of Grove Avenue.

The goal of well-head protection areas (WHPA) is to "prevent contamination of ground-water resources, which provide drinking water…" (NJDEP,1998). A WHPA "is the area from which a well draws its water within a specified timeframe". These areas can be considered in land-use planning and in developing best-management practices for protecting water quality.

WHPAs are broken into three zones to delineate the reaches of water that can be drawn into a well within two years, five years, and 12 years. In the Tier 1 zone, a two-year protection needs to be afforded for bacteriological concerns. Tier 2 is based on the five-year timeframe viewed by the NJDEP as being needed to ensure containment of a known pollutant discharge into the aquifer. Tier 3 provides sufficient area for monitoring to ensure water-quality protection, and provides a ten (10) to 15 year travel time that should provide sufficient dilution and attenuation to minimize risks of well pollution. (Figure 5)

6.2 Surface Water

Township surface-water drains into the Peckman River, which runs essentially south to north throughout Cedar Grove. Having an overall length of about six (6) miles, the Peckman River flows from West Orange (originating in Eagle Rock Reservation) to Woodland Park, where it confluences with the Passaic River.

The watershed of the Peckman River encompasses approximately 11 square miles. While perennial and intermittent streams still feed the river, much of the surface water discharging to the river is routed via underground stormwater drainage systems. The stormwater systems tend to introduce rainwater rather quickly into the river, resulting in fast rises in the stream flow, increasing streambank erosion and flooding, and causing an overall decrease in the amount of ground water discharge (or base flow) into the river.

Historically, settlements in this area of New Jersey were made along shorelines and navigable waterways. The settlements later extended along trails and roads, and tended to be centered on inland waterways, which were conducive to farming and commercial livelihoods. Early Cedar Grove settlements followed similar patterns. Areas along the river and its tributaries were used for grazing, farming, and later for developments.

The major tributary to the Peckman River in Cedar Grove is known as Taylor's Brook, named after the former Taylor dairy farm. The brook flows westward from First Mountain, where it is fed by several smaller, unnamed streams. The brook flows through a closed culvert beneath Ridge Road and again through a concrete channel along the front of the Municipal Library. The confluence of Taylor's Brook and the Peckman River is along the north side of Church Street. The water added to the Peckman River by Taylor's Brook is a major contributor to the flooding that is experienced in this area of the Township following precipitation events.

The Township sanitary sewer treatment plant is operated under a permit issued by the NJDEP, and it discharges to the Peckman River in the northern portion of the Township. Periodic discharge monitoring is performed in accordance with the permit requirements. The plant has been found to comply with the regulatory and permit requirements.
The Peckman River is designated as a "non-trout" fresh water (FW2-NT) waterway by the NJDEP. This designation relates to the quality that must be maintained by regulated discharges into the river, such as those from the Township wastewater plant.

Surface-water quality is being reviewed by the NJDEP on a watershed basis. The Township is located within NJDEP Watershed Management Area 4, which encompasses the Lower Passaic River and Saddle River watersheds. Future regulations will focus on regulating the Total Maximum Daily Load (TMDL) of pollutants that a watershed can accept while sustaining the desired water quality. The TMDLs will take into account point and non-point sources.

Township and state water management requirements encourage the on-site management of stormwater. Information on the local geology, soils, and ground water are important in the design of such management systems.

6.3 Drinking Water

Cedar Grove is served by a public water system. As designated by the NJDEP, Cedar Grove's Public Water System ID is 0704001. The Township is a partner in the Wanaque South Reservoir and Monksville Reservoir, which are owned and operated by the North Jersey District Water Supply Commission (NJDWSC). The NJDWSC operates a surface water reservoir system. A secondary or back-up water source is the Passaic Valley Water Commission (PVWC) system.

In total, Cedar Grove is contracted to obtain 1.7 million gallons per day (mgd) from either the NJDWSC or PVWC.

Periodic audits of the Township water system are successful in identifying leaks, illegal or unregistered connections, and meters that are out of calibration.

Recent actions by the NJDEP in response to drought conditions loosened the regulations regarding water reuse. The Township has reused water discharged from the sewer treatment plant to water shade trees.

Cedar Grove's public water is regularly tested in accordance with state regulations for a public community water system. The water is analyzed for organic and inorganic parameters in accordance with NJDEP regulations.

Public water is treated with chlorine to disinfect the water and make it safe for public consumption. Trihalomethanes can form when the chlorine combines with other constituents in the water distribution system. The levels of trihalomethanes in water that exist in the water at an individual faucet can be higher than the levels that are detected in a water distribution system (Shelton, 1996).

The quality of Township water is summarized in the Consumer Confidence Report that is published annually by the Township Water Department and mailed to residents.

Older homes may have lead water pipes, piping that is joined with lead solder, or leaded brass fixtures. This lead can leach into drinking water. Since lead is a potential health concern, particularly for children, residents should have the water inside their home checked for lead.

Several residences, however, rely wholly or in-part by a private water supply, a domestic well. These residences likely are located in and along the lower flanks of the central (Peckman River) valley, where the sedimentary formation is present. These wells, or the source of the water, deserve protection from contaminants such as oil and gas, salt and pesticides. Many of the older wells may be hand dug or relatively shallow wells, not meeting the current well criteria that

require at least 50 feet of surface casing. Therefore, these private water sources may be very susceptible to contamination.

Residents with private wells should consider periodic water tests. These tests may be arranged privately, but can sometimes be arranged through local and county health authorities. State regulations enacted in September 2002 require that private (domestic) wells be tested whenever a property is transferred or leased. Details are available through the NJDEP (http://www.nj.gov/dep/watersupply/pw_pwta.html).

7.0 CLIMATE

New Jersey is located about halfway between the Equator and the North Pole, on the eastern coast of the United States. Its geographic location results in the State being influenced by wet, dry, hot, and cold airstreams, making for daily weather that is highly variable. The dominant feature of the atmospheric circulation over North America, including New Jersey, is the broad, undulating flow of winds from west to east across the middle latitudes of the continent. These "prevailing westerlies" shift north and south and vary in strength during the course of the year, exerting a major influence on the weather throughout New Jersey.

Climate is a major factor in determining the kinds of plants and animals found in an ecosystem. New Jersey has a temperate climate because it has mild average temperatures, four seasons, and rainfall distributed throughout the year. The Office of the New Jersey State Climatologist (ONJSC) divides New Jersey into five distinct climate regions. This is because even though it is a small state, the geology, distance from the Atlantic Ocean, and prevailing atmospheric flow patterns produce distinct variations in the daily weather between each of the regions. The five regions are: Northern, Central, Pine Barrens, Southwest, and Coastal. The ONJSC site (for all sorts of weather and climate information) is: http://climate.rutgers.edu/stateclim/.

Cedar Grove resides in the “Central Zone”. The Central Zone has a northeast to southwest orientation, running from New York Harbor and the Lower Hudson River to the great bend of the Delaware River in the vicinity of Trenton. This region has many urban locations with large amounts of pollutants produced by the high volume of automobile traffic and industrial processes. The concentration of buildings and paved surfaces serve to retain more heat, thereby affecting the local temperatures. Because of the asphalt, brick, and concrete, the observed nighttime temperatures in heavily developed parts of the zone are regularly warmer than surrounding suburban and rural areas. This phenomenon is often referred to as a "heat island".

The northern edge of the Central Zone is often the boundary between freezing and non-freezing precipitation during wintertime. Average number of freeze free days in the Central Zone are 179. In summer, the heat and humidity may result in uncomfortable sleeping conditions, sometimes for extended periods. The Central Zone has about 15 to 20 days with temperatures above 90 degrees Fahrenheit. Weather stations have registered numerous readings of 100 degrees F or

higher over the past century, and have records of 0 degrees F or below. According to NJ State Climatologist, neighboring Little Falls registered an incredible minus 18 degrees Fahrenheit in February 1934 (the lowest ever recorded there).

Average annual precipitation is about 51 inches in this Central Zone, with about 25 to 30 thunderstorms per year. Measurable precipitation falls on approximately 120 days. Fall months are usually the driest with an average of eight days with measurable precipitation. Other seasons average between 9 and 12 days per month with measurable precipitation. Occasionally there are drought conditions with no precipitation for several months.

Approximately five tornadoes occur each year throughout the state of NJ, and in general, they tend to be weak. Snow and ice storms can occur in Cedar Grove during the winter months, with an occasional record breaking snowstorm delivering over two feet of snow (e.g. the major snowstorm of January 2016). Occasionally tropical storms, and even more rarely hurricanes, pass through NJ with heavy precipitation and high winds. The most recent tropical storm to pass through Cedar Grove was tropical storm Sandy, which had high tropical storm force winds with high wind gusts – the highest measured wind gust in neighboring Montclair was over 85 mph.

Climate is a major factor in determining the kinds of plants and animals found in an ecosystem.

Climate changes naturally over long periods of time. Most climatologists believe that recent changes in climate are the result of human activities, and are attempting to predict the effects and magnitude of future trends. Predictions for NJ are that with climate change, NJ will become gradually warmer year round, and that there will be an increase in precipitation.
In New Jersey, long-term data already document a significant increase in average temperature over the past century, a significant increase in precipitation, and a significant rise in sea level, which is consistent with observed and predicted global trends. NJDEP has a statement on climate change in NJ, including temperature, precipitation, extreme events, and sea level: http://www.nj.gov/dep/dsr/trends/pdfs/climate-change.pdf

8.0 NATURAL HAZARDS

8.1 Flooding

Flooding periodically results from overbank flow along the Peckman River and its tributaries. The flooding usually follows an unusually heavy rain or short-term deluge, when the rainwater run-off is quickly routed to the watercourses.

Quoting from the pamphlet “From then to now --- A History of Cedar Grove” by Samuel Ward Boardman, Jr.: (p. 31)

> In July 1945, Cedar Grove had a memorable disaster. A flood swept down our valley such that stores and dwellings along the lower part of Pompton Avenue had water eighteen inches or more in depth above the ground floor. Farther down the Peckman River, the losses were even worse. It is said that among other serious damage, the railroad embankment was washed out, that a house was swept down the river, and indeed, that one life was lost.

More recently, flooding as a result of Hurricane (Tropical Storm) Floyd in 1999 caused significant damage in the Township and downstream. The section along Pompton Avenue from Church Street north to the railroad trestle (south of Myrtle Avenue) was severely flooded. Road collapses occurred above culverted and channelized streams (particularly along Ridge Road north of W. Bradford Avenue), and serious streambank erosion occurred along stretches of the Peckman River, most notably within Community Park.

Downstream of Cedar Grove, the Route 46 bridge that spans the Peckman River in Little Falls was washed out, requiring millions of dollars in emergency repairs.

In reaction to the flooding, municipalities took action to curb development along the river, enacted stormwater management ordinances, and requested governmental assistance to address the flooding. The Army Corps of Engineers studied potential flood control measures along the river, and the NJDEP considered redrawing the floodplain along the river.

8.2 Radon

Radon is an odorless, colorless gas that occurs naturally from the presence of radium-containing minerals in the earth’s crust. Radon is a concern because exposure to elevated levels can lead to lung disease and cancer.

Radon levels may seep into a home or other building through cracks in the foundation or features designed to safeguard the home from water, such as a sump pump of a French drain system. Radon concentrations may build up in a home that is well sealed or insulated. Ironically, efforts taken to better insulate homes in order to save energy since the 1970s have resulted in an increase in home radon levels.

Radon levels commonly are measured in picocuries per liter, or pCi/L. Levels above 4 pCi/L are viewed as requiring some type of action, as recommended by the USA EPA.

Cedar Grove, according to the NJDEP (October 2016), is a Tier 2 radon potential area. The NJDEP identifies radon potential based on three tiers, with Tier 2 having a "moderate radon potential". Tier 2 designates those municipalities where at least 25 homes were tested with five to 24 percent having radon concentrations greater than or equal to 4 pCi/L. (In 1995 the NJDEP had record of 531 tests that were run in Cedar Grove, with six percent having radon concentrations above 4 pCi/L.) Based on the information obtained via the NJDEP website (http://www.njradon.org) in 2002, the average measured radon level within a home in Cedar Grove is 1.47 pCi/L (http://www.njradon.org/radonin.htm).

Radon levels typically are measured in a basement or the lowermost level that may be occupied in order to represent a potential worst case scenario. Radon is measured either using carbon canisters that are left exposed for a certain period of time and subsequently evaluated by a certified laboratory, or measured using real-time devices.

If radon levels are found to exceed 4 pCi/L, a re-test may be conducted to verify the findings. If a decision is made to address the elevated radon levels, a state-licensed company should be employed (a listing of licensed companies may be obtained from the NJDEP). The abatement action may be as simple as sealing cracks or adding vents to the living space (basement) or may require construction of an active ventilation system. State-licensed contractors should perform radon remediation in homes.

8.3 Landslides

Landslides are the downslope movement of soil and rocks. The force and destruction generated from such occurrences can cause loss of life and property. Cedar Grove has enacted a "Steep

Slopes" ordinance that offers some protection. However, proper engineering (slope stability measures, water control, etc.) is needed to protect even lesser slopes from failing.

Periodically, slope failures of minor nature are noted in Cedar Grove. The oft-chosen remedy is to add rip-rap (or large rocks), which is not very attractive and can still fail without the implementation of other measures.

8.4 Earthquakes

Cedar Grove is not located in a tectonically active area. Active faults are not known, but evidence of millions of years of tectonic activity is recorded in the rocks on which Cedar Grove is situated.

Earthquakes, however, can occur in and around the area. It is not uncommon to experience minor earthquakes every few years. These are manifested in our area by minor shaking and rumbling. At least one earthquake described in the literature appears to have originated in our area. Described using the Modified Mercalii Intensity Scale (1931), an earthquake with the intensity of V to VI was experienced. This earthquake was characterized as being felt by nearly all people – if not all – in the area. The earthquake caused dishes and windows to break, furniture to move, disturbances of trees, poles and other tall objects, and possibly slight damage to plaster and chimneys.

Building height restrictions, instituted as part of the zoning ordinance, should minimize the impact of a moderate to severe earthquake in Cedar Grove.

9.0 VEGETATION AND WILDLIFE

Cedar Grove residents value the environmental and aesthetic aspects provided by trees and shrubs, and the environmental benefits of a diverse wildlife population within the Township. However, there are also concerns regarding the impact of certain wildlife, especially deer, groundhogs and Canada geese, on the quality of life and property damage.

A Township ordinance regulates tree removal and protection. This ordinance discourages clear cutting and encourages tree retention. Requirements for replacing trees are established. A Community Forestry Management Program was initiated in 2002, along with a planned Street Tree Inventory. These initiatives are aimed at improving the environment for residents and nature.

There have been a number of surveys establishing the species of wildlife and vegetation found in Cedar Grove. The first two studies by Dr. John Crow (1995) and Wander Ecological Associates (1995) were commissioned by the Township of Cedar Grove and listed wildlife and vegetation species that were either observed or thought likely to appear (based on habitat) on the Hilltop property, which later became the Hilltop Reservation. In 2000 there was a town wide survey of the species of plant and wildlife within Cedar Grove, and in 2016 the survey was repeated. In both the 2000 and 2016 surveys, residents contributed information on the wildlife in their yards and neighborhoods. The 2000 survey appeared in a local newspaper, and residents were asked to fill out the surveys and mail them back to the Cedar Grove Environmental Commission, and the 2016 survey announcement was in both local newspapers, at the Cedar Grove library, as well as an Environmental Commission web-page and Facebook link to the survey.

Residents whose properties contain wooded areas or who live adjacent to undeveloped or wooded areas reported greater numbers of species of wildlife and plants than other residents. Some homeowners reported ways that they had tried to make their yards attractive to wildlife, especially birds, by having a diversity of bushes and plants that birds would gravitate to (for example, berry bushes for bird food, and trees good for nesting) or bird feeders. Some residents also reported that they had planted bushes that were attractive to butterflies and bees.

The variety of wildlife species that residents of Cedar Grove reported in both 2000 and 2016 was impressive. They confirmed the species listed by Dr. John Crow (1995) and Wander

Ecological Associates (1995), but also listed a number of additional species that either live or migrate through Cedar Grove Township, and which are listed by the Audubon Society and the NJ Department of Environmental Protection (DEP) as possible or likely in this area. For example, a number of people reported bald eagles (a threatened species) passing through the town (and stopping briefly) in both 2000 and 2016 survey, but in 2016 there were also several sightings of golden eagles and a documented sighting of an American kestrel. People reported an increase in some bird species, especially various species of woodpeckers and wild turkeys, in 2016 as compared to 2000. This is supported by NJ DEP's list of bird species increasing in New Jersey, which include some of the species commonly seen in Cedar Grove: wild turkeys, red-bellied woodpeckers, red-tailed hawks, Northern cardinals, American goldfinches, Canada geese, turkey vultures, mallards, and white-breasted nuthatches.

Some of the species sighted in Cedar Grove are currently classified as “endangered” (i.e., Cooper’s hawk and bald eagle) or “threatened” (e.g. red-headed woodpecker). Respondents also reported sightings of species not listed in the Crow and Wander reports, but which the Audubon Society has indicated are possible or likely in this area. For example, a number of people reported seeing bald eagles (a threatened species) in 2000 passing through the town and stopping briefly in the area of the river and woods adjacent to the tennis courts. In the 2016 survey, more people reported sighting bald eagles as well as several sightings of golden eagles, and even a sighting of an American kestrel. American kestrel numbers have been in decline in NJ in recent years and since 2012 are listed as a “state threatened” species”. Also, a number of people reported seeing red foxes in 2000 and 2016 and black bears in 2016, all species not reported by Crow or Wander Ecological Associates.

A compilation of the wildlife species is presented in **Attachment A**.

9.1 Mammals, Reptiles, Amphibians, and Fish

The most frequently reported mammals in the 2000 and 2016 surveys (reported by the great majority of respondents) were: white-tailed deer, groundhog (woodchucks), Eastern chipmunk, Eastern cottontail rabbit, raccoon, red fox, and Eastern gray squirrel. Also listed were Virginia opossum, house mouse, white-footed (deer) mice, Norway rat, coyote, striped skunk, Big brown bat, little brown bat, Eastern mole, woodland vole, short-tailed shrew, and even a rare sighting of a hoary bat (in 2000). Also mentioned only in the 2016 survey (but not in 2000 or earlier) were black bears (passing through the town).

Reptiles and amphibians living in the Township include: eastern box turtle (seen near streams and in wetland areas), Eastern garter snake, and Northern dusky salamander (also sighted near streams and in wetland areas). The 2000 (but not 2016) survey also had sightings of Eastern newt and woodland turtle.

The Peckman River is home to trout (rainbow and brown), suckers, carp and black nose dace. Crayfish and snails have also been reported sporadically.

9.2 Birds

Sixty three species of birds were reported by at least 2 persons as living and nesting in Cedar Grove or passing (migrating) through in both 2000 and 2016, and 13 other species were listed by only one person (avid birders). Respondents reported that some native songbirds that used to frequent this area are no longer seen or have become rare. See **Attachment A** for the full list.

The birds most frequently listed (by the majority of respondents) include: American crow, American robin, mourning dove, blue jay, cardinal, Canada goose, house sparrow, northern cardinal, and wild turkey. Other frequently listed species: American goldfinch, Baltimore oriole, barn swallow, black-capped chickadee, chipping sparrow, common grackle, common raven, Cooper's hawk (an endangered species), dark-eyed junco, downy woodpecker, European starling, gray catbird, great blue heron, hairy woodpecker, house finch, house wren, mallard, Northern flicker, Northern mockingbird, Northern oriole, pileated woodpecker, red-bellied woodpecker, red-headed woodpecker (a threatened species), red-tailed hawk, rock dove, ruby-throated hummingbird, tufted titmouse, turkey vulture, and white-breasted nuthatch.

Less-frequently reported were sightings of such species as: American kestrel (state threatened species), bald eagle (endangered), belted kingfisher, black-and-white warbler, black-billed cuckoo, brown creeper, brown thrasher, brown-headed cowbird, Carolina wren, cedar waxwing, common nighthawk, common yellowthroat, Eastern pewee, Eastern screech owl, fox sparrow, golden eagle, great-horned owl, great crested flycatcher, great horned owl, green heron, herring gull, indigo bunting, killdeer, Northern harrier, ovenbird, pine warbler, purple finch, purple martin, red-breasted nuthatch, red-eyed vireo, rose-breasted grosbeak, ruby crowned kinglet, rufous-sided towhee, scarlet tanager, sharp shinned hawk, white-crowned sparrow, white-throated

sparrow, wood duck, wood thrush, yellow warbler, yellow-bellied sapsucker, and yellow-rumped warbler.

9.3 Plants

In the 2000 survey, residents reported over 160 species of plants (trees, shrubs, wildflowers, evergreens, vines) growing in their yards or on the edges of their properties, especially if the properties bordered a wooded, wetland, or undeveloped area. See **Attachment A** for full list.

The most commonly reported species were trees, including oaks (whether white oak, black oak, pin oak, red oak, scarlet oak, or just plain “oak”), maples (whether sugar maple, Norway maple, swamp maple, red maple, silver maple, or just plain “maple”), flowering dogwood, tulip tree (yellow poplar), black walnut, American beech, black cherry (wild cherry), white and green ash, sassafras, birch (whether white birch, river birch, black birch, gray birch, or just plain “birch”), cedar (yes, there are cedars in Cedar Grove!), and white pine. Some less frequently listed trees and shrubs include elm, hornbeam, American sycamore, linden, sumac, aspen, mountain laurel, common juniper, hemlocks, Norway spruce, willow, hickory (including mockernut hickory), sweetgum, and yew.

More than eight types of wild berries were reported (including mulberry, blackberry, inkberry, raspberry). There were many easy-to-identify plants listed such as poison ivy, milkweed, Jack-in-the pulpit, Virginia creeper, wild geranium, ragweed, Queen Anne’s Lace, skunk cabbage, pokeweed, common violets, dandelions, clover, goldenrods, as well as those not as well known. Examples of such are jewelweed, trillium, purslane, turtleheads, spotted Joe-Pye-weed, and Indian pipe. Some residents reported that species that appeared in years past (such as Pink Lady’s Slipper) are no longer observed.

Japanese knotweed, poison ivy, and Virginia creeper are invasive species complained about by many residents.

10.0 ENVIRONMENTAL QUALITY

The environmental quality experienced in our everyday life is affected by many man-made conditions. These conditions impact the quality of life within our community and the region.

10.1 Nonpoint Source Pollution

Like many other communities located in heavily populated, developed, and industrialized New Jersey, Cedar Grove has a number of sources of pollution. There are known and potential ("point") sources of pollution, which may be regulated by the state or federal government, and there are "nonpoint sources" of pollution. Nonpoint source pollution is called "nonpoint" because it cannot be traced back to a single point such as a discharge pipe from an industrial operation.

Much of this nonpoint source pollution is carried by snowmelt and storm water runoff from roads and highways, commercial, industrial and construction sites, farms and gardens, lawns, and paved or impervious surfaces (including sidewalks, roads, driveways, parking lots, and roofs). This runoff may travel overland, seep into the soil, or be carried through storm sewers. The water moving over the landscape picks up pollutants such as hydrocarbons, heavy metals, oil, organic and inorganic debris, sediment, lawn and garden pesticides and fertilizers, and animal wastes. Examples of nonpoint source polluting activities include: washing cars; using pesticides and fertilizers on lawns and gardens; salting roadways, driveways, and walkways; and improperly disposing of motor oil and household chemicals.

It has become clear that nonpoint sources of pollution are a major cause of water pollution. Nonpoint source pollution may be the biggest threat to ponds, creeks, lakes, streams, rivers, bays, and even the ocean. In fact, throughout the United States, it is estimated that nonpoint source pollution accounts for over half of the nation's water pollution. It threatens our aquatic and marine life, as well as species that feed on aquatic and marine life. Nonpoint source pollution impinges on recreational activities, the fishing industry, impacts negatively on tourism, and most importantly - drinking water supplies. Ultimately the cost of this pollution is paid by every New Jersey resident (in clean-up, filtering costs, etc.).

Nonpoint source pollutants are usually carried by rainwater directly into waterways, or indirectly through storm drains and sewers. Pollutants also leach through the soil into groundwater supplies. The EPA (Environmental Protection Agency) has listed major sources of nonpoint

pollution. (https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/what-nonpoint-source) Communities are urged to reduce the pollution from these sources. For instance, hazardous chemicals or pollutants should not be poured down indoor drains, toilets, or used near or poured down storm drains, sewers, or waterways.

Additional sources of non-point source pollution include: litter, household hazardous products (i.e., paint thinners, oven cleaners, moth balls, drain cleaners), motor oil, car washing (especially using detergents that contain phosphates), pet waste (which pollutes water resources with fecal coliform bacteria and other organisms), salting of roadways, sidewalks and parking lots, poorly maintained septic systems, lawn and garden fertilizers (which contain nitrates and phosphates and cause algae blooms), pesticides, and open containers and exposed materials at construction sites or at commercial, industrial or municipal facilities.

Pesticides pose a serious concern in terms of pollution. Pesticide use is increasing throughout the United States. Major users in New Jersey include farmers, golf course managers, and homeowners. According to the NJDEP, several million pounds of pesticides are used in New Jersey annually, about half of which is used on lawns and gardens. Pesticides drift when applied and can be detected far from the target area. Pesticides are found in surface water, groundwater, and even in rain and fog.

Many pesticides are persistent, whether in buildings, soil, water, or air. Pesticides that may have been applied decades ago to the farms and orchards in Cedar Grove may persist in the environment today and well into the future.

These pesticides can be absorbed through the skin, ingested (food or water), or inhaled. Pesticides can have acute effects (e.g., rashes, headaches, flu-like symptoms) and /or chronic long-term effects (e.g., various cancers, especially non-Hodgkins lymphoma, leukemia, and brain tumors, as well as reproductive effects, endocrine disrupting effects, neurological effects, immunological problems). Studies have shown that fat tissue in humans and wildlife contains pesticide residues (this is known as bioaccumulation.) Pesticides have been detected in human amniotic fluid, blood, urine, fat, and breastmilk. Children, developing fetuses, sick individuals, and the elderly are potentially the most vulnerable to health impacts from exposure to pesticides.

Similarly, studies have found many effects of pesticides and toxins (e.g., PCBs and mercury) in fish and other aquatic life throughout the United States. There are freshwater fish advisories throughout New Jersey generally advising children, pregnant women, and women of childbearing age not to eat certain fish or to severely limit fish consumption. Fish caught locally in the Peckman River should not be consumed. (http://www.nj.gov/dep/dsr/njmainfish.htm)

As noted previously, fertilizers pollute water resources due to their concentration of nitrates and phosphates. Carried into ponds and waterways through stormwater run-off, heavy nitrate/phosphate loadings are responsible for algal blooms, which in turn can lead to fish kills due to eutrophication (or depletion of oxygen from the water supply). Thus it is important to not overuse fertilizers (limit to once a year), and to use slow-release, low nitrogen fertilizers.

The NJDEP outlines many other ways that individuals can reduce non-point source pollution. Hazardous household products and waste should be disposed at designated sites during Household Hazardous Waste Collection Days, such as those held by the County of Essex. Used motor oil, car fluids, litter, or hazardous products should not be disposed down storm drains, which discharge to local surface water bodies (such as the Peckman River) or on the ground. Non-phosphate detergents should be used to wash cars; many commercial car washes now recycles waste water. Pet owners should pick up after pets, and should dispose of wastes in the garbage or toilet. Septic systems should be inspected annually and pumped out every three years depending on use. Neither grease, solid waste, nor household hazardous chemicals should be discharged into septic systems, or to the Township wastewater system. Operators should not keep open containers or exposed materials at construction sites, or at commercial, industrial or municipal facilities. All chemicals and other hazardous materials should be properly stored, used and disposed. More information is at the EPA non-point source pollution site (https://www.epa.gov/nps) and the NJDEP page on watershed information (http://www.nj.gov/dep/watershedrestoration/info.html).

Communities can reduce nonpoint source pollution through watershed protection activities and educational programs. A watershed is the area of land that drains into a body of water such as a river, lake, stream, or bay. Protecting a watershed could involve a variety of activities and/or regulatory requirements. Examples include protecting vegetative stream corridor buffers via setback regulations, reducing stormwater runoff (and non-point pollution) by limiting zoning allowances for impervious coverage, requiring that stormwater management plans incorporate

Best Management Practices, restricting clearing of vegetation on steep slopes and monitoring and maintaining streams and other water bodies. Residents and business operators need to be educated and encouraged to understand the daily role they play in protecting the Township's water resources.

10.1.1 Integrated Pest Management (IPM)

The NJDEP encourages the use of Integrated Pest Management (IPM) or even organic pest control to reduce the use of pesticides and fertilizers. IPM is a system of reducing pest problems by using cultural, biological, mechanical, and chemical pest control methods. The emphasis is on monitoring for and preventing pests, and doing "spot treatments" rather than applying pesticides on a broad scale or routinely. Also, IPM stresses using alternatives to pesticides (e.g., baits, traps, weeding by hand) whenever possible and "treating only as needed with the least-toxic method." Both the Township and the Cedar Grove School District employ these methods. As of 2004, it became mandatory for NJ schools to use Integrated Pest Management on school properties and grounds (the 2002 NJ School Integrated pest Management Act). The NJDEP discusses the NJ School Integrated Pest Management Program at its site http://www.nj.gov/dep/enforcement/pcp/pcp-ipm.htm.

10.2 Known Contaminated Sites

The NJDEP maintains a listing of sites that are known to be contaminated and require some degree of remediation (http://www.nj.gov/dep/srp/kcsnj/). The NJDEP updates the listing of known contaminated sites (KCS) every few years. As of 2016, 17 sites in Cedar Grove are listed due to contamination from industrial, underground storage tank and/or disposal facility discharges.

An up-to-date list of the known contaminated sites can be viewed on the NJDEP website, under the Site Remediation Program (www.state.nj.us/dep/srp/kcs-nj). A search can be conducted by municipality.

Areas that the NJDEP permits for a certain duration to exceed the published ground-water quality standards are known as Classification Exception Areas (CEAs). One such area is mapped in Cedar Grove as of 2001. This CEA is associated with an industrial operation located east of the Peckman River, along Little Falls Road. The ground-water contamination is due to an unpermitted industrial release that is undergoing natural remediation.

10.3 Air Quality

The air quality in Cedar Grove is affected by local as well as regional factors. Automotive exhausts and burning of fossil fuels contributes significantly to this pollution. New Jersey receives significant air pollution from power plants in the Midwest. During colder months, smoke generated from wood-burning fireplaces sends particulates into the air. In a residential neighborhood, even oven exhaust from a restaurant can be a nuisance.

Certain industrial and other air-pollution sources are regulated by the state or federal government. Operators must obtain permits to emit a certain volume of air contaminants on an annual basis. These emissions can be tracked on state and federal internet sites.

The Clean Air Act requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are found all over the United States. They are particle pollution (often referred to as particulate matter), photochemical oxidants and ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These pollutants can harm your health and the environment, and cause property damage. EPA calls these pollutants "criteria" air pollutants because it sets NAAQS for them based on the human health-based and/or environmentally-based criteria (characterizations of the scientific information).

Nationally, the Air Quality Index, or AQI, is a measure of the level of pollution that is present, thus an index for reporting daily air quality. The AQI focuses on health effects that may be experienced within a few hours or days after breathing polluted air. The EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. The EPA does not report lead levels on a continuous basis since the collection and analysis of these samples is more involved. The EPA has established national air quality standards for these pollutants. The EPA “Air Now” site https://airnow.gov/index.cfm?action=aqibasics.aqi also has a search function (using zip codes) for daily local air quality.

Carbon Monoxide

Carbon monoxide (CO) is a colorless and odorless gas, formed when carbon in fuel is not burned completely. It is a byproduct of motor vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide. High concentrations of CO generally occur in areas with heavy traffic congestion.

Other sources of CO emissions include industrial processes, non-transportation fuel combustion, and natural sources such as wildfires. Carbon monoxide enters the bloodstream through the lungs and reduces oxygen delivery to the body's organs and tissues. Carbon monoxide weakens the heart's contractions and lowers the amount of oxygen carried by the blood. It can cause nausea, dizziness, headaches, and when very concentrated, even death. Visual impairment, reduced work capacity, reduced manual dexterity, poor learning ability, and difficulty in performing complex tasks are all associated with exposure to elevated CO levels.

CO levels are dangerous too in indoor air environments. Toxic levels can build up due to faulty heating system exhaust systems. Household detectors, required by Ordinance in Cedar Grove, can prevent fatalities.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a reddish brown, highly reactive gas that is formed in the ambient air through the oxidation of nitric oxide (NO). Nitrogen oxides (NOx), the term used to describe the oxides of nitrogen, play a major role in the formation of ozone, particulate matter, haze and acid rain. The major sources of man-made NOx emissions are high-temperature combustion processes, such as those occurring in automobiles and power plants.

Short-term exposures to low levels of NO_2 may lead to changes in airway responsiveness and lung function in individuals with pre-existing respiratory illnesses and increases in respiratory illnesses in children. Long-term exposures to NO_2 may lead to increased susceptibility to respiratory infection and may cause permanent alterations in the lung.

Ozone

Ground-level ozone is the primary constituent of smog. Ozone is not emitted directly into the air but is formed by the reaction of volatile organic compounds (VOCs) and NOx in the presence of high temperatures and strong sunlight. VOCs and NOx are emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer and commercial products, and other industrial sources. Ozone irritates the lungs and breathing passages, causing coughing and pain in the chest and throat. It increases susceptibility to respiratory infections and reduces the ability to exercise. Long-term exposure may lead to scarring of lung tissue and lowered lung efficiency.

Ozone also affects vegetation and ecosystems, leading to reductions in agricultural and commercial forest yields, reduced growth and survivability of tree seedlings, and increased plant susceptibility to disease, pests, and other environmental stresses.

Particulate Matter

Particulate matter (PM) is the general term used for a mixture of solid particles and liquid droplets found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that the particulates can be detected only with an electron microscope.

PM can be emitted directly or form secondarily in the atmosphere. The chemical composition of particles depends on location, time of year, and weather. Airborne particles can impact vegetation and ecosystems, reduce visibility, and can cause damage to paints and building materials. When inhaled, particles can accumulate in the respiratory system aggravating existing heart and lung diseases, causing changes in the body's defenses against inhaled materials, and damaging lung tissue. Chemicals in and attached to particulates can also be toxic. Very fine particulates can be inhaled deeply into the lungs.

Sulfur Dioxide

Sulfur dioxide aggravates existing lung diseases, especially bronchitis. This pollutant constricts the breathing passages and causes wheezing, shortness of breath, and coughing. High levels of particulates appear to worsen the effect of sulfur dioxide, and long-term exposures to both pollutants leads to higher rates of respiratory illness. Power plants, large industrial facilities, diesel vehicles, and oil-burning home heaters generate sulfur dioxide.

Lead

In the past, automotive sources were the major contributor of lead emissions to the atmosphere. As a result of EPA's regulatory efforts to reduce the content of lead in gasoline, air emissions of lead from the transportation sector have declined over the past decades. Continuing contamination due to these historical lead emissions can be a concern in our local environment, particularly along transportation corridors and on or adjacent to properties where idling vehicles were common. Lead lingers for a long time in soil, and can be taken up by plants including vegetables grown in home gardens.

Today, industrial processes, primarily metals processing, are the major sources of lead emissions to the atmosphere. The highest air concentrations of lead are found in the vicinity of smelters and battery manufacturers. Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food, water, soil, or dust. It accumulates in the blood, bones, and soft tissues. Lead can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as lowered IQ, seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ. Studies also show that lead may be a factor in high blood pressure and subsequent heart disease. Lead can also be deposited on the leaves of plants, presenting a hazard to grazing animals.

10.3.1 Sources of Air Toxics

The USEPA has prepared a comprehensive list of air toxics emissions for the entire country – the ongoing National Air Toxics Emissions Inventory or NATA (https://www.epa.gov/national-air-toxics-assessment). The 2005 inventory for New Jersey (the most recent inventory) indicates that non-point area sources account for 31% of air toxics. Mobile sources as a group are the largest contributor to air toxics, with on-road vehicles representing 33%, and non-road mobile 29% of the whole state inventory (this is not including emissions of diesel particulate matter). The point source group accounts for the remaining 7% of the inventory. Total emissions for the state add up to 67,370 tons per year. Since Essex County is so densely populated, it is not

surprising that it has the 4th highest levels of air toxics emissions from these sources in the state.

Concentrations of some air toxics are dominated not by local emissions, but by atmospheric transformation (or secondary formation) and by what USEPA refers to as “background estimates”.

Background concentrations can be attributed to long-range pollutant transport, unidentified emission sources and past emissions. A detailed description of how USEPA came up with these "background concentrations" can be found on USEPA's NATA web site. Six toxics of concern for NJ in the most recent NATA for which the estimated statewide average background concentrations are higher than their respective health benchmarks are: arsenic compounds, benzene, 1,3-butadiene, carbon tetrachloride, chloroform, and methyl chloride. (http://www.nj.gov/dep/airtoxics/sourceso05.htm)

The Point, Area, and Mobile Sources are grouped accordingly:

- Area Sources:
    - Solvent Use (such as coating cans, cleaning metal parts, and dry cleaning)
    - Industrial Processes (such as small chemical manufacturing plants, bakeries, and making scrap metal into new product)
    - Waste Disposal, Treatment and Recovery (including wastewater treatment and various types of waste incineration)
    - Stationary Source Fuel Combustion (including power plants, industrial and commercial boilers, and home heating)
    - Storage and Transport (including gas stations and large gasoline terminals)
    - Miscellaneous Sources (such as wildfires, structure fires, and crop orchard heaters)

- Mobile Sources:
    - On-road vehicles (cars and trucks)
    - Non-road vehicles (lawnmowers, leaf blowers, construction vehicles, etc.)

- Point Sources: this list does not include many types of sources that are commonly referred to as “point sources” in New Jersey, such as power plants:
    - Refineries
    - Municipal or County Waste Incinerators
    - Toxic Waste Treatment, Storage & Disposal Facilities (known as TSDFs)

- Toxic Release Inventory (TRI) Sources (those facilities that are required to report their emissions under the SARA Right-to-Know program)
- Other Point Sources (that have reported emissions under other state and federal programs)

NJDEP measures outdoor concentrations of air toxics at four monitoring sites in New Jersey. They are located in Camden, Elizabeth, New Brunswick, and Chester. The Camden site has been measuring several toxic volatile organic compounds (VOCs) since 1989. The Elizabeth site began measuring VOCs in 2000, and the New Brunswick and Chester sites became operational in July 2001. Also in July 2001, analysis for toxic metals began at all four sites. Air toxics monitoring data summaries and comparisons can be found at the NJDEP Air Toxics in NJ site http://www.nj.gov/dep/airmon/airtoxics/Monitor.htm.

10.4 Community Noise

Noise and air pollution are our most ubiquitous environmental problems. Sound refers to audible pressure waves in air. Noise is unwanted sound. Community noise interferes with communication and with thought processes. Community noise interferes with sleep, it causes anger and frustration, and has been implicated in psychological and physiological problems. Noise detracts from the quality of life - therefore noise impacts need to be considered in development applications. The EPA includes noise pollution as part of the Clean Air Act (https://www.epa.gov/clean-air-act-overview/clean-air-act-title-iv-noise-pollution).

Community noise levels are measured in A-weighted decibels to approximate the frequency-dependence of human hearing. Noise level in decibels (dB) is defined by

$$L = 10 \lg[p_{rms}^2 / p_{ref}^2]$$

where lg = base-10 logarithm
p_{rms}^2 = mean square sound pressure
p_{ref} = reference pressure, roughly the threshold of hearing

Day-night sound level (DNL) is the preferred metric for community noise. DNL is based on an energy average over a 24-hour period, where nighttime noise (10 pm to 7 am) is weighted by adding 10 to measurements or predictions. Nighttime weighting takes sleep interruption into account.

10.4.1 Transportation-Associated Noise

The day-night sound level contribution of aircraft noise is based on the number of flights, altitude, and aircraft type. Each event (i.e., each aircraft flyover) may cause sleep interruption or speech interference. If the number of flyovers is doubled, the DNL increases by about 3 dB.

Newark Liberty, Teterboro, and Essex County airports contribute to aircraft noise in our region. Helicopters are particularly annoying because of the blade-slap component of helicopter noise. Helicopter flight elevation is not regulated. Aircraft noise alone results in a day-night sound level (DNL) of 46 to 48 dB in the Township of Cedar Grove.

Surface transportation also contributes significant noise pollution. Railroads produce intermittent annoyance in the northern section of Cedar Grove, but the travel and horn noise is propagated throughout much of the Township. Road transportation is a greater problem in the Township, particularly in the vicinity of Pompton Avenue (also called State Highway 23).

Heavy trucks are particularly noisy. At low speeds, the sound contribution of a typical heavy truck is 15 decibels higher than an automobile. The noise of one truck, therefore, equals the noise of about 32 autos. Some trucks have exhaust stacks as high as 13 feet. Moreover, their lower frequency sound waves bend over and around barriers and penetrate buildings. Autos and motorcycles with worn or intentionally noisy mufflers are also a problem.

Based on measurements and modeling, we can estimate a day-night sound level (DNL) of 65 to 67 Db at about 100 feet from the centerline of Pompton Avenue. Highway noise is reduced about 4.5 dB for each doubling of distance between the source and observer. Estimated DNL is 69 to 72 dB at 50 feet from the roadway centerline and 60 to 63 dB at 200 feet. Intervening structures reduce this level in many areas.

10.4.2 Other Noise Sources

Other objectionable noise sources include industrial operations, vehicle idling, leaf blowers, lawn mowers, fans in commercial buildings, all-terrain vehicles, loud radios, and public address systems.

10.4.3 Possible Solutions to Noise Pollution in Cedar Grove

Consideration can be given to the following steps to lessen noise impacts:

- Controlling motor vehicle noise at the source. Truck operators can reduce noise by using best-available mufflers, restricting vehicle idling, and some other modifications.
- Enforcing noise standards for trucks and motorcycles.
- Encouraging common courtesy with regard to hours of garden equipment use.
- Measuring potential noise violations with calibrated instruments.

11.0 OPEN SPACE AND RECREATION

In April 2001, the Planning Board adopted the Open Space and Recreation Element of the Cedar Grove Master Plan. The plan, prepared by the then existing Cedar Grove Open Space Trust Fund Committee, provided a summary of open space within the Township, and the goals for open space preservation. The Plan is based on the belief that "preservation of open space is necessary to maintain the character of the community, to address the recreational needs of the citizens, to protect the natural resources, and to preserve the existing physical characteristics of the Township."

11.1 Existing Open Space & Recreational Facilities

As of 2016, the lands that are dedicated to open space and recreation in the Township of Cedar Grove total approximately 276 acres. A summary of the acreage follows:

	Developed Open Space (Acres)	Undeveloped Open Space (Acres)	Total Open Space (Acres)
Municipal	73.1	4.0	77.1
Township Schools	49.0		49.0
Essex County	20.0	140.8	160.8
Totals	**142.1**	**144.8**	**286.9**

Details on the individual properties making up the summary of dedicated open space are presented in the Cedar Grove Open Space and Recreation Plan. That listing includes parcels owned and operated by Essex County that serve on both a County and regional basis. In addition, the total acreage incorporates an estimate of all recreational land areas belonging to the public school system, access to which is by permit issued by the Board of Education.

The largest town parks in Cedar Grove are the centrally located **Cedar Grove Community Park**, which is the site of the community pool, bath house, picnic area, sports field, playground area, tennis courts; the nearby tennis and basketball courts (commonly known as **Bowden Courts**), and **Morgan's Farm**, for a combined total of 53.5 acres. Two other town parks are pocket parks: **Tranquility Park** (1.9 acres), which is located by Birch and Highland Roads, and **Oak Drive Pocket Park** (2.1 acres) and is located on Oak Drive. Two other parks are mainly

used for their sports playing fields: **George Street Park** (8.9 acres) on George Street, and **Panther Park** (10.7 acres) on West Bradford Avenue. Total township park area is acres.

The **New Jersey Audubon Society** owns 5.1 acres of undeveloped land on Tiffany Court. Essex County has several parks throughout the town: the **West Essex Park** (18.0 acres - a linear park about 50 feet wide throughout that was built on a former railroad bed), **Mills Reservation** (140.8 acres), which is popular with both hikers and birders, and, and **Blasi Field** (2.0 acres, which is solely used as a baseball field). **Hilltop Reservation** is a nature preserve of 284.16 acres, of which a large part is located in Cedar Grove. A new county park, called **Essex County Cedar Grove Park**, was opened in late 2016. It is 77 acres in size, with asphalt paved walking paths and a community center called the Essex County Robert O'Toole Community Center (in honor of former Cedar Grove Mayor and Councilman Robert O'Toole). One walking path connects to the West Essex Park trail at its closest point via a short path – this is because the two parks are adjacent.

12.0 TRAILS

Trails provide low-impact recreation to residents of all ages and physical abilities. There are a number of trails in Cedar Grove - both Cedar Grove and Essex County trails. The most popular is the Essex County linear park called the West Essex Trail. This trail crosses all the way through the township, from Verona to the Little Falls border. The trails in Cedar Grove are used by both groups and individuals of all ages, and use is increasing yearly.

It must be pointed out that abuse and non-management can lead to environmentally detrimental conditions and decrease the safety of such trails. Trail management so far has largely fallen on volunteers, but in 2016 Essex County spent time and effort repairing and cleaning up the West Essex Trail.

12.1 The Lenape Trail

The Lenape Trail is a significant Cedar Grove environmental resource. A section of the Lenape Trail runs along the most of the West Essex Trail, joining with it at Arnold Way in Verona, and following it to just beyond Bowden road in Cedar Grove, where it turns off to the east. The Lenape trail is a walking and biking trail that winds throughout Essex County, and passes through many county and municipal parks. The Cedar Grove portion of the popular trail is used daily for walking and jogging, and in winter even cross-country skiing. The section of the Lenape Trail that runs along the former railroad (West Essex Trail) is also suitable for bicycling. A trail map of Cedar Grove showing the course of the Lenape Trail and its branches is available online (Attachment B).

12.1.1 Environmental and Health Aspects of Trail Use

Trail use includes environmentally-friendly activities that may be recreational or may involve errand trips such as going to a store, to school, or to a meeting. Use of the Lenape Trail can reduce automobile use, thus saving natural resources and reducing pollution. The presence of the Lenape trail encourages healthful exercise. A Federal report, the *National Bicycling and Walking Study*, notes that:

> "The beneficial effect of regular physical activity on health is far reaching, and its role in prevention and management of coronary heart disease, hypertension, obesity, diabetes, osteoporosis, and depression is well established. Physical activity can also help individuals in correction of certain health-impairing behaviors such as cigarette smoking and alcohol abuse. Bicycling and walking are ideal forms of exercise to accomplish all of

these positive outcomes, and can contribute to the current national goal or reducing the costs of health care."

12.1.2 Trail characteristics

The main route of the Lenape Trail through Essex County is about 30 miles long, extending from downtown Newark to the town of Millburn. There are about 11 additional miles of side trails. Completed and proposed sections of the trail traverse county parks, municipal parks, property owned by or dedicated to utility rights-of-way (PSEG), municipal reservoir property, private land (including conservation easements), and on sidewalks. Most of the trail has a dirt or stone surface. The trail is marked with yellow blazes.

Part of the Lenape Trail overlaps the West Essex Trail (an Essex County linear park) in Cedar Grove. The Lenape Trail extends several miles on the roadbed of the abandoned Caldwell Branch of the Erie Lackawanna Railroad. The linear park is 50 feet wide or wider over virtually its entire length. However, some encroachment has been noted. The northern section of this trail is named the 1890 Branch of the Lenape Trail, recognizing the date the railroad was constructed.

The NJ Conservation Foundation owns the part of the Caldwell Branch north of Cedar Grove. That section is also available for non-motorized recreational use.

12.2 Branches of the Lenape Trail

Currently, there are two branches of the Lenape Trail in Cedar Grove. These were named locally: The 1890 Branch; and, the 1775 Branch. Other, unnamed and unmarked trails exist within the Township, several of which are not in use, but – due to increased interest – may be re-established.

12.2.1 The 1890 Branch

The 1890 Branch can be hiked or bicycled by following the abandoned railroad bed east of Bowden Road. The 1890 Branch crosses Francesco Avenue in Little Falls and ends where the abandoned railroad joins the active railroad.

12.2.2 The 1775 Branch

The 1775 Branch begins at the colonial cemetery and Morgan Farm at Pompton Avenue and Commerce Road. The trail is blazed through the Township property, on Old Orchard Court, and on Little Falls Road to the Community Pool road. The trail then follows the foot path past the pool joining the main trail on the abandoned railroad.

12.3 Trail Development

The trail proposal and most of the actual trails were developed by volunteers, with sponsorship and assistance from the Association of NJ Environmental Commissions (ANJEC), NJ Conservation Foundation, the Essex County Parks Commission (now the Department of Parks, Recreation & Cultural Affairs), and the Sierra Club. Volunteers maintain the existing trails.

The Lenape Trail proposal and its implementation received the support of many governmental and institutional officials and organizations. Governmental support includes: the Essex County Planning Board; the mayor and/or township council or commissions of Caldwell, Verona, West Orange, Montclair, Cedar Grove, and Roseland; the Environmental Commissions or Environmental Advisory Committees of Cedar Grove, West Caldwell, West Orange, and Caldwell; and the Recreation Departments of Newark, Belleville, Cedar Grove, and Livingston.

The Cedar Grove *Master Plan Reexamination Report* identifies the existing location of the Lenape Trail and the 1890 Trail, as well as the existing and proposed location of trails that traverse the Hilltop property. The report recommends: "… that these trails be properly maintained and preserved to serve local recreation, environmental and circulation needs."

12.4 Missing Trail Links

There are some discontinuities in the trail. Linking sections of the Lenape Trail is critical to encouraging use. The County property in Cedar Grove, Verona, and North Caldwell (the Hilltop Reservation) is the key to linking the existing trail in Cedar Grove and Verona to the parts of the trail to the west. In Cedar Grove, the bridges over the Peckman River and Pompton Avenue (State Highway 23) are important to the trail, especially with access stairs to the bridge over Pompton Avenue.

12.5 Links to Other Trails

The Lenape trail is linked to the Patriots' Path, a hiking trail in Morris County. The Liberty-Water Gap Trail was completed in 2011 and it provides a walking linkage that crosses New Jersey from Liberty State Park to the Delaware Water Gap. The Liberty-Water Gap Trail includes most of the Lenape Trail (including the Cedar Grove part), the Patriots' Path, the Sussex Branch Trail, and the Paulinskill Valley Trail.

13.0 TRANSPORTATION

It is estimated that more than 80% of the working population of Cedar Grove uses private automobiles for transportation. Others use one of the bus services, walk to work, or work at home. Pompton Avenue (a.k.a. State Highway 23) bisects Cedar Grove and is the most heavily traveled road in the Township, serving about 35,000 vehicles per 24-hour day. Most other heavily traveled streets are part of the Essex County road system. That system, which includes about ten miles of roads, includes East Bradford Avenue (the second most heavily traveled), Ridge Road (the third), and Fairview Avenue.

Several bus lines and numerous taxi and limousine services are available in the Township. Dial-A-Ride serves senior citizens and disabled residents Monday through Friday. It picks up residents at their place of residence and brings them to various stores or shopping malls according to a daily schedule ("curb to curb"). There is also a Medical Transportation service available to bring residents to physicians, dentists, physiotherapy and medical appointments in the West Essex area, including Mountainside and Saint Barnabas Hospital for a small fee.

New Jersey Transit's bus line between Willowbrook Mall (Wayne, NJ) and New York City (Port Authority Bus Terminal) passes daily through the Township on Pompton Avenue and Ridge Road and makes numerous stops on those streets. There is also daily New Jersey Transit bus service between Cedar Grove (numerous stops on Pompton Avenue) and Newark, NJ (Broad Street at Raymond Blvd.). Some bus stops, but not all, have a protective bus shelter.

Over the past decade there has been a renewed interest in walking and bicycling in Cedar Grove. Measures taken to make Cedar Grove a "pedestrian friendly community" and also to improve bicyclist safety would improve the quality of life in Cedar Grove. Not only would this be good for human health, but would also be good for the environment by reducing air and noise pollution, and decrease traffic. Local activities to improve pedestrian safety and convenience can be coordinated throughout the Township and the region.

13.1 Strategies for a Pedestrian-Friendly Community

There are many steps that the Township, developers and redevelopers can take to improve pedestrian access and opportunity within Cedar Grove. These steps may help to reverse the trend toward physical inactivity by making our streets safer and more convenient for walking and

bicycling. These improvements would dovetail with planned improvements to the downtown business district and the revitalization of this area.

- Creating well-marked crosswalks
- Adding pedestrian crossing lights, and increasing the timing of traffic signals to allow for pedestrian crossings at key intersections (improvements important to children, senior citizens, and those with packages and infant strollers)
- Using removable center-of-street yield signs
- Requiring sidewalks in all new developments
- Requiring sidewalks as a condition for permits for business, commercial and certain residential renovations
- Formulating a program to add sidewalks to existing streets
- Implementing a policy that puts sidewalks and other pedestrian enhancements ahead of projects primarily aimed at improving motor vehicle travel
- Add enhancements such as bicycle racks and benches in some locations
- Assuring that pedestrian traffic is unimpeded during building construction or land development
- Joining in programs that instill respect for and awareness of pedestrians
- Strictly enforcing traffic laws, particularly those affecting to pedestrian safety.

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http://www.climatecentral.org/ (Information on climate change in NJ and throughout the US)

www.epa.gov/ (Environmental Protection Agency)

https://www.epa.gov/criteria-air-pollutants (The US EPA: Air Pollutants)

https://www.epa.gov/nps (The US EPA: non-point source pollution)

http://www.njaqinow.net/ (NJ DEP Bureau of Air Monitoring – air quality)

http://www.nj.gov/dep/landuse/fww/fww_main.html (Wetlands)

http://www.nj.gov/dep/srp/kcsnj/ (Known Contaminated Sites listing)

http://www.nj.gov/dep/watershedrestoration/info.html (Non-point source pollution)

www.state.nj.us/dep/ (NJ Department of Environmental Protection)

http://www.state.nj.us/dep/airmon/airtoxics/ (Air toxics in NJ)

ATTACHMENT A
WILDLIFE AND VEGETATION

SECTIONS:

BIRD SPECIES

MAMMAL SPECIES

REPTILES AND AMPHIBIANS

BUTTERFLIES

VEGETATION – TREES, SHRUBS, VINES, HERBACEOUS PLANTS

CEDAR GROVE BIRD SPECIES

The following is a list of bird species observed or likely to occur in Cedar Grove. The birds may be residents, visitors, or migrants, and may or may not breed in this area. The list was compiled from surveys completed by Cedar Grove residents in 2000 and 2016, a study of the Hilltop portion of Cedar Grove prepared by Wander Ecological Consultants in 1995, a report of the Cedar Grove Hilltop area prepared by Dr. John H. Crow in 1995, the NJ Audubon Society (2016), as well as NJ DEP's Division of Fish and Wildlife 2016 list of birds found in New Jersey (http://www.nj.gov/dep/fgw/chkbirds.htm).

Birds actually observed in Cedar Grove are written in boldface. Several of the birds are labeled by NJ as Endangered (Bald Eagle, Northern Goshawk, Northern Harrier, Red-shouldered Hawk) or Threatened (Cooper's Hawk, Long-eared Owl, Red-headed Woodpecker).

COMMON NAME	SCIENTIFIC NAME
Acadian Flycatcher	*Empidonax virescens*
American Crow	***Corvus brachyrhynchos***
American Goldfinch	***Carduelis tristis***
American Kestrel	***Falco sparverius***
American Redstart	*Setophaga ruticilla*
American Robin	***Turdus migratorius***
American Woodcock	*Scolopax minor*
Bald Eagle	***Haliaeetus leucocephalus***
Baltimore Oriole	***Icterus galbula***
Barn Swallow	***Hirundo rustica***
Bay-breasted Warbler	*Dendroica castanea*
Belted Kingfisher	***Ceryle alcyon***
Black-and-white Warbler	***Mniotilta varia***
Black-billed Cuckoo	*Coccyzus erythrophthalmus*
Black-capped Chickadee	***Parus atricapillus***
Black-throated Blue Warbler	*Dendroica caerulescens*
Black-throated Green Warbler	*Dendroica virens*
Blackburnian Warbler	*Dendroica fusca*
Blackpoll Warbler	*Dendroica striata*
Blue Jay	***Cyanocitta cristata***
Blue-gray Gnatcatcher	*Polioptila caerulea*
Blue-winged Warbler	*Vermivora pinus*
Broad-winged Hawk	*Buteo platypterus*
Brown Creeper	***Certhia americana***
Brown Thrasher	***Toxostoma rufum***
Brown-headed Cowbird	***Molothrus ater***
Canada Goose	***Branta canadensis***
Canada Warbler	*Wilsonia canadensis*
Cape May Warbler	*Dendroica tigrina*
Carolina Wren	***Thryothorus ludovicianus***
Cedar Waxwing	***Bombycilla cedrorum***
Cerulean Warbler	*Dendroica caerulea*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Chimney Swift	*Chaetura pelagica*
Chipping Sparrow	***Spizella passerina***

Common Grackle	***Quiscalus quiscula***
Common Nighthawk	***Chordeiles minor***
Common Raven	***Corvus corax***
Common Yellowthroat	***Geothlypis trichas***
Connecticut Warbler	*Oporornis agilis*
Cooper's Hawk	***Accipiter cooperii***
Dark-eyed Junco	***Junco hyemalis***
Downy Woodpecker	***Picoides pubescens***
Eastern Kingbird	*Tyrannus tyrannus*
Eastern Meadowlark	***Sturnella magna***
Eastern Phoebe	*Sayornis phoebe*
Eastern Screech-owl	***Otus asio***
Eastern Pewee	***Contopus virens***
European Starling	***Sturnus vulgaris***
Evening Grosbeak	***Coccothraustes vespertinus***
Fish Crow	*Corvus ossifragus*
Fox Sparrow	***Passerella iliaca***
Golden Eagle	***Aquila chrysaetos***
Golden-crowned Kinglet	*Regulus satrapa*
Golden-winged Warbler	*Vermivora chrysoptera*
Gray Catbird	***Dumetella carolinensis***
Gray-cheeked Thrush	*Catharus minimus*
Great Blue Heron	***Ardea herodias***
Great Crested Flycatcher	***Myiarchus crinitus***
Great Horned Owl	***Bubo virginianus***
Green Heron	***Butorides virescens***
Hairy Woodpecker	***Picoides villosus***
Herring Gull	***Larus argentatus***
Hermit Thrush	*Catharus guttatus*
Hooded Warbler	*Wilsonia citrina*
House Finch	***Carpodacus mexicanus***
House Sparrow	***Passer domesticus***
House Wren	***Troglodytes aedon***
Indigo Bunting	***Passerina cyanea***
Kentucky Warbler	*Oporornis formosus*
Killdeer	***Charadrius vociferus***
Least Flycatcher	*Empidonax minimus*
Long-eared Owl	*Asio otus*
Louisiana Waterthrush	*Seiurus motacilla*
Magnolia Warbler	*Dendroica magnolia*
Mallard	***Anas platyrhynchos***
Mourning Dove	***Zenaida macroura***
Mourning Warbler	*Oporornis philadelphia*
Nashville Warbler	*Vermivora ruficapilla*
Northern Cardinal	***Cardinalis cardinalis***
Northern Flicker	***Colaptes auratus***
Northern Goshawk	*Accipiter gentilis*
Northern Harrier	***Circus cyaneus***
Northern Mockingbird	***Mimus polyglottos***
Northern Oriole	***Icterus galbula***
Northern Parula Warbler	*Parula americana*

Northern Saw-whet Owl	*Aegolius acadicus*
Northern Waterthrush	*Seiurus noveboracensis*
Olive-sided Flycatcher	*Contopus borealis*
Orange-crowned Warbler	*Vermivora celata*
Ovenbird	***Seiurus aurocapillus***
Palm Warbler	*Dendroica palmarum*
Philadelphia Vireo	*Vireo philadelphicus*
Pileated Woodpecker	***Dryocopus pileatus***
Pine Siskin	*Carduelis pinus*
Pine Warbler	***Dendroica pinus***
Prairie Warbler	*Dendroica discolor*
Purple Finch	***Carpodacus purpureus***
Purple Martin	***Progne subis***
Red-bellied Woodpecker	***Melanerpes carolinus***
Red-breasted Nuthatch	***Sitta canadensis***
Red-eyed Vireo	***Vireo olivaceus***
Red-headed Woodpecker	***Melanerpes erythrocephalus***
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	***Buteo jamaicensis***
Red-winged Blackbird	***Agelaius phoeniceus***
Rock Dove	***Columba livia***
Rose-breasted Grosbeak	***Pheucticus ludovicianus***
Ruby-crowned Kinglet	***Regulus calendula***
Ruby-throated Hummingbird	***Archilochus colubris***
Rufous-sided Towhee	***Pipilo erythrophthalmus***
Rusty Blackbird	*Euphagus carolinus*
Scarlet Tanager	***Piranga olivacea***
Sharp-shinned Hawk	***Accipiter striatus***
Solitary Vireo	*Vireo solitarius*
Song Sparrow	***Melospiza melodia***
Swainson's Thrush	*Catharus ustulatus*
Tennessee Warbler	*Vermivora peregrina*
Tufted Titmouse	***Parus bicolor***
Turkey Vulture	***Cathartes aura***
Veery	*Catharus fuscescens*
Whip-poor-will	*Caprimulgus vociferus*
White-breasted Nuthatch	***Sitta carolinensis***
White-crowned Sparrow	***Zonotrichia leucophrys***
White-throated Sparrow	***Zonotrichia albicollis***
Wild Turkey	***Meleagris gallopavo***
Wilson's Warbler	*Wilsonia pusilla*
Winter Wren	*Troglodytes troglodytes*
Wood Duck	***Aix sponsa***
Wood Thrush	***Hylocichla mustelina***
Worm-eating Warbler	*Helmitheros vermivorus*
Yellow Warbler	***Dendroica petechia***
Yelllow-bellied Flycatcher	*Empidonax flaviventris*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Yellow-billed Cuckoo	*Coccyzus americanus*
Yellow-rumped Warbler	***Dendroica coronata***
Yellow-throated Vireo	*Vireo flavifrons*

MAMMAL SPECIES

The following is a list of mammal species observed or likely to occur (based on range and habitat) in Cedar Grove. All except certain bats and black bears are permanent residents. The list was compiled from surveys completed by Cedar Grove residents in 2000 and 2016, a study of the Hilltop portion of Cedar Grove prepared by Wander Ecological Consultants in 1995, a report of the Hilltop area prepared by Dr. John H. Crow in 1995, the NJ Audubon Society list of mammals (2016), and NJ DEP's Division of Fish and Wildlife 2016 list. Mammals actually observed in Cedar Grove are written in boldface. None of these are threatened or endangered.

COMMON NAME	**SCIENTIFIC NAME**
Big Brown Bat	***Eptesicus fuscus***
Black Bear	***Ursus americanus***
Coyote	***Canis latrans***
Eastern Chipmunk	***Tamias striatus***
Eastern Cottontail	***Sylvilagus floridanus***
Eastern Gray Squirrel	***Sciurus carolinensis***
Eastern Mole	***Scalopus aquaticus***
Hoary Bat	***Lasiurus cinereus***
House Mouse	***Mus musculus***
Little Brown Bat	***Myotis lucifugus***
Long-tailed Weasel	*Mustela frenata*
Masked Shrew	*Sorex cinereus*
Northern Short-tailed Shrew	***Blarina brevicauda***
Norway Rat	***Rattus norvegicus***
Raccoon	***Procyon lotor***
Red Bat	*Lasiurus borealis*
Red Fox	***Vulpes vulpes***
Southern Flying Squirrel	*Glaucomys volans*
Striped Skunk	***Mephitis mephitis***
Virginia Opossum	***Didelphis virginiana***
White-footed Mouse	***Peromyscus leucopus***
White-tailed Deer	***Odocoileus virginianus***
Woodchuck (Groundhog)	***Marmota monax***
Woodland Vole	***Microtus pinetorum***

REPTILES AND AMPHIBIANS

The following is a list of amphibian and reptile species observed or likely to occur in Cedar Grove. The list was compiled from surveys completed by Cedar Grove residents in 2000 and 2016, a study of the Hilltop portion of Cedar Grove prepared by Wander Ecological Consultants in 1995, a report of the Cedar Grove Hilltop area prepared by Dr. John H. Crow in 1995, the NJ Audubon Society list of amphibians and reptiles (2016), and the NJ DEP Division of Fish and Wildlife (2016). Species actually observed are written in boldface. The Wood Turtle is labeled as **threatened** by the state (New Jersey Department of Environmental Protection, List of Endangered and Threatened Wildlife, 2016).

COMMON NAME	**SCIENTIFIC NAME**
American Toad	*Bufo americanus*
Black Rat Snake	*Elaphe obsoleta*
Eastern Box Turtle	***Terrapene carolina***
Eastern Garter Snake	***Thamnophis sirtalis***
Eastern Milk Snake	*Lampropeltis triangulum*
Eastern Newt	***Notophthalmus viridescens***
Green Frog	*Rana clamitans*
Northern Black Racer	*Coluber constrictor*
Northern Brown Snake	*Storeria dekayi*
Northern Dusky Salamander	***Desmognathus fuscus***
Northern Ringneck Snake	*Diadophis punctatus edwardsi*
Northern Two-lined Salamander	*Eurycea bislineata*
Red-backed Salamander	*Plethodon cinereus*
Slimy Salamander	*Plethodon glutinosus*
Wood Turtle	***Clemmys insculpta***

BUTTERFLIES

The following is a list of butterfly species observed on the Cedar Grove portion of the Hilltop Reservation area on July 17 - 18, 1995 by Wander Associates. Common and scientific names are from *Checklist & English Names of North American Butterflies* (North American Butterfly Association, 1995). It is expected that other butterfly species common in the Mid-Atlantic region also live in the Cedar Grove area, but were not observed on those dates.

COMMON NAME	**SCIENTIFIC NAME**
Whites and Sulphurs	*Pieridae*
Cabbage White	***Pieris rapae***
Swallowtails	*Papilionidae*
Eastern Tiger Swallowtail	***Papilio glaucus***
Gossamer-wing Butterflies	*Lycaenidae*
Striped Hairstreak	***Satyrium liparops***
Eastern Tailed-Blue	***Everes comyntas***
Spring Azure	***Celastrina ladon***
Brush-footed Butterflies	*Nymphalidae*
Great Spangled Fritillary	***Speyeria cybele***
Eastern Comma	***Polygonia comma***
Mourning Cloak	***Nymphalis antiopa***
Little Wood-Satyr	***Megisto cymela***
Common Wood-Nymph	***Cercyonis pegala***
Monarch	***Danaus plexippus***
Skippers	*Hesperidae*
Silver-Spotted Skipper	***Epargyreus clarus***
Horace's Duskywing	***Erynnis horatius***
Northern Broken-Dash	***Wallengrenia egeremet***
Dun Skipper	***Euphyes vestris***

VEGETATION

New Jersey is in the Mid-Atlantic region of the United States and the forests are part of the eastern woodlands. Cedar Grove has a number of forest areas (Hilltop Reservation, Mills Reservation, along the Peckman River, by the reservoir, along trails, and town parks), as well as many cultivated lawns and gardens. The vegetation found in Cedar Grove is both native, especially in forested areas, and nonnative, especially plantings around homes and buildings for ornamental purposes.

Cedar Grove's undeveloped areas ("open space", especially forested areas) have a variety of tree, shrub, and herbaceous plant species, depending on where they are located (ridge top, on slopes, in wetlands, etc.). There are both native and nonnative species in these areas. Natural vegetation is a reflection of a site's climate, soils, topography, hydrology, history, and disturbance.

Common tree species found in forested areas such as the Hilltop area are: Oak (Red, White, Black, Chestnut, and Scarlet), American Beech, Tulip tree, Maple (Red and Sugar), Hickory (Shagbark, Mockernut, and Pignut), White Ash, Black Birch, Cherry (Black and Sweet), Sassafras, Black Locust, Elm (Slippery and American), Blackgum, Flowering Dogwood, American Hornbeam, Hop Hornbeam, sprouts of American Chestnut, Southern Catalpa, Tree-of-Heaven, and Red Mulberry. There are a wide variety of shrubs present such as: Maple-leaved Viburnum, Black Huckleberry, Late Low Blueberry, Witchhazel, Blackhaw, American Hazelnut, Japanese Barberry, Nannyberry, Spicebush, Sweet Pepperbush, Steeplebush, Common Elderberry, Winterberry, Dogwwods, Northern Arrowwood, Hercules-Club, European Buckthorn, Multiflora Rose, Black Raspberry, Allegheny Blackberry, Morrow Honeysuckle, Winged and Staghorn Sumacs, and Common Privet.

Many herbaceous plants are found growing in undeveloped areas of Cedar Grove. These include many native species including Solomon's Seal, Indian Pipe, various ferns, Jewelweed, Jack-in-the-Pulpit, Skunk Cabbage, Garlic Mustard, and Wild Geranium. However, many areas along stream banks (e.g., in Community Park) also have a problem with invasive Japanese Knotweed.

Much of Cedar Grove is developed and there are some species of plants that are very popular plantings throughout Cedar Grove. Some popular conifers that are planted throughout Cedar Grove are: Common Juniper (*Juniperus communis*), Eastern Red Cedar (*Juniperus virginiana*), Eastern Arborvitae (*Thuja occidentalis*), Norway Spruce (*Picea abies*), Colorado Blue Spruce (*Picea pungens*), Eastern White Pine (*Pinus strobus*), Balsam Fir (*Abies balsamea*), Canada Hemlock (*Tsuga canadensis*), and Yew (*Taxus baccata, Taxus x media*). Over the years tree and shrub species that were mentioned in the above list have been planted throughout the town, as well as some other popular ornamental tree and shrub species which include: Lilac (*Syringa vulgaris*), Euonymus (*Euonymus*), Rose of Sharon (*Hibiscus syriacus*), Forsythia (*Forsythia*), Mountain Laurel (*Kalmia*), Japanese Maple (*Acer palmatum*), Norway Maple (*Acer platanoides*), London Planetree (*Platanus x acerifolia*), and various species of Magnolia, Birch, Azaleas, Viburnum, and Rhodendrons.

The following pages are lists of trees, shrubs, vines, and herbaceous plants frequently encountered in Cedar Grove in undeveloped areas. The lists were compiled from surveys completed by Cedar Grove residents in 2000, a study of the Hilltop portion of Cedar Grove prepared by Wander Ecological Consultants in 1995, a report of the Cedar Grove Hilltop area prepared by Dr. John H. Crow in 1995, and the National Audubon Society list of vegetation

found in the Mid-Atlantic states (1999). It should be understood that these lists may not include all species found in undeveloped areas of Cedar Grove because all undeveloped areas were not surveyed.

TREES

COMMON NAME	SCIENTIFIC NAME
Willow Family	Salicaceae
Bigtooth Aspen	*Populus grandidentata*
Walnut Family	Juglandaceae
Black Walnut	*Juglans nigra*
Butternut Hickory	*Juglans cinerea*
Mockernut Hickory	*Carya tomentosa*
Shagbark Hickory	*Carya ovata*
Sweet Pignut Hickory	*Carya glabra*
Birch Family	Betulaceae
Black Birch	*Betula lenta*
Gray Birch	*Betula populifolia*
River Birch	*Betula nigra*
Eastern Hop Hornbeam	*Ostrya virginiana*
American Hornbeam	*Carpinus caroliniana*
Beech Family	Fagaceae
American Beech	*Fagus grandifolia*
American Chestnut	*Castanea dentata*
White Oak	*Quercus alba*
Chestnut Oak	*Quercus prinus*
Northern Red Oak	*Quercus rubra*
Black Oak	*Quercus velutina*
Scarlet Oak	*Quercus coccinea*
Pin Oak	*Quercus palustris*
Elm Family	Ulmaceae
American Elm	*Ulmus americana*
Slippery Elm	*Ulmus rubra*
Mulberry Family	Moraceae
Red Mulberry	*Morus rubra*
Magnolia Family	Magnoliaceae
Tuliptree	*Liriodendron tulipifera*
Laurel Family	Lauraceae
Sassafras	*Sassafras albidum*

Witch-Hazel Family	Hamaelidaceae
Sweetgum	*Liquidambar styraciflua*
Rose Family	Rosaceae
Black Cherry	*Prunus serotina*
Bird Cherry	*Prunus avium*
Serviceberry	*Amelanchier arborea*
Sweet Crab Apple	*Malus (Pyrus) coronaria*
Legume Family	Leguminosae
Black Locust	*Robinia pseudoacacia*
Linden Family	Tiliaceae
American Basswood	*Tilia americana*
Ailanthus Family	Simaroubaceae
Tree-of-Heaven	*Ailanthus altissima*
Maple Family	Aceraceae
Sugar Maple	*Acer saccharum*
Red Maple	*Acer rubrum*
Norway Maple	*Acer platanoides*
Dogwood Family	Cornaceae
Flowering Dogwood	*Cornus florida*
Tupelo Family	Nyssaceae
Blackgum	*Nyssa sylvatica*
Olive Family	Oleaceae
White Ash	*Fraxinus americana*
Green Ash	*Fraxinus pennsylvanica*
Bignonia Family	Celastraceae
Southern Catalpa	*Catalpa bignonoides*
Sycamore Family	Platanaceae
American Sycamore	*Platanus occidentalis*

SHRUBS

Willow Family	Salicaceae
Pussy Willow	*Salix discolor*
Birch Family	Betulaceae
American Hazelnut	*Corylus americana*
Barberry Family	Berberidaceae

Japanese Barberry	*Berberis thunbergii*
Common Barberry	*Berberis vulgaris*
Laurel Family	Lauraceae
Spicebush	*Lindera benzoin*
Witch-Hazel Family	Hamamelidaceae
Witch-Hazel	*Hamamelis virginiana*
Rose Family	Rosaceae
Multiflora Rose	*Rosa multiflora*
Black Raspberry	*Rubus occidentalis*
Allegheny Blackberry	*Rubus allegheniensis*
Prickly Dewberry	*Rubus flagellaris*
Steeplebush	*Spiraea tomentosa*
Cashew Family	Anacardiaceae
Smooth Sumac	*Rhus glabra*
Staghorn Sumac	*Rhus typhina*
Winged Sumac	*Rhus copallina*
Holly Family	Aquifoliaceae
Winterberry Holly	*Ilex verticillata*
American Holly	*Ilex opaca*
Staff Tree Family	Celastraceae
American Strawberry-bush	*Euonymus americanus*
Buckthorn Family	Rhamnaceae
European Buckthorn	*Rhamnus frangula*
Ginseng Family	Araliaceae
Hercules' Club	*Aralia spinosa*
Dogwood Family	Cornaceae
Silky Dogwood	*Cornus amomum*
Stiff Dogwood	*Cornus racemosa*
Sweet-Pepperbush Family	Clethraceae
Sweet-Pepperbush	*Clethra alnifolia*
Heath Family	Ericaceae
Late Low Blueberry	*Vaccinium angustifolium*
Highbush Blueberry	*Vaccinium corymbosum*
Deerberry	*Vaccinium stamineum*
Black Huckleberry	*Gaylussacia baccata*
Pink Azalea	*Rhododendron periclymenoides*
Mountain Laurel	*Kalmia latifolia*
Olive Family	Oleaceae
Common Privet	*Ligustrum vulgare*

Honeysuckle Family	Caprifoliaceae
Morrow Honeysuckle	*Lonicera morrowii*
Nannyberry	*Viburnum lentago*
Maple-Leaved Viburnum	*Viburnum acerifolium*
Blackhaw	*Viburnum prunifolium*
Northern Arrowwood	*Viburnum recognitum*
Common Elderberry	*Sambucus canadensis*

VINES

Lily Family	Liliaceae
Common Greenbriar	*Smilax rotundifolia*
Cashew Family	Anacardiaceae
Poison Ivy	*Toxicodendron radicans*
Staff Tree Family	Celastraceae
Oriental Bittersweet	*Celastrus orbiculatus*
American Bittersweet	*Celastrus scandens*
Grape Family	Vitaceae
Summer Grape	*Vitis aestivalis*
Cat Grape	*Vitis palmata*
Virginia Creeper	*Parthenocissus quinquefolia*
Bignonia Family	Bignoniaceae
Trumpet Creeper	*Campsis radicans*
Honeysuckle Family	Caprifoliaceae
Japanese Honeysuckle	*Lonicera japonica*

HERBACEOUS PLANTS

Arum Family	Araceae
Jack-in-the-Pulpit	*Arisaema triphyllum*
Skunk-Cabbage	*Symplocarpus foetidus*
Spiderwort Family	Commelinaceae
Asiatic Dayflower	*Commelina communis*
Lily Family	Liliaceae
Field Garlic	*Allium vineale*
False Solomon's Seal	*Smilacina racemosa*
Solomon's Seal	*Polygonatum biflorum*
False Hellebore	*Veratrum viride*
Canada Mayflower	*Maianthemum canadense*
Orange Daylily	*Hemerocallis fulva*
Yucca	*Yucca filamentosa*

Daffodil Family	Amaryllidaceae
Yellow Stargrass	*Hypoxis hirsuta*
Buckwheat Family	Polygonaceae
Sheep Sorrel	*Rumex acetosella*
Broad-Leaved Dock	*Rumex orbiculatus*
Lady's Thumb	*Polygonum persicaria*
Japanese Knotweed	*Polygonum cuspidatum*
Jumpseed	*Polygonum virginianum*
Curly Dock	*Rumex crispus*
Nettle Family	Urticaceae
Clearweed	*Pilea pumila*
False nettle	*Boehmeria cylindrica*
Pokeweed Family	Phytolaccaceae
Pokeweed	*Phytolacca americana*
Plantain Family	Plantaginaceae
Broad Leaved Plantain	*Plantago major*
English Plantain	*Plantago lanceolata*
Pink Family	Caryophyllaceae
Starry Campion	*Silene stellata*
Deptford Pink	*Dianthus armeria*
Common Chickweed	*Stellaria media*
Geranium Family	Geraniaceae
Wild Geranium	*Geranium maculatum*
Buttercup Family	Ranunculaceae
Wild Columbine	*Aquilegia canadensis*
Creeping Buttercup	*Ranunculus repens*
Mustard Family	Cruciferae
Common Winter Cress	*Barbarea vulgaris*
Field Peppergrass	*Lepidium campestre*
Field Pennycress	*Thlaspi arvense*
Garlic mustard	*Alliaria petiolata*
Rose Family	Rosaceae
Common Cinquefoil	*Potentilla simplex*
Rough Cinquefoil	*Potentilla norvegica*
Common Strawberry	*Fragaria virginiana*
Pea Family	Leguminosae
Panicled Tick-Trefoil	*Desmodium paniculatum*
White Clover	*Trifolium repens*
Birdfoot Trefoil	*Lotus corniculatus*
Crown Vetch	*Coronilla varia*

Red Clover	*Trifolium pratense*
Wood Sorrel Family	Oxalidaceae
European Wood Sorrel	*Oxalis eurpaea*
Spurge Family	Euphorbiaceae
Three-Seeded Mercury	*Acalypha virginica*
Touch-Me-Not Family	Balsaminaceae
Orange Jewelweed	*Impatiens capensis*
St. Johnswort Family	Guttiferae
Common St. Johnswort	*Hypericum perforatum*
Violet Family	Violaceae
Common Blue Violet	*Viola sororia*
Evening Primrose family	Onagraceae
Enchanter's Nightshade	*Circaea quadrisulcata*
Ginseng Family	Araliaceae
Wild Sarsaparilla	*Aralia nudicaulis*
Spikenard	*Aralia racemosa*
Carrot Family	Umbelliferae
Queen Anne's Lace	*Daucus carota*
Wintergreen Family	Pyrolaceae
Spotted Wintergreen	*Chimaphila maculata*
Indian Pipe	*Monotropa uniflora*
Heath Family	Ericaceae
Partridgeberry	*Mitchella repens*
Primrose Family	Primulaceae
Whorled Loosestrife	*Lysimachia quadrifolia*
Dogbane Family	Apocynaceae
Indian Hemp	*Apocynum cannabinum*
Vervain Family	Verbenaceae
White Vervain	*Verbena urticifolia*
Mint Family	Lamiaceae
Horse Balm	*Collinsonia canadensis*
Narrow Leaved Mountainmint	*Pycnanthemum tenuifolium*
Heal-all	*Prunella vulgaris*
Tomato Family	Solanaceae
Bittersweet Nightshade	*Solanum dulcamara*

Snapdragon Family	Scrophulariaceae
Common Speedwell	*Veronica officinalis*
Butter-and-Eggs	*Linaria vulgaris*
Common Mullein	*Verbascum thapsus*
Bluebell Family	Campanulaceae (Lobelioideae)
Indian Tobacco	*Lobelia inflata*
Composite (Sunflower and Aster) Family	Compositae
Galinsoga	*Galinsoga ciliata*
Common Ragweed	*Ambrosia artemisiifolia*
Oxeye Daisy	*Chrysanthemum leucanthemum*
Common Mugwort	*Artemesia vulgaris*
Pilewort	*Erechtites hieracium*
Early Goldenrod	*Solidago juncaea*
Canada Goldenrod	*Solidago canadensis*
Wrinkled Goldenrod	*Solidago rugosa*
Gray Goldenrod	*Solidago nemoralis*
Sweet Goldenrod	*Solidago odora*
Silverrod	*Solidago bicolor*
Fragrant Flat-topped Goldenrod	*Euthamia graminifolia*
Heartleaf Aster	*Aster cordifolius*
White Wood Aster	*Aster divaricatus*
Wavy-Leaved Aster	*Aster undulatus*
Purple-Stemmed Aster	*Aster puniceus*
Daisy Fleabane	*Erigeron annuus*
Boneset	*Eupatorium perfoliatum*
Upland Boneset	*Eupatorium sessilifolium*
Sweet Joe-Pye Weed	*Eupatorium purpureum*
Spotted Joe-Pye Weed	*Eupatorium maculatum*
White Snakeroot	*Ageratina altissima*
Burdock	*Arctium minus*
Bull Thistle	*Cirsium vulgare*
Wild Lettuce	Lactuca canadensis
Yarrow	*Achillea millefolium*
Chicory	*Cichorium intybus*
Field Thistle	*Cirsium arvense*
Orange Hawkweed	*Hieracium aurantiacum*
Yellow Hawkweed	*Hieracium caespitosum*
Common Dandelion	*Taraxacum officinale*
Milkweed Family	Asclepiadaceae
Common Milkweed	*Asclepias syriaca*
Butterfly Weed	*Asclepias tuberosa*
Grass Family	Graminae
Tall Oat Grass	Arrhenatherum elatius
Redtop	*Agrostis alba*
White Grass	*Leersia virginiana*
Deertongue Grass	*Panicum clandestinum*

Panicgrass species	*Panicum sp.*
Little Bluestem	Schizachyrium scoparius
Sweet Vernal Grass	*Anthoxanthum odoratum*
Sedge Family	Cyperaceae
Nutsedge species	*Cyperus sp.*
Broad-Leaved Sedge	*Carex platyphylla*
Green Bulrush	*Scirpus atrovirens*
Rush Family	Juncaceae
Path Rush	*Juncus tenuis*
Various Fern Families	
Marginal Wood Fern	*Dryopteris marginalis*
Marsh Fern	*Thelypteris thelypteroides*
New York Fern	*Thelypteris noveboracensis*
Lady Fern	Athyrium felix-femina
Sensitive Fern	*Onoclea sensibilis*
Christmas Fern	*Polystichum acrostichoides*
Hay Scented Fern	*Dennstaedtia punctilobula*
Bracken	*Pteridium aquilinum*
Interrupted Fern	*Osmunda claytoniana*
Cinnamon Fern	*Osmunda cinnamomea*
Clubmoss Family	Lycopodiaceae
Tree Clubmoss	Lycopodium obscurum

ATTACHMENT B

CEDAR GROVE TRAIL MAP

ATTACHMENT C

THE LENAPE TRAIL IN CEDAR GROVE

The Lenape Trail and its branches are shown on the trail map prepared by the Cedar Grove Environmental Commission in 2016. The map debuted in 2002 at the first annual Cedar Grove Trail Restoration and Environmental Awareness Day (TREAD).

The Lenape Trail

Traveling northeastward direction, it is convenient to enter the Lenape Trail at Durrell Street or Fairview Avenue in Verona, or west of Grove Avenue and Bradford Avenue in Cedar Grove. This section of the trail follows the West Essex Bikeway, an abandoned railroad line.

Continuing on the old rail trail, the Bikeway crosses Pompton Avenue on the steel bridge. The trail will continue directly across the Peckman River once the bridge is reconstructed. In the meantime, or if the bridge is inaccessible, turn left (north) before the bridge. Follow the yellow blazes along the Peckman River; cross the river on a pedestrian bridge, and then go through Community Park to rejoin the trail on the railroad grade.

Continue northeast and cross Bowden Road. Turn right at a double blaze about 500 feet past Bowden Road. Follow the yellow blazes eastward through a wooded area to Ridge Road. Cross Ridge Road and follow the trail around the north end of Newark's Cedar Grove Reservoir. Part of the trail is in Little Falls. You are now heading south, crossing Normal Avenue into Mills Reservation, and over First Mountain into Montclair.


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1:24000
LITTLE FALLS
Little Falls
School No 1
Passaic Valley High Sch
Great Notch
Sch No 2
CEDAR GROVE
PASSAIC CO
ESSEX CO
NORTH CALDWELL
North Caldwell
Swimming Pool
North End Sch
Meadow Village
Sewage Disposal
WATCHUNG MTN
SECOND
Cedar Grove
Cedar Grove Reservoir
Mills Reservation County Park
Town Hall
Cedar Grove Memorial Sch
Overbrook Hospital
St Catherine of Siena Ch
County Sanitarium
South End Sch
Brown Sch
County Penitentiary
Whitethorne High Sch
Verona
VERONA
Lanning Ave Sch
Edgemont Sch
Upper Montclair
St Cassian Sch
Mt Hebron Sch
St James Ch
Anderson Park
Bradford Sch
Friends Meeting Ho

Figure 1: Topographic map of Cedar Grove including Caldwell, Orange, Paterson, and Pompton Plains Quadrangles

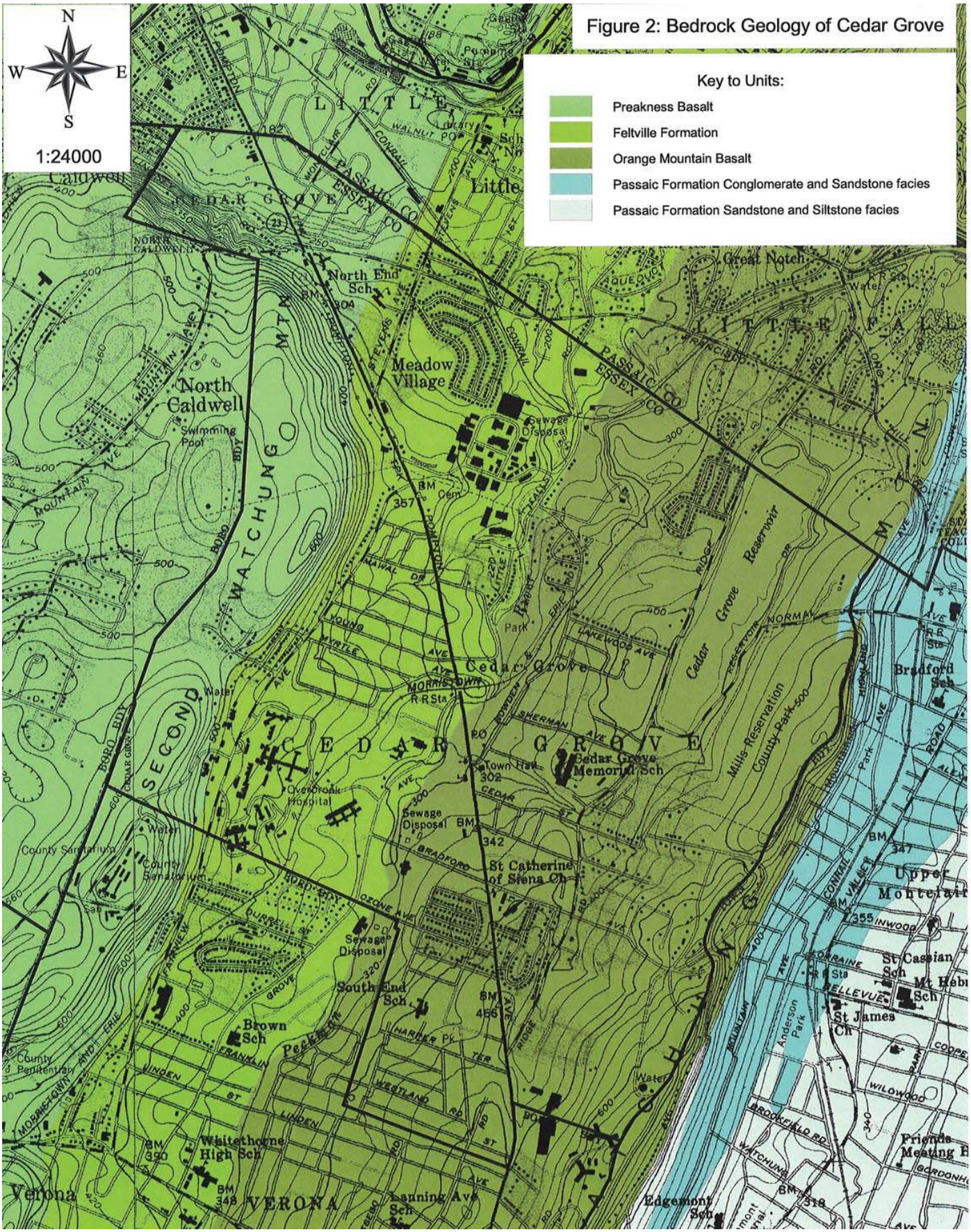
Figure 2: Bedrock Geology of Cedar Grove
Key to Units:
Preakness Basalt
Feltville Formation
Orange Mountain Basalt
Passaic Formation Conglomerate and Sandstone facies
Passaic Formation Sandstone and Siltstone facies
N
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1:24000
Caldwell
North Caldwell
Meadow Village
Little Falls
Great Notch
Cedar Grove
Verona
Upper Montclair
WATCHUNG MTN
SECOND WATCHUNG MTN
ESSEX CO
PASSAIC CO
Cedar Grove Reservoir
Mills Reservation
County Park
North End Sch
Swimming Pool
Sewage Disposal
Overbrook Hospital
County Sanatorium
County Penitentiary
Town Hall
Cedar Grove Memorial Sch
St Catherine of Siena Ch
South End Sch
Brown Sch
Whitehorne High Sch
Lanning Ave Sch
Bradford Sch
St Cassian Sch
St James Ch
Mt Hebron Sch
Friends Meeting H
Edgemont Sch
Anderson Park
Water
BM 304
BM 357
BM 342
BM 347
BM 355
BM 456
BM 390
BM 348
BM 318

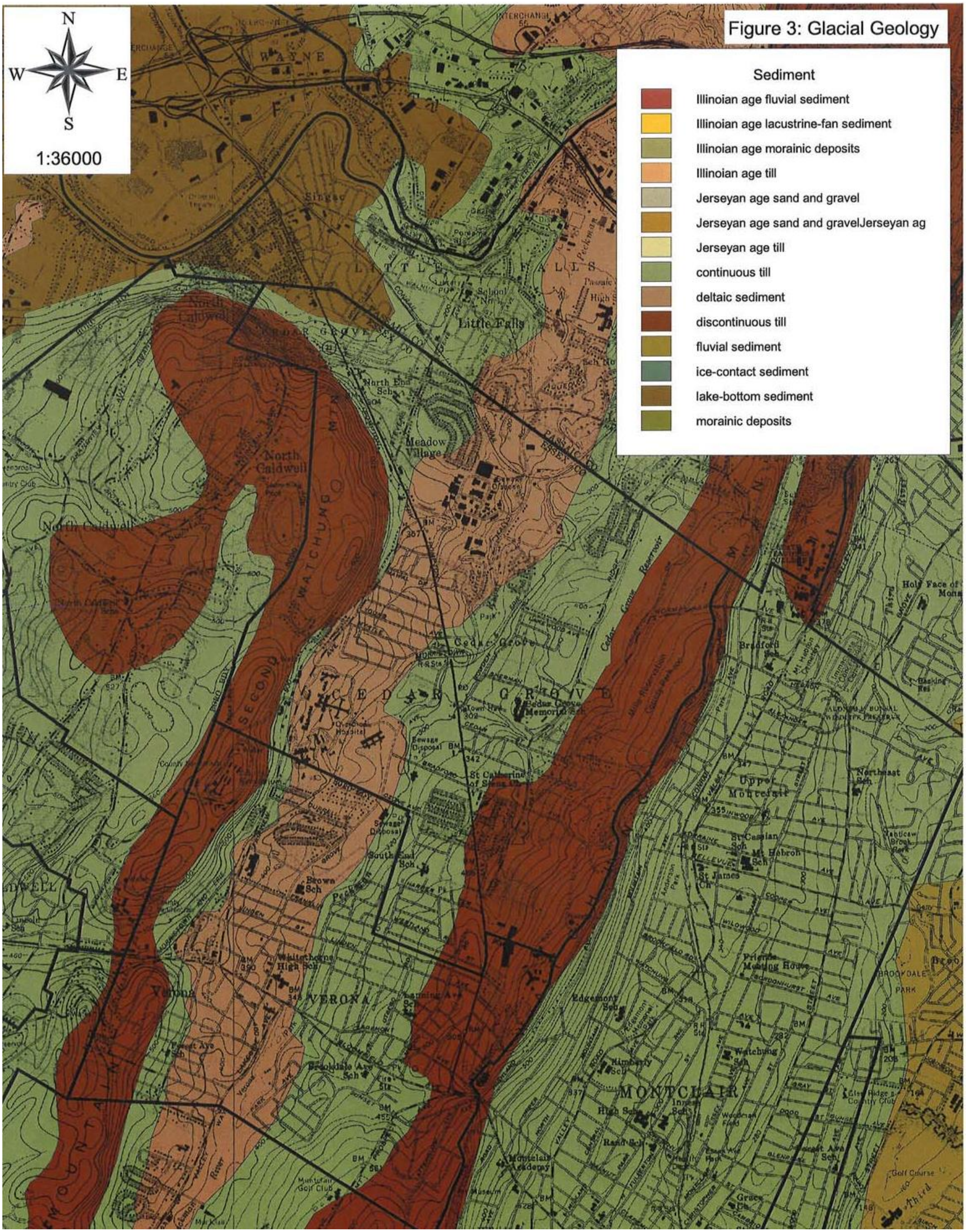
Figure 3: Glacial Geology
N
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1:36000
Sediment
Illinoian age fluvial sediment
Illinoian age lacustrine-fan sediment
Illinoian age morainic deposits
Illinoian age till
Jerseyan age sand and gravel
Jerseyan age sand and gravelJerseyan ag
Jerseyan age till
continuous till
deltaic sediment
discontinuous till
fluvial sediment
ice-contact sediment
lake-bottom sediment
morainic deposits
North Caldwell
Little Falls
Meadow Village
Cedar Grove
Verona
Upper Montclair
Montclair

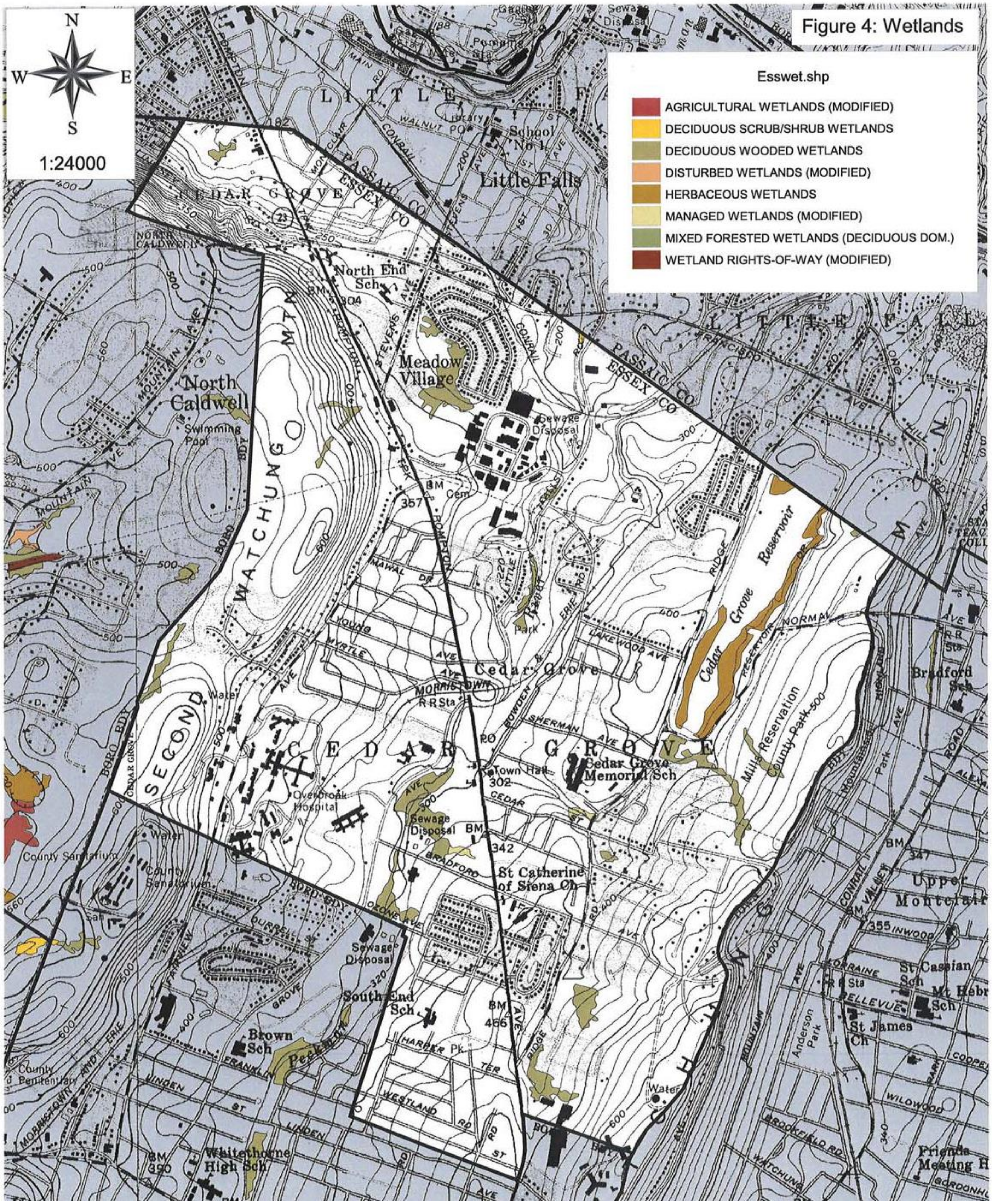
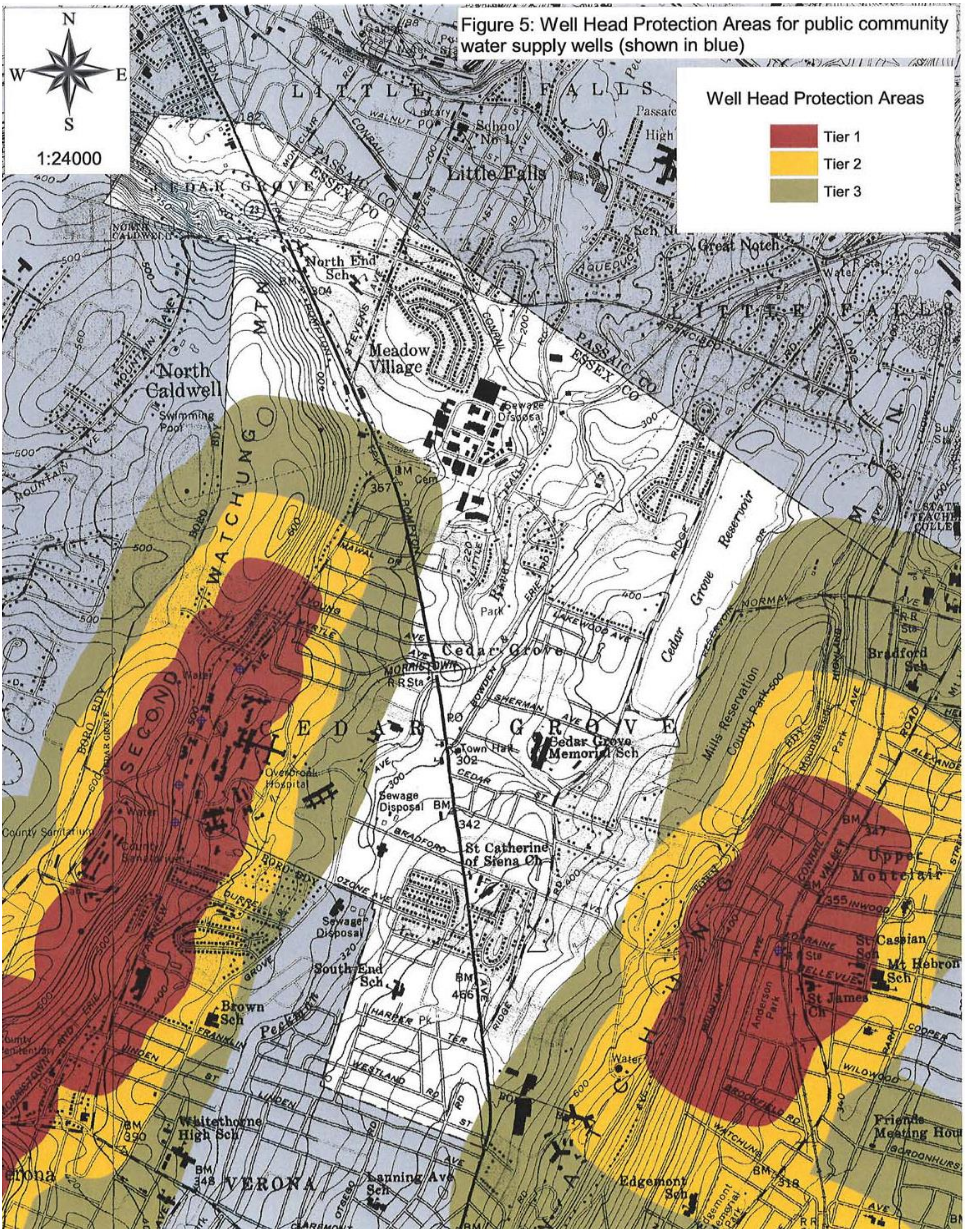


Figure 4: Wetlands
Esswet.shp
AGRICULTURAL WETLANDS (MODIFIED)
DECIDUOUS SCRUB/SHRUB WETLANDS
DECIDUOUS WOODED WETLANDS
DISTURBED WETLANDS (MODIFIED)
HERBACEOUS WETLANDS
MANAGED WETLANDS (MODIFIED)
MIXED FORESTED WETLANDS (DECIDUOUS DOM.)
WETLAND RIGHTS-OF-WAY (MODIFIED)
N
S
E
W
1:24000
CEDAR GROVE
Little Falls
North Caldwell
Meadow Village
SECOND WATCHUNG MTN
Cedar Grove Reservoir
Cedar Grove
Cedar Grove Memorial Sch
Mills Reservation County Park
St Catherine of Siena Ch
Overbrook Hospital
Brown Sch
Whitethorne High Sch
Upper Montclair
Bradford Sch
St James Ch


N
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1:24000
Well Head Protection Areas
Tier 1
Tier 2
Tier 3
LITTLE FALLS
Little Falls
CEDAR GROVE
North Caldwell
Meadow Village
Cedar Grove Reservoir
Cedar Grove
SECOND WATCHUNG MTN
Mills Reservation County Park
Upper Montclair
VERONA
Great Notch
Brown Sch
Whitethorne High Sch
Edgemont Sch
St Catherine of Siena Ch
Cedar Grove Memorial Sch
Overbrook Hospital
County Sanatorium
Bradford Sch
St Cassian Sch
Mt Hebron Sch
St James Ch
Anderson Park
Lanning Ave Sch
South End Sch
North End Sch
Figure 5: Well Head Protection Areas for public community water supply wells (shown in blue)